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# *Development of Emission Factors for the Rubber Manufacturing Industry*

***Volume 1: Emission Factor Program Results - Final Report***

*Volume 3: Test Program Protocol - Jan '95*

***Presented to***

**Rubber Manufacturers Association**



***Presented by***

**TRC**

**TRC Environmental Corporation**

***May 1995***

*Vol 1 revised  
submitted by Dale  
Lowe at 6-12-95  
meeting*

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May 1995

DEVELOPMENT OF EMISSION FACTORS  
FOR THE  
RUBBER MANUFACTURING INDUSTRY

Volume 1

Emission Factor Program Results  
Final Report

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## DEVELOPMENT OF EMISSION FACTORS FOR THE RUBBER MANUFACTURING INDUSTRY

### OVERVIEW

The contributions of the members of the Environment Committee of the Rubber Manufacturers Association in the preparation of this document are hereby gratefully acknowledged.

\*\*\*\*

The Rubber Manufacturers Association is a cooperative manufacturing trade association with more than 150 member companies. While RMA member companies are bound together by a common denominator—basic raw materials—the membership embraces several industries with often dissimilar problems. For this reason, the services of the RMA are organized into five business groups including: General Products, Information and Statistics, Public Affairs, Technical and Standards, and Finance and Administration. The goals of these groups are to: 1) serve as a forum for exchange of information with and among member companies on issues of common concern, and in areas of common interest; 2) provide a single voice for the industry in dealing with its publics, including government, consumers, and the general public; 3) monitor, recommend and promote the industry viewpoints on legislative and regulatory issues of concern, and investigate and report on the potential impact of these issues on the rubber industry; 4) coordinate formulation of industry positions on domestic and international standards; and 5) establish and maintain close working relationships with other organizations which share common interests and concerns.

\*\*\*\*

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The companies which have participated in the Rubber Manufacturers Association Emission Factors Project are presented on the following page.

The following companies are participants in the RMA Emission Factors Development Project.

Abbott Laboratories  
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Albert Trostel Packings, Ltd.  
Akron Rubber Lining  
Ames Rubber Corporation  
Ashtabula Rubber Company  
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Bando Manufacturing of America, Inc.  
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Bridgestone/Firestone, Inc.  
Buckhorn Rubber Products, Inc.  
Cadillac Rubber & Plastics, Inc.  
Carlisle Tire & Rubber Company,  
Division of Carlisle Corp.  
Caterpillar, Inc.  
Central Rubber Company  
Chardon Rubber Company  
Chicago-Allis Manufacturing Company  
Clevite Elastomers, a Pullman  
Company  
Continental General Tire Inc.  
Cooper Tire & Rubber Company  
CR Industries  
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Custom Rubber Corporation  
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Dayco Products, Inc.  
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Garlock Mechanical Packing, Division  
of Colt Industries  
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Schlegel N.A.A.O.  
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The Goodyear Tire & Rubber Company  
The Standard Products Company  
Titan Industries  
Toyo Tire (U.S.A.) Corporation  
Trellex Morse, Division of Svedala  
Industries, Inc.  
Truflex/Pang Rubber Products  
Company  
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Waukesha Rubber Company, Inc.  
West American Rubber Company, Inc.  
Western Consolidated Technologies  
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## SECTION 1 INTRODUCTION

### 1.1 Program Overview and Objectives

The Clean Air Act Amendments (CAAA) of 1990 contain a variety of new programs and approaches designed to reduce emissions of hazardous air pollutants (HAPs), improve urban air quality and to control the precursors of acid rain (**Reference 1**). EPA and the state/local air agencies now have at their disposal an expanded authority base to meet the CAAA objectives including an expanded array of enforcement tools. As the CAAA implementation moves forward, industry will be faced with numerous complex and burdensome air compliance issues.

On July 21, 1992, EPA promulgated the Operating Permit Rule (**Reference 2**), which represents an expanded and very different approach to permitting air emission sources. The operating permit program commonly referred to as *Title V* is a national program which is now being implemented on a state by state (and in the case of California, county by county) basis. In other words, each state has been charged with developing and implementing a federally enforceable operating permit program which meets or exceeds the CAAA requirements.

Title V now requires each facility which exceeds major source thresholds to secure a facility wide permit. The Title V program defines major source applicability on the basis of **potential to emit**. All facilities which have the **potential to emit** more than any of the following must secure a facility operating permit:

- 100 tons/year of a criteria pollutant except in selected urban areas where the threshold can be as low as 10 tons/year
- 10 tons/year of a single HAP or 25 tons/year in aggregate of any listed HAPs

Title V requirements represent a significant departure from past state permitting programs which addressed some but not all sources at a facility on a process by process basis. Before the federal 1990 CAAA, fewer than 20 pollutants were federally regulated. Now there are in excess of 200 regulated pollutants when taking into account additional state air toxics requirements.

To prepare a facility Title V permit, there are several tasks which must be completed. One such activity is the development of the plant emissions inventory which is the largest part of the permitting effort and also one of the areas where accuracy is critical. An inaccurate inventory can result in future compliance problems.

The key to producing an accurate inventory is contingent upon the availability of sound emissions data or emission factors for each process in a facility. These factors coupled with commonly archived process and production data are used to calculate emissions and produce the inventory.

Unfortunately, emission factors have not been established by EPA or the states for many industrial processes, including the rubber manufacturing industry. In the absence of established emissions factors or readily available emissions data, EPA and the states typically adopt the fallback position of requiring emissions testing for each significant process within a facility, an endeavor which is expensive in addition to being very complex.

As a result of the lack of documented emissions factors for the industry, the Rubber Manufacturers Association (RMA), on behalf of its membership, embarked on a large project to address the emission factor issue. Specifically, the objectives of the project were as follows:

- Develop emission factors for the commonly used rubber manufacturing processes;
- Develop a consistent applications approach for developing plant-wide emissions inventories;
- Develop a standard protocol for estimating emissions related to future process changes;
- Provide background information for addressing Title V record keeping and compliance demonstration requirements;
- Provide support for addressing future enhanced monitoring requirements;
- Provide information sufficient to address equipment scale differences;

An intense testing-based project was conducted which resulted in emission factors for the commonly used rubber compounds and processes. The results of the project and the emission factors now available are discussed in the remainder of this report.

## **1.2 Emission Factor Project Definitions**

The following is a brief list of key definitions which define pollutant categories measured in the test program, as well as terminologies which will assist the reader in interpreting the emission factor data provided in this volume.

1. *Total Speciated Volatiles:* The sum of the target volatile organic compounds as well as those compounds tentatively identified during a mass spectral library search.
2. *Total Speciated Semivolatiles:* The sum of the target semivolatile organic compounds as well as those compounds tentatively identified during a mass spectral library search.
3. *TVOC:* Total volatile organic compounds measured as total hydrocarbons (THC) calibrated to a methane standard. Measurements were made on a continuous basis using a THC analyzer in accordance with EPA Reference Method 25A.

4. *Total Metals:* The sum of the target analytes detected. The target analytes are cadmium, chromium, copper, lead, magnesium, nickel and zinc.
5. *Total Sulfur:* The sum of the target sulfur compounds detected during sample analysis using gas chromatography flame photometric detection (GC/FPD).
6. *Total Speciated Organics,* as used in the summary and speciation tables: The total speciated organic compounds measured in the test program. It is the sum of the semivolatile and volatile emissions for a given rubber compound minus any duplicate compounds. Where there is duplication of a chemical compound in the analyte list, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.
7. *Speciation Factors:* The fraction, by weight, of a particular compound to the total for a specific pollutant category. For example, a speciation factor for benzene is determined by dividing the measured benzene emissions by the total speciated organic compound emissions (total speciated organics is defined above).
8. *Volatile Organic Compounds (VOCs)* as defined for permitting requirements is based on the EPA definition cited in 52.21:

*Volatile Organic Compounds (VOC) means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate which participates in atmospheric photochemical reactions. This includes any organic compound other than the following which have been determined to have negligible photochemical reactivity:*

- (a) Methane (CAS 74-82-8);
- (b) Ethane (CAS 74-84-0);
- (c) 1,1,1-Trichloroethane (CAS 71-55-6);
- (d) Methylene Chloride (CAS 75-09-2);
- (e) Trichlorofluoromethane (CAS 75-69-4);
- (f) Dichlorodifluoromethane (CAS 75-71-8);
- (g) Chlorodifluoromethane (CAS 75-45-6);
- (h) Trifluoromethane (CAS 75-46-7);
- (i) Trichlorotrifluoroethane (CAS 76-13-1);
- (j) Dichlorotetrafluoroethane (CAS 76-14-2);
- (k) Chloropentafluoroethane (CAS 76-15-3);
- (l) Dichlorotrifluoroethane (CAS 306-83-2);
- (m) Tetrafluoroethane (CAS 811-97-2);
- (n) Dichlorofluoroethane (CAS 1717-00-6);
- (o) Chlorodifluoroethane (CAS 75-68-3);
- (p) Chlorotetrafluoroethane (CAS 2837-89-0);
- (q) Pentafluoroethane (CAS 354-33-6);
- (r) Tetrafluoroethane (CAS 359-35-3);

- (s) Trifluoroethane (CAS 420-46-2);
- (t) Difluoroethane (CAS 75-37-6);
- (u) Perchloroethylene (CAS 127-18-4); and,
- (v) the following 4 classes of Perfluorocarbon compounds:
  - (1) Cyclic, branched, or linear, completely fluorinated alkanes;
  - (2) Cyclic, branched, or linear, completely fluorinated ethers with no unsaturation;
  - (3) Cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturation; and
  - (4) Sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine.

### 1.3 Emission Factor Summary

Generic rubber compounds were used for the mixing/milling, platen press, extruder, autoclave, and warmup mill tests. Data for the calendaring, grinding, and tire cure processes were generated in actual manufacturing settings. For tire curing, actual tires from several of the participating companies were used.

*Hot Air  
Cure -?*

A summary of the average emission factors for each compound class are presented in Table 1-1. The data presented in this table are average emission factors for all runs conducted for each process. These averages are presented to provide an overview of the relative contribution of each process. Actual emission factor tables for a specific manufacturing process require a knowledge of the type of rubber formulation being utilized. In addition, graphic representations of the relative magnitudes of emissions for each process are provided in Figures 1-1 and 1-2. Emissions for carcass grinding, belt grinding, and sidewall grinding are presented separately in Figure 1-2 because the units for the emission factor (lb/lb rubber removed) are different than the other processes which are in terms of lb pollutant/lb rubber processed.

### 1.4 Report Series Format

The report for this project is presented in three volumes which are entitled as follows:

- Development of Emissions Factors for the Rubber Manufacturing Industry

--Volume 1

Emission Factor Program Results

Table 1-1. Summary of Results--Showing Relative Contribution by Process on an Overall Average Basis--  
(lb Pollutant/lb Rubber)<sup>1,2</sup>

| Process                            | # Compounds<br>or Components<br>Tested | Total VOC<br>as Methane | Total<br>Speciated<br>Volatiles | Total<br>Speciated<br>Semivolatiles | Total<br>Metals | Total<br>Sulfur | Total<br>Amines | Total<br>Particulate<br>Matter |
|------------------------------------|----------------------------------------|-------------------------|---------------------------------|-------------------------------------|-----------------|-----------------|-----------------|--------------------------------|
| Mixing/Milling                     | 26                                     | 1.01E-04                | 8.28E-05                        | 2.86E-06                            | 1.90E-05        | 6.25E-06        | n/a             | 2.86E-04                       |
| Internal Mixer Control             | 1                                      | 7.75E-06                | 4.30E-05                        | 1.64E-06                            | 2.23E-04        | 2.47E-07        | n/a             | 2.62E-03                       |
| Extrusion                          | 4                                      | 1.39E-05                | 2.63E-05                        | 9.10E-06                            | 1.06E-05        | 2.79E-08        | n/a             | 1.44E-05                       |
| Tire Curing                        | 10 <sup>7</sup> <sup>9</sup>           | 2.26E-04                | 1.50E-04                        | 1.31E-05                            | n/a             | 5.36E-06        | 4.27E-08        | n/a                            |
| Platen Press Curing                | 11 <sup>7</sup> <sup>17</sup>          | 6.14E-04                | 2.41E-03                        | 1.13E-04                            | n/a             | 2.14E-04        | n/a             | n/a                            |
| Hot Air Oven Curing                | 3                                      | 2.16E-04                | 1.46E-03                        | 6.65E-04                            | n/a             | 1.14E-03        | n/a             | n/a                            |
| Autoclave Curing <sup>3</sup>      | 10 <sup>(27)</sup> <sup>(27)</sup>     | 1.50E-04                | 6.38E-04                        | 2.48E-04                            | n/a             | 2.98E-04        | 1.01E-08        | n/a                            |
| Warmup Mill - Eng. Prod. - 3 runs  | 1                                      | 1.71E-06                | 9.31E-07                        | 7.02E-09                            | n/a             | 1.42E-07        | n/a             | n/a                            |
| Warmup Mill - Tires                | 3                                      | 1.02E-04                | 1.94E-05                        | 2.32E-05                            | n/a             | 5.81E-07        | n/a             | n/a                            |
| Calendering - Eng. Prod.           | 1 <sup>✓</sup>                         | 4.67E-06                | 4.14E-06                        | 3.09E-08                            | n/a             | 2.04E-06        | n/a             | n/a                            |
| Tire Calendering                   | 2 <sup>7</sup> <sup>17</sup>           | 5.31E-05                | 6.89E-05                        | 3.51E-06                            | n/a             | 1.53E-06        | n/a             | n/a                            |
| Sidewall Grinding <sup>4</sup>     | 3 <sup>runs</sup>                      | 1.57E-02                | 9.90E-03                        | 5.31E-04                            | 2.07E-02        | 0.00E-0         | n/a             | 1.25E-01                       |
| Tire Carcass Grinding <sup>4</sup> | 3                                      | 5.18E-04                | 1.57E-02                        | 6.25E-04                            | 1.38E-02        | 9.99E-06        | n/a             | 5.45E-01                       |
| Retrack Buffing <sup>4</sup>       | 3                                      | 2.40E-04                | 9.96E-06                        | 9.99E-06                            | 9.51E-05        | 9.04E-07        | n/a             | 9.48E-03                       |
| Belt Grinding <sup>4</sup>         | 3                                      | 1.79E-03                | 2.46E-03                        | 1.35E-04                            | 4.79E-02        | 2.12E-02        | n/a             | 1.19E+00                       |

Note: These are averages of pollutant categories and are only provided to appraise the reader of the relative contribution of each process to facility emissions. These are not to be used in the development of emissions inventories.

<sup>1</sup>Sidewall grinding, tire carcass grinding, and belt grinding factors are lb pollutant/lb rubber removed. All other factors are lb pollutant/lb rubber processed.

<sup>2</sup>Table 2-3 details the test methods used for each process.

<sup>3</sup>Emission factors are for noncontact steam systems and include the water phase concentrations.

<sup>4</sup>Process includes a control device(s). However, factors provided in this table are before control, indicating the process's potential to emit.

n/a =

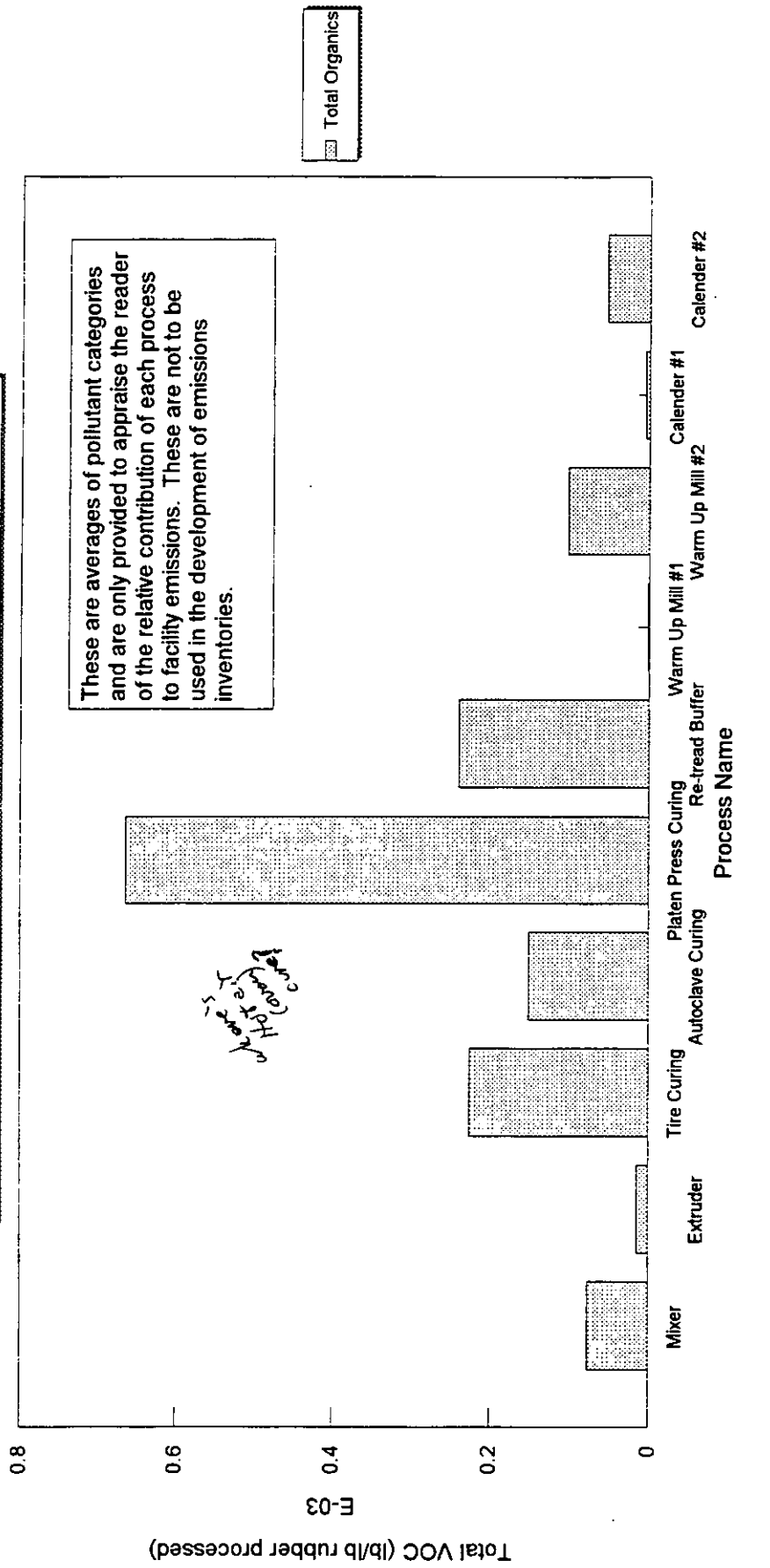
L95-035.1

1-5

Same value as in table 4.12-12

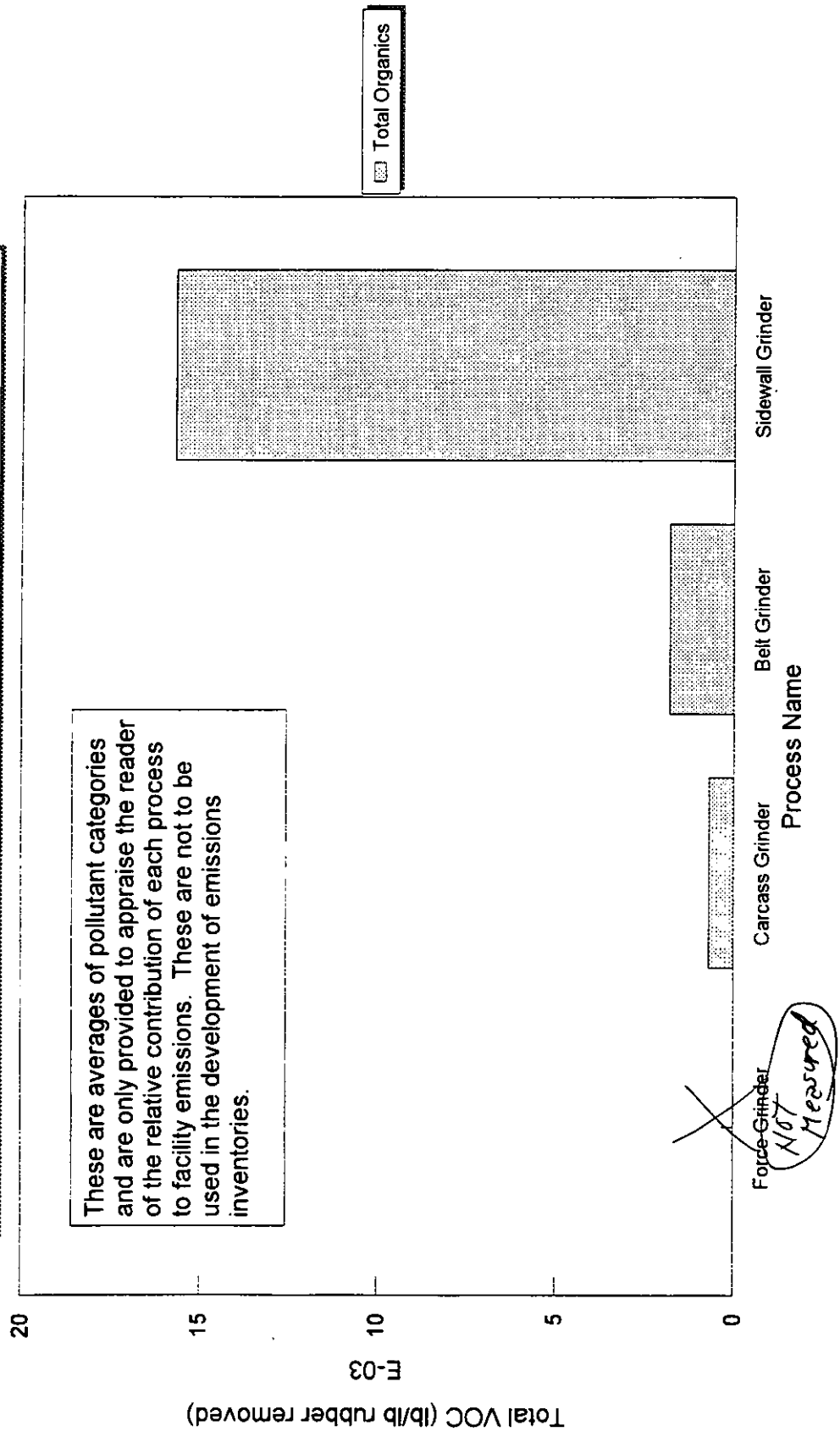
Large! 4 refers mg/m<sup>3</sup> table 4.12-12

Figure 1-1. - Relative Comparison of Emissions from Each Process



| Average Temperature |        |                     |        |                                   |        |
|---------------------|--------|---------------------|--------|-----------------------------------|--------|
| Warm Up Mill #1     | 175 °F | Mixing (Productive) | 220 °F | Mixing (Non-Productive)           | 335 °F |
| Calender #1         | 190 °F | Extruder            | 260 °F | Autoclave/Platen Press/Tire Press | 340 °F |
| Warm Up Mill #2     | 200 °F | Calender #2         | 265 °F |                                   |        |

**Figure 1-2. - Relative Comparison of Emissions from Grinding Processes**



--Volume 2            Project Data  
--Volume 3            Test Program Protocol

The results of this project are presented in the following sections of this volume (Volume 1). Section 2 presents the detailed approach employed to develop factors appropriate for use by the industry while Section 3 follows up with the details of the actual process equipment used to conduct the project. A discussion of the results are presented in Section 4 along with a discussion of the data analysis techniques employed.

Section 5 provides a detailed explanation recommending how to utilize the factors for facility specificity. Finally, this volume is summarized with Section 6 which presents conclusions and recommendations.

## SECTION 2

### EMISSIONS FACTOR DEVELOPMENT APPROACH - ?

#### 2.1 General Process Description

Many of the rubber manufacturing facilities in the United States produce pneumatic tires for automobile, trucks, airplanes and farm machinery. However, the majority of rubber manufacturing facilities produce other engineered rubber products. The processes involved in these industries are very similar. Differences basically consist of the raw rubber material (natural or synthetic) used, the chemical additives, and the type of curing employed. The following is a description of a generic rubber manufacturing facility applicable to both tire and other manufactured rubber products, except where noted. Figure 2-1 shows a process schematic of a typical tire manufacturing facility for reference.

The manufacturing of rubber products involves several processing steps. Initially, the raw rubber (natural or synthetic) is mixed with several additives which are chosen based upon the desired properties of the final product. The mixed rubber is often milled and transferred to an extruder where it can be combined with other rubbers. Many rubber products contain synthetic fabric or fibers for strengthening purposes. These fibers are typically coated with mixed rubber using a calendering machine. The extruded rubber and rubber coated materials are then assembled into its final shape and cured. It is during the curing process that the rubber vulcanizes (crosslinks), producing the characteristic properties of finished rubber. Once the final product is cured, it is often ground to remove rough surfaces and/or to achieve symmetry.

Mixing consists of taking the raw rubber and mixing it with several chemical additives. These additives consist of an accelerator (accelerates the vulcanization rate), zinc oxides (assists in accelerating vulcanization), retarders (prevents premature vulcanization), antioxidants (prevents aging), softeners (facilitates processing of the rubber), carbon black or other fillers (reinforcing/strengthening agents), and inorganic or organic sulfur compounds (vulcanizing agent).

Mixing is typically performed in an internal batch mixer. The internal mixer contains two rotors which shear the rubber mix against the wall of the vessel. Internal mixing is performed at elevated temperatures up to approximately 356°F.

The processing of the rubber mixes is performed in either a non-productive or productive mode, or both. In nonproductive mode, all of the materials are mixed with the exception of the accelerators and sulfur compounds. This mixed rubber is then stored until needed and then the accelerators and sulfur are added to the mix. During the productive mode, the accelerators and sulfur compounds are added to the mix for immediate processing through completion of the final product.

In addition to the operations described above, one other variable was examined to determine its effect upon the emissions. The addition of carbon black to a mix creates the potential for carbon black particulate to escape to the atmosphere. These airborne particles may provide

} - ? why here

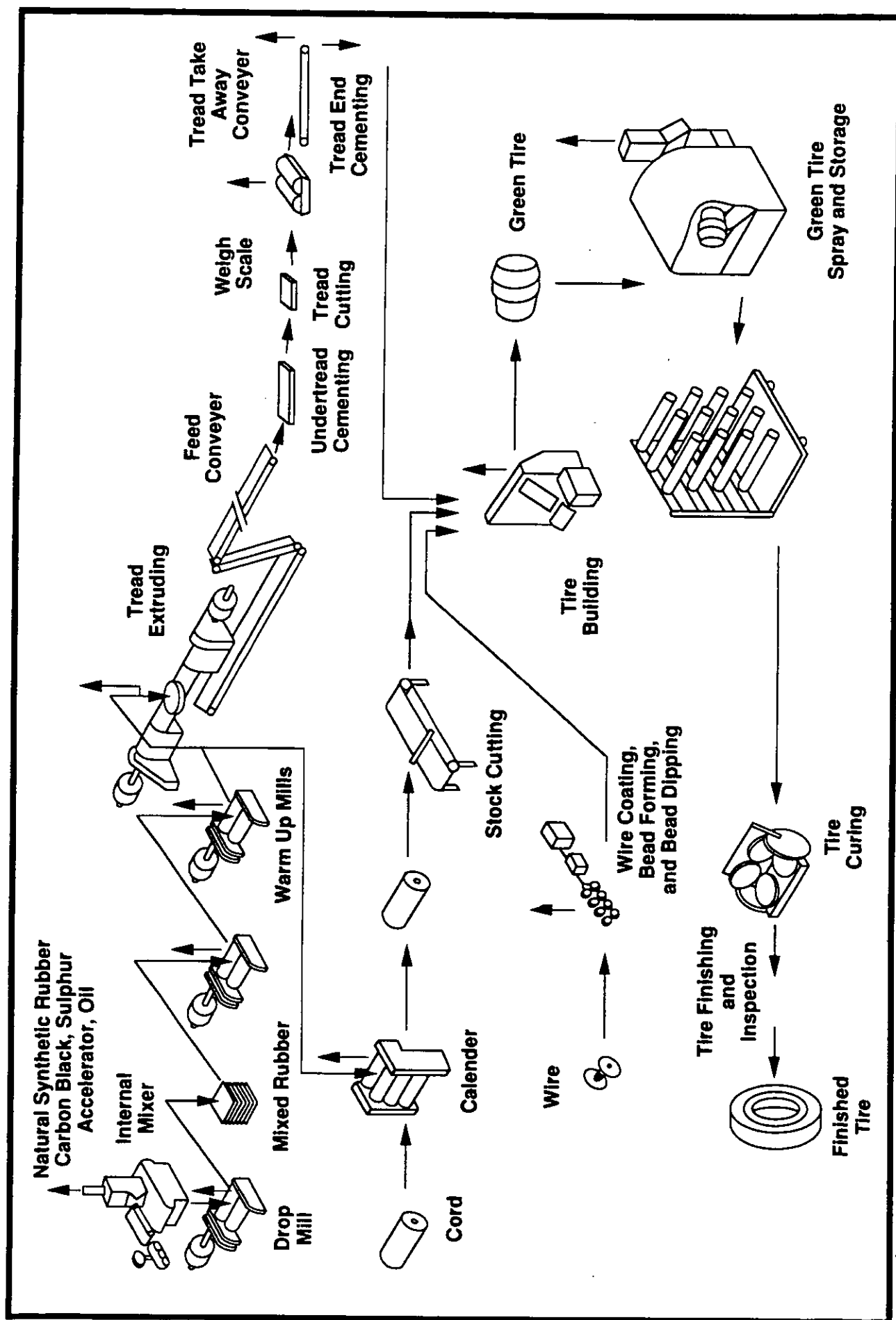


Figure 2-1. Example Tire Manufacturing Facility.

additional surface area for higher molecular weight compounds to adsorb or condense, thereby reducing the emissions from the process.

Once the rubber is properly mixed, it can be extruded. Extrusion is often performed to combine several types of previously mixed rubber compounds. The extruder consists of a power driven screw within a stationary cylinder. A die is attached to the head of the screw to produce the desired shape or cross section of the extruded rubber. Extrusion can be performed with both warm or cold rubber feed. The extruder is jacketed to maintain the desired operating temperature.

Calendering is often used in the rubber manufacturing industry to apply a rubber coat onto synthetic or steel fibers. These calenders employ either 3 or 4 rolls and are hollow to allow for heating or cooling. The openings between the rolls can be adjusted to control the coating thickness. An example of calendering is in the manufacturing of radial tires where synthetic fibers are rubber coated and subsequently combined with rubber stock to create a more durable product.

The final <sup>?</sup> step in manufacturing of rubber <sup>?</sup> products is vulcanizing (curing). There are three predominant vulcanizing processes: ~~press~~ <sup>press</sup> mold curing, autoclave curing, and hot air curing. Press mold curing uses high temperature and pressure to cure the final product. The high pressure (600-10,000 psi) forces the rubber to conform to the shape of the mold. Press mold curing is used in tire and engineered products manufacturing.

Tire Cure?

Autoclave curing utilizes saturated steam at an elevated pressure to cure the rubber mix. Unlike press mold curing, the product is formed into its final shape prior to the curing process. Autoclave curing is the predominant curing method in non-tire rubber manufacturing facilities.

Hot air curing entails passing uncured, green engineered products through a chamber with a heated atmosphere. Temperature and residence times may vary, depending on the product type and formulation. As with the autoclave curing, these products have already been formed into their final shape prior to undergoing the curing process.

Grinding is often performed to remove rough edges and other blemishes from the final product or in some cases to actually form and shape the product. The ground rubber is occasionally recycled and utilized as filler in some rubber manufacturing processes. In the tire manufacturing industry, grinding is performed to balance the tire and also to expose the white sidewall or lettering. ~~Relative to~~ <sup>Relative to</sup> the engineered products industry, grinding may actually be used to obtain the correct shape of the final product such as the final shaping of drive belts.

## 2.2 Equipment Scale Considerations

Emissions testing was performed on several sizes of similar process equipment. These size differences are the most profound on the sizes of internal mixers tested. Emissions tests were performed on internal mixers ranging from a 2 pound laboratory mixer, to a 200 pound pilot

scale system up to a 500 pound production mixer. On a pound pollutant emitted per pound of rubber mixed basis, emissions were not observed to be dependent on mixer size. This is especially true for the volatiles and semivolatile emissions. There was greater variability of metals emissions which is most likely the result of greater particulate losses into the ventilation system on the larger mixers during charging than is experienced on smaller scale equipment.

how was  
it  
handled?

Since there were no direct correlation to process equipment size and emissions, no scaling factors were developed for equipment size.

### 2.3 Selection of Compounds and Target Pollutants

The initial step necessary in developing emission factors is to identify which pollutants are emitted to the atmosphere from the process. Previous investigations into the emissions from rubber manufacturing show that the predominant emissions are low molecular weight organic compounds ( $C_6$ - $C_8$ ). However, the potential for heavier, less volatile organic compound emissions also exists due to the chemistry and the elevated temperatures of many of the processes. Particulate matter emissions can also be significant, especially during the mixing process when carbon black is added to the mix.

Title III of 1990 CAAA lists 189 HAPs. Many of these are applicable to the rubber manufacturing industry. In addition, many states where rubber manufacturing facilities operate have developed their own HAP lists. Since the Title V operating program will be administered by the individual states, there exists the possibility that facilities will need to conduct emission inventories for all of the HAPs in Title III as well as on the state lists. A combined HAP list has been developed from Title III, state HAP lists, as well as the SARA 313 toxic chemical list. All compounds on this combined list (shown in Appendix A) which have the potential to be emitted from the selected processes, have been targeted by this program.

The emissions from each process change depending upon the type of rubber used (natural or synthetic) and the specific additives (metal oxides, accelerators, retardants, antioxidants, softeners, fillers, and vulcanizing agents) in the mix. The emissions vary due to the physical properties of the raw rubber, the physical characteristics of the processes, chemical additives, and the reaction chemistry of the processes. Some historical emissions data is available, although it is not comprehensive. These data have served as a starting point for developing the final target compound list.

The tire manufacturing industry principally uses natural rubber, styrene-butadiene (SBR) rubber, and polybutadiene rubber. Polybutadiene is often mixed with SBR to improve the abrasion and cracking resistance of the tire. For non-tire rubber goods where oil resistance is a priority, rubbers such as polyacrylates, nitrile, neoprene, polyurethanes, epichlorohydrins, chlorosulfonated polyethylene, chlorinated polyethylene, and fluoroelastomers are used. Potential emissions from these rubbers consist of breakdown compounds such as the monomers used to create the rubber.

Accelerators are added to the mix to speed up the vulcanization rate. Typical accelerators are metal oxides (zinc oxide, lead oxide, and magnesium oxide) and a large variety of organic accelerators. These organic accelerators are typically from the following classes of organic compounds: benzothiazoles, benzothiazolesulfonamides, dithiocarbamates, dithiophosphates, guanidines, thioureas, and thiurams.

Antioxidants help to prevent oxidation (aging) of the vulcanized product. Antioxidants are usually high molecular weight amine compounds such as dioctylated diphenylamine. The potential for amine emissions exists upon the degradation of this compound during processing.

Retarders are used to prevent the premature vulcanization (scorching) of the rubber during processing. Retarders currently in use mainly consist of organic acids (salicylic and benzoic acids), phthalic anhydride, and N-(cyclohexylthio)phthalimide. Again, the potential emissions consist of the retarders themselves along with their thermal breakdown components.

Softeners are used to increase the workability of the mix for lubrication during extrusion and molding and, to aid in the dispersion of fillers. The predominant softener used in the rubber industry is petroleum oil. The potential emission compounds from petroleum oil are extensive. The majority of the compounds would most likely be aromatic hydrocarbons of various sizes and types.

Fillers are added to the rubber mix for several reasons. Fillers provide color but are mainly used to reinforce the final product. Fillers are fine particles which increase the abrasion resistance and tensile strength of the product. Carbon black is used as the primary filler in tire manufacturing. Rubber goods requiring a color other than black use numerous types of inorganic fillers. Due to the extremely fine particle size of fillers, they are easily emitted to the atmosphere during mixing.

Sulfur compounds comprise the vast majority of vulcanizing agents currently used. Sulfur can be added as elemental sulfur or within inorganic or organic sulfur compounds. The presence of sulfur and the high temperatures involved in the processes creates the possibility of sulfur compounds such as carbon disulfide to be emitted.

The available historical data for emissions from rubber manufacturing consists mainly of a doctoral thesis presented by Dr. Stephen Rappaport at the University of North Carolina in 1976 (**Reference 3**). Dr. Rappaport conducted a laboratory study of C<sub>6</sub>-C<sub>25</sub> organic compound emissions from the curing of one type of rubber stock used in tire manufacturing. The rubber stock was a mixture of SBR and polybutadiene rubbers along with the necessary chemical additives. The results of Dr. Rappaport's study showed that a large number of cyclic (aromatic) organic compounds were emitted. Although these results are informative, the study was conducted on only one type of rubber mix using a simulated press mold cure. The potential for hazardous compounds to be emitted, other than those discovered by Rappaport, is considerable.

Since the publishing of the Rappaport study, others have confirmed the presence of similar pollutants. Studies conducted by Trelleborg Industri AB confirmed the presence of nitrosamine compounds in laboratory scale curing tests of certain formulations (**Reference 4**).

Similarly, Willoughby et. al. of RAPRA through the development of the FUME data base corroborates the results of the aforementioned studies (**Reference 5**).

Twenty six rubber compounds/mixtures were studied in this program as summarized in Table 2-1. These include four specific tire-related mixtures: ① tread mixture, ⑤ "sidewall mixtures", ④ styrene-butadiene rubbers (SBR), and ③ ethylene-propylene-diene-mixture (EPDM) terpolymers. Thirteen other compounds/mixtures were also studied.

= 13  
+ 13

25

| Typical Tire Compounds | Typical Engineered Products Compounds |
|------------------------|---------------------------------------|
| Tire Inner Liner       | Hypalon                               |
| Tire Ply Coat          | Fluoroelastomer                       |
| Tire Base / Sidewall   | VAMAC                                 |
| Tire Apex              | Hydrogenated Nitrile                  |
| Tire Tread             | Silicone                              |
| Tire Curing Bladder    | Acrylate Rubber                       |
| ⑥                      | Chlorinated Polyethylene              |
|                        | Epichlorohydrin                       |
|                        | SBR                                   |
|                        | EPDM                                  |
|                        | Neoprene                              |
|                        | Nitrile ⑫                             |

there are 7 missing?

The formulations studied during this program and their recipes are provided in Volume 2 - Project Data, Section 1. The composition of these mixes were examined against the combined HAP list (Appendix A of Volume 3 - Test Program Protocol) generated from Title III, state air toxic lists, and SARA 313 toxic chemical list. The target compounds for the emission factor development program are the list of 189 HAPs, in addition to total VOCs and other pollutants prevalent in typical rubber manufacturing processes.

## 2.4 Description of Sampling / Analytical Regimes

The ten processes tested are summarized in Table 2-2 and the test methods employed are shown in Table 2-3: tire press, oven cure of tire cuts, autoclave, extruder, internal mixers, grinding, platen press, calender, warmup mill, and oven cure of engineered products. Nine of the processes were tested for: total volatile organic compounds, speciated volatiles, volatile ozone precursors, sulfur compounds, and semivolatile organic compounds. Two processes (tire press and autoclave) were tested for amines. Four processes (tire press, oven cure of tire cuts, extruder, and some grinding processes) were tested by Fourier transform infrared spectroscopy (FTIR). Three processes (extruder, internal mixers, and grinding) were tested for particulate matter and metals.

To accurately quantify the emissions from each process, the emissions tests were conducted using enclosure methodologies to ensure that all emissions were captured. The design of each enclosure was based upon the criteria in EPA Method 204 for a total enclosure. Figures 2-2 and 2-3 show typical enclosure designs used during the testing. The objective in using the enclosure approach was to collect and "concentrate" non-point source emissions from the individual process in a way that enclosure exhaust could be sampled.

A highly ventilated enclosure with rapid air turnover would not allow for adequate detection limits of the target parameters. EPA's criteria for enclosures have been followed, as guidance. However, air velocities have been varied to allow for optimal sampling conditions within the exhaust duct. Specific enclosure construction and exhaust details vary with the process, fugitive release rate, and target sampling parameters.

## 2.5 Data Analysis Approach - Volume 2

The comprehensive data set for this program is presented in Volume 2 of this report series. The data analysis which produced this data set included consideration of: operating parameters, analytical issues, time averaging for some methods, and data reporting.

During each test run for all processes, all pertinent operating parameters were recorded. These parameters consisted of the quantity and type of materials being processed, processing and/or production rate, process temperature, and process pressure. This data was recorded at the start of each test run and at fifteen minute intervals thereafter until the completion of the test run.

The emissions test data, process data, and laboratory data acquired from the sampling program as summarized in Table 2-2 was compiled and evaluated for each test run. Mass emission rates from each rubber type and each pollutant were calculated from the laboratory results and field test data. The mass emission rates were calculated utilizing the measured exhaust air flow rate and concentration of each target pollutant in the sample vent for each individual test run. All emission calculations were performed in accordance with the specific sampling methodologies utilized for this program.

Table 2-2. Test Matrix of Processes and Chemical Analyses

|                                      | Mixing<br>(Internal) | Extruder | Warmup<br>Mill | Calender | Tire<br>Press | Autoclave | Platen<br>Press | Oven<br>Cure | Grinding |
|--------------------------------------|----------------------|----------|----------------|----------|---------------|-----------|-----------------|--------------|----------|
| Total Volatile Organic<br>Compounds  | X                    | X        | X              | X        | X             | X         | X               | X            | X        |
| Speciated Volatiles                  | X                    | X        | X              | X        | X             | X         | X               | X            | X        |
| Volatile Ozone Precursors            | X                    | X        | X              | X        | X             | X         | X               | X            | X        |
| Sulfur Compounds                     | X                    | X        | X              | X        | X             | X         | X               | X            | X        |
| Speciated Semivolatiles              | X                    | X        | X              | X        | X             | X         | X               | X            | X        |
| Amines                               |                      |          |                |          | X             | X         |                 |              |          |
| Total Speciated Volatiles by<br>FTIR |                      | X        |                |          | X             |           |                 |              | (a)      |
| Particulate Matter                   | X                    | X        |                |          |               |           |                 |              | X        |
| Metals                               | X                    | X        |                |          |               |           |                 |              | X        |

(a) FTIR at one grinding facility.

| Table 2-3. Sampling and Analytical Methods Summary |                                   |                       |
|----------------------------------------------------|-----------------------------------|-----------------------|
| Parameters                                         | Sampling Method                   | Analytical Methods    |
| 1 Total Volatile Organic Compounds                 | M25A                              | M25A/FID              |
| 2 Speciated Volatiles                              | TO-14 (a)<br>Grab Sample          | TO-14/GC-MS<br>M 8240 |
| 3 Volatile Ozone Precursors                        | TO-14                             | TO-14/GC-FID          |
| 4 Sulfur Compounds                                 | TO-14                             | GC/FPD                |
| 5 Speciated Semivolatiles                          | M 0010<br>Grab Sample (b)         | M 8270<br>M 8270      |
| 6 Particulate Matter                               | M5                                | Gravimetric           |
| 7 Metals                                           | M0012                             | M 6010, 7000          |
| 8 Amines                                           | Midget Impinger<br>Sampling Train | GC                    |
| 9 Total Speciated Volatiles by FTIR                | Extractive                        | FTIR                  |

(a) Grab sample for autoclave water trap.

(b) Grab/composite sample for autoclave water trap.

In addition to the sampling conducted at each process emission vent, numerous sampling runs were conducted to quantify background concentrations of target pollutants present in the atmosphere where the sampling was conducted. These background tests were conducted since most of the emissions testing was performed in process areas containing several air pollutant emitting processes. The necessity of background emissions testing was determined by the team leader for each test program based upon field observations. These field observations included assessing the presence of visible emissions, odors, and plant activities which could bias the test data such as maintenance painting. Quantifiable background concentrations were subtracted from the sample concentrations for that day to provide more accurate emission results from the processes.

Laboratory and field blank samples were also collected for each sampling method to recognize and quantify contamination of any sampling media. The results of these blank sample runs were compared with the process sample runs to identify emission results which may be biased. If quantifiable pollutant concentrations were found in the sample blanks, these concentrations were subtracted from the specific test results associated the blank sample. Sample results which were found to have values less than or equal to background or blank sample concentrations were assumed to be equal to zero. ←

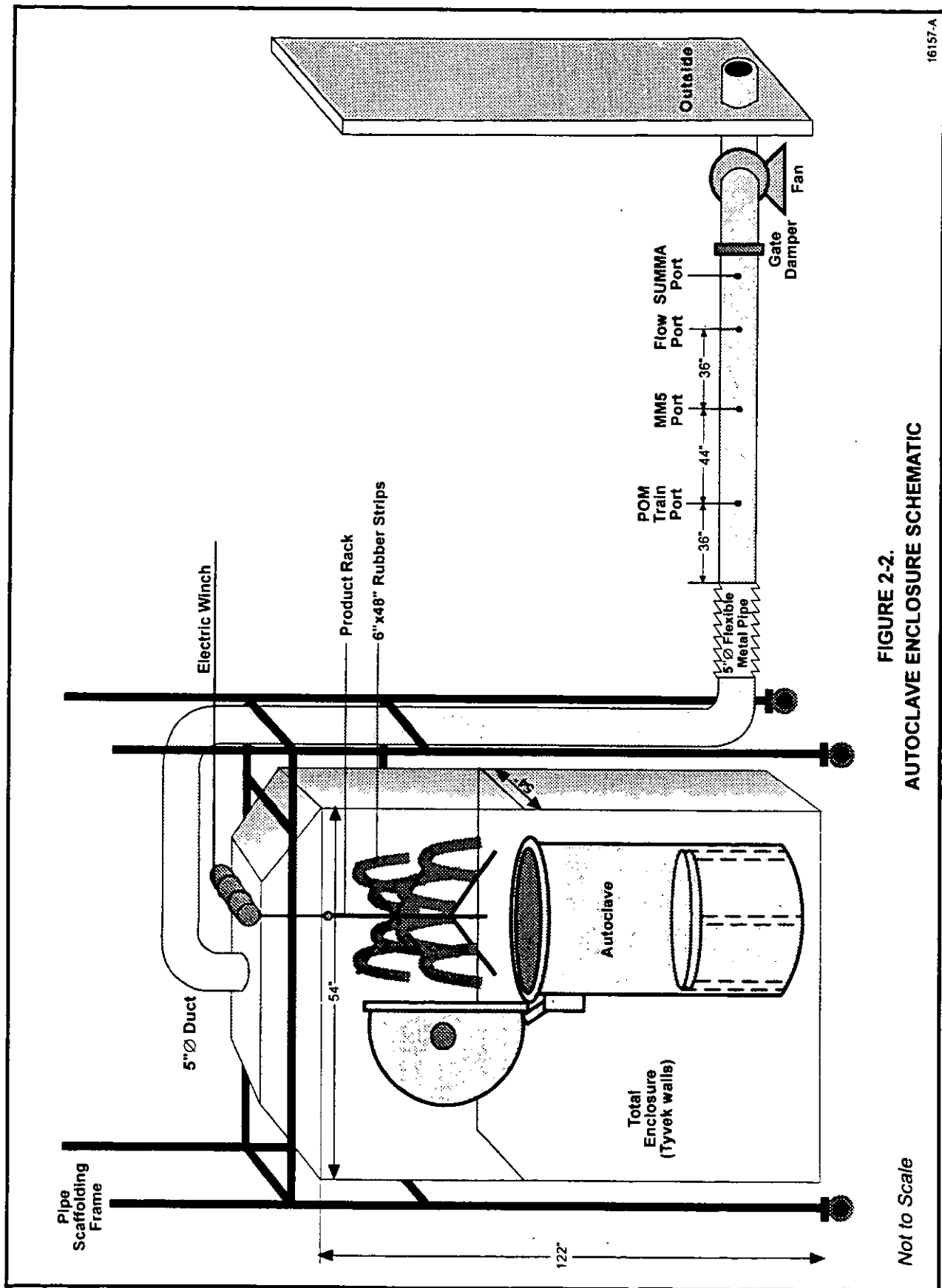


FIGURE 2-2.  
AUTOCLAVE ENCLOSURE SCHEMATIC

Not to Scale

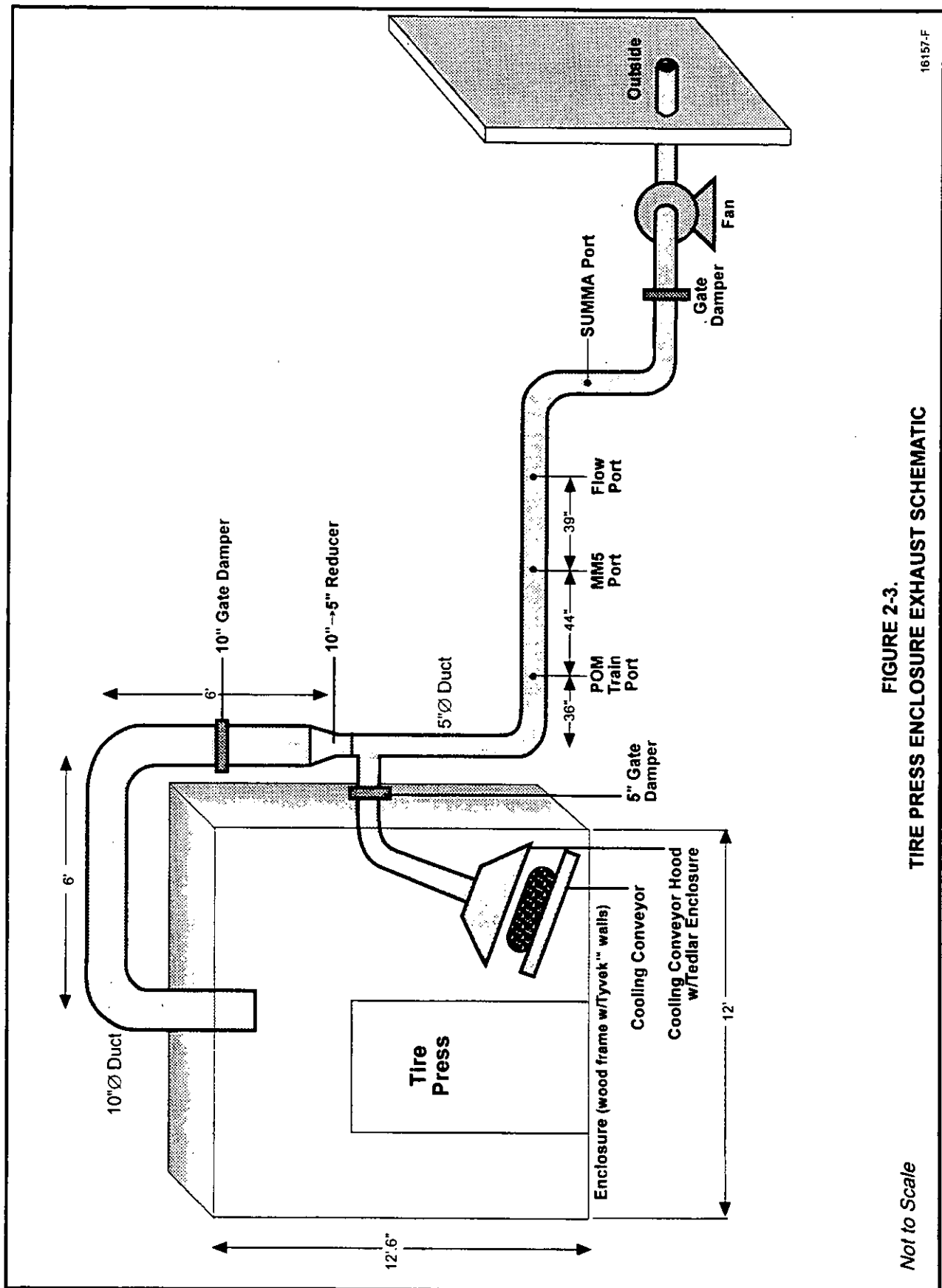


FIGURE 2-3.  
TIRE PRESS ENCLOSURE EXHAUST SCHEMATIC

Not to Scale

16157-F

The emission sampling results and the process data were then correlated to quantify emissions on a basis of pounds of pollutant emitted per pound of rubber processed. For 3 of the grinding operations (sidewall grinding, carcass grinding, and belt grinding), emissions were quantified on a pound of pollutant emitted per pound of rubber removed basis. For batch operations such as the internal mixer and autoclave, this was done by determining the total pounds of pollutant emitted and dividing by the total pounds of rubber processed. For continuous operations such as the extruder and calendering, this was performed by dividing the average hourly mass emission rate by the average hourly rubber processing rate. Results for the tire press were developed on both a lb/lb tire and lb/lb rubber basis due to the non-rubber components of the tires such as fabric and steel cords, wire beads, and belts.

In addition to the results of the compound specific sampling methods data, total organic compound emissions were determined using the data collected during the Method 25A continuous process monitoring. Average total organic concentrations were recorded for each one minute interval for each test run. An average value was then determined from the average of all the one minute data points collected over the duration of each test. Background concentrations were quantified at the beginning of each test run to correct the final result. Mass emissions of total organics were then quantified for each run.

In Volume 2, concentration data are provided for every target analyte and every tentatively identified compound. In each case where a particular compound was not detected, the detection limit is provided. These detection limits allow one to assess whether a compound could have been present at a lower concentration but not have been detectable in any particular sample.

For sampling methods having more than one target pollutant, the pollutant emissions were aggregated to provide total emissions by pollutant category. Total emissions were developed in this manner for metals, organics (including volatiles, ozone precursors, and semivolatiles), sulfur compounds, and in some cases, amines. Many of the target pollutants in these sampling methods were not present in the sample exhaust at quantifiable concentrations. Mass emission rates of these pollutants were calculated based upon their detection limit, as stated in the laboratory results, and their values were denoted with a "<" symbol prior to their stated emission value in the results tables. Aggregate emissions totals are presented for both detected compounds and "detected plus non-detected" compounds reported as lb/lb-rubber. Emissions totals for detected compounds include emissions of all compounds which were detected in the sample by the chemical analysis. The total for "detected plus non-detected" compounds allows for the possibility that a compound could have been present at undetectable levels and could have contributed to the total amount present. This is equal to the total of the detected concentrations plus the total of the detection limits for all other compounds. This "total with non-detects" provides an upper bound on the maximum total concentration for any class of compounds, e.g., volatile organic compounds and provides a conservative total.

## 2.6 Development of Final Factors - Volume 1

The results of the data analysis were assembled to develop pollutant and rubber type specific emission factors for each process. This effort involved collecting and collating the results of several emission tests performed on similar processes at different facilities. Emission factors, presented in Section 4, are reported as point estimates, means, and maxima. Section 5 provides a discussion on how the emission factors may be applied, including guidance on the selection of the mean versus maximum. The emission factors were developed based upon the aggregate emission totals in the data analysis discussed above.

For calculation of emission factors, emissions of all organic compounds were computed as the sum of ozone precursors, volatile organic compounds, and semivolatile organic compounds. For organic compounds which were detected by more than one method, the higher concentration value was used.

For calculation of emission factors and speciation tables, target analytes which were not detected in any runs for a particular process were deleted from the tables. The assumption is that if a target analyte went undetected in any runs, there is a high probability that if it was present, it was present at a concentration well below the detection limit and would not have contributed significantly to aggregate totals.

For some process conditions, multiple runs were conducted and data from Volume 2 were averaged for calculation of speciation factor tables in this volume. For chemical compounds which were not detected in each of the replicate samples for a particular condition, the average concentration was flagged as a "less than" value in the speciation factor tables. If all of the speciation table values for that compound were flagged as "less than" for a particular process (e.g., extrusion), the data for that chemical compound were deleted. Compounds deleted in this way constituted less than 0.5% of the total detected.

Speciation tables are included to show the contributions of specific pollutants and are provided as a percentage of the aggregate emission factor. For example, the concentration (or detection limit) of each organic compound was divided by the "total with non-detects" to yield the percent contribution for that compound. Analyzing the data in this manner highlights the major contributors and allows for identification of insignificant contributors to the overall emission factors.

To calculate speciated emissions, the user should first calculate an emission rate by multiplying the lb/lb rubber emission factor by the amount of rubber processed (or for some of the grinding operations, the amount of rubber removed). To then calculate speciated emissions, the emissions for a given pollutant (e.g., volatiles) would be multiplied by the speciation factor for the desired compound (e.g., butanol). In cases where emissions for the speciated component only are desired, the user can use the species specific emission factor (lb/lb rubber) from Volume 2 of the report series.

## SECTION 3 DESCRIPTION OF TEST FACILITIES

### 3.1 Processes Employing Generic Rubber Compounds

#### 3.1.1 Internal Mixer/Drop Mill

Emissions during mixing were evaluated from four internal mixers at three facilities during this program. For this report series, the mixers are designated as:

Large Banbury Mixer (F-80)  
Small Banbury Mixer (BR-1600)  
Small Banbury Mixer (BR-1600)  
Large Banbury Mixer/Torit Control Device

Large Mixer No. 1  
Small Mixer No. 1  
Small Mixer No. 2  
Mixer Control Device

*comparison as 4 compds*  
*- all 26 compds*  
*- PM control eff.*

Emissions from Large Mixer No. 1 occurred at 2 points in the process, during charging and mixing, and during drop milling. Batch sizes of 125 to 140 pounds per drop were mixed during the testing. Temperatures of the nonproductive runs were approximately 335° F. The productive run temperatures were typically 220° F (240° F for the EPDM 2). The configuration of the unit tested allowed for sampling of the fume collector and duct system. The charging/mixing zone is serviced by an 18-inch exhaust duct leading to a baghouse for control of emissions. Sampling was conducted in the round duct in an area with a suitable length of straight run. Emissions from the drop milling zone were handled similarly, being routed to a collector duct via a long rectangular duct.

The small internal mixers were similar in design and capacity. Emissions were sampled from a section of duct installed in a flexible exhaust hose. Sampling took place during charging and mixing. Batch sizes were typically 2 to 3 pounds for each drop with a fill of approximately 65 percent. Mixing temperatures were the same as with the larger units, and consistent with the recipes (335° F. for the non-productive and 220° F. for the productive drops). At the completion of the mixing, the rubber dropped into a tray drawer for transfer to the adjacent milling unit.

The milling units used with the small internal mixers were enclosed to contain pollutants released during operation. The enclosures were equipped with an outlet exhaust duct to facilitate sampling. Monitoring/sampling continued once the mixed rubber was placed inside the enclosures and continued throughout the milling process.

Control efficiencies of emissions from the large internal mixer were determined through the simultaneous sampling of inlet and outlet ducts of a Torit fabric filter control device. The sampling was conducted during 2 modes of operation, charging/mixing and drop milling. Batch sizes of approximately 465 pounds per drop were mixed during the testing. Temperatures of these master batch nonproductive runs ranged from 315° to 330° F. A summary of the rubber compositions tested is provided below:

*on which mixers?*

| Compounds                                                             | Lbs. Carbon<br>Black | Lbs. Zinc<br>Oxide |
|-----------------------------------------------------------------------|----------------------|--------------------|
| 34 Natural rubber and carbon black masterbatch                        | 100                  | 0                  |
| 231 Natural rubber and carbon black masterbatch                       | 100                  | 0                  |
| 320 Natural rubber and carbon black masterbatch                       | 93                   | 0                  |
| 513 Natural rubber and carbon black masterbatch                       | 93                   | 0                  |
| 550 Natural rubber and carbon black, 2nd pass, w/some additives & oil | 73                   | 13                 |
| 802 Natural rubber and carbon black, 2nd pass, w/some additives & oil | 52                   | 30                 |
| 887 Natural rubber and carbon black, 1st stage                        | 93                   | 0                  |

### 3.1.2 Extrusion

Evaluation of emissions during the extrusion process was conducted on a 3.5-inch extruder. The compounds extruded were mixed and provided by the Goodyear Tire and Rubber Company's St. Mary's, OH facility. Two pallets each of wigwagged tread (Compound No. 6), sidewall (Compound No. 4), emulsion SBR (Compound No. 22), and peroxide-cure EPDM (Compound No. 9) were provided. Optimum target melt temperatures were provided for each compound. These were as follows:

|            |               |
|------------|---------------|
| Tread -    | 255 - 275° F. |
| Sidewall - | 230 - 260° F. |
| SBR 1502 - | 255 - 275° F. |
| EPDM 2 -   | 250 - 280° F. |

The extruder consists of a power driven screw within a stationary cylinder. A die with a 1/8 x 3-inch extrusion slot was attached to the head of the screw to produce the desired cross section of the extruded rubber. During the testing, it became necessary to install additional screens behind the die plate to increase rubber back pressure and temperature. The rubber strips were fed manually into the hopper rollers.

There were two zones sampled during operation of the extruder process. The extruder outlet, or head, was enclosed to permit capture of emissions throughout operation. The small enclosure was equipped with an outlet exhaust duct from which sampling was conducted. This was designated as Location A. After extrusion, the product entered the cool-down zone, designated as Location B, which was also enclosed to allow for sampling of pollutant emissions. Rubber temperatures were measured at the die head and at two points of the cooldown zone.

### 3.1.3 Autoclave Curing

Autoclave curing utilizes saturated steam at an elevated pressure to cure the rubber mix and is the predominant curing method in nontire rubber manufacturing facilities. The 11 rubber compounds selected for testing included compounds used primarily for engineered products, but also included compounds used in tire manufacturing. These compounds were provided by

several manufacturers. The compounds selected and their designated compound numbers were as follows:

- check against p74-2 (Table 4-1) list*
- Tire Base/Sidewall (#4) ✓
  - Tire Tread (#6) ✓
  - EPDM 2 (unextruded peroxide-cured) (#9) ✓
  - EPDM 2 (extruded peroxide-cured) (#9) ✓
  - HNBR Hydrogenated Nitrile (#18) ✓
  - CPE Chlorinated Polyethylene (#21) ✓
  - Tire Apex (#5) ✓
  - EPDM 1 (sulfur-cured) (#8) ✓
  - CRW ~~Neoprene~~ (#11) ✓
  - Hypalon (#15) ✓
  - Emulsion SBR (SBR 1502) (#22) ✓
- polychloroprene?*

The curing tests were conducted using a steam-contact autoclave setup. Figure 3-1 illustrates a schematic of the autoclave structure. A rack loaded with the desired quantity of rubber strips was loaded by electric winch into the autoclave chamber. Three batches of approximately 50 pounds each were loaded and cured for each rubber type. The autoclave was operated at 340° F and approximately 110 psig during each curing run.

Sampling of the autoclave emissions was conducted throughout the three basic modes of operation. Sampling was initiated during the curing phase with sampling of the water trap effluent, conducted during the blowdown phase, and continued through the cool-down phase. TRC's approach was to set up a total capture method whereby all steam and pollutant releases were sampled. The autoclave curing entailed sampling of the water trap condensate (during curing), the blowdown steam, and cooldown air emissions. All steam releases were vented through the 1-inch water trap or blowdown pipe into a series of condensing impingers and sorbent tubes kept under negative pressure by a metering pump. During curing, the water trap condensate was directed into sample containers and large impingers for volume determination. The blowdown pipe was connected to the condensing coils and the first of a series of large impingers. Steam and entrained pollutants were directed into the impingers for condensing and gross pollutant scrubbing through impingement. Remaining gaseous or entrained pollutants then passed through the sorbent traps for the collection of organic species. TRC installed a controlling valve on the blowdown system to control the rate of steam release during the blowdown cycle.

Following completion of each autoclave run, the rack containing the cured rubber products was removed from the autoclave but kept within the temporary enclosure for sampling during the cooldown period.

### 3.1.4 Platen Press Curing

The platen press curing process is a general approach to pressure curing engineered rubber products in molds. Specific molds are used to form the desired engineered product at set pressures and curing temperatures. Emissions from platen presses can be controlled using an exhaust hood and duct. Most emissions occur during mold release, at the end of the curing cycle.

The platen press used in this program was manufactured by Pasadena Hydraulics, Inc. of Pasadena, CA and provided for the test program by Goodyear Tire and Rubber Company.

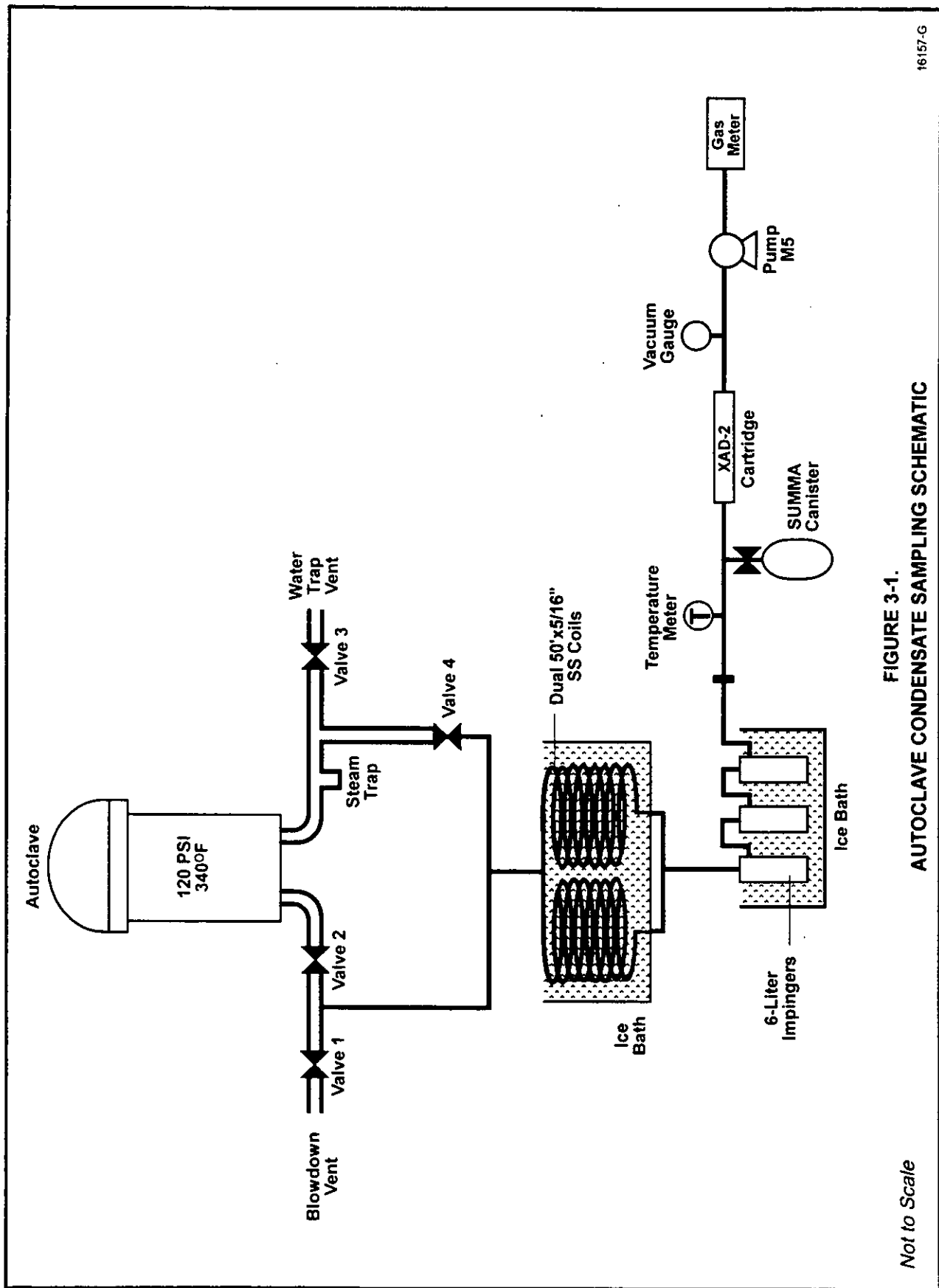


FIGURE 3-1.  
AUTOCLAVE CONDENSATE SAMPLING SCHEMATIC

Not to Scale

16157 G

Testing was conducted at TRC's Lowell, MA facility. Emission rates were developed based on: pounds of pollutant emitted per hour (lbs/hr) and pounds emitted per pound of rubber (lbs/lb rubber) cured.

During this program, 17 rubber compounds were cured at temperatures between 340° and 350° F and pressures of 30 tons for the first 3 minutes and 20 tons for the second 3 minutes. The rubber compounds were from batches mixed during testing of small internal mixer No. 2. The compounds cured and their designated numbers were as follows:

- #1 Tire Inner Liner
- #3 Tire Belt Coat
- #7 Tire Curing Bladder
- #9 EPDM 2 (unextruded peroxide-cured)
- #10 EPDM 3 (non-black sulfur-cured)
- #13 Paracryl OZO
- #14 Paracryl BLT
- #20 Acrylate Rubber
- #23 Epichlorohydrin
- #2 Tire Ply Coat
- #5 Tire Apex
- #11 CRW Neoprene
- #12 CRG Neoprene
- #16 Fluoroelastomer
- #17 AEM
- #19 Silicone
- #22 Emulsion SBR (SBR 1502)

Nine samples of approximately 50 grams each were cured for each rubber type. Each 50-gram tab of rubber was placed directly onto the lower plate and pressed into a "pancake" approximately 185 mm diameter and 1 mm thickness. The cooldown period lasted for 6 minutes when the cured samples were removed from the press and left inside the enclosure. Emissions were contained by an exhaust hood and flexible Tyvek sheeting, and exhausted by a single 5-inch duct and blower.

### **3.1.5 Hot Air Oven Curing**

Hot air oven curing of engineered rubber products is used to final cure preformed products. Three rubber compounds were evaluated. One compound used in tire manufacturing (Tire Apex, Compound #5) and two compounds typical of engineered rubber products manufacturing (sulfur-cured EPDM 1, Compound #8; and Emulsion SBR 1502, Compound #22) were selected. To simulate the process for this program, a lab scale system with enclosure was designed and set up to evaluate the emissions during curing and cooldown. The rubber compound samples were placed in the oven and allowed to reach the curing temperature of 400° F for a period of 5-8 minutes. Each sample weighed approximately 100 grams. After completion of curing, each rubber sample was removed and allowed to cool down in the enclosure and another sample of the same compound placed in the oven and brought up to temperature.

The oven was set up with a preheated sweep gas inlet and an exhaust gas outlet. A temporary enclosure was erected around the oven to contain emissions during the curing and cooldown and when the door was opened. An exhaust duct similar to that used for the platen press was constructed to vent the enclosure and to provide the sampling locations.

## **3.2 Tire Curing**

### **3.2.1 Laboratory Scale Tire Curing**

A lab scale evaluation of emissions from tire cuts (sections) was conducted using a hot nitrogen purge oven cure system with emissions being monitored by a Fourier transform infrared analyzer (FTIR). The lab scale evaluation was conducted to determine if there is a correlation between lab scale and field data for tire curing. A total of 28 tire cuts were oven-cured, representing 9 types of tires from 7 manufacturers. The tire cuts were received uncured and varied in size, weight, and type. The different types received were: original equipment, replacement, and high performance.

There were two zones sampled during the hot air curing of tire cut samples. An oven was set up with a nitrogen sweep gas inlet and a sample gas outlet leading to the FTIR analyzer. This system was used to analyze tire cut off-gases during the curing and cooldown phases. The oven temperature was raised to near 360° F to allow the tire cut core temperature to reach the desired cure temperature of 340° F. After completion of curing, the tire cut was removed and immediately placed in a cooldown chamber equipped similarly to the oven with a sweep gas inlet and a sample gas outlet.

### **3.2.2 Full-Scale Tire Curing**

Evaluation of tire press emissions was conducted on a full-scale tire press equipped with a single mold set and an integral cooldown rack. A total of 9 tire types/brands were press-cured, representing 2 tire sizes from 7 manufacturers. The tires were received uncured and varied in size, weight, and type. Multiple tires for each type were press-cured during each test run to allow for adequate sampling times. The 2 sizes tested were 195/75 and 205/70. A generic, obsolete mold for each tire size was used for the press curing. The different types received were: original equipment (OEM), replacement, and high performance.

Mold temperatures ranged from 330° to 355° F and steam pressures ranged from 200 to 300 psig. Each tire was cured for a period of 10 to 15 minutes. There were two emission zones sampled on the tire press: the press itself and the tire cool-down zone. An enclosure was set up on the tire press to collect fugitive emissions during the press curing of green tires. The enclosure was equipped with an outlet exhaust duct in which sampling was conducted for the target parameters. A similar enclosure was erected around the integral cool-down rack where the tire cools after completion of the press curing.

## **3.3 Other Rubber Processing**

### **3.3.1 Warmup Milling**

Warmup mills are utilized by the industry as a preparation/warmup step for feeding calenders and extruders following each drop from a internal mixer or, to warm the rubber to prepare it for subsequent processing. A warmup mill is similar or identical to a drop mill in that it has

a series of rollers, some toothed, to increase the shearing of the compound. The mill can be batch or continuously fed, depending of the production need.

Evaluations of warmup mill emissions were conducted at two facilities during this program. Emissions from both were captured using a temporary enclosure and exhaust duct system. Emissions from a lab scale warmup mill were tested during the milling of the following three compounds:

- Tire Ply Coat (#2)
- Tire Belt Coat (#3)
- Tire Base/Sidewall (#4)

Multiple drops were made for each test run. One test run was conducted per compound. Each drop was approximately 2.5 pounds of rubber which represents a fill of approximately 65 percent.

A second warmup mill test was conducted at an engineered rubber products manufacturing facility. This was a production facility that operated its warmup mill in a batch mode for the test. The facility ran a neoprene compound in the warmup mill for the three test runs and collected the milled rubber on pigs for running through the calender. The mill roll temperature was approximately 90° F. The rubber was milled to a thickness of 0.3 inches and a temperature of approximately 175° F.

### 3.3.2 Calendering

The calendering process is used to bond a continuous textile or metal mesh web to one or two layers of rubber for use in building tires and other engineered rubber products. The latex-dipped textile passes through a series of rollers through which one or two rubber strips also passes. Under pressure and elevated temperatures induced by the rollers, the rubber is bonded to the web. The nip of the rollers can be adjusted to vary the thickness of the calendered product. The rubberized fabric is then cooled and cut to the proper dimensions.

During this program, emissions from the calendering process were tested at two facilities. The first was a continuous production process where the rubber was continuously fed from a warmup mill. A tire ply coat rubber compound was being run on the test days. Three test runs were conducted from an exhaust collector system outlet stack.

The second process tested involved a batch or "pig" fed calender during calendering of a neoprene compound at an engineered rubber products manufacturing facility. The calender itself had 54-inch wide rolls and ran approximately 1100 linear yards of a neoprene compound during each of the three test runs. The emissions from this system were measured using a temporary enclosure and exhaust duct configuration.

### 3.4 Tire Grinding Processes

The grinding processes used in tire manufacturing are specific to each application. Four types were identified for this program: retread buffing, carcass grinding, whitewall (sidewall), and truing (force). The grinding processes, in general, generate quantities of rubber dust and particles, and may generate HAP emissions, depending on the rubber formulation and the amount of heat generated during grinding. To control these emissions, cyclones, baghouses, and electrostatic precipitators (ESPs) are used either alone, or in combination.

Grinding operations are typically conducted in a collector hood with an exhaust duct leading to a primary and possibly secondary control device. Emissions sampling was conducted in the hood's exhaust duct (control device inlet) to determine the process' potential to emit. Simultaneous sampling was also conducted at the outlet duct of each downstream control device to determine control efficiency and the final pollutant emissions rate.

#### 3.4.1 Force/Balance Grinding

A screening evaluation of emissions from a force grinder was conducted at a full scale tire manufacturing facility using FTIR and total hydrocarbon analyzers. The force grinder is used to buff areas of a tire that are out of specification when the tire is put under load. Observations of the force grinder showed that only a few tires per hour are actually buffed, and the quantity of rubber removed is very slight, resulting in insignificant or no emissions.

#### 3.4.2 Sidewall/Whitewall Grinding

Another surface grinding process, sidewall/whitewall grinding, was also evaluated. The grinder consists of two stones set in a wheel which rotate at high rpms over the whitewall area of the tire, removing a thin coat of black rubber which overlays the whitewall section. The grinder is set into a frame equipped with four powered exhaust ducts. Emissions from the grinding operation are carried via flex hose to overhead ductwork. Emissions at this facility are ducted to a cyclone for removal of rubber dust and pieces ground from the tires. The exhaust air passes through the cyclone and is exhausted to the atmosphere. Approximate grinding time per tire is 20 seconds. Testing was conducted during normal operations, and emissions are based on pounds emitted per hour and pounds emitted per pound of rubber removed, as measured by the quantity of rubber dust and particles collected in the cyclone hopper.

#### 3.4.3 Retread Buffing

Retread buffing was also studied as a surface grinding operation in this program. In this process, the surface of the back of the tread is buffed to prepare it to receive adhesive further down the line. The retread buffer consists of an edger and four inline buffing wheels with hasps around the circumference of each wheel. Each wheel is covered by a hood exhausted by an flexible duct. The four exhaust ducts enter a common header duct. At the facility tested, the header duct conveys the emissions to an American Air Filter cyclone/fabric filter control system. The fabric filter is Model Number 12-84-1347.

A tread section approximately 37 feet long is fed to the edger where the edge is squared. The tread is then fed to the first wheel of the inline buffer which catches and draws the tread into the line. As the tread passes each succeeding wheel, the wheel comes down onto the surface. A given pressure is applied to the buffing wheels to remove the required layer of rubber. As the hasps dull, a greater pressure on the surface is required to remove the same amount of material. The emissions are solid rubber particles and volatile and semivolatile organic compounds. It takes approximately 40 seconds to buff a tread with approximately 5 seconds between tread sections. Sampling was conducted in the 20-inch inlet duct to the cyclone, in the 20-inch baghouse outlet duct prior to the I.D. fan, and in the 22-inch stack after the I.D. fan. Emissions are presented as pounds per hour and pounds emitted per pound of rubber processed, as no actual rubber removal rates were calculable.

#### **3.4.4 Tire Carcass Grinding**

Tire carcass grinding is used for gross rubber removal (tread section) and for preparation of the resulting tire carcass for retreading. This operation consists of two phases, a coarse grind module and a fine grind module. The tire is first ground to a predetermined depth with a coarse grind hasp to prepare it for the fine grind operation. The fine grind operation completely removes the old tread and prepares the carcass surface to receive the new tread. The tire carcass to be ground is placed on a shaft and rotated at predetermined revolutions per minute. The carcass is then placed against a rotating fine tooth hasp at a given pressure. The hasp moves across the surface of the carcass in a predetermined pattern.

The fine grind operation was selected for the study due to the fact that the grinding period is longer, the pressure of the hasp on the wheel is greater than the coarse grind, and the temperature of the carcass surface is higher than for the coarse grind operation. The grinding time for the coarse grind operation is 1-2 minutes, while the grinding time for the fine grind operation is 4 minutes. Approximately 10 to 12 tires are ground per hour.

The fine grind module consists of the rotating shaft on which the carcass is placed and a rotating fine tooth hasp which is covered by a hood. At the facility tested, a flexible exhaust duct connects the hood to an elevated horizontal duct which leads to a cyclone manufactured by Retread Equipment Corp. of Charlotte, NC. The exhaust from the cyclone passes through a horizontal centrifugal fan to an outlet stack on the roof. The entire module was enclosed with Tedlar sheeting to enhance the capture of volatiles, semivolatiles, and particulate matter by the hasp hood. Sampling was conducted in the 10-inch horizontal cyclone inlet duct and in the 16-inch outlet stack. Emissions are presented as pounds per hour and as pounds emitted per pound of rubber removed, measured by the quantity of rubber dust and rubber particles collected in the cyclone hopper.

#### **3.5 Engineered Products Grinding - Drive Belts**

The belt grinding operation selected for this study is located at an engineered rubber products manufacturing facility. The selected process line was deemed to be representative of surface grinding operations. This particular line was used for V-belt grinding and consists of eight grinders. Each grinder is enclosed within a close fitting hood. An exhaust duct exits from

each hood and enters an overhead exhaust manifold. The combined exhaust streams enter the 16-inch diameter central cyclone inlet duct which leads to a Fisher Kloster XQ-120-20 cyclone. An 18-inch duct exits from the top of the cyclone and enters a dual 3-stage electrostatic precipitator (ESP). The effluent streams exiting the ESP are combined into a single 14-inch duct which exits the roof through an I.D. fan. During the grinding operation the belts are cooled with a localized water spray located within each grinder hood. Sampling was conducted in the cyclone inlet duct, cyclone exit duct, and ESP exit duct. Emissions are presented as pounds per hour and as pounds emitted per pound of rubber removed, as measured by initial and final weights of the belt batches for each test run.

## SECTION 4

### DATA ANALYSIS AND DISCUSSION OF RESULTS

This section provides point estimates, means, and maxima of emission factors for individual compounds and elements:

- speciated organic compounds (including volatile compounds, volatile ozone precursors, and semivolatile compounds)
- sulfur compounds
- amines
- metals
- particulate matter

Process and rubber mix/formulation specific emission factors are provided in the following sections. When applicable, rubber formulations are grouped into categories for calculation of means and maxima. Standard deviations are also included for all processes. The speciation table percent values were calculated relative to the "total with non-detects". All data tables are provided at the end of this section.

#### 4.1 Processes Employing Generic Materials

A series of 23 rubber formulations/products and three polymers were tested to determine emission factors for: mixing, extrusion, autoclave curing, and platen press curing. These mixtures tested are presented in Table 4-1. Emissions tests for the mixers were performed on three different size systems: two 2-pound laboratory mixers, a 200-pound pilot scale system, and a 500-pound production mixer. Emissions do not appear to be dependent on mixer size, based on the emission factors of pounds of pollutant emitted per pound of rubber mixed.

##### 4.1.1 Internal Mixing / Drop Mill

All 23 formulations and three polymers were tested once on small internal Mixer No. 2. Five of the formulations were also tested on additional mixers (Table 4-2).

During the earlier stages of the project, data collected on Small Mixer No. 1 and Large Mixer No. 1 were compared for scale differences. Emission factors were calculated for Compounds 4, 6, 9, and 22. Results for these two mixers were found to be somewhat consistent based on emission rate categories. A summary of the emission factors for the mixers is presented in Table 4-3. Emissions for the large and the small mixers do not appear to be dependent on mixer size. Mixers did show variability for total metals. This is likely the result of greater losses into the ventilation system when charging the larger equipment versus what is experienced on smaller scale equipment.

Means, maxima, and standard deviations were determined for tire compounds (1-7), engineered product compounds (1-23) and polymers (SBRs 24-26) in Tables 4-4a, 4b, and 4c, respectively. Pollutant emission factors include organic compounds, metals, sulfur compounds, and particulate matter. Figure 4-1 presents total VOC (total hydrocarbons as methane) for all 23 compounds and 3 polymers (SBR Compounds 24-26).

Table 4-1. Generic Rubber Formulations/Products

| Compound | Category                 | Description                                   |
|----------|--------------------------|-----------------------------------------------|
| 1        | Tire Inner Liner         | Brominated IIR/Natural Rubber                 |
| 2        | Tire Ply Coat            | Natural Rubber/Synthetic Rubber               |
| 3        | Tire Belt Coat           | Natural Rubber                                |
| 4        | Tire Base/Sidewall       | Natural Rubber/Polybutadiene Rubber           |
| 5        | Tire Apex                | Natural Rubber                                |
| 6        | Tire Tread               | Styrene Butadiene Rubber/Polybutadiene Rubber |
| 7        | Tire Bladder             | Butyl Rubber/Neoprene Rubber                  |
| 8        | EPDM 1                   | EPDM Sulfur Cure                              |
| 9        | EPDM 2                   | Peroxide Cure                                 |
| 10       | EPDM 3                   | Non-black EPDM Sulfur Cure                    |
| 11       | CRW                      | Polychloroprene W Type                        |
| 12       | CRG                      | Polychloroprene G Type                        |
| 13       | Paracryl OZO             | Nitrile Rubber/PVC                            |
| 14       | Paracryl BLT             | Nitrile Rubber                                |
| 15       | Hypalon                  | CSM                                           |
| 16       | Fluoroelastomer          | FKM                                           |
| 17       | AEM                      | Vamac                                         |
| 18       | Hydrogenated Nitrile     | HNBR                                          |
| 19       | Silicone                 | VMQ                                           |
| 20       | Acrylate Rubber          | ACM                                           |
| 21       | Chlorinated Polyethylene | CPE                                           |
| 22       | Emulsion SBR             | SBR 1502                                      |
| 23       | Epichlorohydrin          | ECO                                           |
| 24       | Oil-Extended SBR*        | SBR 1712                                      |
| 25       | Emulsion SBR*            | SBR 1500                                      |
| 26       | Solution SBR*            | Duradene 707                                  |

\*Compounds 24, 25, and 26. Were mixes of polymer only, without fillers or cure system.

| Table 4-2. Additional Internal Mixer Tests |                     |      |                                            |
|--------------------------------------------|---------------------|------|--------------------------------------------|
| #                                          | Formulation         | Runs | Tested on                                  |
| 4                                          | tire base/sidewall  | 1    | Large Mixer No. 1 and Small Mixer No. 1    |
| 5                                          | tire apex           | 3    | Internal Mixer with a Torit control device |
| 6                                          | tire tread          | 1    | Large Mixer No. 1                          |
| 9                                          | EPDM2               | 1    | Large Mixer No. 1 and Small Mixer No. 1    |
| 22                                         | emulsion SBR (1502) | 1    | Large Mixer No. 1 and Small Mixer No. 1    |

Tables 4-4d through 4l provide speciation factors for organics, metals, and sulfur compounds for tire compounds, engineered products, and the three polymers as a weight percent value. Similar to Tables 4-4a, 4b, and 4c, means, maxima, and standard deviations were also determined for the speciation factors for the three general rubber categories.

Table 4-5 presents control efficiencies for a Torit fabric filter handling ventilation exhaust from a large production-scale internal mixer.

#### 4.1.2 Extruder

Table 4-6a provides an emission factor summary for the four rubber formulations tested. Tables 4-6b and 6c provide speciation factors for organic compounds and metals for each of the four rubber compounds and all four combined. The only sulfur compound detected in the extruder test series was carbon disulfide (Location A, Run 2). Therefore, a speciated sulfur table was not developed. Carbon disulfide emissions are presented in Volume 2. Figure 4-2 provides a summary of total VOC (THC as methane), metals, and sulfur for the extruder.

#### 4.1.3 Autoclave Curing

Autoclave curing is a process which can utilize either a steam contact or non-contact system. During this program, air emissions and water discharge were evaluated from a steam contact system. Emission factors were calculated using ten of the generic rubber mixtures tested in the small Mixer No. 2. One rubber compound, EPDM 2 (Compound No. 9) was also tested using extruded and unextruded rubber to determine what, if any, differences result in curing emissions if previously extruded. Based on the limited amount of data available, there were no substantial differences between the extruded and unextruded EPDM. A summary of the autoclave emission factors for the rubber mixes is presented in Table 4-7a. Tables 4-7b through 7d present the speciation factors for organic compounds, amines, and sulfur compounds. A summary of total VOCs (total hydrocarbons, as methane) from the autoclave is presented in Figure 4-3.

In this steam contact autoclave system, uncured rubber loaded into the pressurization chamber is in full contact with the steam, resulting in both water-borne and air-borne pollutants. The

Figure 4-1. - BANBURY MIXER / DROP MILL

*Small #1?*

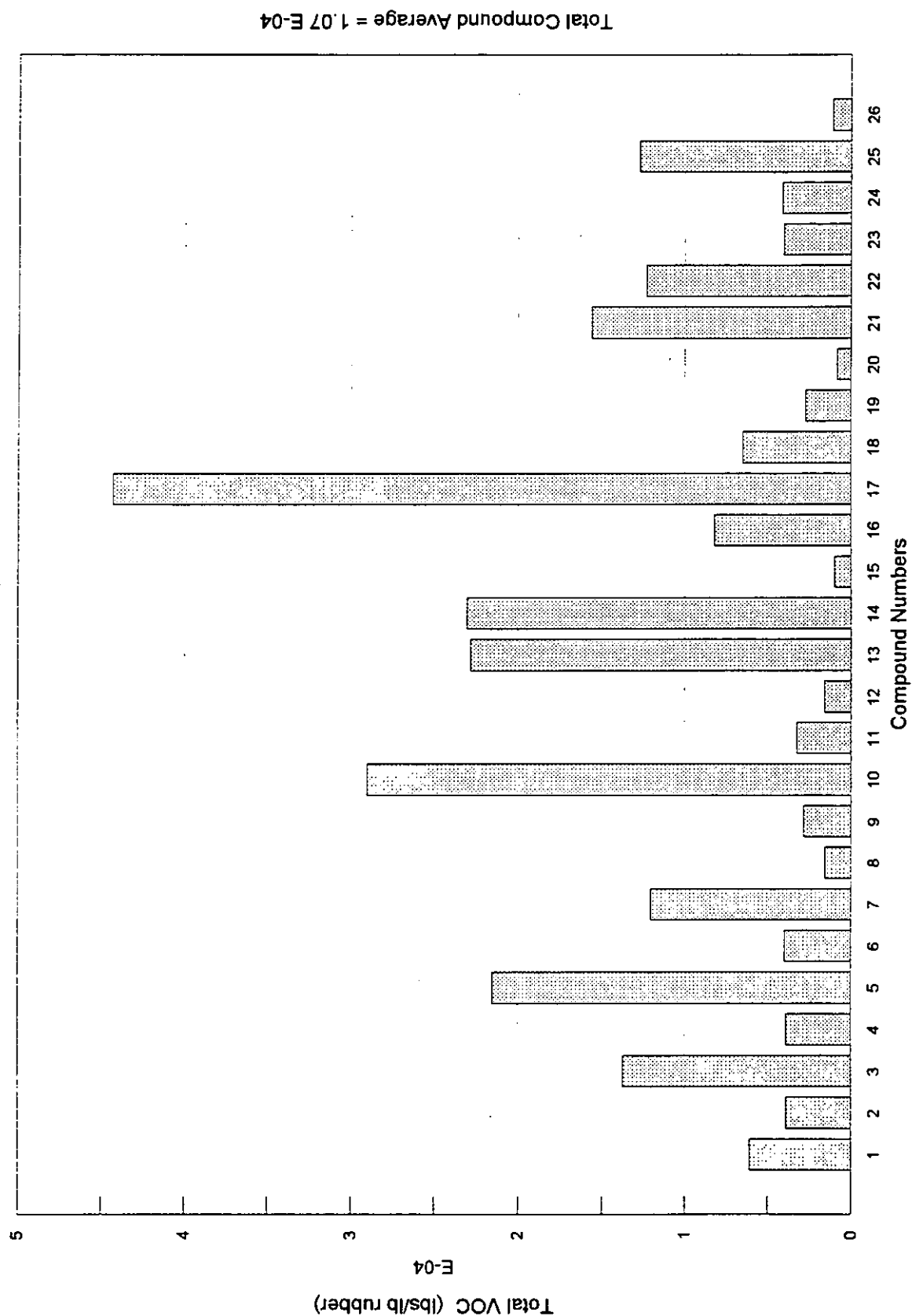


Figure 4-2 - Summary of VOC Emissions For The Extruder Test Series

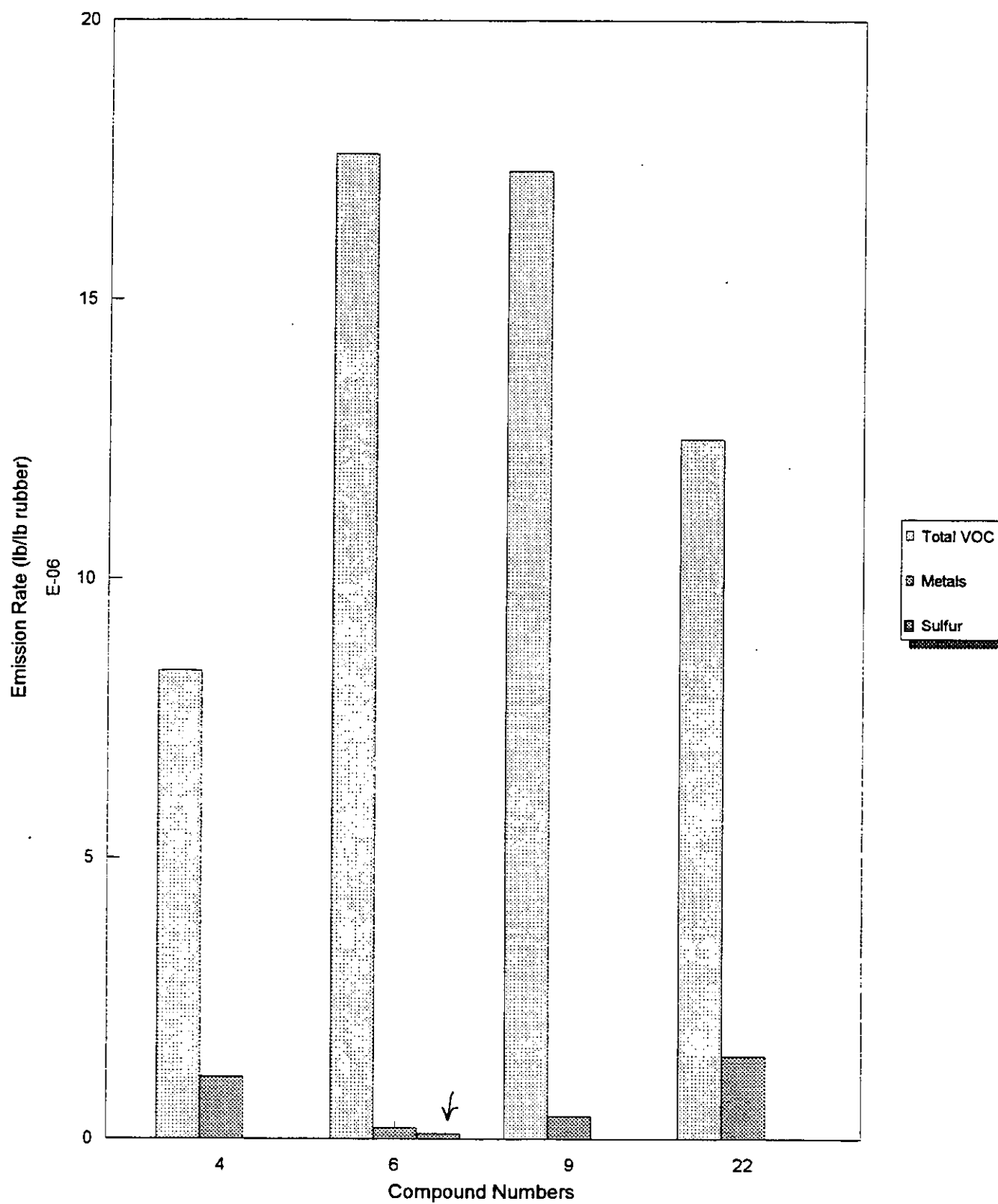
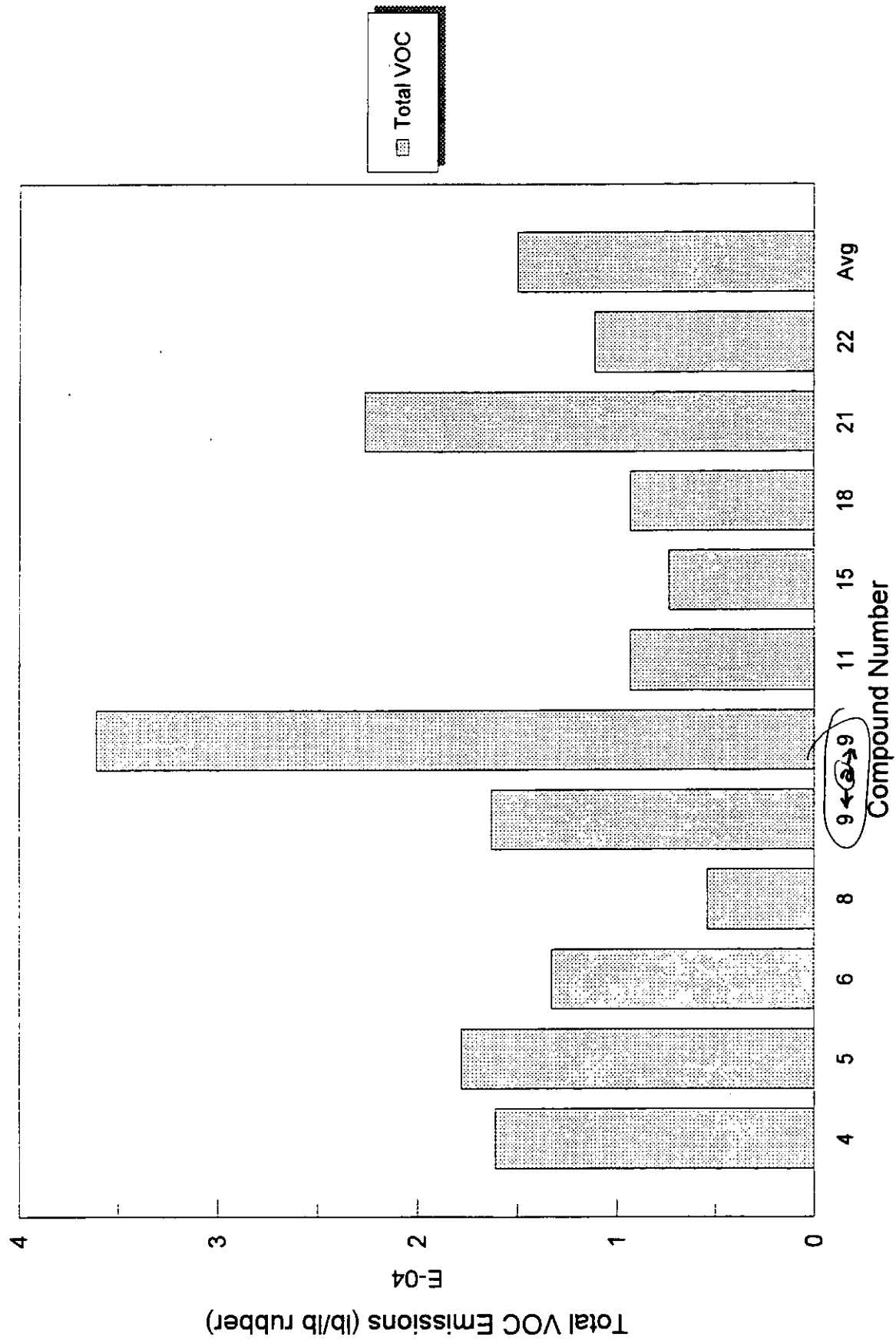


Figure 4-3. Summary of VOC Emissions from Autoclave Tests



steam condensate from this type of system is discharged during blowdown at the end of the curing cycle and, oftentimes, from the water trap during the curing cycle.

In the non-contact system, the uncured rubber is enclosed in a bladder within the pressurization chamber and does not come into contact with the steam. Therefore, pollutants are not discharged with the steam condensate as occurs with the steam contact system, but are emitted as air-borne pollutants upon opening of the autoclave chamber.

In evaluating pollutant discharges from the steam contact type of system, samples were collected and analyzed from two aqueous (water trap and blowdown condensate) and one gaseous (cooldown air) matrices. The total emissions for the autoclave system were obtained by combining the emission and discharge rates (lbs/hr and lbs/lb rubber) for volatiles, semivolatiles, and sulfur compounds. This total is most representative of a non-contact system where all pollutants are discharged as air contaminants and should be considered in an emissions inventory. To enable a comparison of a steam contact system with a non-contact system, the water-borne pollutants from a steam contact system could be considered separately, possibly as a discharge under a NPDES permit, and not as an air emission. However, there is a possibility of downstream fugitive emissions from this aqueous discharge.

As is shown in Table 4-7e, certain classes of pollutants exhibit higher condensability or solubility properties and a higher percentage removal in the aqueous discharge streams. The table indicates that as much as 100 percent of sulfur emissions are removed in the aqueous streams, and could be discounted from inclusion in air emissions inventories when steam contact autoclaves are in use. Similarly, up to 95 percent of semivolatile organic emissions are removed in aqueous streams. Predictably, volatile organics exhibited a much lower removal rate with a maximum of 36 percent removal in the aqueous streams.

As the table indicates, the removal percentages vary by not only pollutant class, but also by rubber compound. It should be noted that the table presents only a comparison of the totals of the pollutant categories, and not the individual chemical species. This information could be determined through further detailed review of the speciated data.

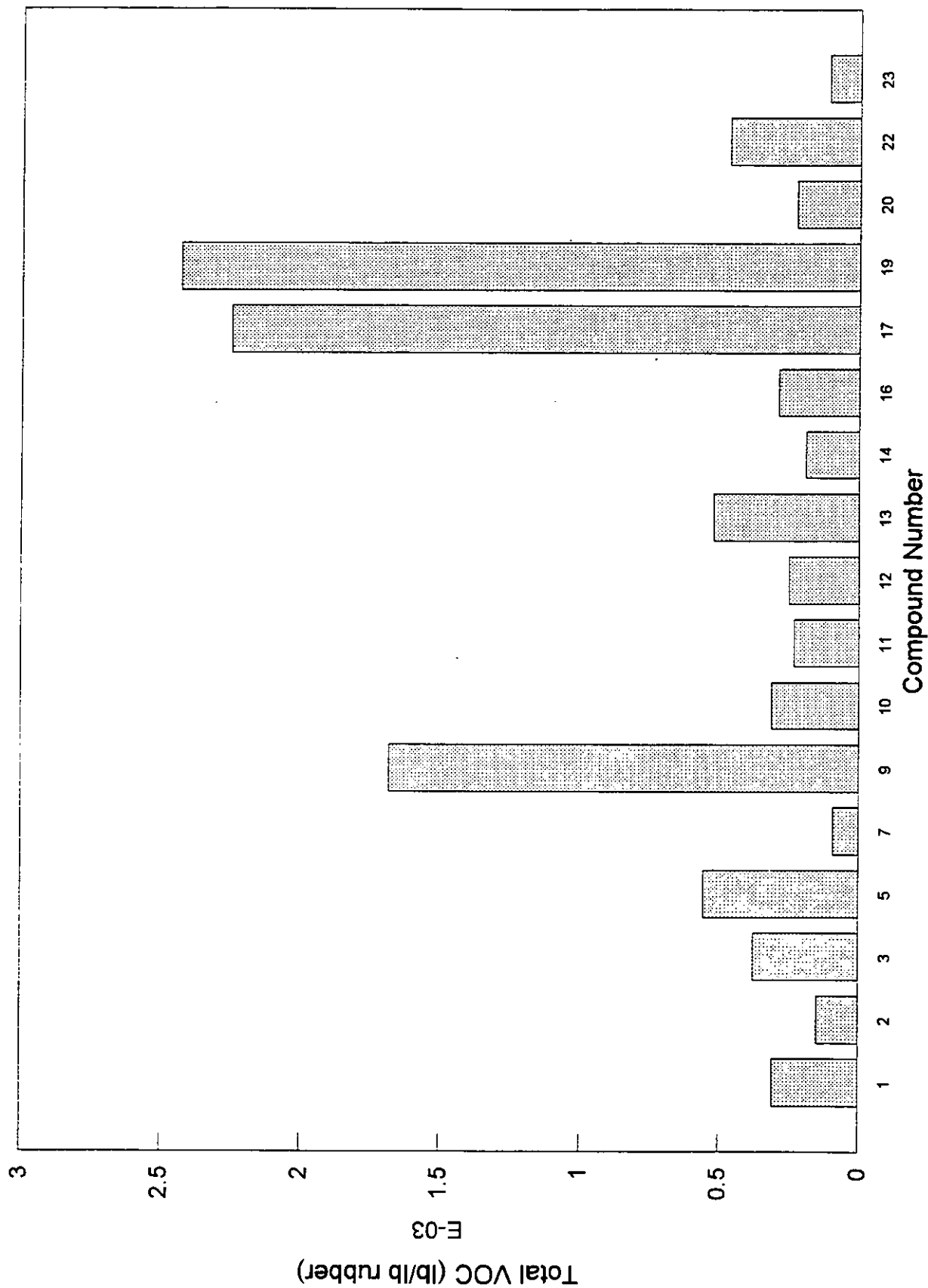
#### **4.1.4 Platen Press Curing**

7.17<sup>m</sup> 4-4  
A summary of VOC (THC as methane) from the platen press is presented in Figure 4-4. An emission factor summary for the platen press for 16 rubber formulations is presented in Table 4-8a. Organic and sulfur compound speciation factors are presented in Tables 4-8b and 8c.

#### **4.1.5 Hot Air Oven Curing**

An emission factor summary for hot air oven curing of 3 rubber formulations is presented in Table 4-9a. Organic and sulfur compound speciation factors are presented in Tables 4-9b and 9c.

Figure 4-4 - Summary of VOC Emissions From The Platen Press



## 4.2 Tire Curing

Tire press emission factors were determined for laboratory scale tire cuts and a full scale tire press. The tires tested represent a cross section of passenger tires and brands from the larger manufacturers.

Table 4-10a provides a summary of VOC emission factors for the laboratory scale tire cuts. Figure 4-5 shows a summary of VOC (THC as methane) emissions for passenger tires. Emission factor summaries for the tire press for OEM (original equipment manufacturer), high performance, replacement tires, and all tires combined are presented in Tables 4-10b, 10c, 10d, and 10e. Tables 4-10f, 10g, 10h and 10i present organic compound speciation factors for the three tire types and all tires combined. Amine and sulfur speciation factors are presented in Tables 4-10j through 10q for each of the tire types and all tires combined.

### 4.2.1 Relationship of Laboratory Scale and Full-scale Data

Table 4-10r provides a comparison of the laboratory and full scale tire press data from FTIR analyses. A review of this table indicates that there is little correlation between the lab and full-scale tire cure data for inorganic compounds, organic sulfur compounds, and speciated organic compounds.

## 4.3 Warmup Mills and Calendering

### 4.3.1 Warmup Mills

An emission factor summary for organics and sulfur compounds for the four rubber mixes tested in the warmup mill are presented in Table 4-11a. Tables 4-11b and 11c present the speciation factors for organic and sulfur compounds.

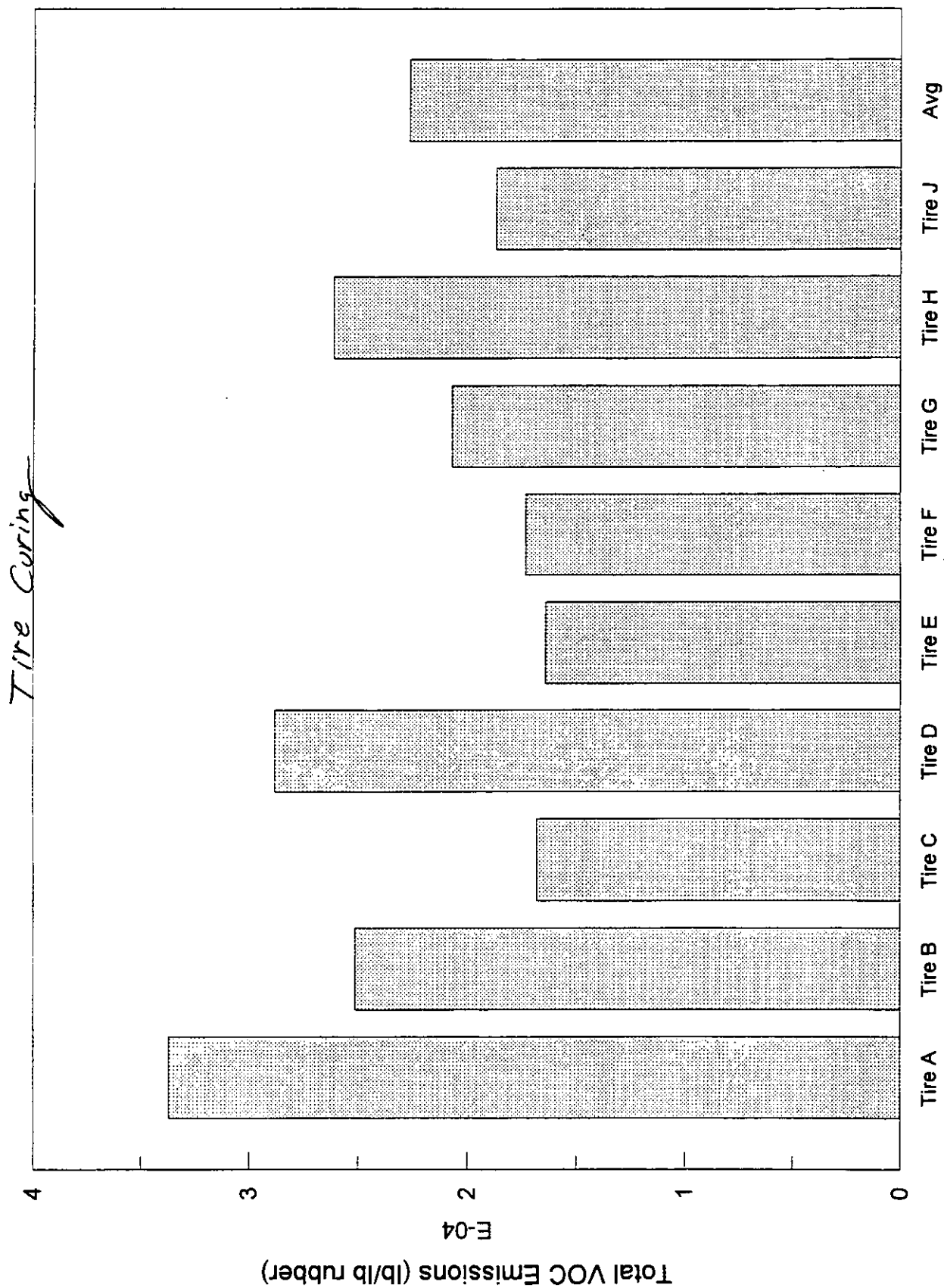
### 4.3.2 Calenders

An emission factor summary for calendering for total organics, total sulfur and amines for two rubber mixes is presented in Table 4-12a. Tables 4-12b and 12c contain speciation factors for organic and sulfur compounds.

## 4.4 Grinding

Emission factors were developed for four grinding operations: sidewall/whitewall grinding, retread carcass grinding, retread buffing, and belt grinding. Inlet and outlet concentrations were measured in order to determine control efficiencies. Force grinding was also evaluated but was found to have insignificant VOC emissions at the facility tested. Specifications of the grinding test series are summarized as follows:

**Figure 4-5. Summary of VOC Emissions for Passenger Tires**



| Process           | Control Device Sampling Locations    | Rubber Removal Measurement             |
|-------------------|--------------------------------------|----------------------------------------|
| Retread Buffing   | Cyclone Inlet, Baghouse Outlet       | lbs Emitted/lb Rubber Processed<br>(1) |
| Sidewall Grinding | Cyclone Inlet, Cyclone Outlet        | lbs Emitted/lb Rubber Removed<br>(2)   |
| Carcass Grinding  | Cyclone Inlet, Cyclone Outlet        | lbs Emitted/lb Rubber Removed<br>(2)   |
| Belt Grinding     | Cyclone Inlet, ESP Inlet, ESP Outlet | lbs Emitted/lb Rubber Removed<br>(3)   |

<sup>1</sup>Initial weights of the retread sections were taken. The emission factors were based on the pounds of tread processed.

<sup>2</sup>Initial and final weights of the cyclone hopper were taken to obtain the quantity of the rubber removed from the tires per test run. The difference in hopper weights was the amount of rubber removed.

<sup>3</sup>Initial and final weights of the belt batches were taken for each test run.

A summary of inlet concentrations, outlet concentrations, and control efficiencies is provided below.

#### 4.4.1 Inlet Concentrations

Summary inlet emission factors for sidewall grinding, tire carcass grinding, retread buffing, and belt grinding are presented in Tables 4-13a through 4-13d, respectively. Tables 4-13e, 13f, and 13g present speciation factors for each of the grinding operations for organic compounds, metals, and sulfur compounds.

#### 4.4.2 Outlet Concentrations

Summary outlet emission factors for the four grinding operations are presented in Tables 4-13h, 13i, 13j, and 13k. Calculated control efficiencies are presented in Table 4-13l.

### 4.5 Effects of Temperature

Table 4-14 presents VOC data for compounds at various temperatures on different processes. While no direct correlations can be derived, empirically one can observe that between 220°F and 400°F. VOC emissions can increase up to two orders of magnitude for most of the compounds. At a minimum, it appears that VOC emissions will increase at least one order of magnitude.

Specific tests were not conducted to determine the effects of elevated temperatures in a given compound. However, several compounds were subjected to temperatures varying from 200°F to 400°F, as a result of the tests conducted for each process. No compounds were tested at multiple temperatures on a given process.

These data, while not conclusive, can be used as a guide for making decisions when applying data from this study to plant-specific situations.

TABLE 4-3  
SMALL MIXER 1/LARGE MIXER 1 SUMMARY

SMALL MIXER 1 -

| Compound  | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total<br>Speciated<br>Organics <sup>1</sup> | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects | Total Metals<br>(lbs/lb rubber)<br>with non-detects | Total PM<br>(lbs/lb rubber) |
|-----------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------|
| TREAD     | NA                                           | NA                                                                      | NA                                                                  | NA                                          | NA                                                  | NA                                                  | NA                          |
| EPDM      | 4.52E-05                                     | < 1.68E-04                                                              | < 1.46E-04                                                          | 1.47E-04                                    | < 2.94E-06                                          | 1.21E-05                                            | 2.07E-04                    |
| SDW       | 2.88E-05                                     | < 9.42E-05                                                              | < 3.79E-05                                                          | 3.51E-05                                    | < 2.27E-06                                          | 5.79E-06                                            | 1.37E-04                    |
| SBR       | 6.59E-05                                     | < 1.09E-04                                                              | < 2.66E-04                                                          | 2.62E-04                                    | < 2.50E-06                                          | 1.35E-05                                            | 1.73E-04                    |
| Mean      | 4.66E-05                                     | < 1.24E-04                                                              | < 1.50E-04                                                          | 1.48E-04                                    | < 2.57E-06                                          | 1.05E-05                                            | 1.72E-04                    |
| Max.      | 6.59E-05                                     | < 1.68E-04                                                              | < 2.66E-04                                                          | 2.62E-04                                    | < 2.94E-06                                          | 1.35E-05                                            | 2.07E-04                    |
| Std. Dev. | 1.52E-05                                     | < 3.19E-05                                                              | < 9.32E-05                                                          | 9.26E-05                                    | < 2.78E-07                                          | 3.35E-06                                            | 2.86E-05                    |

69  
4  
22

LARGE MIXER 1 -

| Compound  | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total<br>Speciated<br>Organics <sup>1</sup> | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects | Total Metals<br>(lbs/lb rubber)<br>with non-detects | Total PM<br>(lbs/lb rubber) |
|-----------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------|
| TREAD     | 4.86E-05                                     | < 3.33E-04                                                              | < 6.69E-05                                                          | 6.79E-05                                    | < 2.86E-06                                          | 6.14E-06                                            | 5.36E-04                    |
| EPDM      | 7.72E-05                                     | < 2.44E-04                                                              | < 1.48E-04                                                          | 1.48E-04                                    | < 3.35E-06                                          | 2.79E-06                                            | 1.31E-04                    |
| SDW       | 3.05E-05                                     | < 3.27E-04                                                              | < 1.10E-04                                                          | 9.91E-05                                    | < 8.07E-06                                          | 3.30E-05                                            | 4.99E-04                    |
| SBR       | 6.41E-05                                     | < 1.87E-04                                                              | < 1.34E-04                                                          | 1.33E-04                                    | < 2.25E-06                                          | 1.29E-04                                            | 4.27E-04                    |
| Mean      | 5.51E-05                                     | < 2.73E-04                                                              | < 1.15E-04                                                          | 1.12E-04                                    | < 4.13E-06                                          | 4.27E-05                                            | 3.98E-04                    |
| Max.      | 7.72E-05                                     | < 3.33E-04                                                              | < 1.48E-04                                                          | 1.48E-04                                    | < 8.07E-06                                          | 1.29E-04                                            | 5.36E-04                    |
| Std. Dev. | 1.74E-05                                     | < 6.07E-05                                                              | < 3.08E-05                                                          | 3.10E-05                                    | < 2.31E-06                                          | 5.12E-05                                            | 1.59E-04                    |

<sup>1</sup> - Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatiles and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

**TABLE 4-4a**  
**SMALL MIXER 2 - TIRE PRODUCTS**  
**TIRE COMPOUND SUMMARY**

| Compound  | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Organics <sup>1</sup><br>(lbs/lb rubber)<br>with non-detects | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects | Total Metals<br>(lbs/lb rubber)<br>with non-detects | Total PM<br>(lbs/lb rubber) |
|-----------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------|
| 1         | 6.11E-05                                     | < 1.93E-06                                                              | < 7.88E-05                                                          | < 8.08E-05                                                                      | < 5.53E-06                                          | 1.20E-05                                            | 1.75E-04                    |
| 2         | 3.86E-05                                     | < 2.56E-06                                                              | < 6.35E-05                                                          | < 6.61E-05                                                                      | < 3.90E-06                                          | < 4.25E-05                                          | 4.02E-04                    |
| 3         | 1.37E-04                                     | < 5.10E-06                                                              | < 1.04E-04                                                          | < 1.09E-04                                                                      | < 7.65E-06                                          | 1.30E-04                                            | 8.99E-04                    |
| 4         | 3.86E-05                                     | < 2.09E-06                                                              | < 5.89E-05                                                          | < 6.09E-05                                                                      | < 2.95E-06                                          | 2.44E-05                                            | 3.00E-04                    |
| 5         | 2.15E-04                                     | < 2.91E-05                                                              | < 4.45E-05                                                          | < 7.36E-05                                                                      | < 3.04E-06                                          | 3.30E-05                                            | 9.25E-04                    |
| 6         | 3.96E-05                                     | < 3.56E-06                                                              | < 1.21E-04                                                          | < 1.25E-04                                                                      | < 7.65E-06                                          | < 8.28E-06                                          | 4.00E-04                    |
| 7         | 1.20E-04                                     | < 2.41E-06                                                              | < 1.16E-04                                                          | < 1.19E-04                                                                      | < 5.64E-06                                          | < 3.54E-05                                          | 5.66E-04                    |
| Mean      | 9.28E-05                                     | < 6.68E-06                                                              | < 8.38E-05                                                          | < 9.06E-05                                                                      | < 5.19E-06                                          | < 4.08E-05                                          | 5.24E-04                    |
| Max.      | 2.15E-04                                     | < 2.91E-05                                                              | < 1.21E-04                                                          | < 1.25E-04                                                                      | < 7.65E-06                                          | < 1.30E-04                                          | 9.25E-04                    |
| Std. Dev. | 6.25E-05                                     | < 9.21E-06                                                              | < 2.79E-05                                                          | < 2.45E-05                                                                      | < 1.84E-06                                          | < 3.82E-05                                          | 2.69E-04                    |

<sup>1</sup> - Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analysis list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

TABLE 4-4b  
SMALL MIXER 2 - ENGINEERED PRODUCTS  
~~PER-COMPOUND SUMMARY~~

| Compound  | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Organics <sup>1</sup><br>(lbs/lb rubber)<br>with non-detects | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects | Total Metals<br>(lbs/lb rubber)<br>with non-detects | Total PM<br>(lbs/lb rubber) |
|-----------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------|
| 1         | 6.11E-05                                     | < 1.93E-06                                                              | < 7.88E-05                                                          | < 8.08E-05                                                                      | < 5.53E-06                                          | 1.20E-05                                            | 1.75E-04                    |
| 2         | 3.86E-05                                     | < 2.56E-06                                                              | < 6.35E-05                                                          | < 6.61E-05                                                                      | < 3.90E-06                                          | < 4.25E-05                                          | 4.02E-04                    |
| 3         | 1.37E-04                                     | < 5.10E-06                                                              | < 1.04E-04                                                          | < 1.09E-04                                                                      | < 7.65E-06                                          | 1.30E-04                                            | 8.99E-04                    |
| 4         | 3.86E-05                                     | < 2.09E-06                                                              | < 5.89E-05                                                          | < 6.09E-05                                                                      | < 2.95E-06                                          | 2.44E-05                                            | 3.00E-04                    |
| 5         | 2.15E-04                                     | < 2.91E-05                                                              | < 4.45E-05                                                          | < 7.36E-05                                                                      | < 3.04E-06                                          | 3.30E-05                                            | 9.25E-04                    |
| 6         | 3.96E-05                                     | < 3.56E-06                                                              | < 1.21E-04                                                          | < 1.25E-04                                                                      | < 7.65E-06                                          | 8.28E-06                                            | 4.00E-04                    |
| 7         | 1.20E-04                                     | < 2.41E-06                                                              | < 1.16E-04                                                          | < 1.19E-04                                                                      | < 5.64E-06                                          | 3.54E-05                                            | 5.66E-04                    |
| 8         | 1.55E-05                                     | < 1.07E-06                                                              | < 5.93E-05                                                          | < 6.04E-05                                                                      | < 7.64E-06                                          | 8.19E-06                                            | 2.22E-04                    |
| 9         | 2.84E-05                                     | < 2.51E-06                                                              | < 6.28E-05                                                          | < 6.53E-05                                                                      | < 5.32E-06                                          | 2.42E-06                                            | 4.92E-05                    |
| 10        | 2.90E-04                                     | < 2.67E-06                                                              | < 3.10E-05                                                          | < 3.13E-04                                                                      | < 2.81E-05                                          | 2.44E-05                                            | 3.58E-04                    |
| 11        | 3.22E-05                                     | < 1.09E-05                                                              | < 3.12E-05                                                          | < 4.21E-05                                                                      | < 9.84E-06                                          | 1.72E-05                                            | 7.82E-05                    |
| 12        | 1.59E-05                                     | < 1.59E-06                                                              | < 6.54E-05                                                          | < 6.70E-05                                                                      | < 5.74E-05                                          | 1.85E-05                                            | 1.83E-04                    |
| 13        | 2.28E-04                                     | < 2.99E-06                                                              | < 1.60E-04                                                          | < 1.63E-04                                                                      | < 3.11E-06                                          | 8.06E-06                                            | 2.46E-04                    |
| 14        | 2.30E-04                                     | < 1.85E-06                                                              | < 1.45E-04                                                          | < 1.47E-04                                                                      | < 1.70E-05                                          | 1.05E-05                                            | 1.30E-04                    |
| 15        | 9.69E-06                                     | < 2.12E-06                                                              | < 6.10E-05                                                          | < 6.32E-05                                                                      | < 4.46E-06                                          | 4.54E-06                                            | 1.42E-04                    |
| 16        | 8.18E-05                                     | < 1.05E-06                                                              | < 3.48E-05                                                          | < 3.59E-05                                                                      | < 2.50E-06                                          | 1.14E-05                                            | 3.17E-04                    |
| 17        | 4.43E-04                                     | < 3.81E-06                                                              | < 3.16E-04                                                          | < 3.20E-04                                                                      | < 5.64E-06                                          | 1.69E-06                                            | 8.96E-05                    |
| 18        | 6.48E-05                                     | < 1.38E-06                                                              | < 1.34E-04                                                          | < 1.35E-04                                                                      | < 7.56E-05                                          | 1.34E-05                                            | 1.92E-04                    |
| 19        | 2.70E-05                                     | < 9.06E-07                                                              | < 2.31E-05                                                          | < 2.40E-05                                                                      | < 1.97E-06                                          | 1.04E-06                                            | 6.89E-05                    |
| 20        | 8.22E-06                                     | < 1.84E-06                                                              | < 1.78E-05                                                          | < 1.97E-05                                                                      | < 4.89E-06                                          | 1.17E-06                                            | 7.84E-04                    |
| 21        | 1.56E-04                                     | < 2.13E-06                                                              | < 1.38E-04                                                          | < 1.40E-05                                                                      | < 3.16E-06                                          | 9.28E-06                                            | 7.50E-05                    |
| 22        | 1.23E-04                                     | < 2.67E-06                                                              | < 9.00E-05                                                          | < 9.27E-05                                                                      | < 3.24E-06                                          | 7.27E-05                                            | 4.49E-04                    |
| 23        | 4.02E-05                                     | < 2.85E-06                                                              | < 5.91E-05                                                          | < 6.19E-05                                                                      | < 4.49E-06                                          | 4.38E-06                                            | 3.39E-04                    |
| Mean      | 1.06E-04                                     | < 3.87E-06                                                              | < 8.76E-05                                                          | < 9.82E-05                                                                      | < 1.18E-05                                          | < 2.15E-05                                          | 3.21E-04                    |
| Max.      | 4.43E-04                                     | < 2.91E-05                                                              | < 3.16E-04                                                          | < 3.20E-04                                                                      | < 7.56E-05                                          | < 1.30E-04                                          | 9.25E-04                    |
| Std. Dev. | 1.08E-04                                     | < 5.73E-06                                                              | < 6.34E-05                                                          | < 7.79E-05                                                                      | < 1.80E-05                                          | < 2.83E-05                                          | 2.52E-04                    |

<sup>1</sup> Organic compound total is taken from the specified statistical summary. The "total" represents the sum of the semivolatiles and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analysis list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

same info as table 4-4a - this is for tire products

**TABLE 4-4c**  
**SMALL MIXER 2 - SBR COPOLYMERS**  
**TIRE COMPOUND SUMMARY**

| Compound  | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Organics <sup>1</sup><br>(lbs/lb rubber)<br>with non-detects | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects | Total Metals<br>(lbs/lb rubber)<br>with non-detects | Total PM<br>(lbs/lb rubber) |
|-----------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-----------------------------|
| 24        | 4.10E-05                                     | < 1.69E-06                                                              | < 4.06E-05                                                          | < 4.23E-05                                                                      | < 2.91E-06                                          | < 6.59E-07                                          | 1.56E-05                    |
| 25        | 1.27E-04                                     | < 2.25E-06                                                              | < 8.80E-05                                                          | < 9.03E-05                                                                      | < 2.72E-06                                          | < 3.16E-07                                          | 2.04E-05                    |
| 26        | 1.10E-05                                     | < 5.20E-07                                                              | < 2.28E-05                                                          | < 2.34E-05                                                                      | < 2.85E-06                                          | < 2.18E-07                                          | 7.37E-06                    |
| Mean      | 5.97E-05                                     | < 1.49E-06                                                              | < 5.05E-05                                                          | < 5.20E-05                                                                      | < 2.83E-06                                          | < 3.98E-07                                          | 1.45E-05                    |
| Max.      | 1.27E-04                                     | < 2.25E-06                                                              | < 8.80E-05                                                          | < 9.03E-05                                                                      | < 2.91E-06                                          | < 6.59E-07                                          | 2.04E-05                    |
| Std. Dev. | 4.92E-05                                     | < 7.21E-07                                                              | < 2.75E-05                                                          | < 2.82E-05                                                                      | < 7.93E-08                                          | < 1.89E-07                                          | 5.38E-06                    |

<sup>1</sup> - Organic compound total is taken from the speciated statistical summaries. The 'total' represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

**TABLE 4-4d**  
**MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - TIRE PRODUCTS**

|   |   | CAS<br>Numbers                           | Cmpd #1<br>% Of Tot   | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |      |
|---|---|------------------------------------------|-----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------------------|-----------------|-----------------|------|
| 1 | 2 | 1-Butanol                                | 00071-35-3            | T                   | T                   | T                   | T                   | T                   | 1.07                | T                | 0.15            | 1.07            | 0.38 |
| 1 | 2 | 1-Chloro-4-(1-chloroethenyl) cyclohexene |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               | T    |
| 1 | 2 | 1-Chloro-5-(1-chloroethenyl) cyclohexene |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               | T    |
| 1 | 2 | 1-Chloropropane                          |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               | T    |
|   |   | 1-Dodecene                               | 112-41-4              | 0.05                | 0.04                | 0.07                | 0.03                | 0.01                | 0.04                | 0.05             | 0.04            | 0.07            | 0.02 |
|   |   | 1-Heptene                                | 00592-76-7            | 0.05                | 0.51                | 0.03                | 0.02                | 0.06                | 0.05                | 0.05             | 0.11            | 0.51            | 0.16 |
|   |   | 1-Hexene                                 | 00592-41-6            | 0.03                | 0.03                | 0.03                | 0.07                | 0.02                | 0.05                | 0.07             | 0.04            | 0.07            | 0.02 |
| 1 | 2 | 1-Methoxybutane                          |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               | T    |
|   |   | 1-Octene                                 | 00111-60-0            | 0.03                | 0.03                | 0.03                | 0.02                | 0.02                | 0.05                | 0.02             | 0.03            | 0.05            | 0.01 |
|   |   | 1-Pentene                                | 00109-67-1            | 0.19                | 0.13                | 0.16                | 0.23                | 0.57                | 0.29                | 0.02             | 0.23            | 0.57            | 0.16 |
| 1 | 2 | 1-Propanol                               |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               | T    |
| 1 |   | 1,1-Dichloroethane                       | 00075-34-3            | 0.57                | 0.20                | 0.24                | 0.16                | 0.28                | 0.37                | 0.40             | 0.32            | 0.57            | 0.13 |
| 1 |   | 1,1-Dichloroethene                       | 00075-35-4            | 0.57                | 0.20                | 0.24                | 0.90                | 0.28                | 0.37                | 0.40             | 0.42            | 0.90            | 0.23 |
| 1 |   | 1,1,1-Trichloroethane                    | 00071-55-6            | 0.57                | 0.12                | 0.29                | 0.07                | 0.25                | 0.37                | 0.40             | 0.30            | 0.57            | 0.16 |
| 1 |   | 1,1,2-Trichloroethane                    | 00079-00-5            | 0.57                | 0.20                | 0.24                | 0.16                | 0.28                | 0.37                | 0.40             | 0.32            | 0.57            | 0.13 |
| 1 |   | 1,1,2,2-Tetrachloroethane                | 00079-34-5            | 0.57                | 0.20                | 0.24                | 0.16                | 0.28                | 0.37                | 0.40             | 0.32            | 0.57            | 0.13 |
| 1 |   | 1,2-Dibromo-3-Chloropropane              | 00096-12-8            | 1.15                | 0.40                | 0.47                | 0.33                | 0.55                | 0.74                | 0.80             | 0.63            | 1.15            | 0.26 |
|   |   | 1,2-Dibromo-3-chloropropane              | 96-12-8               | 0.02                | 0.01                | 0.03                | 0.01                | 0.02                | 0.01                | 0.02             | 0.02            | 0.03            | 0.00 |
| 1 |   | 1,2-Dibromoethane                        | 00106-93-4            | 0.57                | 0.20                | 0.24                | 0.16                | 0.28                | 0.37                | 0.40             | 0.32            | 0.57            | 0.13 |
| 1 |   | 1,2-Dichlorobenzene                      | 00095-50-1            | 0.57                | 0.20                | 0.24                | 0.16                | 0.28                | 0.37                | 0.40             | 0.32            | 0.57            | 0.13 |
|   |   | 1,2-Dichlorobenzene                      | 95-50-1               | 0.01                | 0.01                | 0.01                | 0.00                | 0.00                | 0.01                | 0.01             | 0.01            | 0.01            | 0.00 |
| 1 |   | 1,2-Dichloroethane                       | 00107-06-2            | 0.57                | 0.20                | 0.24                | 0.16                | 0.28                | 0.37                | 0.40             | 0.32            | 0.57            | 0.13 |
| 1 |   | 1,2-Dichloropropane                      | 00078-87-5            | 0.57                | 0.20                | 0.24                | 0.16                | 0.28                | 0.37                | 0.40             | 0.32            | 0.57            | 0.13 |
|   |   | 1,2,4-Trichlorobenzene                   | 120-82-1              | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01             | 0.01            | 0.01            | 0.00 |
|   |   | 1,2,4-Trimethylbenzene                   | 00095-63-6            | 0.19                | 0.29                | 0.16                | 0.11                | 0.08                | 1.19                | 0.17             | 0.31            | 1.19            | 0.36 |
|   |   | 1,2,4-Trimethylbenzene                   | 95-63-6               | 0.05                | 0.03                | 0.05                | 0.03                | 0.03                | 0.04                | 0.00             | 0.03            | 0.05            | 0.02 |
|   |   | 1,3-Butadiene                            | 00106-99-0            | 0.12                | 0.03                | 0.03                | 0.36                | 0.02                | 0.05                | 0.39             | 0.14            | 0.39            | 0.15 |
|   |   | 1,3-Cyclooctadiene                       | 1700-10-3             | 0.01                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.01             | 0.01            | 0.02            | 0.00 |
| 1 |   | 1,3-Dichlorobenzene                      | 00541-73-1            | 0.57                | 0.20                | 0.24                | 0.16                | 0.28                | 0.37                | 0.40             | 0.32            | 0.57            | 0.13 |
|   |   | 1,3-Dichlorobenzene                      | 541-73-1              | 0.01                | 0.01                | 0.01                | 0.00                | 0.01                | 0.01                | 0.01             | 0.01            | 0.01            | 0.00 |
|   |   | 1,3,5-Trimethylbenzene                   | 00108-67-8            | 0.16                | 0.14                | 0.16                | 0.11                | 0.08                | 0.26                | 0.19             | 0.16            | 0.26            | 0.05 |
| 1 |   | 1,4-Dichlorobenzene                      | 00106-46-7            | 0.57                | 0.20                | 0.24                | 0.16                | 0.28                | 0.37                | 0.40             | 0.32            | 0.57            | 0.13 |
|   |   | 1,4-Dichlorobenzene                      | 106-46-7              | 0.01                | 0.01                | 0.00                | 0.00                | 0.00                | 0.00                | 0.00             | 0.00            | 0.01            | 0.00 |
|   |   | 1,4-Diethylbenzene + n-Butylbenzene      | 00105-05-5/00104-51-8 | 0.16                | 0.14                | 0.16                | 0.11                | 0.08                | 0.26                | 0.11             | 0.15            | 0.26            | 0.05 |
| 1 |   | 1,4-Dioxane                              | 00123-91-1            | 2.30                | 0.79                | 0.94                | 0.65                | 1.11                | 1.47                | 1.60             | 1.27            | 2.30            | 0.53 |
|   |   | 1,4-Phenylenediamine                     | 106-50-3              | 0.02                | 0.01                | 0.03                | 0.02                | 0.02                | 0.01                | 0.02             | 0.02            | 0.03            | 0.01 |
|   |   | 1,5-Cyclooctadiene                       | 111-78-4              | 0.02                | 0.02                | 0.04                | 0.02                | 0.02                | 0.02                | 0.03             | 0.02            | 0.04            | 0.01 |
| 1 | 2 | 2-Butanol                                |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               | T    |
| 1 |   | 2-Butanone                               | 00078-93-3            | 7.32                | 2.41                | 0.83                | 4.49                | 2.08                | 0.35                | 1.18             | 2.66            | 7.32            | 2.28 |
| 1 | 2 | 2-Butene                                 | 00126-99-8            | T                   | T                   | T                   | T                   | T                   | T                   | 1.00             | 0.14            | 1.00            | 0.35 |
|   |   | 2-Chloroacetophenone                     | 1341-24-8             | 0.00                | 0.00                | 0.01                | 0.00                | 0.00                | 0.00                | 0.00             | 0.00            | 0.01            | 0.00 |
|   |   | 2-Chloronaphthalene                      | 91-58-7               | 0.00                | 0.00                | 0.01                | 0.00                | 0.00                | 0.00                | 0.00             | 0.00            | 0.01            | 0.00 |
|   |   | 2-Chlorophenol                           | 95-57-8               | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01             | 0.01            | 0.01            | 0.00 |
|   |   | 2-Furaldehyde                            | 98-01-1               | 0.01                | 0.56                | 0.15                | 0.01                | 0.05                | 0.10                | 0.00             | 0.13            | 0.56            | 0.19 |
| 1 |   | 2-Hexanone                               | 00591-78-6            | 0.57                | 0.20                | 0.24                | 0.16                | 0.28                | 0.37                | 0.40             | 0.32            | 0.57            | 0.13 |
|   |   | 2-Methyl-1-butene                        | 00563-46-2            | 0.06                | 0.28                | 0.03                | 0.02                | 0.02                | 0.05                | 0.02             | 0.07            | 0.28            | 0.09 |
|   |   | 2-Methyl-2-butene                        | 00513-35-9            | 0.20                | 0.03                | 0.03                | 0.02                | 0.02                | 0.36                | 0.02             | 0.10            | 0.36            | 0.12 |
|   |   | 2-Methyl-2-pentene                       | 00625-27-4            | 0.03                | 0.03                | 0.03                | 0.02                | 0.02                | 0.05                | 0.02             | 0.03            | 0.05            | 0.01 |
|   |   | 2-Methylheptane                          | 00592-27-8            | 0.68                | 0.59                | 0.04                | 0.18                | 0.25                | 0.15                | 0.18             | 0.29            | 0.68            | 0.23 |
|   |   | 2-Methylhexane                           | 00591-76-4            | 0.05                | 1.39                | 0.14                | 0.21                | 0.21                | 0.16                | 0.13             | 0.33            | 1.39            | 0.44 |
|   |   | 2-Methylnaphthalene                      | 91-57-6               | 0.02                | 0.04                | 0.07                | 0.01                | 0.01                | 0.01                | 0.01             | 0.02            | 0.07            | 0.02 |
|   |   | 2-Methylpentane                          | 00107-63-5            | 0.69                | 0.65                | 0.88                | 1.06                | 1.16                | 0.75                | 0.62             | 0.83            | 1.16            | 0.19 |
|   |   | 2-Methylphenol                           | 95-48-7               | 0.01                | 0.01                | 0.08                | 0.00                | 0.02                | 0.00                | 0.01             | 0.02            | 0.08            | 0.03 |
|   |   | 2-Nitroaniline                           | 88-74-4               | 0.02                | 0.02                | 0.02                | 0.01                | 0.02                | 0.01                | 0.02             | 0.02            | 0.02            | 0.00 |
|   |   | 2-Nitrophenol                            | 88-75-5               | 0.01                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.01             | 0.01            | 0.02            | 0.00 |
|   |   | 2,2-Dimethylbutane                       | 00075-83-2            | 0.03                | 0.03                | 0.04                | 0.13                | 0.13                | 0.05                | 0.02             | 0.06            | 0.13            | 0.04 |
|   |   | 2,2-Dimethylpropane                      | 00463-82-1            | 0.03                | 0.03                | 0.04                | 0.02                | 0.02                | 0.06                | 0.02             | 0.03            | 0.06            | 0.01 |
|   |   | 2,2-oxybis(1-Chloropropane)              | 108-60-1              | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01             | 0.01            | 0.01            | 0.00 |
|   |   | 2,3-Dimethylpentane                      | 00565-59-3            | 0.03                | 0.49                | 0.04                | 0.06                | 0.07                | 0.07                | 0.06             | 0.12            | 0.49            | 0.15 |
|   |   | 2,3,4-Trimethylpentane                   | 00565-75-3            | 0.03                | 0.40                | 0.04                | 0.02                | 0.02                | 0.05                | 0.02             | 0.08            | 0.40            | 0.13 |
|   |   | 2,4-Dichlorophenol                       | 120-83-2              | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01             | 0.01            | 0.01            | 0.00 |
|   |   | 2,4-Dimethylhexane                       | 00589-43-5            | 0.10                | 0.69                | 0.04                | 0.17                | 0.05                | 0.05                | 0.14             | 0.18            | 0.69            | 0.21 |
|   |   | 2,4-Dimethylphenol                       | 105-67-9              | 0.01                | 0.01                | 0.13                | 0.01                | 0.01                | 0.02                | 0.01             | 0.03            | 0.13            | 0.04 |
|   |   | 2,4-Dinitrophenol                        | 105-67-9              | 0.04                | 0.04                | 0.07                | 0.05                | 0.04                | 0.04                | 0.04             | 0.04            | 0.07            | 0.01 |
|   |   | 2,4-Dinitrotoluene                       | 121-14-2              | 0.01                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.01             | 0.01            | 0.02            | 0.00 |
|   |   | 2,4,5-Trichlorophenol                    | 95-95-4               | 0.01                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.01             | 0.01            | 0.02            | 0.00 |

**TABLE 4-4d**  
**MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - TIRE PRODUCTS**

|     |                               | CAS<br>Numbers    | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|-----|-------------------------------|-------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------------------|-----------------|-----------------|
|     | 2,4,6-Trichlorophenol         | 88-06-2           | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.02          | < 0.00          |
|     | 2,6-Dinitrotoluene            | 606-20-2          | < 0.01              | < 0.01              | < 0.03              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.02           | < 0.03          | < 0.00          |
|     | 3-Furaldehyde                 | 498-60-2          | < 0.01              | < 0.01              | < 0.03              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.02           | < 0.03          | < 0.01          |
| 1 2 | 3-Methyl-2-Butanone           |                   | 1.43                | T                   | T                   | T                   | T                   | T                   | T                   | < 0.20           | 1.43            | < 0.50          |
|     | 3-Methylhexane                | 00589-34-4        | 0.13                | 1.92                | 0.23                | 0.23                | 0.28                | 0.21                | 0.15                | 0.45             | 1.92            | 0.60            |
|     | 3-Methylpentane               | 00096-14-0        | 2.66                | 0.58                | 0.41                | 0.79                | 0.99                | 0.41                | 2.75                | 1.23             | 2.75            | 0.95            |
|     | 3-Methylstyrene               | 100-80-1          | < 0.01              | < 0.01              | 0.01                | 0.01                | < 0.01              | < 0.01              | < 0.01              | < 0.01           | 0.01            | < 0.00          |
|     | 3-Nitroaniline                | 99-09-2           | < 0.01              | < 0.01              | < 0.03              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.02           | < 0.03          | < 0.00          |
|     | 3,3'-Dichlorobenzidine        | 91-94-1           | < 0.03              | < 0.01              | < 0.07              | < 0.02              | < 0.03              | < 0.00              | < 0.03              | < 0.03           | < 0.07          | < 0.02          |
|     | 3,3'-Dimethoxybenzidine       | 119-90-4          | < 0.03              | < 0.01              | < 0.08              | < 0.03              | < 0.03              | < 0.01              | < 0.03              | < 0.03           | < 0.08          | < 0.02          |
|     | 3,3'-Dimethylbenzidine        | 119-83-7          | < 0.01              | < 0.00              | < 0.02              | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.01           | < 0.02          | < 0.01          |
|     | 3/4-Methylphenol              | 108-39-4/106-44-5 | 0.01                | < 0.01              | 0.22                | < 0.01              | 0.15                | < 0.01              | < 0.01              | < 0.06           | 0.22            | < 0.08          |
|     | 4-Aminobiphenyl               | 92-67-1           | < 0.01              | < 0.00              | < 0.01              | < 0.00              | < 0.01              | < 0.00              | < 0.01              | < 0.00           | < 0.01          | < 0.00          |
|     | 4-Bromophenyl-phenylether     | 101-55-3          | < 0.02              | < 0.01              | 0.00                | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.01           | 0.02            | < 0.00          |
|     | 4-Chloro-3-methylphenol       | 59-50-7           | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.02          | < 0.00          |
|     | 4-Chloroaniline               | 106-47-8          | < 0.01              | < 0.01              | < 0.01              | 0.01                | < 0.01              | < 0.01              | < 0.01              | < 0.01           | 0.01            | < 0.00          |
|     | 4-Chlorophenyl-phenylether    | 70005-72-3        | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.01          | < 0.00          |
|     | 4-Chlorostyrene               | 1073-67-2         | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.01          | < 0.00          |
|     | 4-Methyl-1-pentene            | 00691-37-2        | < 0.03              | < 0.03              | < 0.03              | 0.31                | < 0.02              | 0.30                | < 0.02              | < 0.11           | 0.31            | < 0.13          |
| 1   | 4-Methyl-2-Pentanone          | 00108-10-1        | < 0.57              | 0.30                | 11.50               | 24.48               | < 0.28              | 24.54               | < 0.40              | < 8.87           | 24.54           | < 10.58         |
|     | 4-Methylstyrene               | 622-97-9          | < 0.01              | < 0.01              | < 0.01              | 0.01                | < 0.01              | < 0.01              | < 0.01              | < 0.01           | 0.01            | < 0.00          |
|     | 4-Nitroaniline                | 100-01-6          | < 0.02              | < 0.01              | < 0.03              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.02           | < 0.03          | < 0.01          |
|     | 4-Nitrobiphenyl               | 92-93-3           | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.02          | < 0.00          |
|     | 4-Nitrophenol                 | 100-02-7          | < 0.03              | < 0.03              | < 0.05              | < 0.02              | < 0.03              | < 0.03              | < 0.03              | < 0.03           | < 0.05          | < 0.01          |
| 1 2 | 4,4-Dimethyl-2-Pentanone      |                   | 1.43                | T                   | T                   | T                   | T                   | T                   | T                   | < 0.20           | 1.43            | < 0.50          |
|     | 4,4'-Methylenedianiline       | 101-77-9          | < 0.02              | < 0.01              | < 0.04              | < 0.02              | < 0.02              | < 0.00              | < 0.03              | < 0.02           | < 0.04          | < 0.01          |
|     | 4,6-Dinitro-2-methylphenol    | 534-52-1          | < 0.03              | < 0.02              | < 0.04              | < 0.04              | < 0.03              | < 0.02              | < 0.03              | < 0.03           | < 0.04          | < 0.01          |
|     | Acenaphthene                  | 83-32-9           | < 0.00              | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00           | < 0.01          | < 0.00          |
|     | Acenaphthylene                | 208-96-8          | < 0.00              | 0.01                | 0.06                | 0.01                | 0.06                | 0.00                | 0.00                | < 0.02           | 0.06            | < 0.02          |
| 1 2 | Acetaldehyde                  | 00075-07-0        | 0.86                | T                   | T                   | T                   | T                   | T                   | T                   | < 0.12           | 0.86            | < 0.30          |
| 1 2 | Acetaldehyde+isobutane        |                   | T                   | T                   | T                   | T                   | 0.83                | T                   | T                   | < 0.12           | 0.83            | < 0.29          |
|     | Acetone                       | 00067-64-1        | 1.87                | 20.10               | 3.83                | 15.91               | 3.74                | 2.61                | 2.60                | 7.24             | 20.10           | 6.93            |
| 1   | Acetonitrile                  | 01722-09-4        | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.63           | < 1.15          | < 0.26          |
| 1 2 | Acetophenone                  | 00098-86-2        | 2.87                | T                   | T                   | T                   | T                   | T                   | T                   | < 0.41           | 2.87            | < 1.00          |
|     | Acetophenone                  | 98-86-2           | 0.05                | 0.03                | 0.05                | 0.01                | 0.03                | 0.06                | 0.10                | 0.05             | 0.10            | 0.03            |
|     | Acetylene                     | 00074-86-2        | 1.01                | 2.55                | 0.43                | 0.53                | 0.12                | 1.41                | 0.04                | 0.87             | 2.55            | 0.82            |
| 1   | Acrolein                      | 00107-02-8        | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.63           | < 1.15          | < 0.26          |
| 1   | Acrylonitrile                 | 00107-13-1        | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.63           | < 1.15          | < 0.26          |
| 1   | Allyl Chloride                | 00107-05-1        | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.63           | < 1.15          | < 0.26          |
|     | Aniline                       | 62-53-3           | < 0.01              | 0.73                | < 0.01              | 0.71                | < 0.01              | 0.08                | < 0.01              | < 0.22           | 0.73            | < 0.31          |
|     | Anthracene                    | 120-12-7          | < 0.00              | < 0.00              | 0.01                | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00           | 0.01            | < 0.00          |
|     | a-Pinene                      | 07785-70-8        | < 0.03              | < 0.03              | < 0.03              | 0.13                | < 0.02              | < 0.05              | < 0.02              | < 0.04           | 0.13            | < 0.04          |
|     | a,a-Trichlorotoluene          | 98-07-7           | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.01          | < 0.00          |
|     | Benzaldehyde                  | 100-52-7          | 0.02                | 0.07                | 0.09                | 0.01                | 0.04                | 0.06                | < 0.01              | < 0.04           | 0.09            | < 0.03          |
|     | Benzene                       | 00071-43-2        | 0.07                | 0.07                | 0.10                | 0.19                | 0.41                | < 0.05              | 0.08                | < 0.14           | 0.41            | < 0.12          |
|     | Benzidine                     | 92-87-5           | < 0.01              | < 0.00              | < 0.03              | < 0.01              | < 0.02              | < 0.00              | < 0.02              | < 0.01           | < 0.03          | < 0.01          |
|     | Benzic acid                   | 65-85-0           | 0.51                | < 0.02              | < 0.03              | 0.06                | 0.53                | 0.25                | 0.16                | < 0.22           | 0.53            | < 0.20          |
|     | Benzonitrile                  | 100-47-0          | < 0.01              | < 0.00              | 0.01                | < 0.00              | 0.01                | < 0.00              | < 0.01              | < 0.01           | 0.01            | < 0.00          |
|     | Benzo(a)anthracene            | 56-55-3           | < 0.01              | < 0.00              | 0.01                | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.01           | 0.01            | < 0.00          |
|     | Benzo(a)pyrene                | 50-32-8           | < 0.01              | < 0.00              | < 0.03              | < 0.01              | < 0.01              | < 0.00              | < 0.02              | < 0.01           | < 0.03          | < 0.01          |
|     | Benzo(b)fluoranthene          | 205-99-2          | < 0.01              | < 0.00              | < 0.02              | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.01           | < 0.02          | < 0.01          |
|     | Benzo(g,h,i)perylene          | 191-24-2          | 0.02                | < 0.00              | < 0.04              | < 0.01              | < 0.02              | < 0.00              | < 0.03              | < 0.02           | 0.04            | < 0.01          |
|     | Benzo(k)fluoranthene          | 207-08-9          | < 0.01              | < 0.00              | < 0.02              | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.01           | < 0.02          | < 0.01          |
|     | Benzyl alcohol                | 100-51-6          | 0.01                | 0.02                | 0.02                | 0.01                | 0.02                | 0.03                | 0.02                | 0.02             | 0.03            | 0.01            |
| 1   | Benzyl Chloride               | 00100-44-7        | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.63           | < 1.15          | < 0.26          |
|     | Benzyl Chloride               | 100-44-7          | < 0.01              | < 0.00              | < 0.01              | < 0.00              | < 0.01              | < 0.00              | < 0.01              | < 0.01           | < 0.01          | < 0.00          |
|     | Biphenyl                      | 92-52-4           | < 0.00              | < 0.00              | 0.05                | 0.01                | < 0.00              | 0.01                | < 0.00              | < 0.01           | 0.05            | < 0.02          |
| 1 2 | bs(1-Methylethyl)Benzene      |                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 2 | bs(1,1-dimethylethyl)peroxide |                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
|     | bs(2-Chloroethoxy)methane     | 111-91-1          | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.01          | < 0.00          |
|     | bs(2-Chloroethyl)ether        | 111-44-4          | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.02          | < 0.00          |
|     | bs(2-Ethylhexyl)phthalate     | 117-81-7          | 0.05                | 0.05                | 0.11                | T                   | 0.03                | 0.14                | 0.03                | 0.06             | 0.14            | 0.05            |
|     | b-Pinene                      | 18172-67-3        | < 0.16              | 0.28                | 0.28                | 0.49                | 0.16                | < 0.26              | < 0.11              | < 0.25           | 0.49            | < 0.12          |
| 1   | Bromodichloromethane          | 00075-27-4        | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
| 1   | Bromofom                      | 00075-25-2        | 0.34                | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.28           | 0.40            | < 0.08          |
| 1   | Bromomethane                  | 00074-83-9        | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |

**TABLE 4-4d**  
**MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - TIRE PRODUCTS**

|     |                                      | CAS<br>Numbers        | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|-----|--------------------------------------|-----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------------------|-----------------|-----------------|
| 2   | Butanal                              | 00123-72-8            | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 2 | Butane                               |                       | T                   | T                   | 1.18                | 1.22                | T                   | T                   | T                   | < 0.34           | 1.22            | < 0.54          |
|     | Butylbenzylphthalate                 | 85-68-7               | 0.01                | 0.01                | 0.03                | < 0.01              | < 0.01              | T                   | < 0.01              | < 0.01           | 0.03            | < 0.01          |
| 1 2 | C10-C11 Branched Alkane              |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 2 | C10H18 Polycyclic Hydrocarbon        |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 2 | C10H20 Alkyl Substituted Cyclohexane |                       | T                   | T                   | T                   | T                   | T                   | 7.67                | T                   | < 1.10           | 7.67            | < 2.68          |
| 1 2 | C11-C12 Branched Alkane              |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 2 | C11H22 Alkane                        |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 2 | C12H24 Alkane                        |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 2 | C4 Aldehyde                          |                       | T                   | T                   | 0.88                | T                   | T                   | T                   | T                   | < 0.13           | 0.88            | < 0.31          |
| 1 2 | C5 Aldehyde                          |                       | T                   | T                   | 0.88                | T                   | T                   | T                   | T                   | < 0.13           | 0.88            | < 0.31          |
| 1 2 | C6H10 O2 Acid Ester                  |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 2 | C8H12 Cyclic alkene                  |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 2 | C8H16 Alkane                         |                       | 2.87                | T                   | T                   | T                   | T                   | T                   | 7.99                | < 1.55           | 7.99            | < 2.81          |
| 1 2 | C9H10 Alkyl Substituted Benzene      |                       | T                   | 1.24                | T                   | T                   | T                   | T                   | T                   | < 0.18           | 1.24            | < 0.43          |
| 1 2 | C9H12 Alkyl Substituted Benzene      |                       | T                   | 1.49                | T                   | T                   | T                   | T                   | T                   | < 0.21           | 1.49            | < 0.52          |
| 1 2 | C9H12 Polycyclic Alkene              |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
|     | Camphene                             | 79-92-5               | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | 0.01                | < 0.01              | < 0.01           | 0.02            | < 0.00          |
| 1   | Carbon Disulfide                     | 00075-15-0            | < 0.57              | < 0.20              | < 0.24              | 0.33                | 0.25                | 3.07                | < 0.40              | < 0.72           | 3.07            | < 0.96          |
| 1   | Carbon Tetrachloride                 | 00056-23-5            | < 0.57              | < 0.20              | 0.11                | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.30           | 0.57            | < 0.15          |
| 1 2 | Carbonyl sulfide                     | 00463-56-1            | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1   | Chlorobenzene                        | 00108-90-7            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
| 1 2 | Chlorobutadiene+Methylpentane        |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1   | Chlorodibromomethane                 | 00124-48-1            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
| 1   | Chloroethane                         | 00075-00-3            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
| 1   | Chloroform                           | 00067-66-3            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
| 1   | Chloromethane                        | 00074-87-3            | < 0.57              | 0.05                | < 0.24              | 0.05                | < 0.28              | 0.26                | < 0.40              | < 0.26           | 0.57            | < 0.17          |
|     | Chrysene                             | 218-01-9              | < 0.01              | < 0.00              | 0.01                | < 0.01              | < 0.01              | T                   | < 0.01              | < 0.01           | 0.01            | < 0.00          |
| 1   | cis-1,2-Dichloroethene               | 00156-59-2            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
| 1   | cis-1,3-Dichloropropene              | 10061-01-5            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
|     | cis-2-Butene                         | 00590-18-1            | < 0.03              | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.05              | < 0.02              | < 0.03           | < 0.05          | < 0.01          |
|     | cis-2-Hexene                         | 07688-21-3            | 0.50                | < 0.03              | < 0.03              | < 0.02              | 0.13                | < 0.05              | 0.22                | < 0.14           | 0.50            | < 0.16          |
|     | cis-2-Pentene                        | 00627-20-3            | 0.09                | 0.32                | 3.61                | 0.45                | 0.19                | 0.37                | 0.22                | 0.75             | 3.61            | 1.17            |
|     | Cumene                               | 00098-82-8            | < 0.03              | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.05              | 0.07                | < 0.04           | 0.07            | < 0.02          |
|     | Cumene                               | 98-82-8               | 0.00                | < 0.00              | 0.00                | 0.00                | 0.00                | 0.01                | 0.02                | < 0.01           | 0.02            | < 0.01          |
| 1 2 | Cyclobutane                          |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
|     | Cyclohexane                          | 00110-82-7            | 0.56                | 1.88                | 0.10                | 0.40                | 0.27                | 0.14                | 6.53                | 1.41             | 6.53            | 2.16            |
|     | Cyclohexanone                        | 108-94-1              | < 0.02              | 0.04                | 0.09                | 0.05                | 0.15                | 0.07                | 0.18                | < 0.09           | 0.18            | < 0.05          |
|     | Cyclohexylamine                      | 108-91-8              | < 0.01              | < 0.01              | < 0.03              | < 0.01              | < 0.01              | 0.00                | < 0.01              | < 0.01           | 0.03            | < 0.01          |
| 1 2 | Cyclooctadiene                       |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
|     | Cyclopentane + 2,3-Dimethylbutane    | 00287-92-3/00079-29-8 | 0.17                | 0.16                | 0.09                | 0.19                | 0.23                | 0.26                | 0.12                | 0.17             | 0.26            | 0.05            |
|     | Cyclopentene                         | 00142-29-0            | < 0.03              | 0.27                | 0.57                | 0.09                | 0.30                | < 0.05              | < 0.02              | < 0.19           | 0.57            | < 0.19          |
| 1 2 | Decane                               |                       | T                   | T                   | 1.18                | T                   | T                   | T                   | T                   | < 0.17           | 1.18            | < 0.41          |
|     | Dibenzofuran                         | 132-64-9              | < 0.00              | 0.00                | 0.03                | 0.00                | < 0.00              | 0.00                | < 0.00              | < 0.01           | 0.03            | < 0.01          |
|     | Dibenz(a,h)anthracene                | 53-90-3               | < 0.02              | < 0.00              | < 0.05              | < 0.01              | < 0.02              | < 0.00              | < 0.03              | < 0.02           | < 0.05          | < 0.01          |
| 1   | Dichlorodifluoromethane              | 00075-71-8            | < 0.57              | < 0.20              | 0.10                | < 0.16              | < 0.28              | 0.12                | < 0.40              | < 0.26           | 0.57            | < 0.16          |
|     | Diethylphthalate                     | 84-66-2               | 0.01                | 0.02                | 0.02                | T                   | 0.00                | 0.01                | T                   | 0.01             | 0.02            | 0.01            |
|     | Dimethylaminoazobenzene              | 60-11-7               | < 0.02              | < 0.01              | < 0.03              | < 0.02              | < 0.02              | < 0.00              | < 0.02              | < 0.02           | < 0.03          | < 0.01          |
|     | Dimethylphthalate                    | 131-11-3              | < 0.00              | < 0.00              | 0.01                | 0.00                | < 0.00              | < 0.00              | < 0.00              | < 0.00           | 0.01            | < 0.00          |
|     | D-n-butylphthalate                   | 84-74-2               | 0.10                | 0.02                | 0.05                | T                   | T                   | 0.01                | T                   | 0.03             | 0.10            | 0.03            |
|     | D-n-octylphthalate                   | 117-84-0              | 0.01                | < 0.00              | < 0.01              | < 0.00              | 0.00                | < 0.00              | < 0.01              | < 0.00           | 0.01            | < 0.00          |
|     | Diphenylamine                        | 122-39-4              | 0.00                | 0.04                | 0.03                | 0.03                | 0.00                | 0.41                | 0.00                | 0.07             | 0.41            | 0.14            |
|     | d-Limonene                           | 05989-27-5            | < 0.16              | < 0.14              | < 0.17              | < 0.12              | 0.21                | < 0.26              | < 0.11              | < 0.17           | 0.26            | < 0.05          |
| 1   | Epichlorohydrin                      | 00106-89-8            | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.63           | < 1.15          | < 0.26          |
|     | Ethane                               | 00074-84-0            | 1.97                | 0.42                | 0.66                | 0.84                | 0.29                | 0.44                | 0.21                | 0.69             | 1.97            | 0.56            |
| 1 2 | Ethanol                              |                       | 1.29                | 1.24                | T                   | 1.43                | 1.11                | 9.20                | T                   | < 2.04           | 9.20            | < 2.98          |
| 1 2 | Ethenylcyclohexene                   | 25168-07-4            | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 2 | Ethyl Acetate                        |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 2 | Ethyl Acrylate                       |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
|     | Ethylacetylene                       | 00107-00-6            | < 0.03              | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.05              | < 0.02              | < 0.03           | < 0.05          | < 0.01          |
|     | Ethylbenzene                         | 00100-41-4            | < 0.03              | 0.22                | 0.20                | 0.19                | 0.16                | 0.19                | 3.64                | < 0.66           | 3.64            | < 1.22          |
|     | Ethylene                             | 00074-85-1            | < 0.03              | 0.10                | 0.22                | 0.25                | 0.18                | 0.11                | < 0.02              | < 0.13           | 0.25            | < 0.08          |
|     | Fluoranthene                         | 206-44-0              | 0.02                | < 0.00              | 0.01                | < 0.00              | 0.00                | < 0.00              | 0.00                | < 0.01           | 0.02            | < 0.01          |
|     | Fluorene                             | 86-73-7               | 0.00                | 0.00                | 0.01                | 0.00                | 0.00                | 0.00                | < 0.00              | < 0.00           | 0.01            | < 0.00          |
| 1 2 | Heptane                              |                       | T                   | 7.45                | T                   | 0.82                | T                   | T                   | T                   | < 1.18           | 7.45            | < 2.57          |
| 1 2 | Heptanone                            |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |

**TABLE 4-4d**  
**MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - TIRE PRODUCTS**

|   |                             | CAS<br>Numbers        | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|---|-----------------------------|-----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------------------|-----------------|-----------------|
| 1 | Hexachlorobenzene           | 118-74-1              | < 0.01              | < 0.01              | 0.01                | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | 0.01            | < 0.00          |
|   | Hexachlorobutadiene         | 00087-68-3            | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.63           | < 1.15          | < 0.26          |
|   | Hexachlorobutadiene         | 87-68-3               | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.02              | < 0.01           | < 0.02          | < 0.00          |
|   | Hexachlorocyclopentadiene   | 77-47-4               | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01           | < 0.02          | < 0.00          |
| 1 | 2 Hexachloroethane          |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
|   | Hexachloroethane            | 67-72-1               | < 0.02              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.02           | < 0.02          | < 0.00          |
|   | Hydroquinone                | 123-31-9              | < 0.01              | < 0.01              | < 0.02              | 1.33                | 35.85               | < 0.01              | < 0.01              | < 5.29           | 35.65           | < 12.40         |
|   | Indeno(1,2,3-cd)pyrene      | 193-39-5              | < 0.02              | < 0.00              | < 0.03              | < 0.01              | < 0.02              | < 0.00              | < 0.02              | < 0.01           | < 0.03          | < 0.01          |
| 1 | 2 Isobutanol                | 00078-84-2            | T                   | T                   | T                   | T                   | 1.25                | T                   | T                   | < 0.18           | 1.25            | < 0.44          |
|   | Isobutane                   | 00075-28-5            | 0.44                | < 0.03              | 0.30                | 0.31                | 0.70                | < 0.06              | 0.12                | < 0.28           | 0.70            | < 0.22          |
|   | Isobutylene + 1-Butene      | 00115-11-7/00106-98-9 | 0.21                | 0.35                | 0.59                | 1.10                | 0.55                | 0.16                | 0.56                | 0.50             | 1.10            | 0.29            |
|   | Isocetane                   | 00540-84-1            | 0.11                | 1.16                | 0.26                | 0.16                | 0.14                | 0.13                | 0.18                | 0.31             | 1.16            | 0.35            |
|   | Isocetanol                  | 26952-21-6            | < 0.13              | 0.22                | < 0.22              | < 0.09              | < 0.13              | 0.48                | < 0.13              | < 0.20           | 0.48            | < 0.12          |
|   | Isopentane                  | 00078-78-4            | 1.03                | < 0.03              | 2.83                | 8.69                | 2.99                | 2.95                | 1.32                | < 2.84           | 8.69            | < 2.61          |
|   | Isophorone                  | 78-59-1               | < 0.01              | 1.00                | < 0.01              | 0.10                | < 0.01              | < 0.00              | < 0.01              | < 0.16           | 1.00            | < 0.35          |
|   | Isoprene                    | 00078-79-5            | < 0.03              | < 0.03              | < 0.03              | < 0.02              | 0.15                | < 0.05              | < 0.02              | < 0.05           | 0.15            | < 0.04          |
| 1 | 2 Isopropyl Alcohol         |                       | 1.29                | T                   | T                   | 0.82                | 1.39                | 0.92                | T                   | < 0.63           | 1.39            | < 0.58          |
| 1 | 2 Methyl Acrylate           |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1 | 2 Methyl Isothiocyanate     | 00556-61-6            | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
|   | Methylacetylene             | 00074-99-7            | < 0.03              | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.05              | < 0.02              | < 0.03           | < 0.05          | < 0.01          |
|   | Methylcyclohexane           | 00108-87-2            | 0.23                | 3.91                | 0.48                | 1.05                | 0.41                | 0.70                | 0.54                | 1.05             | 3.91            | 1.19            |
|   | Methylcyclopentane          | 00096-37-7            | 4.19                | 0.78                | 0.33                | 0.57                | 1.46                | 0.35                | 5.48                | 1.88             | 5.48            | 1.93            |
|   | Methylene bis-chloroaniline | 101-14-4              | < 0.04              | < 0.01              | < 0.09              | < 0.03              | < 0.04              | < 0.01              | < 0.05              | < 0.04           | < 0.09          | < 0.03          |
| 1 | Methylene Chloride          | 00075-09-2            | 1.36                | 1.44                | 35.39               | 3.06                | 0.57                | 1.99                | 0.96                | 6.40             | 35.39           | 11.86           |
| 1 | 2 Methylhexane              |                       | T                   | 7.45                | T                   | T                   | T                   | T                   | T                   | < 1.06           | 7.45            | < 2.61          |
| 1 | 2 Methylpentane             |                       | T                   | 1.24                | 0.88                | 2.45                | T                   | 2.76                | T                   | < 1.05           | 2.76            | < 1.09          |
|   | m-Ethyltoluene              | 00620-14-4            | < 0.03              | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.05              | 0.11                | < 0.04           | 0.11            | < 0.03          |
|   | m-Xylene + p-Xylene         | 00108-38-3/00106-42-3 | 0.32                | 0.88                | 0.65                | 0.84                | 0.56                | 0.50                | 12.13               | 2.27             | 12.13           | 4.03            |
|   | Naphthalene                 | 91-20-3               | 0.03                | 0.05                | 0.28                | 0.03                | 0.34                | 0.04                | 0.04                | 0.12             | 0.34            | 0.13            |
|   | n-Butane                    | 00106-97-8            | 0.95                | 0.35                | 0.94                | 1.17                | 1.93                | 0.16                | 0.53                | 0.86             | 1.93            | 0.55            |
|   | n-Decane                    | 00124-18-5            | 0.49                | 0.41                | 0.44                | 0.85                | 0.28                | < 0.27              | 0.73                | < 0.50           | 0.85            | < 0.20          |
|   | n-Heptane                   | 00142-82-5            | 0.20                | 3.69                | 0.26                | 0.38                | 0.40                | 0.28                | 0.18                | 0.77             | 3.69            | 1.20            |
|   | n-Hexane                    | 00110-54-3            | 10.21               | 1.63                | 1.45                | 2.56                | 8.03                | 1.19                | 9.08                | 4.88             | 10.21           | 3.73            |
|   | Nitrobenzene                | 98-95-3               | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.01          | < 0.00          |
|   | N-Nitrosodiethylamine       | 55-18-5               | < 0.02              | < 0.02              | < 0.03              | < 0.02              | < 0.02              | < 0.02              | < 0.02              | < 0.02           | < 0.03          | < 0.01          |
|   | n-Nitrosodimethylamine      | 62-75-9               | T                   | < 0.01              | < 0.04              | T                   | T                   | < 0.02              | T                   | < 0.01           | 0.04            | < 0.01          |
|   | N-Nitroso-di-n-propylamine  | 621-64-7              | < 0.02              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.02           | < 0.02          | < 0.00          |
|   | N-Nitrosodiphenylamine      | 86-30-6               | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
|   | n-Nitrosomorpholine         | 59-89-2               | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.02              | < 0.01           | < 0.02          | < 0.00          |
|   | n-Nonane                    | 00111-84-2            | 0.33                | 0.25                | 0.13                | < 0.02              | 0.15                | 0.47                | 0.51                | < 0.27           | 0.51            | < 0.17          |
|   | n-Octane                    | 00111-65-9            | 0.19                | < 0.03              | < 0.04              | 0.15                | 0.17                | 0.08                | 0.12                | < 0.11           | 0.19            | < 0.06          |
| 1 | 2 Nonane                    |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
|   | n-Pentane                   | 00109-66-0            | 0.66                | < 0.03              | 0.62                | 0.83                | 1.25                | 0.24                | 0.41                | < 0.58           | 1.25            | < 0.37          |
| 1 | 2 n-Propane                 |                       | 1.43                | T                   | T                   | T                   | T                   | T                   | T                   | < 0.20           | 1.43            | < 0.50          |
|   | n-Propylbenzene             | 00103-65-1            | 0.15                | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.01              | < 0.02              | < 0.05           | 0.15            | < 0.04          |
| 1 | 2 n-Undecane                | 00112-21-4            | 1.43                | T                   | T                   | T                   | 0.97                | T                   | 1.00                | < 0.49           | 1.43            | < 0.58          |
|   | N,N-Diethylaniline          | 91-66-7               | 0.05                | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.01           | 0.05            | < 0.02          |
|   | N,N-Dimethylaniline         | 121-69-7              | < 0.01              | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.01          | < 0.00          |
|   | o-Anisidine                 | 90-04-0               | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.02          | < 0.00          |
|   | o-Ethyltoluene              | 00611-14-3            | < 0.16              | 0.52                | < 0.16              | < 0.11              | < 0.08              | < 0.26              | < 0.11              | < 0.20           | 0.52            | < 0.14          |
|   | o-Toluidine                 | 95-53-4               | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | 0.18                | < 0.01              | < 0.03           | 0.18            | < 0.06          |
|   | o-Xylene                    | 00095-47-6            | 0.12                | 0.59                | 0.29                | 0.62                | 0.21                | 0.76                | 6.51                | 1.30             | 6.51            | 2.14            |
|   | p-Cymene                    | 00099-87-6            | 0.22                | 0.22                | < 0.16              | 0.24                | 0.08                | < 0.26              | 0.16                | < 0.19           | 0.26            | < 0.06          |
|   | Pentachloronitrobenzene     | 82-68-8               | < 0.03              | < 0.03              | < 0.04              | < 0.03              | < 0.03              | < 0.03              | < 0.03              | < 0.03           | < 0.04          | < 0.00          |
|   | Pentachlorophenol           | 87-86-5               | < 0.02              | < 0.01              | < 0.03              | < 0.02              | < 0.02              | < 0.01              | < 0.02              | < 0.02           | < 0.03          | < 0.01          |
| 1 | 2 Pentane                   |                       | T                   | T                   | 1.18                | 1.43                | T                   | T                   | T                   | < 0.37           | 1.43            | < 0.59          |
| 1 | 2 Pentene                   |                       | T                   | T                   | 0.88                | T                   | T                   | T                   | T                   | < 0.13           | 0.88            | < 0.31          |
|   | p-Ethyltoluene              | 00622-96-8            | < 0.03              | < 0.03              | < 0.03              | 0.57                | < 0.02              | < 0.05              | 0.39                | < 0.16           | 0.57            | < 0.21          |
|   | Phenanthrene                | 85-01-8               | 0.02                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01             | 0.02            | 0.00            |
|   | Phenol                      | 108-95-2              | 0.09                | 0.07                | 0.25                | 0.02                | 1.03                | 0.04                | 0.02                | 0.22             | 1.03            | 0.34            |
|   | Phthalimide                 | 85-41-6               | < 0.03              | < 0.03              | 0.64                | < 0.02              | 0.11                | < 0.02              | 0.01                | < 0.12           | 0.64            | < 0.21          |
| 2 | Propanal                    |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
|   | Propane                     | 00074-98-6            | 1.58                | 0.32                | 0.74                | 0.62                | 0.60                | 0.21                | 0.18                | 0.61             | 1.58            | 0.45            |
| 1 | 2 Propylcyclohexane         |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
|   | Propylene                   | 00115-07-1            | < 0.03              | 0.33                | < 0.03              | 0.06                | 0.06                | < 0.05              | < 0.02              | < 0.08           | 0.33            | < 0.10          |
| 1 | Propylene Oxide             | 00075-56-9            | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.63           | < 1.15          | < 0.26          |

**TABLE 4-4d**  
**MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - TIRE PRODUCTS**

|                                       |                            | CAS<br>Numbers | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|---------------------------------------|----------------------------|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------------------|-----------------|-----------------|
|                                       | Pyrene                     | 129-00-0       | 0.04                | 0.01                | 0.03                | 0.01                | 0.04                | 0.01                | 0.02                | 0.02             | 0.04            | 0.02            |
|                                       | Pyridine                   | 110-86-1       | < 0.01              | < 0.01              | < 0.03              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01           | < 0.03          | < 0.01          |
|                                       | Styrene                    | 00100-42-5     | < 0.03              | < 0.03              | < 0.03              | 0.07                | < 0.02              | 3.40                | < 0.02              | < 0.51           | 3.40            | < 1.18          |
| 1                                     | t-Butyl Methyl Ether       | 01634-04-4     | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | 0.26                | < 0.80              | < 0.57           | 1.15            | < 0.29          |
| 1 2                                   | tert-Butyl Alcohol         | 00075-65-0     | T                   | T                   | T                   | T                   | T                   | 0.82                | T                   | < 0.13           | 0.92            | < 0.32          |
| 1                                     | Tetrachloroethene          | 00127-18-4     | < 0.57              | 6.20                | 0.09                | 0.11                | < 0.28              | 0.08                | < 0.40              | < 1.10           | 6.20            | < 2.09          |
| 1 2                                   | Tetrahydrofuran            |                | 1.43                | T                   | T                   | T                   | T                   | T                   | 1.00                | < 0.35           | 1.43            | < 0.56          |
|                                       | Toluene                    | 00108-88-3     | 2.04                | 3.13                | 1.94                | 0.98                | 2.35                | 0.44                | 0.89                | 1.68             | 3.13            | 0.88            |
| 1                                     | trans-1,2-Dichloroethene   | 00156-60-5     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
| 1                                     | trans-1,2-Dichloropropene  | 10061-02-6     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
|                                       | trans-2-Butene             | 00624-64-6     | < 0.03              | < 0.03              | 0.33                | < 0.02              | < 0.02              | < 0.05              | < 0.02              | < 0.07           | 0.33            | < 0.10          |
|                                       | trans-2-Hexene             | 04050-45-7     | < 0.03              | < 0.03              | 0.10                | < 0.02              | 0.11                | < 0.05              | < 0.02              | < 0.05           | 0.11            | < 0.04          |
|                                       | trans-2-Pentene            | 00646-04-8     | < 0.03              | < 0.03              | < 0.03              | 0.19                | < 0.02              | < 0.05              | < 0.02              | < 0.05           | 0.19            | < 0.06          |
| 1                                     | Trichloroethene            | 00079-01-6     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
| 1                                     | Trichlorofluoromethane     | 00075-69-4     | < 0.57              | 1.02                | 0.23                | < 0.16              | < 0.28              | 0.86                | 0.56                | < 0.53           | 1.02            | < 0.30          |
| 1 2                                   | Trichloroheptafluorobutane |                | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                | T               | T               |
| 1                                     | Trichlorotrifluoroethane   | 00076-13-1     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
|                                       | Trifluralin                | 1582-09-8      | < 0.02              | < 0.02              | < 0.03              | < 0.02              | < 0.02              | < 0.02              | < 0.02              | < 0.02           | < 0.03          | < 0.00          |
| 1 2                                   | Undecane                   |                | T                   | T                   | 0.88                | T                   | T                   | T                   | T                   | < 0.13           | 0.88            | < 0.31          |
| 1 2                                   | Unknown                    |                | 2.87                | T                   | T                   | T                   | T                   | T                   | 1.80                | < 0.67           | 2.87            | < 1.09          |
| 1                                     | Vinyl Acetate              | 00108-05-4     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | 3.19                | < 0.37              | < 0.40              | < 0.73           | 3.19            | < 1.01          |
| 1                                     | Vinyl Chloride             | 00075-01-4     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.32           | < 0.57          | < 0.13          |
| Total Detected (lb/lb rubber)         |                            |                | 5.20E-05            | 5.78E-05            | 9.14E-05            | 5.46E-05            | 6.10E-05            | 9.69E-05            | 8.89E-05            |                  |                 |                 |
| Total with non-detects (lb/lb rubber) |                            |                | < 8.08E-05          | < 6.61E-05          | < 1.09E-04          | < 6.09E-05          | < 7.36E-05          | < 1.25E-04          | < 1.19E-04          |                  |                 |                 |

**NOTES:**

- 1 TO14 Compound
- 2 Tentatively Identified Compound(TIC)
- T TIC Not Identified In Summarized Category
- \* % of Total Values Represent % of Total With Non-Detects

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - ENGINEERED PRODUCTS

|                                            | CAS<br>Numbers        | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | Cmpd #8<br>% Of Tot | Cmpd #9<br>% Of Tot | Cmpd #10<br>% Of Tot | Cmpd #11<br>% Of Tot | Cmpd #12<br>% Of Tot | Cmpd #13<br>% Of Tot | Cmpd #14<br>% Of Tot |
|--------------------------------------------|-----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1 2 1-Butanol                              | 00071-36-3            | T                   | T                   | T                   | T                   | T                   | 1.07                | T                   | 1.33                | T                   | 0.47                 | T                    | T                    | 13.57                | 8.13                 |
| 1 2 1-Chloro-4-(1-chloroethyl) cyclohexene |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | 1.47                 | 1.57                 | T                    | T                    |
| 1 2 1-Chloro-5-(1-chloroethyl) cyclohexene |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | 1.47                 | 1.57                 | T                    | T                    |
| 1 2 1-Chloropropane                        |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | 2.71                 | T                    |
| 1-Dodecene                                 | 112-41-4              | < 0.05              | < 0.04              | < 0.07              | < 0.03              | 0.01                | < 0.04              | < 0.05              | < 0.05              | < 0.04              | 0.02                 | 0.02                 | < 0.03               | < 0.02               | < 0.05               |
| 1-Heptene                                  | 00582-76-7            | 0.05                | 0.51                | < 0.03              | < 0.02              | 0.06                | < 0.05              | 0.05                | 0.25                | 0.27                | < 0.02               | 0.09                 | 0.12                 | 0.08                 | 0.13                 |
| 1-Hexene                                   | 00582-41-6            | < 0.03              | < 0.03              | < 0.03              | 0.07                | < 0.02              | < 0.05              | 0.07                | 0.03                | < 0.03              | < 0.02               | < 0.03               | < 0.02               | 0.10                 | < 0.01               |
| 1 2 1-Methoxybutane                        |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | 1.75                 |
| 1-Octene                                   | 00111-60-0            | < 0.03              | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.05              | < 0.02              | < 0.03              | < 0.03              | < 0.02               | < 0.03               | < 0.02               | < 0.01               | < 0.01               |
| 1-Pentene                                  | 00109-87-1            | 0.19                | 0.13                | 0.16                | 0.23                | 0.57                | 0.29                | < 0.02              | 0.18                | 0.87                | 0.10                 | < 0.03               | 0.33                 | 0.13                 | 0.13                 |
| 1 2 1-Propanol                             |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | 1.36                 | T                    |
| 1 1,1-Dichloroethane                       | 00075-34-3            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 1,1-Dichloroethene                       | 00075-35-4            | < 0.57              | < 0.20              | < 0.24              | 0.90                | < 0.28              | < 0.37              | < 0.40              | 0.17                | 0.29                | < 0.16               | < 0.23               | < 0.13               | < 0.11               | 0.15                 |
| 1 1,1,1-Trichloroethane                    | 00071-55-6            | < 0.57              | 0.12                | 0.29                | 0.07                | 0.25                | < 0.37              | < 0.40              | 0.04                | 0.11                | 0.04                 | < 0.23               | 0.04                 | 0.03                 | 0.02                 |
| 1 1,1,2-Trichloroethane                    | 00079-00-5            | < 0.57              | < 0.20              | < 0.24              | < 0.18              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 1,1,2,2-Tetrachloroethane                | 00079-34-5            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 1,2-Dibromo-3-Chloropropane              | 00098-12-6            | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.35              | < 0.39              | < 0.31               | < 0.47               | < 0.25               | < 0.22               | < 0.14               |
| 1,2-Dibromo-3-chloropropane                | 98-12-8               | < 0.02              | < 0.01              | < 0.03              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.02              | < 0.01              | < 0.00               | < 0.02               | < 0.01               | < 0.01               | < 0.01               |
| 1 1,2-Dibromoethane                        | 00106-93-4            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 1,2-Dichlorobenzene                      | 00095-50-1            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 1,2-Dichlorobenzene                      | 95-50-1               | < 0.01              | < 0.01              | < 0.01              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
| 1 1,2-Dichloroethane                       | 00107-06-2            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 1,2-Dichloropropane                      | 00078-87-5            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1,2,4-Trichlorobenzene                     | 120-82-1              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.01               | < 0.00               | < 0.01               |
| 1,2,4-Trimethylbenzene                     | 00095-63-6            | 0.19                | 0.29                | < 0.16              | < 0.11              | 0.08                | 1.19                | 0.17                | 2.70                | 0.23                | < 0.11               | < 0.16               | 0.17                 | < 0.04               | < 0.05               |
| 1,2,4-Trimethylbenzene                     | 95-63-6               | 0.05                | 0.03                | 0.05                | 0.03                | 0.03                | 0.04                | < 0.00              | 0.03                | < 0.01              | < 0.01               | < 0.02               | 0.07                 | 0.02                 | 0.00                 |
| 1,3-Butadiene                              | 00106-99-0            | 0.12                | < 0.03              | < 0.03              | 0.38                | < 0.02              | < 0.05              | 0.39                | 0.19                | 0.26                | < 0.02               | 0.91                 | 0.13                 | 0.07                 | 0.16                 |
| 1,3-Cyclooctadiene                         | 1700-10-3             | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | 0.07                | < 0.01              | < 0.01               | < 0.01               | < 0.01               | < 0.00               | < 0.00               |
| 1 1,3-Dichlorobenzene                      | 00541-73-1            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1,3-Dichlorobenzene                        | 541-73-1              | < 0.01              | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
| 1,3,5-Trimethylbenzene                     | 00108-87-8            | < 0.16              | < 0.14              | < 0.16              | < 0.11              | < 0.08              | < 0.26              | 0.19                | < 0.12              | < 0.13              | < 0.11               | < 0.16               | < 0.09               | 0.09                 | 0.16                 |
| 1 1,4-Dichlorobenzene                      | 00106-46-7            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1,4-Dichlorobenzene                        | 106-46-7              | < 0.01              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | 0.01                | < 0.01              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               |
| 1,4-Diethylbenzene + n-Butylbenzene        | 00105-05-5/00104-51-8 | < 0.16              | < 0.14              | < 0.16              | < 0.11              | < 0.08              | < 0.28              | < 0.11              | < 0.12              | < 0.14              | < 0.11               | < 0.16               | < 0.09               | < 0.04               | < 0.05               |
| 1 1,4-Dioxane                              | 00123-81-1            | < 2.30              | < 0.79              | < 0.94              | < 0.65              | < 1.11              | < 1.47              | < 1.60              | < 0.71              | < 0.78              | < 0.62               | < 0.94               | < 0.50               | < 0.43               | < 0.28               |
| 1,4-Phenylenediamine                       | 106-50-3              | < 0.02              | < 0.01              | < 0.03              | < 0.02              | < 0.02              | < 0.01              | < 0.02              | < 0.02              | < 0.02              | < 0.00               | < 0.02               | < 0.01               | < 0.01               | < 0.02               |
| 1,5-Cyclooctadiene                         | 111-78-4              | < 0.02              | < 0.02              | < 0.04              | < 0.02              | < 0.02              | < 0.02              | < 0.03              | < 0.03              | < 0.02              | < 0.00               | < 0.03               | < 0.02               | < 0.01               | < 0.01               |
| 1 2 2-Butanol                              |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2-Butanone                               | 00078-93-3            | 7.32                | 2.41                | 0.83                | 4.49                | 2.08                | 0.35                | 1.18                | 0.84                | 0.75                | 0.38                 | 0.21                 | 1.22                 | 0.20                 | 0.21                 |
| 1 2 2-Butene                               | 00128-99-8            | T                   | T                   | T                   | T                   | T                   | T                   | 1.00                | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 2-Chloroacetophenone                       | 1341-24-8             | < 0.00              | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.01               |
| 2-Chloronaphthalene                        | 91-58-7               | < 0.00              | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
| 2-Chlorophenol                             | 95-57-8               | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.01               | < 0.00               | < 0.00               |
| 2-Furalsdehyde                             | 98-01-1               | 0.01                | 0.59                | 0.15                | < 0.01              | 0.05                | 0.19                | 0.00                | 0.01                | 0.00                | < 0.00               | < 0.02               | 0.49                 | < 0.00               | 0.01                 |

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - ENGINEERED PRODUCTS

|   | CAS<br>Numbers                  | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | Cmpd #8<br>% Of Tot | Cmpd #9<br>% Of Tot | Cmpd #10<br>% Of Tot | Cmpd #11<br>% Of Tot | Cmpd #12<br>% Of Tot | Cmpd #13<br>% Of Tot | Cmpd #14<br>% Of Tot |
|---|---------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1 | 2-Hexanone                      | 0.57                | 0.20                | 0.24                | 0.16                | 0.28                | 0.37                | 0.40                | 0.18                | 0.19                | 0.18                 | 0.23                 | 0.13                 | 0.11                 | 0.07                 |
|   | 2-Methyl-1-butene               | 0.08                | 0.28                | 0.03                | 0.02                | 0.02                | 0.05                | 0.02                | 0.03                | 0.03                | 0.02                 | 0.15                 | 0.02                 | 0.01                 | 1.48                 |
|   | 2-Methyl-2-butene               | 0.20                | 0.03                | 0.03                | 0.02                | 0.02                | 0.38                | 0.02                | 0.03                | 0.03                | 0.02                 | 0.34                 | 0.02                 | 0.01                 | 0.01                 |
|   | 2-Methyl-2-pentene              | 0.03                | 0.03                | 0.03                | 0.02                | 0.02                | 0.05                | 0.02                | 0.03                | 0.03                | 0.02                 | 0.03                 | 0.02                 | 0.01                 | 0.01                 |
|   | 2-Methylheptane                 | 0.68                | 0.59                | 0.04                | 0.16                | 0.25                | 0.15                | 0.18                | 0.25                | 0.46                | 0.09                 | 0.29                 | 0.16                 | 0.33                 | 0.34                 |
|   | 2-Methylhexane                  | 0.05                | 1.39                | 0.14                | 0.21                | 0.21                | 0.18                | 0.13                | 0.58                | 0.59                | 0.15                 | 0.24                 | 0.24                 | 0.31                 | 0.28                 |
|   | 2-Methylnaphthalene             | 0.02                | 0.04                | 0.07                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.00                 | 0.02                 | 0.00                 | 0.02                 |
|   | 2-Methylpentane                 | 0.69                | 0.65                | 0.66                | 1.06                | 1.16                | 0.75                | 0.82                | 0.87                | 0.94                | 0.24                 | 0.13                 | 0.29                 | 17.03                | 0.08                 |
|   | 2-Methylphenol                  | 0.01                | 0.01                | 0.08                | 0.00                | 0.02                | 0.00                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.00                 |
|   | 2-Nitroaniline                  | 0.02                | 0.02                | 0.02                | 0.01                | 0.02                | 0.01                | 0.02                | 0.02                | 0.02                | 0.00                 | 0.02                 | 0.01                 | 0.01                 | 0.01                 |
|   | 2-Nitrophenol                   | 0.01                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.01                | 0.02                | 0.01                | 0.00                 | 0.02                 | 0.01                 | 0.01                 | 0.02                 |
|   | 2,2-Dimethylbutane              | 0.03                | 0.03                | 0.04                | 0.13                | 0.13                | 0.05                | 0.02                | 0.13                | 0.10                | 0.06                 | 0.04                 | 0.02                 | 1.50                 | 0.01                 |
|   | 2,2-Dimethylpropane             | 0.03                | 0.03                | 0.04                | 0.02                | 0.02                | 0.08                | 0.02                | 0.03                | 0.03                | 0.02                 | 0.04                 | 0.02                 | 0.01                 | 0.01                 |
|   | 2,2,4-trimethyl-1-Chloropropane | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.00                 |
|   | 2,3-Dimethylpentane             | 0.03                | 0.49                | 0.04                | 0.06                | 0.07                | 0.07                | 0.06                | 0.20                | 0.22                | 0.06                 | 0.10                 | 0.09                 | 0.14                 | 0.09                 |
|   | 2,3,4-Trimethylpentane          | 0.03                | 0.40                | 0.04                | 0.02                | 0.02                | 0.05                | 0.02                | 0.13                | 0.25                | 0.02                 | 0.03                 | 0.11                 | 0.08                 | 0.01                 |
|   | 2,4-Dichlorophenol              | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.01                 |
|   | 2,4-Dimethylhexane              | 0.10                | 0.89                | 0.04                | 0.17                | 0.05                | 0.05                | 0.14                | 0.26                | 0.39                | 0.02                 | 0.20                 | 0.14                 | 0.12                 | 0.08                 |
|   | 2,4-Dimethylphenol              | 0.01                | 0.01                | 0.13                | 0.01                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.01                 |
|   | 2,4-Dinitrophenol               | 0.04                | 0.04                | 0.07                | 0.05                | 0.04                | 0.04                | 0.04                | 0.05                | 0.05                | 0.01                 | 0.06                 | 0.03                 | 0.02                 | 0.02                 |
|   | 2,4-Dinitrotoluene              | 0.01                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.00                 |
|   | 2,4,5-Trichlorophenol           | 0.01                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.02                 | 0.01                 | 0.00                 | 0.00                 |
|   | 2,4,6-Trichlorophenol           | 0.01                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.02                 | 0.01                 | 0.00                 | 0.00                 |
|   | 2,6-Dinitrotoluene              | 0.01                | 0.01                | 0.03                | 0.01                | 0.02                | 0.01                | 0.02                | 0.02                | 0.02                | 0.00                 | 0.02                 | 0.01                 | 0.01                 | 0.01                 |
|   | 3-Furaldehyde                   | 0.01                | 0.01                | 0.03                | 0.01                | 0.02                | 0.01                | 0.02                | 0.02                | 0.01                | 0.00                 | 0.02                 | 0.01                 | 0.01                 | 0.01                 |
| 1 | 2,3-Methyl-2-Butanone           | 1.43                | 1.92                | 0.23                | 0.23                | 0.28                | 0.21                | 0.15                | 0.75                | 0.84                | 0.26                 | 0.37                 | 0.33                 | 0.36                 | 0.39                 |
|   | 3-Methylhexane                  | 0.13                | 0.58                | 0.41                | 0.79                | 0.99                | 0.41                | 2.75                | 0.78                | 1.89                | 0.28                 | 0.48                 | 0.45                 | 0.49                 | 0.15                 |
|   | 3-Methylpentane                 | 2.68                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.00                 | 0.00                 | 0.00                 |
|   | 3-Methylstyrene                 | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.00                 | 0.00                 | 0.00                 |
|   | 3-Nitroaniline                  | 0.01                | 0.01                | 0.03                | 0.01                | 0.02                | 0.01                | 0.02                | 0.01                | 0.01                | 0.00                 | 0.02                 | 0.01                 | 0.01                 | 0.01                 |
|   | 3,3'-Dichlorobenzidine          | 0.03                | 0.01                | 0.07                | 0.02                | 0.03                | 0.00                | 0.03                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.00                 | 0.00                 | 0.00                 |
|   | 3,3'-Dimethoxybenzidine         | 0.03                | 0.01                | 0.08                | 0.03                | 0.03                | 0.01                | 0.03                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.00                 | 0.00                 | 0.00                 |
|   | 3,3'-Dimethylbenzidine          | 0.01                | 0.00                | 0.02                | 0.01                | 0.01                | 0.00                | 0.01                | 0.00                | 0.00                | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.00                 |
|   | 3,4-Methylphenol                | 0.01                | 0.01                | 0.22                | 0.01                | 0.15                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.00                 |
|   | 4-Aminobiphenyl                 | 0.01                | 0.00                | 0.01                | 0.00                | 0.01                | 0.00                | 0.01                | 0.00                | 0.00                | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.00                 |
|   | 4-Bromophenyl-phenylether       | 0.02                | 0.01                | 0.00                | 0.01                | 0.02                | 0.01                | 0.02                | 0.02                | 0.01                | 0.00                 | 0.02                 | 0.01                 | 0.00                 | 0.00                 |
|   | 4-Chloro-3-methylphenol         | 0.01                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.01                 |
|   | 4-Chloroaniline                 | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.01                 |
|   | 4-Chlorophenyl-phenylether      | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.01                 |
|   | 4-Chlorostyrene                 | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.00                 |
|   | 4-Methyl-1-pentene              | 0.03                | 0.03                | 0.03                | 0.31                | 0.02                | 0.30                | 0.02                | 0.03                | 0.03                | 0.02                 | 0.03                 | 0.02                 | 0.01                 | 0.01                 |
|   | 4-Methyl-2-Pentanone            | 0.57                | 0.30                | 11.50               | 24.48               | 0.28                | 24.54               | 0.40                | 0.21                | 0.19                | 0.13                 | 0.16                 | 0.13                 | 0.06                 | 0.56                 |
|   | 4-Methylstyrene                 | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.01                | 0.00                 | 0.01                 | 0.00                 | 0.00                 | 0.00                 |
|   | 4-Nitroaniline                  | 0.02                | 0.01                | 0.03                | 0.01                | 0.02                | 0.01                | 0.02                | 0.01                | 0.01                | 0.00                 | 0.02                 | 0.01                 | 0.00                 | 0.01                 |

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - ENGINEERED PRODUCTS

|                                     | CAS<br>Numbers | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | Cmpd #8<br>% Of Tot | Cmpd #9<br>% Of Tot | Cmpd #10<br>% Of Tot | Cmpd #11<br>% Of Tot | Cmpd #12<br>% Of Tot | Cmpd #13<br>% Of Tot | Cmpd #14<br>% Of Tot |
|-------------------------------------|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 4-Nitrophenyl                       | 92-93-3        | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.01               | < 0.01               | < 0.01               | < 0.00               |
| 4-Nitrophenol                       | 100-02-7       | < 0.03              | < 0.03              | < 0.05              | < 0.02              | < 0.03              | < 0.03              | < 0.03              | < 0.03              | < 0.03              | < 0.01               | < 0.04               | < 0.02               | < 0.01               | < 0.01               |
| 1 2 4,4-Dimethyl-2-Pentanone        |                | 1.43                | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 4,4'-Methylenedianiline             | 101-77-9       | < 0.02              | < 0.01              | < 0.04              | < 0.02              | < 0.02              | < 0.00              | < 0.03              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
| 4,6-Dinitro-2-methylphenol          | 534-52-1       | < 0.03              | < 0.02              | < 0.04              | < 0.04              | < 0.03              | < 0.02              | < 0.03              | < 0.03              | < 0.03              | < 0.00               | < 0.03               | < 0.02               | < 0.01               | < 0.01               |
| Acenaphthene                        | 83-32-9        | < 0.00              | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
| Acenaphthylene                      | 208-96-8       | < 0.00              | < 0.01              | 0.06                | 0.01                | 0.06                | 0.00                | 0.00                | 0.00                | 0.00                | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               |
| 1 2 Acetaldehyde                    | 00075-07-0     | 0.86                | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 Acetaldehyde+Isobutane          |                | T                   | T                   | T                   | T                   | 0.83                | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 Acetone                           | 00087-64-1     | 1.87                | 20.10               | 3.83                | 15.91               | 3.74                | 2.61                | 2.80                | 2.86                | 1.83                | 2.18                 | 9.07                 | 1.57                 | < 0.22               | 4.12                 |
| 1 Acetonitrile                      | 01722-08-4     | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.35              | < 0.39              | < 0.31               | < 0.47               | < 0.25               | < 0.22               | < 0.14               |
| 1 2 Acetophenone                    | 00098-88-2     | 2.87                | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| Acetophenone                        | 98-86-2        | 0.05                | 0.03                | 0.05                | 0.01                | 0.03                | 0.06                | 0.10                | 0.02                | 2.26                | 0.03                 | 0.54                 | 0.51                 | 0.03                 | 0.01                 |
| Acetylene                           | 00074-86-2     | 1.01                | 2.55                | 0.43                | 0.53                | 0.12                | 1.41                | 0.04                | 0.43                | 0.83                | 0.49                 | 0.10                 | 0.58                 | 0.20                 | 0.24                 |
| 1 Acrolein                          | 00107-02-8     | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.35              | < 0.38              | < 0.31               | < 0.47               | < 0.25               | < 0.43               | 0.56                 |
| 1 Acrylonitrile                     | 00107-13-1     | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.11              | < 0.39              | < 0.31               | < 0.47               | < 0.25               | < 0.56               | 7.87                 |
| 1 Allyl Chloride                    | 00107-05-1     | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.35              | < 0.39              | < 0.31               | < 0.47               | < 0.25               | < 0.22               | < 0.14               |
| Aniline                             | 62-53-3        | < 0.01              | < 0.73              | < 0.01              | 0.71                | < 0.01              | 0.06                | < 0.01              | 0.01                | 0.01                | 0.00                 | 0.06                 | < 0.00               | < 0.00               | < 0.00               |
| Anthracene                          | 120-12-7       | < 0.00              | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               |
| a,a'-Trichlorotoluene               | 07785-70-8     | < 0.03              | < 0.03              | < 0.03              | 0.13                | < 0.02              | 0.05                | 0.02                | 0.18                | 0.14                | 0.14                 | < 0.03               | < 0.02               | < 0.09               | < 0.01               |
| 98-07-7                             |                | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.01               |
| 100-52-7                            |                | 0.02                | 0.07                | 0.09                | 0.01                | 0.04                | 0.06                | < 0.01              | 0.02                | 0.03                | 0.00                 | 0.02                 | 0.03                 | 0.01                 | 0.01                 |
| Benzaldehyde                        | 00071-43-2     | 0.07                | 0.07                | 0.10                | 0.19                | 0.41                | < 0.05              | 0.08                | < 0.02              | 0.08                | < 0.02               | < 0.03               | 0.05                 | 0.40                 | 0.38                 |
| Benzene                             | 92-87-5        | < 0.01              | < 0.00              | < 0.03              | < 0.01              | < 0.02              | < 0.00              | < 0.02              | < 0.00              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
| Benzidine                           | 85-85-0        | 0.51                | < 0.02              | < 0.03              | 0.06                | 0.53                | 0.25                | 0.18                | 0.02                | < 0.02              | 0.03                 | 0.04                 | < 0.01               | < 0.14               | < 0.03               |
| Benzoic acid                        | 100-47-0       | < 0.01              | < 0.00              | < 0.01              | < 0.00              | < 0.01              | < 0.00              | < 0.01              | < 0.01              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
| Benzonitrile                        | 56-55-3        | < 0.01              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               |
| Benzo(a)anthracene                  | 50-32-6        | < 0.01              | < 0.00              | < 0.03              | < 0.01              | < 0.01              | < 0.00              | < 0.02              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               |
| Benzo(a)pyrene                      | 205-99-2       | < 0.01              | < 0.00              | < 0.02              | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               |
| Benzo(b)fluoranthene                | 191-24-2       | < 0.02              | < 0.00              | < 0.04              | < 0.01              | < 0.02              | < 0.00              | < 0.03              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.01               | < 0.00               | < 0.00               |
| Benzo(g,h,i)perylene                | 207-08-9       | < 0.01              | < 0.00              | < 0.02              | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               |
| Benzo(k)fluoranthene                | 100-51-6       | 0.01                | 0.02                | 0.02                | 0.01                | 0.02                | 0.03                | 0.02                | 0.05                | 0.04                | 0.01                 | 0.01                 | 0.03                 | < 0.00               | < 0.00               |
| Benzyl alcohol                      | 00100-44-7     | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.35              | < 0.39              | < 0.31               | < 0.47               | < 0.25               | < 0.22               | < 0.14               |
| 1 Benzyl Chloride                   | 100-44-7       | < 0.01              | < 0.00              | < 0.01              | < 0.00              | < 0.01              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
| Benzyl Chloride                     | 92-52-4        | < 0.00              | < 0.00              | 0.05                | 0.01                | < 0.00              | 0.01                | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
| Biphenyl                            |                | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 bis(1-Methyl(ethyl)Benzene      |                | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 bis(1,1-dimethyl(ethyl)peroxide | 111-91-1       | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.01               | < 0.00               | < 0.01               |
| bis(2-Chloroethoxy)methane          | 111-44-4       | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.01               | < 0.00               | < 0.00               |
| bis(2-Chloroethyl)ether             | 117-81-7       | 0.05                | 0.05                | 0.11                | T                   | 0.03                | 0.14                | 0.03                | T                   | 0.01                | < 0.00               | 0.64                 | 0.01                 | 0.45                 | T                    |
| bis(2-Ethylhexyl)phthalate          | 18172-67-3     | < 0.16              | 0.28                | 0.28                | 0.49                | 0.16                | < 0.26              | < 0.11              | < 0.13              | < 0.14              | < 0.11               | < 0.17               | < 0.09               | 1.42                 | 10.92                |
| b-Pinene                            | 00075-27-4     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 Bromodichloromethane              | 00075-25-2     | 0.34                | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 Bromoform                         |                | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 Bromomethane                      | 00074-83-9     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - ENGINEERED PRODUCTS

|                                          | CAS<br>Numbers        | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | Cmpd #8<br>% Of Tot | Cmpd #9<br>% Of Tot | Cmpd #10<br>% Of Tot | Cmpd #11<br>% Of Tot | Cmpd #12<br>% Of Tot | Cmpd #13<br>% Of Tot | Cmpd #14<br>% Of Tot |
|------------------------------------------|-----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1 2 Butanal                              | 00123-72-8            | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | 0.73                 | T                    | 13.57                | 8.13                 |
| 1 2 Butane                               | 85-88-7               | T                   | T                   | 1.16                | 1.22                | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| Butylbenzylphthalate                     |                       | 0.01                | 0.01                | 0.03                | < 0.01              | < 0.01              | T                   | < 0.01              | 0.00                | 0.01                | T                    | T                    | 0.00                 | 0.00                 | 0.00                 |
| 1 2 C10-C11 Branched Alkane              |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 C10H18 Polycyclic Hydrocarbon        |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 C10H20 Alkyl Substituted Cyclohexane |                       | T                   | T                   | T                   | T                   | T                   | 7.67                | T                   | T                   | T                   | T                    | T                    | T                    | T                    | 5.25                 |
| 1 2 C11-C12 Branched Alkane              |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | 16.29                | T                    |
| 1 2 C11H22 Alkene                        |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 C12H24 Alkene                        |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 C4 Aldehyde                          |                       | T                   | T                   | 0.86                | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 C5 Aldehyde                          |                       | T                   | T                   | 0.86                | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 C6H10 O2 Acid Ester                  |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 C6H12 Cyclic alkene                  |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 C8H18 Alkene                         |                       | 2.87                | T                   | T                   | T                   | T                   | T                   | 7.99                | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 C8H10 Alkyl Substituted Benzene      |                       | T                   | 1.24                | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 C9H12 Alkyl Substituted Benzene      |                       | T                   | 1.49                | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 2 C9H12 Polycyclic Alkene              |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | 34.02               | T                    | T                    | T                    | T                    | T                    |
| Camphene                                 | 79-92-5               | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | 0.01                | < 0.01              | < 0.01              | < 0.01              | < 0.00               | 0.03                 | 0.07                 | < 0.00               | < 0.00               |
| 1 Carbon Disulfide                       | 00075-15-0            | < 0.57              | < 0.20              | < 0.24              | 0.33                | 0.25                | 3.07                | < 0.40              | 46.45               | 1.02                | 32.76                | 20.52                | 67.47                | 0.51                 | 2.89                 |
| 1 Carbon Tetrachloride                   | 00058-23-5            | < 0.57              | < 0.20              | 0.11                | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 Carbonyl sulfide                       | 00463-58-1            | T                   | T                   | T                   | T                   | T                   | T                   | T                   | 2.21                | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 Chlorobenzene                          | 00108-90-7            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 2 Chlorobutadiene+Methylpentane        |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | 0.78                 | T                    | T                    |
| 1 Chlorobromomethane                     | 00124-48-1            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 Chloroethane                           | 00075-00-3            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 Chloroform                             | 00087-68-3            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.02               |
| 1 Chloromethane                          | 00074-87-3            | < 0.57              | 0.05                | < 0.24              | 0.05                | < 0.28              | 0.26                | < 0.40              | 0.08                | 0.05                | 0.03                 | < 0.23               | 0.03                 | 0.04                 | 0.02                 |
| 1 Chrysene                               | 218-01-9              | < 0.01              | < 0.00              | 0.01                | < 0.01              | < 0.01              | T                   | < 0.01              | < 0.00              | < 0.00              | < 0.00               | 0.00                 | < 0.00               | T                    | < 0.00               |
| 1 cis-1,2-Dichloroethene                 | 00158-59-2            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | 0.39                 | < 0.07               |
| 1 cis-1,3-Dichloropropene                | 10061-01-5            | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1 cis-2-Butene                           | 00590-18-1            | < 0.03              | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.05              | < 0.02              | < 0.03              | < 0.03              | < 0.02               | < 0.03               | < 0.02               | < 0.01               | < 0.01               |
| 1 cis-2-Hexene                           | 07688-21-3            | 0.50                | < 0.03              | < 0.03              | < 0.02              | 0.13                | < 0.05              | 0.22                | < 0.03              | 0.11                | < 0.02               | < 0.03               | < 0.20               | < 0.01               | < 0.01               |
| 1 cis-2-Pentene                          | 00627-20-3            | 0.09                | 0.32                | 3.61                | 0.45                | 0.19                | 0.37                | 0.22                | 0.05                | 0.09                | 1.46                 | T                    | 0.17                 | 0.32                 | 0.19                 |
| 1 Cumene                                 | 00088-82-8            | < 0.03              | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.05              | 0.07                | 0.16                | 4.66                | 0.28                 | < 0.03               | 0.14                 | 0.06                 | < 0.01               |
| 1 Cumene                                 | 98-82-8               | 0.00                | < 0.00              | 0.00                | 0.00                | 0.00                | 0.01                | 0.02                | < 0.00              | < 0.00              | 0.01                 | 0.01                 | 0.03                 | 0.00                 | < 0.00               |
| 1 2 Cyclobutane                          |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 Cyclohexane                            | 00110-82-7            | 0.56                | 1.88                | 0.10                | 0.40                | 0.27                | 0.14                | 6.53                | 0.25                | 0.38                | 0.05                 | 0.08                 | 0.12                 | 0.21                 | 0.19                 |
| 1 Cyclohexanone                          | 108-94-1              | < 0.02              | 0.04                | 0.09                | 0.05                | 0.15                | 0.07                | 0.18                | 0.05                | 0.02                | 0.01                 | < 0.01               | 0.07                 | < 0.00               | 0.02                 |
| 1 Cyclohexylamine                        | 108-91-8              | < 0.01              | < 0.01              | < 0.03              | < 0.01              | < 0.01              | 0.00                | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.01               | < 0.00               | < 0.00               |
| 1 2 Cyclooctadiene                       |                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | 1.77                | T                   | T                    | T                    | T                    | T                    | 17.52                |
| 1 Cyclopentane + 2,3-Dimethylbutane      | 00287-92-3/00079-29-8 | 0.17                | 0.16                | 0.09                | 0.18                | 0.23                | 0.28                | 0.12                | 0.18                | 0.21                | 0.05                 | 0.01                 | 0.11                 | 0.11                 | 0.03                 |
| 1 Cyclopentene                           | 00142-28-0            | < 0.03              | 0.27                | 0.57                | 0.08                | 0.30                | < 0.05              | < 0.02              | < 0.03              | < 0.03              | < 0.02               | < 0.03               | < 0.02               | < 0.30               | < 0.01               |
| 1 2 Decane                               |                       | T                   | T                   | 1.18                | T                   | T                   | T                   | T                   | 1.11                | T                   | 0.78                 | 1.03                 | 0.63                 | T                    | T                    |
| 1 Dibenzofuran                           | 132-64-9              | < 0.00              | 0.00                | 0.03                | 0.00                | < 0.00              | 0.00                | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | 0.00                 |

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - ENGINEERED PRODUCTS

|   | CAS<br>Numbers                                  | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | Cmpd #8<br>% Of Tot | Cmpd #9<br>% Of Tot | Cmpd #10<br>% Of Tot | Cmpd #11<br>% Of Tot | Cmpd #12<br>% Of Tot | Cmpd #13<br>% Of Tot | Cmpd #14<br>% Of Tot |
|---|-------------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1 | Dibenz(a,h)anthracene<br>53-90-3                | < 0.02              | < 0.00              | < 0.05              | < 0.01              | < 0.02              | < 0.00              | < 0.03              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               |
|   | Dichlorodifluoromethane<br>00075-71-8           | < 0.57              | < 0.20              | 0.10                | < 0.16              | < 0.28              | 0.12                | < 0.40              | 0.09                | 0.09                | 0.07                 | < 0.23               | 0.08                 | < 0.11               | < 0.07               |
|   | Diethylphthalate<br>84-66-2                     | 0.01                | 0.02                | 0.02                | T                   | 0.00                | 0.01                | T                   | 0.01                | 0.01                | 0.03                 | T                    | 0.01                 | 0.03                 | 0.01                 |
|   | Dimethylaminoazobenzene<br>60-11-7              | < 0.02              | < 0.01              | < 0.03              | < 0.02              | < 0.02              | < 0.00              | < 0.02              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
|   | Dimethylphthalate<br>131-11-3                   | < 0.00              | < 0.00              | < 0.01              | 0.00                | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
|   | Di-n-butylphthalate<br>84-74-2                  | 0.10                | 0.02                | 0.05                | T                   | T                   | 0.01                | T                   | 0.01                | 0.00                | 0.00                 | T                    | 0.01                 | 0.20                 | 0.01                 |
|   | Di-n-octylphthalate<br>117-84-0                 | 0.01                | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               |
|   | Diphenylamine<br>122-39-4                       | 0.00                | 0.04                | 0.03                | 0.03                | 0.00                | 0.41                | 0.00                | 0.17                | 0.20                | 0.01                 | 0.21                 | 0.07                 | 0.01                 | 0.55                 |
|   | d-Limonene<br>05986-27-5                        | < 0.16              | < 0.14              | < 0.17              | < 0.12              | 0.21                | < 0.26              | < 0.11              | < 0.13              | < 0.14              | < 0.11               | < 0.17               | < 0.09               | < 0.18               | < 0.05               |
| 1 | Epichlorohydrin<br>00106-89-8                   | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.35              | < 0.39              | < 0.31               | < 0.47               | < 0.25               | < 0.22               | < 0.14               |
|   | Ethane<br>00074-84-0                            | 1.87                | 0.42                | 0.66                | 0.64                | 0.29                | 0.44                | 0.21                | 0.29                | 0.30                | 0.10                 | 0.08                 | 0.19                 | 0.05                 | 0.12                 |
| 1 | 2 Ethanol<br>129                                | 1.29                | 1.24                | T                   | 1.43                | 1.11                | 9.20                | T                   | T                   | T                   | 35.09                | T                    | T                    | T                    | T                    |
| 1 | 2 Ethenylcyclohexene<br>25169-07-4              | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | 1.36                 | 8.76                 |
| 1 | 2 Ethyl Acetate<br>T                            | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 | 2 Ethyl Acrylate<br>T                           | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
|   | Ethylacetene<br>00107-00-6                      | < 0.03              | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.05              | < 0.02              | < 0.02              | < 0.03              | < 0.02               | < 0.03               | < 0.02               | < 0.01               | < 0.01               |
|   | Ethylbenzene<br>00100-41-4                      | < 0.03              | 0.22                | 0.20                | 0.19                | 0.16                | 0.19                | 3.64                | 0.18                | 0.11                | < 0.02               | 0.16                 | 0.09                 | 0.13                 | 0.04                 |
|   | Ethylene<br>00074-85-1                          | < 0.03              | 0.10                | 0.22                | 0.25                | 0.18                | 0.11                | < 0.02              | 0.25                | 0.28                | 0.05                 | < 0.03               | 0.06                 | < 0.01               | 0.09                 |
|   | Fluoranthene<br>208-44-0                        | 0.02                | < 0.00              | 0.01                | < 0.00              | 0.00                | < 0.00              | 0.00                | 0.01                | 0.01                | 0.00                 | 0.00                 | 0.01                 | 0.00                 | 0.00                 |
|   | Fluorene<br>88-73-7                             | 0.00                | 0.00                | 0.01                | 0.00                | 0.00                | 0.00                | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
| 1 | 2 Heptane<br>T                                  | T                   | 7.45                | T                   | 0.62                | T                   | T                   | T                   | 2.21                | 2.43                | 0.39                 | 1.03                 | 1.26                 | 2.04                 | 0.89                 |
| 1 | 2 Heptanone<br>T                                | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | 4.40                 | T                    | T                    | T                    |
|   | Hexachlorobenzene<br>118-74-1                   | < 0.01              | < 0.01              | 0.01                | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.01               | < 0.00               | < 0.00               |
| 1 | Hexachlorobutadiene<br>00087-88-3               | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.35              | < 0.39              | < 0.31               | < 0.47               | < 0.25               | < 0.22               | < 0.14               |
|   | Hexachlorobutadiene<br>87-88-3                  | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.02              | < 0.02              | < 0.01              | < 0.00               | < 0.02               | < 0.01               | < 0.00               | < 0.02               |
|   | Hexachlorocyclopentadiene<br>77-47-4            | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.02              | < 0.00               | < 0.03               | < 0.02               | < 0.01               | < 0.01               |
| 1 | 2 Hexachloroethane<br>T                         | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
|   | Hexachloroethane<br>67-72-1                     | < 0.02              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.02              | < 0.01              | < 0.00               | < 0.02               | < 0.01               | < 0.01               | < 0.01               |
|   | Hydroquinone<br>123-31-9                        | < 0.01              | < 0.01              | < 0.02              | 1.33                | 35.65               | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.00               | < 0.02               | < 0.01               | < 0.00               | < 0.02               |
|   | Indeno(1,2,3-cd)pyrene<br>193-39-5              | < 0.02              | < 0.00              | < 0.03              | < 0.01              | < 0.02              | < 0.00              | < 0.02              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               |
| 1 | 2 Isobutanol<br>00076-84-2                      | T                   | T                   | T                   | T                   | 1.25                | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
|   | Isobutane<br>00075-28-5                         | 0.44                | < 0.03              | 0.30                | 0.31                | 0.70                | < 0.06              | 0.12                | 0.43                | 0.25                | < 0.02               | < 0.04               | < 0.02               | < 0.01               | < 0.01               |
|   | Isobutylene + 1-Butene<br>00115-11-7/00106-88-9 | 0.21                | 0.35                | 0.59                | 1.10                | 0.55                | 0.16                | 0.56                | 0.14                | 0.23                | 0.25                 | < 0.03               | 0.06                 | 0.32                 | 0.16                 |
|   | Isocane<br>00540-84-1                           | 0.11                | 1.18                | 0.28                | 0.16                | 0.14                | 0.13                | 0.18                | 0.41                | 0.59                | 0.10                 | 0.17                 | 0.37                 | 0.15                 | 0.18                 |
|   | Isocetanol<br>28852-21-8                        | < 0.13              | 0.22                | < 0.22              | < 0.09              | < 0.13              | 0.48                | < 0.13              | < 0.12              | < 0.10              | 0.53                 | 23.15                | < 0.07               | 0.59                 | < 0.04               |
|   | Isopentane<br>00076-78-4                        | 1.03                | < 0.03              | 2.63                | 8.69                | 2.99                | 2.95                | 1.32                | 3.72                | 1.88                | 1.36                 | 6.69                 | 0.88                 | 3.21                 | 2.00                 |
|   | Isophorone<br>78-59-1                           | < 0.01              | 1.00                | < 0.01              | 0.10                | < 0.01              | < 0.00              | < 0.01              | < 0.01              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.01               |
|   | Isoprene<br>00076-79-5                          | < 0.03              | < 0.03              | < 0.03              | < 0.02              | 0.15                | < 0.05              | < 0.02              | 0.04                | 0.04                | < 0.02               | < 0.03               | < 0.03               | < 0.03               | < 0.03               |
| 1 | 2 Isopropyl Alcohol<br>129                      | 1.29                | T                   | T                   | 0.82                | 1.39                | 0.92                | T                   | T                   | 0.97                | T                    | T                    | T                    | T                    | T                    |
| 1 | 2 Methyl Acrylate<br>T                          | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 | 2 Methyl Isothiocyanate<br>T                    | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
|   | Methylacetene<br>00074-99-7                     | < 0.03              | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.05              | < 0.02              | < 0.02              | < 0.03              | < 0.02               | < 0.03               | < 0.02               | < 0.01               | < 0.01               |
|   | Methylcyclohexane<br>00108-87-2                 | 0.23                | 3.91                | 0.48                | 1.05                | 0.41                | 0.70                | 0.54                | 1.55                | 1.70                | 0.28                 | 0.52                 | 0.71                 | 0.75                 | 0.56                 |
|   | Methylcyclopentane<br>00095-37-7                | 4.19                | 0.78                | 0.33                | 0.57                | 1.46                | 0.35                | 5.48                | 0.57                | 4.98                | 0.17                 | 0.31                 | 0.22                 | 0.38                 | 0.09                 |

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIFICATION FACTORS - ENGINEERED PRODUCTS

|   | CAS<br>Numbers              | Cmpd #1<br>% Of Tot              | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | Cmpd #8<br>% Of Tot | Cmpd #9<br>% Of Tot | Cmpd #10<br>% Of Tot | Cmpd #11<br>% Of Tot | Cmpd #12<br>% Of Tot | Cmpd #13<br>% Of Tot | Cmpd #14<br>% Of Tot |
|---|-----------------------------|----------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1 | Methylene bis-chloroaniline |                                  |                     |                     |                     |                     |                     |                     |                     |                     |                      |                      |                      |                      |                      |
| 1 | Methylene Chloride          | 101-14-4                         | 0.04                | 0.01                | 0.08                | 0.03                | 0.04                | 0.01                | 0.05                | 0.01                | 0.01                 | 0.01                 | 0.01                 | 0.00                 | 0.00                 |
| 1 | 2 Methylhexane              | 00075-09-2                       | 1.36                | 1.44                | 35.39               | 3.06                | 0.57                | 1.99                | 0.96                | 0.80                | 2.89                 | 1.19                 | 0.97                 | 0.14                 | 1.14                 |
| 1 | 2 Methylpentane             |                                  | T                   | 7.45                | T                   | T                   | T                   | T                   | T                   | 1.11                | T                    | T                    | 0.63                 | T                    | 0.53                 |
| 1 | m-Ethyltoluene              |                                  | T                   | 1.24                | 0.88                | 2.45                | T                   | 2.76                | T                   | 1.33                | 1.56                 | 2.05                 | 0.78                 | T                    | T                    |
|   | m-Xylene + p-Xylene         | 00820-14-4                       | < 0.03              | < 0.03              | < 0.03              | < 0.02              | < 0.02              | < 0.05              | 0.11                | < 0.02              | < 0.03               | < 0.03               | < 0.02               | 0.07                 | 0.09                 |
|   | Naphthalene                 | 00108-36-3/00106-42-3<br>91-20-3 | 0.32                | 0.88                | 0.65                | 0.84                | 0.56                | 12.13               | 0.72                | 0.74                | 0.34                 | 0.36                 | 0.55                 | 0.49                 | 0.23                 |
|   | n-Butane                    | 00106-97-8                       | 0.03                | 0.05                | 0.28                | 0.03                | 0.34                | 0.04                | 0.04                | 0.05                | 0.00                 | 0.02                 | 0.05                 | 0.01                 | < 0.00               |
|   | n-Decane                    | 00124-18-5                       | 0.85                | 0.35                | 0.94                | 1.17                | 1.83                | 0.18                | 0.53                | 0.17                | 0.07                 | T                    | 0.19                 | 0.07                 | 0.28                 |
|   | n-Heptane                   | 00142-82-5                       | 0.49                | 0.41                | 0.44                | 0.85                | 0.28                | 0.27                | 0.73                | 0.52                | 0.32                 | < 0.17               | 0.23                 | 0.60                 | 0.18                 |
|   | n-Hexane                    | 00110-54-3                       | 0.20                | 3.69                | 0.26                | 0.38                | 0.40                | 0.28                | 0.16                | 1.45                | 0.39                 | 0.59                 | 0.61                 | 0.65                 | 0.44                 |
|   | Nitrobenzene                | 98-95-3                          | 10.21               | 1.63                | 1.45                | 2.56                | 6.03                | 1.19                | 9.08                | 2.11                | 4.92                 | 0.67                 | 0.70                 | 1.25                 | 0.48                 |
|   | N-Nitrosodiethylamine       | 55-18-5                          | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | 0.05                 | < 0.01               | < 0.00               | < 0.01               |
|   | N-Nitrosodimethylamine      | 82-75-9                          | < 0.02              | < 0.02              | < 0.03              | < 0.02              | < 0.02              | < 0.02              | < 0.02              | < 0.02              | < 0.00               | < 0.02               | < 0.01               | < 0.01               | < 0.01               |
|   | N-Nitroso di-n-propylamine  | 821-84-7                         | T                   | < 0.01              | < 0.04              | T                   | T                   | < 0.02              | T                   | < 0.02              | < 0.00               | < 0.02               | < 0.01               | < 0.01               | < 0.01               |
|   | N-Nitrosodiphenylamine      | 86-30-6                          | < 0.02              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.01              | < 0.02              | < 0.02              | < 0.00               | < 0.02               | < 0.01               | < 0.01               | < 0.01               |
|   | n-Nitrosomorpholine         | 59-89-2                          | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
|   | n-Nonane                    | 00111-84-2                       | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.02              | < 0.02              | < 0.00               | < 0.02               | < 0.01               | < 0.01               | < 0.01               |
|   | n-Octane                    | 00111-65-9                       | 0.33                | 0.25                | 0.13                | < 0.02              | 0.15                | 0.47                | 0.51                | 0.13                | 0.18                 | 0.31                 | 0.17                 | 0.28                 | 0.12                 |
| 1 | 2 Nonane                    |                                  | 0.19                | < 0.03              | < 0.04              | 0.15                | 0.17                | 0.08                | 0.12                | < 0.03              | 0.06                 | 0.15                 | < 0.02               | 0.22                 | 0.05                 |
|   | n-Pentane                   | 00109-66-0                       | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
|   | n-Propane                   | 00103-65-1                       | 0.86                | < 0.03              | 0.62                | 0.83                | 1.25                | 0.24                | 0.41                | 0.29                | 0.11                 | 0.22                 | 0.17                 | 0.15                 | < 0.01               |
| 1 | n-Propylbenzene             |                                  | 1.43                | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 | 2 n-Undecane                | 00112-21-4                       | 0.15                | < 0.03              | < 0.03              | < 0.02              | < 0.05              | < 0.05              | < 0.02              | < 0.02              | < 0.02               | < 0.03               | < 0.02               | < 0.01               | < 0.01               |
|   | N,N-Diethylaniline          | 91-88-7                          | 1.43                | T                   | T                   | T                   | 0.97                | T                   | 1.00                | T                   | T                    | T                    | T                    | T                    | T                    |
|   | N,N-Dimethylaniline         | 121-69-7                         | 0.05                | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               |
|   | o-Anisidine                 | 90-04-0                          | < 0.01              | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.01               |
|   | o-Ethyltoluene              | 00611-14-3                       | < 0.01              | < 0.01              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.01               | < 0.00               | < 0.01               |
|   | o-Toluidine                 | 95-53-4                          | < 0.16              | 0.52                | < 0.16              | < 0.11              | < 0.08              | < 0.26              | < 0.11              | < 0.12              | 0.30                 | 0.36                 | < 0.09               | < 0.04               | < 0.05               |
|   | p-Xylene                    | 00095-47-6                       | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.18              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.12               | < 0.00               | < 0.00               |
|   | p-Cymene                    | 00099-87-8                       | 0.12                | 0.59                | 0.29                | 0.92                | 0.21                | 0.76                | 6.51                | 0.26                | 0.12                 | 0.32                 | 0.25                 | 0.22                 | 0.12                 |
|   | Pentachloronitrobenzene     | 82-68-8                          | 0.22                | 0.22                | < 0.16              | 0.24                | 0.08                | < 0.26              | 0.16                | 0.42                | < 0.11               | < 0.16               | < 0.09               | 0.21                 | 0.09                 |
|   | Pentachlorophenol           | 87-86-5                          | < 0.03              | < 0.03              | < 0.04              | < 0.03              | < 0.03              | < 0.03              | < 0.03              | < 0.03              | < 0.01               | < 0.04               | < 0.02               | < 0.01               | < 0.01               |
|   | 2 Pentane                   |                                  | < 0.02              | < 0.01              | < 0.03              | < 0.02              | < 0.02              | < 0.01              | < 0.02              | < 0.02              | < 0.00               | < 0.02               | < 0.01               | < 0.00               | < 0.00               |
| 1 | 2 Pentene                   |                                  | T                   | T                   | 1.18                | 1.43                | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 | 2 Pentene                   |                                  | T                   | T                   | 0.88                | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
|   | p-Ethyltoluene              | 00622-96-8                       | < 0.03              | < 0.03              | < 0.03              | 0.57                | < 0.02              | < 0.05              | 0.39                | < 0.02              | < 0.02               | < 0.03               | < 0.02               | 0.08                 | < 0.01               |
|   | Phenanthrene                | 85-01-6                          | 0.02                | 0.01                | 0.02                | 0.01                | 0.01                | 0.01                | 0.01                | 0.02                | 0.00                 | 0.00                 | 0.01                 | 0.00                 | 0.01                 |
|   | Phenol                      | 108-95-2                         | 0.09                | 0.07                | 0.25                | 0.02                | 1.03                | 0.04                | 0.02                | 0.05                | 0.00                 | 0.02                 | 0.04                 | 0.03                 | 0.04                 |
|   | Phthalimide                 | 85-41-6                          | < 0.03              | < 0.03              | 0.84                | < 0.02              | < 0.11              | < 0.02              | 0.01                | < 0.03              | T                    | < 0.03               | < 0.02               | 0.00                 | < 0.01               |
| 1 | 2 Propenal                  |                                  | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | 2.04                 | T                    |
|   | Propene                     | 00074-98-6                       | 1.56                | 0.32                | 0.74                | 0.82                | 0.60                | 0.21                | 0.18                | 0.31                | 0.06                 | 0.10                 | 0.15                 | 1.29                 | 3.80                 |
| 1 | 2 Propylcyclohexane         |                                  | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1 | Propylene                   | 00115-07-1                       | < 0.03              | 0.33                | < 0.03              | 0.06                | 0.06                | < 0.05              | < 0.02              | 0.11                | < 0.02               | 0.15                 | < 0.02               | 0.55                 | 0.07                 |
| 1 | Propylene Oxide             | 00075-56-9                       | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | < 0.74              | < 0.80              | < 0.35              | < 0.31               | < 0.47               | < 0.25               | < 0.22               | < 4.73               |

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIFICATION FACTORS - ENGINEERED PRODUCTS

|                                       | CAS<br>Numbers | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | Cmpd #8<br>% Of Tot | Cmpd #9<br>% Of Tot | Cmpd #10<br>% Of Tot | Cmpd #11<br>% Of Tot | Cmpd #12<br>% Of Tot | Cmpd #13<br>% Of Tot | Cmpd #14<br>% Of Tot |
|---------------------------------------|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Pyrene                                | 129-00-0       | 0.04                | 0.01                | 0.03                | 0.01                | 0.04                | 0.01                | 0.02                | 0.02                | 0.03                | T                    | 0.01                 | 0.02                 | 0.00                 | 0.01                 |
| Pyridine                              | 110-86-1       | < 0.01              | < 0.01              | < 0.03              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.01               | < 0.00               | < 0.00               |
| Styrene                               | 00100-42-5     | < 0.03              | < 0.03              | < 0.03              | 0.07                | < 0.02              | 3.40                | < 0.02              | 0.07                | 0.25                | 0.07                 | 0.12                 | < 0.02               | 0.03                 | 0.04                 |
| 1-Butyl Methyl Ether                  | 01834-04-4     | < 1.15              | < 0.40              | < 0.47              | < 0.33              | < 0.55              | 0.28                | < 0.80              | < 0.35              | < 0.39              | < 0.31               | < 0.47               | < 0.25               | < 0.22               | < 0.14               |
| 1-2 tert-Butyl Alcohol                | 00075-65-0     | T                   | T                   | T                   | T                   | T                   | 0.92                | T                   | T                   | T                   | 2.73                 | T                    | T                    | T                    | T                    |
| 1-Tetrachloroethene                   | 00127-18-4     | < 0.57              | 6.20                | 0.09                | 0.11                | < 0.28              | 0.08                | < 0.40              | 0.13                | 0.17                | 0.04                 | 0.08                 | 0.12                 | 0.08                 | 0.10                 |
| 1-2 Tetrahydrofuran                   |                | 1.43                | T                   | T                   | T                   | T                   | T                   | 1.00                | T                   | T                   | T                    | T                    | 0.78                 | T                    | T                    |
| Toluene                               | 00108-88-3     | 2.04                | 3.13                | 1.94                | 0.98                | 2.35                | 0.44                | 0.89                | 2.18                | 3.48                | 0.59                 | 0.93                 | 0.85                 | 1.71                 | 1.05                 |
| 1-trans-1,2-Dichloroethene            | 00158-60-5     | < 0.57              | < 0.20              | < 0.24              | < 0.18              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1-trans-1,2-Dichloropropene           | 10061-02-6     | < 0.57              | < 0.20              | < 0.24              | < 0.18              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| trans-2-Butene                        | 00824-64-6     | < 0.03              | < 0.03              | 0.33                | < 0.02              | < 0.02              | < 0.05              | < 0.02              | < 0.03              | < 0.03              | < 0.02               | < 0.03               | < 0.02               | < 0.04               | < 0.01               |
| trans-2-Hexene                        | 04050-45-7     | < 0.03              | < 0.03              | 0.10                | < 0.02              | < 0.11              | < 0.05              | < 0.02              | < 0.03              | < 0.03              | < 0.02               | < 0.03               | < 0.02               | < 0.01               | < 0.01               |
| trans-2-Pentene                       | 00848-04-8     | < 0.03              | < 0.03              | < 0.03              | 0.19                | < 0.02              | < 0.05              | < 0.02              | < 0.03              | 0.05                | < 0.02               | < 0.03               | < 0.02               | < 0.01               | 0.06                 |
| Trichloroethene                       | 00079-01-6     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.14               | < 0.07               |
| 1-Trichlorofluoromethane              | 00075-69-4     | < 0.57              | 1.02                | 0.23                | < 0.18              | < 0.28              | 0.88                | 0.58                | 0.27                | < 0.18              | 0.45                 | 0.28                 | < 0.13               | 0.12                 | 0.08                 |
| 1-2 Trichloroheptafluorobutane        |                | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1-Trichlorotrifluoroethane            | 00076-13-1     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| Trifluorin                            | 1582-09-8      | < 0.02              | < 0.02              | < 0.03              | < 0.02              | < 0.02              | < 0.02              | < 0.02              | < 0.02              | < 0.02              | < 0.00               | < 0.02               | < 0.01               | < 0.01               | < 0.01               |
| 1-2 Undecane                          |                | T                   | T                   | 0.88                | T                   | T                   | T                   | T                   | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1-2 Unknown                           |                | 2.87                | T                   | T                   | T                   | T                   | T                   | 1.80                | T                   | T                   | T                    | T                    | T                    | T                    | T                    |
| 1-Vinyl Acetate                       | 00108-05-4     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | 3.19                | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| 1-Vinyl Chloride                      | 00075-01-4     | < 0.57              | < 0.20              | < 0.24              | < 0.16              | < 0.28              | < 0.37              | < 0.40              | < 0.18              | < 0.19              | < 0.16               | < 0.23               | < 0.13               | < 0.11               | < 0.07               |
| Total Detected (lb/lb rubber)         |                | 5.20E-05            | 5.78E-05            | 9.14E-05            | 5.48E-05            | 6.10E-05            | 9.88E-05            | 8.88E-05            | 5.39E-05            | 5.73E-05            | 2.84E-04             | 3.54E-05             | 8.14E-05             | 1.54E-04             | 1.41E-04             |
| Total with non-detects (lb/lb rubber) |                | 8.08E-05            | < 6.61E-05          | < 1.09E-04          | < 6.09E-05          | < 7.36E-05          | < 1.25E-04          | < 1.19E-04          | < 6.04E-05          | < 6.53E-05          | < 3.13E-04           | < 4.21E-05           | < 6.70E-05           | < 1.63E-04           | < 1.47E-04           |

NOTES:  
1 TO14 Compound  
2 Tentatively Identified Compound(TIC)  
T TIC Not Identified In Summarized Category  
• % of Total Values Represent % of Total With Non-Detects

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIFICATION FACTORS - ENGINEERED PRODUCTS

|                                              | CAS<br>Numbers        | Cmpd #15<br>% Of Tot | Cmpd #16<br>% Of Tot | Cmpd #17<br>% Of Tot | Cmpd #18<br>% Of Tot | Cmpd #19<br>% Of Tot | Cmpd #20<br>% Of Tot | Cmpd #21<br>% Of Tot | Cmpd #22<br>% Of Tot | Cmpd #23<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|----------------------------------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| f 2 1-Butanol                                | 00071-38-3            | T                    | T                    | T                    | T                    | T                    | T                    | 8.77                 | T                    | T                    | < 1.38           | 13.57           | < 3.38          |
| f 2 1-Chloro-4-(1-chloroethenyl) cyclohexane |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.13           | 1.57            | < 0.43          |
| f 2 1-Chloro-5-(1-chloroethenyl) cyclohexane |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.13           | 1.57            | < 0.43          |
| f 2 1-Chloropropane                          |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.12           | 2.71            | < 0.55          |
| 1-Dodecene                                   | 112-41-4              | < 0.02               | < 0.05               | < 0.02               | 0.02                 | < 0.10               | < 0.18               | < 0.02               | < 0.02               | < 0.03               | < 0.04           | 0.18            | < 0.03          |
| 1-Heptene                                    | 00582-76-7            | < 0.01               | < 0.03               | < 0.04               | 0.05                 | 0.16                 | < 0.08               | < 0.01               | 0.48                 | < 0.03               | < 0.11           | 0.51            | < 0.13          |
| 1-Hexene                                     | 00582-41-6            | < 0.01               | 0.32                 | 0.14                 | 0.02                 | < 0.04               | < 0.08               | < 0.01               | 0.05                 | < 0.03               | < 0.05           | 0.32            | < 0.07          |
| f 2 1-Methoxybutane                          |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.08           | 1.75            | < 0.38          |
| 1-Octene                                     | 00111-80-0            | 0.15                 | < 0.03               | 1.08                 | 0.02                 | < 0.04               | < 0.08               | < 0.01               | < 0.02               | < 0.03               | < 0.08           | 1.08            | < 0.21          |
| 1-Pentene                                    | 00109-67-1            | 0.04                 | 0.52                 | 0.43                 | 13.82                | < 0.04               | 0.53                 | 0.13                 | 0.17                 | < 0.03               | < 0.82           | 13.82           | < 2.78          |
| f 2 1-Propanol                               |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.06           | 1.38            | < 0.28          |
| f 1,1-Dichloroethane                         | 00075-34-3            | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.58               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| f 1,1-Dichloroethene                         | 00075-35-4            | 0.02                 | < 0.23               | < 0.06               | 0.07                 | < 0.28               | < 0.58               | < 0.07               | < 0.12               | < 0.74               | < 0.27           | 0.80            | < 0.22          |
| f 1,1,1-Trichloroethane                      | 00071-55-8            | 0.03                 | 0.05                 | 0.02                 | 0.14                 | 0.48                 | 3.72                 | 0.01                 | 0.07                 | < 0.74               | < 0.34           | 3.72            | < 0.75          |
| f 1,1,2-Trichloroethane                      | 00076-00-5            | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.58               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| f 1,1,2,2-Tetrachloroethane                  | 00079-34-5            | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.58               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| f 1,2-Dibromo-3-Chloropropane                | 00098-12-8            | < 0.19               | < 0.47               | < 0.12               | 0.27                 | < 0.53               | < 1.11               | < 0.14               | < 0.24               | < 1.49               | < 0.48           | 1.49            | < 0.35          |
| f 1,2-Dibromo-3-chloropropane                | 98-12-8               | < 0.01               | < 0.02               | < 0.00               | 0.01                 | < 0.03               | < 0.07               | < 0.01               | < 0.01               | < 0.01               | < 0.02           | 0.07            | < 0.01          |
| f 1,2-Dibromoethane                          | 00108-93-4            | < 0.08               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.58               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| f 1,2-Dichlorobenzene                        | 00095-50-1            | < 0.08               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.58               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| f 1,2-Dichlorobenzene                        | 95-50-1               | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | 0.03            | < 0.01          |
| f 1,2-Dichloroethane                         | 00107-06-2            | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.58               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| f 1,2-Dichloropropane                        | 00078-87-5            | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.58               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| 1,2,4-Trichlorobenzene                       | 120-82-1              | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | 0.03            | < 0.01          |
| 1,2,4-Trimethylbenzene                       | 00095-63-6            | < 0.08               | 4.88                 | < 0.21               | 0.20                 | 0.44                 | < 0.39               | 0.18                 | 0.58                 | < 0.13               | < 0.55           | 4.88            | < 1.07          |
| 1,2,4-Trimethylbenzene                       | 95-83-6               | < 0.00               | < 0.01               | 0.01                 | 0.03                 | 0.06                 | 0.04                 | 0.01                 | < 0.00               | 0.02                 | < 0.02           | 0.07            | < 0.02          |
| 1,3-Butadiene                                | 00108-99-0            | 0.10                 | < 0.03               | < 0.04               | 0.13                 | 0.24                 | < 0.08               | < 0.01               | 0.14                 | 0.23                 | < 0.19           | 0.81            | < 0.19          |
| 1,3-Cyclooctadiene                           | 1700-10-3             | < 0.01               | < 0.01               | < 0.00               | 0.01                 | < 0.02               | < 0.04               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | 0.07            | < 0.01          |
| f 1,3-Dichlorobenzene                        | 00541-73-1            | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.58               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| 1,3-Dichlorobenzene                          | 541-73-1              | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.01               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | 0.03            | < 0.00          |
| 1,3,5-Trimethylbenzene                       | 00108-87-8            | < 0.06               | < 0.18               | 0.80                 | 0.34                 | < 0.18               | 0.41                 | 0.06                 | 0.34                 | < 0.13               | < 0.19           | 0.80            | < 0.12          |
| f 1,4-Dichlorobenzene                        | 00106-46-7            | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.58               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| 1,4-Dichlorobenzene                          | 106-46-7              | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.01               | < 0.02               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | 0.02            | < 0.01          |
| 1,4-Diethylbenzene + n-Butylbenzene          | 00105-05-5/00104-51-8 | < 0.06               | < 0.16               | < 0.21               | 0.09                 | 0.46                 | 0.38                 | < 0.05               | < 0.08               | < 0.13               | < 0.15           | 0.46            | < 0.10          |
| f 1,4-Dioxane                                | 00123-91-1            | < 0.37               | < 0.83               | < 0.24               | 0.54                 | < 1.06               | < 2.22               | < 0.28               | < 0.47               | < 2.98               | < 0.97           | < 2.98          | < 0.70          |
| 1,4-Phenylenediamine                         | 106-50-3              | < 0.01               | < 0.02               | < 0.01               | 0.01                 | < 0.04               | < 0.08               | < 0.01               | < 0.01               | < 0.01               | < 0.02           | 0.08            | < 0.02          |
| 1,5-Cyclooctadiene                           | 111-78-4              | < 0.01               | < 0.03               | < 0.01               | 0.01                 | < 0.05               | < 0.09               | < 0.01               | < 0.01               | < 0.02               | < 0.02           | 0.09            | < 0.02          |
| f 2 2-Butanol                                |                       | T                    | T                    | 0.74                 | T                    | T                    | T                    | T                    | T                    | T                    | < 0.03           | 0.74            | < 0.15          |
| f 2-Butanone                                 | 00078-93-3            | 0.14                 | 0.11                 | 0.33                 | 0.93                 | 0.26                 | 0.68                 | 0.34                 | 4.71                 | < 1.49               | < 1.37           | 7.32            | < 1.77          |
| f 2 2-Butene                                 | 00126-99-8            | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.04           | 1.00            | < 0.20          |
| 2-Chloroacetophenone                         | 1341-24-8             | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.01            | < 0.00          |
| 2-Chloronaphthalene                          | 81-58-7               | < 0.00               | < 0.00               | < 0.00               | 0.00                 | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.01            | < 0.00          |
| 2-Chlorophenol                               | 85-57-8               | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | 0.03            | < 0.01          |
| 2-Furaldehyde                                | 98-01-1               | < 0.01               | < 0.02               | < 0.00               | 0.00                 | < 0.03               | < 0.07               | < 0.01               | 0.04                 | 0.00                 | < 0.07           | 0.56            | < 0.15          |

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - ENGINEERED PRODUCTS

|   | CAS<br>Numbers              | Cmpd #15<br>% Of Tot | Cmpd #16<br>% Of Tot | Cmpd #17<br>% Of Tot | Cmpd #18<br>% Of Tot | Cmpd #19<br>% Of Tot | Cmpd #20<br>% Of Tot | Cmpd #21<br>% Of Tot | Cmpd #22<br>% Of Tot | Cmpd #23<br>% Of Tot | MEAN<br>% of Tot | MAX<br>% of Tot | STD<br>% of Tot |
|---|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| f | 2-Hexanone                  | < 0.08               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
|   | 2-Methyl-1-butene           | 0.04                 | 0.22                 | < 0.04               | 0.02                 | < 0.04               | 0.29                 | < 0.01               | < 0.02               | < 0.03               | < 0.13           | 1.48            | < 0.30          |
|   | 2-Methyl-2-butene           | < 0.01               | < 0.03               | < 0.04               | 0.02                 | < 0.04               | < 0.08               | < 0.01               | 0.12                 | 0.17                 | < 0.07           | 0.38            | < 0.10          |
|   | 2-Methyl-2-pentene          | < 0.01               | 0.08                 | < 0.04               | 0.02                 | < 0.04               | < 0.08               | 0.06                 | < 0.02               | < 0.03               | < 0.03           | 0.08            | < 0.02          |
|   | 2-Methylheptane             | 0.03                 | 0.07                 | < 0.04               | 0.02                 | 0.16                 | 0.22                 | < 0.01               | 0.45                 | < 0.03               | < 0.22           | 0.68            | < 0.18          |
|   | 2-Methylhexane              | 0.21                 | 1.13                 | < 0.04               | 0.06                 | 0.19                 | < 0.08               | 0.13                 | 1.14                 | < 0.03               | < 0.33           | 1.39            | < 0.37          |
|   | 2-Methylnaphthalene         | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.01                 | 0.00                 | 0.02                 | 0.00                 | 0.01             | 0.07            | 0.02            |
|   | 2-Methylpentane             | 0.15                 | < 0.03               | 0.15                 | 0.13                 | 0.22                 | < 0.08               | 1.38                 | 0.48                 | 0.41                 | < 1.23           | 17.03           | < 3.39          |
|   | 2-Methylphenol              | < 0.01               | < 0.01               | < 0.00               | 0.01                 | < 0.02               | 0.01                 | < 0.00               | < 0.01               | < 0.01               | < 0.01           | 0.06            | < 0.02          |
|   | 2-Nitroaniline              | < 0.01               | < 0.02               | < 0.01               | 0.01                 | < 0.04               | < 0.05               | < 0.01               | < 0.01               | < 0.01               | < 0.02           | < 0.05          | < 0.01          |
|   | 2-Nitrophenol               | < 0.01               | < 0.02               | < 0.01               | 0.01                 | < 0.04               | < 0.04               | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.04          | < 0.01          |
|   | 2,2-Dimethylbutane          | < 0.01               | < 0.03               | < 0.04               | 0.02                 | < 0.04               | < 0.08               | 0.07                 | 0.05                 | < 0.03               | < 0.12           | 1.50            | < 0.30          |
|   | 2,2-Dimethylpropane         | < 0.01               | < 0.04               | < 0.04               | 0.02                 | < 0.04               | < 0.08               | < 0.01               | < 0.02               | < 0.03               | < 0.03           | 0.08            | < 0.02          |
|   | 2,2-oxybis(1-Chloropropane) | < 0.01               | < 0.01               | < 0.01               | 0.00                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.03          | < 0.01          |
|   | 2,3-Dimethylpentane         | < 0.01               | < 0.03               | < 0.04               | 0.02                 | 0.08                 | < 0.08               | 0.08                 | 0.41                 | < 0.03               | < 0.11           | 0.48            | < 0.12          |
|   | 2,3,4-Trimethylpentane      | < 0.01               | < 0.03               | < 0.04               | 0.02                 | < 0.04               | < 0.08               | < 0.01               | 0.32                 | < 0.03               | < 0.08           | 0.40            | < 0.10          |
|   | 2,4-Dichlorophenol          | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.03               | < 0.00               | < 0.01               | < 0.01               | < 0.01           | < 0.03          | < 0.01          |
|   | 2,4-Dimethylhexane          | < 0.01               | < 0.03               | < 0.04               | 0.02                 | < 0.04               | < 0.08               | < 0.01               | 0.63                 | < 0.03               | < 0.15           | 0.69            | < 0.18          |
|   | 2,4-Dimethylphenol          | < 0.00               | < 0.01               | 0.01                 | 0.01                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.02           | 0.13            | < 0.02          |
|   | 2,4-Dinitrophenol           | < 0.03               | < 0.05               | < 0.03               | 0.02                 | 0.07                 | < 0.18               | < 0.01               | < 0.03               | < 0.04               | < 0.04           | 0.16            | < 0.03          |
|   | 2,4-Dinitrotoluene          | < 0.01               | < 0.01               | < 0.01               | 0.00                 | < 0.03               | < 0.04               | < 0.00               | < 0.01               | < 0.01               | < 0.01           | < 0.04          | < 0.01          |
|   | 2,4,5-Trichlorophenol       | < 0.01               | < 0.01               | < 0.01               | 0.01                 | < 0.03               | < 0.04               | < 0.00               | < 0.01               | < 0.01               | < 0.01           | < 0.04          | < 0.01          |
|   | 2,4,6-Trichlorophenol       | < 0.01               | < 0.01               | < 0.01               | 0.01                 | < 0.03               | < 0.04               | < 0.00               | < 0.01               | < 0.01               | < 0.01           | < 0.04          | < 0.01          |
|   | 2,6-Dinitrotoluene          | < 0.01               | < 0.02               | < 0.01               | 0.01                 | < 0.04               | < 0.06               | < 0.01               | < 0.01               | < 0.01               | < 0.02           | < 0.06          | < 0.01          |
|   | 3-Furaldehyde               | < 0.01               | < 0.02               | < 0.00               | 0.01                 | < 0.03               | < 0.06               | < 0.01               | < 0.01               | < 0.01               | < 0.02           | < 0.06          | < 0.02          |
| f | 2 3-Methyl-2-Butanone       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.06           | 1.43            | < 0.29          |
|   | 3-Methylhexane              | 0.07                 | 0.08                 | < 0.04               | 0.09                 | 0.29                 | 0.34                 | 0.10                 | 1.58                 | 1.05                 | < 0.44           | 1.92            | < 0.48          |
|   | 3-Methylpentane             | 0.20                 | 0.26                 | 0.15                 | 0.12                 | 0.20                 | 0.52                 | 0.07                 | 0.40                 | 0.32                 | 0.67             | 2.75            | 0.73            |
|   | 3-Methylstyrene             | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.03          | < 0.01          |
|   | 3-Nitroaniline              | < 0.01               | < 0.01               | < 0.01               | 0.01                 | < 0.04               | < 0.06               | < 0.00               | < 0.01               | < 0.01               | < 0.01           | < 0.06          | < 0.01          |
|   | 3,3'-Dichlorobenzidine      | < 0.01               | < 0.01               | < 0.01               | 0.00                 | < 0.01               | < 0.17               | < 0.00               | < 0.00               | < 0.00               | < 0.02           | < 0.17          | < 0.04          |
|   | 3,3'-Dimethoxybenzidine     | < 0.02               | < 0.01               | < 0.01               | 0.00                 | < 0.02               | < 0.22               | < 0.00               | < 0.01               | < 0.01               | < 0.02           | < 0.22          | < 0.04          |
|   | 3,3'-Dimethylbenzidine      | < 0.01               | < 0.00               | < 0.00               | 0.00                 | < 0.01               | < 0.07               | < 0.00               | < 0.00               | < 0.00               | < 0.01           | < 0.07          | < 0.01          |
|   | 3,4-Methylphenol            | < 0.00               | < 0.01               | < 0.00               | 0.01                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.02           | < 0.22          | < 0.05          |
|   | 4-Aminobiphenyl             | < 0.00               | < 0.00               | < 0.00               | 0.00                 | < 0.01               | < 0.02               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.02          | < 0.00          |
|   | 4-Bromophenyl-phenylether   | < 0.01               | < 0.02               | < 0.01               | 0.01                 | < 0.04               | < 0.05               | < 0.00               | < 0.01               | < 0.01               | < 0.01           | < 0.05          | < 0.01          |
|   | 4-Chloro-3-methylphenol     | < 0.01               | < 0.01               | < 0.00               | 0.01                 | < 0.02               | < 0.04               | < 0.00               | < 0.01               | < 0.01               | < 0.01           | < 0.04          | < 0.01          |
|   | 4-Chloroaniline             | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.03          | < 0.01          |
|   | 4-Chlorophenyl-phenylether  | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.02               | < 0.00               | < 0.00               | < 0.00               | < 0.01           | < 0.02          | < 0.01          |
|   | 4-Chlorostyrene             | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.03          | < 0.01          |
|   | 4-Methyl-1-pentene          | < 0.01               | < 0.03               | < 0.04               | 0.02                 | < 0.04               | < 0.08               | < 0.01               | 0.12                 | < 0.03               | < 0.06           | 0.31            | < 0.06          |
|   | 4-Methyl-2-Pentanone        | 0.08                 | 0.24                 | 0.05                 | 3.36                 | < 0.26               | 0.97                 | 0.02                 | 14.73                | < 0.74               | < 3.65           | 24.54           | < 7.40          |
|   | 4-Methylstyrene             | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.03          | < 0.01          |
|   | 4-Nitroaniline              | < 0.01               | < 0.01               | < 0.01               | 0.01                 | < 0.03               | < 0.06               | < 0.00               | < 0.01               | < 0.01               | < 0.01           | < 0.06          | < 0.01          |

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIFICATION FACTORS - ENGINEERED PRODUCTS

|  | CAS<br>Numbers                               | Cmpd #15<br>% Of Tot | Cmpd #16<br>% Of Tot | Cmpd #17<br>% Of Tot | Cmpd #18<br>% Of Tot | Cmpd #19<br>% Of Tot | Cmpd #20<br>% Of Tot | Cmpd #21<br>% Of Tot | Cmpd #22<br>% Of Tot | Cmpd #23<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|--|----------------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
|  | 4-Nitrobiphenyl<br>92-93-3                   | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.02               | < 0.04               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.04          | < 0.01          |
|  | 4-Nitrophenol<br>100-02-7                    | < 0.02               | < 0.03               | < 0.01               | 0.01                 | 0.04                 | < 0.12               | < 0.01               | < 0.02               | < 0.03               | < 0.03           | 0.12            | < 0.02          |
|  | 4,4'-Dimethyl-2-Pentanone<br>101-77-9        | < 0.01               | < 0.01               | < 0.01               | 0.00                 | < 0.02               | < 0.12               | < 0.00               | < 0.00               | < 0.01               | < 0.02           | 0.13            | < 0.29          |
|  | 4,4'-Methylenedianiline<br>534-52-1          | < 0.02               | < 0.03               | < 0.02               | 0.01                 | < 0.06               | < 0.11               | < 0.01               | < 0.01               | < 0.02               | < 0.03           | < 0.12          | < 0.02          |
|  | 4,6-Dinitro-2-methylphenol<br>83-32-9        | < 0.00               | < 0.01               | 0.00                 | 0.00                 | < 0.01               | < 0.02               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.11            | < 0.02          |
|  | Acenaphthene<br>208-98-8                     | 0.00                 | 0.00                 | < 0.00               | 0.00                 | < 0.01               | 0.00                 | < 0.00               | 0.01                 | < 0.00               | < 0.01           | 0.02            | < 0.00          |
|  | Acenaphthylene<br>00075-07-0                 | 0.81                 | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.07           | 0.08            | < 0.02          |
|  | 2 Acetaldehyde<br>100-00-0                   | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.04           | 0.83            | < 0.17          |
|  | 2 Acetaldehyde+isobutane<br>00067-64-1       | 0.82                 | 0.80                 | 0.33                 | 0.31                 | 20.15                | 4.52                 | 11.40                | 12.82                | < 1.49               | < 5.58           | 20.15           | < 6.05          |
|  | Acetone<br>01722-08-4                        | < 0.19               | < 0.47               | < 0.12               | 0.27                 | 1.93                 | < 1.11               | < 0.14               | < 0.24               | < 1.49               | < 0.54           | 1.93            | < 0.48          |
|  | Acetonitrile<br>00068-88-2                   | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.12           | 2.87            | < 0.59          |
|  | 2 Acetophenone<br>98-96-2                    | 0.02                 | 0.03                 | 0.00                 | 0.04                 | 0.10                 | 0.82                 | 0.01                 | 0.03                 | 0.01                 | 0.21             | 2.26            | < 0.48          |
|  | Acetylene<br>00074-86-2                      | 0.34                 | 0.34                 | < 0.04               | 0.15                 | 0.52                 | 1.94                 | 0.17                 | 0.42                 | < 0.03               | < 0.56           | 2.55            | < 0.62          |
|  | Acrolein<br>00107-02-8                       | < 0.19               | < 0.47               | < 0.12               | 0.27                 | < 0.53               | < 1.11               | 0.16                 | 0.32                 | < 1.49               | < 0.52           | 1.49            | < 0.33          |
|  | Acrylonitrile<br>00107-13-1                  | < 0.19               | < 0.47               | < 0.12               | 0.59                 | < 0.53               | < 1.11               | < 0.14               | < 0.24               | < 1.49               | < 0.84           | 7.97            | < 1.56          |
|  | Allyl Chloride<br>00107-05-1                 | < 0.19               | < 0.47               | < 0.12               | 0.27                 | < 0.53               | < 1.11               | < 0.14               | < 0.24               | < 1.49               | < 0.48           | < 1.49          | < 0.35          |
|  | Aniline<br>62-53-3                           | < 0.00               | < 0.01               | 0.16                 | 0.12                 | < 0.01               | 0.04                 | < 0.00               | 0.51                 | 0.36                 | < 0.12           | 0.73            | < 0.22          |
|  | Anthracene<br>120-12-7                       | < 0.00               | < 0.00               | 0.00                 | 0.00                 | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.01            | < 0.00          |
|  | a-Pinene<br>07785-70-8                       | < 0.01               | < 0.03               | < 0.04               | 0.09                 | < 0.04               | < 0.08               | 0.04                 | 0.45                 | < 0.03               | < 0.07           | 0.45            | < 0.08          |
|  | a,a'-Trichlorotoluene<br>98-07-7             | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.02               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.02          | < 0.00          |
|  | Benzaldehyde<br>100-52-7                     | 0.14                 | 1.26                 | < 0.00               | 0.01                 | 0.06                 | 0.00                 | 0.01                 | 0.13                 | 0.03                 | < 0.09           | 1.26            | < 0.25          |
|  | Benzene<br>00071-43-2                        | 0.03                 | 0.07                 | < 0.04               | 0.03                 | 0.59                 | 0.30                 | < 0.01               | 0.10                 | < 0.03               | < 0.14           | 0.59            | < 0.16          |
|  | Benzidine<br>92-87-5                         | 0.03                 | < 0.01               | < 0.01               | 0.00                 | < 0.01               | < 0.07               | < 0.00               | < 0.00               | < 0.00               | < 0.01           | 0.07            | < 0.01          |
|  | Benzoic acid<br>65-85-0                      | 0.23                 | < 0.03               | < 0.01               | 0.01                 | 0.85                 | < 0.08               | T                    | 0.01                 | 0.83                 | < 0.16           | 0.85            | < 0.23          |
|  | Benzonitrile<br>100-47-0                     | < 0.00               | 0.03                 | < 0.00               | 0.00                 | < 0.01               | < 0.02               | < 0.00               | < 0.00               | < 0.00               | < 0.01           | 0.03            | < 0.01          |
|  | Benzo(a)anthracene<br>56-55-3                | < 0.00               | < 0.00               | < 0.00               | 0.00                 | < 0.01               | < 0.04               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.04            | < 0.01          |
|  | Benzo(a)pyrene<br>50-32-8                    | < 0.01               | < 0.00               | < 0.00               | 0.00                 | < 0.01               | < 0.08               | < 0.00               | < 0.00               | < 0.00               | < 0.01           | < 0.08          | < 0.02          |
|  | Benzo(b)fluoranthene<br>205-99-2             | < 0.01               | < 0.00               | < 0.00               | 0.00                 | < 0.01               | < 0.06               | < 0.00               | < 0.00               | < 0.00               | < 0.01           | 0.06            | < 0.01          |
|  | Benzo(g,h,i)perylene<br>191-24-2             | < 0.01               | < 0.00               | < 0.01               | 0.00                 | < 0.01               | < 0.13               | < 0.00               | < 0.00               | < 0.00               | < 0.01           | 0.13            | < 0.03          |
|  | Benzo(k)fluoranthene<br>207-08-9             | < 0.01               | < 0.00               | < 0.00               | 0.00                 | < 0.01               | < 0.06               | < 0.00               | < 0.00               | < 0.00               | < 0.01           | 0.06            | < 0.01          |
|  | Benzyl alcohol<br>100-51-6                   | 0.05                 | 0.02                 | < 0.01               | 0.02                 | 0.04                 | 0.05                 | 0.01                 | 0.02                 | < 0.01               | < 0.02           | 0.05            | < 0.01          |
|  | Benzyl Chloride<br>00100-44-7                | < 0.18               | < 0.47               | < 0.12               | 0.27                 | < 0.53               | < 1.11               | < 0.14               | < 0.24               | < 1.49               | < 0.48           | < 1.49          | < 0.35          |
|  | Benzyl Chloride<br>100-44-7                  | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.01               | < 0.02               | < 0.00               | < 0.00               | < 0.00               | < 0.01           | < 0.02          | < 0.00          |
|  | Biphenyl<br>92-52-4                          | < 0.00               | < 0.00               | < 0.00               | 0.00                 | < 0.01               | < 0.01               | < 0.00               | 0.01                 | < 0.00               | < 0.01           | 0.05            | < 0.01          |
|  | 2 bis(1-Methylethyl)Benzene<br>100-91-1      | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                | T               | T               |
|  | 2 bis(1,1-dimethylethyl)peroxide<br>111-91-1 | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | 5.78            | < 1.18          |
|  | bis(2-Chloroethoxy)methane<br>111-44-4       | < 0.01               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.04               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.04          | < 0.01          |
|  | bis(2-Chloroethyl)ether<br>117-81-7          | 0.07                 | 0.10                 | 0.00                 | 0.02                 | 0.05                 | 0.23                 | 0.09                 | 0.01                 | 1.09                 | < 0.14           | 1.09            | < 0.25          |
|  | bis(2-Ethylhexyl)phthalate<br>18172-67-3     | 0.10                 | < 0.17               | < 0.21               | 0.10                 | 28.93                | < 0.39               | 0.05                 | 1.75                 | < 0.13               | < 2.07           | 28.93           | < 6.33          |
|  | b-Pinene<br>00075-27-4                       | < 0.08               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
|  | Bromochloromethane<br>00075-25-2             | < 0.06               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.23           | < 0.74          | < 0.16          |
|  | Bromomethane<br>00074-83-9                   | < 0.08               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |

TABLE 4.4e  
MIXER 2 ORGANIC COMPOUND SPECIFICATION FACTORS - ENGINEERED PRODUCTS

|                                          | CAS<br>Numbers        | Cmpd #15<br>% Of Tot | Cmpd #16<br>% Of Tot | Cmpd #17<br>% Of Tot | Cmpd #18<br>% Of Tot | Cmpd #19<br>% Of Tot | Cmpd #20<br>% Of Tot | Cmpd #21<br>% Of Tot | Cmpd #22<br>% Of Tot | Cmpd #23<br>% Of Tot | MEAN<br>% of Tot | MAX<br>% of Tot | STD<br>% of Tot |
|------------------------------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| 1 2 Butanal                              | 00123-72-8            | T                    | T                    | T                    | T                    | T                    | T                    | 1.75                 | T                    | T                    | < 0.06           | 13.57           | < 2.98          |
| 1 2 Butane                               | 85-98-7               | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.10           | 1.22            | < 0.34          |
| Butylbenzylphthalate                     |                       | < 0.01               | 0.01                 | < 0.00               | 0.00                 | 0.01                 | 0.03                 | T                    | 0.00                 | 0.00                 | < 0.01           | 0.03            | < 0.01          |
| 1 2 C10-C11 Branched Alkane              |                       | T                    | T                    | 1.48                 | 1.02                 | T                    | T                    | T                    | T                    | T                    | < 0.11           | 1.48            | < 0.36          |
| 1 2 C10H18 Polycyclic Hydrocarbon        |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                | T               | T               |
| 1 2 C10H20 Alkyl Substituted Cyclohexane |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.56           | 7.97            | < 1.85          |
| 1 2 C11-C12 Branched Alkane              |                       | 0.46                 | T                    | 9.61                 | 0.51                 | T                    | T                    | 0.39                 | T                    | T                    | < 1.19           | 18.20           | < 3.76          |
| 1 2 C11H22 Alkane                        |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | 2.95                 | T                    | < 0.13           | 2.95            | < 0.60          |
| 1 2 C12H24 Alkane                        |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | 4.42                 | T                    | < 0.19           | 4.42            | < 0.90          |
| 1 2 C4 Aldehyde                          |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.04           | 0.88            | < 0.18          |
| 1 2 C5 Aldehyde                          |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.04           | 0.88            | < 0.18          |
| 1 2 C8H10 O2 Acid Ester                  |                       | T                    | T                    | 3.70                 | T                    | T                    | T                    | T                    | T                    | T                    | < 0.18           | 3.70            | < 0.75          |
| 1 2 C8H12 Cyclic alkene                  |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                | T               | T               |
| 1 2 C8H16 Alkene                         |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.47           | 7.99            | < 1.71          |
| 1 2 C9H10 Alkyl Substituted Benzene      |                       | T                    | T                    | T                    | 0.68                 | T                    | T                    | T                    | T                    | T                    | < 0.08           | 1.24            | < 0.28          |
| 1 2 C9H12 Alkyl Substituted Benzene      |                       | T                    | T                    | T                    | 0.68                 | T                    | T                    | T                    | T                    | T                    | < 0.09           | 1.49            | < 0.33          |
| 1 2 C9H12 Polycyclic Alkene              |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 1.48           | 34.02           | < 6.94          |
| Camphene                                 | 79-92-5               | < 0.01               | < 0.01               | < 0.00               | 0.02                 | < 0.02               | < 0.04               | < 0.00               | < 0.01               | < 0.01               | < 0.01           | 0.07            | < 0.01          |
| 1 Carbon Disulfide                       | 00075-15-0            | 0.24                 | 0.13                 | < 0.08               | 26.23                | < 0.26               | 1.32                 | 0.03                 | 0.10                 | 0.82                 | < 0.95           | 67.47           | < 17.53         |
| 1 Carbon Tetrachloride                   | 00058-23-5            | 74.09                | < 0.23               | < 0.08               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | 0.38                 | < 3.44           | 74.09           | < 15.08         |
| 1 2 Carbonyl sulfide                     | 00483-58-1            | 0.48                 | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.12           | 2.21            | < 0.48          |
| 1 Chlorobenzene                          | 00106-90-7            | < 0.08               | < 0.23               | < 0.08               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| 1 2 Chlorobutadiene-Methylpentane        |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.03           | 0.78            | < 0.16          |
| 1 Chlorodibromomethane                   | 00124-46-1            | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| 1 Chloroethane                           | 00075-00-3            | < 0.09               | 4.74                 | 0.08                 | 0.14                 | < 0.26               | 2.15                 | < 0.07               | < 0.12               | < 0.74               | < 0.51           | 4.74            | < 1.00          |
| 1 Chloroform                             | 00087-66-3            | 1.03                 | 0.03                 | < 0.08               | 0.14                 | < 0.26               | < 0.56               | 0.01                 | < 0.12               | < 0.74               | < 0.27           | 1.03            | < 0.24          |
| 1 Chloromethane                          | 00074-87-3            | 0.16                 | 0.04                 | 0.26                 | 0.14                 | 0.82                 | 1.70                 | 0.28                 | 0.04                 | < 0.74               | < 0.27           | 1.70            | < 0.36          |
| Chrysene                                 | 218-01-9              | < 0.00               | < 0.00               | < 0.00               | 0.00                 | 0.00                 | < 0.04               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.04            | < 0.01          |
| 1 cis-1,2-Dichloroethene                 | 00158-59-2            | < 0.09               | < 0.23               | < 0.08               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.25           | 0.74            | < 0.17          |
| 1 cis-1,3-Dichloropropene                | 10081-01-5            | < 0.09               | < 0.23               | < 0.08               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | 0.74            | < 0.17          |
| 1 cis-2 Butene                           | 00590-18-1            | < 0.01               | < 0.03               | < 0.04               | 0.02                 | < 0.04               | < 0.08               | < 0.01               | < 0.02               | < 0.03               | < 0.03           | 0.08            | < 0.02          |
| 1 cis-2-Hexene                           | 07686-21-3            | < 0.01               | < 0.03               | 0.24                 | 0.02                 | 0.35                 | < 0.08               | 0.06                 | 0.18                 | < 0.03               | < 0.10           | 0.50            | < 0.12          |
| 1 cis-2-Pentene                          | 00827-20-3            | 0.18                 | 0.17                 | 0.78                 | 0.16                 | 0.37                 | 0.75                 | 30.69                | 0.17                 | 0.17                 | 1.78             | 30.89           | 6.21            |
| Cumene                                   | 00098-82-8            | < 0.01               | < 0.03               | < 0.04               | 0.09                 | 4.40                 | < 0.08               | 0.02                 | 0.06                 | < 0.03               | < 0.48           | 4.88            | < 1.29          |
| Cumene                                   | 98-82-8               | 0.00                 | < 0.00               | 0.00                 | 0.02                 | 0.01                 | 0.03                 | 0.00                 | < 0.00               | 0.00                 | < 0.01           | 0.03            | < 0.01          |
| 1 2 Cyclobutane                          |                       | T                    | T                    | T                    | 0.76                 | T                    | T                    | 1.31                 | 1.47                 | T                    | < 0.19           | 1.47            | < 0.43          |
| Cyclohexane                              | 00110-92-7            | 0.05                 | 0.05                 | < 0.04               | 0.03                 | 0.07                 | < 0.08               | 0.19                 | 0.48                 | 0.08                 | < 0.53           | 6.53            | < 1.33          |
| Cyclohexanone                            | 108-94-1              | < 0.01               | < 0.01               | < 0.00               | 0.03                 | < 0.02               | 0.05                 | < 0.00               | 0.03                 | 0.08                 | < 0.04           | 0.18            | < 0.05          |
| Cyclohexylamine                          | 108-91-8              | < 0.00               | < 0.01               | 0.05                 | 0.00                 | < 0.02               | 1.97                 | < 0.00               | < 0.00               | < 0.01               | < 0.09           | 1.97            | < 0.40          |
| 1 2 Cyclooctadiene                       |                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.64           | 17.52           | < 3.57          |
| Cyclopentane + 2,3-Dimethylbutane        | 00287-92-3/00079-29-8 | 0.03                 | 0.24                 | < 0.05               | 0.03                 | 0.84                 | 0.56                 | 4.27                 | 0.11                 | 0.10                 | < 0.35           | 4.27            | < 0.86          |
| Cyclopentene                             | 00142-29-0            | < 0.01               | < 0.03               | < 0.04               | 0.02                 | < 0.04               | < 0.08               | < 0.01               | < 0.02               | < 0.03               | < 0.09           | 0.57            | < 0.13          |
| 1 2 Decane                               |                       | 0.58                 | T                    | T                    | 2.54                 | 0.44                 | T                    | 0.88                 | T                    | T                    | < 0.40           | 2.54            | < 0.62          |
| Dibenzofuran                             | 132-84-9              | 0.00                 | < 0.00               | < 0.00               | 0.00                 | < 0.01               | 0.00                 | 0.00                 | < 0.00               | 0.00                 | < 0.00           | 0.03            | < 0.01          |

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - ENGINEERED PRODUCTS

|   | CAS<br>Numbers                        | Cmpd #15<br>% Of Tot | Cmpd #16<br>% Of Tot | Cmpd #17<br>% Of Tot | Cmpd #18<br>% Of Tot | Cmpd #19<br>% Of Tot | Cmpd #20<br>% Of Tot | Cmpd #21<br>% Of Tot | Cmpd #22<br>% Of Tot | Cmpd #23<br>% Of Tot | MEAN<br>% of Tot | MAX<br>% of Tot | STD<br>% of Tot |
|---|---------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| 1 | Dibenz(a,h)anthracene<br>00075-71-8   | 0.01                 | 0.00                 | 0.01                 | 0.00                 | 0.01                 | 0.14                 | 0.00                 | 0.00                 | 0.00                 | 0.01             | 0.14            | 0.03            |
|   | Dichlorodifluoromethane<br>84-86-2    | 0.04                 | 0.23                 | 0.08                 | 0.14                 | 0.28                 | 0.25                 | 0.07                 | 0.05                 | 0.74                 | 0.19             | 0.74            | 0.17            |
|   | Diethylphthalate<br>80-11-7           | 0.01                 | 0.01                 | 0.00                 | 0.01                 | 0.02                 | 0.04                 | 0.00                 | 0.01                 | 0.01                 | 0.01             | 0.04            | 0.01            |
|   | Dimethylaminobenzene<br>131-11-3      | 0.03                 | 0.01                 | 0.01                 | 0.00                 | 0.01                 | 0.07                 | 0.00                 | 0.00                 | 0.00                 | 0.01             | 0.07            | 0.01            |
|   | Dimethylphthalate<br>84-74-2          | 0.00                 | 0.01                 | 0.00                 | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.00                 | 0.00                 | 0.00             | 0.01            | 0.00            |
|   | Di-n-butylphthalate<br>117-84-0       | T                    | 0.01                 | T                    | 0.08                 | 0.12                 | 0.11                 | 0.20                 | 0.04                 | 0.14                 | 0.05             | 0.20            | 0.08            |
|   | Diphenylamine<br>122-39-4             | 0.00                 | 0.01                 | 0.00                 | 0.02                 | 0.01                 | 0.02                 | 0.00                 | 0.02                 | 0.00                 | 0.08             | 0.03            | 0.01            |
|   | d-Limonene<br>05989-27-5              | 0.07                 | 0.17                 | 0.21                 | 0.07                 | 0.19                 | 0.39                 | 0.05                 | 0.72                 | 0.13                 | 0.17             | 0.72            | 0.14            |
| 1 | Epichlorohydrin<br>00108-88-8         | 0.19                 | 0.47                 | 0.12                 | 0.27                 | 0.53                 | 1.11                 | 0.14                 | 0.24                 | 1.49                 | 0.48             | 1.49            | 0.35            |
|   | Ethane<br>00074-84-0                  | 0.18                 | 0.18                 | 0.60                 | 0.19                 | 0.47                 | 0.85                 | 0.09                 | 0.28                 | 0.03                 | 0.38             | 1.97            | 0.41            |
| 1 | 2 Ethanol<br>25168-07-4               | T                    | 43.77                | 7.40                 | T                    | T                    | 8.95                 | T                    | 1.47                 | T                    | 4.74             | 43.77           | 11.09           |
| 1 | 2 Ethylcyclohexene<br>118-74-1        | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | 0.44             | 8.78            | 1.79            |
| 1 | 2 Ethyl Acetate<br>118-74-1           | T                    | 14.59                | T                    | T                    | T                    | T                    | T                    | T                    | T                    | 0.83             | 14.59           | 2.98            |
| 1 | 2 Ethyl Acrylate<br>118-74-1          | T                    | T                    | 1.48                 | T                    | T                    | T                    | T                    | T                    | T                    | 0.08             | 1.48            | 0.30            |
|   | Ethylacetylene<br>00107-00-8          | 0.01                 | 0.29                 | 0.04                 | 0.02                 | 0.04                 | 0.08                 | 0.01                 | 0.02                 | 0.03                 | 0.04             | 0.29            | 0.08            |
|   | Ethylbenzene<br>00100-41-4            | 0.08                 | 0.03                 | 0.04                 | 0.21                 | 0.13                 | 0.40                 | 0.01                 | 0.14                 | 0.03                 | 0.28             | 3.64            | 0.72            |
|   | Ethylene<br>00074-85-1                | 0.05                 | 0.03                 | 0.04                 | 0.08                 | 0.13                 | 1.12                 | 0.01                 | 0.07                 | 0.03                 | 0.40             | 6.04            | 1.22            |
|   | Fluoranthene<br>208-44-0              | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.01                 | 0.00                 | 0.00                 | 0.00                 | 0.00             | 0.02            | 0.00            |
|   | Fluorene<br>86-73-7                   | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.01                 | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.00             | 0.01            | 0.00            |
| 1 | 2 Heptane<br>118-74-1                 | T                    | T                    | T                    | T                    | 0.44                 | T                    | T                    | 5.89                 | T                    | 1.08             | 7.45            | 1.90            |
| 1 | 2 Heptanone<br>118-74-1               | 0.58                 | T                    | T                    | T                    | T                    | T                    | 0.22                 | T                    | T                    | 0.23             | 4.40            | 0.90            |
|   | Hexachlorobenzene<br>00087-88-3       | 0.01                 | 0.01                 | 0.00                 | 0.01                 | 0.03                 | 0.04                 | 0.00                 | 0.01                 | 0.01                 | 0.01             | 0.04            | 0.01            |
| 1 | Hexachlorobutadiene<br>87-88-3        | 0.19                 | 0.47                 | 0.12                 | 0.27                 | 0.53                 | 1.11                 | 0.14                 | 0.24                 | 1.49                 | 0.48             | 1.49            | 0.35            |
|   | Hexachlorobutadiene<br>77-47-4        | 0.01                 | 0.02                 | 0.01                 | 0.01                 | 0.03                 | 0.04                 | 0.00                 | 0.01                 | 0.01                 | 0.01             | 0.04            | 0.01            |
|   | Hexachlorocyclopentadiene<br>104-72-1 | 0.01                 | 0.02                 | 0.01                 | 0.01                 | 0.05                 | 0.05                 | 0.01                 | 0.01                 | 0.01                 | 0.02             | 0.05            | 0.01            |
| 1 | 2 Hexachloroethane<br>123-31-9        | 1.04                 | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | 0.05             | 1.04            | 0.21            |
|   | Hexachloroethane<br>193-39-5          | 1.95                 | 0.02                 | 0.01                 | 0.01                 | 0.03                 | 0.05                 | 0.01                 | 0.01                 | 0.01                 | 0.10             | 1.95            | 0.39            |
|   | Hydroquinone<br>00078-84-2            | 0.01                 | 0.02                 | 0.00                 | 0.01                 | 0.03                 | 0.05                 | 0.00                 | 0.01                 | 0.01                 | 1.82             | 35.65           | 7.29            |
|   | Indeno(1,2,3-cd)pyrene<br>00078-84-2  | 0.01                 | 0.00                 | 0.01                 | 0.00                 | 0.01                 | 0.11                 | 0.00                 | 0.00                 | 0.00                 | 0.01             | 0.11            | 0.02            |
| 1 | 2 Isobutanol<br>00075-28-5            | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | 0.05             | 1.25            | 0.25            |
|   | Isobutane<br>00115-11-7/00106-98-9    | 0.03                 | 0.04                 | 0.04                 | 0.02                 | 0.04                 | 0.08                 | 0.01                 | 0.12                 | 0.14                 | 0.14             | 0.70            | 0.18            |
|   | Isobutylene + 1-Butene<br>00540-84-1  | 0.28                 | 0.25                 | 0.04                 | 0.37                 | 0.18                 | 1.40                 | 1.23                 | 1.29                 | 0.03                 | 0.42             | 1.40            | 0.41            |
|   | Isocetane<br>28952-21-6               | 0.08                 | 0.03                 | 0.04                 | 0.08                 | 0.19                 | 0.35                 | 0.15                 | 0.86                 | 0.03                 | 0.28             | 1.16            | 0.27            |
|   | Isocetanol<br>00078-76-4              | 0.06                 | 0.12                 | 0.04                 | 0.05                 | 0.22                 | 0.53                 | 0.82                 | 0.25                 | 0.08                 | 1.22             | 23.15           | 4.66            |
|   | Isopentane<br>78-59-1                 | 0.83                 | 0.04                 | 1.66                 | 1.77                 | 0.85                 | 2.87                 | 8.13                 | 0.02                 | 1.28                 | 2.47             | 8.89            | 2.33            |
|   | Isophorone<br>00078-79-5              | 0.00                 | 0.01                 | 0.00                 | 0.00                 | 0.01                 | 0.02                 | 0.00                 | 0.38                 | 0.00                 | 0.07             | 1.00            | 0.21            |
|   | Isoprene<br>00078-79-5                | 0.01                 | 0.05                 | 0.04                 | 0.02                 | 0.04                 | 0.08                 | 0.01                 | 0.02                 | 0.03                 | 0.04             | 0.15            | 0.03            |
| 1 | 2 Isopropyl Alcohol<br>00556-81-8     | T                    | T                    | 0.74                 | 25.39                | T                    | 2.43                 | 0.22                 | T                    | T                    | 1.49             | 25.39           | 5.13            |
| 1 | 2 Methyl Acrylate<br>00074-99-7       | T                    | T                    | 11.09                | T                    | T                    | T                    | T                    | T                    | T                    | 0.48             | 11.09           | 2.26            |
| 1 | 2 Methyl Isocyanate<br>00108-87-2     | 0.01                 | 0.03                 | 0.04                 | 0.02                 | 0.04                 | 0.08                 | 0.01                 | 0.02                 | 0.03                 | 0.03             | 0.08            | 0.01            |
|   | Methylacetylene<br>00108-87-2         | 0.14                 | 0.14                 | 0.04                 | 0.28                 | 0.92                 | 0.65                 | 0.10                 | 3.35                 | 0.27                 | 0.84             | 3.91            | 0.98            |
|   | Methylcyclohexane<br>00086-37-7       | 0.20                 | 0.13                 | 0.14                 | 0.08                 | 0.19                 | 0.47                 | 0.04                 | 0.27                 | 0.25                 | 0.94             | 5.48            | 1.56            |

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - ENGINEERED PRODUCTS

|   | CAS<br>Numbers                                  | Cmpd #15<br>% Of Tot | Cmpd #16<br>% Of Tot | Cmpd #17<br>% Of Tot | Cmpd #18<br>% Of Tot | Cmpd #19<br>% Of Tot | Cmpd #20<br>% Of Tot | Cmpd #21<br>% Of Tot | Cmpd #22<br>% Of Tot | Cmpd #23<br>% Of Tot | MEAN<br>% of Tot | MAX<br>% of Tot | STD<br>% of Tot |
|---|-------------------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| 1 | Methylene bis-chloroaniline<br>101-14-4         | < 0.02               | < 0.01               | < 0.02               | 0.00                 | < 0.03               | < 0.24               | < 0.00               | < 0.01               | < 0.01               | < 0.03           | < 0.24          | < 0.05          |
| 1 | Methylene Chloride<br>00075-09-2                | 1.11                 | 1.39                 | 5.18                 | 0.84                 | 1.56                 | 5.21                 | 0.20                 | 1.09                 | 1.77                 | 3.09             | 35.39           | 7.01            |
| 1 | 2 Methylhexane                                  | T                    | T                    | T                    | T                    | T                    | T                    | T                    | 5.89                 | T                    | 0.74             | 7.45            | 1.88            |
| 1 | 2 Methylpentane                                 | 0.89                 | T                    | T                    | T                    | T                    | T                    | T                    | 0.88                 | T                    | 0.81             | 3.89            | 1.07            |
|   | m-Ethyltoluene                                  | < 0.01               | 0.17                 | < 0.04               | 0.09                 | < 0.04               | 0.23                 | 0.04                 | < 0.02               | < 0.03               | < 0.05           | 0.23            | < 0.05          |
|   | m-Xylene + p-Xylene<br>00620-14-4               | 0.49                 | 0.30                 | 0.15                 | 0.65                 | 0.42                 | 1.71                 | 0.10                 | 0.46                 | 0.18                 | 1.03             | 12.13           | 2.39            |
|   | Naphthalene<br>00108-38-3/00108-42-3<br>91-20-3 | 0.04                 | 0.03                 | 0.01                 | 0.02                 | 0.05                 | 0.09                 | 0.01                 | 0.06                 | 0.05                 | 0.06             | 0.34            | < 0.08          |
|   | n-Butane<br>00106-97-8                          | 0.11                 | 0.20                 | 1.30                 | 0.07                 | 0.20                 | 0.63                 | 0.08                 | 0.41                 | 0.73                 | 0.47             | 1.93            | 0.48            |
|   | n-Decane<br>00124-18-5                          | 0.11                 | < 0.17               | 0.24                 | 0.85                 | < 0.20               | 0.62                 | 0.39                 | 1.40                 | 0.21                 | < 0.43           | 1.40            | < 0.30          |
|   | n-Heptane<br>00142-82-5                         | 0.10                 | 0.10                 | < 0.04               | 0.15                 | 0.57                 | 0.50                 | 0.10                 | 2.98                 | 0.15                 | < 0.69           | 3.69            | < 0.91          |
|   | n-Hexane<br>00110-54-3                          | 1.25                 | 5.06                 | 35.33                | 0.30                 | 0.99                 | 2.47                 | 0.18                 | 0.84                 | 1.00                 | 4.01             | 35.33           | 7.25            |
|   | Nitrobenzene<br>98-95-3                         | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.02               | < 0.03               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | 0.05            | < 0.01          |
|   | N-Nitrosodimethylamine<br>55-18-5               | < 0.01               | < 0.02               | < 0.01               | 0.01                 | < 0.04               | < 0.08               | < 0.01               | < 0.01               | < 0.01               | < 0.02           | 0.06            | < 0.02          |
|   | N-Nitrosodimethylamine<br>62-75-9               | T                    | < 0.02               | T                    | 0.01                 | < 0.03               | < 0.10               | < 0.01               | < 0.01               | < 0.01               | < 0.01           | 0.10            | < 0.02          |
|   | N-Nitroso-di-n-propylamine<br>821-84-7          | < 0.01               | < 0.02               | < 0.01               | 0.01                 | < 0.03               | < 0.08               | < 0.01               | < 0.01               | < 0.01               | < 0.01           | 0.08            | < 0.01          |
|   | N-Nitrosodiphenylamine<br>86-30-6               | 0.00                 | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | 0.00             | 0.00            | 0.00            |
|   | n-Nitrosomorpholine<br>59-89-2                  | < 0.01               | < 0.02               | < 0.00               | 0.01                 | < 0.03               | < 0.05               | < 0.01               | < 0.01               | < 0.01               | < 0.01           | 0.05            | < 0.01          |
|   | n-Nonane<br>00111-84-2                          | < 0.01               | < 0.03               | < 0.04               | 0.36                 | 0.37                 | < 0.08               | 0.21                 | 0.06                 | < 0.03               | < 0.19           | 0.51            | < 0.14          |
|   | n-Octane<br>00111-65-9                          | 0.08                 | < 0.03               | < 0.04               | 0.02                 | < 0.04               | < 0.08               | < 0.01               | 0.11                 | < 0.03               | < 0.06           | 0.22            | < 0.08          |
| 1 | 2 Nonane                                        | T                    | T                    | T                    | T                    | T                    | T                    | 0.44                 | T                    | T                    | < 0.02           | 0.44            | < 0.09          |
|   | n-Pentane<br>00109-86-0                         | 0.07                 | < 0.04               | 0.19                 | 0.12                 | 0.12                 | < 0.08               | 0.03                 | 0.30                 | 0.56                 | < 0.29           | 1.25            | < 0.30          |
| 1 | 2 n-Propane                                     | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.06           | 1.43            | < 0.29          |
|   | n-Propylbenzene<br>00103-65-1                   | < 0.01               | 0.14                 | < 0.04               | 0.02                 | < 0.04               | < 0.08               | < 0.01               | < 0.02               | < 0.03               | < 0.04           | 0.15            | < 0.04          |
| 1 | 2 n-Undecane                                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.15           | 1.43            | < 0.39          |
|   | N,N-Diethylaniline<br>91-96-7                   | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.01               | < 0.02               | < 0.00               | < 0.00               | < 0.00               | < 0.01           | 0.05            | < 0.01          |
|   | N,N-Dimethylaniline<br>121-89-7                 | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.01               | < 0.02               | < 0.00               | < 0.00               | < 0.00               | < 0.01           | 0.02            | < 0.00          |
|   | o-Anisidine<br>90-04-0                          | < 0.01               | < 0.01               | < 0.00               | 0.01                 | < 0.03               | < 0.04               | < 0.00               | < 0.01               | < 0.01               | < 0.01           | 0.04            | < 0.01          |
|   | o-Ethyltoluene<br>00611-14-3                    | < 0.08               | < 0.16               | < 0.21               | 0.09                 | < 0.16               | < 0.39               | < 0.05               | 0.16                 | < 0.13               | < 0.17           | 0.52            | < 0.12          |
|   | o-Toluidine<br>95-53-4                          | < 0.00               | < 0.01               | < 0.00               | 0.00                 | < 0.01               | < 0.02               | < 0.00               | < 0.00               | < 0.01               | < 0.02           | 0.18            | < 0.04          |
|   | o-Xylene<br>00085-47-6                          | 0.13                 | 0.15                 | 0.16                 | 0.27                 | 0.20                 | 0.83                 | 0.11                 | 0.39                 | < 0.03               | < 0.55           | 6.51            | < 1.28          |
|   | p-Cymene<br>00099-87-6                          | < 0.06               | < 0.16               | 0.29                 | 0.17                 | < 0.18               | < 0.39               | 0.10                 | 1.23                 | < 0.13               | < 0.23           | 1.23            | < 0.23          |
|   | Pentachloronitrobenzene<br>82-88-8              | < 0.02               | < 0.04               | < 0.01               | 0.02                 | < 0.08               | < 0.10               | < 0.01               | < 0.02               | < 0.03               | < 0.03           | 0.10            | < 0.02          |
|   | Pentachlorophenol<br>87-88-5                    | < 0.02               | < 0.02               | < 0.01               | 0.01                 | 0.05                 | < 0.08               | < 0.00               | < 0.01               | < 0.01               | < 0.02           | 0.08            | < 0.02          |
| 1 | 2 Pentane                                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.11           | 1.43            | < 0.37          |
| 1 | 2 Pentene                                       | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.04           | 0.86            | < 0.18          |
|   | p-Ethyltoluene<br>00622-98-8                    | < 0.01               | < 0.03               | < 0.04               | 0.02                 | < 0.04               | < 0.08               | 0.07                 | 0.20                 | < 0.03               | < 0.08           | 0.57            | < 0.13          |
|   | Phenanthrene<br>85-01-6                         | < 0.00               | 0.01                 | 0.00                 | 0.01                 | 0.01                 | 0.02                 | 0.00                 | 0.01                 | 0.00                 | < 0.01           | 0.02            | < 0.01          |
|   | Phenol<br>108-95-2                              | 0.04                 | 0.13                 | 0.40                 | 0.04                 | < 0.02               | 0.09                 | 0.01                 | 0.74                 | 0.02                 | < 0.14           | 1.03            | < 0.25          |
|   | Phthalimide<br>85-41-6                          | < 0.02               | < 0.03               | < 0.01               | 0.01                 | 0.03                 | 0.26                 | < 0.01               | 0.07                 | 1.33                 | < 0.12           | 1.33            | < 0.29          |
| 1 | 2 Propanal                                      | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.09           | 2.04            | < 0.42          |
|   | Propane<br>00074-98-6                           | 0.07                 | 0.12                 | 0.36                 | 0.06                 | 0.24                 | 1.15                 | 0.06                 | 0.23                 | < 0.03               | < 0.55           | 3.80            | < 0.81          |
| 1 | 2 Propylcyclohexane                             | T                    | T                    | T                    | 0.59                 | T                    | T                    | T                    | T                    | T                    | < 0.03           | 0.59            | < 0.12          |
|   | Propylene<br>00115-07-1                         | < 0.01               | < 0.03               | < 0.04               | 0.03                 | < 0.04               | < 0.08               | < 0.01               | < 0.02               | < 0.03               | < 0.08           | 0.55            | < 0.12          |
| 1 | Propylene Oxide<br>00075-56-9                   | < 0.19               | < 0.47               | < 0.12               | 0.27                 | < 0.53               | < 1.11               | < 0.14               | < 0.24               | < 1.49               | < 0.88           | 4.73            | < 0.93          |

TABLE 4-4e  
MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - ENGINEERED PRODUCTS

|                                       | CAS<br>Numbers | Cmpd #15<br>% Of Tot | Cmpd #16<br>% Of Tot | Cmpd #17<br>% Of Tot | Cmpd #18<br>% Of Tot | Cmpd #19<br>% Of Tot | Cmpd #20<br>% Of Tot | Cmpd #21<br>% Of Tot | Cmpd #22<br>% Of Tot | Cmpd #23<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|---------------------------------------|----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| Pyrene                                | 129-00-0       | 0.01                 | 0.01                 | 0.00                 | 0.00                 | 0.01                 | 0.11                 | 0.00                 | 0.01                 | 0.02                 | 0.02             | 0.11            | 0.02            |
| Pyridine                              | 110-86-1       | < 0.01               | < 0.01               | < 0.01               | 0.01                 | < 0.02               | < 0.06               | < 0.00               | < 0.01               | < 0.01               | < 0.01           | < 0.06          | < 0.01          |
| Styrene                               | 00100-42-5     | < 0.01               | < 0.03               | < 0.04               | 0.04                 | < 0.04               | < 0.08               | 0.05                 | 1.60                 | < 0.03               | < 0.27           | 3.40            | < 0.74          |
| 1 t-Butyl Methyl Ether                | 01634-04-4     | < 0.19               | < 0.47               | < 0.12               | 0.27                 | < 0.53               | < 1.11               | 5.70                 | < 0.24               | < 1.49               | < 0.70           | 5.70            | < 1.12          |
| 1 2 tert-Butyl Alcohol                | 00075-65-0     | T                    | T                    | T                    | T                    | T                    | T                    | 13.15                | T                    | T                    | < 0.73           | 13.15           | < 2.71          |
| 1 Tetrachloroethene                   | 00127-18-4     | 1.10                 | < 0.23               | < 0.06               | 0.06                 | 0.12                 | 0.39                 | < 0.07               | 2.06                 | < 0.74               | < 0.56           | 8.20            | < 1.28          |
| 1 2 Tetrahydrofuran                   |                | T                    | T                    | T                    | T                    | 0.61                 | T                    | T                    | T                    | T                    | < 0.17           | 1.43            | < 0.36          |
| Toluene                               | 00108-88-3     | 0.50                 | 0.49                 | 0.32                 | 0.51                 | 1.61                 | 2.42                 | 0.10                 | 2.66                 | 37.21                | 2.98             | 37.21           | 7.56            |
| 1 trans-1,2-Dichloroethene            | 00156-90-5     | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| 1 trans-1,2-Dichloropropene           | 10061-02-6     | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| trans-2-Butene                        | 00624-64-6     | 0.61                 | < 0.03               | < 0.04               | 0.02                 | < 0.04               | 0.95                 | < 0.01               | < 0.02               | 1.20                 | < 0.17           | 1.20            | < 0.33          |
| trans-2-Hexene                        | 04050-45-7     | < 0.01               | < 0.03               | < 0.04               | 0.02                 | < 0.04               | < 0.08               | < 0.01               | < 0.02               | < 0.03               | < 0.04           | 0.11            | < 0.03          |
| trans-2-Pentene                       | 00646-04-6     | < 0.01               | < 0.03               | < 0.04               | 0.04                 | < 0.04               | < 0.08               | < 0.01               | < 0.02               | < 0.03               | < 0.04           | 0.19            | < 0.04          |
| 1 Trichloroethene                     | 00079-01-6     | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| 1 Trichloroheptafluorobutane          | 00075-69-4     | 0.27                 | 0.90                 | < 0.06               | 0.26                 | 0.69                 | 2.54                 | 0.05                 | 0.72                 | < 0.74               | < 0.50           | 2.54            | < 0.52          |
| 1 2 Trichloroheptafluorobutane        |                | 0.69                 | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.03           | 0.69            | < 0.14          |
| 1 Trichlorotrifluoroethene            | 00076-13-1     | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.17          |
| Trifluoroin                           | 1582-09-8      | < 0.01               | < 0.02               | < 0.01               | 0.01                 | < 0.04               | < 0.07               | < 0.01               | < 0.01               | < 0.02               | < 0.02           | < 0.07          | < 0.01          |
| 1 2 Undecane                          |                | T                    | T                    | T                    | 0.85                 | T                    | T                    | 0.31                 | T                    | T                    | < 0.08           | 0.88            | < 0.25          |
| 1 2 Unknown                           |                | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | T                    | < 0.20           | 2.87            | < 0.68          |
| 1 Vinyl Acetate                       | 00108-05-4     | < 0.09               | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.37           | 3.19            | < 0.63          |
| 1 Vinyl Chloride                      | 00075-01-4     | 0.02                 | < 0.23               | < 0.06               | 0.14                 | < 0.26               | < 0.56               | < 0.07               | < 0.12               | < 0.74               | < 0.24           | < 0.74          | < 0.18          |
| Total Detected (lb/lb rubber)         |                | 5.95E-05             | 3.04E-05             | 2.99E-04             | 1.24E-04             | 1.98E-05             | 1.22E-05             | 1.34E-04             | 8.69E-05             | 3.25E-05             |                  |                 |                 |
| Total with non-detects (lb/lb rubber) |                | < 6.32E-05           | < 3.59E-05           | < 3.20E-04           | < 1.35E-04           | < 2.40E-05           | < 1.87E-05           | < 1.40E-04           | < 9.27E-05           | < 6.18E-05           |                  |                 |                 |

NOTES:

- 1 TO14 Compound
- 2 Tentatively Identified Compound(TIC)
- T TIC Not Identified In Summarized Category
- % of Total Values Represent % of Total With Non-Detects

**TABLE 4-4f**  
**MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - POLYMERS**

|                                              | CAS<br>Numbers        | Cmpd #24<br>% Of Tot | Cmpd #25<br>% Of Tot | Cmpd #26<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|----------------------------------------------|-----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| 1 2 1-Butanol                                | 00071-36-3            | T                    | T                    | T                    | T                | T               | T               |
| 1 2 1-Chloro-4-(1-chloroethenyl) cyclohexene |                       | T                    | T                    | T                    | T                | T               | T               |
| 1 2 1-Chloro-5-(1-chloroethenyl) cyclohexene |                       | T                    | T                    | T                    | T                | T               | T               |
| 1 2 1-Chloropropane                          |                       | T                    | T                    | T                    | T                | T               | T               |
| 1-Dodecene                                   | 112-41-4              | < 0.02               | < 0.03               | < 0.02               | < 0.02           | < 0.03          | < 0.00          |
| 1-Heptene                                    | 00592-76-7            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 1-Hexene                                     | 00592-41-6            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 1 2 1-Methoxybutane                          |                       | T                    | T                    | T                    | T                | T               | T               |
| 1-Octene                                     | 00111-60-0            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 1-Pentene                                    | 00109-67-1            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 1 2 1-Propanol                               |                       | T                    | T                    | T                    | T                | T               | T               |
| 1 1,1-Dichloroethane                         | 00075-34-3            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 1,1-Dichloroethene                         | 00075-35-4            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 1,1,1-Trichloroethane                      | 00071-55-6            | 1.81                 | 0.13                 | 0.40                 | 0.78             | 1.81            | 0.74            |
| 1 1,1,2-Trichloroethane                      | 00079-00-5            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 1,1,2,2-Tetrachloroethane                  | 00079-34-5            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 1,2-Dibromo-3-Chloropropane                | 00096-12-8            | < 0.43               | < 0.40               | < 0.45               | < 0.43           | < 0.45          | < 0.02          |
| 1 1,2-Dibromo-3-chloropropane                | 96-12-8               | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 1 1,2-Dibromoethane                          | 00106-93-4            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 1,2-Dichlorobenzene                        | 00095-50-1            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 1,2-Dichlorobenzene                        | 95-50-1               | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| 1 1,2-Dichloroethane                         | 00107-06-2            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 1,2-Dichloropropane                        | 00078-87-5            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 1,2,4-Trichlorobenzene                     | 120-82-1              | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| 1 1,2,4-Trimethylbenzene                     | 00095-63-6            | < 0.15               | < 0.14               | < 0.16               | < 0.15           | < 0.16          | < 0.01          |
| 1 1,2,4-Trimethylbenzene                     | 95-63-6               | 0.10                 | 0.26                 | 0.04                 | 0.14             | 0.26            | 0.09            |
| 1 1,3-Butadiene                              | 00106-99-0            | 0.18                 | 0.56                 | < 0.03               | < 0.26           | 0.56            | < 0.22          |
| 1 1,3-Cyclooctadiene                         | 1700-10-3             | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| 1 1,3-Dichlorobenzene                        | 00541-73-1            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 1,3-Dichlorobenzene                        | 541-73-1              | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 1 1,3,5-Trimethylbenzene                     | 00108-67-8            | < 0.15               | < 0.14               | < 0.16               | < 0.15           | < 0.16          | < 0.01          |
| 1 1,4-Dichlorobenzene                        | 00106-46-7            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 1,4-Dichlorobenzene                        | 106-46-7              | 0.01                 | 0.01                 | < 0.00               | < 0.01           | 0.01            | < 0.00          |
| 1 1,4-Diethylbenzene + n-Butylbenzene        | 00105-05-5/00104-51-8 | < 0.15               | 0.87                 | < 0.16               | < 0.39           | 0.87            | < 0.34          |
| 1 1,4-Dioxane                                | 00123-91-1            | < 0.86               | < 0.79               | < 0.91               | < 0.85           | < 0.91          | < 0.05          |
| 1 1,4-Phenylenediamine                       | 106-50-3              | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 1 1,5-Cyclooctadiene                         | 111-78-4              | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 1 2 2-Butanol                                |                       | T                    | T                    | T                    | T                | T               | T               |
| 1 2-Butanone                                 | 00078-93-3            | 0.43                 | 0.79                 | 0.14                 | 0.45             | 0.79            | 0.27            |
| 1 2 2-Butene                                 | 00126-99-8            | T                    | T                    | T                    | T                | T               | T               |
| 2-Chloroacetophenone                         | 1341-24-8             | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 2-Chloronaphthalene                          | 91-58-7               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 2-Chlorophenol                               | 95-57-8               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 2-Furaldehyde                                | 98-01-1               | 0.01                 | 0.02                 | 0.00                 | 0.01             | 0.02            | 0.01            |
| 1 2-Hexanone                                 | 00591-78-6            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 2-Methyl-1-butene                            | 00563-46-2            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 2-Methyl-2-butene                            | 00513-35-9            | 0.88                 | 1.15                 | 1.18                 | 1.07             | 1.18            | 0.13            |
| 2-Methyl-2-pentene                           | 00625-27-4            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 2-Methylheptane                              | 00592-27-8            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |

**TABLE 4-4f**  
**MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - POLYMERS**

|                              | CAS<br>Numbers    | Cmpd #24<br>% Of Tot | Cmpd #25<br>% Of Tot | Cmpd #26<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|------------------------------|-------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| 2-Methylhexane               | 00591-76-4        | 0.18                 | 0.18                 | < 0.03               | < 0.13           | 0.18            | < 0.07          |
| 2-Methylnaphthalene          | 91-57-6           | 0.07                 | 0.16                 | 0.01                 | 0.08             | 0.16            | 0.06            |
| 2-Methylpentane              | 00107-83-5        | 0.50                 | 0.43                 | 0.47                 | 0.47             | 0.50            | 0.03            |
| 2-Methylphenol               | 95-48-7           | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| 2-Nitroaniline               | 88-74-4           | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 2-Nitrophenol                | 88-75-5           | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 2,2-Dimethylbutane           | 00075-83-2        | < 0.03               | 0.24                 | 0.13                 | < 0.13           | 0.24            | < 0.08          |
| 2,2-Dimethylpropane          | 00463-82-1        | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 2,2'-oxybis(1-Chloropropane) | 108-60-1          | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 2,3-Dimethylpentane          | 00565-59-3        | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 2,3,4-Trimethylpentane       | 00565-75-3        | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 2,4-Dichlorophenol           | 120-83-2          | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| 2,4-Dimethylhexane           | 00589-43-5        | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 2,4-Dimethylphenol           | 105-67-9          | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| 2,4-Dinitrophenol            | 105-67-9          | < 0.02               | < 0.03               | < 0.02               | < 0.02           | < 0.03          | < 0.00          |
| 2,4-Dinitrotoluene           | 121-14-2          | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 2,4,5-Trichlorophenol        | 95-95-4           | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 2,4,6-Trichlorophenol        | 88-06-2           | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 2,6-Dinitrotoluene           | 606-20-2          | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 3-Furaldehyde                | 498-60-2          | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 1 2 3-Methyl-2-Butanone      |                   | T                    | T                    | T                    | T                | T               | T               |
| 3-Methylhexane               | 00589-34-4        | 0.15                 | 0.14                 | 0.14                 | 0.14             | 0.15            | 0.00            |
| 3-Methylpentane              | 00096-14-0        | 0.45                 | 0.59                 | 0.59                 | 0.55             | 0.59            | 0.07            |
| 3-Methylstyrene              | 100-80-1          | 0.12                 | 0.31                 | 0.01                 | 0.14             | 0.31            | 0.12            |
| 3-Nitroaniline               | 99-09-2           | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 3,3'-Dichlorobenzidine       | 91-94-1           | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 3,3'-Dimethoxybenzidine      | 119-90-4          | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 3,3'-Dimethylbenzidine       | 119-93-7          | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| 3/4-Methylphenol             | 108-39-4/106-44-5 | < 0.00               | < 0.01               | 0.01                 | < 0.00           | 0.01            | < 0.00          |
| 4-Aminobiphenyl              | 92-67-1           | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 4-Bromophenyl-phenylether    | 101-55-3          | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 4-Chloro-3-methylphenol      | 59-50-7           | < 0.00               | < 0.01               | < 0.00               | < 0.01           | < 0.01          | < 0.00          |
| 4-Chloroaniline              | 106-47-8          | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 4-Chlorophenyl-phenylether   | 70005-72-3        | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 4-Chlorostyrene              | 1073-67-2         | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| 4-Methyl-1-pentene           | 00691-37-2        | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 1 4-Methyl-2-Pentanone       | 00108-10-1        | 0.16                 | 0.24                 | 0.14                 | 0.18             | 0.24            | 0.04            |
| 4-Methylstyrene              | 622-97-9          | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 4-Nitroaniline               | 100-01-6          | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 4-Nitrobiphenyl              | 92-93-3           | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 4-Nitrophenol                | 100-02-7          | < 0.01               | < 0.02               | < 0.02               | < 0.02           | < 0.02          | < 0.00          |
| 1 2 4,4-Dimethyl-2-Pentanone |                   | T                    | T                    | T                    | T                | T               | T               |
| 4,4'-Methylenedianiline      | 101-77-9          | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 4,6-Dinitro-2-methylphenol   | 534-52-1          | < 0.01               | < 0.02               | < 0.02               | < 0.02           | < 0.02          | < 0.00          |
| Acenaphthene                 | 83-32-9           | 0.00                 | < 0.00               | < 0.00               | < 0.00           | 0.00            | < 0.00          |
| Acenaphthylene               | 208-96-8          | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 1 2 Acetaldehyde             | 00075-07-0        | T                    | T                    | T                    | T                | T               | T               |
| 1 Acetaldehyde+Isobutane     |                   | T                    | T                    | T                    | T                | T               | T               |
| 1 Acetone                    | 00067-64-1        | < 0.43               | 2.42                 | < 0.45               | < 1.10           | 2.42            | < 0.93          |
| 1 Acetonitrile               | 01722-09-4        | < 0.43               | < 0.40               | < 0.45               | < 0.43           | < 0.45          | < 0.02          |

**TABLE 4-4f**  
**MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - POLYMERS**

|                                          | CAS<br>Numbers | Cmpd #24<br>% Of Tot | Cmpd #25<br>% Of Tot | Cmpd #26<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|------------------------------------------|----------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| 1 2 Acetophenone                         | 00098-86-2     | T                    | T                    | T                    | T                | T               | T               |
| Acetophenone                             | 98-86-2        | 0.09                 | 0.23                 | 0.04                 | 0.12             | 0.23            | 0.08            |
| Acetylene                                | 00074-86-2     | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 1 Acrolein                               | 00107-02-8     | 0.84                 | 2.96                 | 3.41                 | 2.40             | 3.41            | 1.12            |
| 1 Acrylonitrile                          | 00107-13-1     | < 0.43               | < 0.40               | < 0.45               | < 0.43           | < 0.45          | < 0.02          |
| 1 Allyl Chloride                         | 00107-05-1     | < 0.43               | < 0.40               | < 0.45               | < 0.43           | < 0.45          | < 0.02          |
| Aniline                                  | 62-53-3        | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Anthracene                               | 120-12-7       | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| a-Pinene                                 | 07785-70-8     | 0.13                 | 1.33                 | < 0.03               | < 0.50           | 1.33            | < 0.59          |
| a,a,a-Trichlorotoluene                   | 98-07-7        | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Benzaldehyde                             | 100-52-7       | 0.35                 | 1.05                 | 0.12                 | 0.51             | 1.05            | 0.40            |
| Benzene                                  | 00071-43-2     | 0.08                 | 0.19                 | < 0.03               | < 0.10           | 0.19            | < 0.07          |
| Benzidine                                | 92-87-5        | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| Benzoic acid                             | 65-85-0        | < 0.01               | < 0.01               | 0.03                 | < 0.02           | 0.03            | < 0.01          |
| Benzonitrile                             | 100-47-0       | < 0.00               | 0.06                 | < 0.00               | < 0.02           | 0.06            | < 0.03          |
| Benzo(a)anthracene                       | 56-55-3        | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Benzo(a)pyrene                           | 50-32-8        | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Benzo(b)fluoranthene                     | 205-99-2       | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Benzo(g,h,i)perylene                     | 191-24-2       | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Benzo(k)fluoranthene                     | 207-08-9       | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Benzyl alcohol                           | 100-51-6       | 0.04                 | 0.08                 | 0.03                 | 0.05             | 0.08            | 0.02            |
| 1 Benzyl Chloride                        | 00100-44-7     | < 0.43               | < 0.40               | < 0.45               | < 0.43           | < 0.45          | < 0.02          |
| Benzyl Chloride                          | 100-44-7       | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Biphenyl                                 | 92-52-4        | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 1 2 bis(1-Methylethyl)Benzene            |                | 2.43                 | 4.94                 | T                    | < 2.46           | 4.94            | < 2.02          |
| 1 2 bis(1,1-dimethylethyl)peroxide       |                | T                    | T                    | T                    | T                | T               | T               |
| bis(2-Chloroethoxy)methane               | 111-91-1       | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| bis(2-Chloroethyl)ether                  | 111-44-4       | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| bis(2-Ethylhexyl)phthalate               | 117-81-7       | 0.11                 | 0.16                 | 0.08                 | 0.12             | 0.16            | 0.03            |
| b-Pinene                                 | 18172-67-3     | < 0.15               | < 0.14               | < 0.16               | < 0.15           | < 0.16          | < 0.01          |
| 1 Bromodichloromethane                   | 00075-27-4     | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 Bromoform                              | 00075-25-2     | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 Bromomethane                           | 00074-83-9     | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 2 Butanal                              | 00123-72-8     | T                    | T                    | T                    | T                | T               | T               |
| 1 2 Butane                               |                | 1.62                 | T                    | 0.57                 | < 0.73           | 1.62            | < 0.67          |
| Butylbenzylphthalate                     | 85-68-7        | 0.06                 | 0.02                 | 0.01                 | 0.03             | 0.06            | 0.02            |
| 1 2 C10-C11 Branched Alkane              |                | T                    | T                    | 1.42                 | < 0.47           | 1.42            | < 0.67          |
| 1 2 C10H18 Polycyclic Hydrocarbon        |                | 43.24                | 121.07               | T                    | < 54.77          | 121.07          | < 50.09         |
| 1 2 C10H20 Alkyl Substituted Cyclohexane |                | T                    | T                    | T                    | T                | T               | T               |
| 1 2 C11-C12 Branched Alkane              |                | 2.16                 | 9.88                 | T                    | < 4.02           | 9.88            | < 4.24          |
| 1 2 C11H22 Alkene                        |                | T                    | T                    | T                    | T                | T               | T               |
| 1 2 C12H24 Alkene                        |                | T                    | 4.94                 | T                    | < 1.65           | 4.94            | < 2.33          |
| 1 2 C4 Aldehyde                          |                | T                    | T                    | T                    | T                | T               | T               |
| 1 2 C5 Aldehyde                          |                | T                    | T                    | T                    | T                | T               | T               |
| 1 2 C6H10 O2 Acid Ester                  |                | T                    | T                    | T                    | T                | T               | T               |
| 1 2 C8H12 Cyclic alkene                  |                | 2.43                 | 7.41                 | T                    | < 3.28           | 7.41            | < 3.09          |
| 1 2 C8H16 Alkene                         |                | T                    | T                    | T                    | T                | T               | T               |
| 1 2 C9H10 Alkyl Substituted Benzene      |                | T                    | T                    | T                    | T                | T               | T               |
| 1 2 C9H12 Alkyl Substituted Benzene      |                | T                    | T                    | T                    | T                | T               | T               |
| 1 2 C9H12 Polycyclic Alkene              |                | T                    | T                    | T                    | T                | T               | T               |

**TABLE 4-4f**  
**MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - POLYMERS**

|                                   | CAS<br>Numbers        | Cmpd #24<br>% Of Tot | Cmpd #25<br>% Of Tot | Cmpd #26<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|-----------------------------------|-----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| Camphene                          | 79-92-5               | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| 1 Carbon Disulfide                | 00075-15-0            | 0.62                 | 0.82                 | 0.22                 | 0.55             | 0.82            | 0.25            |
| 1 Carbon Tetrachloride            | 00056-23-5            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 2 Carbonyl sulfide              | 00463-58-1            | T                    | T                    | T                    | T                | T               | T               |
| 1 Chlorobenzene                   | 00108-90-7            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 2 Chlorobutadiene+Methylpentane |                       | T                    | T                    | T                    | T                | T               | T               |
| 1 Chlorodibromomethane            | 00124-48-1            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 Chloroethane                    | 00075-00-3            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 Chloroform                      | 00067-66-3            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 Chloromethane                   | 00074-87-3            | 0.14                 | 0.18                 | 0.07                 | 0.13             | 0.18            | 0.04            |
| Chrysene                          | 218-01-9              | 0.00                 | < 0.00               | < 0.00               | < 0.00           | 0.00            | < 0.00          |
| 1 cis-1,2-Dichloroethene          | 00156-59-2            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 cis-1,3-Dichloropropene         | 10061-01-5            | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| cis-2-Butene                      | 00590-18-1            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| cis-2-Hexene                      | 07688-21-3            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| cis-2-Pentene                     | 00627-20-3            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| Cumene                            | 00098-82-8            | 0.26                 | 0.70                 | < 0.03               | < 0.33           | 0.70            | < 0.28          |
| Cumene                            | 98-82-8               | < 0.00               | < 0.00               | 0.01                 | < 0.00           | 0.01            | < 0.00          |
| 1 2 Cyclobutane                   |                       | T                    | T                    | T                    | T                | T               | T               |
| Cyclohexane                       | 00110-82-7            | 0.24                 | 0.30                 | 3.31                 | 1.28             | 3.31            | 1.44            |
| Cyclohexanone                     | 108-94-1              | < 0.01               | < 0.01               | 0.01                 | < 0.01           | 0.01            | < 0.00          |
| Cyclohexylamine                   | 108-91-8              | < 0.00               | < 0.01               | < 0.00               | < 0.01           | < 0.01          | < 0.00          |
| 1 2 Cyclooctadiene                |                       | T                    | T                    | T                    | T                | T               | T               |
| Cyclopentane + 2,3-Dimethylbutane | 00287-92-3/00079-29-8 | 0.14                 | 0.11                 | 0.13                 | 0.13             | 0.14            | 0.01            |
| Cyclopentene                      | 00142-29-0            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 1 2 Decane                        |                       | T                    | T                    | 0.85                 | < 0.28           | 0.85            | < 0.40          |
| Dibenzofuran                      | 132-64-9              | 0.00                 | 0.00                 | < 0.00               | < 0.00           | 0.00            | < 0.00          |
| Dibenz(a,h)anthracene             | 53-90-3               | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| 1 Dichlorodifluoromethane         | 00075-71-8            | < 0.22               | 0.09                 | T                    | < 0.10           | 0.22            | < 0.09          |
| Diethylphthalate                  | 84-66-2               | 0.32                 | 0.05                 | 0.05                 | 0.14             | 0.32            | 0.13            |
| Dimethylaminoazobenzene           | 60-11-7               | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| Dimethylphthalate                 | 131-11-3              | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Di-n-butylphthalate               | 84-74-2               | 1.01                 | 0.11                 | 0.05                 | 0.39             | 1.01            | 0.44            |
| Di-n-octylphthalate               | 117-84-0              | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Diphenylamine                     | 122-39-4              | 0.28                 | 1.15                 | 0.04                 | 0.49             | 1.15            | 0.48            |
| d-Limonene                        | 05989-27-5            | < 0.15               | 0.28                 | < 0.16               | < 0.20           | 0.28            | < 0.06          |
| 1 Epichlorohydrin                 | 00106-89-8            | < 0.43               | < 0.40               | < 0.45               | < 0.43           | < 0.45          | < 0.02          |
| Ethane                            | 00074-84-0            | 0.46                 | 0.65                 | 1.26                 | 0.79             | 1.26            | 0.34            |
| 1 2 Ethanol                       |                       | T                    | T                    | T                    | T                | T               | T               |
| 1 2 Ethenylcyclohexene            | 25168-07-4            | T                    | T                    | T                    | T                | T               | T               |
| 1 2 Ethyl Acetate                 |                       | T                    | T                    | T                    | T                | T               | T               |
| 1 2 Ethyl Acrylate                |                       | T                    | T                    | T                    | T                | T               | T               |
| Ethylacetylene                    | 00107-00-6            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| Ethylbenzene                      | 00100-41-4            | 0.11                 | 0.22                 | < 0.03               | < 0.12           | 0.22            | < 0.08          |
| Ethylene                          | 00074-85-1            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| Fluoranthene                      | 206-44-0              | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Fluorene                          | 86-73-7               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 1 2 Heptane                       |                       | T                    | T                    | T                    | T                | T               | T               |
| 1 2 Heptanone                     |                       | T                    | T                    | 0.57                 | < 0.19           | 0.57            | < 0.27          |
| Hexachlorobenzene                 | 118-74-1              | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |

**TABLE 4-4f**  
**MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - POLYMERS**

|                             | CAS<br>Numbers        | Cmpd #24<br>% Of Tot | Cmpd #25<br>% Of Tot | Cmpd #26<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|-----------------------------|-----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| 1 Hexachlorobutadiene       | 00087-68-3            | < 0.43               | < 0.40               | < 0.45               | < 0.43           | < 0.45          | < 0.02          |
| Hexachlorobutadiene         | 87-68-3               | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| Hexachlorocyclopentadiene   | 77-47-4               | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 1 2 Hexachloroethane        |                       | T                    | T                    | T                    | T                | T               | T               |
| Hexachloroethane            | 67-72-1               | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| Hydroquinone                | 123-31-9              | < 0.00               | < 0.01               | < 0.00               | < 0.01           | < 0.01          | < 0.00          |
| Indeno(1,2,3-cd)pyrene      | 193-39-5              | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 1 2 Isobutanol              | 00078-84-2            | T                    | T                    | T                    | T                | T               | T               |
| Isobutane                   | 00075-28-5            | 0.15                 | 0.19                 | 0.38                 | 0.24             | 0.38            | 0.10            |
| Isobutylene + 1-Butene      | 00115-11-7/00106-98-9 | < 0.03               | 0.22                 | 0.10                 | < 0.12           | 0.22            | < 0.08          |
| Isooctane                   | 00540-84-1            | 0.22                 | 0.23                 | 0.16                 | 0.21             | 0.23            | 0.03            |
| Isooctanol                  | 26952-21-6            | < 0.05               | < 0.07               | < 0.05               | < 0.06           | < 0.07          | < 0.01          |
| Isopentane                  | 00078-78-4            | 1.04                 | 1.48                 | 1.62                 | 1.38             | 1.62            | 0.25            |
| Isophorone                  | 78-59-1               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Isoprene                    | 00078-79-5            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 1 2 Isopropyl Alcohol       |                       | T                    | T                    | T                    | T                | T               | T               |
| 1 2 Methyl Acrylate         |                       | T                    | T                    | T                    | T                | T               | T               |
| 1 2 Methyl Isothiocyanate   | 00556-61-6            | T                    | T                    | T                    | T                | T               | T               |
| Methylacetylene             | 00074-99-7            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| Methylcyclohexane           | 00108-87-2            | 0.25                 | 0.26                 | 0.22                 | 0.24             | 0.26            | 0.02            |
| Methylcyclopentane          | 00096-37-7            | 0.35                 | 0.27                 | 1.11                 | 0.58             | 1.11            | 0.38            |
| Methylene bis-chloroaniline | 101-14-4              | < 0.01               | < 0.02               | < 0.02               | < 0.02           | < 0.02          | < 0.00          |
| Methylene Chloride          | 00075-09-2            | 3.24                 | 5.44                 | 12.69                | 7.12             | 12.69           | 4.04            |
| 1 2 Methylhexane            |                       | T                    | T                    | T                    | T                | T               | T               |
| 1 2 Methylpentane           |                       | 1.89                 | T                    | 3.41                 | < 1.77           | 3.41            | < 1.39          |
| m-Ethyltoluene              | 00620-14-4            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| m-Xylene + p-Xylene         | 00108-38-3/00106-42-3 | 0.28                 | 0.48                 | < 0.03               | < 0.26           | 0.48            | < 0.18          |
| Naphthalene                 | 91-20-3               | 0.05                 | 0.17                 | 0.02                 | 0.08             | 0.17            | 0.07            |
| n-Butane                    | 00106-97-8            | 0.82                 | 0.76                 | 1.00                 | 0.86             | 1.00            | 0.10            |
| n-Decane                    | 00124-18-5            | < 0.16               | < 0.15               | < 0.17               | < 0.16           | < 0.17          | < 0.01          |
| n-Heptane                   | 00142-82-5            | 0.21                 | 0.22                 | 0.17                 | 0.20             | 0.22            | 0.02            |
| n-Hexane                    | 00110-54-3            | 0.88                 | 0.64                 | 1.09                 | 0.87             | 1.09            | 0.18            |
| Nitrobenzene                | 98-95-3               | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| N-Nitrosodiethylamine       | 55-18-5               | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| n-Nitrosodimethylamine      | 62-75-9               | < 0.01               | < 0.02               | < 0.01               | < 0.01           | < 0.02          | < 0.00          |
| N-Nitroso-di-n-propylamine  | 621-64-7              | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| N-Nitrosodiphenylamine      | 86-30-6               | T                    | T                    | T                    | T                | T               | T               |
| n-Nitrosomorpholine         | 59-89-2               | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| n-Nonane                    | 00111-84-2            | < 0.03               | 0.15                 | < 0.03               | < 0.07           | 0.15            | < 0.05          |
| n-Octane                    | 00111-65-9            | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 1 2 Nonane                  |                       | T                    | T                    | T                    | T                | T               | T               |
| n-Pentane                   | 00109-66-0            | 0.21                 | 0.22                 | 0.37                 | 0.27             | 0.37            | 0.07            |
| 1 2 n-Propane               |                       | T                    | T                    | T                    | T                | T               | T               |
| n-Propylbenzene             | 00103-65-1            | 0.20                 | 1.15                 | 0.15                 | 0.50             | 1.15            | 0.46            |
| 1 2 n-Undecane              | 00112-21-4            | T                    | T                    | T                    | T                | T               | T               |
| N,N-Diethylaniline          | 91-66-7               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| N,N-Dimethylaniline         | 121-69-7              | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| o-Anisidine                 | 90-04-0               | < 0.00               | < 0.01               | < 0.00               | < 0.01           | < 0.01          | < 0.00          |
| o-Ethyltoluene              | 00611-14-3            | < 0.15               | < 0.14               | < 0.16               | < 0.15           | < 0.16          | < 0.01          |
| o-Toluidine                 | 95-53-4               | 0.80                 | 0.66                 | < 0.00               | < 0.49           | 0.80            | < 0.35          |

**TABLE 4-4f**  
**MIXER 2 ORGANIC COMPOUND SPECIATION FACTORS - POLYMERS**

|                                       | CAS<br>Numbers | Cmpd #24<br>% Of Tot | Cmpd #25<br>% Of Tot | Cmpd #26<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|---------------------------------------|----------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| o-Xylene                              | 00095-47-6     | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| p-Cymene                              | 00099-87-6     | 0.23                 | 1.06                 | < 0.16               | < 0.48           | 1.06            | < 0.41          |
| Pentachloronitrobenzene               | 82-68-8        | < 0.02               | < 0.03               | < 0.02               | < 0.02           | < 0.03          | < 0.00          |
| Pentachlorophenol                     | 87-86-5        | < 0.01               | < 0.02               | < 0.01               | < 0.01           | < 0.02          | < 0.00          |
| 1 2 Pentane                           |                | T                    | T                    | 1.42                 | < 0.47           | 1.42            | < 0.67          |
| 1 2 Pentene                           |                | T                    | T                    | T                    | T                | T               | T               |
| p-Ethyltoluene                        | 00622-96-8     | 0.93                 | 4.67                 | < 0.03               | < 1.88           | 4.67            | < 2.01          |
| Phenanthrene                          | 85-01-8        | 0.01                 | 0.02                 | 0.01                 | 0.01             | 0.02            | 0.00            |
| Phenol                                | 108-95-2       | 0.03                 | < 0.00               | 0.06                 | < 0.03           | 0.06            | < 0.02          |
| Phthalimide                           | 85-41-6        | < 0.01               | < 0.02               | < 0.02               | < 0.02           | < 0.02          | < 0.00          |
| 1 2 Propanal                          |                | T                    | T                    | T                    | T                | T               | T               |
| Propane                               | 00074-98-6     | 0.78                 | 0.36                 | 0.59                 | 0.58             | 0.78            | 0.17            |
| 1 2 Propylcyclohexane                 |                | T                    | T                    | T                    | T                | T               | T               |
| Propylene                             | 00115-07-1     | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 1 Propylene Oxide                     | 00075-56-9     | < 0.43               | < 0.40               | < 0.45               | < 0.43           | < 0.45          | < 0.02          |
| Pyrene                                | 129-00-0       | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Pyridine                              | 110-86-1       | < 0.01               | < 0.01               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| Styrene                               | 00100-42-5     | 10.39                | 14.72                | < 0.03               | < 8.38           | 14.72           | < 6.16          |
| 1 t-Butyl Methyl Ether                | 01634-04-4     | < 0.43               | < 0.40               | < 0.45               | < 0.43           | < 0.45          | < 0.02          |
| 1 2 tert-Butyl Alcohol                | 00075-65-0     | T                    | T                    | T                    | T                | T               | T               |
| 1 Tetrachloroethene                   | 00127-18-4     | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 2 Tetrahydrofuran                   |                | T                    | T                    | T                    | T                | T               | T               |
| Toluene                               | 00108-88-3     | 0.50                 | 0.38                 | 0.25                 | 0.38             | 0.50            | 0.10            |
| 1 trans-1,2-Dichloroethene            | 00156-60-5     | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 trans-1,2-Dichloropropene           | 10061-02-6     | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| trans-2-Butene                        | 00624-64-6     | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| trans-2-Hexene                        | 04050-45-7     | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| trans-2-Pentene                       | 00646-04-8     | < 0.03               | < 0.03               | < 0.03               | < 0.03           | < 0.03          | < 0.00          |
| 1 Trichloroethene                     | 00079-01-6     | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 Trichlorofluoromethane              | 00075-69-4     | 0.30                 | < 0.20               | T                    | < 0.16           | 0.30            | < 0.12          |
| 1 2 Trichloroheptafluorobutane        |                | T                    | T                    | T                    | T                | T               | T               |
| 1 Trichlorotrifluoroethane            | 00076-13-1     | 0.21                 | < 0.20               | < 0.23               | < 0.21           | 0.23            | < 0.01          |
| Trifluralin                           | 1582-09-8      | < 0.01               | < 0.02               | < 0.01               | < 0.01           | < 0.02          | < 0.00          |
| 1 2 Undecane                          |                | T                    | T                    | T                    | T                | T               | T               |
| 1 2 Unknown                           |                | T                    | T                    | T                    | T                | T               | T               |
| 1 Vinyl Acetate                       | 00108-05-4     | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| 1 Vinyl Chloride                      | 00075-01-4     | < 0.22               | < 0.20               | < 0.23               | < 0.21           | < 0.23          | < 0.01          |
| Total Detected (lb/lb rubber)         |                | 3.64E-05             | 8.50E-05             | 1.70E-05             |                  |                 |                 |
| Total with non-detects (lb/lb rubber) |                | < 4.23E-05           | < 9.03E-05           | < 2.34E-05           |                  |                 |                 |

**NOTES:**

- 1 TO14 Compound
- 2 Tentatively Identified Compound(TIC)
- T TIC Not Identified In Summarized Category
- \* % of Total Values Represent % of Total With Non-Detects

**TABLE 4-4g**  
**MIXER 2 METALS SPECIATION FACTORS - TIRE PRODUCTS**

|                                       | #1<br>% of Tot | #2<br>% of Tot | #3<br>% of Tot | #4<br>% of Tot | #5<br>% of Tot | #6<br>% of Tot | #7<br>% of Tot | MEAN<br>% of Tot | MAX<br>% of Tot | STD<br>% of Tot |
|---------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------|-----------------|-----------------|
| Cr                                    | 0.265          | 0.016          | 0.046          | 0.097          | 0.082          | 0.051          | 0.347          | 0.129            | 0.347           | 0.116           |
| Cu                                    | 0.157          | 0.016          | 0.058          | 0.059          | 0.049          | 0.128          | 0.132          | 0.086            | 0.157           | 0.049           |
| Mg                                    | 1.543          | 2.795          | 0.617          | 0.902          | 1.638          | 23.286         | 1.089          | 4.553            | 23.286          | 7.676           |
| Ni                                    | 0.410          | 0.066          | 0.073          | 0.167          | 0.075          | 0.513          | 0.139          | <                | 0.513           | <               |
| Zn                                    | 97.494         | 97.100         | 99.190         | 98.750         | 98.079         | 75.969         | 98.254         | 94.977           | 99.190          | 7.787           |
| Cd                                    | 0.078          | 0.006          | 0.005          | 0.010          | 0.015          | 0.026          | 0.011          | 0.022            | 0.078           | 0.024           |
| Pb                                    | 0.053          | 0.001          | 0.010          | 0.014          | 0.061          | 0.026          | 0.029          | 0.028            | 0.061           | 0.021           |
| Total Detected (lb/lb rubber)         | 1.20E-05       | 4.25E-05       | 1.30E-04       | 2.44E-05       | 3.30E-05       | 8.23E-06       | 3.53E-05       |                  |                 |                 |
| Total with non-detects (lb/lb rubber) | 1.20E-05       | 4.25E-05       | 1.30E-04       | 2.44E-05       | 3.30E-05       | 8.29E-06       | 3.54E-05       |                  |                 |                 |

NOTE: % of Total Values Represent % of Total With Non-Detects

TABLE 4.4h  
MIXER 2 METALS SPECIATION FACTORS - ENGINEERED PRODUCTS

|                                       | #1<br>% of Tot | #2<br>% of Tot | #3<br>% of Tot | #4<br>% of Tot | #5<br>% of Tot | #6<br>% of Tot | #7<br>% of Tot | #8<br>% of Tot | #9<br>% of Tot | #10<br>% of Tot | #11<br>% of Tot | #12<br>% of Tot | #13<br>% of Tot |
|---------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|
| Cr                                    | 0.265          | 0.016          | 0.046          | 0.097          | 0.082          | 0.051          | 0.347          | 0.054          | 0.063          | 0.084 <         | 0.068           | 0.035           | 0.082           |
| Cu                                    | 0.157          | 0.016          | 0.058          | 0.059          | 0.049 <        | 0.128          | 0.132          | 0.108          | 0.314          | 0.079           | 0.027 <         | 0.029           | 0.065           |
| Mg                                    | 1.543          | 2.795          | 0.617          | 0.902          | 1.638          | 23.286         | 1.089          | 8.878          | 3.750          | 92.135          | 51.605          | 67.045          | 3.216           |
| Ni                                    | 0.410 <        | 0.066          | 0.073          | 0.167          | 0.075 <        | 0.513 <        | 0.139          | 0.413 <        | 1.254          | 0.099 <         | 0.136           | 0.116           | 0.425           |
| Zn                                    | 97.494         | 97.100         | 99.190         | 98.750         | 98.079         | 75.969         | 98.254         | 90.519         | 94.510         | 7.573           | 48.153          | 32.765          | 96.117          |
| Cd                                    | 0.078          | 0.006          | 0.005          | 0.010          | 0.015          | 0.026          | 0.011          | 0.011          | 0.046          | 0.017           | 0.007           | 0.004           | 0.007           |
| Pb                                    | 0.053          | 0.001          | 0.010          | 0.014          | 0.061 <        | 0.026          | 0.029          | 0.018 <        | 0.063          | 0.034           | 0.003 <         | 0.006           | 0.088           |
| Total Detected (lb/lb rubber)         | 1.20E-05       | 4.25E-05       | 1.30E-04       | 2.44E-05       | 3.30E-05       | 8.23E-06       | 3.53E-05       | 8.19E-06       | 2.39E-06       | 2.44E-05        | 1.71E-05        | 1.85E-05        | 8.06E-06        |
| Total with non-detects (lb/lb rubber) | 1.20E-05 <     | 4.25E-05       | 1.30E-04       | 2.44E-05       | 3.30E-05 <     | 8.29E-06 <     | 3.54E-05       | 8.19E-06 <     | 2.43E-06       | 2.44E-05 <      | 1.72E-05 <      | 1.85E-05        | 8.06E-06        |

NOTE: % of Total Values Represent % of Total With Non-Detects

TABLE 4-4h  
MIXER 2 METALS SPECIATION FACTORS - ENGINEERED PRODUCTS

|                                       | #14        | #15        | #16        | #17        | #18        | #19        | #20        | #21        | #22      | #23      | MEAN     | MAX      | STD      |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|----------|----------|----------|----------|
|                                       | % of Tot   | % of Tot   | % of Tot   | % of Tot   | % of Tot   | % of Tot   | % of Tot   | % of Tot   | % of Tot | % of Tot | % of Tot | % of Tot | % of Tot |
| Cr                                    | 0.038      | 0.043      | 0.007      | 2.484 <    | 0.121 <    | 1.017      | 0.797      | 0.012      | 0.005    | 0.481    | < 0.273  | 2.484    | < 0.536  |
| Cu                                    | 0.218      | 0.431 <    | 0.036      | 0.690      | 0.121      | 20.949     | 0.797      | 0.070      | 0.040    | 0.458    | < 1.088  | 20.949   | 4.240    |
| Mg                                    | 3.482      | 91.352     | 98.699     | 4.398      | 0.833      | 50.746     | 10.584     | 97.725     | 7.682    | 83.377   | 30.756   | 98.699   | 37.253   |
| Ni                                    | < 0.256    | 0.475 <    | 0.146      | 1.897      | 0.290      | 2.542 <    | 1.993 <    | 0.232 <    | 0.035    | 0.664    | < 0.540  | 2.542    | < 0.682  |
| Zn                                    | 95.922     | 7.658      | 1.099      | 90.288     | 98.613     | 24.509     | 85.613     | 1.944      | 92.227   | 14.991   | 67.276   | 99.190   | 37.928   |
| Cd                                    | 0.032      | 0.037      | 0.005      | 0.157      | 0.011      | 0.058      | 0.115      | 0.007      | 0.004    | 0.024    | 0.030    | 0.157    | 0.038    |
| Pb                                    | 0.051      | 0.005 <    | 0.007 <    | 0.086 <    | 0.012      | 0.178 <    | 0.100 <    | 0.012      | 0.007    | 0.006    | < 0.038  | 0.178    | 0.042    |
| Total Detected (lb/lb rubber)         | 1.05E-05   | 4.54E-06   | 1.14E-05   | 1.69E-06   | 1.34E-05   | 1.03E-06   | 1.15E-06   | 9.26E-06   | 7.26E-05 | 4.38E-06 |          |          |          |
| Total with non-detects (lb/lb rubber) | < 1.05E-05 | 4.54E-06 < | 1.14E-05 < | 1.69E-06 < | 1.34E-05 < | 1.04E-06 < | 1.18E-06 < | 9.28E-06 < | 7.27E-05 | 4.38E-06 |          |          |          |

NOTE: % of Total Values Represent % of Total With Non-Detects

**TABLE 4-4i**  
**MIXER 2 METALS SPECIATION FACTORS - POLYMERS**

|                                       | #24<br>% of Tot | #25<br>% of Tot | #26<br>% of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|---------------------------------------|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|
| Cr                                    | < 2.422         | 9.736           | 12.949          | < 8.369          | 12.949          | < 4.405         |
| Cu                                    | 3.390           | 7.174           | 9.712           | 6.759            | 9.712           | 2.597           |
| Mg                                    | 24.410          | 26.646          | 19.424          | 23.493           | 26.646          | 3.019           |
| Ni                                    | < 4.843         | 10.249          | 12.949          | < 9.347          | < 12.949        | < 3.370         |
| Zn                                    | 61.800          | 42.019          | 40.143          | 47.987           | 61.800          | 9.797           |
| Cd                                    | 0.966           | 1.265           | 1.404           | 1.211            | 1.404           | 0.183           |
| Pb                                    | 2.170           | 2.911           | 3.419           | 2.833            | 3.419           | 0.513           |
| Total Detected (lb/lb rubber)         | 6.11E-07        | 2.84E-07        | 1.90E-07        |                  |                 |                 |
| Total with non-detects (lb/lb rubber) | < 6.59E-07      | < 3.16E-07      | < 2.18E-07      |                  |                 |                 |

NOTE: % of Total Values Represent % of Total With Non-Detects

**TABLE 4-4j**  
**MIXER 2 SULFUR SPECIATION FACTORS - TIRE PRODUCTS**

|                                       | CAS<br>Numbers | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|---------------------------------------|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------------------|-----------------|-----------------|
| Carbonyl Sulfide                      | 463-58-1       | < 4.19              | < 4.12              | < 4.12              | < 4.12              | 17.61               | 20.82               | < 4.12              | < 8.45           | 20.82           | < 6.86          |
| Methyl Mercaptan                      | 74-93-1        | < 3.35              | < 3.32              | < 3.32              | < 3.32              | < 2.65              | < 1.98              | < 3.32              | < 3.04           | < 3.35          | < 0.49          |
| Ethyl Mercaptan                       | 75-08-1        | < 4.19              | < 4.21              | < 4.21              | < 4.21              | < 3.36              | < 2.50              | < 4.21              | < 3.84           | < 4.21          | < 0.62          |
| Dimethyl Sulfide                      | 75-18-3        | < 4.19              | < 4.21              | < 4.21              | < 4.21              | < 3.36              | < 2.50              | < 4.21              | < 3.84           | < 4.21          | < 0.62          |
| Carbon Disulfide                      | 75-15-0        | < 2.52              | < 2.61              | < 2.61              | < 2.61              | < 2.08              | 23.72               | < 2.61              | < 5.54           | 23.72           | < 7.43          |
| Isopropyl Mercaptan                   | 75-33-2        | < 5.24              | < 5.05              | < 5.05              | < 5.05              | < 4.03              | < 3.00              | < 5.05              | < 4.64           | < 5.24          | < 0.76          |
| tert-Butyl Mercaptan                  | 75-66-1        | < 6.08              | < 6.31              | < 6.31              | < 6.31              | < 5.04              | < 3.75              | < 6.31              | < 5.73           | < 6.31          | < 0.92          |
| n-Propyl Mercaptan                    | 107-03-9       | < 5.24              | < 5.05              | < 5.05              | < 5.05              | < 4.03              | < 3.00              | < 5.05              | < 4.64           | < 5.24          | < 0.76          |
| Ethyl Methyl Sulfide                  | 624-89-5       | < 5.24              | < 5.05              | < 5.05              | < 5.05              | < 4.03              | < 3.00              | < 5.05              | < 4.64           | < 5.24          | < 0.76          |
| Thiophene                             | 110-02-1       | < 5.87              | < 5.89              | < 5.89              | < 5.89              | < 4.70              | < 3.50              | < 5.89              | < 5.38           | < 5.89          | < 0.87          |
| Isobutyl Mercaptan                    | 513-44-0       | < 6.08              | < 6.31              | < 6.31              | < 6.31              | < 5.04              | < 3.75              | < 6.31              | < 5.73           | < 6.31          | < 0.92          |
| Diethyl Sulfide                       | 352-93-2       | < 6.08              | < 6.31              | < 6.31              | < 6.31              | < 5.04              | < 3.75              | < 6.31              | < 5.73           | < 6.31          | < 0.92          |
| n-Butyl Mercaptan                     | 109-79-5       | < 6.08              | < 6.31              | < 6.31              | < 6.31              | < 5.04              | < 3.75              | < 6.31              | < 5.73           | < 6.31          | < 0.92          |
| Dimethyl Disulfide                    | 624-92-0       | < 3.14              | < 3.24              | < 3.24              | < 3.24              | 8.43                | < 1.93              | < 3.24              | < 3.78           | 8.43            | < 1.95          |
| 3-Methylthiophene                     | 616-44-4       | < 6.71              | < 6.73              | < 6.73              | < 6.73              | < 5.38              | < 4.00              | < 6.73              | < 6.15           | < 6.73          | < 0.99          |
| Tetrahydrothiophene                   | 110-01-0       | < 6.08              | < 5.89              | < 5.89              | < 5.89              | < 4.70              | < 3.50              | < 5.89              | < 5.41           | < 6.08          | < 0.89          |
| 2-Ethylthiophene                      | 872-55-9       | < 7.76              | < 7.58              | < 7.58              | < 7.58              | < 6.05              | < 4.50              | < 7.58              | < 6.94           | < 7.76          | < 1.13          |
| 2,5-Dimethylthiophene                 | 638-02-8       | < 7.76              | < 7.58              | < 7.58              | < 7.58              | < 6.05              | < 4.50              | < 7.58              | < 6.94           | < 7.76          | < 1.13          |
| Diethyl Disulfide                     | 110-81-6       | < 4.19              | < 4.21              | < 4.21              | < 4.21              | < 3.36              | < 2.50              | < 4.21              | < 3.84           | < 4.21          | < 0.62          |
| Total Detected (lb/lb rubber)         |                | 0.00E+00            | 0.00E+00            | 0.00E+00            | 0.00E+00            | 7.90E-07            | 3.41E-06            | 0.00E+00            |                  |                 |                 |
| Total with non-detects (lb/lb rubber) |                | < 5.53E-06          | < 3.90E-06          | < 7.65E-06          | < 2.95E-06          | < 3.04E-06          | < 7.65E-06          | < 5.64E-06          |                  |                 |                 |

NOTE: % of Total Values Represent % of Total With Non-Detects

TABLE 4-4k  
MIXER 2 SULFUR SPECIATION FACTORS - ENGINEERED PRODUCTS

|                                       | CAS<br>Numbers | Cmpd #1<br>% Of Tot | Cmpd #2<br>% Of Tot | Cmpd #3<br>% Of Tot | Cmpd #4<br>% Of Tot | Cmpd #5<br>% Of Tot | Cmpd #6<br>% Of Tot | Cmpd #7<br>% Of Tot | Cmpd #8<br>% Of Tot | Cmpd #9<br>% Of Tot | Cmpd #10<br>% Of Tot | Cmpd #11<br>% Of Tot | Cmpd #12<br>% Of Tot | Cmpd #13<br>% Of Tot |
|---------------------------------------|----------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|
| Carbonyl Sulfide                      | 463-58-1       | 4.19                | 4.12                | 4.12                | 4.12                | 17.61               | 20.82               | 4.12                | 29.39               | 21.56               | 0.87                 | 1.25                 | 10.70                | 18.82                |
| Methyl Mercaptan                      | 74-93-1        | 3.35                | 3.32                | 3.32                | 3.32                | 2.65                | 1.98                | 3.32                | 1.38                | 2.36                | 0.69                 | 1.00                 | 1.45                 | 2.82                 |
| Ethyl Mercaptan                       | 75-08-1        | 4.19                | 4.21                | 4.21                | 4.21                | 3.36                | 2.50                | 4.21                | 1.75                | 2.98                | 0.87                 | 1.25                 | 1.83                 | 3.56                 |
| Dimethyl Sulfide                      | 75-18-3        | 4.19                | 4.21                | 4.21                | 4.21                | 3.36                | 2.50                | 4.21                | 1.75                | 2.98                | 0.87                 | 1.25                 | 1.83                 | 3.56                 |
| Carbon Disulfide                      | 75-15-0        | 2.52                | 2.61                | 2.61                | 2.61                | 2.08                | 23.72               | 2.61                | 31.84               | 12.37               | 79.83                | 70.85                | 48.72                | 2.21                 |
| Isopropyl Mercaptan                   | 75-33-2        | 5.24                | 5.05                | 5.05                | 5.05                | 4.03                | 3.00                | 5.05                | 2.10                | 3.58                | 1.08                 | 1.57                 | 2.20                 | 4.28                 |
| tert-Butyl Mercaptan                  | 75-66-1        | 6.08                | 6.31                | 6.31                | 6.31                | 5.04                | 3.75                | 6.31                | 2.62                | 4.47                | 1.26                 | 1.82                 | 2.75                 | 5.35                 |
| n-Propyl Mercaptan                    | 107-03-9       | 5.24                | 5.05                | 5.05                | 5.05                | 4.03                | 3.00                | 5.05                | 2.10                | 3.58                | 1.08                 | 1.57                 | 2.20                 | 4.28                 |
| Ethyl Methyl Sulfide                  | 624-89-5       | 5.24                | 5.05                | 5.05                | 5.05                | 4.03                | 3.00                | 5.05                | 2.10                | 3.58                | 1.08                 | 1.57                 | 2.20                 | 4.28                 |
| Thiophene                             | 110-02-1       | 5.87                | 5.89                | 5.89                | 5.89                | 4.70                | 3.50                | 5.89                | 2.45                | 4.17                | 1.21                 | 1.76                 | 2.58                 | 4.99                 |
| Isobutyl Mercaptan                    | 513-44-0       | 6.08                | 6.31                | 6.31                | 6.31                | 5.04                | 3.75                | 6.31                | 2.62                | 4.47                | 1.26                 | 1.82                 | 2.75                 | 5.35                 |
| Diethyl Sulfide                       | 352-93-2       | 6.08                | 6.31                | 6.31                | 6.31                | 5.04                | 3.75                | 6.31                | 2.62                | 4.47                | 1.28                 | 1.82                 | 2.75                 | 5.35                 |
| n-Butyl Mercaptan                     | 109-79-5       | 6.08                | 6.31                | 6.31                | 6.31                | 5.04                | 3.75                | 6.31                | 2.62                | 4.47                | 1.26                 | 1.82                 | 2.75                 | 5.35                 |
| Dimethyl Disulfide                    | 624-92-0       | 3.14                | 3.24                | 3.24                | 3.24                | 8.43                | 1.93                | 3.24                | 1.35                | 2.30                | 0.65                 | 0.94                 | 1.41                 | 2.74                 |
| 3-Methylthiophene                     | 616-44-4       | 6.71                | 6.73                | 6.73                | 6.73                | 5.38                | 4.00                | 6.73                | 2.80                | 4.77                | 1.39                 | 2.01                 | 2.93                 | 5.70                 |
| Tetrahydrothiophene                   | 110-01-0       | 6.08                | 5.89                | 5.89                | 5.89                | 4.70                | 3.50                | 5.89                | 2.45                | 4.17                | 1.26                 | 1.82                 | 2.56                 | 4.99                 |
| 2-Ethylthiophene                      | 872-55-9       | 7.76                | 7.58                | 7.58                | 7.58                | 6.05                | 4.50                | 7.58                | 3.15                | 5.37                | 1.61                 | 2.32                 | 3.30                 | 6.41                 |
| 2,5-Dimethylthiophene                 | 638-02-8       | 7.76                | 7.58                | 7.58                | 7.58                | 6.05                | 4.50                | 7.58                | 3.15                | 5.37                | 1.61                 | 2.32                 | 3.30                 | 6.41                 |
| Diethyl Disulfide                     | 110-81-6       | 4.19                | 4.21                | 4.21                | 4.21                | 3.36                | 2.50                | 4.21                | 1.75                | 2.98                | 0.87                 | 1.25                 | 1.83                 | 3.56                 |
| Total Detected (lb/lb rubber)         |                | 0.00E+00            | 0.00E+00            | 0.00E+00            | 0.00E+00            | 7.90E-07            | 3.41E-06            | 0.00E+00            | 4.68E-05            | 1.81E-06            | 2.25E-05             | 6.97E-06             | 3.41E-05             | 5.85E-07             |
| Total with non-detects (lb/lb rubber) |                | 5.53E-06            | 3.90E-06            | 7.65E-06            | 2.95E-06            | 3.04E-06            | 7.65E-06            | 5.64E-06            | 7.64E-05            | 5.32E-06            | 2.81E-05             | 9.84E-06             | 5.74E-05             | 3.11E-06             |

NOTE: % of Total Values Represent % of Total With Non-Detects

**TABLE 4-4K**  
**MIXER 2 SULFUR SPECIATION FACTORS - ENGINEERED PRODUCTS**

|                                       | CAS<br>Numbers | Cmpd #14<br>% Of Tot | Cmpd #15<br>% Of Tot | Cmpd #16<br>% Of Tot | Cmpd #17<br>% Of Tot | Cmpd #18<br>% Of Tot | Cmpd #19<br>% Of Tot | Cmpd 20<br>% Of Tot | Cmpd #21<br>% Of Tot | Cmpd #22<br>% Of Tot | Cmpd #23<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|---------------------------------------|----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| Carbonyl Sulfide                      | 463-58-1       | 66.71                | 61.20                | 4.19                 | 4.19                 | 3.02                 | 8.55                 | 32.50               | 11.14                | 4.12                 | 64.06                | < 17.45          | 66.71           | < 20.04         |
| Methyl Mercaptan                      | 74-93-1        | 0.60                 | 1.30                 | 3.35                 | 3.35                 | 2.42                 | 3.17                 | < 2.22              | < 3.11               | < 3.32               | < 1.01               | < 2.38           | < 3.35          | < 0.97          |
| Ethyl Mercaptan                       | 75-08-1        | 0.76                 | 1.64                 | 4.19                 | 4.19                 | 3.02                 | 4.01                 | < 2.81              | < 3.89               | < 4.21               | < 1.28               | < 3.01           | < 4.21          | < 1.22          |
| Dimethyl Sulfide                      | 75-18-3        | 0.76                 | 1.64                 | 4.19                 | 4.19                 | 3.02                 | 4.01                 | < 2.81              | < 3.89               | < 4.21               | < 1.28               | < 3.01           | < 4.21          | < 1.22          |
| Carbon Disulfide                      | 75-15-0        | 16.43                | 2.44                 | 2.52                 | 2.52                 | 29.71                | 2.49                 | 5.14                | < 2.33               | < 2.61               | 7.48                 | < 15.58          | 79.83           | < 22.10         |
| Isopropyl Mercaptan                   | 75-33-2        | 0.91                 | 1.97                 | 5.24                 | 5.24                 | 3.78                 | 4.82                 | < 3.38              | < 4.86               | < 5.05               | < 1.54               | < 3.66           | < 5.24          | < 1.50          |
| tert-Butyl Mercaptan                  | 75-66-1        | 1.14                 | 2.46                 | 6.08                 | 6.08                 | 4.38                 | 6.02                 | < 4.22              | < 5.64               | < 6.31               | < 1.93               | < 4.46           | < 6.31          | < 1.81          |
| n-Propyl Mercaptan                    | 107-03-9       | 0.91                 | 1.97                 | 5.24                 | 5.24                 | 3.78                 | 4.82                 | < 3.38              | < 4.86               | < 5.05               | < 1.54               | < 3.66           | < 5.24          | < 1.50          |
| Ethyl Methyl Sulfide                  | 624-89-5       | 0.91                 | 1.97                 | 5.24                 | 5.24                 | 3.78                 | 4.82                 | < 3.38              | < 4.86               | < 5.05               | < 1.54               | < 3.66           | < 5.24          | < 1.50          |
| Thiophene                             | 110-02-1       | 1.06                 | 2.30                 | 5.87                 | 5.87                 | 4.23                 | 5.62                 | < 3.94              | < 5.44               | < 5.89               | < 1.80               | < 4.21           | < 5.89          | < 1.71          |
| Isobutyl Mercaptan                    | 513-44-0       | 1.14                 | 2.46                 | 6.08                 | 6.08                 | 4.38                 | 6.02                 | < 4.22              | < 5.64               | < 6.31               | < 1.93               | < 4.46           | < 6.31          | < 1.81          |
| Diethyl Sulfide                       | 352-93-2       | 1.14                 | 2.46                 | 6.08                 | 6.08                 | 4.38                 | 6.02                 | < 4.22              | < 5.64               | < 6.31               | < 1.93               | < 4.46           | < 6.31          | < 1.81          |
| n-Butyl Mercaptan                     | 109-79-5       | 1.14                 | 2.46                 | 6.08                 | 6.08                 | 4.38                 | 6.02                 | < 4.22              | < 5.64               | < 6.31               | < 1.93               | < 4.46           | < 6.31          | < 1.81          |
| Dimethyl Disulfide                    | 624-92-0       | 0.59                 | 1.26                 | 3.14                 | 3.14                 | 2.27                 | 3.09                 | < 2.17              | < 2.92               | < 3.24               | < 0.99               | < 2.55           | < 8.43          | < 1.56          |
| 3-Methylthiophene                     | 616-44-4       | 1.22                 | 2.63                 | 6.71                 | 6.71                 | 4.84                 | 6.42                 | < 4.50              | < 6.22               | < 6.73               | < 2.05               | < 4.81           | < 6.73          | < 1.96          |
| Tetrahydrothiophene                   | 110-01-0       | 1.06                 | 2.30                 | 6.08                 | 6.08                 | 4.38                 | 5.62                 | < 3.94              | < 5.84               | < 5.89               | < 1.80               | < 4.26           | < 6.08          | < 1.74          |
| 2-Ethylthiophene                      | 872-55-9       | 1.37                 | 2.95                 | 7.76                 | 7.76                 | 5.59                 | 7.23                 | < 5.07              | < 7.19               | < 7.58               | < 2.31               | < 5.46           | < 7.76          | < 2.23          |
| 2,5-Dimethylthiophene                 | 638-02-8       | 1.37                 | 2.95                 | 7.76                 | 7.76                 | 5.59                 | 7.23                 | < 5.07              | < 7.19               | < 7.58               | < 2.31               | < 5.46           | < 7.76          | < 2.23          |
| Diethyl Disulfide                     | 110-81-6       | 0.76                 | 1.64                 | 4.19                 | 4.19                 | 3.02                 | 4.01                 | < 2.81              | < 3.89               | < 4.21               | < 1.28               | < 3.01           | < 4.21          | < 1.22          |
| Total Detected (lb/lb rubber)         |                | 1.41E-05             | 2.84E-06             | 0.00E+00             | 0.00E+00             | 2.25E-05             | 1.69E-07             | 1.83E-06            | 3.52E-07             | 0.00E+00             | 3.21E-06             |                  |                 |                 |
| Total with non-detects (lb/lb rubber) |                | < 1.70E-05           | < 4.48E-06           | < 2.50E-06           | < 5.64E-06           | < 7.58E-05           | < 1.97E-06           | < 4.86E-06          | < 3.16E-06           | < 3.24E-06           | < 4.49E-06           |                  |                 |                 |

NOTE: % of Total Values Represent % of Total With Non-Detects

**TABLE 4-41**  
**MIXER 2 SULFUR SPECIATION FACTORS - POLYMERS**

|                                       | CAS<br>Numbers | Cmpd #24<br>% Of Tot | Cmpd #25<br>% Of Tot | Cmpd #26<br>% Of Tot | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|---------------------------------------|----------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| Carbonyl Sulfide                      | 463-58-1       | 3.85                 | 3.76                 | < 4.12               | < 3.91           | < 4.12          | < 0.16          |
| Methyl Mercaptan                      | 74-93-1        | 3.10                 | 3.03                 | < 3.32               | < 3.15           | < 3.32          | < 0.13          |
| Ethyl Mercaptan                       | 75-08-1        | 3.93                 | 3.83                 | < 4.21               | < 3.99           | < 4.21          | < 0.16          |
| Dimethyl Sulfide                      | 75-18-3        | 3.93                 | 3.83                 | < 4.21               | < 3.99           | < 4.21          | < 0.16          |
| Carbon Disulfide                      | 75-15-0        | 9.08                 | 11.31                | < 2.61               | < 7.66           | 11.31           | < 3.69          |
| Isopropyl Mercaptan                   | 75-33-2        | 4.72                 | 4.60                 | < 5.05               | < 4.79           | < 5.05          | < 0.19          |
| tert-Butyl Mercaptan                  | 75-66-1        | 5.89                 | 5.75                 | < 6.31               | < 5.99           | < 6.31          | < 0.24          |
| n-Propyl Mercaptan                    | 107-03-9       | 4.72                 | 4.60                 | < 5.05               | < 4.79           | < 5.05          | < 0.19          |
| Ethyl Methyl Sulfide                  | 624-89-5       | 4.72                 | 4.60                 | < 5.05               | < 4.79           | < 5.05          | < 0.19          |
| Thiophene                             | 110-02-1       | 5.50                 | 5.37                 | < 5.89               | < 5.59           | < 5.89          | < 0.22          |
| Isobutyl Mercaptan                    | 513-44-0       | 5.89                 | 5.75                 | < 6.31               | < 5.99           | < 6.31          | < 0.24          |
| Diethyl Sulfide                       | 352-93-2       | 5.89                 | 5.75                 | < 6.31               | < 5.99           | < 6.31          | < 0.24          |
| n-Butyl Mercaptan                     | 109-79-5       | 5.89                 | 5.75                 | < 6.31               | < 5.99           | < 6.31          | < 0.24          |
| Dimethyl Disulfide                    | 624-92-0       | 3.03                 | 2.95                 | < 3.24               | < 3.07           | < 3.24          | < 0.12          |
| 3-Methylthiophene                     | 616-44-4       | 6.29                 | 6.13                 | < 6.73               | < 6.38           | < 6.73          | < 0.26          |
| Tetrahydrothiophene                   | 110-01-0       | 5.50                 | 5.37                 | < 5.89               | < 5.59           | < 5.89          | < 0.22          |
| 2-Ethylthiophene                      | 872-55-9       | 7.07                 | 6.90                 | < 7.58               | < 7.18           | < 7.58          | < 0.29          |
| 2,5-Dimethylthiophene                 | 638-02-8       | 7.07                 | 6.90                 | < 7.58               | < 7.18           | < 7.58          | < 0.29          |
| Diethyl Disulfide                     | 110-81-6       | 3.93                 | 3.83                 | < 4.21               | < 3.99           | < 4.21          | < 0.16          |
| Total Detected (lb/lb rubber)         |                | 2.64E-07             | 3.08E-07             | 0.00E+00             |                  |                 |                 |
| Total with non-detects (lb/lb rubber) |                | < 2.91E-06           | < 2.72E-06           | < 2.85E-06           |                  |                 |                 |

NOTE: % of Total Values Represent % of Total With Non-Detects

**TABLE 4-5**  
**INTERNAL MIXER CONTROL DEVICE EFFICIENCY SUMMARY**

| Pollutant Categories              | Internal Mixer Control Device (1) |          |          |          |          |          |          |          | Control Efficiency % |
|-----------------------------------|-----------------------------------|----------|----------|----------|----------|----------|----------|----------|----------------------|
|                                   | Inlet                             |          |          |          | Outlet   |          |          |          |                      |
|                                   | 1                                 | 2        | 3        | Average  | 1        | 2        | 3        | Average  |                      |
| Total Metals (lbs/hr) (2)         | 2.23E+00                          | 4.03E+00 | 2.08E-01 | 2.15E+00 | 1.15E-02 | 1.49E-02 | 1.07E-02 | 1.23E-02 | 99.4%                |
| Total Particulate Matter (lbs/hr) | 35.152                            | 17.405   | 17.794   | 23.450   | 0.149    | 0.117    | 0.212    | 0.159    | 99.3%                |

(1) - Torit fabric filter.

(2) - Inlet and outlet values shown are detected analytes only.

TABLE 4-6a  
EXTRUSION SUMMARY

| Compound                           | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Organics <sup>1</sup><br>(lbs/lb rubber)<br>with non-detects | Total Particulate<br>(lbs/lb rubber) | Total Metals<br>(lbs/lb rubber) |
|------------------------------------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------|---------------------------------|
| Tire Base/Sidewall, Compound 4     | 8.35E-06                                     | < 6.41E-06                                                              | < 2.06E-05                                                          | < 1.50E-05                                                                      | 2.38E-05                             | 1.10E-06                        |
| Tire TREAD, Compound 6             | 1.76E-05                                     | < 2.21E-05                                                              | < 6.40E-05                                                          | < 5.87E-05                                                                      | 1.28E-06                             | 1.94E-07                        |
| EPDM 2 (Peroxide Cure), Compound 9 | 1.73E-05                                     | < 1.28E-05                                                              | < 2.36E-05                                                          | < 2.77E-05                                                                      | 5.75E-06                             | 3.97E-07                        |
| Emulsion SBR 1502, Compound 22     | 1.24E-05                                     | < 2.29E-06                                                              | < 1.84E-05                                                          | < 1.25E-05                                                                      | 2.66E-05                             | 1.47E-06                        |
| Mean                               | 1.39E-05                                     | < 1.09E-05                                                              | < 3.17E-05                                                          | < 2.85E-05                                                                      | 1.44E-05                             | 7.90E-07                        |
| Max.                               | 1.76E-05                                     | < 2.21E-05                                                              | < 6.40E-05                                                          | < 5.87E-05                                                                      | 2.66E-05                             | 1.47E-06                        |
| Std. Dev.                          | 3.82E-06                                     | < 7.47E-06                                                              | < 1.88E-05                                                          | < 1.84E-05                                                                      | 1.10E-05                             | 5.17E-07                        |

<sup>1</sup> Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

TABLE 4 - 6.B. Extruder Organic Speciation Factors

| Compound                            | CAS #                  | Cmpd. #9   |       | Cmpd. #22  |       | Cmpd. #4   |       | Cmpd. #6   |      | TOTAL              |                   |                   |
|-------------------------------------|------------------------|------------|-------|------------|-------|------------|-------|------------|------|--------------------|-------------------|-------------------|
|                                     |                        | % of Total |       | % of Total |       | % of Total |       | % of Total |      | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| 1-Butanol                           | 00071-36-3             | <          | 0.39  | T          | 1.40  | <          | 0.02  | T          | 1.42 | 0.45               | 1.42              | 0.58              |
| 1-Hexene                            | 00592-41-6             | <          | 0.01  | 1.40       | <     | 0.02       | 0.00  | <          | 0.00 | 0.36               | 1.40              | 0.60              |
| 1-Pentene                           | 00109-67-1             | <          | 0.20  | 0.05       | <     | 0.02       | 1.16  | <          | 1.16 | 0.36               | 1.16              | 0.47              |
| 1,2,4-Trichlorobenzene              | 120-83-2               | <          | 0.06  | 0.07       | <     | 0.17       | 0.01  | <          | 0.01 | 0.08               | 0.17              | 0.06              |
| 1,2,4-Trimethylbenzene              | 00095-63-6             | <          | 0.75  | 0.42       | 1.86  | 4.56       | 0.01  | <          | 4.56 | 1.90               | 4.56              | 1.63              |
| 1,3-Butadiene                       | 00106-99-0             | <          | 0.22  | 0.62       | 0.60  | 0.86       | 0.00  | <          | 0.86 | 0.58               | 0.86              | 0.23              |
| 1,3,5-Trimethylbenzene              | 00108-67-8             | <          | 0.15  | 0.82       | 1.09  | 1.07       | 0.01  | <          | 1.07 | 0.78               | 1.09              | 0.38              |
| 1,4-Dichlorobenzene                 | 106-46-7               | <          | 0.05  | 0.02       | 0.08  | 0.01       | 0.01  | <          | 0.01 | 0.04               | 0.08              | 0.03              |
| 1,4-Diethylbenzene + n-Butylbenzene | 00105-05-5, 00104-51-8 | <          | 1.53  | 0.04       | 0.21  | 0.36       | 0.01  | <          | 0.36 | 0.53               | 1.53              | 0.59              |
| 2-Butanone                          | 78-93-3                | <          | 0.42  | 0.74       | 0.90  | 0.20       | 0.00  | <          | 0.20 | 0.57               | 0.90              | 0.27              |
| 2-Chloroacetophenone                | 532-27-4               | <          | 0.02  | 0.03       | 0.08  | 0.01       | 0.01  | <          | 0.01 | 0.03               | 0.08              | 0.03              |
| 2-Chloronaphthalene                 | 1335-88-2              | <          | 0.02  | 0.01       | 0.09  | 0.01       | 0.01  | <          | 0.01 | 0.03               | 0.09              | 0.03              |
| 2-Furaldehyde                       |                        | <          | 0.11  | 0.03       | 0.33  | 0.02       | 0.02  | <          | 0.02 | 0.12               | 0.33              | 0.12              |
| 2-Methylnaphthalene                 |                        | <          | 0.03  | 0.39       | 0.07  | 0.17       | 0.01  | <          | 0.17 | 0.17               | 0.39              | 0.14              |
| 2-Methylpentane                     | 00107-83-5             | <          | 0.82  | 0.29       | 0.42  | 0.38       | 0.00  | <          | 0.38 | 0.48               | 0.82              | 0.20              |
| 2,2-Dimethylbutane                  | 00075-83-2             | <          | 0.09  | 0.04       | 0.02  | 0.08       | 0.00  | <          | 0.08 | 0.06               | 0.09              | 0.03              |
| 3-Methylhexane                      | 00589-34-4             | <          | 0.07  | 0.04       | 0.23  | 0.14       | 0.01  | <          | 0.14 | 0.12               | 0.23              | 0.07              |
| 3-Methylpentane                     | 00096-14-0             | <          | 1.00  | 0.31       | 0.29  | 0.07       | 0.29  | <          | 0.07 | 0.42               | 1.00              | 0.35              |
| 3/4-Methylphenol                    |                        | <          | 0.07  | 0.02       | 0.15  | 0.02       | 0.02  | <          | 0.02 | 0.06               | 0.15              | 0.05              |
| 4-Methyl-1-pentene                  | 00691-37-2             | <          | 0.03  | 0.01       | 0.22  | 0.06       | 0.00  | <          | 0.06 | 0.08               | 0.22              | 0.08              |
| 4-Methyl-2-Pentanone                | 108-10-1               | <          | 1.03  | 12.83      | 37.01 | 4.54       | 37.01 | <          | 4.54 | 13.85              | 37.01             | 14.04             |
| Acenaphthene                        |                        | <          | 0.02  | 0.03       | 0.05  | 0.00       | 0.05  | <          | 0.00 | 0.02               | 0.05              | 0.02              |
| Acenaphthylene                      |                        | <          | 0.01  | 0.07       | 0.04  | 0.03       | 0.04  | <          | 0.03 | 0.04               | 0.07              | 0.02              |
| Acetone                             | 67-64-1                |            | 1.31  | 4.82       | 2.20  | 3.06       | 2.20  |            | 3.06 | 2.85               | 4.82              | 1.30              |
| Acetophenone                        | 98-86-2                |            | 29.53 | 0.13       | 0.14  | 5.19       | 0.14  |            | 5.19 | 8.75               | 29.53             | 12.18             |
| Acetylene                           | 00074-86-2             | <          | 0.06  | 0.30       | 0.27  | 0.27       | 0.27  | <          | 0.27 | 0.23               | 0.30              | 0.10              |
| Aniline                             | 62-53-3                | <          | 0.03  | 1.76       | 3.12  | 0.32       | 3.12  | <          | 0.32 | 1.31               | 3.12              | 1.23              |
| Benzaldehyde                        | 100-52-7               |            | 0.14  | 0.28       | 0.14  | 0.03       | 0.14  |            | 0.03 | 0.15               | 0.28              | 0.09              |
| Benzene                             | 00071-43-2             |            | 0.27  | 0.98       | 0.30  | 0.46       | 0.30  |            | 0.46 | 0.50               | 0.98              | 0.28              |
| Benzoic acid                        | 65-85-0                |            | 1.56  | 0.73       | 0.58  | 0.03       | 0.58  | <          | 0.03 | 0.73               | 1.56              | 0.55              |
| Benzonitrile                        | 100-47-0               | <          | 0.04  | 0.07       | 0.09  | 0.00       | 0.09  | <          | 0.00 | 0.05               | 0.09              | 0.03              |
| Benzyl alcohol                      | 100-51-6               | <          | 0.12  | 0.14       | 0.16  | 0.20       | 0.16  | <          | 0.20 | 0.16               | 0.20              | 0.03              |
| Biphenyl                            | 92-52-4                |            | 0.01  | 0.04       | 0.03  | 0.02       | 0.03  |            | 0.02 | 0.03               | 0.04              | 0.01              |
| bis-Methylethylbenzene              |                        |            | T     | 0.40       | T     | T          | T     |            | T    | 0.10               | 0.40              | 0.17              |
| bis(2-Ethylhexyl)phthalate          |                        |            | 0.24  | 1.18       | 0.62  | 0.17       | 0.62  |            | 0.17 | 0.55               | 1.18              | 0.40              |
| Butanal                             | 123-72-8               |            | 0.65  | T          | T     | T          | T     |            | T    | 0.16               | 0.65              | 0.28              |
| Butane                              | 106-97-8               |            | T     | 0.34       | 0.42  | 0.25       | 0.42  |            | 0.25 | 0.25               | 0.42              | 0.16              |
| Butanol                             | 71-36-3                |            | T     | 0.34       | T     | 1.06       | T     |            | 1.06 | 0.35               | 1.06              | 0.43              |
| Butylbenzylphthalate                |                        | <          | 0.05  | 0.09       | 0.11  | 0.02       | 0.11  | <          | 0.02 | 0.07               | 0.11              | 0.04              |

TABLE 4 - 6.B. Extruder Organic Speciation Factors

| Compound                          | CAS #                  | Cmpd #9    |  | Cmpd #22   |  | Cmpd #4    |  | Cmpd. #6   |  | TOTAL              |                   |                   |
|-----------------------------------|------------------------|------------|--|------------|--|------------|--|------------|--|--------------------|-------------------|-------------------|
|                                   |                        | % of Total |  | % of Total |  | % of Total |  | % of Total |  | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| C10H14 Alkyl Substituted Benzene  |                        | T          |  | T          |  | 0.69       |  | T          |  | 0.17               | 0.69              | 0.30              |
| C10H18 Cyclic Hydrocarbon         |                        | T          |  | 7.15       |  | T          |  | 0.68       |  | 1.96               | 7.15              | 3.01              |
| C11 + C12 Alkenes                 |                        | T          |  | 0.61       |  | T          |  | T          |  | 0.15               | 0.61              | 0.27              |
| C11-C12 Branched Alkane           |                        | 3.24       |  | T          |  | T          |  | 0.71       |  | 0.99               | 3.24              | 1.33              |
| C13H18 Substituted Benzene        |                        | T          |  | 0.93       |  | T          |  | T          |  | 0.23               | 0.93              | 0.40              |
| C9H10 Alkyl Substituted Benzene   |                        | 3.01       |  | 0.32       |  | T          |  | T          |  | 0.83               | 3.01              | 1.27              |
| C9H12 Alkyl Substituted Benzene   |                        | T          |  | 0.91       |  | 7.71       |  | 2.99       |  | 2.90               | 7.71              | 2.98              |
| C9H12 Cyclic Hydrocarbon          |                        | 1.55       |  | T          |  | T          |  | T          |  | 0.39               | 1.55              | 0.67              |
| Carbon Disulfide                  | 75-15-0                | 0.35       |  | 0.92       |  | 0.73       |  | 0.45       |  | 0.61               | 0.92              | 0.23              |
| Chloromethane                     | 74-87-3                | 0.22       |  | 1.46       |  | 0.47       |  | 0.11       |  | 0.57               | 1.46              | 0.53              |
| cis-2-Pentene                     | 000627-20-3            | 1.97       |  | 0.15       |  | 0.10       |  | 4.88       |  | 1.78               | 4.88              | 1.94              |
| Cumene                            | 98-82-8                | 5.35       |  | 0.29       |  | 0.04       |  | 0.19       |  | 1.47               | 5.35              | 2.24              |
| Cyclobutane                       | 287-23-0               | T          |  | 1.85       |  | 1.71       |  | T          |  | 0.89               | 1.85              | 0.89              |
| Cyclohexanone                     | 108-94-1               | 0.08       |  | 0.10       |  | 0.76       |  | 0.21       |  | 0.29               | 0.76              | 0.28              |
| Cyclopentane                      | 00287-92-3,            | T          |  | 0.56       |  | T          |  | T          |  | 0.14               | 0.56              | 0.24              |
| Cyclopentane + 2,3-Dimethylbutane | 00287-92-3, 00079-29-8 |            |  | 0.17       |  | 0.29       |  | 0.09       |  | 0.22               | 0.32              | 0.09              |
| Cyclopentene                      | 00142-29-0             | 0.02       |  | 0.03       |  | 0.02       |  | 0.09       |  | 0.04               | 0.09              | 0.03              |
| Decane                            | 124-18-5               | 0.21       |  | T          |  | T          |  | 0.04       |  | 0.06               | 0.21              | 0.09              |
| Dibenzofuran                      | 38178-38-0             | 0.02       |  | 0.02       |  | 0.04       |  | 0.00       |  | 0.02               | 0.04              | 0.01              |
| Diethylphthalate                  | 84-66-2                | 0.07       |  | 0.10       |  | 0.04       |  | 0.46       |  | 0.17               | 0.46              | 0.17              |
| Dimethylphthalate                 | 131-11-13              | 0.02       |  | 0.03       |  | 0.08       |  | 0.01       |  | 0.04               | 0.08              | 0.03              |
| Di-n-butylphthalate               |                        | 1.32       |  | 0.60       |  | 0.55       |  | 0.33       |  | 0.70               | 1.32              | 0.37              |
| Diphenylamine                     |                        | 1.32       |  | 0.07       |  | 0.10       |  | 0.69       |  | 0.54               | 1.32              | 0.51              |
| Dodecane                          | 112-40-3               | 0.14       |  | 2.06       |  | T          |  | 0.50       |  | 0.67               | 2.06              | 0.82              |
| Ethane                            | 00074-84-0             | 0.12       |  | 0.28       |  | 0.06       |  | 0.14       |  | 0.15               | 0.28              | 0.08              |
| Ethylbenzene                      | 00100-41-4             | 0.11       |  | 2.85       |  | 0.22       |  | 0.14       |  | 0.83               | 2.85              | 1.17              |
| Ethylhexanol                      |                        | T          |  | T          |  | 4.63       |  | T          |  | 1.16               | 4.63              | 2.01              |
| Ethylhexenal                      |                        | 0.39       |  | 6.74       |  | 0.46       |  | T          |  | 1.90               | 6.74              | 2.80              |
| Fluoranthene                      | 206-44-0               | 0.02       |  | 0.02       |  | 0.05       |  | 0.01       |  | 0.02               | 0.05              | 0.02              |
| Fluorene                          | 86-73-7                | 0.03       |  | 0.02       |  | 0.02       |  | 0.00       |  | 0.02               | 0.03              | 0.01              |
| Heptanone                         |                        | 0.73       |  | T          |  | T          |  | 0.28       |  | 0.25               | 0.73              | 0.30              |
| Hexachlorobutadiene               | 87-68-3                | 0.26       |  | 0.12       |  | 0.28       |  | 0.02       |  | 0.17               | 0.28              | 0.11              |
| Isobutane                         | 00075-28-5             | 0.51       |  | 0.10       |  | 0.15       |  | 0.51       |  | 0.32               | 0.51              | 0.19              |
| Isobutanol                        | 78-83-1                | 0.26       |  | T          |  | 1.54       |  | 0.71       |  | 0.63               | 1.54              | 0.59              |
| Isobutylene + 1-Butene            | 00115-11-7, 00106-98-9 | 0.59       |  | 0.70       |  | 0.09       |  | 0.06       |  | 0.36               | 0.70              | 0.29              |
| Isobutyraldehyde                  | 78-84-2                | 0.26       |  | T          |  | T          |  | 0.35       |  | 0.15               | 0.35              | 0.16              |
| Isopentane                        | 00078-78-4             | 9.01       |  | 3.72       |  | 1.82       |  | 2.15       |  | 4.17               | 9.01              | 2.88              |
| Isophorone                        | 78-59-1                | 0.03       |  | 0.51       |  | 0.19       |  | 0.01       |  | 0.18               | 0.51              | 0.20              |

TABLE 4 - 6.B. Extruder Organic Speciation Factors

| Compound                              | CAS #                  | Cmpd #9    |            | Cmpd #22   |            | Cmpd #4    |            | Cmpd #6    |            | TOTAL              |                   |                   |
|---------------------------------------|------------------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------------|-------------------|-------------------|
|                                       |                        | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Isoprene                              | 00078-79-5             | 0.09       | <          | 0.09       | <          | 0.14       | <          | 0.27       | <          | 0.15               | 0.27              | 0.07              |
| Isopropyl Alcohol                     | 67-63-0                | 0.99       | T          | 0.68       | T          | 0.35       | T          | 2.60       | 0.99       | 0.99               | 2.60              | 1.00              |
| Methylcyclopentane                    | 00096-37-7             | 1.47       | <          | 0.68       | <          | 0.31       | <          | 0.12       | 0.65       | 0.65               | 1.47              | 0.52              |
| Methylene Chloride                    | 79-09-2                | 8.81       | <          | 0.65       | <          | 10.66      | <          | 22.47      | 10.65      | 10.65              | 22.47             | 7.79              |
| Methylpentane                         |                        | 0.97       | <          | 0.65       | <          | T          | <          | T          | 0.40       | 0.40               | 0.97              | 0.42              |
| m-Ethyltoluene                        | 00620-14-4             | 0.25       | <          | 0.34       | <          | 1.02       | <          | 2.02       | 0.91       | 0.91               | 2.02              | 0.71              |
| m-Xylene + p-Xylene                   | 00108-38-3, 00106-42-3 | 0.55       | <          | 0.48       | <          | 0.51       | <          | 0.57       | 0.53       | 0.53               | 0.57              | 0.03              |
| Naphthalene                           | 91-20-3                | 2.82       | <          | 0.48       | <          | 0.44       | <          | 0.30       | 1.01       | 1.01               | 2.82              | 1.05              |
| n-Butane                              | 00106-97-8             | 0.50       | <          | 0.53       | <          | 0.55       | <          | 0.27       | 0.46       | 0.46               | 0.55              | 0.11              |
| n-Decane                              | 00124-18-5             | 0.12       | <          | 0.14       | <          | 0.24       | <          | 0.57       | 0.27       | 0.27               | 0.57              | 0.18              |
| n-Hexane                              | 00110-54-3             | 3.02       | <          | 19.52      | <          | 0.68       | <          | 0.67       | 5.97       | 5.97               | 19.52             | 7.88              |
| Nitromethane                          | 75-52-5                | T          | <          | T          | <          | T          | <          | 0.25       | 0.06       | 0.06               | 0.25              | 0.11              |
| n-Nonane                              | 00111-84-2             | 0.07       | <          | 0.01       | <          | 0.08       | <          | 0.03       | 0.05       | 0.05               | 0.08              | 0.03              |
| n-Octane                              | 00111-65-9             | 0.04       | <          | 0.05       | <          | 0.19       | <          | 0.09       | 0.09       | 0.09               | 0.19              | 0.06              |
| n-Pentane                             | 00109-66-0             | 0.48       | <          | 0.42       | <          | 0.34       | <          | 0.08       | 0.33       | 0.33               | 0.48              | 0.15              |
| n-Propylbenzene                       | 00103-65-1             | 0.02       | <          | 0.04       | <          | 0.25       | <          | 0.54       | 0.21       | 0.21               | 0.54              | 0.21              |
| o-Ethyltoluene                        | 00611-14-3             | 1.14       | <          | 0.25       | <          | 0.44       | <          | 1.24       | 0.77       | 0.77               | 1.24              | 0.43              |
| o-Xylene                              | 00095-47-6             | 0.27       | <          | 3.81       | <          | 0.28       | <          | 0.44       | 1.20       | 1.20               | 3.81              | 1.51              |
| p-Cymene                              | 00099-87-6             | 0.20       | <          | 0.51       | <          | 1.30       | <          | 0.74       | 0.69       | 0.69               | 1.30              | 0.40              |
| Pentane                               | 109-66-0               | 0.38       | <          | T          | <          | T          | <          | T          | 0.10       | 0.10               | 0.38              | 0.17              |
| p-Ethyltoluene                        | 00622-96-8             | 0.18       | <          | 0.40       | <          | 0.60       | <          | 0.78       | 0.49       | 0.49               | 0.78              | 0.22              |
| Phenanthrene                          | 85-01-8                | 0.02       | <          | 0.07       | <          | 0.04       | <          | 0.02       | 0.04       | 0.04               | 0.07              | 0.02              |
| Phenol                                | 108-95-2               | 0.62       | <          | 0.09       | <          | 0.80       | <          | 0.24       | 0.44       | 0.44               | 0.80              | 0.28              |
| Propane                               | 00074-98-6             | 0.04       | <          | 0.34       | <          | 2.59       | <          | 4.81       | 1.94       | 1.94               | 4.81              | 1.93              |
| Propene                               | 115-07-1               | T          | <          | 2.25       | <          | T          | <          | 0.17       | 0.61       | 0.61               | 2.25              | 0.95              |
| Propylbenzene                         |                        | T          | <          | T          | <          | T          | <          | 0.21       | 0.05       | 0.05               | 0.21              | 0.09              |
| Propylene                             | 00115-07-1             | 0.20       | <          | 0.34       | <          | 0.53       | <          | 0.15       | 0.31       | 0.31               | 0.53              | 0.15              |
| Pyrene                                | 129-00-0               | 0.06       | <          | 0.02       | <          | 0.03       | <          | 0.01       | 0.03       | 0.03               | 0.06              | 0.02              |
| Pyridine                              | 110-86-1               | 0.52       | <          | 0.11       | <          | 0.25       | <          | 0.02       | 0.23       | 0.23               | 0.52              | 0.19              |
| Styrene                               | 00100-42-5             | 0.09       | <          | 0.31       | <          | 0.07       | <          | 1.24       | 0.43       | 0.43               | 1.24              | 0.48              |
| Tetrahydrofuran                       | 109-99-9               | T          | <          | T          | <          | 1.54       | <          | T          | 0.39       | 0.39               | 1.54              | 0.67              |
| Toluene                               | 00108-88-3             | 3.23       | <          | 2.74       | <          | 0.78       | <          | 15.78      | 5.63       | 5.63               | 15.78             | 5.93              |
| Undecane                              | 1120-21-4              | 0.21       | <          | 1.43       | <          | T          | <          | 0.18       | 0.46       | 0.46               | 1.43              | 0.57              |
| TOTAL Detected (lb/lb rubber)         |                        | 2.62E-05   | 1.02E-05   | 1.02E-05   | 1.37E-05   | 5.50E-05   |            |            |            |                    |                   |                   |
| TOTAL with non-detects (lb/lb rubber) |                        | < 2.77E-05 | < 1.25E-05 | < 1.50E-05 | < 5.87E-05 |            |            |            |            |                    |                   |                   |

TABLE 4 - 6.C Extruder Metal Speciation Factors

|                                       | Cmpd. #9<br>% of Total | Cmpd. #22<br>% of Total | Cmpd. #4<br>% of Total | Cmpd. #6<br>% of Total | TOTAL              |                   |                   |
|---------------------------------------|------------------------|-------------------------|------------------------|------------------------|--------------------|-------------------|-------------------|
|                                       |                        |                         |                        |                        | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Chromium                              | 19.66                  | 17.29                   | 22.26                  | 11.62                  | 17.71              | 22.26             | 3.93              |
| Cobalt                                | 3.79                   | 0.71                    | 1.72                   | 5.12                   | 2.83               | 5.12              | 1.72              |
| Magnesium                             | 18.15                  | 19.15                   | 21.38                  | 14.03                  | 18.18              | 21.38             | 2.66              |
| Nickel                                | 25.54                  | 33.63                   | 18.05                  | 37.33                  | 28.64              | 37.33             | 7.45              |
| Zinc                                  | 32.86                  | 29.23                   | 36.59                  | 31.91                  | 32.65              | 36.59             | 2.64              |
| Total Detected (lb/lb rubber)         | 3.97E-07               | 1.47E-06                | 1.10E-06               | 1.94E-07               |                    |                   |                   |
| Total with non-detects (lb/lb rubber) | 3.97E-07               | 1.47E-06                | 1.10E-06               | 1.94E-07               |                    |                   |                   |

**TABLE 4-7a**  
**AUTOCCLAVE SUMMARY<sup>1</sup>**

| Compound  | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Organics <sup>2</sup><br>(lbs/lb rubber)<br>with non-detects | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects | Amines<br>(lbs/lb rubber)<br>with non-detects |
|-----------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------|
| 4         | 1.61E-04                                     | < 1.79E-04                                                              | < 4.07E-04                                                          | < 5.62E-04                                                                      | < 3.04E-06                                          | < 4.29E-08                                    |
| 5         | 1.78E-04                                     | < 9.32E-05                                                              | < 4.79E-04                                                          | < 5.54E-04                                                                      | < 3.11E-06                                          | < 2.86E-08                                    |
| 6         | 1.33E-04                                     | < 6.08E-04                                                              | < 2.46E-04                                                          | < 8.27E-04                                                                      | < 2.79E-06                                          | < 4.73E-08                                    |
| 8         | 5.42E-05                                     | < 1.82E-05                                                              | < 6.67E-04                                                          | < 6.68E-04                                                                      | < 2.85E-03                                          | < 9.42E-08                                    |
| 9a        | 1.63E-04                                     | < 8.21E-04                                                              | < 4.12E-04                                                          | < 1.22E-03                                                                      | < 6.54E-06                                          | < 7.10E-08                                    |
| 9         | 3.61E-04                                     | < 4.98E-04                                                              | < 3.33E-04                                                          | < 8.17E-04                                                                      | < 3.13E-06                                          | < 4.69E-08                                    |
| 11        | 9.32E-05                                     | < 1.04E-04                                                              | < 2.54E-04                                                          | < 3.55E-04                                                                      | < 1.46E-04                                          | < 3.61E-08                                    |
| 15        | 7.34E-05                                     | < 8.73E-05                                                              | < 4.36E-04                                                          | < 5.08E-04                                                                      | < 1.99E-04                                          | < 5.11E-08                                    |
| 18        | 9.27E-05                                     | < 2.02E-04                                                              | < 1.89E-03                                                          | < 2.09E-03                                                                      | < 7.07E-05                                          | < 1.80E-07                                    |
| 21        | 2.26E-04                                     | < 1.28E-04                                                              | < 1.84E-03                                                          | < 1.96E-03                                                                      | < 1.94E-06                                          | < 3.19E-08                                    |
| 22        | 1.11E-04                                     | < 2.36E-05                                                              | < 2.18E-04                                                          | < 2.37E-04                                                                      | < 3.33E-06                                          | < 5.18E-08                                    |
| Mean      | 1.50E-04                                     | < 2.51E-04                                                              | < 6.53E-04                                                          | < 8.91E-04                                                                      | < 2.99E-04                                          | < 6.20E-08                                    |
| Max.      | 3.61E-04                                     | < 8.21E-04                                                              | < 1.89E-03                                                          | < 2.09E-03                                                                      | < 2.85E-03                                          | < 1.80E-07                                    |
| Std. Dev. | 8.24E-05                                     | < 2.55E-04                                                              | < 5.84E-04                                                          | < 5.90E-04                                                                      | < 8.09E-04                                          | < 4.13E-08                                    |

a - Extruded EPDM

1 - Inclusive of both gaseous and aqueous matrices representing the blowdown and water trap effluent, and cooldown air stream.

2 - Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

TABLE 4-7b  
AUTOCLAVE ORGANIC SPECIATION FACTORS

| Compound                            | CAS #               | Cmpd. #4<br>% of TOT | Cmpd. #5<br>% of TOT | Cmpd. #6<br>% of TOT | Cmpd. #8<br>% of TOT | Cmpd. #9*<br>% of TOT | Cmpd. #9<br>% of TOT | Cmpd. #11<br>% of TOT | Cmpd. #15<br>% of TOT | Cmpd. #18<br>% of TOT | Cmpd. #21<br>% of TOT | Cmpd. #22<br>% of TOT | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|-------------------------------------|---------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------|-----------------|-----------------|
| 1-Butanol                           | 00071-36-3          | T                    | T                    | T                    | T                    | T                     | T                    | 0.26                  | T                     | T                     | 1.23                  | T                     | 0.14             | 1.23            | 0.35            |
| 1-Dodecene                          | 112-41-4            | 0.01                 | 0.01                 | 0.01                 | 0.03                 | 0.04                  | 0.06                 | 0.03                  | 0.11                  | 0.00                  | 0.01                  | 0.04                  | 0.07             | 0.11            | 0.03            |
| 1-Heptene                           | 00592-76-7          | 0.09                 | 0.11                 | 0.05                 | 0.17                 | 0.02                  | 0.05                 | 0.09                  | 0.11                  | 0.00                  | 0.07                  | 0.06                  | 0.07             | 0.17            | 0.04            |
| 1-Hexene                            | 00592-41-6          | 0.00                 | 0.01                 | 0.01                 | 0.00                 | 0.01                  | 0.01                 | 0.00                  | 0.01                  | 0.00                  | 0.03                  | 0.02                  | 0.01             | 0.03            | 0.01            |
| 1-Octene                            | 00111-60-0          | 0.00                 | 0.03                 | 0.01                 | 0.00                 | 0.01                  | 0.00                 | 0.10                  | 0.17                  | 0.00                  | 0.64                  | 0.01                  | 0.09             | 0.64            | 0.18            |
| 1-Pentene                           | 00109-67-1          | 0.01                 | 0.06                 | 0.03                 | 0.00                 | 0.02                  | 0.00                 | 0.01                  | 0.02                  | 0.09                  | 0.04                  | 0.13                  | 0.04             | 0.13            | 0.04            |
| 1,1-Dichloroethane                  | 75-34-3             | 0.03                 | 0.04                 | 0.01                 | 0.08                 | 0.01                  | 0.01                 | 0.05                  | 0.06                  | 0.03                  | 0.02                  | 0.03                  | 0.03             | 0.08            | 0.02            |
| 1,1-Dichloroethene                  | 75-35-4             | 0.03                 | 0.04                 | 0.01                 | 0.08                 | 0.01                  | 0.01                 | 0.06                  | 0.06                  | 0.03                  | 0.02                  | 0.03                  | 0.03             | 0.08            | 0.02            |
| 1,1,1-Trichloroethane               | 71-55-6             | 0.03                 | 0.04                 | 0.01                 | 0.08                 | 0.01                  | 0.01                 | 0.06                  | 0.06                  | 0.03                  | 0.02                  | 0.03                  | 0.03             | 0.08            | 0.02            |
| 1,1,2-Trichloroethane               | 79-00-5             | 0.03                 | 0.04                 | 0.01                 | 0.08                 | 0.01                  | 0.01                 | 0.06                  | 0.06                  | 0.03                  | 0.02                  | 0.03                  | 0.03             | 0.08            | 0.02            |
| 1,1,2,2-Tetrachloroethane           | 79-34-5             | 0.03                 | 0.04                 | 0.01                 | 0.08                 | 0.01                  | 0.01                 | 0.06                  | 0.06                  | 0.03                  | 0.02                  | 0.03                  | 0.03             | 0.08            | 0.02            |
| 1,2-Dibromo-3-Chloropropane         | 00096-12-8          | 0.05                 | 0.07                 | 0.03                 | 0.16                 | 0.02                  | 0.02                 | 0.11                  | 0.11                  | 0.05                  | 0.04                  | 0.05                  | 0.07             | 0.16            | 0.04            |
| 1,2-Dibromo-3-chloropropane         | 96-12-8             | 0.01                 | 0.01                 | 0.00                 | 0.01                 | 0.02                  | 0.02                 | 0.01                  | 0.00                  | 0.00                  | 0.00                  | 0.02                  | 0.01             | 0.02            | 0.01            |
| 1,2-Dibromoethane                   | 00106-93-4          | 0.03                 | 0.04                 | 0.01                 | 0.08                 | 0.01                  | 0.01                 | 0.05                  | 0.06                  | 0.03                  | 0.02                  | 0.03                  | 0.03             | 0.08            | 0.02            |
| 1,2-Dichlorobenzene                 | 00095-50-1          | 0.03                 | 0.04                 | 0.01                 | 0.08                 | 0.01                  | 0.01                 | 0.05                  | 0.06                  | 0.03                  | 0.02                  | 0.03                  | 0.03             | 0.08            | 0.02            |
| 1,2-Dichlorobenzene                 | 95-50-1             | 0.00                 | 0.00                 | 0.00                 | 0.01                 | 0.01                  | 0.01                 | 0.00                  | 0.00                  | 0.00                  | 0.00                  | 0.01                  | 0.00             | 0.01            | 0.00            |
| 1,2-Dichloroethane                  | 107-06-2            | 0.03                 | 0.04                 | 0.01                 | 0.08                 | 0.01                  | 0.01                 | 0.06                  | 0.06                  | 0.03                  | 0.02                  | 0.03                  | 0.03             | 0.08            | 0.02            |
| 1,2-Dichloropropane                 | 78-87-5             | 0.03                 | 0.04                 | 0.01                 | 0.08                 | 0.01                  | 0.01                 | 0.06                  | 0.06                  | 0.03                  | 0.02                  | 0.03                  | 0.03             | 0.08            | 0.02            |
| 1,2-Epoxybutane                     | 106-88-7            | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.00                  | 0.00                 | 0.00                  | 0.00                  | 0.00                  | 0.00                  | 0.00                  | 0.00             | 0.00            | 0.00            |
| 1,2,4-Trichlorobenzene              | 120-82-1            | 0.00                 | 0.00                 | 0.00                 | 0.01                 | 0.01                  | 0.01                 | 0.00                  | 0.00                  | 0.00                  | 0.00                  | 0.01                  | 0.00             | 0.01            | 0.00            |
| 1,2,4-Trimethylbenzene              | 95-63-6             | 0.78                 | 0.40                 | 0.58                 | 0.25                 | 0.06                  | 0.30                 | 0.11                  | 0.19                  | 0.06                  | 0.03                  | 0.36                  | 0.28             | 0.78            | 0.22            |
| 1,3-Butadiene                       | 106-99-0            | 0.31                 | 0.38                 | 0.09                 | 0.01                 | 0.00                  | 0.11                 | 0.04                  | 0.00                  | 0.00                  | 0.00                  | 0.14                  | 0.10             | 0.38            | 0.13            |
| 1,3-Cyclooctadiene                  | 1700-10-3           | 0.00                 | 0.00                 | 0.00                 | 0.04                 | 0.01                  | 0.02                 | 0.01                  | 0.00                  | 0.00                  | 0.00                  | 0.01                  | 0.01             | 0.04            | 0.01            |
| 1,3-Dichlorobenzene                 | 00541-73-1          | 0.03                 | 0.04                 | 0.01                 | 0.08                 | 0.01                  | 0.01                 | 0.05                  | 0.06                  | 0.03                  | 0.02                  | 0.03                  | 0.03             | 0.08            | 0.02            |
| 1,3-Dichlorobenzene                 | 541-73-1            | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.01                  | 0.01                 | 0.00                  | 0.00                  | 0.00                  | 0.00                  | 0.01                  | 0.00             | 0.01            | 0.00            |
| 1,3,5-Trimethylbenzene              | 00108-67-8          | 0.28                 | 0.23                 | 0.12                 | 0.26                 | 0.04                  | 0.03                 | 0.03                  | 0.17                  | 0.01                  | 0.02                  | 0.20                  | 0.13             | 0.28            | 0.10            |
| 1,4-Dichloro-1,3-Butadiene          | 02984-42-1          | T                    | T                    | T                    | T                    | T                     | T                    | 0.24                  | T                     | T                     | T                     | T                     | 0.02             | 0.24            | 0.07            |
| 1,4-Dichlorobenzene                 | 00106-46-7          | 0.03                 | 0.04                 | 0.01                 | 0.08                 | 0.01                  | 0.01                 | 0.05                  | 0.05                  | 0.03                  | 0.02                  | 0.03                  | 0.03             | 0.08            | 0.02            |
| 1,4-Dichlorobenzene                 | 106-46-7            | 0.00                 | 0.00                 | 0.00                 | 0.01                 | 0.01                  | 0.01                 | 0.00                  | 0.01                  | 0.00                  | 0.00                  | 0.00                  | 0.00             | 0.01            | 0.00            |
| 1,4-Diethylbenzene + n-Butylbenzene | 0105-05-5/00104-51- | 0.09                 | 0.48                 | 0.21                 | 0.19                 | 0.01                  | 0.06                 | 0.02                  | 0.07                  | 0.13                  | 0.01                  | 0.01                  | 0.12             | 0.48            | 0.13            |
| 1,4-Dioxane                         | 00123-91-1          | 0.10                 | 0.14                 | 0.05                 | 0.33                 | 0.03                  | 0.05                 | 0.22                  | 0.22                  | 0.11                  | 0.09                  | 0.10                  | 0.13             | 0.33            | 0.09            |
| 1,4-Phenylenediamine                | 105-50-3            | 0.00                 | 0.00                 | 0.00                 | 0.01                 | 0.01                  | 0.01                 | 0.01                  | 0.00                  | 0.00                  | 0.00                  | 0.01                  | 0.01             | 0.01            | 0.00            |
| 1,5-Cyclooctadiene                  | 111-78-4            | 0.01                 | 0.01                 | 0.01                 | 0.02                 | 0.02                  | 0.03                 | 0.01                  | 0.00                  | 0.00                  | 0.00                  | 0.02                  | 0.01             | 0.03            | 0.01            |
| 2-Butanone                          | 78-93-3             | 0.32                 | 0.38                 | 0.06                 | 0.51                 | 0.20                  | 0.17                 | 0.39                  | 0.21                  | 0.08                  | 0.99                  | 0.37                  | 0.33             | 0.99            | 0.25            |
| 2-Butene                            | 00126-99-8          | T                    | 0.10                 | T                    | 0.20                 | T                     | T                    | 0.10                  | T                     | T                     | 0.60                  | T                     | 0.09             | 0.60            | 0.17            |
| 2-Chloro-1,3-Butadiene              | 00126-99-8          | T                    | T                    | T                    | T                    | T                     | T                    | 1.22                  | T                     | T                     | T                     | T                     | 0.11             | 1.22            | 0.35            |
| 2-Chloro-1,3-Butadiene dimer        | 1341-24-8           | 0.00                 | 0.04                 | 0.00                 | 0.00                 | 0.00                  | 0.00                 | 0.24                  | 0.00                  | 0.00                  | 0.00                  | 0.00                  | 0.03             | 0.24            | 0.07            |
| 2-Chloroacetophenone                | 91-58-7             | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.00                  | 0.01                 | 0.00                  | 0.00                  | 0.00                  | 0.00                  | 0.00                  | 0.00             | 0.01            | 0.00            |
| 2-Chloronaphthalene                 | 95-57-8             | 0.00                 | 0.00                 | 0.00                 | 0.01                 | 0.01                  | 0.01                 | 0.00                  | 0.00                  | 0.00                  | 0.00                  | 0.01                  | 0.00             | 0.01            | 0.00            |
| 2-Chlorophenol                      | 00123-05-7          | T                    | T                    | T                    | T                    | T                     | T                    | 0.26                  | T                     | T                     | T                     | T                     | 0.02             | 0.26            | 0.08            |
| 2-Ethylhexanal                      | 98-01-1             | 0.01                 | 0.01                 | 0.00                 | 0.01                 | 0.01                  | 0.02                 | 0.01                  | 0.00                  | 0.00                  | 0.00                  | 0.01                  | 0.01             | 0.02            | 0.01            |
| 2-Furaldehyde                       | 14688-13-6          | T                    | T                    | T                    | T                    | T                     | T                    | 0.01                  | T                     | T                     | 0.05                  | T                     | 0.00             | 0.05            | 0.01            |
| 2-Heptene                           | 591-78-6            | 0.03                 | 0.04                 | 0.02                 | 0.08                 | 0.02                  | 0.02                 | 0.06                  | 0.06                  | 0.03                  | 0.35                  | 0.03                  | 0.07             | 0.35            | 0.09            |
| 2-Hexanone                          | 00563-46-2          | 0.04                 | 0.00                 | 0.00                 | 0.00                 | 0.01                  | 0.00                 | 0.00                  | 0.00                  | 0.00                  | 0.02                  | 0.01                  | 0.01             | 0.04            | 0.01            |

TABLE 4-7b  
AUTOCLAVE ORGANIC SPECIFICATION FACTORS

| Compound                     | CAS #             | Cmpd #4<br>% of TOT | Cmpd #5<br>% of TOT | Cmpd #6<br>% of TOT | Cmpd #6<br>% of TOT | Cmpd #7<br>% of TOT | Cmpd #9<br>% of TOT | Cmpd #11<br>% of TOT | Cmpd #15<br>% of TOT | Cmpd #18<br>% of TOT | Cmpd #21<br>% of TOT | Cmpd #22<br>% of TOT | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|------------------------------|-------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| 2-Methyl-2-butene            | 00513-35-9        | < 0.34              | < 6.38              | < 0.15              | < 0.00              | < 0.00              | < 0.35              | < 0.06               | < 0.94               | < 0.00               | < 1.15               | < 2.59               | < 1.09           | < 6.38          | < 1.83          |
| 2-Methyl-2-pentene           | 00625-27-4        | < 0.02              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.02          | < 0.01          |
| 2-Methyl-2-Propanol          | 00075-65-0        | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 1.92               | < 0.01               | < 0.17           | < 1.92          | < 0.55          |
| 2-Methylbutanal              | 00096-17-3        | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.05          | < 0.01          |
| 2-Methylfuran                | 00534-22-5        | < 0.27              | < 0.52              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.07           | < 0.52          | < 0.16          |
| 2-Methylheptane              | 00592-27-8        | < 0.57              | < 0.56              | < 0.15              | < 0.77              | < 0.08              | < 0.15              | < 0.42               | < 1.04               | < 0.00               | < 0.25               | < 0.20               | < 0.38           | < 1.04          | < 0.31          |
| 2-Methylhexane               | 00591-76-4        | < 0.21              | < 0.29              | < 0.09              | < 0.54              | < 0.02              | < 0.09              | < 0.25               | < 0.48               | < 0.00               | < 0.15               | < 0.12               | < 0.20           | < 0.54          | < 0.17          |
| 2-Methylnaphthalene          | 91-57-6           | < 0.02              | < 0.19              | < 0.02              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.16               | < 0.04           | < 0.19          | < 0.06          |
| 2-Methylpentane              | 00107-83-5        | < 0.09              | < 0.23              | < 0.15              | < 1.28              | < 0.12              | < 0.02              | < 0.11               | < 0.09               | < 0.02               | < 0.08               | < 0.48               | < 0.24           | < 1.28          | < 0.35          |
| 2-Methylphenol               | 95-48-7           | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.01          | < 0.00          |
| 2-Methylpropanal             | 00078-84-2        | < 0.00              | < 0.10              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.10          | < 0.03          |
| 2-Nitroaniline               | 88-74-4           | < 0.01              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 2-Nitrophenol                | 88-75-5           | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.02              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.02          | < 0.00          |
| 2-Phenyl-2-Propanol          |                   | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.32              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.10           | < 0.73          | < 0.22          |
| 2,2-Dimethylbutane           | 00075-83-2        | < 0.10              | < 0.01              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.02               | < 0.02               | < 0.01               | < 0.01               | < 0.01               | < 0.02           | < 0.10          | < 0.03          |
| 2,2-Dimethylpropane          | 00463-82-1        | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 2,2'-oxybis(1-Chloropropane) | 108-60-1          | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.01          | < 0.00          |
| 2,3-Dimethylpentane          | 00565-59-3        | < 0.06              | < 0.08              | < 0.03              | < 0.19              | < 0.00              | < 0.03              | < 0.09               | < 0.12               | < 0.00               | < 0.08               | < 0.05               | < 0.07           | < 0.19          | < 0.05          |
| 2,3,4-Trimethylpentane       | 00565-75-3        | < 0.13              | < 0.14              | < 0.01              | < 0.07              | < 0.00              | < 0.00              | < 0.04               | < 0.12               | < 0.01               | < 0.02               | < 0.02               | < 0.05           | < 0.14          | < 0.05          |
| 2,4-Dichlorophenol           | 120-83-2          | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.01          | < 0.00          |
| 2,4-Dimethylhexane           | 00589-43-5        | < 0.32              | < 0.24              | < 0.05              | < 0.20              | < 0.00              | < 0.04              | < 0.50               | < 0.27               | < 0.01               | < 0.06               | < 0.08               | < 0.16           | < 0.50          | < 0.15          |
| 2,4-Dimethylphenol           | 105-67-9          | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.01          | < 0.00          |
| 2,4-Dinitrophenol            | 105-67-9          | < 0.01              | < 0.01              | < 0.01              | < 0.02              | < 0.03              | < 0.03              | < 0.03               | < 0.01               | < 0.00               | < 0.01               | < 0.03               | < 0.02           | < 0.03          | < 0.01          |
| 2,4-Dinitrotoluene           | 121-14-2          | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.01          | < 0.00          |
| 2,4,5-Trichlorophenol        | 95-95-4           | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 2,4,6-Trichlorophenol        | 88-06-2           | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 2,6-Dinitrotoluene           | 606-20-2          | < 0.01              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.02              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.02          | < 0.00          |
| 3-Furaldehyde                | 498-60-2          | < 0.01              | < 0.01              | < 0.00              | < 0.02              | < 0.02              | < 0.02              | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.02               | < 0.01           | < 0.02          | < 0.01          |
| 3-Heptanone                  | 00106-35-4        | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.03               | < 0.01               | < 0.00           | < 0.03          | < 0.01          |
| 3-Heptene                    | 14686-14-7        | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.05               | < 0.01               | < 0.00           | < 0.05          | < 0.01          |
| 3-Methyl styrene             | 100-80-1          | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 3-Methylbutanal              | 00590-86-3        | < 0.16              | < 0.15              | < 0.10              | < 0.15              | < 0.02              | < 0.00              | < 0.10               | < 0.01               | < 0.01               | < 0.95               | < 0.02               | < 0.12           | < 0.95          | < 0.27          |
| 3-Methylheptane              | 00589-81-1        | < 0.05              | < 0.15              | < 0.08              | < 0.15              | < 0.02              | < 0.00              | < 0.01               | < 0.01               | < 0.01               | < 0.01               | < 0.02               | < 0.30           | < 1.15          | < 0.44          |
| 3-Methylhexane               | 00589-34-4        | < 0.05              | < 0.21              | < 0.02              | < 0.18              | < 0.02              | < 0.05              | < 2.81               | < 0.12               | < 0.00               | < 0.03               | < 0.04               | < 0.32           | < 2.81          | < 0.79          |
| 3-Methylpentane              | 00096-14-0        | < 0.10              | < 0.05              | < 0.04              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.01               | < 0.02           | < 0.10          | < 0.03          |
| 3-Methylstyrene              | 100-80-1          | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 3-Nitroaniline               | 99-09-2           | < 0.01              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 3,3'-Dichlorobenzidine       | 91-94-1           | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.01          | < 0.00          |
| 3,3'-Dimethoxybenzidine      | 119-90-4          | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| 3,3'-Dimethylbenzidine       | 119-93-7          | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| 3,4-Methylphenol             | 108-39-4/106-44-5 | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.01          | < 0.00          |
| 4-Aminobiphenyl              | 92-67-1           | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.01          | < 0.00          |
| 4-Bromophenyl-phenylether    | 101-55-3          | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.02               | < 0.01           | < 0.02          | < 0.01          |
| 4-Chloro-3-methylphenol      | 59-50-7           | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.01          | < 0.00          |
| 4-Chloroaniline              | 106-47-8          | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.01          | < 0.00          |

TABLE 4-7b  
AUTOCLAVE ORGANIC SPECIFICATION FACTORS

| Compound                   | CAS #      | Cmpd. #4<br>% of TOT | Cmpd. #5<br>% of TOT | Cmpd. #6<br>% of TOT | Cmpd. #8<br>% of TOT | Cmpd. #9*<br>% of TOT | Cmpd. #9<br>% of TOT | Cmpd. #11<br>% of TOT | Cmpd. #15<br>% of TOT | Cmpd. #16<br>% of TOT | Cmpd. #21<br>% of TOT | Cmpd. #22<br>% of TOT | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|----------------------------|------------|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------|-----------------|-----------------|
| 4-Chlorophenyl-phenylether | 70005-72-3 | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01                | < 0.01               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.01                | < 0.00           | < 0.01          | < 0.00          |
| 4-Chlorostyrene            | 1073-67-2  | < 0.00               | < 0.01               | < 0.00               | < 0.01               | < 0.01                | < 0.01               | < 0.05                | < 0.10                | < 0.00                | < 0.00                | < 0.01                | < 0.02           | < 0.10          | < 0.03          |
| 4-Methyl styrene           | 622-97-9   | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00                | < 0.00               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00           | < 0.00          | < 0.00          |
| 4-Methyl-1-pentene         | 00691-37-2 | < 0.02               | < 0.00               | < 0.04               | < 0.00               | < 0.01                | < 0.00               | < 0.00                | < 0.00                | < 0.00                | < 0.01                | < 0.16                | < 0.02           | < 0.16          | < 0.05          |
| 4-Methyl-2-pentanone       | 108-10-1   | 28.55                | < 0.12               | 8.80                 | < 0.08               | 1.01                  | < 0.10               | < 0.06                | < 0.06                | 2.73                  | < 0.02                | 27.22                 | < 6.25           | 28.55           | < 10.50         |
| 4-Methylstyrene            | 622-97-9   | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01                | < 0.01               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.01                | < 0.00           | < 0.01          | < 0.00          |
| 4-Nitroaniline             | 100-01-6   | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01                | < 0.01               | < 0.01                | < 0.00                | < 0.00                | < 0.00                | < 0.01                | < 0.01           | < 0.01          | < 0.00          |
| 4-Nitrophenyl              | 92-93-3    | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01                | < 0.01               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.01                | < 0.00           | < 0.01          | < 0.00          |
| 4-Nitrophenol              | 100-02-7   | < 0.01               | < 0.01               | < 0.00               | < 0.01               | < 0.02                | < 0.02               | < 0.01                | < 0.01                | < 0.00                | < 0.00                | < 0.01                | < 0.01           | < 0.02          | < 0.01          |
| 4,4'-Methylenedianiline    | 101-77-9   | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01                | < 0.01               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.01                | < 0.00           | < 0.01          | < 0.00          |
| 4,6-Dinitro-2-methylphenol | 534-52-1   | < 0.01               | < 0.01               | < 0.00               | < 0.01               | < 0.01                | < 0.02               | < 0.02                | < 0.01                | < 0.00                | < 0.00                | < 0.03                | < 0.01           | < 0.03          | < 0.01          |
| Acenaphthene               | 83-32-9    | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00                | < 0.01               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.01                | < 0.00           | < 0.01          | < 0.00          |
| Acenaphthylene             | 208-96-8   | < 0.01               | < 0.00               | < 0.04               | < 0.01               | < 0.00                | < 0.00               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.04                | < 0.01           | < 0.04          | < 0.02          |
| Acetaldehyde               | 00075-07-0 | < 0.01               | < 0.33               | < 0.04               | < 0.04               | < 0.04                | < 0.04               | < 0.03                | < 0.03                | < 0.03                | < 0.06                | < 0.06                | < 0.04           | < 0.33          | < 0.09          |
| Acetone                    | 67-64-1    | 3.74                 | 16.09                | < 0.40               | 1.61                 | 1.18                  | 1.66                 | 6.53                  | 1.51                  | 0.15                  | 28.38                 | 1.46                  | 5.70             | 28.38           | 8.39            |
| Acetonitrile               | 01722-09-4 | < 0.05               | < 0.29               | < 0.03               | < 0.16               | < 0.02                | < 0.02               | < 0.11                | < 0.11                | < 0.05                | < 0.04                | < 0.05                | < 0.09           | < 0.29          | < 0.08          |
| Acetophenone               | 00098-86-2 | 0.87                 | < 0.06               | < 0.17               | < 0.02               | 10.91                 | 10.77                | < 0.04                | < 0.05                | < 0.02                | < 0.01                | < 0.86                | < 2.43           | 10.91           | < 4.06          |
| Acetophenone               | 98-86-2    | < 0.00               | < 0.04               | < 0.00               | < 0.05               | < 0.00                | < 0.00               | < 0.08                | < 0.00                | < 0.00                | < 0.03                | < 0.00                | < 0.02           | 64.06           | 23.32           |
| Acetylene                  | 00074-86-2 | < 0.05               | < 0.05               | < 0.03               | < 0.16               | < 0.03                | < 0.02               | < 0.11                | < 0.11                | < 0.05                | < 0.23                | < 0.05                | < 0.08           | < 0.23          | < 0.06          |
| Acrolein                   | 00107-02-8 | < 0.06               | < 0.08               | < 0.03               | < 0.17               | < 0.02                | < 0.03               | < 0.11                | < 0.11                | < 0.05                | < 0.04                | < 0.06                | < 0.07           | < 0.17          | < 0.05          |
| Acrylonitrile              | 107-13-1   | < 0.05               | < 0.07               | < 0.03               | < 0.17               | < 0.02                | < 0.03               | < 0.11                | < 0.11                | < 0.05                | < 0.04                | < 0.05                | < 0.07           | < 0.17          | < 0.04          |
| Allyl chloride             | 107-05-1   | < 0.01               | < 0.01               | < 0.28               | < 0.01               | 1.15                  | 1.15                 | < 0.01                | < 0.01                | < 0.01                | < 0.04                | < 0.05                | < 0.07           | < 0.17          | < 0.04          |
| Alpha-Methoxy Cumene       |            | 1.06                 | < 0.01               | < 0.98               | < 0.01               | 4.48                  | 7.52                 | < 0.01                | < 0.01                | < 0.01                | < 0.04                | < 0.05                | < 0.23           | 1.15            | < 0.44          |
| Alpha-Methyl Styrene       |            | < 0.01               | < 0.01               | < 0.03               | < 0.13               | < 0.22                | < 0.02               | < 0.62                | < 0.01                | < 0.03                | < 0.01                | < 0.13                | < 1.95           | 7.52            | < 2.43          |
| Alpha-Pinene               | 07785-70-8 | < 0.01               | < 0.01               | < 0.03               | < 0.13               | < 0.22                | < 0.02               | < 0.62                | < 0.01                | < 0.03                | < 0.01                | < 0.13                | < 1.95           | 7.52            | < 2.43          |
| Aniline                    | 62-53-3    | 1.86                 | 1.62                 | 3.12                 | 0.13                 | 0.22                  | 0.02                 | 0.62                  | 0.01                  | 0.08                  | 0.00                  | 3.48                  | 1.01             | 3.48            | 1.25            |
| Anthracene                 | 120-12-7   | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00                | < 0.00               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00           | < 0.00          | < 0.00          |
| a-Pinene                   | 07785-70-8 | < 0.01               | < 0.10               | < 0.06               | < 0.08               | < 0.02                | < 0.00               | < 0.00                | < 0.07                | < 0.03                | < 0.02                | < 0.28                | < 0.06           | < 0.28          | < 0.08          |
| a,a,a-Trichlorotoluene     | 98-07-7    | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01                | < 0.01               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.01                | < 0.00           | < 0.01          | < 0.00          |
| Benzaldehyde               | 00100-52-7 | < 0.01               | < 0.01               | < 0.01               | < 0.01               | < 0.01                | < 0.01               | < 0.01                | < 0.01                | < 0.01                | < 0.01                | < 0.16                | < 0.01           | < 0.16          | < 0.04          |
| Benzaldehyde               | 100-52-7   | < 0.00               | < 0.05               | < 0.00               | < 0.01               | < 0.01                | < 0.02               | < 0.01                | < 0.03                | < 0.00                | < 0.01                | < 0.02                | < 0.02           | < 0.05          | < 0.01          |
| Benzene                    | 71-43-2    | 2.07                 | 0.97                 | 1.10                 | 3.34                 | 0.36                  | 0.18                 | 0.47                  | 1.04                  | 0.02                  | 0.27                  | 4.82                  | 1.33             | 4.82            | 1.44            |
| Benzidine                  | 92-87-5    | < 0.00               | < 0.07               | < 0.00               | < 0.01               | < 0.00                | < 0.00               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.01           | < 0.07          | < 0.02          |
| Benzoic acid               | 65-85-0    | 0.03                 | 0.01                 | < 0.00               | < 0.02               | 0.13                  | 0.20                 | < 0.03                | < 0.04                | < 0.00                | < 0.00                | < 0.64                | < 0.10           | < 0.64          | < 0.18          |
| Benzonitrile               | 100-47-0   | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00                | < 0.01               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00           | < 0.01          | < 0.00          |
| Benzo(a)anthracene         | 56-55-3    | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00                | < 0.00               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00           | < 0.01          | < 0.00          |
| Benzo(a)pyrene             | 50-32-8    | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00                | < 0.00               | < 0.01                | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00           | < 0.01          | < 0.00          |
| Benzo(b)fluoranthene       | 205-99-2   | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00                | < 0.00               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00           | < 0.00          | < 0.00          |
| Benzo(g,h,i)perylene       | 191-24-2   | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00                | < 0.00               | < 0.01                | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00           | < 0.01          | < 0.00          |
| Benzo(k)fluoranthene       | 207-08-9   | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00                | < 0.00               | < 0.01                | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00           | < 0.01          | < 0.00          |
| Benzyl alcohol             | 100-51-6   | 0.01                 | < 0.00               | < 0.00               | < 0.01               | < 0.01                | < 0.02               | < 0.01                | < 0.00                | < 0.00                | < 0.00                | < 0.02                | < 0.01           | < 0.02          | < 0.01          |
| Benzyl Chloride            | 00100-44-7 | < 0.05               | < 0.07               | < 0.03               | < 0.16               | < 0.02                | < 0.02               | < 0.11                | < 0.11                | < 0.05                | < 0.04                | < 0.05                | < 0.07           | < 0.16          | < 0.04          |
| Benzyl Chloride            | 100-44-7   | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00                | < 0.01               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.00           | < 0.01          | < 0.00          |
| Biphenyl                   | 92-52-4    | 0.01                 | 0.05                 | 0.05                 | 0.01                 | 0.01                  | 0.01                 | 0.00                  | 0.00                  | 0.00                  | 0.00                  | 0.17                  | 0.03             | 0.17            | < 0.05          |
| bis(2-Chloroethoxy)methane | 111-91-1   | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01                | < 0.01               | < 0.00                | < 0.00                | < 0.00                | < 0.00                | < 0.01                | < 0.00           | < 0.01          | < 0.00          |

TABLE 4-7b  
AUTOCLAVE ORGANIC SPECIFICATION FACTORS

| Compound                   | CAS #      | Cmpd #4<br>% of TOT | Cmpd #5<br>% of TOT | Cmpd #6<br>% of TOT | Cmpd #8<br>% of TOT | Cmpd #9<br>% of TOT | Cmpd #11<br>% of TOT | Cmpd #15<br>% of TOT | Cmpd #16<br>% of TOT | Cmpd #21<br>% of TOT | Cmpd #22<br>% of TOT | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|----------------------------|------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| Bis(2-Chloroethyl)ether    | 111-44-4   | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| Bis(2-Ethylhexyl)phthalate | 117-81-7   | 0.08                | 0.06                | 0.29                | 0.06                | 0.01                | 0.21                 | 0.20                 | 0.00                 | 0.11                 | 0.07                 | 0.10             | 0.29            | 0.09            |
| b-Pinene                   | 18172-67-3 | < 0.07              | 0.07                | < 0.04              | < 0.02              | < 0.01              | < 0.02               | 0.06                 | < 0.01               | 0.02                 | 0.15                 | < 0.05           | 0.15            | < 0.04          |
| Bromodichloromethane       | 75-27-4    | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.06               | < 0.06               | < 0.03               | < 0.02               | < 0.03               | < 0.03           | < 0.08          | < 0.02          |
| Bromoforn                  | 75-25-2    | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.06               | < 0.06               | < 0.03               | < 0.02               | < 0.03               | < 0.03           | < 0.08          | < 0.02          |
| Bromomethane               | 74-83-9    | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.06               | < 0.06               | < 0.03               | < 0.02               | < 0.03               | < 0.03           | < 0.08          | < 0.02          |
| Butanal                    | 00123-72-8 | < 0.16              | < 0.16              | < 0.68              | < 0.68              | < 0.06              | < 0.06               | < 0.16               | < 0.16               | < 0.05               | < 0.05               | < 0.08           | < 0.68          | < 0.20          |
| Butene Isomer              | 25167-67-3 | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| Butyl Acrylate             | 00141-32-2 | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| Butyl Propionate           | 00590-01-2 | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| Butyl Thiocyanate          | 85-68-7    | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| Butylbenzylphthalate       | 00123-72-8 | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| Butyraldehyde              | 00123-72-8 | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| C10H14 Alkyl Benzene       |            | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| C10H18 Cyclic Alkene       |            | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| C10H20 Alkene              |            | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| C10H22 Alkene              |            | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| C11H22 Cyclic Alkene       |            | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| C11H24 Alkene              |            | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| C12H24 Alkene              |            | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| C6H12 Alkene               |            | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| C7H16 Alkene               |            | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| C9H12 Cyclic Alkene        |            | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| Camphene                   | 79-92-5    | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06              | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06               | < 0.06           | < 0.06          | < 0.06          |
| Carbon disulfide           | 75-15-0    | < 0.08              | 0.39                | < 0.07              | 57.47               | 0.48                | 25.18                | 28.88                | 50.83                | 0.05                 | 0.78                 | 14.94            | 57.47           | 21.10           |
| Carbon tetrachloride       | 56-23-5    | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| Carbonyl Sulfide           | 00463-58-1 | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| Chlorobenzene              | 108-90-7   | 0.03                | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| Chlorodibromomethane       | 00124-48-1 | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| Chloroethane               | 75-003     | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| Chloroform                 | 67-66-3    | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| Chloromethane              | 74-87-3    | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| Chloroprene                | 126-99-8   | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| Chrysene                   | 218-01-9   | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| cis-1,2-Dichloroethene     | 156-59-2   | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| cis-1,3-Dichloropropene    | 10061-01-5 | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| cis-2-Butene               | 00590-18-1 | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| cis-2-Hexene               | 07688-21-3 | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| cis-2-Pentene              | 00627-20-3 | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | 11.15                | 0.03                 | 0.03                 | 0.03                 | 1.04             | 11.15           | 3.20            |
| Cumene                     | 98-82-8    | 0.49                | < 0.57              | 0.10                | 0.45                | 0.12                | 1.47                 | 0.14                 | 0.00                 | 11.79                | < 0.43               | 1.44             | 11.79           | 3.29            |
| Cyclohexane                | 110-92-7   | 0.01                | 0.01                | 0.01                | 0.01                | 0.11                | 0.00                 | 0.01                 | 0.00                 | 0.01                 | 0.03                 | 0.03             | 0.11            | 0.04            |
| Cyclohexanone              | 108-94-1   | 6.63                | 1.99                | 10.48               | 0.18                | 0.03                | 0.19                 | 0.22                 | 0.00                 | 0.16                 | 0.14                 | 0.18             | 0.42            | 0.13            |
| Cyclohexene                | 110-83-8   | 0.48                | 0.58                | 0.24                | 0.00                | 0.00                | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.12             | 0.58            | 0.21            |

TABLE 4-7b  
AUTOCALVE ORGANIC SPECIFICATION FACTORS

| Compound                          | CAS #               | Cmpd #4<br>% of TOT | Cmpd #5<br>% of TOT | Cmpd #6<br>% of TOT | Cmpd #8<br>% of TOT | Cmpd #9<br>% of TOT | Cmpd #11<br>% of TOT | Cmpd #15<br>% of TOT | Cmpd #16<br>% of TOT | Cmpd #21<br>% of TOT | Cmpd #22<br>% of TOT | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|-----------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| Cyclohexylamine                   | 108-91-8            | < 21.75             | 11.95               | 51.35               | 1.44                | 0.06                | 0.03                 | 0.11                 | 0.14                 | 0.02                 | < 0.01               | < 7.90           | 51.35           | < 15.28         |
| Cyclooctadiene                    | 0287-92-3/00079-29- | < 0.26              | 0.16                | < 0.04              | < 0.05              | < 0.04              | < 0.09               | 0.58                 | 0.04                 | < 0.01               | < 0.11               | < 0.00           | 0.05            | < 0.13          |
| Cyclopentane + 2,3-Dimethylbutane | 00142-29-0          | 0.17                | 0.31                | < 0.01              | 0.11                | 0.01                | < 0.00               | 0.01                 | 0.14                 | 11.01                | < 0.04               | < 1.13           | 11.01           | < 3.13          |
| Cyclopentene                      | 132-64-9            | 0.00                | 0.01                | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.31            | < 0.09          |
| Dibenz(a,h)anthracene             | 53-90-3             | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.01            | < 0.00          |
| Dibromochloromethane              | 124-48-1            | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.01            | < 0.00          |
| Dichlorodifluoromethane           | 00075-71-8          | < 0.03              | 0.04                | < 0.01              | 0.08                | 0.01                | < 0.01               | 0.05                 | 0.06                 | 0.02                 | < 0.03               | < 0.03           | 0.08            | < 0.02          |
| Diethylphthalate                  | 84-66-2             | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.00            | < 0.00          |
| Diisopropylbenzene Isomer         | 27195-67-1          | < 0.16              | < 0.15              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.31               | < 0.03           | 0.31            | < 0.09          |
| Dimethyl Cyclohexane              | 60-11-7             | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.16            | < 0.06          |
| Dimethyl Cyclohexane Isomer       | 131-11-3            | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.01            | < 0.00          |
| Dimethylaminoazobenzene           | 84-74-2             | < 0.00              | 0.00                | < 0.00              | < 0.00              | 0.01                | 0.01                 | 0.00                 | 0.09                 | 0.01                 | 0.14                 | < 0.02           | 0.14            | < 0.05          |
| Di-n-butylphthalate               | 117-84-0            | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.00            | < 0.00          |
| Di-n-octylphthalate               | 122-39-4            | 0.11                | 0.06                | 0.94                | 0.01                | 0.60                | 0.99                 | 0.32                 | 0.01                 | 0.00                 | 0.22                 | 0.30             | 0.99            | < 0.36          |
| Diphenylamine                     | 05989-27-5          | < 0.03              | 0.91                | 0.08                | < 0.27              | 0.04                | < 0.65               | 3.88                 | 0.12                 | 0.02                 | < 0.39               | < 0.59           | 3.88            | < 1.08          |
| d-Limonene                        | 00106-89-8          | < 0.05              | 0.07                | < 0.03              | 0.53                | 0.02                | < 0.62               | 0.11                 | 0.11                 | 0.04                 | < 0.05               | < 0.10           | 0.53            | < 0.14          |
| Epichlorohydrin                   | 00074-84-0          | < 0.01              | 0.03                | < 0.00              | < 0.00              | 0.04                | 0.06                 | < 0.00               | < 0.00               | 0.07                 | < 0.00               | < 0.02           | 0.07            | < 0.02          |
| Ethane                            | 25168-07-4          | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.12            | < 0.03          |
| Ethenyl Cyclohexene               | 140-88-5            | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.00            | < 0.00          |
| Ethyl acrylate                    | 00107-00-6          | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00           | 0.01            | < 0.00          |
| Ethylacetylene                    | 100-41-4            | 0.85                | 0.32                | 0.35                | 0.58                | 0.27                | 0.37                 | 0.02                 | 1.75                 | 0.17                 | 0.55                 | < 0.48           | 1.75            | < 0.47          |
| Ethylbenzene                      | 00074-85-1          | < 0.03              | 0.06                | < 0.01              | < 0.00              | 0.01                | < 0.00               | < 0.08               | 0.01                 | < 0.01               | < 0.02               | < 0.02           | 0.08            | < 0.02          |
| Ethylene                          | 106-93-4            | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.00            | < 0.00          |
| Ethylene dibromide                | 206-44-0            | 0.00                | 0.00                | 0.00                | 0.00                | 0.00                | 0.01                 | 0.00                 | 0.00                 | < 0.00               | 0.14                 | 0.02             | 0.14            | < 0.04          |
| Fluoranthene                      | 86-73-7             | 0.01                | 0.01                | < 0.02              | 0.00                | < 0.00              | < 0.00               | < 0.00               | 0.00                 | < 0.00               | 0.01                 | 0.01             | 0.02            | < 0.01          |
| Fluorene                          | 142-82-5            | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.00            | < 0.00          |
| Heptane                           | 118-74-1            | < 0.00              | < 0.00              | < 0.00              | < 0.01              | 0.01                | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.02               | < 0.01           | 0.02            | < 0.00          |
| Hexachlorobenzene                 | 00087-68-3          | < 0.05              | 0.07                | 0.03                | 0.16                | 0.03                | 0.06                 | 0.04                 | 0.11                 | 0.04                 | 0.05                 | 0.06             | 0.16            | < 0.04          |
| Hexachlorobutadiene               | 87-68-3             | < 0.00              | < 0.00              | < 0.00              | < 0.01              | 0.03                | 0.05                 | 0.01                 | < 0.00               | < 0.00               | 0.01                 | 0.01             | 0.05            | < 0.02          |
| Hexachlorobutadiene               | 77-47-4             | < 0.00              | < 0.01              | < 0.00              | < 0.01              | 0.01                | 0.02                 | 0.01                 | < 0.00               | < 0.00               | < 0.01               | 0.01             | 0.02            | < 0.01          |
| Hexachlorocyclopentadiene         | 67-72-1             | < 0.00              | < 0.01              | < 0.00              | < 0.01              | 0.01                | 0.02                 | 0.02                 | < 0.00               | < 0.00               | < 0.01               | 0.02             | 0.10            | < 0.03          |
| Hexachloroethane                  | 123-31-9            | < 0.00              | < 0.00              | < 0.00              | < 0.01              | 0.01                | 0.01                 | 0.01                 | < 0.00               | < 0.00               | < 0.01               | < 0.00           | 0.01            | < 0.00          |
| Hydroquinone                      | 193-39-5            | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.01            | < 0.00          |
| Indeno(1,2,3-cd)pyrene            | 74-88-4             | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | 0.00            | < 0.00          |
| Iodomethane                       | 00078-84-2          | < 0.11              | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.03               | < 0.03               | < 0.02           | 0.11            | < 0.03          |
| Isobutanol                        | 00075-28-5          | < 0.00              | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.03               | < 0.03               | < 0.02           | 0.11            | < 0.03          |
| Isobutane                         | 00539-90-2          | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.12               | < 0.12               | < 0.01           | 0.12            | < 0.03          |
| Isobutyl Butyrate                 | 0115-11-7/00106-98- | < 0.06              | 0.77                | 0.05                | 1.15                | 0.31                | 0.03                 | 0.28                 | 1.89                 | 2.17                 | 5.16                 | < 1.09           | 5.16            | < 1.48          |
| Isobutyl Thiocyanate              | 540-84-1            | < 0.09              | 0.13                | 0.03                | 0.15                | 0.02                | < 0.03               | 2.08                 | 0.21                 | 0.20                 | < 0.07               | < 0.27           | 0.02            | < 0.00          |
| Isobutylene + 1-Butene            | 26952-21-6          | 0.48                | 0.04                | 4.56                | < 0.11              | 0.89                | 1.35                 | 26.71                | 15.83                | 5.79                 | 2.23                 | < 6.12           | 26.71           | < 7.99          |
| Isobutylisocyanate                |                     |                     |                     |                     |                     |                     |                      |                      |                      |                      |                      |                  |                 |                 |
| Isocetane                         |                     |                     |                     |                     |                     |                     |                      |                      |                      |                      |                      |                  |                 |                 |
| Isocetanol                        |                     |                     |                     |                     |                     |                     |                      |                      |                      |                      |                      |                  |                 |                 |

TABLE 4-7b  
AUTOCLAVE ORGANIC SPECIATION FACTORS

| Compound                    | CAS #               | Cmpd #4<br>% of TOT | Cmpd #5<br>% of TOT | Cmpd #6<br>% of TOT | Cmpd #8<br>% of TOT | Cmpd #9*<br>% of TOT | Cmpd #11<br>% of TOT | Cmpd #15<br>% of TOT | Cmpd #16<br>% of TOT | Cmpd #21<br>% of TOT | Cmpd #22<br>% of TOT | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|-----------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| Isopentane                  | 00078-78-4          | < 1.50              | 6.11                | 0.55                | 1.75                | 0.43                 | 0.29                 | 1.56                 | 0.21                 | 0.00                 | 1.24                 | 1.31             | 6.11            | 1.62            |
| Isophorone                  | 78-59-1             | 0.04                | 0.04                | 0.00                | 0.00                | < 0.00               | < 0.00               | < 0.00               | 0.00                 | < 0.00               | 0.15                 | 0.02             | 0.15            | 0.04            |
| Isoprene                    | 00078-79-5          | 0.00                | 0.01                | 0.00                | 0.00                | < 0.00               | < 0.00               | < 0.00               | 0.00                 | < 0.00               | < 0.00               | 0.00             | 0.01            | 0.00            |
| m- & p-Ethyl Toluene        | 0620-14-4/00622-96- | 0.39                | T                   | 0.10                | T                   | T                    | 0.35                 | T                    | T                    | T                    | T                    | 0.08             | 0.39            | 0.14            |
| Methacrolein                | 00078-85-3          | < T                 | < 0.10              | < T                 | < T                 | < T                  | < T                  | < T                  | < T                  | < T                  | < T                  | 0.01             | 0.10            | 0.03            |
| Methyl Cyclohexane          | 00108-87-2          | 0.31                | < 0.45              | < 0.11              | 0.74                | < T                  | < 0.00               | 0.58                 | T                    | 0.17                 | T                    | 0.22             | 0.74            | 0.25            |
| Methyl Isothiocyanate       | 00556-61-6          | < T                 | < T                 | < T                 | 0.14                | < T                  | < T                  | < T                  | < T                  | < T                  | < T                  | 0.01             | 0.14            | 0.04            |
| Methyl methacrylate         | 80-62-6             | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | 0.00             | < 0.00          | < 0.00          |
| Methylacetylene             | 00074-99-7          | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | 0.72                 | < 0.00               | < 0.00               | < 0.00               | < 0.00               | 0.07             | 0.72            | 0.21            |
| Methylcyclohexane           | 00108-87-2          | 0.11                | 0.04                | 0.03                | 0.10                | < 0.01               | 0.02                 | 0.01                 | 0.02                 | < 0.00               | 0.07                 | 0.04             | 0.11            | 0.04            |
| Methylcyclopentane          | 00096-37-7          | 0.06                | 0.17                | 0.03                | 0.14                | 0.02                 | 0.12                 | 0.19                 | T                    | 0.03                 | 0.03                 | 0.08             | 0.19            | 0.06            |
| Methylene bis-chloroaniline | 101-14-4            | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01               | < 0.00               | < 0.01               | < 0.00               | < 0.00               | < 0.01               | 0.01             | 0.02            | < 0.00          |
| Methylene chloride          | 75-09-2             | 1.73                | 13.24               | 0.27                | 0.46                | 0.18                 | 0.15                 | 2.32                 | 0.02                 | 2.49                 | 5.10                 | 2.41             | 13.24           | 3.72            |
| Methylheptene isomer        |                     | < T                 | < T                 | < T                 | < T                 | < T                  | < T                  | < T                  | < T                  | < 0.03               | < T                  | 0.00             | 0.03            | 0.01            |
| m-Ethyltoluene              | 00620-14-4          | 0.30                | 0.26                | 0.20                | 0.14                | 0.08                 | 1.22                 | 0.10                 | 0.04                 | 0.02                 | 0.31                 | 0.25             | 1.22            | 0.32            |
| m-p-Xylene                  | 108-38-3/106-42-3   | 7.96                | 11.16               | 1.17                | 2.91                | 1.05                 | 0.08                 | 6.37                 | 0.07                 | 0.63                 | 2.00                 | 3.15             | 11.16           | 3.52            |
| Naphthalene                 | 00091-20-3          | < T                 | < T                 | < 0.11              | < T                 | < T                  | 0.13                 | < T                  | < T                  | < T                  | < 0.16               | 0.04             | 0.16            | 0.06            |
| Naphthalene                 | 91-20-3             | 0.05                | 0.05                | 0.12                | 0.04                | 0.01                 | 0.02                 | 0.06                 | 0.00                 | 0.00                 | 0.14                 | 0.05             | 0.14            | 0.04            |
| n-Butane                    | 00106-97-8          | 0.17                | 0.12                | 0.10                | 0.13                | < 0.01               | 0.14                 | 0.05                 | 0.04                 | 0.20                 | 0.18                 | 0.11             | 0.20            | 0.06            |
| N-Butyl acetate             | 123-86-4            | < 0.00              | < 0.00              | < 0.00              | < 0.00              | 0.12                 | 0.48                 | < 0.00               | < 0.00               | 0.63                 | 0.17                 | 0.14             | 0.63            | 0.21            |
| n-Decane                    | 00124-18-5          | 0.17                | 0.72                | 0.09                | 0.22                | 0.05                 | 0.01                 | 0.20                 | 0.05                 | 0.03                 | 0.30                 | 0.17             | 0.72            | 0.20            |
| n-Dodecane                  | 00112-40-3          | < T                 | < 0.75              | < T                 | < T                 | < T                  | < 0.63               | < T                  | < T                  | < T                  | < T                  | 0.13             | 0.75            | 0.27            |
| n-Heptane                   | 00142-82-5          | 0.72                | 0.88                | 0.26                | 1.25                | 0.13                 | 0.39                 | 1.40                 | T                    | 0.61                 | 0.34                 | 0.57             | 1.40            | 0.44            |
| n-Hexane                    | 110-54-3            | 0.33                | 0.55                | 0.13                | 0.59                | 0.10                 | 0.27                 | 0.36                 | 0.00                 | 0.10                 | 0.17                 | 0.26             | 0.59            | 0.18            |
| Nitrobenzene                | 98-95-3             | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | 0.00             | < 0.01          | < 0.00          |
| N-Nitrosodiethylamine       | 55-18-5             | < 0.01              | < 0.01              | < 0.01              | < 0.02              | < 0.02               | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.02               | 0.01             | < 0.03          | < 0.01          |
| n-Nitrosodimethylamine      | 62-75-9             | < 0.01              | < 0.01              | < 0.01              | < 0.02              | < 0.02               | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.02               | 0.01             | < 0.02          | < 0.01          |
| N-Nitroso-di-n-propylamine  | 621-64-7            | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | 0.01             | < 0.02          | < 0.00          |
| n-Nitrosomorpholine         | 59-89-2             | < 0.00              | < 0.01              | < 0.00              | < 0.01              | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | 0.01             | < 0.01          | < 0.00          |
| Nonane                      | 111-84-2            | 0.34                | 0.57                | 0.10                | 0.46                | 0.06                 | 0.38                 | 0.43                 | 0.00                 | 0.18                 | 0.17                 | 0.25             | 0.57            | 0.18            |
| n-Pentane                   | 00109-66-0          | 0.03                | 0.05                | 0.02                | 0.04                | < 0.01               | 0.01                 | 0.09                 | 0.02                 | 0.05                 | 0.05                 | 0.03             | 0.09            | 0.02            |
| n-Propylbenzene             | 00103-65-1          | 0.08                | 0.11                | 0.07                | 0.13                | < 0.01               | 0.01                 | 0.05                 | 0.03                 | 0.02                 | 0.14                 | 0.06             | 0.14            | 0.05            |
| n-Undecane                  | 00112-21-4          | < T                 | 2.55                | < T                 | T                   | T                    | < 0.01               | T                    | T                    | T                    | T                    | 0.23             | 2.55            | 0.73            |
| N,N-Diethylaniline          | 91-66-7             | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | 0.00             | < 0.01          | < 0.00          |
| N,N-Dimethylaniline         | 121-69-7            | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | 0.00             | < 0.01          | < 0.00          |
| o-Anisidine                 | 90-04-0             | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.01               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | 0.01             | < 0.01          | < 0.00          |
| Octane                      | 111-65-9            | 0.63                | 0.57                | 0.18                | 0.87                | 0.08                 | 0.06                 | 1.08                 | 0.00                 | 0.21                 | 0.24                 | 0.37             | 1.08            | 0.34            |
| o-Ethyltoluene              | 00611-14-3          | 1.50                | 0.08                | 2.27                | 0.16                | 6.09                 | 0.51                 | 0.05                 | 0.07                 | 0.07                 | 9.37                 | 2.54             | 9.37            | 3.33            |
| o-Toluidine                 | 95-53-4             | 0.04                | < 0.00              | 1.84                | < 0.01              | < 0.01               | < 0.00               | < 0.00               | 0.00                 | < 0.00               | 0.07                 | 0.18             | 1.84            | 0.53            |
| o-Xylene                    | 95-47-6             | 0.88                | 0.76                | 0.40                | 0.72                | 1.02                 | 5.67                 | 1.44                 | 0.00                 | 4.68                 | 1.23                 | 1.56             | 5.67            | 1.76            |
| p-Cymene                    | 00099-87-6          | 0.11                | 1.69                | 0.19                | 0.82                | 0.05                 | 0.04                 | 0.08                 | 0.24                 | 0.04                 | 0.83                 | 0.37             | 1.69            | 0.51            |
| Pentachloronitrobenzene     | 82-68-8             | < 0.01              | < 0.01              | < 0.00              | < 0.01              | < 0.02               | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.04               | 0.01             | < 0.04          | < 0.01          |
| Pentachlorophenol           | 87-86-5             | < 0.01              | 0.08                | < 0.00              | < 0.01              | < 0.01               | 0.11                 | 0.01                 | < 0.00               | < 0.00               | < 0.03               | 0.02             | 0.11            | 0.03            |
| p-Ethyltoluene              | 00622-96-8          | 0.18                | 0.10                | 0.11                | 0.05                | < 0.01               | 0.23                 | 0.08                 | 0.02                 | 0.01                 | 0.21                 | 0.09             | 0.23            | 0.08            |
| Phenanthrene                | 85-01-8             | 0.01                | 0.01                | 0.02                | 0.01                | 0.01                 | 0.00                 | 0.00                 | 0.00                 | 0.00                 | 0.14                 | 0.02             | 0.14            | 0.04            |

TABLE 4-7b  
AUTOCLAVE ORGANIC SPECIATION FACTORS

| Compound                              | CAS #      | Cmpd #4<br>% of TOT | Cmpd #5<br>% of TOT | Cmpd #6<br>% of TOT | Cmpd #8<br>% of TOT | Cmpd #9<br>% of TOT | Cmpd #11<br>% of TOT | Cmpd #15<br>% of TOT | Cmpd #18<br>% of TOT | Cmpd #21<br>% of TOT | Cmpd #22<br>% of TOT | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|---------------------------------------|------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| Phenol                                | 108-95-2   | < 0.00              | < 0.02              | < 0.00              | < 0.01              | 0.12                | < 0.01               | < 0.02               | < 0.00               | 0.00                 | < 0.01               | < 0.03           | 0.12            | < 0.04          |
| Phthalimide                           | 85-41-6    | < 0.00              | < 0.00              | < 0.01              | < 0.01              | < 0.01              | < 0.01               | 0.00                 | < 0.00               | < 0.00               | < 0.01               | < 0.01           | 0.02            | < 0.00          |
| Propane                               | 00074-98-6 | 0.07                | 0.43                | 0.10                | 0.24                | < 0.01              | < 0.01               | 0.11                 | 0.00                 | 0.10                 | 0.02                 | < 0.10           | 0.43            | < 0.12          |
| Propyl Butyrate                       | 00105-66-8 | < T                 | < T                 | < T                 | < T                 | < 0.03              | < T                  | < T                  | < T                  | < T                  | < T                  | < 0.00           | < 0.03          | < 0.01          |
| Propylene                             | 00115-07-1 | < 0.01              | 0.03                | < 0.01              | < 0.01              | < 0.01              | < 0.14               | < 0.01               | 0.01                 | 0.02                 | < 0.01               | < 0.02           | 0.14            | < 0.04          |
| Propylene Oxide                       | 00075-56-9 | < 0.05              | < 0.07              | < 0.03              | < 0.16              | < 0.02              | < 0.06               | < 0.11               | < 0.05               | < 0.04               | < 0.05               | < 0.06           | < 0.16          | < 0.04          |
| Pyrene                                | 129-00-0   | 0.03                | 0.00                | 0.03                | 0.02                | 0.02                | 0.01                 | 0.01                 | 0.00                 | 0.00                 | 0.10                 | 0.02             | 0.10            | 0.03            |
| Pyridine                              | 110-86-1   | < 0.01              | 0.01                | < 0.00              | < 0.01              | < 0.01              | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.01          | < 0.00          |
| S-Butyl acetate                       | 105-46-4   | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Styrene                               | 100-42-5   | 0.23                | 0.13                | 0.40                | 0.05                | 0.05                | 0.01                 | 0.13                 | 0.01                 | 0.00                 | 0.41                 | < 0.14           | 0.41            | < 0.14          |
| 1-Butanol                             | 00075-65-0 | < T                 | < T                 | < T                 | < T                 | < T                 | < 0.05               | < T                  | < T                  | < 0.15               | < T                  | < 0.02           | < 0.15          | < 0.04          |
| T-Butyl acetate                       | 540-88-5   | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | 1.06                 | < 0.00               | < 0.00               | 1.45                 | < 0.00               | < 0.23           | 1.45            | < 0.49          |
| tert-Butyl methyl ether               | 1634-04-4  | 0.05                | 0.05                | 0.03                | 0.17                | < 0.02              | 0.32                 | 0.11                 | 0.05                 | 11.75                | 0.06                 | < 1.15           | 11.75           | < 3.35          |
| Tetrachloroethene                     | 127-18-4   | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.06               | 0.33                 | < 0.03               | 0.02                 | < 0.03               | < 0.06           | 0.33            | < 0.09          |
| Tetrahydrofuran                       | 109-99-9   | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.00           | < 0.01          | < 0.00          |
| Tetrahydromethylnaphthalene isomer    |            | < T                 | < 0.30              | < T                 | < T                 | < T                 | < T                  | < T                  | < T                  | < T                  | < T                  | < 0.03           | < 0.30          | < 0.09          |
| Toluene                               | -108-98-3  | 3.69                | 2.81                | 0.86                | 4.18                | 0.41                | 2.10                 | 5.53                 | 0.19                 | 1.29                 | 1.20                 | 2.10             | 5.53            | 1.66            |
| trans-1,2-Dichloroethene              | 156-60-5   | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.06               | < 0.06               | < 0.03               | < 0.02               | < 0.03               | < 0.03           | < 0.08          | < 0.02          |
| trans-1,2-Dichloropropene             | 10061-02-6 | < 0.00              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.06               | < 0.06               | < 0.03               | < 0.02               | < 0.03               | < 0.03           | < 0.08          | < 0.02          |
| trans-2-Butene                        | 00624-64-6 | < 0.00              | < 0.01              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.01               | < 0.00               | < 0.00           | < 0.01          | < 0.00          |
| trans-2-Hexene                        | 04050-45-7 | < 0.02              | < 0.12              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.01               | < 0.00               | < 0.01               | < 0.01               | < 0.07           | < 0.59          | < 0.17          |
| trans-2-Pentene                       | 00646-04-8 | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.01              | < 0.00               | < 0.00               | < 0.00               | < 0.01               | < 0.02               | < 0.01           | < 0.02          | < 0.00          |
| Trichloroethene                       | 79-01-6    | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.06               | < 0.06               | < 0.03               | < 0.02               | < 0.03               | < 0.03           | < 0.08          | < 0.02          |
| Trichlorofluoromethane                | 75-69-4    | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | < 0.06               | < 0.03               | < 0.02               | < 0.03               | < 0.03           | < 0.08          | < 0.02          |
| Trichlorofluoroethane                 | 00076-13-1 | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.05               | < 0.06               | < 0.03               | < 0.02               | < 0.03               | < 0.03           | < 0.08          | < 0.02          |
| Trifluorin                            | 1582-09-8  | < 0.00              | < 0.01              | < 0.00              | < 0.01              | < 0.02              | < 0.01               | < 0.01               | < 0.00               | < 0.00               | < 0.01               | < 0.01           | < 0.02          | < 0.01          |
| Trimethyl Cyclopentane Isomer         |            | < T                 | < T                 | < T                 | < T                 | < T                 | < T                  | < T                  | < T                  | < T                  | < T                  | < 0.01           | < 0.08          | < 0.02          |
| Trimethylcyclohexane Isomer           |            | < T                 | < T                 | < T                 | < T                 | < T                 | < 0.05               | < T                  | < T                  | < 0.33               | < T                  | < 0.03           | < 0.33          | < 0.10          |
| Unknown                               |            | 0.34                | < 0.38              | 0.04                | 0.07                | 0.03                | 0.05                 | 0.16                 | < T                  | 0.08                 | < T                  | < 0.10           | 0.38            | < 0.13          |
| Vinyl acetate                         | 108-05-4   | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.06               | < 0.06               | < 0.03               | < 0.02               | < 0.03               | < 0.03           | < 0.08          | < 0.02          |
| Vinyl bromide                         | 593-60-2   | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00              | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00               | < 0.00           | < 0.00          | < 0.00          |
| Vinyl Chloride                        | 75-01-4    | < 0.03              | < 0.04              | < 0.01              | < 0.08              | < 0.01              | < 0.06               | < 0.06               | < 0.03               | < 0.02               | < 0.03               | < 0.03           | < 0.08          | < 0.02          |
| Total Detected (lb/lb rubber)         |            | 5.6E-04             | 5.5E-04             | 8.1E-04             | 6.5E-04             | 1.1E-03             | 3.4E-04              | 5.0E-04              | 2.0E-03              | 1.9E-03              | 2.3E-04              |                  |                 |                 |
| Total with non-defects (lb/lb rubber) |            | 5.62E-04            | 5.54E-04            | 8.27E-04            | 6.58E-04            | 1.22E-03            | 3.55E-04             | 5.08E-04             | 2.09E-03             | 1.96E-03             | 2.37E-04             |                  |                 |                 |

T Tentatively Identified Compound (TIC) Not Identified in Summarized Category  
% of Total Values Represent % of Total With Non-Detects

NOTES

TABLE 4-7c  
AUTOCLAVE AMINE SPECIATION FACTORS

|                                       | Cmpd. #4   | Cmpd. #5   | Cmpd. #6   | Cmpd. #8   | Cmpd. #9*  | Cmpd. #9   | Cmpd. #11  | Cmpd. #15  | Cmpd. #18  | Cmpd. #21  | Cmpd. #22  | MEAN     | MAX      | STD      |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|----------|----------|
|                                       | % of TOT   | % of TOT   | % of TOT   | % of TOT   | % of TOT   | % of TOT   | % of TOT   | % of TOT   | % of TOT   | % of TOT   | % of TOT   | % of TOT | % of TOT | % of TOT |
| Trimethylamine                        | < 16.67    | 6.88       | < 16.67    | 5.13       | < 16.67    | < 16.67    | < 16.67    | < 16.67    | 12.09      | < 16.67    | < 13.19    | < 14.00  | 16.67    | < 4.09   |
| Dimethylamine                         | < 16.67    | 18.62      | < 16.67    | 57.43      | < 16.67    | < 16.67    | < 16.67    | < 16.67    | 5.97       | < 16.67    | 34.06      | < 21.16  | 57.43    | < 13.01  |
| Diethylamine                          | < 16.67    | 18.62      | < 16.67    | 9.36       | < 16.67    | < 16.67    | < 16.67    | < 16.67    | 20.49      | < 16.67    | < 13.19    | < 16.21  | < 20.49  | < 2.72   |
| Butylamine                            | < 16.67    | 18.62      | < 16.67    | 9.36       | < 16.67    | < 16.67    | < 16.67    | < 16.67    | 20.49      | < 16.67    | < 13.19    | < 16.21  | < 20.49  | < 2.72   |
| Cyclohexylamine                       | < 16.67    | 18.62      | < 16.67    | 9.36       | < 16.67    | < 16.67    | < 16.67    | < 16.67    | 20.49      | < 16.67    | < 13.19    | < 16.21  | < 20.49  | < 2.72   |
| Diphenylamine                         | < 16.67    | 18.62      | < 16.67    | 9.36       | < 16.67    | < 16.67    | < 16.67    | < 16.67    | 20.49      | < 16.67    | < 13.19    | < 16.21  | < 20.49  | < 2.72   |
| Total Detected (lb/lb rubber)         | 0.00E+00   | 1.96E-09   | 0.00E+00   | 5.89E-08   | 0.00E+00   | 0.00E+00   | 0.00E+00   | 0.00E+00   | 3.25E-08   | 0.00E+00   | 1.76E-08   |          |          |          |
| Total with non-detects (lb/lb rubber) | < 4.29E-08 | < 2.86E-08 | < 4.73E-08 | < 9.42E-08 | < 7.10E-08 | < 4.69E-08 | < 3.61E-08 | < 5.11E-08 | < 1.80E-07 | < 3.19E-08 | < 5.18E-08 |          |          |          |

NOTE: % of Total Values Represent % of Total With Non-Detects

TABLE 4-7d  
AUTOCLAVE SPECIATED SULFUR FACTORS

|                                       | CAS #    | Cmpd.#4<br>% of TOT | Cmpd.#5<br>% of TOT | Cmpd.#6<br>% of TOT | Cmpd.#8<br>% of TOT | Cmpd.#9*<br>% of TOT | Cmpd.#9<br>% of TOT | Cmpd.#11<br>% of TOT | Cmpd.#15<br>% of TOT | Cmpd.#18<br>% of TOT | Cmpd.#21<br>% of TOT | Cmpd.#22<br>% of TOT | MEAN<br>% of TOT | MAX<br>% of TOT | STD<br>% of TOT |
|---------------------------------------|----------|---------------------|---------------------|---------------------|---------------------|----------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|-----------------|-----------------|
| Carbonyl Sulfide                      | 463-58-1 | 15.06               | 14.97               | 19.63               | 0.69                | 12.46                | 16.54               | 1.39                 | 0.44                 | 12.97                | 7.34                 | 13.04                | 10.41            | 19.63           | 6.52            |
| Methyl Mercaptan                      | 74-93-1  | 2.71                | 1.35                | 2.41                | 0.00                | 0.70                 | 1.84                | 0.04                 | 0.02                 | 0.11                 | 1.78                 | 1.58                 | 1.14             | 2.71            | 0.96            |
| Ethyl Mercaptan                       | 75-08-1  | 3.41                | 1.72                | 3.05                | 0.00                | 0.89                 | 2.33                | 0.04                 | 0.03                 | 0.14                 | 2.25                 | 2.00                 | 1.44             | 3.41            | 1.22            |
| Dimethyl Sulfide                      | 75-18-3  | 3.41                | 1.72                | 3.05                | 0.00                | 1.61                 | 2.33                | 0.04                 | 0.03                 | 0.14                 | 5.28                 | 2.00                 | 1.78             | 5.28            | 1.82            |
| Carbon Disulfide                      | 75-15-0  | 9.28                | 44.87               | 12.69               | 99.24               | 65.86                | 31.85               | 97.61                | 98.82                | 83.84                | 37.07                | 42.61                | 56.70            | 99.24           | 32.48           |
| Isopropyl Mercaptan                   | 75-33-2  | 4.19                | 2.08                | 3.67                | 0.00                | 1.08                 | 2.79                | 0.06                 | 0.04                 | 0.18                 | 2.72                 | 2.40                 | 1.74             | 4.19            | 1.48            |
| tert-Butyl Mercaptan                  | 75-66-1  | 5.01                | 2.56                | 4.58                | 0.00                | 1.33                 | 3.49                | 0.07                 | 0.04                 | 0.21                 | 3.37                 | 3.00                 | 2.15             | 5.01            | 1.81            |
| n-Propyl Mercaptan                    | 107-03-9 | 4.19                | 2.08                | 3.67                | 0.00                | 1.08                 | 2.79                | 0.06                 | 0.04                 | 0.18                 | 2.72                 | 2.40                 | 1.74             | 4.19            | 1.48            |
| Ethyl Methyl Sulfide                  | 624-89-5 | 4.19                | 2.08                | 3.67                | 0.00                | 1.08                 | 2.79                | 0.06                 | 0.04                 | 0.18                 | 2.72                 | 2.40                 | 1.74             | 4.19            | 1.48            |
| Thiophene                             | 110-02-1 | 4.77                | 2.39                | 4.28                | 0.00                | 1.24                 | 3.26                | 0.06                 | 0.09                 | 0.20                 | 3.16                 | 2.80                 | 2.02             | 4.77            | 1.70            |
| Isobutyl Mercaptan                    | 513-44-0 | 5.01                | 2.56                | 4.58                | 0.00                | 1.33                 | 3.49                | 0.07                 | 0.04                 | 0.21                 | 3.37                 | 3.00                 | 2.15             | 5.01            | 1.81            |
| Diethyl Sulfide                       | 352-93-2 | 5.01                | 2.56                | 4.58                | 0.00                | 1.33                 | 3.49                | 0.07                 | 0.04                 | 0.21                 | 3.37                 | 3.00                 | 2.15             | 5.01            | 1.81            |
| n-Butyl Mercaptan                     | 109-79-5 | 5.01                | 2.56                | 4.58                | 0.00                | 1.33                 | 3.49                | 0.07                 | 0.04                 | 0.21                 | 3.37                 | 3.00                 | 2.15             | 5.01            | 1.81            |
| Dimethyl Disulfide                    | 624-92-0 | 2.58                | 3.41                | 2.35                | 0.00                | 1.92                 | 1.79                | 0.03                 | 0.05                 | 0.11                 | 4.32                 | 1.54                 | 1.65             | 4.32            | 1.41            |
| 3-Methylthiophene                     | 616-44-4 | 5.45                | 2.74                | 4.89                | 0.01                | 1.42                 | 3.73                | 0.07                 | 0.06                 | 0.23                 | 3.61                 | 3.20                 | 2.31             | 5.45            | 1.95            |
| Tetrahydrothiophene                   | 110-01-0 | 4.87                | 2.42                | 4.28                | 0.00                | 1.26                 | 3.26                | 0.08                 | 0.04                 | 0.21                 | 3.17                 | 2.80                 | 2.03             | 4.87            | 1.72            |
| 2-Ethylthiophene                      | 872-55-9 | 6.23                | 3.10                | 5.50                | 0.01                | 1.61                 | 4.19                | 0.08                 | 0.05                 | 0.26                 | 4.07                 | 3.60                 | 2.61             | 6.23            | 2.21            |
| 2,5-Dimethylthiophene                 | 638-02-8 | 6.23                | 3.10                | 5.50                | 0.01                | 1.61                 | 4.19                | 0.08                 | 0.05                 | 0.26                 | 4.07                 | 3.60                 | 2.61             | 6.23            | 2.21            |
| Diethyl Disulfide                     | 110-81-6 | 3.41                | 1.72                | 3.05                | 0.00                | 0.89                 | 2.33                | 0.04                 | 0.03                 | 0.14                 | 2.25                 | 2.00                 | 1.44             | 3.41            | 1.22            |
| Total Detected (lb/lb rubber)         |          | 6.69E-07            | 1.89E-06            | 8.29E-07            | 2.85E-03            | 5.23E-06             | 1.47E-06            | 1.44E-04             | 1.98E-04             | 6.85E-05             | 8.94E-07             | 1.82E-06             |                  |                 |                 |
| Total with non-detects (lb/lb rubber) |          | < 3.04E-06          | < 3.11E-06          | < 2.79E-06          | < 2.85E-03          | < 6.54E-06           | < 3.13E-06          | < 1.45E-04           | < 2.00E-04           | < 7.07E-05           | < 1.93E-06           | < 3.34E-06           |                  |                 |                 |

NOTE: % of Total Values Represent % of Total With Non-Detects

Table 4-7e. Comparison of Autoclave Water - Borne Pollutants with Total Pollutant Emission Rates

| Compound No.:                                                                                        | 4        | 5        | 6        | 8        | 9 (a)    | 9        | 11       | 15       | 18       | 21       | 22       |
|------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| <b>Water - Borne Pollutants (Aqueous matrix) (b)</b><br>(Typical of Steam - Contact Systems)         |          |          |          |          |          |          |          |          |          |          |          |
| Semivolatiles (lbs/lb rubber)                                                                        | 1.55E-04 | 8.30E-05 | 5.29E-04 | 1.28E-05 | 6.30E-04 | 3.28E-04 | 6.01E-06 | 2.51E-05 | 1.74E-04 | 6.72E-05 | 1.74E-05 |
| Volatiles (lbs/lb rubber)                                                                            | 1.37E-04 | 7.32E-05 | 6.00E-05 | 4.88E-06 | 2.48E-05 | 1.13E-05 | 3.28E-05 | 1.87E-05 | 4.15E-05 | 6.60E-04 | 5.58E-05 |
| Sulfur Compounds (lbs/lb rubber)                                                                     | 6.69E-07 | 1.87E-06 | 8.29E-07 | 2.77E-03 | 4.90E-06 | 1.35E-06 | 1.36E-04 | 1.76E-04 | 1.11E-05 | 8.94E-07 | 1.70E-06 |
| <b>Total Emissions (Combined gaseous and aqueous matrices)</b><br>(Typical of Non - Contact Systems) |          |          |          |          |          |          |          |          |          |          |          |
| Semivolatiles (lbs/lb rubber)                                                                        | 1.78E-04 | 9.15E-05 | 6.06E-04 | 1.34E-05 | 8.11E-04 | 4.90E-04 | 1.02E-04 | 8.54E-05 | 2.01E-04 | 1.25E-04 | 2.17E-05 |
| Volatiles (lbs/lb rubber)                                                                            | 3.99E-04 | 4.68E-04 | 2.39E-04 | 6.35E-04 | 4.05E-04 | 3.25E-04 | 2.42E-04 | 4.20E-04 | 1.85E-03 | 1.82E-03 | 2.14E-04 |
| Sulfur Compounds (lbs/lb rubber)                                                                     | 6.69E-07 | 1.90E-06 | 8.29E-07 | 2.85E-03 | 5.23E-06 | 1.47E-06 | 1.44E-04 | 1.98E-04 | 6.85E-05 | 8.94E-07 | 1.82E-06 |
| <b>Percent of Pollutants Discharged in Aqueous Streams (c)</b>                                       |          |          |          |          |          |          |          |          |          |          |          |
| Semivolatiles                                                                                        | 87.2%    | 90.7%    | 87.3%    | 95.7%    | 77.7%    | 66.9%    | 5.9%     | 29.3%    | 86.5%    | 53.7%    | 80.2%    |
| Volatiles                                                                                            | 34.4%    | 15.6%    | 25.1%    | 0.8%     | 6.1%     | 3.5%     | 13.6%    | 4.5%     | 2.2%     | 36.3%    | 26.1%    |
| Sulfur Compounds                                                                                     | 100.0%   | 98.4%    | 100.0%   | 97.2%    | 93.7%    | 91.8%    | 94.4%    | 88.9%    | 16.2%    | 100.0%   | 93.4%    |

(a) Compound for this run had been previously extruded at a temperature of approximately 260 degrees F. All other rubber compounds cured in these autoclave test runs were unextruded rubber, processed by internal mixer and drop mill only.

(b) Water-borne organics from water trap and blowdown discharge.

(c) This percentage could possibly be omitted from use in an emissions inventory involving a steam contact autoclave. Discharges may actually be relevant to NPDES. Note that there is a potential for downstream fugitive emissions from these aqueous discharge streams.

TABLE 4-8a  
PLATEN PRESS SUMMARY

| Compound  | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Organics <sup>1</sup><br>(lbs/lb rubber)<br>with non-detects | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects |
|-----------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|
| 1         | 3.10E-04                                     | < 5.02E-05                                                              | < 1.76E-03                                                          | < 1.59E-03                                                                      | < 7.66E-05                                          |
| 2         | 1.51E-04                                     | < 3.32E-05                                                              | < 1.73E-03                                                          | < 1.39E-03                                                                      | < 5.95E-04                                          |
| 3         | 3.77E-04                                     | < 3.56E-05                                                              | < 3.02E-03                                                          | < 2.85E-03                                                                      | < 7.48E-05                                          |
| 5         | 5.56E-04                                     | < 1.14E-04                                                              | < 6.59E-04                                                          | < 5.27E-04                                                                      | < 1.08E-04                                          |
| 7         | 9.34E-05                                     | < 6.06E-05                                                              | < 1.65E-03                                                          | < 9.54E-04                                                                      | < 1.52E-04                                          |
| 9         | 1.68E-03                                     | < 4.92E-04                                                              | < 5.57E-03                                                          | < 5.70E-03                                                                      | < 9.08E-05                                          |
| 10        | 3.15E-04                                     | < 2.70E-05                                                              | < 3.04E-03                                                          | < 2.87E-03                                                                      | < 1.04E-03                                          |
| 11        | 2.35E-04                                     | < 1.02E-04                                                              | < 2.52E-03                                                          | < 2.50E-03                                                                      | < 3.42E-04                                          |
| 12        | 2.53E-04                                     | < 3.46E-05                                                              | < 2.77E-03                                                          | < 2.61E-03                                                                      | < 5.74E-04                                          |
| 13        | 5.21E-04                                     | < 4.09E-05                                                              | < 3.11E-03                                                          | < 2.80E-03                                                                      | < 7.88E-04                                          |
| 14        | 1.93E-04                                     | < 3.42E-05                                                              | < 4.09E-03                                                          | < 3.93E-03                                                                      | < 7.60E-04                                          |
| 16        | 2.91E-04                                     | < 3.91E-05                                                              | < 2.15E-03                                                          | < 1.99E-03                                                                      | < 7.48E-05                                          |
| 17        | 2.25E-03                                     | < 1.05E-03                                                              | < 3.10E-03                                                          | < 3.95E-03                                                                      | < 7.48E-05                                          |
| 19        | 2.43E-03                                     | < 7.23E-05                                                              | < 3.86E-03                                                          | < 3.60E-03                                                                      | < 6.98E-05                                          |
| 20        | 2.26E-04                                     | < 1.76E-05                                                              | < 3.04E-03                                                          | < 2.87E-03                                                                      | < 7.22E-05                                          |
| 22        | 4.68E-04                                     | < 3.73E-05                                                              | < 3.16E-03                                                          | < 2.89E-03                                                                      | < 9.58E-05                                          |
| 23        | 1.12E-04                                     | < 4.90E-05                                                              | < 1.56E-03                                                          | < 1.41E-03                                                                      | < 1.01E-04                                          |
| Mean      | 6.15E-04                                     | < 1.35E-04                                                              | < 2.75E-03                                                          | < 2.61E-03                                                                      | < 2.99E-04                                          |
| Max.      | 2.43E-03                                     | < 1.05E-03                                                              | < 5.57E-03                                                          | < 5.70E-03                                                                      | < 1.04E-03                                          |
| Std. Dev. | 7.21E-04                                     | < 2.52E-04                                                              | < 1.11E-03                                                          | < 1.23E-03                                                                      | < 3.12E-04                                          |

<sup>1</sup> - Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

TABLE 4 - 8.B PLATEN PRESS ORGANIC SPECIATION FACTORS

|                                             | CAS #             | Cmpd. #1<br>% of Total | Cmpd. #2<br>% of Total | Cmpd. #3<br>% of Total | Cmpd. #5<br>% of Total | Cmpd. #7<br>% of Total | Cmpd. #9<br>% of Total | Cmpd. #10<br>% of Total | Cmpd. #11<br>% of Total | Cmpd. #12<br>% of Total | Cmpd. #13<br>% of Total |
|---------------------------------------------|-------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 1 * 1-Butanol                               | 00071-36-3        | T                      | T                      | 0.33                   | T                      | T                      | T                      | 0.33                    | T                       | T                       | 0.85                    |
| 1 * 1-Chloro-4-(1-Chloroethenyl)-Cyclohexen |                   | T                      | T                      | T                      | T                      | T                      | T                      | T                       | 0.19                    | T                       | T                       |
| 1 * 1-Chloro-5-(1-Chloroethenyl)-Cyclohexen |                   | T                      | T                      | T                      | T                      | T                      | T                      | T                       | 0.12                    | T                       | T                       |
| 1-Pentene                                   | 109-67-1          | < 0.06                 | 1.02                   | 0.28                   | < 0.31                 | < 0.20                 | < 0.02                 | < 0.03                  | < 0.03                  | < 0.03                  | < 0.03                  |
| 1 * 1,1-Difluoroethane                      | 00075-34-3        | T                      | T                      | T                      | T                      | T                      | T                      | T                       | 0.63                    | T                       | T                       |
| 1 1,1,1-Trichloroethane                     | 00071-55-6        | 0.22                   | 0.18                   | 0.11                   | 0.72                   | 0.44                   | 0.07                   | 0.09                    | < 0.11                  | 1.16                    | 12.72                   |
| 1,2,4-Trichlorobenzene                      | 120-82-1          | < 0.02                 | < 0.01                 | < 0.01                 | < 0.04                 | < 0.04                 | < 0.00                 | < 0.00                  | < 0.01                  | < 0.01                  | < 0.01                  |
| 1,2,4-Trimethylbenzene                      | 95-83-6           | 0.05                   | 0.08                   | 0.02                   | 0.11                   | 0.06                   | 0.01                   | 0.01                    | 0.01                    | 0.01                    | 0.00                    |
| 1,3-Butadiene                               | 106-99-0          | < 0.05                 | 0.88                   | < 0.02                 | 1.11                   | 0.99                   | 0.13                   | 0.26                    | < 0.04                  | < 0.03                  | < 0.02                  |
| 1 * 1,3-Dioxolane                           |                   | T                      | T                      | T                      | 0.21                   | T                      | T                      | T                       | T                       | T                       | T                       |
| 1 * 1,4-Dichloro-1,3-Butadiene              | 02984-42-1        | T                      | T                      | T                      | T                      | T                      | T                      | T                       | 0.03                    | T                       | T                       |
| 1,4-Dichlorobenzene                         | 106-46-7          | 0.01                   | 0.01                   | 0.00                   | < 0.03                 | 0.01                   | < 0.00                 | 0.00                    | < 0.00                  | 0.00                    | < 0.00                  |
| 1,4-Diethylbenzene + n-Butylbenzene         | 105-05-5/104-51-8 | < 0.57                 | < 0.83                 | < 0.31                 | < 2.19                 | < 1.88                 | < 1.46                 | < 0.31                  | < 0.28                  | < 0.32                  | < 0.30                  |
| 1 2-Butanone                                | 00078-93-3        | 0.12                   | 0.20                   | 0.10                   | 0.39                   | < 2.70                 | 0.05                   | < 0.18                  | < 0.07                  | 0.05                    | < 0.42                  |
| 1 * 2-Butene                                | 00126-99-8        | T                      | T                      | T                      | 0.17                   | T                      | T                      | T                       | T                       | T                       | T                       |
| 1 * 2-Chloro-1,3-Butadiene                  | 00126-99-8        | T                      | T                      | T                      | T                      | T                      | T                      | T                       | 0.36                    | T                       | T                       |
| 2-Chloronaphthalene                         | 91-59-7           | < 0.01                 | < 0.00                 | < 0.00                 | < 0.02                 | < 0.02                 | < 0.00                 | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  |
| 2-Furaldehyde                               | 98-01-1           | 0.01                   | 0.03                   | 0.01                   | 0.04                   | 0.04                   | 0.00                   | 0.01                    | 0.01                    | 0.03                    | 0.00                    |
| 2-Methyl-1-butene                           | 563-46-2          | < 0.06                 | < 0.07                 | 0.08                   | < 0.23                 | < 0.20                 | < 0.02                 | < 0.03                  | < 0.03                  | < 0.03                  | < 0.03                  |
| 2-Methyl-2-butene                           | 513-35-9          | < 0.06                 | < 0.07                 | < 0.03                 | < 0.23                 | < 0.20                 | 4.69                   | < 0.03                  | < 0.03                  | < 0.03                  | < 0.03                  |
| 2-Methylnaphthalene                         | 91-57-6           | 0.01                   | 0.02                   | 0.01                   | 0.38                   | 0.02                   | 0.00                   | 0.00                    | 0.01                    | 0.01                    | 0.00                    |
| 2-Methylpentane                             | 107-83-5          | 0.07                   | 0.10                   | < 0.04                 | < 0.22                 | < 0.24                 | < 0.02                 | < 0.04                  | < 0.04                  | < 0.04                  | < 0.04                  |
| 2-Methylphenol                              | 95-48-7           | < 0.02                 | < 0.01                 | 0.00                   | < 0.04                 | < 0.03                 | < 0.00                 | < 0.00                  | < 0.01                  | < 0.00                  | < 0.01                  |
| 2,2-Dimethylbutane                          | 75-83-2           | < 0.07                 | < 0.08                 | < 0.04                 | < 0.28                 | < 0.24                 | < 0.02                 | < 0.04                  | < 0.04                  | < 0.04                  | < 0.04                  |
| 1 * 3-Heptanone                             | 00106-35-4        | T                      | T                      | T                      | T                      | T                      | T                      | T                       | 0.03                    | T                       | T                       |
| 3-Methylhexane                              | 589-34-4          | < 0.08                 | < 0.09                 | < 0.05                 | 0.50                   | < 0.28                 | < 0.03                 | < 0.05                  | < 0.04                  | < 0.05                  | < 0.04                  |
| 3-Methylpentane                             | 96-14-0           | 0.08                   | 0.18                   | 0.04                   | < 0.35                 | < 0.24                 | < 0.02                 | < 0.04                  | 0.20                    | 0.04                    | < 0.04                  |
| 3-Methylstyrene                             | 100-80-1          | < 0.02                 | 0.00                   | 0.00                   | < 0.03                 | < 0.03                 | < 0.00                 | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  |
| 3/4-Methylphenol                            | 108-39-4/106-44-5 | < 0.02                 | < 0.01                 | 0.00                   | < 0.04                 | < 0.03                 | < 0.00                 | < 0.00                  | < 0.01                  | < 0.00                  | < 0.00                  |
| 4-Chloroaniline                             | 106-47-8          | < 0.01                 | < 0.01                 | 0.00                   | < 0.03                 | < 0.02                 | < 0.00                 | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  |
| 4-Chlorostyrene                             | 1073-67-2         | < 0.02                 | 0.02                   | < 0.00                 | < 0.03                 | < 0.03                 | < 0.00                 | < 0.00                  | 0.01                    | 0.01                    | < 0.00                  |
| 4-Methyl-2-pentanone                        | 00108-10-1        | < 0.16                 | < 0.45                 | 4.09                   | < 0.30                 | < 1.35                 | < 0.05                 | < 0.09                  | < 0.04                  | < 0.09                  | 0.21                    |
| Acenaphthene                                | 83-32-9           | < 0.01                 | < 0.01                 | 0.00                   | 0.01                   | < 0.02                 | 0.00                   | 0.00                    | < 0.00                  | 0.00                    | < 0.00                  |
| Acenaphthylene                              | 208-96-8          | < 0.01                 | < 0.00                 | 0.01                   | < 0.01                 | < 0.01                 | < 0.00                 | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  |
| 1 * Acetaldehyde                            | 00075-07-0        | T                      | T                      | T                      | 1.27                   | T                      | 0.13                   | T                       | 0.07                    | T                       | T                       |
| 1 Acetone                                   | 00067-64-1        | 0.77                   | 1.58                   | 0.56                   | 9.94                   | 1.79                   | 1.21                   | 0.35                    | 1.10                    | 0.44                    | 0.49                    |
| 1 Acetonitrile                              | 01722-09-4        | < 0.32                 | < 0.90                 | < 0.18                 | 1.04                   | < 2.70                 | < 0.11                 | < 0.18                  | < 0.08                  | < 0.19                  | < 0.42                  |
| Acetophenone                                | 98-86-2           | 0.03                   | 0.10                   | 0.01                   | T                      | 0.09                   | 7.71                   | 0.02                    | T                       | 0.08                    | 0.02                    |
| Acetylene                                   | 74-86-2           | 0.05                   | 0.10                   | 0.03                   | < 0.13                 | < 0.07                 | < 0.01                 | < 0.01                  | < 0.01                  | < 0.01                  | < 0.01                  |
| 1 Acrylonitrile                             | 00107-13-1        | < 0.32                 | < 0.90                 | < 0.18                 | 0.51                   | < 2.70                 | < 0.11                 | < 0.18                  | < 0.08                  | < 0.19                  | < 0.42                  |
| 1 * Alpha-Methyl Styrene                    |                   | T                      | T                      | T                      | 0.21                   | T                      | 0.54                   | T                       | T                       | T                       | T                       |
| Aniline                                     | 62-53-3           | < 0.01                 | 0.03                   | 0.02                   | 0.38                   | < 0.02                 | < 0.00                 | < 0.00                  | 0.01                    | < 0.00                  | < 0.00                  |
| Benzaldehyde                                | 100-52-7          | 0.06                   | 0.08                   | 0.04                   | 0.13                   | 0.12                   | 0.02                   | 0.03                    | 0.02                    | 0.05                    | 0.03                    |
| Benzene                                     | 71-43-2           | 0.07                   | 0.10                   | 0.04                   | < 0.22                 | < 0.22                 | < 0.02                 | < 0.04                  | < 0.03                  | < 0.04                  | < 0.03                  |
| Benzidine                                   | 92-87-5           | < 0.01                 | < 0.01                 | 0.00                   | 0.86                   | < 0.02                 | < 0.00                 | < 0.00                  | < 0.01                  | < 0.00                  | < 0.00                  |
| Benzoic acid                                | 65-85-0           | < 0.03                 | 0.29                   | 0.07                   | < 0.18                 | 0.05                   | < 0.01                 | 0.04                    | < 0.03                  | < 0.01                  | < 0.01                  |
| Benzonitrile                                | 100-47-0          | < 0.01                 | < 0.00                 | < 0.00                 | < 0.02                 | < 0.02                 | 0.06                   | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  |
| Benzyl alcohol                              | 100-51-6          | < 0.03                 | 0.01                   | 0.01                   | < 0.05                 | 0.01                   | < 0.01                 | 0.01                    | < 0.00                  | 0.02                    | 0.01                    |
| Biphenyl                                    | 92-52-4           | < 0.01                 | < 0.00                 | 0.00                   | 0.06                   | < 0.01                 | < 0.00                 | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  |
| bis(2-Ethylhexyl)phthalate                  | 117-81-7          | 0.26                   | 0.18                   | 0.07                   | 0.73                   | 1.21                   | 0.05                   | 0.10                    | 0.07                    | 0.14                    | 0.64                    |
| 1 * Butane                                  |                   | 0.61                   | T                      | 0.33                   | T                      | T                      | T                      | T                       | T                       | T                       | T                       |
| Butylbenzylphthalate                        | 85-68-7           | 0.03                   | 0.02                   | 0.01                   | 0.12                   | 0.06                   | 0.01                   | 0.01                    | 0.01                    | 0.03                    | 0.02                    |
| 1 * C12H24 Branched Alkene                  |                   | T                      | T                      | T                      | T                      | T                      | T                      | T                       | T                       | T                       | 4.24                    |
| 1 * C9-C10 Branched Alkane                  |                   | T                      | T                      | T                      | T                      | T                      | T                      | T                       | T                       | T                       | T                       |
| Camphene                                    | 79-92-5           | 0.05                   | 0.05                   | 0.02                   | < 0.13                 | 0.11                   | 0.02                   | 0.03                    | 0.02                    | 0.03                    | < 0.00                  |
| 1 Carbon Disulfide                          | 00075-15-0        | 0.14                   | 38.43                  | 0.11                   | 0.66                   | < 1.35                 | 0.07                   | 48.06                   | 13.87                   | 21.99                   | 33.91                   |
| 1 * Carbonyl Sulfide                        | 00463-58-1        | T                      | T                      | T                      | T                      | T                      | T                      | T                       | 0.03                    | 0.35                    | T                       |
| 1 * Chlorodifluoromethane                   |                   | T                      | T                      | T                      | 0.21                   | T                      | T                      | T                       | T                       | T                       | T                       |
| 1 Chloroethane                              | 00075-00-3        | < 0.16                 | < 0.45                 | < 0.09                 | < 0.25                 | < 1.35                 | < 0.05                 | < 0.09                  | < 0.04                  | < 0.09                  | < 0.21                  |
| 1 Chloromethane                             | 00074-87-3        | 0.07                   | < 0.45                 | 0.03                   | < 0.25                 | < 1.35                 | < 0.05                 | < 0.09                  | < 0.04                  | 0.03                    | < 0.21                  |
| cis-2-Pentene                               | 627-20-3          | 7.21                   | 3.17                   | 6.06                   | 8.96                   | 5.12                   | < 0.02                 | 3.78                    | 4.61                    | 5.60                    | < 0.03                  |
| Cumene                                      | 98-82-8           | 0.00                   | 0.00                   | 0.00                   | 0.02                   | 0.01                   | 0.05                   | 0.00                    | 0.00                    | 0.00                    | 0.00                    |
| 1 * Cyclobutane                             |                   | T                      | T                      | 0.55                   | T                      | T                      | T                      | T                       | T                       | T                       | T                       |
| Cyclohexanone                               | 108-94-1          | 0.03                   | < 0.01                 | 0.02                   | 2.54                   | < 0.05                 | 0.01                   | < 0.01                  | 0.01                    | 0.01                    | < 0.01                  |
| Cyclohexene                                 | 00110-82-7        | T                      | T                      | T                      | 0.59                   | T                      | T                      | T                       | T                       | T                       | T                       |
| 1 * Cyclooctadiene                          |                   | T                      | T                      | T                      | T                      | T                      | T                      | T                       | T                       | T                       | T                       |
| Cyclopentane + 2,3-Dimethylbutane           | 287-92-3/79-29-8  | 0.05                   | 0.12                   | 0.05                   | < 0.31                 | < 0.22                 | < 0.02                 | < 0.04                  | < 0.03                  | < 0.04                  | < 0.03                  |

TABLE 4 - 8.B PLATEN PRESS ORGANIC SPECIATION FACTORS

|                                       | CAS #                             | Cmpd. #1<br>% of Total | Cmpd. #2<br>% of Total | Cmpd. #3<br>% of Total | Cmpd. #5<br>% of Total | Cmpd. #7<br>% of Total | Cmpd. #9<br>% of Total | Cmpd. #10<br>% of Total | Cmpd. #11<br>% of Total | Cmpd. #12<br>% of Total | Cmpd. #13<br>% of Total |
|---------------------------------------|-----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 1                                     | Dibenzofuran                      | 132-64-9               | 0.00                   | 0.00                   | 0.01                   | 0.01                   | 0.00                   | 0.00                    | 0.00                    | 0.00                    | 0.00                    |
|                                       | Dichlorodifluoromethane           | 00075-71-8             | 0.10                   | 0.45                   | 0.08                   | 0.25                   | 1.35                   | 0.05                    | 0.06                    | 0.04                    | 0.07                    |
|                                       | Diethylphthalate                  | 84-66-2                | 0.06                   | 0.04                   | 0.02                   | 0.09                   | 0.08                   | 0.01                    | 0.02                    | 0.01                    | 0.04                    |
|                                       | Dimethylphthalate                 | 131-11-3               | 0.01                   | 0.01                   | 0.00                   | 0.03                   | 0.02                   | 0.00                    | 0.00                    | 0.00                    | 0.00                    |
|                                       | Di-n-butylphthalate               | 84-74-2                | 0.00                   | 0.15                   | 0.01                   | 0.03                   | 0.08                   | 0.13                    | 0.00                    | T                       | 0.01                    |
|                                       | Di-n-octylphthalate               | 117-84-0               | 0.01                   | 0.01                   | 0.00                   | 0.04                   | 0.01                   | 0.00                    | 0.01                    | 0.00                    | 0.01                    |
|                                       | Diphenylamine                     | 122-39-4               | 0.01                   | 0.03                   | 0.00                   | 0.11                   | 0.02                   | 0.08                    | 0.00                    | 0.04                    | 0.04                    |
|                                       | Ethane                            | 74-84-0                | 0.24                   | 0.27                   | 0.09                   | 1.14                   | 0.49                   | 0.12                    | 0.12                    | 0.15                    | 0.14                    |
| 1 *                                   | Ethanol                           |                        | T                      | T                      | T                      | 0.42                   | T                      | T                       | 3.29                    | T                       | T                       |
|                                       | Ethylbenzene                      | 100-41-4               | 0.09                   | 0.10                   | 0.05                   | 0.25                   | 0.30                   | 0.03                    | 0.05                    | 0.04                    | 0.05                    |
|                                       | Ethylene                          | 74-85-1                | 0.13                   | 0.15                   | 0.06                   | 0.29                   | 0.08                   | 0.01                    | 0.01                    | 0.03                    | 0.01                    |
|                                       | Fluoranthene                      | 208-44-0               | 0.00                   | 0.00                   | 0.00                   | 0.01                   | 0.01                   | 0.00                    | 0.00                    | 0.00                    | 0.00                    |
|                                       | Fluorene                          | 86-73-7                | 0.00                   | 0.00                   | 0.00                   | 0.02                   | 0.02                   | 0.00                    | 0.00                    | 0.00                    | 0.00                    |
|                                       | Hexachlorobutadiene               | 87-68-3                | 0.04                   | 0.02                   | 0.01                   | 0.06                   | 0.07                   | 0.01                    | 0.01                    | 0.01                    | 0.01                    |
|                                       | Isobutane                         | 75-28-5                | 0.15                   | 0.15                   | 0.07                   | 0.19                   | 0.31                   | 0.02                    | 0.03                    | 0.03                    | 0.03                    |
|                                       | Isobutylene + 1-Butene            | 115-11-7/106-98-9      | 2.13                   | 0.05                   | 1.23                   | 0.30                   | 0.16                   | 0.02                    | 0.03                    | 0.38                    | 2.97                    |
|                                       | Isooctanol                        | 26952-21-6             | 0.25                   | 0.10                   | 0.11                   | 0.43                   | 0.42                   | 0.05                    | 0.14                    | 3.00                    | 0.06                    |
|                                       | Isopentane                        | 78-78-4                | 0.72                   | 0.99                   | 0.45                   | 6.60                   | 0.87                   | 0.44                    | 0.22                    | 0.99                    | 0.22                    |
|                                       | Isoprene                          | 78-79-5                | 0.06                   | 0.03                   | 0.03                   | 0.22                   | 0.19                   | 0.02                    | 0.03                    | 0.03                    | 0.03                    |
| 1 *                                   | Isopropanol                       | 00067-63-0             | 0.61                   | 4.52                   | 1.11                   | 1.06                   | T                      | T                       | T                       | 0.03                    | 0.69                    |
|                                       | Methylcyclopentane                | 96-37-7                | 0.10                   | 0.16                   | 0.09                   | 0.39                   | 0.24                   | 0.04                    | 0.04                    | 0.05                    | 0.04                    |
| 1                                     | Methylene Chloride                | 00075-09-2             | 78.99                  | 29.38                  | 79.59                  | 33.30                  | 54.01                  | 80.46                   | 40.58                   | 68.70                   | 61.34                   |
|                                       | m-Xylene + p-Xylene               | 108-38-3/106-42-3      | 0.06                   | 0.14                   | 0.32                   | 1.75                   | 0.34                   | 0.03                    | 0.05                    | 0.04                    | 0.05                    |
|                                       | Naphthalene                       | 91-20-3                | 0.02                   | 0.03                   | 0.02                   | 0.30                   | 0.25                   | 0.07                    | 0.01                    | 0.07                    | 0.01                    |
|                                       | n-Butane                          | 106-97-8               | 0.83                   | 0.53                   | 0.43                   | 0.58                   | 0.71                   | 0.04                    | 0.09                    | 0.06                    | 0.03                    |
|                                       | n-Decane                          | 124-18-5               | 0.60                   | 0.67                   | 0.33                   | 0.50                   | 2.00                   | 0.20                    | 0.32                    | 0.29                    | 0.34                    |
|                                       | n-Hexane                          | 110-54-3               | 0.47                   | 0.74                   | 0.24                   | 3.15                   | 0.97                   | 0.29                    | 0.14                    | 1.25                    | 0.10                    |
|                                       | n-Pentane                         | 109-66-0               | 0.08                   | 0.24                   | 0.03                   | 0.23                   | 0.20                   | 0.02                    | 0.03                    | 0.03                    | 0.03                    |
|                                       | n-Propylbenzene                   | 103-65-1               | 0.10                   | 0.11                   | 0.06                   | 0.39                   | 0.34                   | 0.03                    | 0.05                    | 0.05                    | 0.06                    |
| 1 *                                   | n-Undecane                        | 00112-21-4             | T                      | T                      | T                      | 2.54                   | T                      | T                       | T                       | 0.03                    | T                       |
|                                       | o-Ethyltoluene                    | 811-14-3               | 0.51                   | 0.57                   | 0.28                   | 1.96                   | 1.69                   | 0.26                    | 0.27                    | 0.25                    | 0.29                    |
|                                       | o-Toluidine                       | 95-53-4                | 0.01                   | 0.11                   | 0.00                   | 0.03                   | 0.02                   | 0.00                    | 0.00                    | 0.00                    | 0.08                    |
|                                       | o-Xylene                          | 95-47-6                | 0.09                   | 0.10                   | 0.05                   | 0.38                   | 0.19                   | 0.03                    | 0.05                    | 0.04                    | 0.05                    |
|                                       | Phenanthrene                      | 85-01-8                | 0.01                   | 0.02                   | 0.01                   | 0.05                   | 0.02                   | 0.00                    | 0.00                    | 0.00                    | 0.01                    |
|                                       | Phenol                            | 108-95-2               | 0.04                   | 0.04                   | 0.02                   | 0.18                   | 0.04                   | 0.02                    | 0.01                    | 0.02                    | 0.02                    |
|                                       | Phthalimide                       | 85-41-6                | 0.05                   | 0.03                   | 0.12                   | 0.08                   | 0.09                   | 0.01                    | 0.06                    | 0.01                    | 0.03                    |
|                                       | Propane                           | 74-98-6                | 0.20                   | 0.04                   | 0.07                   | 0.83                   | 0.31                   | 0.04                    | 0.07                    | 0.06                    | 0.02                    |
|                                       | Propylene                         | 115-07-1               | 0.05                   | 0.07                   | 0.02                   | 0.23                   | 0.12                   | 0.01                    | 0.02                    | 0.04                    | 0.02                    |
| 1                                     | Propylene Oxide                   | 00075-56-9             | 0.32                   | 7.46                   | 0.18                   | 0.51                   | 2.70                   | 0.11                    | 0.18                    | 1.45                    | 0.19                    |
|                                       | Pyrene                            | 129-00-0               | 0.01                   | 0.01                   | 0.00                   | 0.02                   | 0.01                   | 0.00                    | 0.00                    | 0.00                    | 0.01                    |
| 1 *                                   | tert-Butyl Alcohol                |                        | T                      | T                      | 0.33                   | T                      | T                      | T                       | 1.10                    | T                       | 1.18                    |
| 1                                     | Tetrachloroethene                 | 00127-18-4             | 0.16                   | 0.45                   | 0.02                   | 0.25                   | 1.35                   | 0.05                    | 0.09                    | 0.04                    | 0.09                    |
|                                       | Toluene                           | 108-88-3               | 0.27                   | 0.45                   | 0.21                   | 2.24                   | 0.31                   | 0.05                    | 0.10                    | 0.09                    | 0.11                    |
|                                       | trans-2-Pentene                   | 646-04-8               | 0.06                   | 0.03                   | 0.03                   | 0.23                   | 0.20                   | 0.02                    | 0.03                    | 0.03                    | 0.03                    |
| 1                                     | Trichlorofluoromethane            | 00075-69-4             | 0.19                   | 0.45                   | 0.10                   | 0.56                   | 1.35                   | 0.05                    | 0.08                    | 0.06                    | 0.12                    |
| 1 *                                   | (1-Methoxy-1-Methylethyl)-Benzene |                        | T                      | T                      | T                      | T                      | T                      | 0.27                    | T                       | T                       | T                       |
| Total                                 |                                   | 100.00                 | 100.00                 | 100.00                 | 100.00                 | 100.00                 | 100.00                 | 100.00                  | 100.00                  | 100.00                  | 100.00                  |
| TOTAL Detected (lb/lb rubber)         |                                   | 1.52E-03               | 1.29E-03               | 2.79E-03               | 4.66E-04               | 6.60E-04               | 5.62E-03               | 2.79E-03                | 2.44E-03                | 2.54E-03                | 2.66E-03                |
| TOTAL with non-detects (lb/lb rubber) |                                   | < 1.59E-03             | < 1.39E-03             | < 2.85E-03             | < 5.27E-04             | < 9.54E-04             | < 5.70E-03             | < 2.87E-03              | < 2.50E-03              | < 2.81E-03              | < 2.80E-03              |

1 - Results from Method TO-14

\* - Tentatively Identified compound

TABLE 4 - 8.8 PLATEN PRESS ORGANIC SPECIATION FACTORS

|                                         | CAS #             | Cmpd. #14<br>% of Total | Cmpd. #16<br>% of Total | Cmpd. #17<br>% of Total | Cmpd. #19<br>% of Total | Cmpd. #20<br>% of Total | Cmpd. #22<br>% of Total | Cmpd. #23<br>% of Total | TOTAL              |                   |                   |
|-----------------------------------------|-------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------|-------------------|-------------------|
|                                         |                   |                         |                         |                         |                         |                         |                         |                         | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| 1-Butanol                               | 00071-36-3        | 0.33                    | 0.47                    | 0.24                    | T                       | T                       | T                       | T                       | < 0.15             | < 0.85            | < 0.24            |
| 1-Chloro-4-(1-Chloroethenyl)-Cyclohexen |                   | T                       | T                       | T                       | T                       | T                       | T                       | T                       | < 0.01             | < 0.19            | < 0.04            |
| 1-Chloro-5-(1-Chloroethenyl)-Cyclohexen |                   | T                       | T                       | T                       | T                       | T                       | T                       | T                       | < 0.01             | < 0.12            | < 0.03            |
| 1-Pentene                               | 109-67-1          | < 0.02                  | 0.08                    | 5.11                    | < 0.02                  | < 0.03                  | < 0.03                  | < 0.06                  | < 0.43             | < 5.11            | < 1.19            |
| 1,1-Difluoroethane                      | 00075-34-3        | T                       | T                       | T                       | T                       | T                       | 0.31                    | T                       | < 0.06             | < 0.63            | < 0.18            |
| 1,1,1-Trichloroethane                   | 00071-55-6        | 0.05                    | 0.12                    | 0.38                    | 0.06                    | 0.12                    | 0.16                    | 0.14                    | < 0.99             | < 12.72           | < 2.94            |
| 1,2,4-Trichlorobenzene                  | 120-82-1          | < 0.00                  | < 0.01                  | 0.00                    | < 0.00                  | < 0.00                  | < 0.01                  | < 0.01                  | < 0.01             | < 0.04            | < 0.01            |
| 1,2,4-Trimethylbenzene                  | 95-63-6           | 0.02                    | 0.02                    | 0.01                    | 15.39                   | 0.02                    | 0.01                    | 0.02                    | < 0.93             | < 15.39           | < 3.61            |
| 1,3-Butadiene                           | 106-99-0          | 0.55                    | < 0.04                  | < 0.02                  | 0.28                    | 0.89                    | < 0.02                  | 0.48                    | < 0.34             | < 1.11            | < 0.38            |
| 1,3-Dioxolane                           |                   | T                       | T                       | T                       | T                       | T                       | T                       | T                       | < 0.01             | < 0.21            | < 0.05            |
| 1,4-Dichloro-1,3-Butadiene              | 02984-42-1        | T                       | T                       | T                       | T                       | T                       | T                       | T                       | < 0.00             | < 0.03            | < 0.01            |
| 1,4-Dichlorobenzene                     | 106-46-7          | 0.00                    | 0.00                    | 0.00                    | 0.00                    | 0.00                    | < 0.01                  | 0.01                    | < 0.01             | < 0.03            | < 0.01            |
| 1,4-Diethylbenzene + n-Butylbenzene     | 105-05-5/104-51-8 | < 0.23                  | < 0.44                  | < 0.22                  | < 0.22                  | < 0.30                  | < 0.29                  | < 0.61                  | < 0.62             | < 2.19            | < 0.59            |
| 2-Butanone                              | 00078-93-3        | < 0.13                  | 0.08                    | < 0.13                  | 0.38                    | 0.06                    | < 0.33                  | 0.08                    | < 0.32             | < 2.70            | < 0.81            |
| 2-Butene                                | 00126-99-8        | T                       | T                       | T                       | T                       | T                       | 0.17                    | T                       | < 0.02             | < 0.17            | < 0.06            |
| 2-Chloro-1,3-Butadiene                  | 00126-99-8        | T                       | T                       | T                       | T                       | T                       | 0.14                    | T                       | < 0.03             | < 0.36            | < 0.09            |
| 2-Chloronaphthalene                     | 91-58-7           | 0.00                    | < 0.00                  | < 0.00                  | < 0.00                  | 0.00                    | < 0.00                  | < 0.00                  | < 0.00             | < 0.02            | < 0.01            |
| 2-Furaldehyde                           | 98-01-1           | 0.01                    | 0.01                    | < 0.00                  | < 0.01                  | 0.01                    | 0.00                    | 0.01                    | < 0.01             | < 0.04            | < 0.01            |
| 2-Methyl-1-butene                       | 563-46-2          | < 0.02                  | < 0.05                  | < 0.02                  | < 0.02                  | < 0.03                  | < 0.03                  | < 0.06                  | < 0.06             | < 0.23            | < 0.06            |
| 2-Methyl-2-butene                       | 513-35-9          | < 0.02                  | < 0.05                  | < 0.02                  | < 0.02                  | < 0.03                  | < 3.26                  | < 0.06                  | < 0.52             | < 4.69            | < 1.29            |
| 2-Methylnaphthalene                     | 91-57-6           | 0.01                    | 0.01                    | 0.00                    | 0.00                    | 0.01                    | 0.02                    | 0.01                    | 0.03               | 0.38              | 0.09              |
| 2-Methylpentane                         | 107-83-5          | < 0.03                  | < 0.06                  | < 0.03                  | 0.10                    | 0.04                    | < 0.04                  | < 0.08                  | < 0.07             | < 0.24            | < 0.06            |
| 2-Methylphenol                          | 95-48-7           | < 0.00                  | < 0.01                  | < 0.00                  | < 0.01                  | 0.00                    | < 0.01                  | < 0.01                  | < 0.01             | < 0.04            | < 0.01            |
| 2,2-Dimethylbutane                      | 75-83-2           | < 0.03                  | < 0.06                  | < 0.03                  | < 0.03                  | 0.03                    | < 0.04                  | < 0.08                  | < 0.07             | < 0.28            | < 0.07            |
| 3-Heptanone                             | 00106-35-4        | T                       | T                       | T                       | T                       | T                       | 0.10                    | T                       | < 0.01             | < 0.10            | < 0.02            |
| 3-Methylhexane                          | 589-34-4          | < 0.03                  | < 0.07                  | < 0.03                  | < 0.03                  | < 0.04                  | < 0.04                  | < 0.09                  | < 0.09             | < 0.50            | < 0.12            |
| 3-Methylpentane                         | 96-14-0           | < 0.03                  | < 0.06                  | < 0.03                  | 0.32                    | 0.05                    | < 0.04                  | < 0.08                  | < 0.11             | < 0.35            | < 0.10            |
| 3-Methylstyrene                         | 100-80-1          | 0.00                    | < 0.01                  | 0.00                    | < 0.00                  | 0.00                    | < 0.01                  | < 0.01                  | < 0.01             | < 0.03            | < 0.01            |
| 3/4-Methylphenol                        | 108-39-4/106-44-5 | < 0.00                  | 0.00                    | < 0.00                  | < 0.01                  | 0.00                    | < 0.01                  | 0.00                    | < 0.01             | < 0.04            | < 0.01            |
| 4-Chloroaniline                         | 106-47-8          | < 0.00                  | < 0.00                  | 0.02                    | < 0.00                  | < 0.00                  | < 0.01                  | < 0.01                  | < 0.01             | < 0.03            | < 0.01            |
| 4-Chlorostyrene                         | 1073-67-2         | < 0.00                  | < 0.01                  | < 0.00                  | < 0.00                  | < 0.00                  | < 0.01                  | < 0.01                  | < 0.01             | < 0.03            | < 0.01            |
| 4-Methyl-2-pentanone                    | 00108-10-1        | < 0.07                  | < 0.13                  | < 0.06                  | < 0.16                  | < 0.08                  | < 0.77                  | < 0.17                  | < 0.49             | < 4.09            | < 0.98            |
| Acenaphthene                            | 83-32-9           | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  | 0.00                    | 0.00                    | 0.00                    | < 0.00             | < 0.02            | < 0.01            |
| Acenaphthylene                          | 208-96-8          | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  | 0.00                    | < 0.00                  | < 0.00             | < 0.01            | < 0.00            |
| Acetaldehyde                            | 00075-07-0        | T                       | T                       | T                       | T                       | T                       | 0.14                    | T                       | < 0.08             | < 1.27            | < 0.30            |
| Acetone                                 | 00067-64-1        | 0.27                    | 0.60                    | 0.30                    | 24.79                   | 0.39                    | 0.88                    | 0.68                    | 2.71               | 24.79             | 5.94              |
| Acetonitrile                            | 01722-09-4        | < 0.13                  | < 0.25                  | < 0.13                  | < 0.32                  | < 0.17                  | < 0.33                  | < 0.35                  | < 0.46             | < 2.70            | < 0.62            |
| Acetophenone                            | 98-86-2           | 0.05                    | 0.03                    | 0.02                    | 0.01                    | 0.03                    | 0.14                    | 0.02                    | < 0.49             | < 7.71            | < 1.80            |
| Acetylene                               | 74-86-2           | 0.02                    | < 0.02                  | 0.04                    | 0.05                    | 0.03                    | < 0.02                  | < 0.02                  | < 0.04             | < 0.13            | < 0.03            |
| Acrylonitrile                           | 00107-13-1        | 0.77                    | < 0.25                  | < 0.13                  | < 0.32                  | < 0.17                  | < 0.33                  | < 0.35                  | < 0.46             | < 2.70            | < 0.80            |
| Alpha-Methyl Styrene                    |                   | T                       | T                       | T                       | T                       | T                       | 0.07                    | T                       | < 0.05             | < 0.54            | < 0.13            |
| Aniline                                 | 62-53-3           | < 0.00                  | < 0.00                  | 25.68                   | < 0.00                  | < 0.00                  | 0.15                    | 0.20                    | < 1.56             | < 25.68           | < 6.03            |
| Benzaldehyde                            | 100-52-7          | 0.03                    | 0.18                    | < 0.00                  | 0.51                    | 0.04                    | 0.02                    | 0.04                    | < 0.08             | < 0.51            | < 0.12            |
| Benzene                                 | 71-43-2           | 0.03                    | 0.05                    | 0.03                    | 0.16                    | 0.03                    | < 0.04                  | < 0.07                  | < 0.07             | < 0.22            | < 0.06            |
| Benidine                                | 92-87-5           | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  | 0.01                    | < 0.01                  | < 0.06             | < 0.86            | < 0.20            |
| Benzoic acid                            | 65-85-0           | 0.07                    | 0.19                    | 0.09                    | 0.77                    | 0.08                    | < 0.01                  | 0.04                    | < 0.12             | < 0.77            | < 0.18            |
| Benzonitrile                            | 100-47-0          | < 0.00                  | 0.01                    | < 0.00                  | < 0.00                  | < 0.00                  | 0.01                    | < 0.00                  | < 0.01             | < 0.06            | < 0.01            |
| Benzyl alcohol                          | 100-51-6          | 0.01                    | 0.02                    | < 0.00                  | 0.01                    | 0.01                    | < 0.01                  | 0.02                    | < 0.01             | < 0.05            | < 0.01            |
| Biphenyl                                | 92-52-4           | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  | < 0.00                  | < 0.01             | < 0.06            | < 0.01            |
| bis(2-Ethylhexyl)phthalate              | 117-81-7          | 0.06                    | 0.15                    | 0.10                    | 0.12                    | 0.09                    | 0.09                    | 0.46                    | 0.27               | 1.21              | 0.31              |
| Butane                                  |                   | T                       | T                       | T                       | T                       | T                       | T                       | T                       | < 0.06             | < 0.61            | < 0.16            |
| Butylbenzylphthalate                    | 85-68-7           | 0.01                    | 0.03                    | 0.01                    | 0.01                    | 0.01                    | 0.02                    | 0.04                    | 0.03               | 0.12              | 0.03              |
| C12H24 Branched Alkene                  |                   | 0.33                    | T                       | T                       | T                       | T                       | T                       | T                       | < 0.27             | < 4.24            | < 1.00            |
| C9-C10 Branched Alkane                  |                   | T                       | T                       | T                       | 1.60                    | T                       | T                       | T                       | < 0.09             | < 1.60            | < 0.38            |
| Camphene                                | 79-92-5           | 0.02                    | 0.04                    | < 0.00                  | < 0.00                  | 0.02                    | 0.02                    | 0.03                    | < 0.04             | < 0.13            | < 0.03            |
| Carbon Disulfide                        | 00075-15-0        | 22.06                   | 0.28                    | 0.16                    | < 0.16                  | 0.15                    | 5.65                    | 0.81                    | < 10.82            | < 46.06           | < 15.18           |
| Carbonyl Sulfide                        | 00463-58-1        | 0.41                    | T                       | T                       | T                       | T                       | T                       | T                       | < 0.05             | < 0.41            | < 0.12            |
| Chlorodifluoromethane                   |                   | T                       | T                       | T                       | T                       | T                       | T                       | T                       | < 0.01             | < 0.21            | < 0.05            |
| Chloroethane                            | 00075-00-3        | < 0.07                  | 0.07                    | < 0.06                  | < 0.16                  | < 0.08                  | < 0.17                  | < 0.17                  | < 0.21             | < 1.35            | < 0.30            |
| Chloromethane                           | 00074-87-3        | < 0.07                  | 0.03                    | 0.03                    | < 0.16                  | 0.03                    | < 0.17                  | 0.07                    | < 0.18             | < 1.35            | < 0.31            |
| cis-2-Pentene                           | 627-20-3          | 4.77                    | 6.65                    | 2.37                    | 8.28                    | 6.79                    | < 1.68                  | 7.00                    | < 4.83             | < 8.96            | < 2.60            |
| Cumene                                  | 98-82-8           | 0.00                    | < 0.00                  | 0.00                    | < 0.00                  | 0.00                    | 0.00                    | 0.00                    | < 0.01             | < 0.05            | < 0.01            |
| Cyclobutane                             |                   | T                       | T                       | T                       | T                       | T                       | T                       | T                       | < 0.03             | < 0.55            | < 0.13            |
| Cyclohexanone                           | 108-94-1          | 0.01                    | 0.02                    | < 0.00                  | < 0.01                  | 0.00                    | 0.01                    | 0.05                    | < 0.16             | < 2.54            | < 0.58            |
| Cyclohexene                             | 00110-82-7        | T                       | T                       | T                       | T                       | T                       | T                       | T                       | < 0.03             | < 0.59            | < 0.14            |
| Cyclooctadiene                          |                   | 0.57                    | T                       | T                       | T                       | T                       | T                       | T                       | < 0.03             | < 0.57            | < 0.13            |
| Cyclopentane + 2,3-Dimethylbutane       | 287-92-3/79-29-8  | < 0.03                  | < 0.05                  | < 0.03                  | 0.13                    | 0.02                    | < 0.03                  | < 0.07                  | < 0.07             | < 0.31            | < 0.06            |

TABLE 4 - 8.B PLATEN PRESS ORGANIC SPECIATION FACTORS

|                                       | CAS #                             | Cmpd. #14         | Cmpd. #16  | Cmpd. #17  | Cmpd. #19  | Cmpd. #20  | Cmpd. #22  | Cmpd. #23  | TOTAL      |            |            |
|---------------------------------------|-----------------------------------|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                                       |                                   | % of Total        | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | Mean       | MAX        | STD        |
|                                       |                                   |                   |            |            |            |            |            |            | % of Total | % of Total | % of Total |
| 1                                     | Dibenzofuran                      | 132-84-9          | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.01       | 0.00       |
|                                       | Dichlorodifluoromethane           | 00075-71-8        | 0.05       | 0.15       | 0.04       | 0.16       | 0.05       | 0.17       | 0.08       | 1.35       | 0.31       |
|                                       | Diethylphthalate                  | 84-66-2           | 0.02       | 0.03       | 0.01       | 0.00       | 0.01       | 0.01       | 0.04       | 0.09       | 0.03       |
|                                       | Dimethylphthalate                 | 131-11-3          | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.03       | 0.01       |
|                                       | Di-n-butylphthalate               | 84-74-2           | 0.01       | 0.00       | 0.24       | 0.01       | 0.02       | 0.00       | 0.25       | 0.25       | 0.08       |
|                                       | Di-n-octylphthalate               | 117-84-0          | 0.00       | 0.01       | 0.00       | 0.00       | 0.01       | 0.00       | 0.02       | 0.04       | 0.01       |
|                                       | Diphenylamine                     | 122-39-4          | 0.22       | 0.02       | 0.00       | 0.00       | 0.00       | 0.01       | 0.00       | 0.22       | 0.05       |
|                                       | Ethane                            | 74-84-0           | 0.10       | 0.20       | 0.01       | 0.01       | 0.06       | 0.16       | 0.26       | 1.14       | 0.26       |
| 1 *                                   | Ethanol                           | T                 | 1.58       | 15.92      | T          | T          | T          | T          | 1.29       | 15.92      | 3.75       |
|                                       | Ethylbenzene                      | 100-41-4          | 0.04       | 0.07       | 0.04       | 0.04       | 0.05       | 0.05       | 0.10       | 0.30       | 0.07       |
|                                       | Ethylene                          | 74-85-1           | 0.03       | 0.02       | 0.01       | 0.01       | 0.05       | 0.04       | 0.03       | 0.29       | 0.07       |
|                                       | Fluoranthene                      | 206-44-0          | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.01       | 0.00       |
|                                       | Fluorene                          | 86-73-7           | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.02       | 0.01       |
|                                       | Hexachlorobutadiene               | 87-88-3           | 0.00       | 0.01       | 0.00       | 0.01       | 0.00       | 0.01       | 0.02       | 0.07       | 0.02       |
|                                       | Isobutane                         | 75-28-5           | 0.05       | 0.04       | 0.02       | 0.20       | 0.03       | 0.03       | 0.14       | 0.31       | 0.08       |
|                                       | Isobutylene + 1-Butene            | 115-11-7/106-98-9 | 0.02       | 2.40       | 2.04       | 0.30       | 0.02       | 0.72       | 0.05       | 2.97       | 0.97       |
|                                       | Isooctanol                        | 26952-21-6        | 0.02       | 0.15       | 0.02       | 0.06       | 0.02       | 0.07       | 0.06       | 3.00       | 0.69       |
|                                       | Isopentane                        | 78-78-4           | 0.20       | 0.36       | 0.43       | 25.20      | 0.29       | 0.39       | 0.38       | 25.20      | 5.91       |
|                                       | Isoprene                          | 78-79-5           | 0.02       | 0.04       | 0.02       | 0.02       | 0.03       | 0.03       | 0.06       | 0.22       | 0.06       |
| 1 *                                   | Isopropanol                       | 00067-63-0        | T          | 0.63       | 15.92      | T          | T          | T          | 0.65       | 15.92      | 3.76       |
|                                       | Methylcyclopentane                | 96-37-7           | 0.03       | 0.06       | 0.03       | 0.48       | 0.10       | 0.04       | 0.08       | 0.48       | 0.13       |
| 1                                     | Methylene Chloride                | 00075-09-2        | 66.18      | 79.09      | 27.86      | 5.44       | 86.69      | 79.64      | 80.68      | 86.69      | 23.75      |
|                                       | m-Xylene + p-Xylene               | 108-38-3/106-42-3 | 0.04       | 0.07       | 0.04       | 0.04       | 0.05       | 0.05       | 0.10       | 1.75       | 0.40       |
|                                       | Naphthalene                       | 91-20-3           | 0.02       | 0.02       | 0.01       | T          | 0.01       | 0.10       | 0.03       | 0.30       | 0.08       |
|                                       | n-Butane                          | 106-97-8          | 0.17       | 0.04       | 0.23       | 0.21       | 0.27       | 0.12       | 0.20       | 0.83       | 0.25       |
|                                       | n-Decane                          | 124-18-5          | 0.24       | 0.47       | 0.24       | 0.24       | 0.31       | 0.31       | 0.65       | 2.00       | 0.41       |
|                                       | n-Hexane                          | 110-54-3          | 0.17       | 0.26       | 0.13       | 8.31       | 0.92       | 0.29       | 0.35       | 8.31       | 1.95       |
|                                       | n-Pentane                         | 109-66-0          | 0.11       | 0.05       | 0.02       | 0.07       | 0.10       | 0.03       | 0.07       | 0.24       | 0.07       |
|                                       | n-Propylbenzene                   | 103-65-1          | 0.04       | 0.08       | 0.04       | 0.16       | 0.05       | 0.05       | 0.11       | 0.39       | 0.10       |
| 1 *                                   | n-Undecane                        | 00112-21-4        | T          | T          | T          | T          | T          | T          | T          | 2.54       | 0.60       |
|                                       | o-Ethyltoluene                    | 611-14-3          | 0.20       | 0.40       | 0.20       | 0.20       | 0.26       | 0.20       | 0.55       | 1.86       | 0.50       |
|                                       | o-Toluidine                       | 95-53-4           | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.11       | 0.03       |
|                                       | o-Xylene                          | 95-47-6           | 0.04       | 0.07       | 0.04       | 0.04       | 0.05       | 0.05       | 0.10       | 0.38       | 0.08       |
|                                       | Phenanthrene                      | 85-01-8           | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.01       | 0.05       | 0.01       |
|                                       | Phenol                            | 108-95-2          | 0.07       | 0.03       | 0.00       | 0.00       | 0.02       | 0.02       | 0.03       | 0.18       | 0.04       |
|                                       | Phthalimide                       | 85-41-6           | 0.05       | 0.29       | 0.22       | 0.01       | 0.00       | 0.01       | 1.15       | 1.15       | 0.27       |
|                                       | Propane                           | 74-98-6           | 0.07       | 0.03       | 0.01       | 0.01       | 0.02       | 0.06       | 0.13       | 0.83       | 0.19       |
|                                       | Propylene                         | 115-07-1          | 0.01       | 0.03       | 0.01       | 0.01       | 0.02       | 0.02       | 0.04       | 0.23       | 0.06       |
| 1                                     | Propylene Oxide                   | 00075-56-9        | 0.13       | 0.25       | 0.13       | 0.32       | 0.17       | 0.92       | 0.35       | 7.46       | 1.75       |
|                                       | Pyrene                            | 129-00-0          | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.02       | 0.01       |
| 1 *                                   | tert-Butyl Alcohol                | T                 | T          | 0.32       | 3.20       | T          | T          | T          | T          | 3.20       | 0.80       |
| 1                                     | Tetrachloroethene                 | 00127-18-4        | 0.07       | 0.13       | 0.06       | 0.16       | 0.08       | 0.17       | 0.17       | 1.35       | 0.30       |
|                                       | Toluene                           | 108-88-3          | 0.10       | 1.99       | 0.08       | 0.28       | 0.16       | 0.15       | 0.39       | 2.24       | 0.63       |
|                                       | trans-2-Pentene                   | 846-04-8          | 0.02       | 0.05       | 0.02       | 0.02       | 0.03       | 0.03       | 0.06       | 0.23       | 0.06       |
| 1                                     | Trichlorofluoromethane            | 00075-69-4        | 0.07       | 0.16       | 0.05       | 0.16       | 0.12       | 0.17       | 0.16       | 1.35       | 0.31       |
| 1 *                                   | (1-Methoxy-1-Methylethyl)-Benzene | T                 | T          | T          | T          | T          | T          | T          | T          | 0.27       | 0.06       |
| Total                                 |                                   | 100.00            | 100.00     | 100.00     | 100.00     | 100.00     | 100.00     | 100.00     |            |            |            |
| TOTAL Detected (lb/lb rubber)         |                                   | 3.86E-03          | 1.92E-03   | 3.88E-03   | 3.49E-03   | 2.81E-03   | 2.80E-03   | 1.34E-03   |            |            |            |
| TOTAL with non-detects (lb/lb rubber) |                                   | 3.93E-03          | 1.99E-03   | 3.95E-03   | 3.60E-03   | 2.87E-03   | 2.89E-03   | 1.41E-03   |            |            |            |

1 - Results from Method TO-14      \* - Tentatively Identified

TABLE 4 - 8.C PLATEN PRESS SULFUR SPECIATION FACTORS

|                                     | CAS #    | Cmpd.#1<br>% of Total | Cmpd.#2<br>% of Total | Cmpd.#3<br>% of Total | Cmpd.#5<br>% of Total | Cmpd.#7<br>% of Total | Cmpd.#9<br>% of Total | Cmpd.#10<br>% of Total | Cmpd.#11<br>% of Total | Cmpd.#12<br>% of Total | Cmpd.#13<br>% of Total |
|-------------------------------------|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|
| Carbonyl Sulfide                    | 463-58-1 | < 61.24               | 8.02                  | < 61.25               | < 68.62               | < 76.30               | < 61.27               | < 0.32                 | < 1.21                 | 8.66                   | 4.61                   |
| Carbon Disulfide                    | 75-15-0  | < 38.76               | 91.98                 | < 38.75               | < 31.38               | < 23.70               | < 38.73               | 99.68                  | 98.79                  | 91.34                  | 95.39                  |
| Total                               |          | 100.00                | 100.00                | 100.00                | 100.00                | 100.00                | 100.00                | 100.00                 | 100.00                 | 100.00                 | 100.00                 |
| Total detected (lb/lb rubber)       |          | 0.00E+00              | 4.55E-04              | 0.00E+00              | 0.00E+00              | 0.00E+00              | 0.00E+00              | 9.69E-04               | 2.65E-04               | 5.07E-04               | 7.22E-04               |
| Total w/ non detects (lb/lb rubber) |          | < 5.16E-06            | < 4.55E-04            | < 5.03E-06            | < 6.56E-06            | < 8.44E-06            | < 6.12E-06            | < 9.72E-04             | < 2.69E-04             | < 5.07E-04             | < 7.22E-04             |

|                                     | CAS #    | Cmpd.#14<br>% of Total | Cmpd.#16<br>% of Total | Cmpd.#17<br>% of Total | Cmpd.#19<br>% of Total | Cmpd.#20<br>% of Total | Cmpd.#22<br>% of Total | Cmpd.#23<br>% of Total | TOTAL      |            |            |
|-------------------------------------|----------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------|------------|------------|
|                                     |          |                        |                        |                        |                        |                        |                        |                        | Mean       | MAX        | STD        |
|                                     |          |                        |                        |                        |                        |                        |                        |                        | % of Total | % of Total | % of Total |
| Carbonyl Sulfide                    | 463-58-1 | 12.78                  | < 61.25                | < 61.25                | < 61.25                | < 61.25                | < 68.22                | 81.87                  | 44.67      | 81.87      | 29.26      |
| Carbon Disulfide                    | 75-15-0  | 87.22                  | < 38.75                | < 38.75                | < 38.75                | < 38.75                | < 31.78                | 18.13                  | 55.33      | 99.68      | 29.26      |
| Total                               |          | 100.00                 | 100.00                 | 100.00                 | 100.00                 | 100.00                 | 100.00                 | 100.00                 |            |            |            |
| Total detected (lb/lb rubber)       |          | 6.88E-04               | 0.00E+00               | 0.00E+00               | 0.00E+00               | 0.00E+00               | 0.00E+00               | 3.23E-05               |            |            |            |
| Total w/ non detects (lb/lb rubber) |          | < 6.88E-04             | < 5.03E-06             | < 5.03E-06             | < 4.70E-06             | < 4.86E-06             | < 5.87E-06             | < 3.23E-05             |            |            |            |

**TABLE 4-9A**  
**HOT AIR OVEN CURE SUMMARY**

| <b>Compound</b>  | <b>Total VOCs,<br/>as methane<br/>(lbs/lb rubber)</b> | <b>Total Speciated<br/>Semivolatiles<br/>(lbs/lb rubber)<br/>with non-detects</b> | <b>Total Speciated<br/>Volatiles<br/>(lbs/lb rubber)<br/>with non-detects</b> | <b>Total Speciated<br/>Organics<sup>1</sup><br/>(lbs/lb rubber)<br/>with non-detects</b> | <b>Total Sulfur<br/>(lbs/lb rubber)<br/>with non-detects</b> |
|------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>5</b>         | 3.10E-04                                              | < 6.36E-04                                                                        | < 2.46E-04                                                                    | < 8.77E-04                                                                               | < 7.71E-05                                                   |
| <b>8</b>         | 2.26E-04                                              | < 1.19E-04                                                                        | < 1.94E-03                                                                    | < 2.06E-03                                                                               | < 1.14E-03                                                   |
| <b>22</b>        | 1.12E-04                                              | < 1.24E-03                                                                        | < 2.20E-03                                                                    | < 3.36E-03                                                                               | < 2.21E-03                                                   |
| <b>Mean</b>      | 2.16E-04                                              | < 6.65E-04                                                                        | < 1.46E-03                                                                    | < 2.10E-03                                                                               | < 1.14E-03                                                   |
| <b>Max.</b>      | 3.10E-04                                              | < 1.24E-03                                                                        | < 2.20E-03                                                                    | < 3.36E-03                                                                               | < 2.21E-03                                                   |
| <b>Std. Dev.</b> | 8.11E-05                                              | < 4.58E-04                                                                        | < 8.66E-04                                                                    | < 1.01E-03                                                                               | < 8.71E-04                                                   |

<sup>1</sup> - Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

Table 4-9.B HOT AIR OVEN CURE ORGANIC SPECIATION FACTORS

| Chemical Compound            | CAS Numbers | Cmpd. #5<br>% of Total | Cmpd. #8<br>% of Total | Cmpd. #22<br>% of Total | MEAN<br>% of Total | MAX<br>% of Total | STD. DEV.<br>% of Total |
|------------------------------|-------------|------------------------|------------------------|-------------------------|--------------------|-------------------|-------------------------|
| 1,1,1-Trichloroethane        | 00071-55-6  | 0.13                   | < 0.21                 | < 0.17                  | < 0.17             | < 0.21            | < 0.03                  |
| 1,1,2,2-Tetrachloroethane    | 00079-34-5  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| 1,1,2-Trichloroethane        | 00079-00-5  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| 1,1-Dichloroethane           | 00075-34-3  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| 1,1-Dichloroethene           | 00075-35-4  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| 1,2,4-Trichlorobenzene       | 120-82-1    | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| O 1,2,4-Trimethylbenzene     | 00095-63-6  | < 0.20                 | 0.10                   | < 0.05                  | < 0.12             | < 0.20            | < 0.06                  |
| 1,2-Dibromoethane            | 00106-93-4  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| 1,2-Dibromo-3-Chloropropane  | 00096-12-8  | < 0.29                 | < 0.41                 | < 0.35                  | < 0.35             | < 0.41            | < 0.05                  |
| 1,2-Dichlorobenzene          | 00095-50-1  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| 1,2-Dichloroethane           | 00107-06-2  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| 1,2-Dichloropropane          | 00078-87-5  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| O 1,3,5-Trimethylbenzene     | 00108-67-8  | < 0.20                 | 0.57                   | < 0.06                  | < 0.27             | 0.57              | < 0.21                  |
| O 1,3-Butadiene              | 00106-99-0  | < 0.04                 | 0.06                   | < 0.01                  | < 0.04             | 0.06              | < 0.02                  |
| 1,3-Cyclooctadiene           | 1700-10-3   | < 0.02                 | 0.00                   | < 0.01                  | < 0.01             | < 0.02            | < 0.00                  |
| 1,3-Dichlorobenzene          | 00541-73-1  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| 1,4-Dichlorobenzene          | 00106-46-7  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| O 1,4-Diethylbenzene         | 00105-05-5  | < 0.20                 | < 0.06                 | < 0.01                  | < 0.09             | < 0.20            | < 0.08                  |
| 1,4-Dioxane                  | 00123-91-1  | < 0.59                 | < 0.83                 | < 0.69                  | < 0.70             | < 0.83            | < 0.10                  |
| 1,4-Phenylenediamine         | 106-50-3    | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| 1,5-Cyclooctadiene           | 111-78-4    | < 0.03                 | < 0.01                 | < 0.02                  | < 0.02             | < 0.03            | < 0.01                  |
| T 1-Butanol                  | 00071-36-3  |                        | T 2.59                 | T                       | < 0.86             | 2.59              | < 1.22                  |
| O 1-Butene                   | 00106-98-9  | 0.96                   | < 0.01                 | < 0.01                  | < 0.33             | 0.96              | < 0.45                  |
| 1-Dodecene                   | 112-41-4    | < 0.05                 | < 0.02                 | < 0.03                  | < 0.03             | < 0.05            | < 0.02                  |
| O 1-Heptene                  | 00592-76-7  | 0.10                   | < 0.04                 | < 0.01                  | < 0.05             | 0.10              | < 0.04                  |
| O 1-Hexene                   | 00592-41-6  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| T 1-Methoxy-Cumene           |             |                        | T 1.55                 | T                       | 0.52               | 1.55              | 0.73                    |
| O 1-Octene                   | 111-66-0    | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| O 1-Pentene                  | 00109-67-1  | < 0.04                 | < 0.01                 | 0.03                    | 0.03               | < 0.04            | 0.01                    |
| 2,2'-oxybis(1-Chloropropane) | 108-60-1    | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| O 2,2-Dimethylbutane         | 00075-83-2  | 0.10                   | 0.03                   | < 0.01                  | < 0.05             | 0.10              | < 0.04                  |
| O 2,2-Dimethylpropane        | 00463-82-1  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.02                  |
| O 2,3,4-Trimethylpentane     | 00565-75-3  | < 0.04                 | 0.03                   | 0.17                    | 0.08               | 0.17              | 0.07                    |
| O 2,3-Dimethylbutane         | 00079-29-8  | < 0.04                 | 0.02                   | 0.01                    | 0.03               | < 0.04            | 0.01                    |
| O 2,3-Dimethylpentane        | 00565-59-3  | 0.16                   | < 0.01                 | < 0.01                  | < 0.06             | 0.16              | < 0.07                  |
| 2,4,5-Trichlorophenol        | 95-95-4     | < 0.01                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| 2,4,6-Trichlorophenol        | 88-06-2     | < 0.01                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| 2,4-Dichlorophenol           | 120-83-2    | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| O 2,4-Dimethylhexane         | 00589-43-5  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.02                  |
| 2,4-Dimethylphenol           | 105-67-9    | < 0.01                 | < 0.00                 | < 0.00                  | < 0.01             | < 0.01            | < 0.00                  |
| 2,4-Dinitrophenol            | 51-28-5     | < 0.07                 | < 0.03                 | < 0.04                  | < 0.04             | < 0.07            | < 0.02                  |
| 2,4-Dinitrotoluene           | 121-14-2    | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.00                  |
| 2,6-Dinitrotoluene           | 606-20-2    | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.01                  |
| 2-Butanone                   | 00078-93-3  | 0.18                   | < 0.41                 | < 0.35                  | < 0.32             | < 0.41            | < 0.10                  |
| 2-Chloroacetophenone         | 1341-24-8   | < 0.01                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.01            | < 0.00                  |
| 2-Chloronaphthalene          | 91-58-7     | < 0.01                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.01            | < 0.00                  |
| 2-Chlorophenol               | 95-57-8     | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| T 2-Ethyl Hexanal            | 00123-05-7  |                        | T 1.55                 | T                       | < 0.52             | 1.55              | < 0.73                  |
| T 2-Ethyl-1-Hexanol          | 00104-76-7  |                        | T 15.52                | 0.69                    | 5.40               | 15.52             | 7.16                    |
| 2-Furaldehyde                | 98-01-1     | 0.01                   | 0.00                   | 0.01                    | 0.01               | 0.01              | 0.01                    |
| 2-Hexanone                   | 00591-78-6  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| O 2-Methylheptane            | 00592-27-8  | 0.07                   | 0.05                   | < 0.01                  | < 0.04             | 0.07              | < 0.02                  |
| O 2-Methylhexane             | 00591-76-4  | < 0.04                 | 0.02                   | 0.02                    | 0.03               | < 0.04            | 0.01                    |
| 2-Methylnaphthalene          | 91-57-6     | 0.05                   | 0.02                   | 0.05                    | 0.04               | 0.05              | 0.01                    |
| O 2-Methylpentane            | 00107-83-5  | 0.50                   | 0.04                   | 0.71                    | 0.42               | 0.71              | 0.28                    |

Table 4-9.B HOT AIR OVEN CURE ORGANIC SPECIATION FACTORS

| Chemical Compound          | CAS Numbers       | Cmpd. #5<br>% of Total | Cmpd. #8<br>% of Total | Cmpd. #22<br>% of Total | MEAN<br>% of Total | MAX<br>% of Total | STD. DEV.<br>% of Total |
|----------------------------|-------------------|------------------------|------------------------|-------------------------|--------------------|-------------------|-------------------------|
| 2-Methylphenol             | 95-48-7           | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| O 2-Methyl-1-Butene        | 00563-46-2        | < 0.04                 | 0.04                   | 0.05                    | 0.04               | 0.05              | 0.00                    |
| O 2-Methyl-2-Butene        | 00513-35-9        | 0.40                   | 0.86                   | 0.12                    | 0.46               | 0.86              | 0.31                    |
| O 2-Methyl-2-Pentene       | 00625-27-4        | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| T 2-Methyl-2-Propenal      |                   | 1.11                   | T                      | T                       | < 0.37             | 1.11              | < 0.52                  |
| 2-Nitroaniline             | 88-74-4           | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.01                  |
| 2-Nitrophenol              | 88-75-5           | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.01                  |
| 3,3'-Dichlorobenzidine     | 91-94-1           | < 0.01                 | < 0.00                 | < 0.00                  | < 0.01             | < 0.01            | < 0.00                  |
| 3,3'-Dimethoxybenzidine    | 119-90-4          | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| 3,3'-Dimethylbenzidine     | 119-93-7          | < 0.01                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.01            | < 0.00                  |
| 3-Furaldehyde              | 498-60-2          | 0.01                   | < 0.00                 | < 0.01                  | < 0.01             | 0.01              | < 0.00                  |
| O 3-Methylhexane           | 00589-34-4        | 0.36                   | 0.01                   | < 0.01                  | < 0.13             | 0.36              | < 0.16                  |
| O 3-Methylpentane          | 00096-14-0        | 0.06                   | 0.02                   | 0.01                    | 0.03               | 0.06              | 0.02                    |
| 3-Methylstyrene            | 100-80-1          | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| 3-Nitroaniline             | 99-09-2           | < 0.02                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.02            | < 0.01                  |
| 3/4-Methylphenol           | 108-39-4/106-44-5 | 0.04                   | < 0.00                 | 0.01                    | 0.02               | 0.04              | 0.01                    |
| 4,4'-Methylenedianiline    | 101-77-9          | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| 4,6-Dinitro-2-methylphenol | 88-85-7           | < 0.03                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.03            | < 0.01                  |
| 4-Aminobiphenyl            | 92-67-1           | < 0.01                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.01            | < 0.00                  |
| 4-Bromophenyl-phenylether  | 101-55-3          | < 0.01                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| 4-Chloroaniline            | 106-47-8          | < 0.01                 | < 0.00                 | < 0.00                  | < 0.01             | < 0.01            | < 0.00                  |
| 4-Chlorophenyl-phenylether | 7005-72-3         | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| 4-Chlorostyrene            | 1073-67-2         | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.01                  |
| 4-Chloro-3-methylphenol    | 59-50-7           | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| 4-Methylstyrene            |                   | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| O 4-Methyl-1-Pentene       | 00691-37-2        | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| 4-Methyl-2-pentanone       | 00108-10-1        | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| 4-Nitroaniline             | 100-01-6          | < 0.02                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.02            | < 0.01                  |
| 4-Nitrobiphenyl            | 92-93-3           | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| 4-Nitrophenol              | 100-02-7          | < 0.03                 | < 0.01                 | < 0.02                  | < 0.02             | < 0.03            | < 0.01                  |
| a,a,a-Trichlorotoluene     | 98-07-7           | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| Acenaphthene               | 83-32-9           | < 0.01                 | < 0.00                 | 0.00                    | 0.00               | < 0.01            | 0.00                    |
| Acenaphthylene             | 208-96-8          | < 0.07                 | 0.00                   | < 0.02                  | < 0.03             | < 0.07            | < 0.03                  |
| Acetone                    | 00067-64-1        | 1.46                   | 0.72                   | 0.64                    | 0.94               | 1.46              | 0.37                    |
| Acetonitrile               | 75-05-8           | 0.07                   | < 0.41                 | < 0.35                  | < 0.28             | < 0.41            | < 0.15                  |
| T Acetophenone             | 00098-86-2        | T                      | 10.35                  | 0.43                    | 3.59               | 10.35             | 4.78                    |
| O Acetylene                | 00074-86-2        | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| Acrolein                   | 00107-02-8        | 0.09                   | < 0.41                 | 0.28                    | 0.26               | < 0.41            | 0.13                    |
| Acrylonitrile              | 00107-13-1        | < 0.29                 | < 0.41                 | < 0.35                  | < 0.35             | < 0.41            | < 0.05                  |
| T Alkane                   |                   | 0.29                   | 0.53                   | 4.73                    | 1.85               | 4.73              | 2.04                    |
| T Alkyl acid               |                   | 13.24                  | 1.57                   | 13.73                   | 9.52               | 13.73             | 5.62                    |
| Allyl Chloride             | 00107-05-1        | < 0.29                 | < 0.41                 | < 0.35                  | < 0.35             | < 0.41            | < 0.05                  |
| T Alpha-Methylstyrene      | 00098-83-9        | T                      | 3.10                   | T                       | < 1.03             | 3.10              | < 1.46                  |
| Aniline                    | 62-53-3           | < 0.01                 | 0.01                   | 0.03                    | 0.01               | 0.03              | 0.01                    |
| Anthracene                 | 120-12-7          | 0.04                   | 0.01                   | < 0.01                  | < 0.02             | 0.04              | < 0.01                  |
| O a-Pinene                 | 1330-16-1         | < 0.04                 | 0.01                   | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| Benzaldehyde               | 100-52-7          | 0.06                   | 0.03                   | 0.49                    | 0.19               | 0.49              | 0.21                    |
| O Benzene                  | 00071-43-2        | 0.17                   | 2.37                   | 0.12                    | 0.89               | 2.37              | 1.05                    |
| Benzidine                  | 92-87-5           | < 0.01                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.01            | < 0.00                  |
| Benzoic acid               | 65-85-0           | 0.88                   | 0.36                   | 0.57                    | 0.60               | 0.88              | 0.21                    |
| Benzonitrile               | 100-47-0          | < 0.01                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.01            | < 0.00                  |
| T Benzophenone             | 119-61-9          | T                      | 0.05                   | T                       | 0.02               | 0.05              | 0.02                    |
| T Benzothiazole            | 95-16-9           | 3.47                   | 0.21                   | 0.55                    | 1.41               | 3.47              | 1.46                    |
| Benzo(a)anthracene         | 56-55-3           | < 0.00                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.00            | < 0.00                  |
| Benzo(a)pyrene             | 50-32-8           | < 0.00                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.00            | < 0.00                  |
| Benzo(b)fluoranthene       | 205-99-2          | < 0.00                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.00            | < 0.00                  |
| Benzo(g,h,i)perylene       | 191-24-2          | < 0.00                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.00            | < 0.00                  |
| Benzo(k)fluoranthene       | 207-08-9          | < 0.00                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.00            | < 0.00                  |

Table 4-9.B HOT AIR OVEN CURE ORGANIC SPECIATION FACTORS

| Chemical Compound                                 | CAS Numbers | Cmpd. #5<br>% of Total | Cmpd. #8<br>% of Total | Cmpd. #22<br>% of Total | MEAN<br>% of Total | MAX<br>% of Total | STD. DEV.<br>% of Total |
|---------------------------------------------------|-------------|------------------------|------------------------|-------------------------|--------------------|-------------------|-------------------------|
| Benzyl alcohol                                    | 100-51-6    | < 0.01                 | < 0.01                 | 0.01                    | 0.01               | 0.01              | 0.00                    |
| Benzyl Chloride                                   | 00100-44-7  | < 0.29                 | < 0.41                 | < 0.35                  | < 0.35             | < 0.41            | < 0.05                  |
| Biphenyl                                          | 92-52-4     | 0.04                   | 0.02                   | < 0.12                  | < 0.06             | < 0.12            | < 0.04                  |
| bis(2-Chloroethoxy)methane                        | 111-91-1    | < 0.01                 | < 0.00                 | < 0.00                  | < 0.01             | < 0.01            | < 0.00                  |
| bis(2-Chloroethyl)ether                           | 111-44-4    | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| bis(2-Ethylhexyl)phthalate                        | 117-81-7    | < 0.00                 | 0.01                   | 0.03                    | 0.02               | 0.03              | 0.01                    |
| Bromodichloromethane                              | 00075-27-4  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Bromoform                                         | 00075-25-2  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Bromomethane                                      | 00074-83-9  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| T Butanal                                         | 00123-72-8  | T                      | T                      | 0.87                    | 0.29               | 0.87              | 0.41                    |
| T Butyl Propionate                                | 00590-01-2  | T                      | 5.17                   | T                       | < 1.72             | 5.17              | < 2.44                  |
| T Butylatedhydroxytoluene                         | 128-37-0    | T                      | 0.05                   | T                       | 0.02               | 0.05              | 0.02                    |
| Butylbenzylphthalate                              | 85-68-7     | 0.01                   | 0.00                   | 0.00                    | 0.00               | 0.01              | 0.00                    |
| T Butylbutanamine                                 |             | T                      | T                      | 1.66                    | 0.55               | 1.66              | 0.78                    |
| O b-Pinene                                        | 127-91-3    | < 0.21                 | 0.07                   | < 0.01                  | < 0.10             | < 0.21            | < 0.08                  |
| Camphene                                          | 79-92-5     | < 0.02                 | < 0.01                 | 0.01                    | 0.01               | < 0.02            | 0.01                    |
| Carbon Disulfide                                  | 00075-15-0  | 0.18                   | 22.76                  | 35.57                   | 19.50              | 35.57             | 14.63                   |
| Carbon Tetrachloride                              | 00056-23-5  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Chlorobenzene                                     | 00108-90-7  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Chloroethane                                      | 00075-00-3  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Chloroform                                        | 00067-66-3  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Chloromethane                                     | 00074-87-3  | 0.05                   | < 0.21                 | < 0.17                  | < 0.14             | < 0.21            | < 0.07                  |
| Chrysene                                          | 218-01-9    | < 0.00                 | 0.00                   | < 0.00                  | < 0.00             | 0.00              | < 0.00                  |
| cis-1,2-Dichloroethene                            | 00156-59-2  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| cis-1,3-Dichloropropene                           | 10061-01-5  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| O cis-2-Butene                                    | 00590-18-1  | < 0.04                 | 0.02                   | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| O cis-2-Hexene                                    | 00592-43-8  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| O cis-2-Pentene                                   | 00627-20-3  | < 0.04                 | < 0.01                 | 1.19                    | 0.42               | 1.19              | 0.55                    |
| O Cumene                                          | 00098-82-8  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| O Cyclohexane                                     | 00110-82-7  | 0.29                   | < 0.01                 | 0.02                    | 0.11               | 0.29              | 0.13                    |
| Cyclohexanone                                     | 108-94-1    | 0.12                   | 0.01                   | 2.37                    | 0.84               | 2.37              | 1.09                    |
| T Cyclohexyl Isothiocyanate                       | 01122-82-3  | T                      | 4.14                   | T                       | 1.38               | 4.14              | 1.95                    |
| Cyclohexylamine                                   | 108-91-8    | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| O Cyclopentane                                    | 00287-92-3  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| O Cyclopentene                                    | 00142-29-0  | 0.64                   | 0.03                   | < 0.01                  | < 0.23             | 0.64              | < 0.29                  |
| T C <sub>11</sub> H <sub>24</sub> Branched Alkene |             | 1.11                   | T                      | T                       | < 0.37             | 1.11              | < 0.52                  |
| Dibenzofuran                                      | 132-64-9    | 0.22                   | 0.10                   | 0.10                    | 0.14               | 0.22              | 0.06                    |
| Dibenz(a,h)anthracene                             | 53-70-3     | < 0.00                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.00            | < 0.00                  |
| Dibromochloromethane                              | 00124-48-1  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Dichlorodifluoromethane                           | 00075-71-8  | 0.06                   | < 0.21                 | < 0.17                  | < 0.15             | < 0.21            | < 0.06                  |
| T Dicyclohexyldisulphide                          | 2550-40-5   | 1.77                   | T                      | T                       | 0.59               | 1.77              | 0.84                    |
| Diethylphthalate                                  | 84-66-2     | 0.01                   | 0.00                   | 0.01                    | 0.01               | 0.01              | 0.00                    |
| T Dimethyl Cyclopentane Isomer                    |             | 0.18                   | T                      | T                       | < 0.06             | 0.18              | < 0.09                  |
| Dimethylaminoazobenzene                           | 60-11-7     | < 0.01                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.01            | < 0.00                  |
| Dimethylphthalate                                 | 131-11-3    | 0.01                   | 0.00                   | < 0.00                  | < 0.00             | 0.01              | < 0.00                  |
| Diphenylamine                                     | 122-39-4    | T                      | < 0.00                 | 0.04                    | 0.01               | 0.04              | 0.02                    |
| Di-n-butylphthalate                               | 84-74-2     | 0.87                   | T                      | 0.03                    | 0.30               | 0.87              | 0.40                    |
| Di-n-octylphthalate                               | 117-84-0    | < 0.00                 | < 0.00                 | 0.00                    | 0.00               | 0.00              | 0.00                    |
| O d-Limonene                                      | 05989-27-5  | < 0.21                 | < 0.06                 | < 0.01                  | < 0.09             | < 0.21            | < 0.08                  |
| Epichlorohydrin                                   | 00106-89-8  | < 0.29                 | < 0.41                 | < 0.35                  | < 0.35             | < 0.41            | < 0.05                  |
| O Ethane                                          | 00074-84-0  | 0.37                   | 0.06                   | 0.18                    | 0.21               | 0.37              | 0.13                    |
| O Ethylacetylene                                  | 00107-00-6  | < 0.04                 | 0.16                   | < 0.01                  | < 0.07             | 0.16              | < 0.07                  |
| O Ethylbenzene                                    | 00100-41-4  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| O Ethylene                                        | 00074-85-1  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| Fluoranthene                                      | 206-44-0    | 0.02                   | 0.01                   | < 0.01                  | < 0.01             | 0.02              | < 0.00                  |
| Fluorene                                          | 86-73-7     | < 0.00                 | 0.01                   | < 0.01                  | < 0.01             | 0.01              | < 0.00                  |
| Hexachlorobenzene                                 | 118-74-1    | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |

Table 4-9.B HOT AIR OVEN CURE ORGANIC SPECIATION FACTORS

| Chemical Compound           | CAS Numbers | Cmpd. #5<br>% of Total | Cmpd. #8<br>% of Total | Cmpd. #22<br>% of Total | MEAN<br>% of Total | MAX<br>% of Total | STD. DEV.<br>% of Total |
|-----------------------------|-------------|------------------------|------------------------|-------------------------|--------------------|-------------------|-------------------------|
| Hexachlorobutadiene         | 87-68-3     | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.01                  |
| Hexachlorocyclopentadiene   | 77-47-4     | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.00                  |
| Hexachloroethane            | 67-72-1     | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.01                  |
| Hexachloro-1,3-butadiene    | 00087-68-3  | < 0.29                 | < 0.41                 | < 0.35                  | < 0.35             | < 0.41            | < 0.05                  |
| Hydroquinone                | 123-31-9    | < 0.01                 | < 0.00                 | < 0.00                  | < 0.01             | < 0.01            | < 0.00                  |
| Indeno(1,2,3-cd)pyrene      | 193-39-5    | < 0.00                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.00            | < 0.00                  |
| O Isobutane                 | 00075-28-5  | 0.06                   | < 0.01                 | 0.07                    | 0.05               | 0.07              | 0.03                    |
| T Isobutene                 | 00115-11-7  | 0.55                   | T                      | T                       | < 0.18             | 0.55              | < 0.26                  |
| O Isobutylene               | 00115-11-7  | < 0.04                 | < 0.01                 | 0.07                    | 0.04               | 0.07              | 0.02                    |
| O Isooctane                 | 00540-84-1  | 0.20                   | < 0.01                 | < 0.01                  | < 0.08             | 0.20              | < 0.09                  |
| Isooctanol                  | 26952-21-6  | < 0.18                 | < 0.05                 | < 0.08                  | < 0.11             | < 0.18            | < 0.06                  |
| O Isopentane                | 00078-78-4  | 0.60                   | 0.03                   | 0.56                    | 0.40               | 0.60              | 0.26                    |
| Isophorone                  | 78-59-1     | < 0.01                 | < 0.00                 | < 0.00                  | < 0.00             | < 0.01            | < 0.00                  |
| O Isoprene                  | 00078-79-5  | < 0.04                 | 0.03                   | < 0.01                  | < 0.03             | < 0.04            | < 0.01                  |
| T Isothiocyanatobutane      |             | T                      | T                      | 0.35                    | 0.12               | 0.35              | 0.16                    |
| T Mercaptobenzothiazole     | 149-30-4    | 1.04                   | T                      | 0.20                    | 0.41               | 1.04              | 0.45                    |
| T Methenamine               | 100-97-0    | 34.05                  | 0.09                   | 0.25                    | 11.46              | 34.05             | 15.97                   |
| T Methyl Cyclohexane        | 00108-87-2  | 0.18                   | T                      | T                       | < 0.06             | 0.18              | < 0.09                  |
| T Methyl Cyclopentane       | 00096-37-7  | 0.18                   | T                      | T                       | < 0.06             | 0.18              | < 0.09                  |
| T Methyl Ester Benzoic Acid |             | T                      | 0.13                   | 0.25                    | 0.13               | 0.25              | 0.10                    |
| T Methyl Vinyl Ketone       | 00078-94-4  | 0.74                   | T                      | T                       | < 0.25             | 0.74              | < 0.35                  |
| O Methylacetylene           | 00074-99-7  | 0.23                   | < 0.01                 | 0.03                    | 0.09               | 0.23              | 0.10                    |
| O Methylcyclohexane         | 00108-87-2  | 0.22                   | 0.06                   | < 0.01                  | < 0.10             | 0.22              | < 0.09                  |
| O Methylcyclopentane        | 00096-37-7  | 0.22                   | 0.04                   | < 0.01                  | < 0.09             | 0.22              | < 0.09                  |
| Methylene bis-chloroaniline | 101-14-4    | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | 0.02              | < 0.01                  |
| Methylene Chloride          | 00075-09-2  | 2.95                   | 2.85                   | 9.54                    | 5.11               | 9.54              | 3.13                    |
| T Methylthiobenzothiazole   |             | T                      | 0.05                   | 0.16                    | 0.07               | 0.16              | 0.07                    |
| O m-Ethyltoluene            | 00620-14-4  | < 0.04                 | 0.03                   | < 0.01                  | < 0.03             | < 0.04            | < 0.01                  |
| O m-Xylene                  | 00108-38-3  | < 0.04                 | 0.06                   | < 0.01                  | < 0.04             | 0.06              | < 0.02                  |
| N,N-Diethylaniline          | 91-66-7     | < 0.01                 | < 0.00                 | < 0.00                  | < 0.01             | < 0.01            | < 0.00                  |
| N,N-Dimethylaniline         | 121-69-7    | < 0.01                 | < 0.00                 | < 0.04                  | < 0.02             | < 0.04            | < 0.02                  |
| Naphthalene                 | 91-20-3     | 0.15                   | 0.05                   | 0.07                    | 0.09               | 0.15              | 0.04                    |
| Nitrobenzene                | 98-95-3     | < 0.01                 | < 0.00                 | < 0.00                  | < 0.01             | < 0.01            | < 0.00                  |
| O n-Butane                  | 00106-97-8  | 0.54                   | 3.07                   | 0.07                    | 1.23               | 3.07              | 1.32                    |
| O n-Butylbenzene            | 00104-51-8  | < 0.20                 | < 0.06                 | < 0.01                  | < 0.09             | < 0.20            | < 0.08                  |
| O n-Decane                  | 00124-18-5  | < 0.21                 | < 0.06                 | < 0.01                  | < 0.09             | < 0.21            | < 0.09                  |
| O n-Heptane                 | 00142-82-5  | 0.18                   | 0.03                   | < 0.01                  | < 0.08             | 0.18              | < 0.08                  |
| O n-Hexane                  | 00110-54-3  | 0.44                   | 0.15                   | 0.20                    | 0.27               | 0.44              | 0.13                    |
| n-Nitrosodiethylamine       | 55-18-5     | < 0.03                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.03            | < 0.01                  |
| n-Nitrosodimethylamine      | 62-75-9     | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.01                  |
| n-Nitrosomorpholine         | 59-89-2     | < 0.03                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.03            | < 0.01                  |
| n-Nitroso-di-n-propylamine  | 621-64-7    | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.01                  |
| O n-Nonane                  | 00111-84-2  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.02                  |
| O n-Octane                  | 00111-65-9  | 0.08                   | 0.03                   | < 0.01                  | < 0.04             | 0.08              | < 0.03                  |
| O n-Pentane                 | 00109-66-0  | 0.11                   | < 0.01                 | 0.07                    | 0.06               | 0.11              | 0.04                    |
| O n-Propylbenzene           | 00103-65-1  | < 0.04                 | 0.01                   | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| o-Anisidine                 | 90-04-0     | < 0.01                 | < 0.00                 | < 0.01                  | < 0.01             | < 0.01            | < 0.00                  |
| O o-Ethyltoluene            | 00611-14-3  | < 0.20                 | 0.08                   | < 0.01                  | < 0.10             | < 0.20            | < 0.08                  |
| o-Toluidine                 | 95-53-4     | < 0.01                 | < 0.00                 | < 0.00                  | < 0.01             | < 0.01            | < 0.00                  |
| O o-Xylene                  | 00095-47-6  | 0.06                   | 2.39                   | < 0.01                  | < 0.82             | 2.39              | < 1.11                  |
| Pentachloronitrobenzene     | 82-68-8     | < 0.04                 | < 0.01                 | < 0.02                  | < 0.02             | < 0.04            | < 0.01                  |
| Pentachlorophenol           | 87-86-5     | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.01                  |
| Phenanthrene                | 85-01-8     | 0.28                   | 0.09                   | 0.07                    | 0.14               | 0.28              | 0.10                    |
| Phenol                      | 108-95-2    | 0.14                   | 0.02                   | 0.06                    | 0.07               | 0.14              | 0.05                    |
| Phthalimide                 | 85-41-6     | 0.81                   | < 0.01                 | 0.76                    | 0.53               | 0.81              | 0.37                    |
| O Propane                   | 00074-98-6  | 0.13                   | 0.10                   | 0.07                    | 0.10               | 0.13              | 0.03                    |
| O Propylene                 | 00115-07-1  | 0.07                   | 0.02                   | 0.02                    | 0.04               | 0.07              | 0.02                    |
| Propylene Oxide             | 00075-56-9  | < 0.29                 | < 0.41                 | < 0.35                  | < 0.35             | < 0.41            | < 0.05                  |
| Pyrene                      | 129-00-0    | 0.07                   | 0.01                   | 0.02                    | 0.04               | 0.07              | 0.03                    |

Table 4-9.B HOT AIR OVEN CURE ORGANIC SPECIATION FACTORS

| Chemical Compound                  | CAS Numbers | Cmpd. #5<br>% of Total | Cmpd. #8<br>% of Total | Cmpd. #22<br>% of Total | MEAN<br>% of Total | MAX<br>% of Total | STD. DEV.<br>% of Total |
|------------------------------------|-------------|------------------------|------------------------|-------------------------|--------------------|-------------------|-------------------------|
| Pyridine                           | 110-86-1    | < 0.01                 | 0.03                   | < 0.01                  | < 0.02             | 0.03              | < 0.01                  |
| O p-Cymene                         | 00099-87-6  | < 0.20                 | < 0.06                 | < 0.01                  | < 0.09             | < 0.20            | < 0.08                  |
| O p-Ethyltoluene                   | 00622-96-8  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| O p-Xylene                         | 00106-42-3  | 0.22                   | 0.14                   | 0.75                    | 0.37               | 0.75              | 0.27                    |
| O Styrene                          | 00100-42-5  | 0.10                   | 0.02                   | 0.01                    | 0.04               | 0.10              | 0.04                    |
| T Substituted Aromatic Hydrocarbon | 70693-06-0  | T                      | 0.07                   | 3.05                    | 1.04               | 3.05              | 1.42                    |
| T Substituted Benzene              | 71-43-2     | T                      | 0.10                   | T                       | 0.03               | 0.10              | 0.05                    |
| T Substituted Cyclic Hydrocarbon   |             | 1.85                   | T                      | 0.16                    | 0.67               | 1.85              | 0.83                    |
| T Substituted Hydrocarbon          |             | 9.23                   | 1.63                   | 2.22                    | 4.36               | 9.23              | 3.45                    |
| T Substituted Indole               | 120-72-9    | T                      | T                      | 0.28                    | 0.09               | 0.28              | 0.13                    |
| T Substituted Naphthalene          | 91-20-3     | 2.16                   | T                      | T                       | 0.72               | 2.16              | 1.02                    |
| T Substituted Quinoline            | 91-22-5     | T                      | T                      | 3.67                    | 1.22               | 3.67              | 1.73                    |
| Tetrachloroethene                  | 00127-18-4  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Toluene                            | 00108-88-3  | 0.31                   | 0.21                   | 0.16                    | 0.23               | 0.31              | 0.07                    |
| trans-1,2-Dichloroethene           | 00156-60-5  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| trans-1,3-Dichloropropene          | 10061-02-6  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| O trans-2-Butene                   | 00624-64-6  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| O trans-2-Hexene                   | 00592-43-8  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| O trans-2-Pentene                  | 00646-04-8  | < 0.04                 | < 0.01                 | < 0.01                  | < 0.02             | < 0.04            | < 0.01                  |
| Trichloroethene                    | 00079-01-6  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Trichlorofluoromethane             | 00075-69-4  | 0.08                   | < 0.21                 | < 0.17                  | < 0.16             | < 0.21            | < 0.05                  |
| Trichlorotrifluoroethane           | 00076-13-1  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Trifluralin                        | 1582-09-8   | < 0.02                 | < 0.01                 | < 0.01                  | < 0.01             | < 0.02            | < 0.01                  |
| t-Butyl Methyl Ether               | 01634-04-4  | < 0.29                 | < 0.41                 | < 0.35                  | < 0.35             | < 0.41            | < 0.05                  |
| Vinyl Acetate                      | 00108-05-4  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Vinyl Chloride                     | 00075-01-4  | < 0.15                 | < 0.21                 | < 0.17                  | < 0.18             | < 0.21            | < 0.02                  |
| Total Percent                      |             | 100.00                 | 100.00                 | 100.00                  |                    |                   |                         |
| Total Detected                     |             | 7.74E-04               | 1.79E-03               | 2.99E-03                | 1.85E-03           | 2.99E-03          | 9.04E-04                |
| Total with Non-detects             |             | < 8.77E-04             | < 2.06E-03             | < 3.36E-03              | < 2.10E-03         | < 3.36E-03        | < 1.02E-03              |

A "0" signifies a value representing less than 0.005% of the total with non-detects.

A "T" signifies a Tentatively Identified Compound (TIC). A "T" is given if the compound was not detected in that sample.

An "O" signifies an Ozone Precursor compound.

Table 4 - 9C. Hot Air Oven Cure  
Sulfur Summary

| Sulfur Compound                        | CAS Numbers | Cmpd.#5<br>% of Total | Cmpd.#8<br>% of Total | Cmpd.#22<br>% of Total | MEAN<br>% of Total | MAX<br>% of Total | STD. DEV.<br>% of Total |
|----------------------------------------|-------------|-----------------------|-----------------------|------------------------|--------------------|-------------------|-------------------------|
| 2,5-Dimethylthiophene                  | 638-02-8    | < 7.76                | < 3.46                | < 2.38                 | < 4.53             | < 7.76            | < 2.32                  |
| 2-Ethylthiophene                       | 872-55-9    | < 7.76                | < 3.46                | < 2.38                 | < 4.53             | < 7.76            | < 2.32                  |
| 3-Methylthiophene                      | 616-44-4    | < 6.71                | < 2.99                | < 2.11                 | < 3.94             | < 6.71            | < 1.99                  |
| Carbon Disulfide                       | 75-15-0     | < 2.52                | 56.50                 | 69.45                  | < 42.82            | 69.45             | < 28.99                 |
| Carbonyl Sulfide                       | 463-58-1    | < 4.19                | < 1.87                | < 1.29                 | < 2.45             | < 4.19            | < 1.25                  |
| Diethyl Disulfide                      | 110-81-6    | < 4.19                | < 1.87                | < 1.32                 | < 2.46             | < 4.19            | < 1.24                  |
| Diethyl Sulfide                        | 352-93-2    | < 6.08                | < 2.71                | < 1.98                 | < 3.59             | < 6.08            | < 1.78                  |
| Dimethyl Disulfide                     | 624-92-0    | < 3.14                | < 1.40                | < 1.02                 | < 1.85             | < 3.14            | < 0.93                  |
| Dimethyl Sulfide                       | 75-18-3     | < 4.19                | < 1.87                | < 1.32                 | < 2.46             | < 4.19            | < 1.24                  |
| Ethyl Mercaptan                        | 75-08-1     | < 4.19                | < 1.87                | < 1.32                 | < 2.46             | < 4.19            | < 1.24                  |
| Ethyl Methyl Sulfide                   |             | < 5.24                | < 2.34                | < 1.58                 | < 3.05             | < 5.24            | < 1.58                  |
| Isobutyl Mercaptan                     | 513-44-0    | < 6.08                | < 2.71                | < 1.98                 | < 3.59             | < 6.08            | < 1.78                  |
| Isopropyl Mercaptan                    | 75-33-2     | < 5.24                | < 2.34                | < 1.58                 | < 3.05             | < 5.24            | < 1.58                  |
| Methyl Mercaptan                       | 74-93-1     | < 3.35                | < 1.50                | < 1.04                 | < 1.96             | < 3.35            | < 1.00                  |
| n-Butyl Mercaptan                      | 109-79-5    | < 6.08                | < 2.71                | < 1.98                 | < 3.59             | < 6.08            | < 1.78                  |
| n-Propyl Mercaptan                     | 107-03-9    | < 5.24                | < 2.34                | < 1.58                 | < 3.05             | < 5.24            | < 1.58                  |
| tert-Butyl Mercaptan                   | 75-66-1     | < 6.08                | < 2.71                | < 1.98                 | < 3.59             | < 6.08            | < 1.78                  |
| Tetrahydrothiophene                    | 110-01-0    | < 6.08                | < 2.71                | < 1.85                 | < 3.55             | < 6.08            | < 1.83                  |
| Thiophene                              | 110-02-1    | < 5.87                | < 2.62                | < 1.85                 | < 3.45             | < 5.87            | < 1.74                  |
| Total Percent                          |             | 100.00                | 100.00                | 100.00                 |                    |                   |                         |
| Total Detected (lb/lb of rubber)       |             | 0.0                   | 6.43E-04              | 1.53E-03               |                    |                   |                         |
| Total w/ Non Detects (lb/lb of rubber) |             | < 7.71E-05            | < 1.14E-03            | < 2.21E-03             |                    |                   |                         |

TABLE 4 - 10a  
LAB CUT FTIR DATA  
lb/lb Rubber

|                 | Inorganic Compounds |                |          |                  | Organic Sulfur Compounds |                  |          |               | Organic Compounds |          |          |          | Other    | TOTAL<br>VOC as CH4 |
|-----------------|---------------------|----------------|----------|------------------|--------------------------|------------------|----------|---------------|-------------------|----------|----------|----------|----------|---------------------|
|                 | Carbon Monoxide     | Sulfur Dioxide | Ammonia  | Carbonyl Sulfide | Carbonyl Sulfide         | Carbon Disulfide | Methanol | t-Butyl Amine | Methane           | Ethylene | Ethanol  |          |          |                     |
| Lab Cut No. 1A  | 2.30E-06            | 3.20E-06       | 4.38E-07 | 1.67E-05         | 1.64E-04                 | 1.64E-04         | 3.20E-05 | 1.69E-05      | 1.61E-07          | 3.46E-07 | 2.52E-05 | 1.40E-04 | 2.15E-04 |                     |
| Lab Cut No. 2A  | 1.21E-06            | 6.30E-07       | 3.27E-07 | 8.03E-06         | 5.28E-05                 | 5.28E-05         | 2.64E-05 | 1.13E-05      | 4.67E-08          | 3.27E-07 | 1.88E-05 | 5.72E-05 | 1.14E-04 |                     |
| Lab Cut No. 3A  | 2.51E-06            | ND             | 3.88E-07 | 6.74E-06         | 2.92E-05                 | 2.92E-05         | 6.54E-05 | 5.77E-05      | 4.77E-07          | 2.98E-08 | 1.46E-05 | 1.00E-04 | 2.38E-04 |                     |
| Lab Cut No. 3B  | 5.05E-06            | ND             | 6.51E-07 | 8.20E-06         | 2.10E-05                 | 2.10E-05         | 7.89E-05 | 7.70E-05      | 3.53E-07          | 1.36E-07 | 1.26E-05 | 8.74E-05 | 2.56E-04 |                     |
| Lab Cut No. 3C  | 8.07E-06            | 1.74E-07       | 4.27E-06 | 2.16E-05         | 1.09E-04                 | 1.09E-04         | 5.89E-05 | 8.91E-05      | 6.98E-07          | 1.18E-07 | ND       | 1.45E-04 | 2.94E-04 |                     |
| Lab Cut No. 3D  | 6.69E-06            | ND             | 4.50E-06 | 1.88E-05         | 7.72E-05                 | 7.72E-05         | 4.80E-05 | 1.27E-04      | 7.96E-07          | 9.95E-07 | ND       | 2.41E-04 | 4.19E-04 |                     |
| Lab Cut No. 3E  | 5.53E-06            | ND             | 3.67E-06 | 1.66E-05         | 7.48E-05                 | 7.48E-05         | 4.04E-05 | 5.83E-05      | 4.86E-07          | 2.43E-07 | ND       | 9.36E-05 | 1.93E-04 |                     |
| Lab Cut No. 3F  | 3.65E-06            | 2.77E-06       | 7.66E-07 | 7.72E-06         | 1.95E-05                 | 1.95E-05         | 6.74E-05 | 6.81E-05      | 6.78E-07          | 8.94E-08 | 1.98E-05 | 8.54E-05 | 2.41E-04 |                     |
| Lab Cut No. 4A  | 1.67E-06            | 3.25E-07       | 6.09E-08 | 8.33E-06         | 2.20E-05                 | 2.20E-05         | 3.47E-06 | 3.26E-05      | 2.23E-06          | 1.52E-07 | 2.62E-05 | 6.56E-05 | 1.30E-04 |                     |
| Lab Cut No. 5A  | 6.52E-07            | 1.42E-06       | 3.97E-07 | 3.85E-06         | 3.00E-05                 | 3.00E-05         | 1.82E-05 | 2.64E-05      | 1.13E-07          | 4.53E-08 | 1.67E-06 | 4.14E-05 | 8.78E-05 |                     |
| Lab Cut No. 5B  | 2.43E-06            | 7.94E-08       | 5.03E-07 | 6.70E-06         | 4.58E-05                 | 4.58E-05         | 2.61E-05 | 3.77E-05      | ND                | 9.26E-08 | 2.41E-06 | 5.40E-05 | 1.20E-04 |                     |
| Lab Cut No. 6A  | 7.14E-07            | 3.52E-06       | 4.33E-07 | 1.78E-06         | 4.15E-05                 | 4.15E-05         | 1.58E-05 | 3.86E-05      | 1.27E-07          | 1.40E-06 | 1.33E-06 | 3.21E-05 | 8.93E-05 |                     |
| Lab Cut No. 6B  | 7.09E-07            | ND             | ND       | ND               | ND                       | ND               | 8.18E-06 | ND            | ND                | ND       | ND       | 7.09E-06 | 1.53E-05 |                     |
| Lab Cut No. 6C  | 7.18E-07            | 6.95E-08       | 6.95E-08 | 3.24E-07         | 1.20E-05                 | 1.20E-05         | 4.75E-06 | 6.46E-06      | 4.63E-08          | 2.43E-07 | 4.40E-07 | 1.20E-05 | 2.40E-05 |                     |
| Lab Cut No. 6D  | 2.20E-06            | 2.33E-07       | 6.21E-07 | 2.20E-06         | 5.93E-05                 | 5.93E-05         | 1.59E-05 | 4.32E-05      | 1.03E-07          | 7.76E-08 | ND       | 4.09E-05 | 1.00E-04 |                     |
| Lab Cut No. 7A  | 3.52E-07            | 1.35E-07       | 5.15E-07 | 8.13E-08         | 5.55E-06                 | 5.55E-06         | ND       | 1.57E-06      | ND                | 2.17E-07 | 6.26E-06 | 4.15E-05 | 4.95E-05 |                     |
| Lab Cut No. 7B  | 9.95E-07            | 1.94E-07       | 7.04E-07 | 1.70E-07         | 4.78E-06                 | 4.78E-06         | ND       | 3.33E-06      | 2.43E-08          | 7.28E-08 | 1.03E-05 | 5.61E-05 | 6.98E-05 |                     |
| Lab Cut No. 7C  | 1.52E-06            | 4.15E-06       | 3.82E-06 | 1.45E-06         | 2.26E-05                 | 2.26E-05         | ND       | 3.01E-05      | 1.63E-07          | 1.64E-04 | 3.24E-05 | 5.38E-05 | 2.80E-04 |                     |
| Lab Cut No. 8A  | 2.90E-06            | 5.47E-06       | 1.74E-06 | 1.29E-05         | 1.02E-04                 | 1.02E-04         | 5.41E-05 | 5.78E-05      | 8.30E-07          | 1.82E-07 | 2.69E-05 | 8.95E-05 | 2.29E-04 |                     |
| Lab Cut No. 8B  | 1.88E-06            | 4.69E-07       | 1.63E-06 | 6.57E-06         | 4.15E-05                 | 4.15E-05         | 2.98E-05 | 4.27E-05      | 1.73E-07          | 1.23E-08 | ND       | 4.22E-05 | 1.15E-04 |                     |
| Lab Cut No. 8C  | 1.11E-06            | ND             | 1.82E-06 | 9.00E-06         | 6.82E-05                 | 6.82E-05         | 4.19E-05 | 6.71E-05      | 1.47E-07          | 2.93E-07 | 3.78E-06 | 3.46E-05 | 1.48E-04 |                     |
| Lab Cut No. 8D  | 2.36E-06            | ND             | 2.96E-06 | 1.70E-05         | 1.47E-04                 | 1.47E-04         | 9.52E-05 | 1.13E-04      | 6.66E-07          | 1.65E-07 | 1.39E-05 | 9.99E-05 | 3.23E-04 |                     |
| Lab Cut No. 9A  | 3.03E-06            | 2.70E-07       | 2.37E-06 | 1.71E-06         | 1.45E-05                 | 1.45E-05         | 3.77E-05 | 5.66E-05      | 1.50E-07          | 2.74E-07 | ND       | 1.92E-04 | 2.87E-04 |                     |
| Lab Cut No. 9B  | 1.53E-06            | ND             | 9.74E-07 | 3.90E-07         | 7.17E-06                 | 7.17E-06         | 1.84E-05 | 2.05E-05      | 3.25E-08          | 2.27E-07 | ND       | 6.75E-05 | 1.07E-04 |                     |
| Lab Cut No. 9C  | 2.96E-06            | 3.02E-07       | 1.81E-06 | 8.77E-07         | 1.22E-05                 | 1.22E-05         | 3.22E-05 | 4.33E-05      | 1.51E-07          | 6.05E-08 | ND       | 1.38E-04 | 2.13E-04 |                     |
| Lab Cut No. 10A | 2.82E-06            | 6.35E-06       | 4.46E-07 | 7.94E-06         | 3.03E-05                 | 3.03E-05         | 2.19E-05 | 2.49E-05      | 4.25E-08          | 2.23E-06 | 1.89E-06 | 2.85E-05 | 7.94E-05 |                     |
| Lab Cut No. 10B | 2.69E-06            | 2.28E-07       | 6.01E-07 | 1.16E-05         | 5.62E-05                 | 5.62E-05         | 4.67E-05 | 4.36E-05      | 1.04E-07          | 7.25E-08 | 8.87E-06 | 6.63E-05 | 1.66E-04 |                     |
| Lab Cut No. 10C | 3.12E-05            | ND             | 6.02E-07 | 1.20E-05         | 6.69E-05                 | 6.69E-05         | 5.65E-05 | 4.78E-05      | 1.04E-07          | 9.34E-08 | 8.63E-06 | 4.94E-05 | 1.63E-04 |                     |

cutting?  
**TABLE 4 - 10b**  
**TIRE PRESS SUMMARY - ORIGINAL EQUIPMENT (OEM)**

| Tire      | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Organics <sup>1</sup><br>(lbs/lb rubber)<br>with non-detects | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects | Total Amines<br>(lbs/lb rubber)<br>with non-detects |
|-----------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| A         | 3.37E-04                                     | < 5.50E-06                                                              | < 1.43E-04                                                          | < 1.48E-04                                                                      | < 2.98E-06                                          | < 6.50E-07                                          |
| D         | 2.88E-04                                     | < 2.00E-05                                                              | < 1.50E-04                                                          | < 1.66E-04                                                                      | < 6.76E-06                                          | < 1.01E-07                                          |
| F         | 1.73E-04                                     | < 3.26E-05                                                              | < 2.48E-04                                                          | < 2.76E-04                                                                      | < 1.09E-05                                          | < 8.77E-08                                          |
| Mean      | 2.66E-04                                     | < 1.94E-05                                                              | < 1.80E-04                                                          | < 1.97E-04                                                                      | < 6.88E-06                                          | < 2.80E-07                                          |
| Max.      | 3.37E-04                                     | < 3.26E-05                                                              | < 2.48E-04                                                          | < 2.76E-04                                                                      | < 1.09E-05                                          | < 6.50E-07                                          |
| Std. Dev. | 6.87E-05                                     | < 1.11E-05                                                              | < 4.79E-05                                                          | < 5.66E-05                                                                      | < 3.23E-06                                          | < 2.62E-07                                          |

<sup>1</sup> - Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

**TABLE 4 - 10c**  
**TIRE PRESS SUMMARY - HIGH PERFORMANCE**

| Tire             | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Organics <sup>1</sup><br>(lbs/lb rubber)<br>with non-detects | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects | Total Amines<br>(lbs/lb rubber)<br>with non-detects |
|------------------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| <b>E</b>         | 1.64E-04                                     | < 3.58E-06                                                              | < 1.69E-04                                                          | < 1.71E-04                                                                      | < 1.21E-05                                          | < 1.63E-07                                          |
| <b>G</b>         | 2.07E-04                                     | < 1.49E-05                                                              | < 1.97E-04                                                          | < 2.11E-04                                                                      | < 1.03E-05                                          | < 1.44E-07                                          |
| <b>H</b>         | 2.61E-04                                     | < 7.75E-06                                                              | < 3.08E-04                                                          | < 3.15E-04                                                                      | < 1.73E-05                                          | < 1.00E-07                                          |
| <b>Mean</b>      | 2.11E-04                                     | < 8.74E-06                                                              | < 2.25E-04                                                          | < 2.32E-04                                                                      | < 1.32E-05                                          | < 1.36E-07                                          |
| <b>Max.</b>      | 2.61E-04                                     | < 1.49E-05                                                              | < 3.08E-04                                                          | < 3.15E-04                                                                      | < 1.73E-05                                          | < 1.63E-07                                          |
| <b>Std. Dev.</b> | 3.97E-05                                     | < 4.67E-06                                                              | < 6.00E-05                                                          | < 6.07E-05                                                                      | < 2.97E-06                                          | < 2.64E-08                                          |

<sup>1</sup> - Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

**TABLE 4-10d**  
**TIRE PRESS SUMMARY - REPLACEMENT TIRES**

| Tire      | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Organics <sup>1</sup><br>(lbs/lb rubber)<br>with non-detects | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects | Total Amines<br>(lbs/lb rubber)<br>with non-detects |
|-----------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| B         | 2.51E-04                                     | < 1.38E-05                                                              | < 1.49E-04                                                          | < 1.57E-04                                                                      | < 1.78E-05                                          | < 1.25E-07                                          |
| C         | 1.68E-04                                     | < 5.64E-06                                                              | < 1.07E-04                                                          | < 1.12E-04                                                                      | < 1.41E-05                                          | < 2.18E-07                                          |
| I         | 1.87E-04                                     | < 1.70E-05                                                              | < 1.74E-04                                                          | < 1.91E-04                                                                      | < 7.19E-06                                          | < 7.89E-08                                          |
| Mean      | 2.02E-04                                     | < 1.21E-05                                                              | < 1.43E-04                                                          | < 1.53E-04                                                                      | < 1.30E-05                                          | < 1.41E-07                                          |
| Max.      | 2.51E-04                                     | < 1.70E-05                                                              | < 1.74E-04                                                          | < 1.91E-04                                                                      | < 1.78E-05                                          | < 2.18E-07                                          |
| Std. Dev. | 3.55E-05                                     | < 4.78E-06                                                              | < 2.76E-05                                                          | < 3.24E-05                                                                      | < 4.40E-06                                          | < 5.79E-08                                          |

1 - Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

**TABLE 4-10e**  
**TIRE PRESS SUMMARY - ALL TIRES**

| <b>Tire</b>      | <b>Total VOCs,<br/>as methane<br/>(lbs/lb rubber)</b> | <b>Total Speciated<br/>Semivolatiles<br/>(lbs/lb rubber)<br/>with non-detects</b> | <b>Total Speciated<br/>Volatiles<br/>(lbs/lb rubber)<br/>with non-detects</b> | <b>Total Speciated<br/>Organics<sup>1</sup><br/>(lbs/lb rubber)<br/>with non-detects</b> | <b>Total Sulfur<br/>(lbs/lb rubber)<br/>with non-detects</b> | <b>Total Amines<br/>(lbs/lb rubber)<br/>with non-detects</b> |
|------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|
| <b>A</b>         | 3.37E-04                                              | < 5.50E-06                                                                        | < 1.43E-04                                                                    | < 1.48E-04                                                                               | < 2.98E-06                                                   | < 6.50E-07                                                   |
| <b>B</b>         | 2.51E-04                                              | < 1.38E-05                                                                        | < 1.49E-04                                                                    | < 1.57E-04                                                                               | < 1.78E-05                                                   | < 1.25E-07                                                   |
| <b>C</b>         | 1.68E-04                                              | < 5.64E-06                                                                        | < 1.07E-04                                                                    | < 1.12E-04                                                                               | < 1.41E-05                                                   | < 2.18E-07                                                   |
| <b>D</b>         | 2.88E-04                                              | < 2.00E-05                                                                        | < 1.50E-04                                                                    | < 1.66E-04                                                                               | < 6.76E-06                                                   | < 1.01E-07                                                   |
| <b>E</b>         | 1.64E-04                                              | < 3.58E-06                                                                        | < 1.69E-04                                                                    | < 1.71E-04                                                                               | < 1.21E-05                                                   | < 1.63E-07                                                   |
| <b>F</b>         | 1.73E-04                                              | < 3.26E-05                                                                        | < 2.48E-04                                                                    | < 2.76E-04                                                                               | < 1.09E-05                                                   | < 8.77E-08                                                   |
| <b>G</b>         | 2.07E-04                                              | < 1.49E-05                                                                        | < 1.97E-04                                                                    | < 2.11E-04                                                                               | < 1.03E-05                                                   | < 1.44E-07                                                   |
| <b>H</b>         | 2.61E-04                                              | < 7.75E-06                                                                        | < 3.08E-04                                                                    | < 3.15E-04                                                                               | < 1.73E-05                                                   | < 1.00E-07                                                   |
| <b>I</b>         | 1.87E-04                                              | < 1.70E-05                                                                        | < 1.74E-04                                                                    | < 1.91E-04                                                                               | < 7.19E-06                                                   | < 7.89E-08                                                   |
| <b>Mean</b>      | 2.26E-04                                              | < 1.34E-05                                                                        | < 1.83E-04                                                                    | < 1.94E-04                                                                               | < 1.10E-05                                                   | < 1.85E-07                                                   |
| <b>Max.</b>      | 3.37E-04                                              | < 3.26E-05                                                                        | < 3.08E-04                                                                    | < 3.15E-04                                                                               | < 1.78E-05                                                   | < 6.50E-07                                                   |
| <b>Std. Dev.</b> | 5.77E-05                                              | < 8.68E-06                                                                        | < 5.77E-05                                                                    | < 6.07E-05                                                                               | < 4.64E-06                                                   | < 1.69E-07                                                   |

<sup>1</sup> - Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

TABLE 4 - 10F. TIRE PRESS ORGANIC COMPOUND SPECIATION FACTORS - OEM

| Compounds                   | CAS Numbers           | Type A     | Type D     | Type F     | OEM                |                   |                   |
|-----------------------------|-----------------------|------------|------------|------------|--------------------|-------------------|-------------------|
|                             |                       | % of Total | % of Total | % of Total | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| 1-Butanol                   | 71-36-3               | 1.07       | T          | T          | 0.36               | 1.07              | 0.50              |
| 1-Dodecene                  | 00112-41-4            | < 0.04     | < 0.03     | 0.02       | 0.03               | 0.04              | 0.01              |
| 1,1-Dichloroethane          | 75-34-3               | < 0.14     | < 0.13     | 0.03       | 0.10               | 0.14              | 0.05              |
| 1,1-Dichloroethene          | 75-35-4               | < 0.14     | < 0.13     | 0.20       | 0.16               | 0.20              | 0.03              |
| 1,1,1-Trichloroethane       | 71-55-6               | 0.05       | < 0.13     | 14.64      | 4.94               | 14.64             | 6.86              |
| 1,1,2-Trichloroethane       | 79-00-5               | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| 1,1,2,2-Tetrachloroethane   | 79-34-5               | < 0.14     | 0.13       | < 0.07     | 0.11               | 0.14              | 0.03              |
| 1,2-Dibromo-3-Chloropropane | 96-12-8               | < 0.29     | 0.25       | < 0.13     | 0.22               | 0.29              | 0.07              |
| 1,2-Dibromoethane           | 106-93-4              | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| 1,2-Dichlorobenzene         | 95-50-1               | < 0.01     | < 0.01     | < 0.00     | 0.01               | 0.01              | 0.00              |
| 1,2-dichloroethane          | 107-06-3              | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| 1,2-Dichloropropane         | 78-87-5               | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| 1,2,4-Trichlorobenzene      | 00120-82-1            | < 0.01     | < 0.01     | < 0.00     | 0.00               | 0.01              | 0.00              |
| 1,2,4-Trimethylbenzene      | 00095-63-6            | 0.07       | 0.18       | < 0.17     | 0.14               | 0.18              | 0.05              |
| 1,3-Butadiene               | 106-99-0              | < 0.29     | < 0.25     | < 0.13     | 0.22               | 0.29              | 0.07              |
| 1,3-Dichlorobenzene         | 541-34-5              | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| 1,4-Dichlorobenzene         | 00106-46-7            | 0.00       | < 0.01     | 0.24       | 0.08               | 0.24              | 0.11              |
| 1,4-Dioxane                 | 123-91-1              | < 0.57     | < 0.50     | < 0.26     | 0.45               | 0.57              | 0.13              |
| 2-Butanone                  | 78-93-3               | 0.27       | 0.54       | 0.54       | 0.45               | 0.54              | 0.13              |
| 2-Chloroacetophenone        | 01341-24-8            | < 0.00     | < 0.00     | < 0.00     | 0.00               | 0.00              | 0.00              |
| 2-Furaldehyde               | 00098-01-1            | < 0.01     | < 0.01     | 0.01       | 0.01               | 0.01              | 0.00              |
| 2-Hexanone                  | 591-78-6              | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| 2-Methylnaphthalene         | 00091-57-6            | 0.02       | 0.10       | 0.02       | 0.05               | 0.10              | 0.04              |
| 2-Methylphenol              | 00095-48-7            | 0.01       | < 0.01     | < 0.00     | 0.01               | 0.01              | 0.00              |
| 3-Methylstyrene             | 00100-80-1            | 0.00       | 0.01       | 0.01       | 0.01               | 0.01              | 0.00              |
| 3/4-Methylphenol            | 00108-39-4/00106-44-5 | < 0.01     | < 0.01     | < 0.00     | 0.01               | 0.01              | 0.00              |
| 4-Chlorophenyl-phenylether  | 70005-72-3            | < 0.01     | < 0.01     | < 0.00     | 0.00               | 0.01              | 0.00              |
| 4-Methyl-2-Pentanone        | 108-10-1              | 9.45       | 7.57       | 3.33       | 6.78               | 9.45              | 2.56              |
| 4-Methylstyrene             | 00622-97-9            | < 0.00     | 0.01       | 0.00       | 0.00               | 0.01              | 0.00              |
| Acenaphthene                | 00083-32-9            | < 0.00     | < 0.00     | 0.00       | 0.00               | 0.00              | 0.00              |
| Acenaphthylene              | 00208-96-8            | 0.02       | 0.03       | < 0.02     | 0.02               | 0.03              | 0.00              |
| Acetone                     | 67-64-1               | 3.39       | 5.36       | 4.07       | 4.27               | 5.36              | 0.82              |
| Acetonitrile                | 1722-09-4             | < 0.29     | < 0.25     | < 0.13     | 0.22               | 0.29              | 0.07              |
| Acetophenone                | 00098-86-2            | 0.05       | 0.08       | 0.04       | 0.06               | 0.08              | 0.02              |
| Acrolein                    | 107-02-8              | < 0.29     | < 0.25     | < 0.13     | 0.22               | 0.29              | 0.07              |
| Acrylonitrile               | 107-13-1              | < 0.29     | < 0.25     | < 0.13     | 0.22               | 0.29              | 0.07              |
| Allyl Chloride              | 107-05-1              | < 0.29     | < 0.25     | < 0.13     | 0.22               | 0.29              | 0.07              |
| Aniline                     | 00062-53-3            | 1.19       | 3.45       | 1.58       | 2.07               | 3.45              | 0.99              |
| a-Pinene                    | 7785-70-8             | 3.57       | 1.58       | T          | 1.71               | 3.57              | 1.46              |
| Benzaldehyde                | 00100-52-7            | 0.05       | < 0.01     | < 0.00     | 0.02               | 0.05              | 0.02              |
| Benzene                     | 71-43-2               | 0.13       | 0.12       | 0.12       | 0.13               | 0.13              | 0.01              |
| Benzoic acid                | 00065-85-0            | < 0.06     | < 0.01     | < 0.01     | 0.03               | 0.06              | 0.02              |
| Benzonitrile                | 00100-47-0            | 0.02       | < 0.00     | < 0.00     | 0.01               | 0.02              | 0.01              |
| Benzyl alcohol              | 00100-51-6            | 0.01       | 0.00       | < 0.00     | 0.00               | 0.01              | 0.00              |
| Benzyl Chloride             | 100-44-7              | < 0.00     | < 0.00     | 0.02       | 0.01               | 0.02              | 0.01              |
| Biphenyl                    | 00092-52-4            | 0.06       | 0.02       | < 0.01     | 0.03               | 0.06              | 0.02              |
| bis(2-Ethylhexyl)phthalate  | 00117-81-7            | 0.08       | 0.01       | < 0.02     | 0.04               | 0.08              | 0.03              |
| Bromodichloromethane        | 75-27-4               | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| Bromoform                   | 75-25-2               | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| Bromomethane                | 74-83-9               | 0.08       | 0.04       | < 0.07     | 0.06               | 0.08              | 0.01              |
| Butane                      | 106-97-8              | T          | T          | T          | T                  | T                 | T                 |
| Butylbenzylphthalate        | 00085-68-7            | 0.00       | < 0.01     | 0.00       | 0.01               | 0.01              | 0.00              |
| C13-C14 Branched Alkane     |                       | T          | T          | T          | T                  | T                 | T                 |
| Camphene                    | 00079-92-5            | < 0.01     | < 0.01     | 0.00       | 0.01               | 0.01              | 0.00              |
| Carbon Disulfide            | 75-15-0               | 17.29      | 0.44       | 0.17       | 5.97               | 17.29             | 8.01              |
| Carbon Tetrachloride        | 56-23-5               | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| Chlorobenzene               | 108-90-7              | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| Chlorodibromoethene         | 124-48-1              | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| Chloroethane                | 75-00-3               | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| Chloroform                  | 67-66-3               | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| Chloromethane               | 74-87-3               | 0.07       | 0.05       | 0.02       | 0.05               | 0.07              | 0.02              |
| cis-1,2-Dichloroethene      | 156-59-2              | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| cis-1,3-Dichloropropene     | 10061-01-5            | < 0.14     | < 0.13     | < 0.07     | 0.11               | 0.14              | 0.03              |
| Cumene                      | 98-82-8               | 0.08       | 0.21       | 0.15       | 0.14               | 0.21              | 0.05              |
| Cyclobutane                 |                       | 1.43       | 1.10       | T          | 0.84               | 1.43              | 0.61              |

TABLE 4 - 10F. TIRE PRESS ORGANIC COMPOUND SPECIATION FACTORS - OEM

| Compounds                             | CAS Numbers | Type A     | Type D     | Type F     | OEM                |                   |                   |
|---------------------------------------|-------------|------------|------------|------------|--------------------|-------------------|-------------------|
|                                       |             | % of Total | % of Total | % of Total | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Cyclohexanone                         | 00108-94-1  | 0.69       | 3.15       | 2.44       | 2.09               | 3.15              | 1.04              |
| Cyclohexylamine                       | 00108-91-8  | < 0.01     | 4.70       | < 7.82     | < 4.18             | < 7.82            | < 3.21            |
| Decane                                |             | T          | T          | T          | T                  | T                 | T                 |
| Dibenzofuran                          | 00132-64-9  | 0.01       | 0.00       | < 0.00     | < 0.00             | < 0.01            | < 0.00            |
| Dichlorodifluoromethane               | 75-71-8     | < 0.14     | < 0.13     | < 0.09     | < 0.12             | < 0.14            | < 0.02            |
| Diethylphthalate                      | 00084-66-2  | 0.02       | 0.00       | 0.00       | 0.01               | 0.02              | 0.01              |
| Dimethylcyclohexane                   |             | T          | 1.58       | T          | 0.53               | 1.58              | 0.74              |
| Dimethylphthalate                     | 00131-11-3  | 0.00       | 0.01       | 0.00       | 0.00               | 0.01              | 0.00              |
| Di-n-butylphthalate                   | 00084-74-2  | 0.14       | 0.11       | 0.34       | 0.20               | 0.34              | 0.10              |
| Diphenylamine                         | 00122-39-4  | 0.71       | 0.06       | 0.04       | 0.27               | 0.71              | 0.31              |
| Dodecane                              |             | 3.57       | T          | T          | 1.19               | 3.57              | 1.68              |
| Epichlorohydrin                       | 106-89-8    | < 0.29     | < 0.25     | < 0.13     | < 0.22             | < 0.29            | < 0.07            |
| Ethanol                               |             | 17.83      | T          | 4.88       | 7.57               | 17.83             | 7.52              |
| Ethylbenzene                          | 100-41-4    | 3.57       | 7.25       | 3.58       | 4.80               | 7.25              | 1.74              |
| Fluoranthene                          | 00206-44-0  | 0.00       | < 0.00     | 0.01       | < 0.00             | < 0.01            | < 0.00            |
| Fluorene                              | 00086-73-7  | 0.02       | < 0.00     | 0.00       | < 0.01             | < 0.02            | < 0.01            |
| Heptane                               |             | 1.78       | 4.73       | 7.32       | 4.61               | 7.32              | 2.26              |
| Hexachlorobutadiene                   | 87-68-3     | < 0.29     | 0.25       | < 0.13     | < 0.22             | < 0.29            | < 0.07            |
| Isobutanol                            |             | T          | T          | 3.25       | 1.08               | 3.25              | 1.53              |
| Isopentane                            |             | T          | T          | 1.63       | 0.54               | 1.63              | 0.77              |
| Isophorone                            | 00078-59-1  | < 0.00     | 0.01       | 0.00       | < 0.00             | < 0.01            | < 0.00            |
| Isopropyl Alcohol                     |             | 1.07       | T          | T          | 0.36               | 1.07              | 0.50              |
| m & p-Xylenes                         | 1330-20-7   | 11.59      | 17.35      | 8.13       | 12.36              | 17.35             | 3.80              |
| Methylcyclohexane                     |             | 1.78       | 3.15       | 5.69       | 3.54               | 5.69              | 1.62              |
| Methylene Chloride                    | 79-09-2     | 0.66       | 4.57       | 1.95       | 2.39               | 4.57              | 1.63              |
| Methylheptane                         |             | T          | 3.15       | 3.25       | 2.14               | 3.25              | 1.51              |
| Methylhexane                          |             | 0.89       | 1.58       | 7.32       | 3.26               | 7.32              | 2.88              |
| Methylhexanone                        |             | T          | T          | T          | T                  | T                 | T                 |
| Methylpentane                         | 96-14-0     | T          | T          | T          | T                  | T                 | T                 |
| Naphthalene                           | 00091-20-3  | 0.05       | 0.17       | < 0.11     | < 0.11             | < 0.17            | < 0.05            |
| n-Hexane                              | 110-54-3    | 0.32       | 0.52       | 1.06       | 0.63               | 1.06              | 0.31              |
| Octane                                |             | T          | 4.73       | 4.07       | 2.93               | 4.73              | 2.09              |
| o-Toluidine                           | 00095-53-4  | 0.12       | < 0.01     | 0.00       | < 0.04             | < 0.12            | < 0.06            |
| o-Xylene                              | 95-47-6     | 2.85       | 4.89       | 2.68       | 3.47               | 4.89              | 1.00              |
| Phenanthrene                          | 00085-01-8  | 0.01       | 0.01       | < 0.01     | < 0.01             | < 0.01            | < 0.00            |
| Phenol                                | 00108-95-2  | 0.05       | < 0.01     | 0.05       | < 0.03             | < 0.05            | < 0.02            |
| Phthalimide                           | 00085-41-6  | 0.11       | 1.30       | < 0.00     | < 0.47             | < 1.30            | < 0.59            |
| Propane                               | 74-98-6     | T          | T          | T          | T                  | T                 | T                 |
| Propylene Oxide                       | 75-56-9     | < 0.29     | < 0.25     | < 0.13     | < 0.22             | < 0.29            | < 0.07            |
| Pyrene                                | 00129-00-0  | 0.02       | 0.02       | 0.03       | 0.03               | 0.03              | 0.00              |
| Styrene                               | 100-42-5    | 0.27       | 0.17       | 1.38       | 0.61               | 1.38              | 0.55              |
| t-Butyl Methyl Ether                  | 1634-04-4   | < 0.29     | < 0.25     | 0.11       | < 0.21             | < 0.29            | < 0.08            |
| Tetrachloroethene                     | 127-18-4    | 0.05       | < 0.13     | 0.07       | < 0.08             | < 0.13            | < 0.03            |
| Toluene                               | 108-88-3    | 4.46       | 7.57       | 4.23       | 5.42               | 7.57              | 1.52              |
| trans-1,2-Dichloroethene              | 156-60-5    | < 0.14     | < 0.13     | < 0.07     | < 0.11             | < 0.14            | < 0.03            |
| trans-1,2-Dichloropropene             | 10061-02-6  | < 0.14     | < 0.13     | < 0.07     | < 0.11             | < 0.14            | < 0.03            |
| Trichloroethene                       | 79-01-6     | < 0.14     | < 0.13     | < 0.07     | < 0.11             | < 0.14            | < 0.03            |
| Trichlorofluoromethane                | 75-69-4     | < 0.14     | < 0.13     | 0.07       | < 0.11             | < 0.14            | < 0.03            |
| Trichlorotrifluoroethane              | 76-13-1     | < 0.14     | < 0.13     | < 0.07     | < 0.11             | < 0.14            | < 0.03            |
| Undecane                              | 1120-21-4   | 1.60       | 1.58       | T          | 1.06               | 1.60              | 0.75              |
| Vinyl Chloride                        | 75-1-4      | < 0.14     | < 0.13     | < 0.07     | < 0.11             | < 0.14            | < 0.03            |
| Vinyl Acetate                         | 108-05-4    | < 0.14     | < 0.13     | < 0.07     | < 0.11             | < 0.14            | < 0.03            |
| Total                                 |             | 100        | 100        | 100        |                    |                   |                   |
| Total Detected (lb/lb rubber)         |             | 1.37E-04   | 1.56E-04   | 2.46E-04   |                    |                   |                   |
| Total with non-detects (lb/lb rubber) |             | < 1.48E-04 | < 1.66E-04 | < 2.76E-04 |                    |                   |                   |

TABLE 4 - 10G. TIRE PRESS ORGANIC COMPOUND SPECIATION FACTORS - HIGH PERFORMANCE

| Compounds                   | CAS Numbers           | Type E     | Type G     | Type H     | High Performance |                |                |
|-----------------------------|-----------------------|------------|------------|------------|------------------|----------------|----------------|
|                             |                       | % of Total | % of Total | % of Total | Mean % of Total  | MAX % of Total | STD % of Total |
| 1-Butanol                   | 71-36-3               | T          | T          | T          | T                | T              | T              |
| 1-Dodecene                  | 00112-41-4            | < 0.03     | < 0.03     | < 0.02     | < 0.02           | < 0.03         | < 0.01         |
| 1,1-Dichloroethane          | 75-34-3               | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| 1,1-Dichloroethane          | 75-34-3               | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| 1,1,1-Trichloroethane       | 71-55-6               | 0.25       | 0.06       | 0.05       | 0.12             | 0.25           | 0.09           |
| 1,1,2-Trichloroethane       | 79-00-5               | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| 1,1,2,2-Tetrachloroethane   | 79-34-5               | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| 1,2-Dibromo-3-Chloropropane | 96-12-8               | < 0.25     | < 0.17     | < 0.12     | < 0.18           | < 0.25         | < 0.05         |
| 1,2-Dibromoethane           | 106-93-4              | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| 1,2-Dichlorobenzene         | 95-50-1               | < 0.01     | < 0.00     | < 0.00     | < 0.00           | < 0.01         | < 0.00         |
| 1,2-dichloroethane          | 107-06-3              | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| 1,2-Dichloropropane         | 78-87-5               | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| 1,2,4-Trichlorobenzene      | 00120-82-1            | < 0.01     | < 0.00     | < 0.00     | < 0.00           | < 0.01         | < 0.00         |
| 1,2,4-Trimethylbenzene      | 00095-63-6            | 0.24       | 0.27       | 0.30       | 0.27             | 0.30           | 0.03           |
| 1,3-Butadiene               | 106-99-0              | < 0.25     | < 0.17     | < 0.12     | < 0.18           | < 0.25         | < 0.05         |
| 1,3-Dichlorobenzene         | 541-34-5              | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| 1,4-Dichlorobenzene         | 00106-46-7            | < 0.00     | < 0.03     | < 0.00     | < 0.01           | < 0.03         | < 0.01         |
| 1,4-Dioxane                 | 123-91-1              | < 0.50     | < 0.34     | < 0.24     | < 0.36           | < 0.50         | < 0.10         |
| 2-Butanone                  | 78-93-3               | 0.60       | 0.29       | 0.53       | 0.47             | 0.60           | 0.13           |
| 2-Chloroacetophenone        | 01341-24-8            | 0.00       | < 0.00     | < 0.00     | < 0.00           | < 0.00         | < 0.00         |
| 2-Furaldehyde               | 00098-01-1            | < 0.01     | < 0.02     | < 0.01     | < 0.01           | < 0.02         | < 0.01         |
| 2-Hexanone                  | 591-78-6              | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| 2-Methylnaphthalene         | 00091-57-6            | 0.07       | 0.02       | 0.05       | 0.05             | 0.07           | 0.02           |
| 2-Methylphenol              | 00095-48-7            | < 0.01     | < 0.00     | < 0.01     | < 0.01           | < 0.01         | < 0.00         |
| 3-Methylstyrene             | 00100-80-1            | 0.01       | 0.01       | 0.02       | 0.01             | 0.02           | 0.00           |
| 3,4-Methylphenol            | 00108-39-4/00106-44-5 | < 0.01     | < 0.00     | < 0.00     | < 0.00           | < 0.01         | < 0.00         |
| 4-Chlorophenyl-phenylether  | 70005-72-3            | < 0.00     | < 0.00     | < 0.00     | < 0.00           | < 0.00         | < 0.00         |
| 4-Methyl-2-Pentanone        | 108-10-1              | 5.73       | 6.06       | 5.19       | 5.66             | 6.06           | 0.36           |
| 4-Methylstyrene             | 00622-97-9            | 0.01       | < 0.00     | < 0.00     | < 0.00           | < 0.01         | < 0.00         |
| Acenaphthene                | 00083-32-9            | < 0.00     | < 0.00     | < 0.00     | < 0.00           | < 0.00         | < 0.00         |
| Acenaphthylene              | 00208-96-8            | 0.04       | 0.03       | 0.01       | 0.02             | 0.04           | 0.02           |
| Acetone                     | 67-64-1               | 5.11       | 7.76       | 9.03       | 7.30             | 9.03           | 1.63           |
| Acetonitrile                | 1722-09-4             | < 0.25     | < 0.17     | < 0.12     | < 0.18           | < 0.25         | < 0.05         |
| Acetophenone                | 00098-86-2            | 0.04       | 0.06       | 0.04       | 0.05             | 0.06           | 0.01           |
| Acrolein                    | 107-02-8              | < 0.25     | < 0.17     | < 0.12     | < 0.18           | < 0.25         | < 0.05         |
| Acrylonitrile               | 107-13-1              | < 0.25     | < 0.17     | < 0.12     | < 0.18           | < 0.25         | < 0.05         |
| Allyl Chloride              | 107-05-1              | < 0.25     | < 0.17     | < 0.12     | < 0.18           | < 0.25         | < 0.05         |
| Aniline                     | 00062-53-3            | 0.43       | 0.33       | 0.11       | 0.29             | 0.43           | 0.14           |
| a-Pinene                    | 7785-70-8             | 1.55       | T          | T          | 0.52             | 1.55           | 0.73           |
| Benzaldehyde                | 00100-52-7            | < 0.01     | < 0.07     | < 0.00     | < 0.03           | < 0.07         | < 0.03         |
| Benzene                     | 71-43-2               | 0.25       | 0.26       | 0.15       | 0.22             | 0.26           | 0.05           |
| Benzoic acid                | 00065-85-0            | < 0.01     | < 0.04     | < 0.01     | < 0.02           | < 0.04         | < 0.01         |
| Benzonitrile                | 00100-47-0            | < 0.00     | < 0.00     | < 0.00     | < 0.00           | < 0.00         | < 0.00         |
| Benzyl alcohol              | 00100-51-6            | < 0.01     | < 0.01     | < 0.00     | < 0.01           | < 0.01         | < 0.00         |
| Benzyl Chloride             | 100-44-7              | < 0.00     | < 0.00     | < 0.00     | < 0.00           | < 0.00         | < 0.00         |
| Biphenyl                    | 00092-52-4            | 0.03       | 0.03       | 0.02       | 0.02             | 0.03           | 0.01           |
| bis(2-Ethylhexyl)phthalate  | 00117-81-7            | < 0.06     | < 0.03     | < 0.01     | < 0.03           | < 0.06         | < 0.02         |
| Bromodichloromethane        | 75-27-4               | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| Bromoform                   | 75-25-2               | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| Bromomethane                | 74-83-9               | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| Butane                      |                       | T          | T          | T          | T                | T              | T              |
| Butylbenzylphthalate        | 00085-68-7            | < 0.01     | < 0.00     | < 0.00     | < 0.00           | < 0.01         | < 0.00         |
| C13-C14 Branched Alkane     |                       | T          | T          | T          | T                | T              | T              |
| Camphene                    | 00079-92-5            | < 0.01     | < 0.01     | < 0.00     | < 0.01           | < 0.01         | < 0.00         |
| Carbon Disulfide            | 75-15-0               | 4.49       | 2.87       | 2.18       | 3.18             | 4.49           | 0.97           |
| Carbon Tetrachloride        | 56-23-5               | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| Chlorobenzene               | 108-90-7              | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| Chlorodibromomethane        | 124-48-1              | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| Chloroethane                | 75-00-3               | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| Chloroform                  | 67-66-3               | < 0.12     | < 0.03     | < 0.06     | < 0.07           | < 0.12         | < 0.04         |
| Chloromethane               | 74-87-3               | < 0.12     | < 0.05     | < 0.03     | < 0.07           | < 0.12         | < 0.04         |
| cis-1,2-Dichloroethene      | 156-59-2              | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| cis-1,3-Dichloropropene     | 10061-01-5            | < 0.12     | < 0.09     | < 0.06     | < 0.09           | < 0.12         | < 0.03         |
| Cumene                      | 98-82-8               | 0.26       | 0.14       | 0.22       | 0.21             | 0.26           | 0.05           |
| Cyclobutane                 |                       | 1.08       | T          | T          | 0.36             | 1.08           | 0.51           |

TABLE 4 - 10G. TIRE PRESS ORGANIC COMPOUND SPECIATION FACTORS - HIGH PERFORMANCE

| Compounds                             | CAS Numbers | Type E     | Type G     | Type H     | High Performance   |                   |                   |
|---------------------------------------|-------------|------------|------------|------------|--------------------|-------------------|-------------------|
|                                       |             | % of Total | % of Total | % of Total | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Cyclohexanone                         | 00108-94-1  | 0.11       | 0.23       | 0.31       | 0.21               | 0.31              | 0.08              |
| Cyclohexylamin                        | 00108-91-8  | < 0.01     | < 0.01     | < 0.01     | < 0.01             | < 0.01            | < 0.00            |
| Decane                                |             | 1.55       | 2.13       | 3.01       | 2.23               | 3.01              | 0.60              |
| Dibenzofuran                          | 00132-64-9  | 0.00       | 0.00       | 0.00       | 0.00               | 0.00              | 0.00              |
| Dichlorodifluoromethane               | 75-71-8     | 0.08       | 0.09       | 0.07       | 0.08               | 0.09              | 0.01              |
| Diethylphthalate                      | 00084-66-2  | 0.00       | 0.01       | 0.01       | 0.00               | 0.01              | 0.00              |
| Dimethylcyclohexane                   |             | T          | 3.19       | 3.01       | 2.07               | 3.19              | 1.46              |
| Dimethylphthalate                     | 00131-11-3  | 0.03       | 0.10       | 0.00       | 0.05               | 0.10              | 0.04              |
| Di-n-butylphthalate                   | 00084-74-2  | 0.18       | 0.08       | 0.12       | 0.13               | 0.18              | 0.04              |
| Diphenylamine                         | 00122-39-4  | 0.09       | 3.49       | 0.27       | 1.28               | 3.49              | 1.56              |
| Dodecane                              |             | T          | T          | T          | T                  | T                 | T                 |
| Epichlorohydrin                       | 106-89-8    | < 0.25     | < 0.17     | < 0.12     | < 0.18             | < 0.25            | < 0.05            |
| Ethanol                               |             | T          | T          | T          | T                  | T                 | T                 |
| Ethylbenzene                          | 100-41-4    | 7.43       | 3.19       | 6.77       | 5.80               | 7.43              | 1.86              |
| Fluoranthene                          | 00206-44-0  | 0.01       | 0.01       | 0.00       | 0.01               | 0.01              | 0.00              |
| Fluorene                              | 00086-73-7  | < 0.00     | < 0.00     | < 0.00     | < 0.00             | < 0.00            | < 0.00            |
| Heptane                               |             | 6.19       | 9.57       | 6.77       | 7.51               | 9.57              | 1.48              |
| Hexachlorobutadiene                   | 87-68-3     | < 0.25     | < 0.17     | < 0.12     | < 0.18             | < 0.25            | < 0.05            |
| Isobutanol                            |             | T          | T          | T          | T                  | T                 | T                 |
| Isopentane                            |             | T          | T          | T          | T                  | T                 | T                 |
| Isophorone                            | 00078-59-1  | 0.04       | < 0.02     | < 0.02     | < 0.03             | < 0.04            | < 0.01            |
| Isopropyl Alcohol                     |             | T          | T          | T          | T                  | T                 | T                 |
| m & p-Xylenes                         | 1330-20-7   | 17.02      | 9.47       | 16.55      | 14.35              | 17.02             | 3.46              |
| Methylcyclohexane                     |             | 4.64       | 7.45       | 6.02       | 6.04               | 7.45              | 1.14              |
| Methylene Chloride                    | 79-09-2     | 2.79       | 0.48       | 0.90       | 1.39               | 2.79              | 1.00              |
| Methylheptane                         |             | 3.09       | 4.25       | 3.01       | 3.45               | 4.25              | 0.57              |
| Methylhexane                          |             | 6.19       | 8.51       | 7.52       | 7.41               | 8.51              | 0.95              |
| Methylhexanone                        |             | T          | T          | T          | T                  | T                 | T                 |
| Methylpentane                         |             | T          | 2.13       | 1.50       | 1.21               | 2.13              | 0.89              |
| Naphthalene                           | 00091-20-3  | 0.13       | 0.06       | 0.08       | 0.09               | 0.13              | 0.03              |
| n-Hexane                              | 110-54-3    | 1.86       | 3.19       | 2.56       | 2.54               | 3.19              | 0.54              |
| Octane                                |             | 6.19       | 7.45       | 5.27       | 6.30               | 7.45              | 0.89              |
| o-Toluidine                           | 00095-53-4  | 0.01       | 0.06       | 0.01       | 0.03               | 0.06              | 0.03              |
| o-Xylene                              | 95-47-6     | 5.57       | 2.55       | 3.61       | 3.91               | 5.57              | 1.25              |
| Phenanthrene                          | 00085-01-8  | 0.01       | 0.02       | 0.01       | 0.01               | 0.02              | 0.01              |
| Phenol                                | 00108-95-2  | 0.13       | 0.28       | 0.19       | 0.20               | 0.28              | 0.06              |
| Phthalimide                           | 00085-41-6  | 0.21       | 1.59       | 0.72       | 0.84               | 1.59              | 0.57              |
| Propane                               | 74-98-6     | T          | T          | T          | T                  | T                 | T                 |
| Propylene Oxide                       | 75-56-9     | < 0.25     | < 0.17     | < 0.12     | < 0.18             | < 0.25            | < 0.05            |
| Pyrene                                | 00129-00-0  | 0.03       | 0.04       | 0.03       | 0.03               | 0.04              | 0.01              |
| Styrene                               | 100-42-5    | 0.56       | 0.37       | 0.10       | 0.34               | 0.56              | 0.19              |
| t-Butyl Methyl Ether                  | 1634-04-4   | < 0.25     | < 0.17     | < 0.12     | < 0.18             | < 0.25            | < 0.05            |
| Tetrachloroethene                     | 127-18-4    | 0.05       | 0.04       | 0.04       | 0.04               | 0.05              | 0.00              |
| Toluene                               | 108-88-3    | 7.58       | 5.11       | 8.27       | 6.99               | 8.27              | 1.36              |
| trans-1,2-Dichloroethene              | 156-60-5    | < 0.12     | < 0.09     | < 0.06     | < 0.09             | < 0.12            | < 0.03            |
| trans-1,2-Dichloropropene             | 10061-02-6  | < 0.12     | < 0.09     | < 0.06     | < 0.09             | < 0.12            | < 0.03            |
| Trichloroethene                       | 79-01-6     | < 0.12     | < 0.09     | < 0.06     | < 0.09             | < 0.12            | < 0.03            |
| Trichlorofluoromethane                | 75-69-4     | < 0.12     | < 0.09     | < 0.06     | < 0.09             | < 0.12            | < 0.03            |
| Trichlorotrifluoroethane              | 76-13-1     | < 0.12     | < 0.09     | < 0.06     | < 0.09             | < 0.12            | < 0.03            |
| Undecane                              |             | 1.55       | 2.13       | 2.26       | 1.98               | 2.26              | 0.31              |
| Vinyl Chloride                        | 75-1-4      | < 0.12     | < 0.09     | < 0.06     | < 0.09             | < 0.12            | < 0.03            |
| Vinyl Acetate                         | 108-05-4    | < 0.12     | < 0.09     | < 0.06     | < 0.09             | < 0.12            | < 0.03            |
| Total                                 |             | 100        | 100        | 100        |                    |                   |                   |
| Total Detected (lb/lb rubber)         |             | 1.60E-04   | 2.02E-04   | 3.05E-04   |                    |                   |                   |
| Total with non-detects (lb/lb rubber) |             | < 1.71E-04 | < 2.11E-04 | < 3.15E-04 |                    |                   |                   |

TABLE 4 - 10H. TIRE PRESS ORGANIC COMPOUND SPECIATION FACTORS - REPLACEMENT

| Compounds                   | CAS Numbers           | Type B     | Type C     | Type I     | Replacement        |                   |                   |
|-----------------------------|-----------------------|------------|------------|------------|--------------------|-------------------|-------------------|
|                             |                       | % of Total | % of Total | % of Total | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| 1-Butanol                   | 71-36-3               | T          | 1.67       | T          | 0.56               | 1.67              | 0.79              |
| 1-Dodecene                  | 00112-41-4            | < 0.13     | < 0.02     | < 0.04     | < 0.06             | < 0.13            | < 0.05            |
| 1,1-Dichloroethane          | 75-34-3               | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| 1,1-Dichloroethene          | 75-35-4               | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| 1,1,1-Trichloroethane       | 71-55-6               | < 0.16     | 0.16       | 0.07       | < 0.13             | < 0.16            | < 0.04            |
| 1,1,2-Trichloroethane       | 79-00-5               | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| 1,1,2,2-Tetrachloroethane   | 79-34-5               | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| 1,2-Dibromo-3-Chloropropane | 96-12-8               | < 0.32     | 0.44       | < 0.21     | < 0.33             | < 0.44            | < 0.10            |
| 1,2-Dibromoethane           | 106-93-4              | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| 1,2-Dichlorobenzene         | 95-50-1               | 0.00       | 0.22       | < 0.01     | < 0.08             | < 0.22            | < 0.10            |
| 1,2-dichloroethane          | 107-06-3              | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| 1,2-Dichloropropane         | 78-87-5               | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| 1,2,4-Trichlorobenzene      | 00120-82-1            | 0.00       | < 0.00     | < 0.01     | < 0.01             | < 0.01            | < 0.00            |
| 1,2,4-Trimethylbenzene      | 00095-63-6            | 0.11       | 0.07       | 0.09       | 0.09               | 0.11              | 0.01              |
| 1,3-Butadiene               | 106-99-0              | < 0.32     | 0.44       | < 0.21     | < 0.33             | < 0.44            | < 0.10            |
| 1,3-Dichlorobenzene         | 541-34-5              | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| 1,4-Dichlorobenzene         | 00106-46-7            | 0.00       | 0.22       | 0.00       | 0.08               | 0.22              | 0.10              |
| 1,4-Dioxane                 | 123-91-1              | < 0.65     | 0.89       | < 0.42     | < 0.65             | < 0.89            | < 0.19            |
| 2-Butanone                  | 78-93-3               | 0.28       | 0.43       | 0.40       | 0.37               | 0.43              | 0.07              |
| 2-Chloroacetophenone        | 01341-24-8            | < 0.01     | < 0.00     | < 0.00     | < 0.01             | < 0.01            | < 0.01            |
| 2-Furaldehyde               | 00098-01-1            | < 0.04     | 0.02       | 0.04       | < 0.03             | < 0.04            | < 0.01            |
| 2-Hexanone                  | 591-78-6              | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| 2-Methylnaphthalene         | 00091-57-6            | 0.03       | 0.15       | 0.04       | 0.07               | 0.15              | 0.05              |
| 2-Methylphenol              | 00095-48-7            | 0.01       | 0.01       | < 0.01     | < 0.01             | < 0.01            | < 0.00            |
| 3-Methylstyrene             | 00100-80-1            | 0.01       | 0.00       | 0.01       | 0.01               | 0.01              | 0.00              |
| 3/4-Methylphenol            | 00108-39-4/00106-44-5 | 0.03       | < 0.01     | < 0.01     | < 0.01             | < 0.03            | < 0.01            |
| 4-Chlorophenyl-phenylether  | 70005-72-3            | T          | < 0.00     | < 0.01     | < 0.00             | < 0.01            | < 0.00            |
| 4-Methyl-2-Pentanone        | 108-10-1              | 12.48      | 9.28       | 4.69       | 8.81               | 12.48             | 3.20              |
| 4-Methylstyrene             | 00622-97-9            | 0.00       | 0.00       | 0.00       | 0.00               | 0.00              | 0.00              |
| Acenaphthene                | 00083-32-9            | 0.01       | < 0.00     | < 0.00     | < 0.00             | < 0.01            | < 0.00            |
| Acenaphthylene              | 00208-96-8            | 0.01       | 0.06       | 0.05       | 0.04               | 0.06              | 0.02              |
| Acetone                     | 67-64-1               | 4.12       | 3.40       | 4.04       | 3.85               | 4.12              | 0.32              |
| Acetonitrile                | 1722-09-4             | < 0.32     | 0.44       | < 0.21     | < 0.33             | < 0.44            | < 0.10            |
| Acetophenone                | 00098-86-2            | 0.10       | 0.08       | 0.06       | 0.08               | 0.10              | 0.01              |
| Acrolein                    | 107-02-8              | < 0.28     | 0.43       | < 0.21     | < 0.31             | < 0.43            | < 0.09            |
| Acrylonitrile               | 107-13-1              | < 0.32     | 0.44       | < 0.21     | < 0.33             | < 0.44            | < 0.10            |
| Allyl Chloride              | 107-05-1              | < 0.32     | 0.44       | < 0.21     | < 0.33             | < 0.44            | < 0.10            |
| Aniline                     | 00062-53-3            | 1.63       | 0.51       | 3.97       | 2.04               | 3.97              | 1.44              |
| a-Pinene                    | 7785-70-8             | 4.05       | 6.57       | T          | 3.54               | 6.57              | 2.70              |
| Benzaldehyde                | 00100-52-7            | 0.05       | 0.09       | < 0.01     | < 0.05             | < 0.09            | < 0.03            |
| Benzene                     | 71-43-2               | < 0.15     | 0.24       | 0.26       | < 0.22             | < 0.26            | < 0.05            |
| Benzoic acid                | 00065-85-0            | < 0.01     | < 0.02     | 0.12       | < 0.05             | < 0.12            | < 0.05            |
| Benzonitrile                | 00100-47-0            | < 0.01     | < 0.00     | < 0.00     | < 0.01             | < 0.01            | < 0.00            |
| Benzyl alcohol              | 00100-51-6            | 0.01       | 0.01       | < 0.01     | < 0.01             | < 0.01            | < 0.00            |
| Benzyl Chloride             | 100-44-7              | < 0.01     | 0.44       | < 0.00     | < 0.15             | < 0.44            | < 0.21            |
| Biphenyl                    | 00092-52-4            | 0.04       | 0.04       | < 0.00     | < 0.03             | < 0.04            | < 0.02            |
| bis(2-Ethylhexyl)phthalate  | 00117-81-7            | 1.02       | 0.12       | 0.02       | 0.39               | 1.02              | 0.45              |
| Bromodichloromethane        | 75-27-4               | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Bromoform                   | 75-25-2               | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Bromomethane                | 74-83-9               | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Butane                      |                       | 1.10       | T          | T          | 0.37               | 1.10              | 0.52              |
| Butylbenzylphthalate        | 00085-68-7            | T          | 0.01       | < 0.01     | < 0.00             | < 0.01            | < 0.00            |
| C13-C14 Branched Alkane     |                       | 1.80       | 2.06       | T          | 1.29               | 2.06              | 0.92              |
| Camphene                    | 00079-92-5            | < 0.03     | < 0.01     | 0.69       | < 0.24             | < 0.69            | < 0.31            |
| Carbon Disulfide            | 75-15-0               | 5.74       | 3.10       | 1.09       | 3.31               | 5.74              | 1.90              |
| Carbon Tetrachloride        | 56-23-5               | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Chlorobenzene               | 108-90-7              | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Chlorodibromoethene         | 124-48-1              | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Chloroethane                | 75-00-3               | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Chloroform                  | 67-66-3               | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Chloromethane               | 74-87-3               | < 0.16     | 0.07       | 0.04       | < 0.09             | < 0.16            | < 0.05            |
| cis-1,2-Dichloroethene      | 156-59-2              | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| cis-1,3-Dichloropropene     | 10061-01-5            | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Cumene                      | 98-82-8               | 0.21       | 0.44       | 0.11       | 0.26               | 0.44              | 0.14              |
| Cyclobutane                 |                       | 1.51       | 3.59       | T          | 1.70               | 3.59              | 1.47              |

TABLE 4 - 10H. TIRE PRESS ORGANIC COMPOUND SPECIATION FACTORS - REPLACEMENT

| Compounds                             | CAS Numbers | Type B     | Type C     | Type I     | Replacement        |                   |                   |
|---------------------------------------|-------------|------------|------------|------------|--------------------|-------------------|-------------------|
|                                       |             | % of Total | % of Total | % of Total | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Cyclohexanone                         | 00108-94-1  | 5.15       | 0.62       | 1.49       | 2.42               | 5.15              | 1.96              |
| Cyclohexylamine                       | 00108-91-8  | < 0.04     | < 0.01     | < 0.01     | < 0.02             | < 0.04            | < 0.01            |
| Decane                                |             | T          | T          | 2.60       | 0.87               | 2.60              | 1.23              |
| Dibenzofuran                          | 00132-64-9  | 0.01       | 0.01       | 0.00       | 0.01               | 0.01              | 0.00              |
| Dichlorodifluoromethane               | 75-71-8     | < 0.16     | 0.19       | < 0.10     | < 0.15             | < 0.19            | < 0.04            |
| Diethylphthalate                      | 00084-66-2  | 0.02       | 0.01       | 0.00       | 0.01               | 0.02              | 0.01              |
| Dimethylcyclohexane                   |             | T          | T          | 2.60       | 0.87               | 2.60              | 1.23              |
| Dimethylphthalate                     | 00131-11-3  | 0.02       | 0.02       | 0.01       | 0.01               | 0.02              | 0.01              |
| Di-n-butylphthalate                   | 00084-74-2  | 0.41       | 0.56       | 0.05       | 0.34               | 0.56              | 0.21              |
| Diphenylamine                         | 00122-39-4  | 1.15       | 0.15       | 0.06       | 0.45               | 1.15              | 0.49              |
| Dodecane                              |             | 4.05       | 5.56       | T          | 3.20               | 5.56              | 2.35              |
| Epichlorohydrin                       | 106-89-8    | < 0.32     | 0.44       | < 0.21     | < 0.33             | < 0.44            | < 0.10            |
| Ethanol                               |             | 20.24      | T          | T          | 6.75               | 20.24             | 9.54              |
| Ethylbenzene                          | 100-41-4    | 1.87       | 0.91       | 3.78       | 2.19               | 3.78              | 1.19              |
| Fluoranthene                          | 00206-44-0  | 0.00       | 0.01       | 0.01       | 0.01               | 0.01              | 0.00              |
| Fluorene                              | 00086-73-7  | 0.02       | < 0.00     | 0.01       | < 0.01             | < 0.02            | < 0.01            |
| Heptane                               |             | 2.95       | 1.68       | 7.81       | 4.15               | 7.81              | 2.64              |
| Hexachlorobutadiene                   | 87-68-3     | < 0.32     | 0.44       | < 0.21     | < 0.33             | < 0.44            | < 0.10            |
| Isobutanol                            |             | T          | T          | T          | T                  | T                 | T                 |
| Isopentane                            |             | T          | T          | T          | T                  | T                 | T                 |
| Isophorone                            | 00078-59-1  | < 0.00     | 0.02       | < 0.00     | < 0.01             | < 0.02            | < 0.01            |
| Isopropyl Alcohol                     |             | T          | T          | T          | T                  | T                 | T                 |
| m & p-Xylenes                         | 1330-20-7   | 6.77       | 5.02       | 11.46      | 7.75               | 11.46             | 2.72              |
| Methylcyclohexane                     |             | 2.02       | 1.29       | 6.51       | 3.27               | 6.51              | 2.31              |
| Methylene Chloride                    | 79-09-2     | 0.60       | 1.79       | 1.95       | 1.45               | 1.95              | 0.61              |
| Methylheptane                         |             | T          | T          | 3.91       | 1.30               | 3.91              | 1.84              |
| Methylhexane                          |             | 1.30       | 1.14       | 6.51       | 2.98               | 6.51              | 2.50              |
| Methylhexanone                        |             | T          | 23.24      | 9.12       | 10.79              | 23.24             | 9.56              |
| Methylpentane                         |             | T          | T          | T          | T                  | T                 | T                 |
| Naphthalene                           | 00091-20-3  | 0.05       | 0.13       | 0.08       | 0.09               | 0.13              | 0.03              |
| n-Hexane                              | 110-54-3    | 0.70       | 0.24       | 1.82       | 0.92               | 1.82              | 0.66              |
| Octane                                |             | T          | 1.37       | 6.51       | 2.63               | 6.51              | 2.80              |
| o-Toluidine                           | 00095-53-4  | 0.18       | 0.01       | < 0.01     | < 0.07             | < 0.18            | < 0.08            |
| o-Xylene                              | 95-47-6     | 1.37       | 1.08       | 3.13       | 1.86               | 3.13              | 0.90              |
| Phenanthrene                          | 00085-01-8  | 0.01       | 0.04       | 0.02       | 0.03               | 0.04              | 0.01              |
| Phenol                                | 00108-95-2  | 0.32       | 0.20       | 0.23       | 0.25               | 0.32              | 0.05              |
| Phthalimide                           | 00085-41-6  | 0.38       | 1.89       | 1.67       | 1.31               | 1.89              | 0.67              |
| Propane                               | 74-98-6     | T          | 0.98       | T          | 0.33               | 0.98              | 0.46              |
| Propylene Oxide                       | 75-56-9     | < 0.32     | 1.99       | < 0.21     | < 0.84             | < 1.99            | < 0.81            |
| Pyrene                                | 00129-00-0  | 0.03       | 0.08       | 0.03       | 0.05               | 0.08              | 0.02              |
| Styrene                               | 100-42-5    | 0.20       | 0.33       | 0.43       | 0.32               | 0.43              | 0.10              |
| t-Butyl Methyl Ether                  | 1634-04-4   | < 0.32     | 0.44       | < 0.21     | < 0.33             | < 0.44            | < 0.10            |
| Tetrachloroethene                     | 127-18-4    | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Toluene                               | 108-88-3    | 4.68       | 2.60       | 5.60       | 4.29               | 5.60              | 1.26              |
| trans-1,2-Dichloroethene              | 156-60-5    | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| trans-1,2-Dichloropropene             | 10061-02-6  | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Trichloroethene                       | 79-01-6     | < 0.16     | 0.22       | 0.06       | < 0.15             | < 0.22            | < 0.07            |
| Trichlorofluoromethane                | 75-69-4     | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Trichlorotrifluoroethane              | 76-13-1     | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Undecane                              |             | 2.02       | 2.78       | 1.30       | 2.04               | 2.78              | 0.60              |
| Vinyl Chloride                        | 75-14       | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Vinyl Acetate                         | 108-05-4    | < 0.16     | 0.22       | < 0.10     | < 0.16             | < 0.22            | < 0.05            |
| Total                                 |             | 100        | 100        | 100        |                    |                   |                   |
| Total Detected (lb/lb rubber)         |             | 1.43E-04   | 1.12E-04   | 1.80E-04   |                    |                   |                   |
| Total with non-detects (lb/lb rubber) |             | < 1.57E-04 | < 1.12E-04 | < 1.91E-04 |                    |                   |                   |

TABLE 4 - 101. TIRE PRESS ORGANIC COMPOUND SPECIATION FACTORS - ALL TIRES

| Compounds                   | CAS Numbers           | Type A     | Type B     | Type C     | Type D     | Type E     | Type F     | Type G     | Type H     | Type I     | Mean       | MAX        | STD        |
|-----------------------------|-----------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                             |                       | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total |
| 1-Butanol                   | 71-36-3               | 1.07       | 0.13       | 0.02       | 0.03       | 0.03       | 0.02       | 0.03       | 0.02       | 0.04       | 0.30       | 1.87       | 0.59       |
| 1-Dodecene                  | 00112-41-4            | 0.04       | 0.13       | 0.02       | 0.03       | 0.03       | 0.02       | 0.03       | 0.02       | 0.04       | 0.04       | 0.13       | 0.03       |
| 1,1-Dichloroethane          | 75-34-3               | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.03       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| 1,1-Dichloroethene          | 75-35-4               | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.20       | 0.09       | 0.06       | 0.10       | 0.14       | 0.22       | 0.05       |
| 1,1,1-Trichloroethane       | 71-55-6               | 0.05       | 0.16       | 0.16       | 0.13       | 0.25       | 14.64      | 0.06       | 0.05       | 0.07       | 1.73       | 14.64      | 4.56       |
| 1,1,2-Trichloroethane       | 79-00-5               | 0.14       | 0.15       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| 1,1,2,2-Tetrachloroethane   | 79-34-5               | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| 1,2-Dibromo-3-Chloropropane | 96-12-8               | 0.29       | 0.32       | 0.44       | 0.25       | 0.25       | 0.13       | 0.17       | 0.12       | 0.21       | 0.24       | 0.44       | 0.10       |
| 1,2-Dibromochloroethane     | 106-93-4              | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| 1,2-Dichlorobenzene         | 95-50-1               | 0.01       | 0.00       | 0.22       | 0.01       | 0.01       | 0.00       | 0.00       | 0.00       | 0.01       | 0.03       | 0.22       | 0.07       |
| 1,2-Dichloroethane          | 107-06-3              | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| 1,2-Dichloropropane         | 78-87-5               | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| 1,2,4-Trichlorobenzene      | 00120-82-1            | 0.07       | 0.11       | 0.07       | 0.18       | 0.24       | 0.17       | 0.27       | 0.30       | 0.09       | 0.17       | 0.30       | 0.08       |
| 1,2,4-Trimethylbenzene      | 00095-63-6            | 0.29       | 0.32       | 0.44       | 0.25       | 0.25       | 0.13       | 0.17       | 0.12       | 0.21       | 0.24       | 0.44       | 0.10       |
| 1,3-Butadiene               | 106-99-0              | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| 1,3-Dichlorobenzene         | 541-34-5              | 0.00       | 0.00       | 0.22       | 0.01       | 0.00       | 0.24       | 0.03       | 0.00       | 0.00       | 0.00       | 0.01       | 0.00       |
| 1,4-Dichlorobenzene         | 00106-46-7            | 0.57       | 0.65       | 0.89       | 0.50       | 0.50       | 0.26       | 0.34       | 0.24       | 0.42       | 0.49       | 0.89       | 0.19       |
| 1,4-Dioxane                 | 123-91-1              | 0.27       | 0.28       | 0.43       | 0.54       | 0.60       | 0.54       | 0.29       | 0.53       | 0.40       | 0.43       | 0.80       | 0.12       |
| 2-Butanone                  | 78-93-3               | 0.00       | 0.01       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.01       | 0.00       |
| 2-Chloroacetophenone        | 01341-24-8            | 0.01       | 0.04       | 0.02       | 0.01       | 0.01       | 0.01       | 0.02       | 0.01       | 0.04       | 0.02       | 0.04       | 0.01       |
| 2-Furaldehyde               | 00098-01-1            | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| 2-Hexanone                  | 591-78-6              | 0.02       | 0.03       | 0.15       | 0.10       | 0.07       | 0.02       | 0.02       | 0.05       | 0.04       | 0.06       | 0.15       | 0.04       |
| 2-Methylnaphthalene         | 00091-57-6            | 0.01       | 0.01       | 0.01       | 0.01       | 0.01       | 0.00       | 0.00       | 0.01       | 0.01       | 0.01       | 0.01       | 0.00       |
| 2-Methylphenol              | 00095-48-7            | 0.00       | 0.01       | 0.00       | 0.01       | 0.01       | 0.01       | 0.01       | 0.02       | 0.01       | 0.01       | 0.02       | 0.00       |
| 3-Methylstyrene             | 00100-80-1            | 0.01       | 0.03       | 0.01       | 0.01       | 0.01       | 0.00       | 0.00       | 0.00       | 0.01       | 0.01       | 0.03       | 0.01       |
| 3,4-Methylphenol            | 00108-39-4/00106-44-5 | 0.01       | 0.01       | 0.01       | 0.01       | 0.01       | 0.00       | 0.00       | 0.00       | 0.01       | 0.01       | 0.01       | 0.00       |
| 4-Chlorophenyl-phenylether  | 70005-72-3            | 0.01       | 0.01       | 0.00       | 0.01       | 0.00       | 0.00       | 0.00       | 0.00       | 0.01       | 0.00       | 0.01       | 0.00       |
| 4-Methyl-2-Pentanone        | 108-10-1              | 9.45       | 12.48      | 9.28       | 7.57       | 5.73       | 3.33       | 6.06       | 5.19       | 4.69       | 7.09       | 12.48      | 2.71       |
| 4-Methylstyrene             | 00622-97-9            | 0.00       | 0.00       | 0.00       | 0.01       | 0.01       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.01       | 0.00       |
| Acenaphthene                | 00083-32-9            | 0.00       | 0.01       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.01       | 0.00       |
| Acenaphthylene              | 00208-96-8            | 0.02       | 0.01       | 0.06       | 0.03       | 0.04       | 0.02       | 0.03       | 0.01       | 0.05       | 0.03       | 0.06       | 0.02       |
| Acetone                     | 67-64-1               | 3.39       | 4.12       | 3.40       | 5.36       | 5.11       | 4.07       | 7.76       | 9.03       | 4.04       | 5.14       | 9.03       | 1.87       |
| Acetonitrile                | 1722-09-4             | 0.29       | 0.32       | 0.44       | 0.25       | 0.25       | 0.13       | 0.17       | 0.12       | 0.21       | 0.24       | 0.44       | 0.10       |
| Acetophenone                | 00098-86-2            | 0.05       | 0.10       | 0.08       | 0.08       | 0.04       | 0.04       | 0.06       | 0.04       | 0.06       | 0.06       | 0.10       | 0.02       |
| Acrolein                    | 107-02-8              | 0.29       | 0.28       | 0.43       | 0.25       | 0.25       | 0.13       | 0.17       | 0.12       | 0.21       | 0.24       | 0.43       | 0.09       |
| Acrylonitrile               | 107-13-1              | 0.29       | 0.32       | 0.44       | 0.25       | 0.25       | 0.13       | 0.17       | 0.12       | 0.21       | 0.24       | 0.44       | 0.10       |
| Allyl Chloride              | 107-05-1              | 0.29       | 0.32       | 0.44       | 0.25       | 0.25       | 0.13       | 0.17       | 0.12       | 0.21       | 0.24       | 0.44       | 0.10       |
| Aniline                     | 00062-53-3            | 1.19       | 1.63       | 0.51       | 3.45       | 0.43       | 1.58       | 0.33       | 0.11       | 3.97       | 1.47       | 3.97       | 1.31       |
| a-Pinene                    | 7785-70-8             | 3.57       | 4.05       | 6.57       | 1.58       | 1.55       | 1.58       | 0.07       | 0.00       | 0.01       | 1.92       | 6.57       | 2.21       |
| Benzaldehyde                | 00100-52-7            | 0.05       | 0.05       | 0.09       | 0.01       | 0.01       | 0.00       | 0.07       | 0.00       | 0.01       | 0.03       | 0.09       | 0.03       |
| Benzene                     | 71-43-2               | 0.13       | 0.15       | 0.24       | 0.12       | 0.25       | 0.12       | 0.26       | 0.15       | 0.26       | 0.19       | 0.26       | 0.06       |
| Benzoic acid                | 00065-85-0            | 0.06       | 0.01       | 0.02       | 0.01       | 0.01       | 0.01       | 0.04       | 0.01       | 0.12       | 0.03       | 0.12       | 0.04       |
| Benzonitrile                | 00100-47-0            | 0.02       | 0.01       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.01       | 0.02       | 0.01       |
| Benzyl alcohol              | 00100-51-6            | 0.01       | 0.01       | 0.01       | 0.00       | 0.01       | 0.00       | 0.01       | 0.00       | 0.01       | 0.01       | 0.01       | 0.00       |
| Benzyl Chloride             | 100-44-7              | 0.00       | 0.01       | 0.44       | 0.00       | 0.00       | 0.02       | 0.00       | 0.00       | 0.00       | 0.05       | 0.44       | 0.14       |
| Biphenyl                    | 00092-52-4            | 0.06       | 0.04       | 0.04       | 0.02       | 0.03       | 0.01       | 0.03       | 0.02       | 0.00       | 0.03       | 0.06       | 0.02       |

TABLE 4 - 101. TIRE PRESS ORGANIC COMPOUND SPECIATION FACTORS - ALL TIRES

| Compounds                                                                       | CAS Numbers | ALL TIRES  |            |            |            |            |            |            |            |            |            |            |            |
|---------------------------------------------------------------------------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                                                                                 |             | Type A     | Type B     | Type C     | Type D     | Type E     | Type F     | Type G     | Type H     | Type I     | Mean       | MAX        | STD        |
|                                                                                 |             | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total |
| bis(2-Ethylhexyl)phthalate<br>Bromodichloromethane<br>Bromolorm<br>Bromomethane | 00117-81-7  | 0.08       | 1.02       | 0.12       | 0.01       | 0.06       | 0.02       | 0.03       | 0.01       | 0.02       | 0.15       | 1.02       | 0.31       |
|                                                                                 | 75-27-4     | <          | 0.14       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | <          | 0.10       | 0.12       | 0.22       | 0.05       |
|                                                                                 | 75-25-2     | <          | 0.14       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | <          | 0.10       | 0.12       | 0.22       | 0.05       |
|                                                                                 | 74-83-9     | 0.08       | 0.16       | 0.22       | 0.04       | 0.12       | 0.07       | 0.09       | <          | 0.10       | 0.10       | 0.22       | 0.05       |
| Butane                                                                          |             | T          | 1.10       | T          | T          | T          | T          | T          | T          | T          | 0.12       | 1.10       | 0.35       |
| Butylbenzylphthalate                                                            | 00085-68-7  | 0.00       | T          | 0.01       | <          | 0.01       | 0.00       | 0.00       | 0.00       | <          | 0.00       | 0.01       | 0.00       |
| C13-C14 Branched Alkane                                                         |             | T          | 1.80       | 2.06       | T          | T          | T          | T          | T          | T          | 0.43       | 2.06       | 0.81       |
| Camphene                                                                        | 00079-92-5  | <          | 0.01       | <          | 0.01       | <          | 0.01       | <          | 0.01       | <          | 0.08       | 0.69       | 0.21       |
| Carbon Disulfide                                                                | 75-15-0     | 17.29      | 5.74       | 3.10       | 0.44       | 4.49       | 0.17       | 2.87       | 2.18       | 1.09       | 4.15       | 17.29      | 4.95       |
| Carbon Tetrachloride                                                            | 56-23-5     | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| Chlorobenzene                                                                   | 108-90-7    | <          | 0.14       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| Chlorodibromomethane                                                            | 124-48-1    | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| Chloroethane                                                                    | 75-00-3     | <          | 0.14       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| Chloroform                                                                      | 67-66-3     | <          | 0.14       | 0.22       | 0.13       | 0.12       | 0.07       | 0.03       | 0.06       | 0.10       | 0.12       | 0.22       | 0.06       |
| Chloromethane                                                                   | 74-87-3     | 0.07       | 0.16       | 0.07       | 0.05       | 0.12       | 0.02       | 0.05       | 0.03       | 0.04       | 0.07       | 0.16       | 0.04       |
| cis-1,2-Dichloroethene                                                          | 156-59-2    | <          | 0.14       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| cis-1,3-Dichloropropene                                                         | 10061-01-5  | <          | 0.14       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22       | 0.05       |
| Cumene                                                                          | 98-82-8     | 0.08       | 0.21       | 0.44       | 0.21       | 0.26       | 0.15       | 0.14       | 0.22       | 0.11       | 0.20       | 0.44       | 0.10       |
| Cyclobutane                                                                     |             | 1.43       | 1.51       | 3.59       | 1.10       | 1.08       | T          | T          | T          | T          | 0.97       | 3.59       | 1.11       |
| Cyclohexanone                                                                   | 00108-94-1  | 0.69       | 5.15       | 0.62       | 3.15       | 0.11       | 2.44       | 0.23       | 0.31       | 1.49       | 1.58       | 5.15       | 1.61       |
| Cyclohexylamine                                                                 | 00108-91-8  | <          | 0.01       | <          | 0.01       | 4.70       | <          | 0.01       | <          | 0.01       | 1.40       | 7.82       | 2.70       |
| Decane                                                                          |             | T          | T          | T          | T          | 1.55       | T          | 2.13       | 3.01       | 2.60       | 1.03       | 3.01       | 1.21       |
| Dibenzofuran                                                                    | 00132-54-9  | 0.01       | 0.01       | 0.01       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.01       | 0.00       |
| Dichlorodifluoromethane                                                         | 75-71-8     | <          | 0.14       | 0.19       | 0.13       | 0.08       | 0.09       | 0.09       | 0.07       | <          | 0.12       | 0.19       | 0.04       |
| Diethylphthalate                                                                | 00084-66-2  | 0.02       | 0.02       | 0.01       | 0.00       | 0.00       | 0.00       | 0.01       | 0.01       | 0.00       | 0.01       | 0.02       | 0.01       |
| Dimethylcyclohexane                                                             |             | T          | T          | T          | 1.58       | T          | T          | 3.19       | 3.01       | 2.60       | 1.15       | 3.19       | 1.36       |
| Dimethylphthalate                                                               | 00131-11-3  | 0.00       | 0.02       | 0.02       | 0.01       | 0.03       | 0.00       | 0.10       | 0.00       | 0.01       | 0.02       | 0.10       | 0.03       |
| Di-n-butylphthalate                                                             | 00084-74-2  | 0.14       | 0.41       | 0.56       | 0.11       | 0.18       | 0.34       | 0.08       | 0.12       | 0.05       | 0.22       | 0.56       | 0.16       |
| Diphenylamine                                                                   | 00122-39-4  | 0.71       | 1.15       | 0.15       | 0.06       | 0.09       | 0.04       | 3.49       | 0.27       | 0.06       | 0.67       | 3.49       | 1.06       |
| Dodecane                                                                        |             | 3.57       | 4.05       | 5.56       | T          | T          | T          | T          | T          | T          | 1.46       | 5.56       | 2.13       |
| Epichlorohydrin                                                                 | 106-89-8    | <          | 0.29       | 0.44       | <          | 0.25       | <          | 0.17       | <          | 0.21       | 0.24       | 0.44       | 0.10       |
| Ethanol                                                                         |             | 17.83      | 20.24      | T          | T          | T          | 4.88       | T          | T          | T          | 4.77       | 20.24      | 7.79       |
| Ethylbenzene                                                                    | 100-41-4    | 3.57       | 1.87       | 0.91       | 7.25       | 7.43       | 3.58       | 3.19       | 6.77       | 3.78       | 4.26       | 7.43       | 2.22       |
| Fluoranthene                                                                    | 00206-44-0  | 0.00       | 0.00       | 0.01       | 0.00       | 0.01       | 0.01       | 0.01       | 0.00       | 0.01       | 0.01       | 0.01       | 0.00       |
| Fluorene                                                                        | 00086-73-7  | 0.02       | 0.02       | <          | <          | <          | 0.00       | <          | <          | 0.01       | 0.01       | 0.02       | 0.01       |
| Heptane                                                                         |             | 1.78       | 2.95       | 1.68       | 4.73       | 6.19       | 7.32       | 9.57       | 6.77       | 7.81       | 5.42       | 9.57       | 2.64       |
| Hexachlorobutadiene                                                             | 87-68-3     | <          | 0.29       | 0.44       | 0.25       | <          | <          | 0.13       | <          | 0.17       | 0.24       | 0.44       | 0.10       |
| Isobutanol                                                                      |             | T          | T          | T          | T          | T          | 3.25       | T          | T          | T          | 0.36       | 3.25       | 1.02       |
| Isopentane                                                                      |             | T          | T          | T          | T          | T          | 1.63       | T          | T          | T          | 0.18       | 1.63       | 0.51       |
| Isophorone                                                                      | 00078-59-1  | <          | 0.00       | 0.02       | 0.01       | 0.04       | 0.00       | 0.02       | <          | 0.00       | 0.01       | 0.04       | 0.01       |
| Isopropyl Alcohol                                                               |             | 1.07       | T          | T          | T          | T          | T          | T          | T          | T          | 0.12       | 1.07       | 0.34       |
| m & p-Xylenes                                                                   | 1330-20-7   | 11.59      | 6.77       | 5.02       | 17.35      | 17.02      | 8.13       | 9.47       | 16.55      | 11.46      | 11.48      | 17.35      | 4.35       |
| Methylcyclohexane                                                               |             | 1.78       | 2.02       | 1.29       | 3.15       | 4.64       | 5.69       | 7.45       | 6.02       | 6.51       | 4.28       | 7.45       | 2.15       |
| Methylene Chloride                                                              |             | 0.66       | 0.60       | 1.79       | 4.57       | 2.79       | 1.95       | 0.48       | 0.90       | 1.95       | 1.74       | 4.57       | 1.25       |
| Methylheptane                                                                   | 79-09-2     | T          | T          | T          | 3.15       | 3.09       | 3.25       | 4.25       | 3.01       | 3.91       | 2.30       | 4.25       | 1.67       |
| Methylhexane                                                                    |             | 0.89       | 1.30       | 1.14       | 1.58       | 6.19       | 7.32       | 8.51       | 7.52       | 6.51       | 4.55       | 8.51       | 3.04       |

TABLE 4 - 101. TIRE PRESS ORGANIC COMPOUND SPECIATION FACTORS - ALL TIRES

| Compounds                             | CAS Numbers | Type A     | Type B     | Type C     | Type D     | Type E     | Type F     | Type G     | Type H     | Type I     | Mean       | ALL TIRES<br>MAX | STD        |
|---------------------------------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------------|------------|
|                                       |             | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total | % of Total       | % of Total |
| Methylhexanone                        |             | T          | T          | 23.24      | T          | T          | T          | 2.13       | T          | 9.12       | 3.60       | 23.24            | 7.51       |
| Methylpentane                         | 00091-20-3  | T          | T          | 0.13       | 0.17       | 0.13       | 0.11       | 0.06       | 0.08       | 0.08       | 0.40       | 2.13             | 0.77       |
| Naphthalene                           | 110-54-3    | 0.05       | 0.05       | 0.24       | 0.52       | 1.86       | 1.06       | 3.19       | 2.56       | 1.82       | 0.10       | 0.17             | 0.04       |
| n-Hexane                              |             | 0.32       | 0.70       | 1.37       | 4.73       | 6.19       | 4.07       | 7.45       | 5.27       | 6.51       | 1.36       | 3.19             | 0.99       |
| Octane                                |             | T          | T          | 0.01       | 0.01       | 0.01       | 0.00       | 0.08       | 0.01       | 0.01       | 3.95       | 7.45             | 2.67       |
| o-Toluidine                           | 00095-53-4  | 0.12       | 0.18       | 0.01       | 0.01       | 0.01       | 0.00       | 0.06       | 0.01       | 0.01       | 0.05       | 0.18             | 0.06       |
| o-Xylene                              | 95-47-6     | 2.85       | 1.37       | 1.08       | 4.89       | 5.57       | 2.68       | 2.55       | 3.61       | 3.13       | 3.08       | 5.57             | 1.38       |
| Phenanthrene                          | 00085-01-8  | 0.01       | 0.01       | 0.04       | 0.01       | 0.01       | 0.01       | 0.02       | 0.01       | 0.02       | 0.02       | 0.04             | 0.01       |
| Phenol                                | 00108-95-2  | 0.05       | 0.32       | 0.20       | 0.01       | 0.13       | 0.05       | 0.28       | 0.19       | 0.23       | 0.16       | 0.32             | 0.10       |
| Phthalimide                           | 00085-41-6  | 0.11       | 0.38       | 1.89       | 1.30       | 0.21       | 0.00       | 1.59       | 0.72       | 1.87       | 0.87       | 1.89             | 0.70       |
| Propane                               | 74-98-6     | T          | T          | 0.98       | T          | T          | T          | T          | T          | T          | 0.11       | 0.98             | 0.31       |
| Propylene Oxide                       | 75-56-9     | 0.29       | 0.32       | 1.99       | 0.25       | 0.25       | 0.13       | 0.17       | 0.12       | 0.21       | 0.41       | 1.99             | 0.56       |
| Pyrene                                | 00129-00-0  | 0.02       | 0.03       | 0.08       | 0.02       | 0.03       | 0.03       | 0.04       | 0.03       | 0.03       | 0.04       | 0.08             | 0.02       |
| Styrene                               | 100-42-5    | 0.27       | 0.20       | 0.33       | 0.17       | 0.56       | 1.38       | 0.37       | 0.10       | 0.43       | 0.42       | 1.38             | 0.36       |
| t-Butyl Methyl Ether                  | 1634-04-4   | 0.29       | 0.32       | 0.44       | 0.25       | 0.25       | 0.11       | 0.17       | 0.12       | 0.21       | 0.24       | 0.44             | 0.10       |
| Tetrachloroethene                     | 127-18-4    | 0.05       | 0.16       | 0.22       | 0.13       | 0.05       | 0.07       | 0.04       | 0.04       | 0.10       | 0.10       | 0.22             | 0.06       |
| Toluene                               | 108-88-3    | 4.46       | 4.68       | 2.60       | 7.57       | 7.58       | 4.23       | 5.11       | 8.27       | 5.60       | 5.57       | 8.27             | 1.77       |
| trans-1,2-Dichloroethene              | 156-60-5    | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22             | 0.05       |
| trans-1,2-Dichloropropene             | 10061-02-6  | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22             | 0.05       |
| Trichloroethene                       | 79-01-6     | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22             | 0.05       |
| Trichlorofluoromethane                | 75-69-4     | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22             | 0.05       |
| Trichlorofluoroethane                 | 76-13-1     | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22             | 0.05       |
| Undecane                              |             | 1.60       | 2.02       | 2.78       | 1.58       | 1.55       | T          | 2.13       | 2.26       | 1.30       | 1.69       | 2.78             | 0.73       |
| Vinyl Chloride                        | 75-1-4      | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22             | 0.05       |
| Vinyl Acetate                         | 108-05-4    | 0.14       | 0.16       | 0.22       | 0.13       | 0.12       | 0.07       | 0.09       | 0.06       | 0.10       | 0.12       | 0.22             | 0.05       |
| Total                                 |             | 100        | 100        | 100        | 100        | 100        | 100        | 100        | 100        | 100        | 0.12       | 0.22             | 0.05       |
| Total Detected (lb/lb rubber)         |             | 1.37E-04   | 1.43E-04   | 1.12E-04   | 1.56E-04   | 1.60E-04   | 2.46E-04   | 2.02E-04   | 3.05E-04   | 1.80E-04   |            |                  |            |
| Total with non-detects (lb/lb rubber) |             | 1.48E-04   | 1.57E-04   | 1.12E-04   | 1.66E-04   | 1.71E-04   | 2.76E-04   | 2.11E-04   | 3.15E-04   | 1.91E-04   |            |                  |            |

TABLE 4 - 10J. TIRE PRESS AMINE SPECIATION FACTORS - OEM

|                                      | Type A<br>% of Total | Type D<br>% of Total | Type F<br>% of Total | OEM                |                   |                   |
|--------------------------------------|----------------------|----------------------|----------------------|--------------------|-------------------|-------------------|
|                                      |                      |                      |                      | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Trimethylamine                       | 2.20                 | < 66.67              | < 88.98              | 52.62              | 88.98             | 36.80             |
| Dimethylamine                        | 97.80                | 33.33                | 11.02                | 47.38              | 97.80             | 36.80             |
| Total                                | 100.00               | 100.00               | 100.00               |                    |                   |                   |
| Total Detected (lb/lb rubber)        | 3.56E-07             | 9.21E-09             | 2.12E-09             |                    |                   |                   |
| Total with non-detects(lb/lb rubber) | < 6.50E-07           | < 1.01E-07           | < 8.77E-08           |                    |                   |                   |

**TABLE 4 - 10K. TIRE PRESS AMINE SPECIATION FACTORS - HIGH PERFORMANCE**

|                                      | Type E<br>% of Total | Type G<br>% of Total | Type H<br>% of Total | High Performance   |                   |                   |
|--------------------------------------|----------------------|----------------------|----------------------|--------------------|-------------------|-------------------|
|                                      |                      |                      |                      | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Trimethylamine                       | < 86.96              | < 50.00              | < 69.93              | 68.96              | 86.96             | 15.10             |
| Dimethylamine                        | 13.04                | < 50.00              | 30.07                | 31.04              | 50.00             | 15.10             |
| Total                                | 100.00               | 100.00               | 100.00               |                    |                   |                   |
| Total Detected (lb/lb rubber)        | 4.74E-09             | 0.00E+00             | 7.93E-09             |                    |                   |                   |
| Total with non-detects(lb/lb rubber) | < 1.63E-07           | < 1.44E-07           | < 1.00E-07           |                    |                   |                   |

TABLE 4 - 10L. TIRE PRESS AMINE SPECIATION FACTORS - REPLACEMENT

|                                      | Type B<br>% of Total | Type C<br>% of Total | Type I<br>% of Total | Replacement        |                   |                   |
|--------------------------------------|----------------------|----------------------|----------------------|--------------------|-------------------|-------------------|
|                                      |                      |                      |                      | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Trimethylamine                       | < 50.00              | < 50.00              | < 79.28              | 59.76              | 79.28             | 13.80             |
| Dimethylamine                        | < 50.00              | < 50.00              | 20.72                | 40.24              | 50.00             | 13.80             |
| Total                                | 100.00               | 100.00               | 100.00               |                    |                   |                   |
| Total Detected (lb/lb rubber)        | 0.00E+00             | 0.00E+00             | 3.92E-09             |                    |                   |                   |
| Total with non-detects(lb/lb rubber) | < 1.25E-07           | < 2.18E-07           | < 7.89E-08           |                    |                   |                   |

TABLE 4 - 10M. TIRE PRESS AMINE SPECIATION FACTORS - ALL TIRES

|                                      | Type A<br>% of Total | Type B<br>% of Total | Type C<br>% of Total | Type D<br>% of Total | Type E<br>% of Total | Type F<br>% of Total | Type G<br>% of Total | Type H<br>% of Total | Type I<br>% of Total | ALL TIRES          |                   |
|--------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|-------------------|
|                                      |                      |                      |                      |                      |                      |                      |                      |                      |                      | Mean<br>% of Total | MAX<br>% of Total |
| Trimethylamine                       | 2.20                 | < 50.00              | < 50.00              | < 66.67              | < 86.96              | < 88.98              | < 50.00              | < 69.93              | < 79.28              | 60.45              | 88.98             |
| Dimethylamine                        | 97.80                | < 50.00              | < 50.00              | 33.33                | 13.04                | 11.02                | < 50.00              | 30.07                | 20.72                | 39.55              | 97.80             |
| Total                                | 100.00               | 100.00               | 100.00               | 100.00               | 100.00               | 100.00               | 100.00               | 100.00               | 100.00               |                    |                   |
| Total Detected (lb/lb rubber)        | 3.56E-07             | 0.00E+00             | 0.00E+00             | 9.21E-09             | 4.74E-09             | 2.12E-09             | 0.00E+00             | 7.93E-09             | 3.92E-09             |                    |                   |
| Total with non-detects(lb/lb rubber) | < 6.50E-07           | < 1.25E-07           | < 2.18E-07           | < 1.01E-07           | < 1.63E-07           | < 8.77E-08           | < 1.44E-07           | < 1.00E-07           | < 7.89E-08           |                    |                   |

TABLE 4- 10N. TIRE PRESS SULFUR SPECIATION FACTORS - OEM

|                                       | CAS<br>Numbers | Type A<br>% of Total | Type D<br>% of Total | Type F<br>% of Total | OEM                |                   |                   |
|---------------------------------------|----------------|----------------------|----------------------|----------------------|--------------------|-------------------|-------------------|
|                                       |                |                      |                      |                      | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Carbonyl Sulfide                      | 463-58-1       | 3.65                 | 3.80                 | 4.14                 | < 3.86             | < 4.14            | < 0.20            |
| Methyl Mercaptan                      | 74-93-1        | < 0.70               | 3.06                 | 3.31                 | < 2.36             | < 3.31            | < 1.18            |
| Ethyl Mercaptan                       | 75-08-1        | < 0.89               | 3.88                 | 4.14                 | < 2.97             | < 4.14            | < 1.48            |
| Dimethyl Sulfide                      | 75-18-3        | < 0.89               | 3.88                 | 4.14                 | < 2.97             | < 4.14            | < 1.48            |
| Carbon Disulfide                      | 75-15-0        | 76.70                | 10.28                | 3.77                 | 30.25              | 76.70             | 32.95             |
| Isopropyl Mercaptan                   | 75-33-2        | < 1.06               | 4.65                 | 5.17                 | < 3.63             | < 5.17            | < 1.83            |
| tert-Butyl Mercaptan                  | 75-66-1        | < 1.33               | 5.82                 | 6.00                 | < 4.38             | < 6.00            | < 2.16            |
| n-Propyl Mercaptan                    | 107-03-9       | < 1.06               | 4.65                 | 5.17                 | < 3.63             | < 5.17            | < 1.83            |
| Ethyl Methyl Sulfide                  | 624-89-5       | < 1.06               | 4.65                 | 5.17                 | < 3.63             | < 5.17            | < 1.83            |
| Thiophene                             | 110-02-1       | < 1.24               | 5.43                 | 5.79                 | < 4.15             | < 5.79            | < 2.07            |
| Isobutyl Mercaptan                    | 513-44-0       | < 1.33               | 5.82                 | 6.00                 | < 4.38             | < 6.00            | < 2.16            |
| Diethyl Sulfide                       | 352-93-2       | < 1.33               | 5.82                 | 6.00                 | < 4.38             | < 6.00            | < 2.16            |
| n-Butyl Mercaptan                     | 109-79-5       | < 1.33               | 5.82                 | 6.00                 | < 4.38             | < 6.00            | < 2.16            |
| Dimethyl Disulfide                    | 624-92-0       | < 0.68               | 2.99                 | 3.10                 | < 2.26             | < 3.10            | < 1.11            |
| 3-Methylthiophene                     | 616-44-4       | < 1.42               | 6.20                 | 6.62                 | < 4.75             | < 6.62            | < 2.36            |
| Tetrahydrothiophene                   | 110-01-0       | < 1.24               | 5.43                 | 6.00                 | < 4.22             | < 6.00            | < 2.12            |
| 2-Ethylthiophene                      | 872-55-9       | < 1.60               | 6.98                 | 7.66                 | < 5.41             | < 7.66            | < 2.71            |
| 2,5-Dimethylthiophene                 | 638-02-8       | < 1.60               | 6.98                 | 7.66                 | < 5.41             | < 7.66            | < 2.71            |
| Diethyl Disulfide                     | 110-81-6       | < 0.89               | 3.88                 | 4.14                 | < 2.97             | < 4.14            | < 1.48            |
| Total                                 |                | 100.00               | 100.00               | 100.00               |                    |                   |                   |
| Total Detected (lb/lb rubber)         |                | 2.39E-05             | 6.95E-07             | 4.09E-07             |                    |                   |                   |
| Total with non-detects (lb/lb rubber) |                | < 2.98E-05           | 6.76E-06             | 1.09E-05             |                    |                   |                   |

**TABLE 4 -100. TIRE PRESS SULFUR SPECIATION FACTORS - HIGH PERFORMANCE**

|                                       | CAS<br>Numbers | Type E<br>% of Total | Type G<br>% of Total | Type H<br>% of Total | HIGH PERFORMANCE   |                   |                   |
|---------------------------------------|----------------|----------------------|----------------------|----------------------|--------------------|-------------------|-------------------|
|                                       |                |                      |                      |                      | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Carbonyl Sulfide                      | 463-58-1       | < 2.15               | < 2.15               | < 2.73               | < 2.34             | < 2.73            | < 0.28            |
| Methyl Mercaptan                      | 74-93-1        | < 1.73               | < 1.73               | < 2.19               | < 1.88             | < 2.19            | < 0.21            |
| Ethyl Mercaptan                       | 75-08-1        | < 2.19               | < 2.19               | < 2.73               | < 2.37             | < 2.73            | < 0.26            |
| Dimethyl Sulfide                      | 75-18-3        | < 2.19               | < 2.19               | < 2.73               | < 2.37             | < 2.73            | < 0.26            |
| Carbon Disulfide                      | 75-15-0        | 49.30                | 49.30                | 36.48                | 45.02              | 49.30             | 6.05              |
| Isopropyl Mercaptan                   | 75-33-2        | < 2.63               | < 2.63               | < 3.42               | < 2.89             | < 3.42            | < 0.37            |
| tert-Butyl Mercaptan                  | 75-66-1        | < 3.29               | < 3.29               | < 3.96               | < 3.51             | < 3.96            | < 0.32            |
| n-Propyl Mercaptan                    | 107-03-9       | < 2.63               | < 2.63               | < 3.42               | < 2.89             | < 3.42            | < 0.37            |
| Ethyl Methyl Sulfide                  | 624-89-5       | < 2.63               | < 2.63               | < 3.42               | < 2.89             | < 3.42            | < 0.37            |
| Thiophene                             | 110-02-1       | < 3.07               | < 3.07               | < 3.83               | < 3.32             | < 3.83            | < 0.36            |
| Isobutyl Mercaptan                    | 513-44-0       | < 3.29               | < 3.29               | < 3.96               | < 3.51             | < 3.96            | < 0.32            |
| Diethyl Sulfide                       | 352-93-2       | < 3.29               | < 3.29               | < 3.96               | < 3.51             | < 3.96            | < 0.32            |
| n-Butyl Mercaptan                     | 109-79-5       | < 3.29               | < 3.29               | < 3.96               | < 3.51             | < 3.96            | < 0.32            |
| Dimethyl Disulfide                    | 624-92-0       | < 1.69               | < 1.69               | < 2.05               | < 1.81             | < 2.05            | < 0.17            |
| 3-Methylthiophene                     | 616-44-4       | < 3.51               | < 3.51               | < 4.37               | < 3.79             | < 4.37            | < 0.41            |
| Tetrahydrothiophene                   | 110-01-0       | < 3.07               | < 3.07               | < 3.96               | < 3.37             | < 3.96            | < 0.42            |
| 2-Ethylthiophene                      | 872-55-9       | < 3.94               | < 3.94               | < 5.05               | < 4.31             | < 5.05            | < 0.52            |
| 2,5-Dimethylthiophene                 | 638-02-8       | < 3.94               | < 3.94               | < 5.05               | < 4.31             | < 5.05            | < 0.52            |
| Diethyl Disulfide                     | 110-81-6       | < 2.19               | < 2.19               | < 2.73               | < 2.37             | < 2.73            | < 0.26            |
| Total                                 |                | 100.00               | 100.00               | 100.00               |                    |                   |                   |
| Total Detected (lb/lb rubber)         |                | 5.97E-06             | 5.06E-06             | 6.32E-06             |                    |                   |                   |
| Total with non-detects (lb/lb rubber) |                | < 1.21E-05           | < 1.03E-05           | < 1.73E-05           |                    |                   |                   |

TABLE 4 -10P. TIRE PRESS SULFUR SPECIATION FACTORS - REPLACEMENT

|                                       | CAS<br>Numbers | Type B<br>% of Total | Type C<br>% of Total | Type I<br>% of Total | REPLACEMENT        |                   |                   |
|---------------------------------------|----------------|----------------------|----------------------|----------------------|--------------------|-------------------|-------------------|
|                                       |                |                      |                      |                      | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Carbonyl Sulfide                      | 463-58-1       | < 2.57               | < 3.49               | < 3.38               | < 3.15             | < 3.49            | < 0.41            |
| Methyl Mercaptan                      | 74-93-1        | < 2.07               | < 2.80               | < 2.72               | < 2.53             | < 2.80            | < 0.33            |
| Ethyl Mercaptan                       | 75-08-1        | < 2.59               | < 3.51               | < 3.45               | < 3.18             | < 3.51            | < 0.42            |
| Dimethyl Sulfide                      | 75-18-3        | < 2.59               | < 3.51               | < 3.45               | < 3.18             | < 3.51            | < 0.42            |
| Carbon Disulfide                      | 75-15-0        | 39.80                | 18.46                | 20.21                | 26.15              | 39.80             | 9.67              |
| Isopropyl Mercaptan                   | 75-33-2        | < 3.19               | < 4.34               | < 4.14               | < 3.89             | < 4.34            | < 0.50            |
| tert-Butyl Mercaptan                  | 75-66-1        | < 3.81               | < 5.14               | < 5.17               | < 4.71             | < 5.17            | < 0.63            |
| n-Propyl Mercaptan                    | 107-03-9       | < 3.19               | < 4.34               | < 4.14               | < 3.89             | < 4.34            | < 0.50            |
| Ethyl Methyl Sulfide                  | 624-89-5       | < 3.19               | < 4.34               | < 4.14               | < 3.89             | < 4.34            | < 0.50            |
| Thiophene                             | 110-02-1       | < 3.63               | < 4.92               | < 4.83               | < 4.46             | < 4.92            | < 0.59            |
| Isobutyl Mercaptan                    | 513-44-0       | < 3.81               | < 5.14               | < 5.17               | < 4.71             | < 5.17            | < 0.63            |
| Diethyl Sulfide                       | 352-93-2       | < 3.81               | < 5.14               | < 5.17               | < 4.71             | < 5.17            | < 0.63            |
| n-Butyl Mercaptan                     | 109-79-5       | < 3.81               | < 5.14               | < 5.17               | < 4.71             | < 5.17            | < 0.63            |
| Dimethyl Disulfide                    | 624-92-0       | < 1.96               | < 2.65               | < 2.66               | < 2.42             | < 2.66            | < 0.32            |
| 3-Methylthiophene                     | 616-44-4       | < 4.15               | < 5.62               | < 5.52               | < 5.10             | < 5.62            | < 0.67            |
| Tetrahydrothiophene                   | 110-01-0       | < 3.71               | < 5.05               | < 4.83               | < 4.53             | < 5.05            | < 0.58            |
| 2-Ethylthiophene                      | 872-55-9       | < 4.75               | < 6.45               | < 6.21               | < 5.80             | < 6.45            | < 0.75            |
| 2,5-Dimethylthiophene                 | 638-02-8       | < 4.75               | < 6.45               | < 6.21               | < 5.80             | < 6.45            | < 0.75            |
| Diethyl Disulfide                     | 110-81-6       | < 2.59               | < 3.51               | < 3.45               | < 3.18             | < 3.51            | < 0.42            |
| Total                                 |                | 100.00               | 100.00               | 100.00               |                    |                   |                   |
| Total Detected (lb/lb rubber)         |                | 7.10E-06             | 2.61E-06             | 1.45E-06             |                    |                   |                   |
| Total with non-detects (lb/lb rubber) |                | < 1.78E-05           | < 1.41E-05           | < 7.19E-06           |                    |                   |                   |

TABLE 4 -10Q. TIRE PRESS SULFUR SPECIATION FACTORS - ALL TIRES

|                                       | CAS Numbers | Type A<br>% of Total | Type B<br>% of Total | Type C<br>% of Total | Type D<br>% of Total | Type E<br>% of Total | Type F<br>% of Total | Type G<br>% of Total | Type H<br>% of Total | Type I<br>% of Total | ALL TIRES          |                   |                   |
|---------------------------------------|-------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|-------------------|-------------------|
|                                       |             |                      |                      |                      |                      |                      |                      |                      |                      |                      | Mean<br>% of Total | MAX<br>% of Total | STD<br>% of Total |
| Carbonyl Sulfide                      | 463-58-1    | 3.65                 | 2.57                 | 3.49                 | 3.80                 | 2.15                 | 4.14                 | 2.15                 | 2.73                 | 3.38                 | 3.12               | 4.14              | 0.69              |
| Methyl Mercaptan                      | 74-93-1     | <                    | 2.07                 | 2.80                 | 3.06                 | 1.73                 | 3.31                 | 1.73                 | 2.19                 | 2.72                 | 2.26               | 3.31              | 0.77              |
| Ethyl Mercaptan                       | 75-08-1     | <                    | 2.59                 | 3.51                 | 3.88                 | 2.19                 | 4.14                 | 2.19                 | 2.73                 | 3.45                 | 2.84               | 4.14              | 0.96              |
| Dimethyl Sulfide                      | 75-18-3     | <                    | 2.59                 | 3.51                 | 3.88                 | 2.19                 | 4.14                 | 2.19                 | 2.73                 | 3.45                 | 2.84               | 4.14              | 0.96              |
| Carbon Disulfide                      | 75-15-0     | 76.70                | 39.80                | 18.46                | 10.28                | 49.30                | 3.77                 | 49.30                | 36.48                | 20.21                | 33.81              | 76.70             | 21.70             |
| Isopropyl Mercaptan                   | 75-33-2     | <                    | 3.19                 | 4.34                 | 4.65                 | 2.63                 | 5.17                 | 2.63                 | 3.42                 | 4.14                 | 3.47               | 5.17              | 1.19              |
| tert-Butyl Mercaptan                  | 75-66-1     | <                    | 3.81                 | 5.14                 | 5.82                 | 3.29                 | 6.00                 | 3.29                 | 3.96                 | 5.17                 | 4.20               | 6.00              | 1.41              |
| n-Propyl Mercaptan                    | 107-03-9    | <                    | 3.19                 | 4.34                 | 4.65                 | 2.63                 | 5.17                 | 2.63                 | 3.42                 | 4.14                 | 3.47               | 5.17              | 1.19              |
| Ethyl Methyl Sulfide                  | 624-89-5    | <                    | 3.19                 | 4.34                 | 4.65                 | 2.63                 | 5.17                 | 2.63                 | 3.42                 | 4.14                 | 3.47               | 5.17              | 1.19              |
| Thiophene                             | 110-02-1    | <                    | 3.63                 | 4.92                 | 5.43                 | 3.07                 | 5.79                 | 3.07                 | 3.83                 | 4.83                 | 3.98               | 5.79              | 1.35              |
| Isobutyl Mercaptan                    | 513-44-0    | <                    | 3.81                 | 5.14                 | 5.82                 | 3.29                 | 6.00                 | 3.29                 | 3.96                 | 5.17                 | 4.20               | 6.00              | 1.41              |
| Diethyl Sulfide                       | 352-93-2    | <                    | 3.81                 | 5.14                 | 5.82                 | 3.29                 | 6.00                 | 3.29                 | 3.96                 | 5.17                 | 4.20               | 6.00              | 1.41              |
| n-Butyl Mercaptan                     | 109-79-5    | <                    | 3.81                 | 5.14                 | 5.82                 | 3.29                 | 6.00                 | 3.29                 | 3.96                 | 5.17                 | 4.20               | 6.00              | 1.41              |
| Dimethyl Disulfide                    | 624-92-0    | <                    | 1.96                 | 2.65                 | 2.99                 | 1.69                 | 3.10                 | 1.69                 | 2.05                 | 2.66                 | 2.16               | 3.10              | 0.73              |
| 3-Methylthiophene                     | 616-44-4    | <                    | 4.15                 | 5.82                 | 6.20                 | 3.51                 | 6.82                 | 3.51                 | 4.37                 | 5.52                 | 4.55               | 6.82              | 1.54              |
| Tetrahydrothiophene                   | 110-01-0    | <                    | 3.71                 | 5.05                 | 5.43                 | 3.07                 | 6.00                 | 3.07                 | 3.96                 | 4.83                 | 4.04               | 6.00              | 1.38              |
| 2-Ethylthiophene                      | 872-55-9    | <                    | 4.75                 | 6.45                 | 6.98                 | 3.94                 | 7.66                 | 3.94                 | 5.05                 | 6.21                 | 5.18               | 7.66              | 1.77              |
| 2,5-Dimethylthiophene                 | 638-02-8    | <                    | 4.75                 | 6.45                 | 6.98                 | 3.94                 | 7.66                 | 3.94                 | 5.05                 | 6.21                 | 5.18               | 7.66              | 1.77              |
| Diethyl Disulfide                     | 110-81-6    | <                    | 2.59                 | 3.51                 | 3.88                 | 2.19                 | 4.14                 | 2.19                 | 2.73                 | 3.45                 | 2.84               | 4.14              | 0.96              |
| Total                                 |             | 100.00               | 100.00               | 100.00               | 100.00               | 100.00               | 100.00               | 100.00               | 100.00               | 100.00               |                    |                   |                   |
| Total Detected (lb/lb rubber)         |             | 2.39E-05             | 7.10E-06             | 2.61E-06             | 6.95E-07             | 5.97E-06             | 4.09E-07             | 5.06E-06             | 6.32E-06             | 1.45E-06             |                    |                   |                   |
| Total with non-detects (lb/lb rubber) |             | < 2.98E-05           | 1.78E-05             | 1.41E-05             | 6.76E-06             | 1.21E-05             | 1.09E-05             | 1.03E-05             | 1.73E-05             | 7.19E-06             |                    |                   |                   |

**TABLE 4-10r**  
**EMISSIONS COMPARISON - TIRE PRESS FIELD vs LAB CUT DATA**  
**lb/lb rubber**

| DATA SOURCE       | Organic Sulfur Compounds |                  | Organic Compounds |          | Total Organics |
|-------------------|--------------------------|------------------|-------------------|----------|----------------|
|                   | Carbonyl Sulfide         | Carbon Disulfide | Methanol          | Ethanol  |                |
| Tire Press No. 1  | 6.69E-07                 | 8.56E-05         | 2.03E-05          | 2.75E-05 | 1.34E-04       |
| Lab Cut No. 1A    | 3.00E-05                 | 3.00E-05         | 2.64E-05          | 4.14E-05 | 1.28E-04       |
| Tire Press No. 2  | 5.17E-07                 | 1.16E-04         | 3.79E-05          | 2.66E-05 | 1.81E-04       |
| Lab Cut No. 2A    | 2.20E-05                 | 2.20E-05         | 3.26E-05          | 6.56E-05 | 1.42E-04       |
| Tire Press No. 3  | 4.62E-07                 | 4.53E-05         | 3.94E-05          | 2.75E-05 | 1.13E-04       |
| Lab Cut No. 3A    | 6.66E-05                 | 6.66E-05         | 4.78E-05          | 4.94E-05 | 2.30E-04       |
| Lab Cut No. 3B    | 2.92E-05                 | 2.92E-05         | 5.77E-05          | 1.00E-04 | 2.16E-04       |
| Lab Cut No. 3C    | 2.10E-05                 | 2.10E-05         | 7.70E-05          | 8.74E-05 | 2.06E-04       |
| Lab Cut No. 3D    | 1.09E-04                 | 1.09E-04         | 8.91E-05          | 1.45E-04 | 4.53E-04       |
| Lab Cut No. 3E    | 7.72E-05                 | 7.72E-05         | 1.27E-04          | 2.41E-04 | 5.23E-04       |
| Lab Cut No. 3F    | 7.48E-05                 | 7.48E-05         | 5.83E-05          | 9.36E-05 | 3.02E-04       |
| Tire Press No. 5  | 1.38E-07                 | 2.25E-05         | 1.45E-05          | ND       | 3.71E-05       |
| Lab Cut No. 5A    | 5.93E-05                 | 5.93E-05         | 4.32E-05          | 4.09E-05 | 2.03E-04       |
| Lab Cut No. 5B    | 5.28E-05                 | 5.28E-05         | 1.13E-05          | 5.72E-05 | 1.74E-04       |
| Tire Press No. 6  | 2.36E-07                 | 3.87E-05         | 8.01E-06          | ND       | 4.69E-05       |
| Lab Cut No. 6A    | 2.26E-05                 | 2.26E-05         | 3.01E-05          | 5.38E-05 | 1.29E-04       |
| Lab Cut No. 6B    | 4.15E-05                 | 4.15E-05         | 3.86E-05          | 3.21E-05 | 1.54E-04       |
| Lab Cut No. 6C    | ND                       | ND               | ND                | 7.09E-06 | 7.09E-06       |
| Lab Cut No. 6D    | 1.20E-05                 | 1.20E-05         | 6.46E-06          | 1.20E-05 | 4.25E-05       |
| Tire Press No. 7  | 1.02E-07                 | 3.29E-05         | 1.64E-06          | 3.29E-05 | 6.76E-05       |
| Lab Cut No. 7A    | 0.00E+00                 | 0.00E+00         | 0.00E+00          | 0.00E+00 | 0.00E+00       |
| Lab Cut No. 7B    | 5.55E-06                 | 5.55E-06         | 1.57E-06          | 4.15E-05 | 5.41E-05       |
| Lab Cut No. 7C    | 4.78E-06                 | 4.78E-06         | 3.33E-06          | 5.61E-05 | 6.90E-05       |
| Tire Press No. 8  | 1.89E-07                 | 6.02E-05         | 1.15E-05          | ND       | 7.19E-05       |
| Lab Cut No. 8A    | 1.22E-05                 | 1.22E-05         | 4.33E-05          | 1.38E-04 | 2.05E-04       |
| Lab Cut No. 8B    | 1.02E-04                 | 1.02E-04         | 5.78E-05          | 8.95E-05 | 3.51E-04       |
| Lab Cut No. 8C    | 4.15E-05                 | 4.15E-05         | 4.27E-05          | 4.22E-05 | 1.68E-04       |
| Lab Cut No. 8D    | 6.82E-05                 | 6.82E-05         | 6.71E-05          | 3.46E-05 | 2.38E-04       |
| Tire Press No. 9  | 1.23E-07                 | 6.97E-05         | 1.09E-05          | ND       | 8.08E-05       |
| Lab Cut No. 9A    | 4.58E-05                 | 4.58E-05         | 3.77E-05          | 5.40E-05 | 1.83E-04       |
| Lab Cut No. 9B    | 1.45E-05                 | 1.45E-05         | 5.66E-05          | 1.92E-04 | 2.78E-04       |
| Lab Cut No. 9C    | 7.17E-06                 | 7.17E-06         | 2.05E-05          | 6.75E-05 | 1.02E-04       |
| Tire Press No. 10 | 2.21E-07                 | 2.81E-05         | 9.12E-06          | ND       | 3.74E-05       |
| Lab Cut No. 10A   | 1.47E-04                 | 1.47E-04         | 1.13E-04          | 9.99E-05 | 5.06E-04       |
| Lab Cut No. 10B   | 3.03E-05                 | 3.03E-05         | 2.49E-05          | 2.85E-05 | 1.14E-04       |
| Lab Cut No. 10C   | 5.62E-05                 | 5.62E-05         | 4.36E-05          | 6.63E-05 | 2.22E-04       |

ND = Not detected. Detection limits cannot be determined with the FTIR analyzer as it is calibrated to zero.

**TABLE 4-11a**  
**WARMUP MILL SUMMARY**

| Compound        | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Organics <sup>1</sup><br>(lbs/lb rubber)<br>with non-detects | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects |
|-----------------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|
| 2 <sup>2</sup>  | 1.10E-04                                     | < 1.75E-06                                                              | < 4.17E-05                                                          | < 3.47E-05                                                                      | < 6.84E-06                                          |
| 3 <sup>2</sup>  | 1.12E-04                                     | < 4.06E-05                                                              | < 8.64E-06                                                          | < 4.39E-05                                                                      | < 1.05E-05                                          |
| 4 <sup>2</sup>  | 8.40E-05                                     | < 2.99E-05                                                              | < 2.51E-05                                                          | < 5.08E-05                                                                      | < 6.52E-06                                          |
| 12 <sup>3</sup> | 1.71E-06                                     | < 1.24E-08                                                              | < 1.14E-06                                                          | < 9.61E-07                                                                      | < 1.62E-06                                          |
| Mean            | 7.69E-05                                     | < 1.81E-05                                                              | < 1.91E-05                                                          | < 3.26E-05                                                                      | < 6.37E-06                                          |
| Max.            | 1.12E-04                                     | < 4.06E-05                                                              | < 4.17E-05                                                          | < 5.08E-05                                                                      | < 1.05E-05                                          |
| Std. Dev.       | 4.48E-05                                     | < 1.76E-05                                                              | < 1.56E-05                                                          | < 1.91E-05                                                                      | < 3.16E-06                                          |

<sup>1</sup> - Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

<sup>2</sup> - One run conducted on each tire compound: Warmup Mill 2 - (#2) tire ply coat, (#3) belt coat, and (#4) base/sidewall

<sup>3</sup> - Three runs conducted on Engineered Product #12 (neoprene) (Warmup Mill 1), the total average being presented.

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Table 4-11b. Warmup Mill Organic Compound Speciation Factors

| Compound                            | CAS Number        | Warmup Mill 2<br>Cmpd. 2<br>% of Total | Warmup Mill 2<br>Cmpd. 3<br>% of Total | Warmup Mill 2<br>Cmpd. 4<br>% of Total | Warmup Mill 1<br>Cmpd 12<br>% of Total | Warmup Mill 1&2<br>Average<br>% of Total | Warmup Mill 1&2<br>Maximum<br>% of Total | Warmup Mill 1&2<br>Std. Dev.<br>% of Total |
|-------------------------------------|-------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|------------------------------------------|------------------------------------------|--------------------------------------------|
| 1-Heptene                           | 592-76-7          | 0.22                                   | < 0.02                                 | 0.06                                   | 0.50                                   | < 0.30                                   | 0.50                                     | 0.20                                       |
| 1-Pentene                           | 109-67-1          | < 0.06                                 | < 0.02                                 | 0.38                                   | 0.14                                   | < 0.15                                   | 0.16                                     | 0.01                                       |
| 1,2,4-Trimethylbenzene              | 95-63-6           | 0.03                                   | 0.62                                   | 0.04                                   | < 0.08                                 | < 0.15                                   | 0.23                                     | 0.08                                       |
| 1,3,5-Trimethylbenzene              | 108-67-8          | 0.77                                   | < 0.11                                 | 0.27                                   | < 0.08                                 | < 0.23                                   | 0.38                                     | 0.15                                       |
| 1,4-Diethylbenzene + n-Butylbenzene | 105-05-5/104-51-8 | < 0.30                                 | < 0.11                                 | < 0.09                                 | < 0.86                                 | < 0.51                                   | 0.86                                     | 0.35                                       |
| 2-Butanone                          | 00078-93-3        | 2.34                                   | 0.17                                   | 0.80                                   | < 0.79                                 | < 0.94                                   | 1.10                                     | 0.16                                       |
| 2-Furaldehyde                       | 98-01-1           | 0.05                                   | 0.10                                   | < 0.02                                 | 0.00                                   | < 0.03                                   | 0.06                                     | 0.03                                       |
| 2-Methyl-2-butene                   | 513-35-9          | < 0.06                                 | < 0.02                                 | 0.26                                   | < 0.01                                 | < 0.06                                   | 0.11                                     | 0.05                                       |
| 2-Methylheptane                     | 592-27-8          | 0.16                                   | 0.06                                   | 0.04                                   | < 0.01                                 | < 0.05                                   | 0.09                                     | 0.04                                       |
| 2-Methylhexane                      | 591-76-4          | 0.08                                   | < 0.02                                 | 0.06                                   | 1.87                                   | < 0.96                                   | 1.87                                     | 0.91                                       |
| 2-Methylnaphthalene                 | 91-57-6           | 0.12                                   | 1.03                                   | 0.13                                   | 0.02                                   | 0.22                                     | 0.42                                     | 0.20                                       |
| 2-Methylpentane                     | 107-83-5          | 0.94                                   | 0.16                                   | 0.25                                   | < 0.01                                 | < 0.23                                   | 0.45                                     | 0.22                                       |
| 2-Methylphenol                      | 95-48-7           | 0.06                                   | < 0.04                                 | < 0.01                                 | 0.00                                   | < 0.02                                   | 0.04                                     | 0.02                                       |
| 2,2-Dimethylbutane                  | 75-83-2           | 0.22                                   | < 0.02                                 | < 0.02                                 | < 0.01                                 | < 0.05                                   | 0.09                                     | 0.04                                       |
| 2,3-Dimethylpentane                 | 565-59-3          | < 0.06                                 | < 0.02                                 | < 0.02                                 | 0.56                                   | < 0.30                                   | 0.56                                     | 0.26                                       |
| 2,4-Dimethylhexane                  | 589-43-5          | < 0.06                                 | < 0.02                                 | 0.07                                   | 0.30                                   | < 0.18                                   | 0.30                                     | 0.12                                       |
| 2,4-Dimethylphenol                  | 105-67-9          | 0.11                                   | < 0.04                                 | 0.35                                   | < 0.01                                 | < 0.09                                   | 0.17                                     | 0.08                                       |
| 3-Methylhexane                      | 589-34-4          | 0.17                                   | < 0.02                                 | 0.06                                   | 2.68                                   | < 1.38                                   | 2.68                                     | 1.30                                       |
| 3-Methylpentane                     | 96-14-0           | 0.86                                   | 0.10                                   | 0.19                                   | 0.07                                   | 0.23                                     | 0.38                                     | 0.15                                       |
| 3/4-Methylphenol                    | 108-39-4/106-44-5 | 0.16                                   | < 0.04                                 | 0.02                                   | < 0.00                                 | < 0.04                                   | 0.07                                     | 0.04                                       |
| 4-Aminobiphenyl                     | 92-67-1           | < 0.01                                 | < 0.01                                 | < 0.00                                 | < 0.01                                 | < 0.01                                   | 0.01                                     | 0.00                                       |
| 4-Chloroaniline                     | 106-47-8          | < 0.01                                 | 0.67                                   | 0.11                                   | < 0.00                                 | < 0.13                                   | 0.26                                     | 0.13                                       |
| 4-Chlorostyrene                     | 1073-67-2         | < 0.01                                 | < 0.03                                 | < 0.01                                 | < 0.00                                 | < 0.01                                   | 0.02                                     | 0.01                                       |
| 4-Methyl-1-pentene                  | 691-37-2          | < 0.06                                 | 0.07                                   | 0.10                                   | < 0.01                                 | < 0.04                                   | 0.08                                     | 0.03                                       |
| 4-Methyl-2-Pentanone                | 00108-10-1        | 0.45                                   | 2.60                                   | 17.94                                  | < 0.39                                 | < 3.69                                   | 7.00                                     | 3.30                                       |
| Acenaphthylene                      | 208-96-8          | 0.12                                   | 0.12                                   | 0.10                                   | < 0.00                                 | < 0.06                                   | 0.11                                     | 0.06                                       |
| Acetone                             | 00067-64-1        | 39.87                                  | 0.80                                   | 3.10                                   | 0.42                                   | 7.51                                     | 14.59                                    | 7.08                                       |
| Acetophenone                        | 98-86-2           | < 0.01                                 | 0.64                                   | 0.06                                   | 0.03                                   | < 0.13                                   | 0.24                                     | 0.10                                       |
| Acetylene                           | 74-86-2           | 0.92                                   | 0.10                                   | 0.31                                   | 0.08                                   | 0.26                                     | 0.44                                     | 0.18                                       |
| Acrylonitrile                       | 00107-13-1        | 0.37                                   | < 0.32                                 | < 0.26                                 | < 0.79                                 | < 0.55                                   | 0.79                                     | 0.23                                       |
| Aniline                             | 62-53-3           | 0.22                                   | 12.12                                  | 6.84                                   | < 0.03                                 | < 3.21                                   | 6.39                                     | 3.18                                       |
| Benzaldehyde                        | 100-52-7          | 0.07                                   | < 0.05                                 | < 0.01                                 | 0.01                                   | < 0.03                                   | 0.04                                     | 0.02                                       |
| Benzene                             | 71-43-2           | 0.17                                   | 0.04                                   | 0.11                                   | 0.05                                   | 0.08                                     | 0.11                                     | 0.03                                       |
| Benzoic acid                        | 65-85-0           | 1.36                                   | 1.41                                   | 1.42                                   | 0.26                                   | 0.83                                     | 1.40                                     | 0.57                                       |
| Benzonitrile                        | 100-47-0          | < 0.01                                 | 0.03                                   | < 0.01                                 | < 0.00                                 | < 0.01                                   | 0.01                                     | 0.01                                       |
| Benzyl alcohol                      | 100-51-6          | < 0.02                                 | 0.06                                   | 0.02                                   | < 0.01                                 | < 0.02                                   | 0.04                                     | 0.01                                       |
| Biphenyl                            | 92-52-4           | 0.10                                   | 0.08                                   | 0.08                                   | 0.01                                   | 0.05                                     | 0.09                                     | 0.04                                       |
| bis(2-Ethylhexyl)phthalate          | 117-81-7          | 0.09                                   | 1.97                                   | 0.21                                   | 0.16                                   | 0.46                                     | 0.76                                     | 0.30                                       |
| b-Pinene                            | 18172-67-3        | 0.32                                   | < 0.11                                 | < 0.09                                 | < 0.15                                 | < 0.16                                   | 0.17                                     | 0.01                                       |
| Butylbenzylphthalate                | 85-68-7           | 0.00                                   | 0.00                                   | 0.00                                   | 0.01                                   | 0.00                                     | 0.01                                     | 0.00                                       |
| C11-C12 Branched Alkane             |                   | 13.29                                  | 0.70                                   | 4.24                                   | 8.74                                   | 7.41                                     | 8.74                                     | 1.33                                       |
| C9H12 Alkyl Substituted Benzene     |                   | 0.00                                   | 0.00                                   | 0.82                                   | 0.75                                   | 0.51                                     | 0.75                                     | 0.24                                       |
| Camphene                            | 79-92-5           | < 0.02                                 | < 0.05                                 | < 0.01                                 | < 0.01                                 | < 0.02                                   | 0.03                                     | 0.01                                       |
| Carbon Disulfide                    | 00075-15-0        | 1.70                                   | 0.22                                   | 0.49                                   | 21.13                                  | 10.97                                    | 21.13                                    | 10.16                                      |
| Chloro-4-(1-Chloroethyl)Cyclohexene |                   | 0.00                                   | 0.00                                   | 0.00                                   | 3.78                                   | 3.78                                     | 3.78                                     | NA                                         |
| Chloro-5-(1-Chloroethyl)Cyclohexene |                   | 0.00                                   | 0.00                                   | 0.00                                   | 3.33                                   | 3.33                                     | 3.33                                     | NA                                         |
| cis-2-Pentene                       | 627-20-3          | 0.39                                   | 0.15                                   | 0.07                                   | 0.47                                   | 0.33                                     | 0.47                                     | 0.13                                       |
| Cumene                              | 98-82-8           | < 0.01                                 | 0.03                                   | 0.00                                   | 0.00                                   | < 0.01                                   | 0.01                                     | 0.01                                       |
| Cyclobutane                         |                   | 0.00                                   | 0.00                                   | 0.65                                   | 0.00                                   | 0.22                                     | 0.22                                     | NA                                         |
| Cyclohexane                         | 110-82-7          | 1.30                                   | < 0.02                                 | 0.07                                   | < 0.02                                 | < 0.24                                   | 0.47                                     | 0.22                                       |
| Cyclohexanone                       | 108-94-1          | 0.09                                   | 2.11                                   | 0.07                                   | 0.03                                   | 0.39                                     | 0.75                                     | 0.36                                       |
| Cyclohexylamine                     | 108-91-8          | < 0.01                                 | 40.11                                  | 46.80                                  | < 0.01                                 | < 14.49                                  | 28.98                                    | 14.48                                      |
| Cyclopentane + 2,3-Dimethylbutane   | 287-92-3/79-29-8  | 0.21                                   | 0.06                                   | 0.09                                   | < 0.01                                 | < 0.07                                   | 0.12                                     | 0.05                                       |
| Cyclopentene                        | 142-29-0          | 0.42                                   | < 0.02                                 | < 0.02                                 | < 0.01                                 | < 0.08                                   | 0.15                                     | 0.07                                       |
| Decane                              |                   | 5.32                                   | 0.00                                   | 0.49                                   | 0.00                                   | 1.93                                     | 1.93                                     | NA                                         |
| Dibenzofuran                        | 132-64-9          | 0.05                                   | < 0.01                                 | 0.02                                   | < 0.00                                 | < 0.02                                   | 0.03                                     | 0.01                                       |

Table 4-11b. Warmup Mill Organic Compound Speciation Factors

| Compound                            | CAS Number        | Warmup Mill 2<br>Cmpd. 2<br>% of Total | Warmup Mill 2<br>Cmpd. 3<br>% of Total | Warmup Mill 2<br>Cmpd. 4<br>% of Total | Warmup Mill 1<br>Cmpd 12<br>% of Total | Warmup Mill 1&2<br>Average<br>% of Total | Warmup Mill 1&2<br>Maximum<br>% of Total | Warmup Mill 1&2<br>Std. Dev.<br>% of Total |
|-------------------------------------|-------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|------------------------------------------|------------------------------------------|--------------------------------------------|
| Diethylphthalate                    | 84-66-2           | 0.00                                   | 0.02                                   | 0.00                                   | 0.01                                   | 0.01                                     | 0.01                                     | 0.00                                       |
| Dimethylpentane                     |                   | 0.00                                   | 0.00                                   | 0.00                                   | 0.55                                   | 0.55                                     | 0.55                                     | NA                                         |
| Dimethylphthalate                   | 131-11-3          | < 0.01                                 | 0.16                                   | < 0.00                                 | < 0.00                                 | < 0.03                                   | 0.06                                     | 0.03                                       |
| Di-n-butylphthalate                 | 84-74-2           | 0.01                                   | 0.31                                   | 0.33                                   | 0.03                                   | 0.12                                     | 0.22                                     | 0.10                                       |
| Di-n-octylphthalate                 | 117-84-0          | < 0.00                                 | < 0.00                                 | < 0.00                                 | 0.00                                   | < 0.00                                   | 0.00                                     | 0.00                                       |
| Diphenylamine                       | 122-39-4          | 0.03                                   | 0.70                                   | 0.17                                   | 0.07                                   | 0.19                                     | 0.30                                     | 0.11                                       |
| d-Limonene                          | 5989-27-5         | < 0.30                                 | < 0.11                                 | < 0.09                                 | 0.59                                   | < 0.38                                   | 0.59                                     | 0.21                                       |
| Ethane                              | 74-84-0           | 0.22                                   | 0.06                                   | 0.11                                   | 0.73                                   | 0.43                                     | 0.73                                     | 0.30                                       |
| Ethyl Acetate                       |                   | 0.00                                   | 0.00                                   | 0.00                                   | 14.21                                  | 14.21                                    | 14.21                                    | NA                                         |
| Ethylbenzene                        | 100-41-4          | 0.32                                   | < 0.02                                 | 0.15                                   | 0.03                                   | < 0.10                                   | 0.17                                     | 0.07                                       |
| Ethylene                            | 74-85-1           | < 0.06                                 | < 0.02                                 | 0.04                                   | 0.19                                   | < 0.12                                   | 0.19                                     | 0.07                                       |
| Fluoranthene                        | 206-44-0          | < 0.00                                 | 0.01                                   | 0.00                                   | < 0.00                                 | < 0.00                                   | 0.01                                     | 0.00                                       |
| Fluorene                            | 86-73-7           | 0.01                                   | 0.08                                   | 0.03                                   | 0.01                                   | 0.02                                     | 0.04                                     | 0.02                                       |
| Heptane                             |                   | 0.00                                   | 0.00                                   | 0.00                                   | 5.17                                   | 5.17                                     | 5.17                                     | NA                                         |
| Isobutane                           | 75-28-5           | < 0.06                                 | 0.06                                   | 0.10                                   | 0.06                                   | < 0.07                                   | 0.07                                     | 0.01                                       |
| Isobutylene + 1-Butene              | 115-11-7/106-98-9 | 1.16                                   | 0.20                                   | 0.72                                   | 0.40                                   | 0.55                                     | 0.69                                     | 0.15                                       |
| Isooctane                           | 540-84-1          | < 0.06                                 | 0.07                                   | 0.07                                   | 0.16                                   | < 0.11                                   | 0.16                                     | 0.04                                       |
| Isopentane                          | 78-78-4           | < 0.06                                 | 0.42                                   | 1.57                                   | 0.35                                   | < 0.52                                   | 0.68                                     | 0.17                                       |
| Isophorone                          | 78-59-1           | 0.02                                   | 25.53                                  | 0.60                                   | < 0.00                                 | < 4.36                                   | 8.72                                     | 4.36                                       |
| Isopropyl Alcohol                   |                   | 0.00                                   | 0.00                                   | 1.63                                   | 0.00                                   | 0.54                                     | 0.54                                     | NA                                         |
| Methylcyclohexane                   | 108-87-2          | 0.68                                   | 0.12                                   | 0.48                                   | 0.00                                   | 0.42                                     | 0.42                                     | NA                                         |
| Methylcyclopentane                  | 96-37-7           | 0.71                                   | 0.10                                   | 0.14                                   | 0.05                                   | 0.18                                     | 0.32                                     | 0.13                                       |
| Methylene Chloride                  | 00075-09-2        | 2.92                                   | 0.94                                   | 1.34                                   | 5.29                                   | 3.51                                     | 5.29                                     | 1.78                                       |
| Methylhexane                        |                   | 0.00                                   | 0.00                                   | 0.00                                   | 9.09                                   | 9.09                                     | 9.09                                     | NA                                         |
| Methylpentane                       |                   | 4.25                                   | 0.00                                   | 0.65                                   | 0.00                                   | 1.63                                     | 1.63                                     | NA                                         |
| m-Ethyltoluene                      | 620-14-4          | 0.47                                   | < 0.02                                 | < 0.02                                 | < 0.01                                 | < 0.09                                   | 0.17                                     | 0.08                                       |
| m-Xylene + p-Xylene                 | 108-38-3/106-42-3 | 1.76                                   | 0.08                                   | 0.50                                   | 0.14                                   | 0.46                                     | 0.78                                     | 0.32                                       |
| Naphthalene                         | 91-20-3           | 0.37                                   | 0.85                                   | 0.33                                   | 0.03                                   | 0.27                                     | 0.52                                     | 0.24                                       |
| n-Butane                            | 106-97-8          | 0.26                                   | 0.21                                   | 0.18                                   | 0.13                                   | 0.17                                     | 0.21                                     | 0.04                                       |
| n-Decane                            | 124-18-5          | 1.46                                   | 0.12                                   | 0.14                                   | 0.16                                   | 0.37                                     | 0.58                                     | 0.21                                       |
| n-Heptane                           | 142-82-5          | 0.41                                   | 0.06                                   | 0.11                                   | 2.45                                   | 1.32                                     | 2.45                                     | 1.13                                       |
| n-Hexane                            | 110-54-3          | 2.06                                   | 0.28                                   | 0.49                                   | 2.45                                   | 1.70                                     | 2.45                                     | 0.76                                       |
| n-Nonane                            | 111-84-2          | 0.72                                   | < 0.02                                 | 0.04                                   | < 0.01                                 | < 0.14                                   | 0.26                                     | 0.13                                       |
| n-Pentane                           | 109-66-0          | 0.30                                   | 0.06                                   | 0.09                                   | 0.03                                   | 0.09                                     | 0.15                                     | 0.06                                       |
| o-Ethyltoluene                      | 611-14-3          | 0.44                                   | < 0.11                                 | < 0.09                                 | < 0.37                                 | < 0.29                                   | 0.37                                     | 0.08                                       |
| o-Xylene                            | 95-47-6           | 1.00                                   | < 0.02                                 | 0.27                                   | < 0.02                                 | < 0.23                                   | 0.43                                     | 0.20                                       |
| p-Cymene                            | 99-87-6           | < 0.30                                 | < 0.11                                 | 0.09                                   | < 0.06                                 | < 0.11                                   | 0.17                                     | 0.05                                       |
| p-Ethyltoluene                      | 622-96-8          | < 0.06                                 | < 0.02                                 | < 0.02                                 | < 0.05                                 | < 0.04                                   | 0.05                                     | 0.01                                       |
| Phenanthrene                        | 85-01-8           | 0.01                                   | 0.09                                   | 0.02                                   | 0.02                                   | 0.03                                     | 0.04                                     | 0.01                                       |
| Phenol                              | 108-95-2          | 0.13                                   | < 0.03                                 | < 0.01                                 | 0.08                                   | < 0.07                                   | 0.08                                     | 0.01                                       |
| Propane                             | 74-98-6           | 0.31                                   | 0.27                                   | 0.13                                   | 2.21                                   | 1.22                                     | 2.21                                     | 0.99                                       |
| Propylene                           | 115-07-1          | < 0.06                                 | < 0.02                                 | < 0.02                                 | 0.04                                   | < 0.04                                   | 0.04                                     | 0.00                                       |
| Pyrene                              | 129-00-0          | 0.00                                   | 0.03                                   | 0.01                                   | 0.01                                   | 0.01                                     | 0.01                                     | 0.00                                       |
| Styrene                             | 100-42-5          | 0.45                                   | < 0.02                                 | < 0.02                                 | < 0.01                                 | < 0.09                                   | 0.16                                     | 0.08                                       |
| Tetrachloroethene                   | 00127-18-4        | 0.24                                   | < 0.16                                 | < 0.13                                 | < 0.39                                 | < 0.29                                   | 0.39                                     | 0.11                                       |
| Toluene                             | 108-88-3          | 0.95                                   | 0.84                                   | 0.38                                   | 5.20                                   | 2.96                                     | 5.20                                     | 2.24                                       |
| trans-2-Hexene                      | 4050-45-7         | 0.16                                   | < 0.02                                 | < 0.02                                 | < 0.01                                 | < 0.04                                   | 0.07                                     | 0.03                                       |
| Trichlorofluoromethane              | 00075-69-4        | 0.66                                   | 0.11                                   | 0.26                                   | < 0.39                                 | < 0.37                                   | 0.39                                     | 0.02                                       |
| Undecane                            |                   | 2.66                                   | 0.00                                   | 0.65                                   | 0.00                                   | 1.10                                     | 1.10                                     | NA                                         |
| Total                               |                   | 100.00                                 | 100.00                                 | 100.00                                 | 100.00                                 |                                          |                                          |                                            |
| Total lb/lb rubber detected         |                   | 3.41E-05                               | 4.31E-05                               | 5.03E-05                               | 9.34E-07                               |                                          |                                          |                                            |
| Total lb/lb rubber with non-detects |                   | < 3.47E-05                             | < 4.39E-05                             | < 5.08E-05                             | < 9.61E-07                             |                                          |                                          |                                            |

\* Percent Values in this table are expressed as % of lb/lb-rubber including detection limits for undetected compounds.

Table 4-11c. Warmup Mill Sulfur Speciation Factors

| Compounds              | CAS Numbers | Warmup<br>Mill 1<br>Cmpnd. 12<br>% of Total | Warmup<br>Mill 2<br>Cmpnd. 2<br>% of Total | Warmup<br>Mill 2<br>Cmpnd. 3<br>% of Total | Warmup<br>Mill 2<br>Cmpnd. 4<br>% of Total | Warmup<br>Mill 1&2<br>Average<br>% of Total | Warmup<br>Mill 1&2<br>Maximum<br>% of Total | Warmup<br>Mill 1&2<br>Std. Dev.<br>% of Total |
|------------------------|-------------|---------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|---------------------------------------------|---------------------------------------------|-----------------------------------------------|
| Carbonyl Sulfide       | 463-58-1    | <                                           | 0.52                                       | 15.30 <                                    | 4.09 <                                     | 3.92 <                                      | 7.77                                        | 3.63                                          |
| Methyl Mercaptan       | 74-93-1     | <                                           | 0.42                                       | 2.70 <                                     | 3.26 <                                     | 3.24 <                                      | 3.07                                        | 1.32                                          |
| Ethyl Mercaptan        | 75-08-1     | <                                           | 0.53                                       | 3.37 <                                     | 4.26 <                                     | 4.05 <                                      | 3.89                                        | 1.68                                          |
| Dimethyl Sulfide       | 75-18-3     | <                                           | 0.53                                       | 3.37 <                                     | 4.26 <                                     | 4.05 <                                      | 3.89                                        | 1.68                                          |
| Carbon Disulfide       | 75-15-0     |                                             | 87.82                                      | 9.69 <                                     | 2.59                                       | 6.13 <                                      | 87.82                                       | 40.84                                         |
| Isopropyl Mercaptan    | 75-33-2     | <                                           | 0.63                                       | 4.21 <                                     | 5.18 <                                     | 5.00 <                                      | 4.80                                        | 2.08                                          |
| tert-Butyl Mercaptan   | 75-66-1     | <                                           | 0.79                                       | 4.89 <                                     | 6.18 <                                     | 5.94 <                                      | 5.67                                        | 2.44                                          |
| n-Propyl Mercaptan     | 107-03-9    | <                                           | 0.63                                       | 4.21 <                                     | 5.18 <                                     | 5.00 <                                      | 4.80                                        | 2.08                                          |
| Ethyl Methyl Sulfide   | 624-89-5    | <                                           | 0.63                                       | 4.21 <                                     | 5.18 <                                     | 5.00 <                                      | 4.80                                        | 2.08                                          |
| Thiophene              | 110-02-1    | <                                           | 0.74                                       | 4.72 <                                     | 5.76 <                                     | 5.54 <                                      | 5.34                                        | 2.30                                          |
| Isobutyl Mercaptan     | 513-44-0    | <                                           | 0.79                                       | 4.89 <                                     | 6.18 <                                     | 5.94 <                                      | 5.67                                        | 2.44                                          |
| Diethyl Sulfide        | 352-93-2    | <                                           | 0.79                                       | 4.89 <                                     | 6.18 <                                     | 5.94 <                                      | 5.67                                        | 2.44                                          |
| n-Butyl Mercaptan      | 109-79-5    | <                                           | 0.79                                       | 4.89 <                                     | 6.18 <                                     | 5.94 <                                      | 5.67                                        | 2.44                                          |
| Dimethyl Disulfide     | 624-92-0    | <                                           | 0.41                                       | 2.53 <                                     | 3.26 <                                     | 3.11 <                                      | 2.96                                        | 1.28                                          |
| 3-Methylthiophene      | 616-44-4    | <                                           | 0.84                                       | 5.39 <                                     | 6.68 <                                     | 6.48 <                                      | 6.19                                        | 2.67                                          |
| Tetrahydrothiophene    | 110-01-0    | <                                           | 0.74                                       | 4.89 <                                     | 6.02 <                                     | 5.81 <                                      | 5.57                                        | 2.42                                          |
| 2-Ethylthiophene       | 872-55-9    | <                                           | 0.95                                       | 6.24 <                                     | 7.69 <                                     | 7.43 <                                      | 7.12                                        | 3.08                                          |
| 2,5-Dimethylthiophene  | 638-02-8    | <                                           | 0.95                                       | 6.24 <                                     | 7.69 <                                     | 7.43 <                                      | 7.12                                        | 3.08                                          |
| Diethyl Disulfide      | 110-81-6    | <                                           | 0.53                                       | 3.37 <                                     | 4.18 <                                     | 4.05 <                                      | 3.87                                        | 1.67                                          |
| Total                  |             | 100.00                                      | 100.00                                     | 100.00                                     | 100.00                                     | 100.00                                      |                                             |                                               |
| Total Detected         |             | 1.42E-07                                    | 1.37E-06                                   | 0.00E+00                                   | 3.76E-07                                   |                                             |                                             |                                               |
| Total with non-detects |             | <                                           | 1.62E-07                                   | 5.47E-06                                   | 1.05E-05                                   | 6.14E-06                                    |                                             |                                               |

\* Percent Values in this table are expressed as % of lb/lb rubber including detection limits for undetected compounds.

**TABLE 4-12a**  
**CALENDERING SUMMARY**

| Compound        | Total VOCs,<br>as methane<br>(lbs/lb rubber) | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber)<br>with non-detects | Total Speciated<br>Organics <sup>1</sup><br>(lbs/lb rubber)<br>with non-detects | Total Sulfur<br>(lbs/lb rubber)<br>with non-detects |
|-----------------|----------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------|
| 2 <sup>2</sup>  | 5.31E-05                                     | < 3.94E-06                                                              | < 7.38E-05                                                          | < 7.34E-05                                                                      | < 3.79E-05                                          |
| 12 <sup>3</sup> | 4.67E-06                                     | < 3.57E-08                                                              | < 5.48E-06                                                          | < 4.49E-06                                                                      | < 2.06E-06                                          |
| Mean            | 2.89E-05                                     | < 1.99E-06                                                              | < 3.96E-05                                                          | < 3.89E-05                                                                      | < 2.00E-05                                          |
| Max.            | 5.31E-05                                     | < 3.94E-06                                                              | < 7.38E-05                                                          | < 7.34E-05                                                                      | < 3.79E-05                                          |
| Std. Dev.       | 2.42E-05                                     | < 1.95E-06                                                              | < 3.42E-05                                                          | < 3.45E-05                                                                      | < 1.79E-05                                          |

- 1 - Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.
- 2 - Three runs conducted on Tire Compound #2 (tire ply coat) (Calendering 2), the total average being presented.
- 3 - Three runs conducted on Engineered Product #12 (neoprene) (Calendering 1), the total average being presented.

**TABLE 4-12b**  
**Calender Organic Compound Speciation Factors**

| Organic Compound                      | CAS Number        | Calender 1<br>%of TOT | Calender 2<br>%of TOT | Pollutant<br>Mean<br>% of TOT | Pollutant<br>Maximum<br>% of TOT | Standard<br>Deviation<br>% of TOT |
|---------------------------------------|-------------------|-----------------------|-----------------------|-------------------------------|----------------------------------|-----------------------------------|
| Heptene                               | 592-76-7          | 0.122                 | 1.020                 | 0.571                         | 1.197                            | 0.442                             |
| 1-Hexene                              | 592-41-6          | < 0.004               | < 0.015               | < 0.010                       | < 0.016                          | < 0.006                           |
| 1-Pentene                             | 109-67-1          | < 0.115               | < 0.015               | < 0.065                       | < 0.206                          | < 0.063                           |
| 1,1,1-Trichloroethane                 | 71-55-6           | < 0.513               | < 0.066               | < 0.290                       | < 0.642                          | < 0.227                           |
| 1,2-Dichloroethane                    | 107-06-2          | < 0.513               | < 0.162               | < 0.337                       | < 0.642                          | < 0.222                           |
| 1,2,4-Trimethylbenzene                | 95-63-6           | 0.078                 | 0.572                 | 0.325                         | 0.701                            | 0.249                             |
| 1,3,5-Trimethylbenzene                | 108-67-8          | < 0.014               | < 0.302               | < 0.158                       | < 0.361                          | < 0.136                           |
| 1,4-Dichlorobenzene                   | 106-46-7          | < 0.513               | < 0.082               | < 0.298                       | < 0.642                          | < 0.225                           |
| 1,4-Diethylbenzene + n-Butylbenzene   | 105-05-5/104-51-8 | < 0.514               | < 0.123               | < 0.318                       | < 1.510                          | < 0.426                           |
| 1,5-Cyclooctadiene                    | 111-78-4          | < 0.003               | < 0.340               | < 0.171                       | < 0.379                          | < 0.153                           |
| 2-Butanone                            | 78-93-3           | < 1.026               | < 0.349               | < 0.688                       | < 1.283                          | < 0.438                           |
| 2-Furaldehyde                         | 98-01-1           | 0.000                 | 0.057                 | 0.028                         | 0.071                            | 0.026                             |
| 2-Methyl-1-butene                     | 563-46-2          | < 0.029               | < 0.015               | < 0.022                       | < 0.054                          | < 0.016                           |
| 2-Methyl-2-butene                     | 513-35-9          | < 0.003               | < 0.045               | < 0.024                       | < 0.070                          | < 0.023                           |
| 2-Methylheptane                       | 592-27-8          | < 0.016               | < 0.429               | < 0.223                       | < 0.787                          | < 0.230                           |
| 2-Methylhexane                        | 591-76-4          | 0.434                 | 2.289                 | 1.361                         | 2.687                            | 0.977                             |
| 2-Methylnaphthalene                   | 91-57-6           | 0.004                 | 0.341                 | 0.172                         | 0.426                            | 0.157                             |
| 2-Methylpentane                       | 107-83-5          | 0.014                 | 0.421                 | 0.218                         | 0.629                            | 0.201                             |
| 2-Methylphenol                        | 95-48-7           | < 0.001               | < 0.003               | < 0.002                       | < 0.003                          | < 0.001                           |
| 2,2-Dimethylbutane                    | 75-83-2           | < 0.003               | < 0.031               | < 0.017                       | < 0.059                          | < 0.017                           |
| 2,3-Dimethylpentane                   | 565-59-3          | 0.144                 | 0.834                 | 0.489                         | 0.977                            | 0.357                             |
| 2,3,4-Trimethylpentane                | 565-75-3          | < 0.003               | < 0.083               | < 0.043                       | < 0.218                          | < 0.062                           |
| 2,4-Dimethylhexane                    | 589-43-5          | 0.080                 | 0.611                 | 0.346                         | 0.707                            | 0.264                             |
| 3-Methylhexane                        | 589-34-4          | 0.637                 | 5.126                 | 2.882                         | 6.025                            | 2.220                             |
| 3-Methylpentane                       | 96-14-0           | 0.089                 | 0.357                 | 0.223                         | 0.557                            | 0.166                             |
| 3/4-Methylphenol                      | 108-39-4/106-44-5 | < 0.001               | < 0.002               | < 0.002                       | < 0.003                          | < 0.001                           |
| 4-Aminobiphenyl                       | 92-67-1           | < 0.002               | < 0.003               | < 0.002                       | < 0.005                          | < 0.002                           |
| 4-Chlorostyrene                       | 1073-67-2         | < 0.000               | < 0.006               | < 0.003                       | < 0.008                          | < 0.003                           |
| 4-Methyl-2-pentanone                  | 108-10-1          | < 0.513               | < 0.851               | < 0.682                       | < 0.957                          | < 0.368                           |
| 4-Nitrobiphenyl                       | 92-93-3           | < 0.001               | < 0.005               | < 0.003                       | < 0.006                          | < 0.002                           |
| 1-Naphthene                           | 83-32-9           | < 0.001               | < 0.007               | < 0.004                       | < 0.008                          | < 0.003                           |
| Acetone                               | 67-64-1           | 0.406                 | 1.663                 | 1.034                         | 2.051                            | 0.709                             |
| Acetophenone                          | 98-86-2           | 0.007                 | 0.696                 | 0.352                         | 0.828                            | 0.315                             |
| Acetylene                             | 74-86-2           | 0.016                 | 0.172                 | 0.094                         | 0.193                            | 0.076                             |
| Acrolein                              | 107-02-8          | < 1.026               | < 0.173               | < 0.600                       | < 1.283                          | < 0.448                           |
| Aniline                               | 62-53-3           | < 0.007               | < 0.127               | < 0.067                       | < 0.158                          | < 0.057                           |
| Benzaldehyde                          | 100-52-7          | 0.002                 | 0.072                 | 0.037                         | 0.082                            | 0.032                             |
| Benzene                               | 71-43-2           | 0.031                 | 0.061                 | 0.046                         | 0.065                            | 0.026                             |
| Benzoic acid                          | 65-85-0           | 0.051                 | 0.111                 | 0.081                         | 0.144                            | 0.055                             |
| Benzonitrile                          | 100-47-0          | < 0.000               | < 0.482               | < 0.241                       | < 0.553                          | < 0.218                           |
| Benzo(b)fluoranthene                  | 205-99-2          | < 0.000               | < 0.001               | < 0.000                       | < 0.001                          | < 0.000                           |
| Benzo(k)fluoranthene                  | 207-08-9          | < 0.000               | < 0.001               | < 0.000                       | < 0.001                          | < 0.000                           |
| Benzyl alcohol                        | 100-51-6          | < 0.001               | < 0.004               | < 0.003                       | < 0.004                          | < 0.002                           |
| Biphenyl                              | 92-52-4           | 0.002                 | 0.026                 | 0.014                         | 0.033                            | 0.012                             |
| bis(1-Methylethyl) Benzene            |                   | < 0.000               | < 1.714               | < 0.857                       | < 2.735                          | < 0.994                           |
| bis(2-Ethylhexyl)phthalate            | 117-81-7          | 0.033                 | 1.213                 | 0.623                         | 2.232                            | 0.655                             |
| b-Pinene                              | 18172-67-3        | < 0.128               | < 0.115               | < 0.122                       | < 0.194                          | < 0.067                           |
| Butylbenzylphthalate                  | 85-68-7           | 0.002                 | 0.002                 | 0.002                         | 0.002                            | 0.001                             |
| C11-C12 Branched Alkane               |                   | 17.068                | 2.735                 | 9.901                         | 18.287                           | 7.541                             |
| Camphene                              | 79-92-5           | < 0.001               | < 0.010               | < 0.006                       | < 0.012                          | < 0.004                           |
| Carbon Disulfide                      | 75-15-0           | 58.616                | 3.153                 | 30.885                        | 64.166                           | 25.710                            |
| Chloro-4-(1-Chloroethenyl)Cyclohexene |                   | < 1.368               | < 0.000               | < 0.684                       | < 2.559                          | < 0.820                           |
| Chloro-5-(1-Chloroethenyl)Cyclohexene |                   | < 1.368               | < 0.000               | < 0.684                       | < 2.559                          | < 0.820                           |
| Chloromethane                         | 74-87-3           | < 0.513               | < 0.029               | < 0.271                       | < 0.642                          | < 0.231                           |
| Cumene                                | 98-82-8           | 0.016                 | 0.086                 | 0.051                         | 0.090                            | 0.036                             |
| Cumene                                | 98-82-8           | 0.001                 | 0.016                 | 0.008                         | 0.019                            | 0.007                             |
| Cyclohexane                           | 110-82-7          | 0.045                 | 0.124                 | 0.085                         | 0.160                            | 0.056                             |
| Cyclohexanone                         | 108-94-1          | 0.007                 | 0.096                 | 0.051                         | 0.115                            | 0.042                             |
| Cyclopentane + 2,3-Dimethylbutane     | 287-92-3/79-29-8  | < 0.007               | < 0.111               | < 0.059                       | < 0.141                          | < 0.052                           |
| Cyclopentene                          | 142-29-0          | < 0.003               | < 0.094               | < 0.048                       | < 0.100                          | < 0.041                           |
| Dibenzofuran                          | 132-64-9          | < 0.001               | < 0.001               | < 0.001                       | < 0.002                          | < 0.001                           |
| 1,1-Difluoromethane                   | 75-71-8           | < 0.513               | < 0.038               | < 0.276                       | < 0.642                          | < 0.229                           |

**TABLE 4-12b**  
**Calender Organic Compound Speciation Factors**

| Organic Compound                      | CAS Number        | Calender 1<br>% of TOT | Calender 2<br>% of TOT | Pollutant<br>Mean<br>% of TOT | Pollutant<br>Maximum<br>% of TOT | Standard<br>Deviation<br>% of TOT |
|---------------------------------------|-------------------|------------------------|------------------------|-------------------------------|----------------------------------|-----------------------------------|
| Diethylphthalate                      | 84-66-2           | 0.002                  | 0.001                  | 0.001                         | 0.003                            | 0.001                             |
| Dimethylpentane                       |                   | < 0.000                | < 1.309                | < 0.655                       | < 1.367                          | < 0.584                           |
| Di-n-butylphthalate                   | 84-74-2           | 0.006                  | 0.000                  | 0.003                         | 0.007                            | 0.003                             |
| Di-n-octylphthalate                   | 117-84-0          | < 0.000                | < 0.000                | < 0.000                       | < 0.001                          | < 0.000                           |
| Diphenylamine                         | 122-39-4          | 0.019                  | 0.013                  | 0.016                         | 0.051                            | 0.014                             |
| d-Limonene                            | 5989-27-5         | < 0.789                | < 0.097                | < 0.443                       | < 0.855                          | < 0.340                           |
| Ethane                                | 74-84-0           | 0.157                  | 0.201                  | 0.179                         | 0.341                            | 0.114                             |
| Ethyl Acetate                         |                   | < 3.637                | < 0.000                | < 1.819                       | < 5.795                          | < 2.109                           |
| Ethylcyclohexene                      |                   | < 0.000                | < 7.844                | < 3.922                       | < 12.207                         | < 3.904                           |
| Ethylacetylene                        | 107-00-6          | < 0.003                | < 0.069                | < 0.036                       | < 0.094                          | < 0.032                           |
| Ethylbenzene                          | 100-41-4          | 0.044                  | 0.225                  | 0.134                         | 0.270                            | 0.098                             |
| Ethylene                              | 74-85-1           | 0.039                  | 0.298                  | 0.169                         | 0.362                            | 0.131                             |
| Ethylpentane                          |                   | < 0.000                | < 0.863                | < 0.431                       | < 1.367                          | < 0.500                           |
| Fluoranthene                          | 206-44-0          | < 0.000                | < 0.001                | < 0.000                       | < 0.001                          | < 0.000                           |
| Fluorene                              | 86-73-7           | < 0.002                | < 0.005                | < 0.004                       | < 0.012                          | < 0.003                           |
| Heptane                               |                   | 1.197                  | 11.331                 | 6.264                         | 12.307                           | 4.906                             |
| Hydroquinone                          | 123-31-9          | < 0.002                | < 0.089                | < 0.046                       | < 0.254                          | < 0.073                           |
| Isobutane                             | 75-28-5           | 0.018                  | 0.075                  | 0.047                         | 0.083                            | 0.032                             |
| Isobutylene + 1-Butene                | 115-11-7/106-98-9 | < 0.141                | < 0.015                | < 0.078                       | < 0.150                          | < 0.061                           |
| Isooctane                             | 540-84-1          | 0.049                  | 0.355                  | 0.202                         | 0.414                            | 0.153                             |
| Isopentane                            | 78-78-4           | 0.198                  | 0.852                  | 0.525                         | 1.149                            | 0.374                             |
| Isophorone                            | 78-59-1           | < 0.001                | < 0.192                | < 0.096                       | < 0.235                          | < 0.089                           |
| Methylcyclohexane                     | 108-87-2          | 0.160                  | 1.333                  | 0.746                         | 1.932                            | 0.616                             |
| Methylcyclopentane                    | 96-37-7           | 0.031                  | 0.241                  | 0.136                         | 0.341                            | 0.110                             |
| Methylene Chloride                    | 75-09-2           | < 0.899                | < 0.108                | < 0.504                       | < 1.612                          | < 0.468                           |
| Methylethylbenzene                    |                   | < 0.000                | < 4.668                | < 2.334                       | < 7.223                          | < 2.702                           |
| Methylhexane                          |                   | 1.112                  | 12.239                 | 6.675                         | 13.674                           | 5.336                             |
| Methylhexanone                        |                   | < 0.000                | < 2.618                | < 1.309                       | < 2.735                          | < 1.169                           |
| m-Ethyltoluene                        | 620-14-4          | < 0.049                | < 0.204                | < 0.127                       | < 0.227                          | < 0.088                           |
| m-Xylene + p-Xylene                   | 108-38-3/106-42-3 | 0.140                  | 0.402                  | 0.271                         | 0.492                            | 0.171                             |
| Naphthalene                           | 91-20-3           | 0.007                  | 0.173                  | 0.090                         | 0.196                            | 0.078                             |
| Octane                                | 106-97-8          | 0.036                  | 0.029                  | 0.032                         | 0.058                            | 0.019                             |
| Decane                                | 124-18-5          | < 0.145                | < 0.630                | < 0.387                       | < 0.688                          | < 0.269                           |
| n-Heptane                             | 142-82-5          | 0.581                  | 6.704                  | 3.642                         | 7.817                            | 2.929                             |
| n-Hexane                              | 110-54-3          | 0.658                  | 0.813                  | 0.736                         | 1.265                            | 0.456                             |
| n-Nonane                              | 111-84-2          | 0.050                  | 0.490                  | 0.270                         | 0.685                            | 0.224                             |
| n-Octane                              | 111-65-9          | 0.009                  | 0.405                  | 0.207                         | 0.787                            | 0.229                             |
| n-Pentane                             | 109-66-0          | < 0.018                | < 0.045                | < 0.032                       | < 0.067                          | < 0.022                           |
| n-Propylbenzene                       | 103-65-1          | < 0.004                | < 0.047                | < 0.025                       | < 0.061                          | < 0.022                           |
| Octane                                |                   | < 0.000                | < 0.803                | < 0.401                       | < 2.408                          | < 0.692                           |
| o-Ethyltoluene                        | 611-14-3          | 0.038                  | 3.450                  | 1.744                         | 3.874                            | 1.539                             |
| o-Toluidine                           | 95-53-4           | < 0.001                | < 0.004                | < 0.002                       | < 0.005                          | < 0.002                           |
| o-Xylene                              | 95-47-6           | 0.051                  | 0.405                  | 0.228                         | 0.492                            | 0.176                             |
| p-Cymene                              | 99-87-6           | < 0.038                | < 0.075                | < 0.057                       | < 0.076                          | < 0.033                           |
| p-Ethyltoluene                        | 622-96-8          | < 0.030                | < 0.073                | < 0.051                       | < 0.105                          | < 0.042                           |
| Phenanthrene                          | 85-01-8           | 0.006                  | 0.008                  | 0.007                         | 0.015                            | 0.005                             |
| Phenol                                | 108-95-2          | 0.018                  | 0.244                  | 0.131                         | 0.421                            | 0.125                             |
| Phthalimide                           | 85-41-6           | < 0.004                | < 0.752                | < 0.378                       | < 0.842                          | < 0.336                           |
| Propane                               | 74-98-6           | 0.437                  | 3.993                  | 2.215                         | 4.564                            | 1.742                             |
| Propylene                             | 115-07-1          | 0.011                  | 0.100                  | 0.055                         | 0.128                            | 0.046                             |
| Pyrene                                | 129-00-0          | 0.002                  | 0.003                  | 0.002                         | 0.004                            | 0.002                             |
| Styrene                               | 100-42-5          | 0.017                  | 0.616                  | 0.317                         | 0.963                            | 0.306                             |
| Toluene                               | 108-88-3          | 1.482                  | 5.647                  | 3.565                         | 8.169                            | 2.650                             |
| trans-2-Hexene                        | 4050-45-7         | < 0.003                | < 0.043                | < 0.023                       | < 0.047                          | < 0.019                           |
| Trichlorofluoromethane                | 75-69-4           | < 0.513                | < 0.116                | < 0.315                       | < 0.642                          | < 0.222                           |
| Trichlorofluoroethane                 | 76-13-1           | < 0.513                | < 0.097                | < 0.305                       | < 0.642                          | < 0.223                           |
| Undecane                              |                   | < 0.000                | < 0.904                | < 0.452                       | < 2.713                          | < 0.780                           |
| Total Detected (lb/lb rubber)         |                   | 3.76E-06               | 5.43E-05               |                               |                                  |                                   |
| Total with non-detects (lb/lb rubber) |                   | < 4.49E-06             | < 7.34E-05             |                               |                                  |                                   |

Percent values in this table are expressed as percent of lb/lb-rubber including detection limits for undetected compounds.

**TABLE 4-12c**  
**Calender Sulfur Speciation Factors**

| <b>Organic Compound</b>                      | <b>CAS Number</b> | <b>Calender 1<br/>%of TOT</b> | <b>Calender 2<br/>%of TOT</b> | <b>Pollutant Mean<br/>%of TOT</b> | <b>Pollutant Maximum<br/>%of TOT</b> | <b>Standard Deviation<br/>%of TOT</b> |
|----------------------------------------------|-------------------|-------------------------------|-------------------------------|-----------------------------------|--------------------------------------|---------------------------------------|
| Carbonyl Sulfide                             | 463-58-1          | 2.07                          |                               | 2.07                              | 2.17                                 | 0.07                                  |
| Carbon Disulfide                             | 75-15-0           | 97.93                         | 100.00                        | 98.96                             | 100.00                               | 1.04                                  |
| <b>Total Detected (lb/lb rubber)</b>         |                   | <b>2.04E-06</b>               | <b>1.53E-06</b>               |                                   |                                      |                                       |
| <b>Total with non-detects (lb/lb rubber)</b> |                   | <b>2.04E-06</b>               | <b>1.53E-06</b>               |                                   |                                      |                                       |

TABLE 4-13a  
SIDEWALL/WHITEWALL GRINDING - UNCONTROLLED SUMMARY

| Control Device | Total VOCs, as methane (lbs/lb rubber removed) | Total Speciated Semivolatiles (lbs/lb rubber removed) with non-detects | Total Speciated Volatiles (lbs/lb rubber removed) with non-detects | Total Speciated Organics <sup>1</sup> (lbs/lb rubber removed) with non-detects | Total Sulfur (lbs/lb rubber removed) with non-detects | Total Metals (lbs/lb rubber removed) with non-detects | Total PM (lbs/lb rubber removed) <sup>2</sup> |
|----------------|------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------|
| Inlet          |                                                |                                                                        |                                                                    |                                                                                |                                                       |                                                       |                                               |
| Run 1          | 9.94E-03                                       | < 9.97E-04                                                             | < 1.14E-02                                                         | NA                                                                             | < 2.93E-04                                            | < 2.39E-02                                            | 1.42E+00                                      |
| Run 2          | 5.65E-03                                       | < 1.24E-03                                                             | < 1.30E-02                                                         | NA                                                                             | < 3.14E-04                                            | < 2.18E-02                                            | 1.29E+00                                      |
| Run 3          | 3.16E-02                                       | < 1.13E-03                                                             | < 1.07E-02                                                         | NA                                                                             | < 4.36E-04                                            | < 1.64E-02                                            | 9.62E-01                                      |
| Table 4/12-12  | 1.67E-2                                        |                                                                        |                                                                    |                                                                                |                                                       |                                                       | 1.88E-4                                       |
| Mean           | 1.57E-02                                       | < 1.12E-03                                                             | < 1.17E-02                                                         | < 1.02E-02                                                                     | < 3.47E-04                                            | < 2.07E-02                                            | 1.23E+00                                      |
| Max.           | 3.16E-02                                       | < 1.24E-03                                                             | < 1.30E-02                                                         | < 2.12E-03                                                                     | < 4.36E-04                                            | < 2.39E-02                                            | 1.42E+00                                      |
| Std. Dev.      | 1.14E-02                                       | < 9.94E-05                                                             | < 9.63E-04                                                         | < 3.02E-04                                                                     | < 6.29E-05                                            | < 3.16E-03                                            | 1.94E-01                                      |

1 - Run specific Speciated Organics were not evaluated.

Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analytic list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

2 - For uncontrolled PM emissions, use a factor of 1.0 lbs emitted per pound of rubber removed.

TABLE 4-13b CXLONE INLET  
CARCASS GRINDING - UNCONTROLLED SUMMARY

| Control Device      | Total VOCs, as methane (lbs/lb rubber removed) | Total Speciated Semivolatiles (lbs/lb rubber removed) with non-detects | Total Speciated Volatiles (lbs/lb rubber removed) with non-detects | Total Speciated Organics <sup>1</sup> (lbs/lb rubber removed) with non-detects | Total Sulfur (lbs/lb rubber removed) with non-detects | Total Metals (lbs/lb rubber removed) with non-detects | Total PM (lbs/lb rubber removed) <sup>2</sup> |
|---------------------|------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------|
| Inlet               |                                                |                                                                        |                                                                    |                                                                                |                                                       |                                                       |                                               |
| Run 1               | 3.79E-04                                       | < 4.07E-04                                                             | < 1.05E-02                                                         | NA <                                                                           | 2.21E-05                                              | 1.93E-02                                              | 5.67E-01                                      |
| Run 2               | 7.93E-04                                       | < 9.91E-04                                                             | < 1.83E-02                                                         | NA <                                                                           | 2.73E-05                                              | 1.18E-02                                              | 5.68E-01                                      |
| Run 3               | 3.82E-04                                       | < 8.72E-04                                                             | < 1.87E-02                                                         | NA <                                                                           | 2.87E-05                                              | 1.04E-02                                              | 5.02E-01                                      |
| in Table 4-13F Mean | 5.18E-04                                       | < 7.57E-04                                                             | < 1.58E-02                                                         | 1.63E-2 < 1.64E-02                                                             | 2.60E-05                                              | 1.38E-02                                              | 5.45E-01                                      |
| Max.                | 7.93E-04                                       | < 9.91E-04                                                             | < 1.87E-02                                                         | < 9.59E-03                                                                     | 2.87E-05                                              | 1.93E-02                                              | 5.68E-01                                      |
| Std. Dev.           | 1.94E-04                                       | < 2.52E-04                                                             | < 3.77E-03                                                         | < 1.11E-03                                                                     | 2.84E-06                                              | 3.91E-03                                              | 3.09E-02                                      |

1 - Run specific Speciated Organics were not evaluated.

Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semi-volatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

2 - For uncontrolled PM emissions, use a factor of 1.0 lbs emitted per lb of rubber removed.

Why?

Total Metals = 1.38E-2  
Table 4-13F shows specification

Cd -.01% 1.38E-6  
Cr .01% 1.38E-6  
Co -.01%  
Pb -.01% 1.38E-6  
Ni .01% 1.38E-6

TABLE 4-13c

## RETREAD BUFFING - UNCONTROLLED SUMMARY

| Control Device       | Total VOCs, as methane (lbs/lb rubber processed) | Total Speciated Semivolatiles (lbs/lb rubber processed) with non-detects | Total Speciated Volatiles (lbs/lb rubber processed) with non-detects | Total Speciated Organics <sup>1</sup> (lbs/lb rubber processed) with non-detects | Total Sulfur (lbs/lb rubber processed) with non-detects | Total Metals (lbs/lb rubber processed) with non-detects | Total PM (lbs/lb rubber processed) |
|----------------------|--------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|------------------------------------|
| Inlet                |                                                  |                                                                          |                                                                      |                                                                                  |                                                         |                                                         |                                    |
| Run 1                | 1.98E-04                                         | < 2.74E-06                                                               | < 1.10E-05                                                           | NA                                                                               | < 1.78E-06                                              | 1.03E-04                                                | 9.96E-03                           |
| Run 2                | 3.70E-04                                         | < 2.71E-06                                                               | < 1.45E-05                                                           | NA                                                                               | < 3.03E-06                                              | 1.10E-04                                                | 1.02E-02                           |
| Run 3                | 1.52E-04                                         | < 2.31E-06                                                               | < 4.44E-06                                                           | NA                                                                               | < 2.87E-06                                              | 7.26E-05                                                | 8.23E-03                           |
| table 412-12<br>Mean | 2.43E-4<br>2.40E-04                              | < 2.59E-06                                                               | < 9.98E-06                                                           | < 1.13E-05                                                                       | < 2.56E-06                                              | 9.51E-05                                                | 9.09E-7<br>9.48E-03                |
| Max.                 | 3.70E-04                                         | < 2.74E-06                                                               | < 1.45E-05                                                           | < 2.71E-06                                                                       | < 3.03E-06                                              | 1.10E-04                                                | 1.02E-02                           |
| Std. Dev.            | 9.38E-05                                         | < 1.96E-07                                                               | < 4.17E-06                                                           | < 4.25E-07                                                                       | < 5.55E-07                                              | 1.62E-05                                                | 8.78E-04                           |

Run specific Speciated Organics were not evaluated.

Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analytic list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

TABLE 4-13d CYCLONE INLET  
BELT GRINDING - UNCONTROLLED SUMMARY

| Cyclone Inlet | Total Speciated Semivolatiles (lbs/lb rubber removed) with non-detects | Total Speciated Volatiles (lbs/lb rubber removed) with non-detects | Total Speciated Organics <sup>1</sup> (lbs/lb rubber removed) with non-detects | Total Sulfur (lbs/lb rubber removed) with non-detects | Total Metals (lbs/lb rubber removed) with non-detects | Total PM (lbs/lb rubber removed) <sup>2</sup> |
|---------------|------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------|
| Run 1         | < 2.47E-04                                                             | < 2.94E-03                                                         | NA <                                                                           | 3.12E-04                                              | 5.13E-02                                              | 1.28E+00                                      |
| Run 2         | < 2.57E-04                                                             | < 3.25E-03                                                         | NA <                                                                           | 3.09E-04                                              | 4.52E-02                                              | 1.12E+00                                      |
| Run 3         | < 2.27E-04                                                             | < 2.43E-03                                                         | NA <                                                                           | 2.36E-04                                              | 4.72E-02                                              | 1.17E+00                                      |
| table 4.12-12 | 1.78E-3                                                                | 2.87E-03                                                           | < 2.63E-03                                                                     | < 2.86E-04                                            | 4.79E-02                                              | 2.26E-4                                       |
| Mean          | < 2.44E-04                                                             | < 3.25E-03                                                         | < 1.35E-03                                                                     | < 3.12E-04                                            | 5.13E-02                                              | 1.19E+00                                      |
| Max.          | < 2.57E-04                                                             | < 3.38E-04                                                         | < 1.47E-04                                                                     | < 3.51E-05                                            | 5.13E-02                                              | 1.28E+00                                      |
| Std. Dev.     | < 1.25E-05                                                             | < 3.38E-04                                                         | < 1.47E-04                                                                     | < 3.51E-05                                            | 2.54E-03                                              | 6.68E-02                                      |

| ESP Inlet | Total VOCs, as methane (lbs/lb rubber removed) | Total Metals (lbs/lb rubber removed) with non-detects | Total PM (lbs/lb rubber removed) |
|-----------|------------------------------------------------|-------------------------------------------------------|----------------------------------|
| Run 1     | 2.39E-03                                       | 9.24E-05                                              | 1.51E-02                         |
| Run 2     | 2.30E-03                                       | 1.02E-04                                              | 1.20E-02                         |
| Run 3     | 6.78E-04                                       | 7.35E-05                                              | 8.51E-03                         |
| Mean      | 1.79E-03                                       | 8.94E-05                                              | 1.19E-02                         |
| Max.      | 2.39E-03                                       | 1.02E-04                                              | 1.51E-02                         |
| Std. Dev. | 7.87E-04                                       | 1.19E-05                                              | 2.69E-03                         |

Run specific Speciated Organics were not evaluated.

Organic compound total is taken from the speciated statistical summaries. The "total" represents the sum of the semivolatile and volatile emissions results for a given rubber compound. Where there is duplication of a chemical compound in the analyte list, between the two methods, the higher value was used to present a conservative emissions total. The other value was ignored and not included in the total.

For uncontrolled PM emissions, use a factor of 1.0 pounds emitted per pound of rubber removed.

TABLE 4 - 13.E GRINDING UNCONTROLLED ORGANIC COMPOUND SPECIATION FACTORS

| Compounds                                | CAS Numbers       | Retread Butting % of Total | Belt Grinding % of Total | Carcass Grinding % of Total | Sidewall Grinding % of Total | TOTAL *      |             |             |
|------------------------------------------|-------------------|----------------------------|--------------------------|-----------------------------|------------------------------|--------------|-------------|-------------|
|                                          |                   |                            |                          |                             |                              | Mean Inlet % | MAX Inlet % | STD Inlet % |
| 1-Chloro-4-(1-chloroethenyl) cyclohexene |                   |                            | 0.41                     |                             |                              | 0.14         | 0.41        | 0.19        |
| 1-Chloro-5-(1-chloroethenyl) cyclohexene |                   |                            | 0.15                     |                             |                              | 0.05         | 0.15        | 0.07        |
| 1-Heptene                                | 592-76-7          | 1.73                       | 0.04                     | 0.17                        | 3.40                         | 1.20         | 3.40        | 1.56        |
| 1,2,4-Trimethylbenzene                   | 95-63-6           | 0.02                       | 0.21                     | 0.00                        | 0.02                         | 0.08         | 0.21        | 0.09        |
| 1,3-Butadiene                            | 106-99-0          | 0.01                       | 0.92                     | 0.16                        | 0.24                         | 0.44         | 0.92        | 0.34        |
| 1,3-Pentadiene                           |                   |                            | 0.01                     | 0.01                        | 0.59                         | 0.20         | 0.59        | 0.27        |
| 1,4-Dichlorobenzene                      | 00106-46-7        | 0.02                       | 0.02                     | 0.00                        | 0.05                         | 0.02         | 0.05        | 0.02        |
| 1,4-Diethylbenzene + n-Butylbenzene      | 105-05-5/104-51-8 | 0.01                       | 0.18                     | 0.01                        | 0.08                         | 0.09         | 0.18        | 0.07        |
| 2-Butanone                               | 00078-93-3        | 0.00                       | 0.44                     | 0.00                        | 0.46                         | 0.30         | 0.46        | 0.21        |
| 2-Butene                                 |                   |                            |                          |                             | 1.54                         | 0.51         | 1.54        | 0.73        |
| 2-Chloro-1,3-Butadiene                   |                   |                            | 3.10                     |                             |                              | 1.03         | 3.10        | 1.46        |
| 2-Chlorothiophene                        |                   |                            | 0.08                     |                             |                              | 0.03         | 0.08        | 0.04        |
| 2-Furaldehyde                            | 98-01-1           | 0.15                       | 1.39                     | 0.01                        | 0.08                         | 0.49         | 1.39        | 0.64        |
| 2-Methyl-2-butene                        | 513-35-9          | 0.00                       | 0.04                     | 5.00                        | 0.26                         | 1.77         | 5.00        | 2.29        |
| 2-Methylheptane                          | 592-27-8          | 0.04                       | 0.04                     | 0.00                        | 2.52                         | 0.85         | 2.52        | 1.18        |
| 2-Methylhexane                           | 591-76-4          | 6.33                       | 0.04                     | 0.44                        | 8.02                         | 2.83         | 8.02        | 3.67        |
| 2-Methylnaphthalene                      | 91-57-6           | 0.06                       | 0.57                     | 0.00                        | 0.01                         | 0.19         | 0.57        | 0.26        |
| 2-Methylpentane                          | 107-83-5          | 0.00                       | 0.81                     | 0.01                        | 0.56                         | 0.46         | 0.81        | 0.33        |
| 2,2-Dimethylbutane                       | 75-83-2           | 0.00                       | 0.26                     | 0.00                        | 0.05                         | 0.10         | 0.26        | 0.11        |
| 2,3-Dimethylpentane                      | 565-59-3          | 0.00                       | 0.04                     | 0.11                        | 2.98                         | 1.04         | 2.98        | 1.37        |
| 2,4-Dimethylhexane                       | 589-43-5          | 0.95                       | 0.04                     | 0.18                        | 1.95                         | 0.72         | 1.95        | 0.87        |
| 3-Ethylpentane                           |                   |                            |                          |                             | 1.63                         | 0.54         | 1.63        | 0.77        |
| 3-Heptanone                              |                   |                            | 0.08                     |                             |                              | 0.03         | 0.08        | 0.04        |
| 3-Methylheptane                          |                   |                            |                          |                             | 0.82                         | 0.27         | 0.82        | 0.39        |
| 3-Methylhexane                           | 589-34-4          | 13.46                      | 0.04                     | 1.12                        | 17.13                        | 6.10         | 17.13       | 7.81        |
| 3-Methylpentane                          | 96-14-0           | 0.00                       | 5.70                     | 0.02                        | 0.69                         | 2.14         | 5.70        | 2.53        |
| 4-Chlorostyrene                          | 1073-67-2         | 0.07                       | 0.07                     | 0.01                        | 0.05                         | 0.04         | 0.07        | 0.03        |
| 4-Methyl-2-pentanone                     | 00108-10-1        | 0.12                       | 0.25                     | 0.12                        | 0.28                         | 0.21         | 0.28        | 0.07        |
| Acenaphthene                             | 83-32-9           | 0.02                       | 0.01                     | 0.00                        | 0.03                         | 0.01         | 0.03        | 0.01        |
| Acenaphthylene                           | 208-96-8          | 0.25                       | 0.01                     | 0.00                        | 0.02                         | 0.01         | 0.02        | 0.01        |
| Acetaldehyde                             |                   |                            | 0.39                     |                             |                              | 0.13         | 0.39        | 0.18        |
| Acetone                                  | 00067-64-1        | 0.03                       | 1.03                     | 0.11                        | 0.35                         | 0.50         | 1.03        | 0.39        |
| Acetophenone                             | 98-86-2           | 0.17                       | 0.22                     | 0.01                        | 0.03                         | 0.09         | 0.22        | 0.10        |
| Acrolein                                 | 00107-02-8        | 0.07                       | 0.45                     | 0.01                        | 0.56                         | 0.34         | 0.56        | 0.24        |
| Aniline                                  | 62-53-3           | 0.59                       | 0.03                     | 0.12                        | 3.98                         | 1.37         | 3.98        | 1.84        |
| α-Pinene                                 | 7785-70-8         | 0.00                       | 0.20                     | 0.00                        | 0.02                         | 0.07         | 0.20        | 0.09        |
| Benzaldehyde                             | 100-52-7          | 0.97                       | 0.04                     | 0.01                        | 0.03                         | 0.03         | 0.04        | 0.01        |
| Benzene                                  | 71-43-2           | 1.47                       | 0.03                     | 0.03                        | 0.13                         | 0.06         | 0.13        | 0.05        |
| Benzoic acid                             | 65-85-0           | 1.96                       | 0.05                     | 0.02                        | 0.63                         | 0.23         | 0.63        | 0.28        |
| Benzo(a)anthracene                       | 56-55-3           | 0.20                       | 0.01                     | 0.00                        | 0.01                         | 0.01         | 0.01        | 0.00        |
| Benzo(g,h,i)perylene                     | 191-24-2          | 0.18                       | 0.02                     | 0.01                        | 0.01                         | 0.02         | 0.02        | 0.00        |
| Biphenyl                                 | 92-52-4           | 0.06                       | 0.01                     | 0.00                        | 0.03                         | 0.01         | 0.03        | 0.01        |
| bis(2-Ethylhexyl)phthalate               | 117-81-7          | 0.18                       | 2.01                     | 0.05                        | 0.18                         | 0.75         | 2.01        | 0.90        |
| Butanal                                  |                   |                            | 0.15                     | 0.01                        |                              | 0.05         | 0.15        | 0.07        |
| C7H16 Branched Alkane                    |                   | 1.29                       |                          | 0.15                        |                              | 0.05         | 0.15        | 0.07        |
| C8H16 Alkene                             |                   |                            |                          |                             | 0.45                         | 0.15         | 0.45        | 0.21        |
| C8H16 Branched Alkene                    |                   |                            |                          | 0.02                        |                              | 0.01         | 0.02        | 0.01        |
| C9H20 Alkane                             |                   |                            |                          |                             | 4.25                         | 1.42         | 4.25        | 2.00        |
| Carbon Disulfide                         | 00075-15-0        | 0.10                       | 11.51                    | 0.01                        | 0.27                         | 3.93         | 11.51       | 5.36        |
| Chrysene                                 | 218-01-9          | 0.11                       | 0.02                     | 0.01                        | 0.01                         | 0.01         | 0.02        | 0.00        |
| cis-2-Pentene                            | 627-20-3          | 0.02                       | 0.84                     | 0.00                        | 0.02                         | 0.29         | 0.84        | 0.39        |
| Cyclobutane                              |                   | 0.02                       |                          | 0.00                        |                              | 0.00         | 0.00        | 0.00        |
| Cyclohexane                              | 110-82-7          | 19.46                      | 0.96                     | 0.50                        | 0.15                         | 0.54         | 0.96        | 0.33        |
| Cyclohexanone                            | 108-94-1          | 0.14                       | 0.05                     | 0.10                        | 0.05                         | 0.06         | 0.10        | 0.02        |
| Cyclohexylamine                          | 108-91-8          | 0.67                       | 0.09                     | 2.89                        | 0.06                         | 1.01         | 2.89        | 1.33        |
| Cyclopentane + 2,3-Dimethylbutane        | 287-92-3/79-29-8  | 0.02                       | 0.35                     | 0.00                        | 0.20                         | 0.18         | 0.35        | 0.14        |
| Dibenzofuran                             | 132-64-9          | 0.03                       | 0.01                     | 0.00                        | 0.02                         | 0.01         | 0.02        | 0.01        |
| Dibromochloromethane                     | 00124-48-1        | 0.01                       | 0.25                     | 0.00                        | 0.28                         | 0.18         | 0.28        | 0.13        |
| Diethylphthalate                         | 84-66-2           | 0.03                       | 0.01                     | 0.00                        | 0.02                         | 0.01         | 0.02        | 0.01        |
| Dimethyl Cyclopentane Isomer             |                   | 0.18                       |                          |                             | 0.49                         | 0.16         | 0.49        | 0.23        |
| Dimethylcyclohexane                      |                   |                            |                          | 0.04                        | 1.86                         | 0.63         | 1.86        | 0.87        |
| Di-n-butylphthalate                      | 84-74-2           | 0.34                       | 0.13                     | 0.01                        | 0.02                         | 0.05         | 0.13        | 0.05        |
| Diphenylamine                            | 122-39-4          | 0.30                       | 0.18                     | 0.04                        | 0.03                         | 0.08         | 0.18        | 0.07        |
| dl-Limonene                              | 5989-27-5         | 0.01                       | 0.18                     | 0.01                        | 0.37                         | 0.19         | 0.37        | 0.15        |
| Ethanol                                  |                   |                            |                          | 0.03                        |                              | 0.01         | 0.03        | 0.01        |
| Ethyl Cyclopentane                       |                   | 0.31                       |                          |                             | 0.57                         | 0.19         | 0.57        | 0.27        |
| Ethylbenzene                             | 100-41-4          | 0.00                       | 0.03                     | 0.00                        | 0.56                         | 0.20         | 0.56        | 0.26        |
| Ethylpentane                             | 206-44-0          | 0.22                       | 0.01                     |                             |                              | 0.00         | 0.00        | 0.00        |
| Fluoranthene                             | 86-73-7           | 0.24                       | 0.01                     | 0.03                        | 0.01                         | 0.02         | 0.03        | 0.01        |
| Fluorene                                 |                   | 0.03                       | 0.01                     | 0.00                        | 0.03                         | 0.01         | 0.03        | 0.01        |
| Heptane                                  | 75-28-5           | 0.43                       |                          | 0.44                        | 0.56                         | 0.33         | 0.56        | 0.24        |
| Isobutane                                | 115-11-7/106-98-9 | 0.00                       | 0.24                     | 0.00                        | 0.20                         | 0.15         | 0.24        | 0.10        |
| Isobutylene + 1-Butene                   | 540-84-1          | 0.01                       | 0.04                     | 0.00                        | 1.69                         | 0.58         | 1.69        | 0.79        |
| Isocetane                                | 78-78-4           | 0.00                       | 0.04                     | 0.07                        | 1.13                         | 0.41         | 1.13        | 0.51        |
| Isopentane                               | 78-59-1           | 0.03                       | 1.02                     | 0.07                        | 0.85                         | 0.64         | 1.02        | 0.41        |
| Isophorone                               | 108-87-2          | 0.06                       | 0.02                     | 0.00                        | 0.03                         | 0.02         | 0.03        | 0.01        |
| Matrix of C7-C8 Cyclic & aliphatic HC's  | 96-37-7           | 7.17                       |                          |                             |                              |              |             |             |
| Methylcyclohexane                        | 00075-09-2        | 9.14                       | 0.04                     | 0.88                        | 3.99                         | 1.64         | 3.99        | 1.70        |
| Methylcyclopentane                       |                   | 0.62                       | 0.33                     | 0.07                        | 0.65                         | 0.35         | 0.65        | 0.24        |
| Methylene Chloride                       |                   | 0.02                       | 1.89                     | 25.58                       | 0.33                         | 9.27         | 25.58       | 11.55       |
| Methylheptane                            | 108-38-3/106-42-3 |                            |                          | 0.10                        |                              | 0.03         | 0.10        | 0.05        |

TABLE 4 - 13.E GRINDING UNCONTROLLED ORGANIC COMPOUND SPECIATION FACTORS

| Compounds                             | CAS Numbers | Retread<br>Buffing<br>% of Total | Belt<br>Grinding<br>% of Total | Carcass<br>Grinding<br>% of Total | Sidewall<br>Grinding<br>% of Total | TOTAL *         |                |                |
|---------------------------------------|-------------|----------------------------------|--------------------------------|-----------------------------------|------------------------------------|-----------------|----------------|----------------|
|                                       |             |                                  |                                |                                   |                                    | Mean<br>Inlet % | MAX<br>Inlet % | STD<br>Inlet % |
| Methylhexane                          | 91-20-3     | 0.76                             | T                              | 0.44                              | T                                  | 0.15            | 0.44           | 0.21           |
| Methylhexanone                        | 106-97-8    | 0.14                             | T                              | T                                 | T                                  | 0.00            | 0.00           | 0.00           |
| m-Xylene + p-Xylene                   | 124-18-5    | < 0.01                           | 0.32                           | < 0.01                            | < 0.32                             | < 0.22          | < 0.32         | < 0.14         |
| Naphthalene                           | 142-82-5    | 0.19                             | 0.15                           | 0.00                              | 0.04                               | 0.06            | 0.15           | 0.06           |
| n-Butane                              | 110-54-3    | < 0.00                           | < 0.04                         | < 0.00                            | 0.95                               | < 0.33          | < 0.95         | < 0.44         |
| n-Decane                              | 111-84-2    | < 0.01                           | 0.64                           | < 0.01                            | < 0.08                             | < 0.25          | < 0.64         | < 0.28         |
| n-Heptane                             | 111-65-9    | 24.09                            | < 0.04                         | 1.42                              | 20.88                              | < 7.44          | < 20.88        | < 9.51         |
| n-Hexane                              |             | < 0.00                           | 1.59                           | < 0.10                            | 1.21                               | < 0.97          | < 1.59         | < 0.63         |
| n-Nonane                              |             | < 0.00                           | 0.25                           | < 0.00                            | < 0.49                             | < 0.25          | < 0.49         | < 0.20         |
| n-Octane                              | 611-14-3    | < 0.00                           | < 0.04                         | < 0.02                            | 1.64                               | < 0.57          | < 1.64         | < 0.76         |
| n-Undecane                            | 95-53-4     | T                                | 0.72                           | T                                 | T                                  | 0.24            | 0.72           | 0.34           |
| Octane                                | 95-47-6     | T                                | T                              | 0.04                              | T                                  | 0.01            | 0.04           | 0.02           |
| o-Ethyltoluene                        | 99-87-6     | < 0.01                           | 0.24                           | < 0.01                            | < 0.08                             | < 0.11          | < 0.24         | < 0.10         |
| o-Toluidine                           | 85-01-8     | < 0.07                           | < 0.03                         | 0.02                              | < 0.04                             | < 0.03          | < 0.04         | < 0.01         |
| o-Xylene                              | 108-95-2    | < 0.01                           | 0.21                           | < 0.00                            | < 0.19                             | < 0.13          | < 0.21         | < 0.09         |
| p-Cymene                              | 85-41-6     | < 0.01                           | 0.33                           | < 0.01                            | < 0.08                             | < 0.14          | < 0.33         | < 0.14         |
| Phenanthrene                          | 74-98-6     | 0.21                             | < 0.01                         | 0.02                              | 0.02                               | < 0.02          | < 0.02         | < 0.00         |
| Phenol                                | 129-00-0    | 2.70                             | 0.34                           | < 0.01                            | 0.15                               | < 0.17          | < 0.34         | < 0.13         |
| Phthalimide                           | 00127-18-4  | < 0.26                           | < 0.06                         | 0.37                              | 0.04                               | < 0.15          | < 0.37         | < 0.15         |
| Propane                               | 108-88-3    | 0.03                             | 0.35                           | < 0.00                            | < 0.76                             | < 0.37          | < 0.76         | < 0.31         |
| Pyrene                                | 00075-69-4  | 1.30                             | < 0.09                         | 0.10                              | 0.02                               | < 0.07          | < 0.10         | < 0.03         |
| Tetrachloroethene                     |             | < 0.00                           | 5.30                           | < 0.00                            | < 0.28                             | < 1.86          | < 5.30         | < 2.43         |
| Toluene                               |             | < 0.06                           | 51.22                          | 58.52                             | 1.83                               | 37.19           | 58.52          | 25.18          |
| Trichlorofluoromethane                |             | < 0.00                           | < 0.25                         | 0.03                              | < 0.28                             | < 0.19          | < 0.28         | < 0.11         |
| Trimethyl Cyclohexane Isomer          |             | T                                | T                              | T                                 | 0.59                               | 0.20            | 0.59           | 0.28           |
| Trimethyl Cyclopentane Isomer         |             | T                                | T                              | T                                 | 0.12                               | 0.04            | 0.12           | 0.06           |
| Unknown                               |             | T                                | T                              | T                                 | 1.40                               | 0.47            | 1.40           | 0.66           |
| Total Detected (lb/lb rubber)         |             | 9.54E-06                         | 2.53E-03                       | 1.63E-02                          | 9.43E-03                           |                 |                |                |
| Total with non-detects (lb/lb rubber) |             | < 1.13E-05                       | < 2.63E-03                     | < 1.64E-02                        | < 1.02E-02                         |                 |                |                |

in  
Table 4-12-12

TABLE 4 - 13.F GRINDING UNCONTROLLED METAL SPECIATION FACTORS

|                                        | Retread<br>Buffing<br>% of Total | Belt<br>Grinding<br>% of Total | Carcass<br>Grinding<br>% of Total | Sidewall<br>Grinding<br>% of Total | Mean<br>Inlet % | Total*<br>MAX<br>Inlet % | STD<br>Inlet % |
|----------------------------------------|----------------------------------|--------------------------------|-----------------------------------|------------------------------------|-----------------|--------------------------|----------------|
| Co                                     | 0.01                             |                                |                                   |                                    |                 |                          |                |
| Cr                                     | 0.03                             | 0.01                           | 0.01                              | 0.12                               | 0.05            | 0.12                     | 0.05           |
| Cu                                     |                                  | 0.01                           | 0.03                              | 0.00                               | 0.01            | 0.03                     | 0.01           |
| Mg                                     | 0.42                             | 0.17                           | 2.28                              | 0.97                               | 1.14            | 2.28                     | 0.87           |
| Ni                                     | 0.02                             | 0.04                           | 0.01                              | 0.07                               | 0.04            | 0.07                     | 0.02           |
| Zn                                     | 99.53                            | 99.77                          | 97.65                             | 98.69                              | 98.70           | 99.77                    | 0.86           |
| Cd                                     |                                  | 0.00                           | 0.01                              | 0.01                               | 0.00            | 0.01                     | 0.00           |
| Pb                                     |                                  | 0.01                           | 0.01                              | 0.14                               | 0.05            | 0.14                     | 0.06           |
| Total                                  |                                  | 100.00                         | 100.00                            | 100.00                             |                 |                          |                |
| Total Detected (lb/lb rubber)          |                                  | 4.79E-02                       | 4.79E-02                          | 4.79E-02                           |                 |                          |                |
| Total with non-detected (lb/lb rubber) |                                  | 4.79E-02                       | 4.79E-02                          | < 4.79E-02                         | < 1.14E-01      | 7.97E-01                 | 7.97E-01       |

\* - Retread Buffing not included.

TABLE 4 - 13.G Grinding Uncontrolled Sulfur Speciation Factors

| Compounds                             | CAS Numbers | Retread Buffing % of Total | Belt Grinding % of Total | Carcass Grinding % of Total | Sidewall Grinding % of Total | Total*       |             |             |
|---------------------------------------|-------------|----------------------------|--------------------------|-----------------------------|------------------------------|--------------|-------------|-------------|
|                                       |             |                            |                          |                             |                              | Mean Inlet % | MAX Inlet % | STD Inlet % |
| Carbonyl Sulfide                      | 463-58-1    | <                          | 7.28                     | <                           | 3.65                         | 44.52        | 44.52       | 44.52       |
| Carbon Disulfide                      | 75-15-0     | 92.72                      | 96.35                    | <                           | 15.06                        | 55.48        | 55.48       | 55.48       |
| Total                                 |             | 100.00                     | 100.00                   | 100.00                      | 100.00                       |              |             |             |
| Total Detected (lb/lb rubber)         |             |                            | 2.12E-04                 | 9.99E-06                    | 0.00                         |              |             |             |
| Total with non-detects (lb/lb rubber) |             |                            | < 2.86E-04               | < 2.60E-05                  | < 3.47E-04                   |              |             |             |

\* - Retread Buffing not included

**TABLE 4-13h**  
**SIDEWALL/WHITEWALL GRINDING - CONTROLLED SUMMARY**

| <b>Control<br/>Device<br/>Outlet</b> | <b>Total Metals<br/>(lbs/lb rubber<br/>removed)<br/>with non-detects</b> | <b>Total PM<br/>(lbs/lb rubber<br/>removed)<br/>with non-detects</b> |
|--------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Run 1</b>                         | 6.00E-05                                                                 | 6.69E-03                                                             |
| <b>Run 2</b>                         | 3.66E-04                                                                 | 1.59E-02                                                             |
| <b>Run 3</b>                         | 1.48E-04                                                                 | 7.08E-03                                                             |
| <b>Mean</b>                          | 1.92E-04                                                                 | 9.90E-03                                                             |
| <b>Max.</b>                          | 3.66E-04                                                                 | 1.59E-02                                                             |
| <b>Std. Dev.</b>                     | 1.29E-04                                                                 | 4.25E-03                                                             |

TABLE 4-13i  
CARCASS GRINDING - CONTROLLED SUMMARY

| Control Device Outlet | Total VOCs, as methane (lbs/lb rubber removed) | Total Speciated Semivolatiles (lbs/lb rubber removed) with non-detects | Total Speciated Volatiles (lbs/lb rubber removed) with non-detects | Total Sulfur (lbs/lb rubber removed) with non-detects | Total Metals (lbs/lb rubber removed) with non-detects | Total PM (lbs/lb rubber removed) |
|-----------------------|------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|----------------------------------|
| Run 1                 | 3.24E-04                                       | < 3.59E-05                                                             | < 1.19E-03                                                         | < 1.96E-05                                            | < 6.85E-06                                            | 1.16E-03                         |
| Run 2                 | 4.76E-04                                       | < 4.33E-05                                                             | < 1.34E-03                                                         | < 1.86E-05                                            | < 7.19E-06                                            | 1.16E-03                         |
| Run 3                 | 4.50E-04                                       | < 5.34E-05                                                             | < 6.86E-04                                                         | < 2.10E-05                                            | < 8.71E-06                                            | 1.38E-03                         |
| Mean                  | <sup>to 4</sup><br>4.17E-04                    | < 4.42E-05                                                             | < 1.07E-03                                                         | < 1.97E-05                                            | < 7.58E-06                                            | 1.23E-03                         |
| Max.                  | 4.76E-04                                       | < 5.34E-05                                                             | < 1.34E-03                                                         | < 2.10E-05                                            | < 8.71E-06                                            | 1.38E-03                         |
| Std. Dev.             | 6.64E-05                                       | < 7.17E-06                                                             | < 2.80E-04                                                         | < 9.84E-07                                            | < 8.09E-07                                            | 1.04E-04                         |

TABLE 4-13j *Batch 1E-05*  
RETREAD BUFFING - CONTROLLED SUMMARY

| Control Device Outlet | Total Speciated Semivolatiles (lbs/lb rubber processed) with non-detects | Total Speciated Volatiles (lbs/lb rubber processed) with non-detects | Total Sulfur (lbs/lb rubber processed) with non-detects | Total Metals (lbs/lb rubber processed) with non-detects | Total PM (lbs/lb rubber processed) |
|-----------------------|--------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|------------------------------------|
| Run 1                 | < 5.30E-07                                                               | < 3.63E-06                                                           | < 1.14E-06                                              | < 1.83E-07                                              | 3.57E-05                           |
| Run 2                 | < 8.11E-07                                                               | < 5.17E-07                                                           | < 1.21E-06                                              | < 1.30E-07                                              | 4.62E-05                           |
| Run 3                 | < 7.74E-07                                                               | < 5.64E-08                                                           | < 1.14E-06                                              | < 6.11E-06                                              | 5.57E-04                           |
| Mean                  | < 7.05E-07                                                               | < 1.40E-06                                                           | < 1.16E-06                                              | < 2.14E-06                                              | 2.13E-04                           |
| Max.                  | < 8.11E-07                                                               | < 3.63E-06                                                           | < 1.21E-06                                              | < 6.11E-06                                              | 5.57E-04                           |
| Std. Dev.             | < 1.25E-07                                                               | < 1.59E-06                                                           | < 3.30E-08                                              | < 2.81E-06                                              | 2.43E-04                           |

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TABLE 4-13k *ESP OUTLET*  
BELT GRINDING - CONTROLLED SUMMARY

| ESP<br>Outlet | Total Speciated<br>Semivolatiles<br>(lbs/lb rubber<br>removed)<br>with non-detects | Total Speciated<br>Volatiles<br>(lbs/lb rubber<br>removed)<br>with non-detects | Total Sulfur<br>(lbs/lb rubber<br>removed)<br>with non-detects | Total Metals<br>(lbs/lb rubber<br>removed)<br>with non-detects | Total PM<br>(lbs/lb rubber<br>removed) |
|---------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------|
| Run 1         | < 1.10E-04                                                                         | < 3.27E-03                                                                     | < 3.55E-04                                                     | 5.40E-05                                                       | 4.06E-04                               |
| Run 2         | < 1.24E-04                                                                         | < 4.36E-03                                                                     | < 8.83E-04                                                     | 2.96E-05                                                       | 3.48E-04                               |
| Run 3         | < 1.06E-04                                                                         | < 3.03E-03                                                                     | < 6.83E-04                                                     | 3.03E-05                                                       | 3.61E-04                               |
| Mean          | < 1.13E-04                                                                         | < 3.55E-03                                                                     | < 6.40E-04                                                     | 3.80E-05                                                       | 3.72E-04                               |
| Max.          | < 1.24E-04                                                                         | < 4.36E-03                                                                     | < 8.83E-04                                                     | 5.40E-05                                                       | 4.06E-04                               |
| Std. Dev.     | < 7.72E-06                                                                         | < 5.79E-04                                                                     | < 2.18E-04                                                     | 1.13E-05                                                       | 2.49E-05                               |

*VOC?*

TABLE 4-131  
CONTROL DEVICE EFFICIENCY SUMMARY

| Pollutant Categories (1)               | Retread Buffing |                  | Control Efficiency | Carcass Grinding |                | Control Efficiency |
|----------------------------------------|-----------------|------------------|--------------------|------------------|----------------|--------------------|
|                                        | Inlet           | BAFFHOUSE Outlet |                    | Inlet            | CYCLONE Outlet |                    |
| Total Speciated Semivolatiles (lbs/hr) | 8.62E-03        | 3.30E-03         | 61.7%              | 6.98E-02         | 1.33E-03       | 98.1%              |
| Total Metals (lbs/hr)                  | 6.85E-01        | 1.43E-02         | 97.9%              | 1.64E+00         | 8.34E-04       | 99.9%              |
| Total Particulate Matter (lbs/hr)      | 6.80E+01        | 1.43E+00         | 97.9% ✓            | 6.33E+00         | 1.42E-01       | 97.8% ✓            |

| Pollutant Categories (1)               | Sidewall/Whitewall Grinding |                | Control Efficiency | Belt Grinding |                   | Control Efficiency |
|----------------------------------------|-----------------------------|----------------|--------------------|---------------|-------------------|--------------------|
|                                        | Inlet                       | CYCLONE Outlet |                    | Cyclone-Inlet | Cyclone/ESP-Inlet |                    |
| Total Speciated Semivolatiles (lbs/hr) | NA                          | NA             | NA                 | 9.76E-03      |                   | 70.6%              |
| Total Metals (lbs/hr)                  | 2.71E-01                    | 2.49E-03       | 99.1%              | 2.96E+00      | 5.57E-03          | 99.9%              |
| Total Particulate Matter (lbs/hr)      | 1.61E+00                    | 1.30E-01       | 91.9% ✓            | 7.33E+01      | 7.46E-01          | 100.0%             |

98.98% 96.91% 99.97%  
100%

(1) - Inlet and outlet values shown are for detected analytes only.

Table 4-14. Effects of Processing Temperature on Emissions

| Total VOC (lb/lb Rubber) |                                     |                         |                                     |                         |                                 |                           |                           |
|--------------------------|-------------------------------------|-------------------------|-------------------------------------|-------------------------|---------------------------------|---------------------------|---------------------------|
| Compound #               | Mixer<br>(220-240°F) <sup>(1)</sup> | Extruder<br>(250-275°F) | Autoclave<br>(340°F)                | Platen Press<br>(340°F) | Hot Air<br>Oven Cure<br>(400°F) | Warmup<br>Mill<br>(200°F) | Calendering<br>(265°F)    |
| 2                        | 3.86E-05                            | --                      | --                                  | 1.51E-04                | --                              | 1.1E-04                   | 5.31E-05 <sup>(3)</sup>   |
| 3                        | 1.37E-04                            | --                      | --                                  | 3.77E-04                | --                              | 1.12E-04                  | --                        |
| 4                        | 3.86E-05                            | 8.35E-06                | 1.61E-04                            | --                      | --                              | 8.4E-05                   | --                        |
| 5                        | 2.15E-04                            | --                      | 1.78E-04                            | 5.56E-04 <sup>(3)</sup> | 3.10E-04                        | --                        | --                        |
| 6                        | 3.96E-05                            | 1.76E-05                | 1.33E-04                            | --                      | --                              | --                        | --                        |
| 8                        | --                                  | --                      | --                                  | --                      | 2.26E-04                        | --                        | --                        |
| 9                        | 2.84E-05                            | 1.73E-05                | 3.61E-04<br>1.63E-04 <sup>(2)</sup> | 1.68E-03                | --                              | --                        | --                        |
| 11                       | 3.22E-05                            | --                      | 9.32E-05                            | 2.35E-04 <sup>(3)</sup> | --                              | --                        | --                        |
| 12                       | 1.59E-05                            | --                      | --                                  | 2.53E-04                | --                              | 1.71E-06 <sup>(3,4)</sup> | 4.67E-06 <sup>(3,4)</sup> |
| 22                       | 1.23E-04                            | 1.24E-05                | 1.11E-04                            | 4.68E-04                | 1.12E-04                        | --                        | --                        |

<sup>(1)</sup> Also included mixer non-productive runs which averaged approximately 335°F<sup>(2)</sup> Extruded EPDM<sup>(3)</sup> Avg. of 3 runs<sup>(4)</sup> Warmup Mill 2 (175°F) and Calender 2 (180-200°F)

↑  
more platen  
press was  
done?

6/28/95 says #1  
4/12/95. 4402

## SECTION 5

### EMISSION FACTOR APPLICATION

Application of the emissions and speciation factors presented in Section 4 will vary depending on several source specific factors. These include the number and types of products manufactured at the facility, the facility's status with respect to Title V, the operational flexibility required by the source, the recordkeeping and reporting systems in place at the facility, and whether or not the emission factor becomes critical in determining applicability to various regulations (E.G., Title V, Title III, RACT, or enhanced monitoring). The user should be cautioned however to consider all factors when choosing an emission factor as the facility will be required to demonstrate compliance based on the chosen emission factor.

The emission factors (lbs of pollutant emitted/lb rubber) for total organics (regulated as VOCs), total sulfur, total metals, total particulate, and amines are presented on a per rubber compound and per process basis. For the speciated components, weight percentages have been provided on a process and rubber compound specific basis. Additionally, emission and speciation factor means, maxima and standard deviations for each process have also been calculated for all rubber compounds and specialty groupings (e.g., engineered products and tire manufacturing).

Facilities which process several different rubber compounds may use the mean or the maximum for a particular process or grouping to simplify the emissions inventory process. The user is cautioned however, that if a mean emission factor is used and rubbers yielding higher emissions are the primary compounds processed, a situation of noncompliance may result. In that particular case, the maximum emission factor would be recommended. In general, use of the maximum emission factor value will result in the maximum operational flexibility of the facility.

For facilities which process only a few rubber compounds, the compound-specific factors could be used. For processes where not all compounds have been represented, the user will need to determine on a case by case basis whether the mean or the maximum value would be more representative of the compounds processed at the facility.

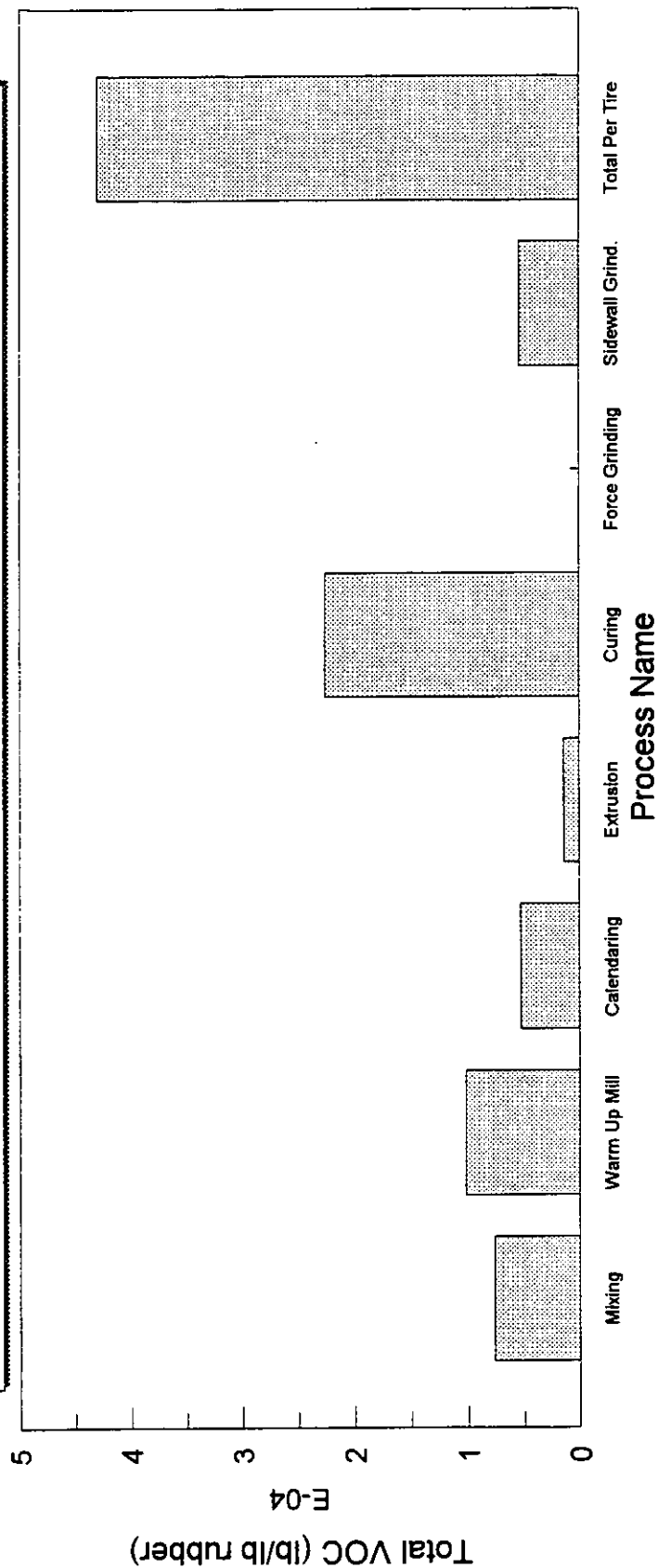
To calculate emissions using the emission factors presented, the user should simply select the most appropriate factor, based on the facility-specific characterization and needs. The emission factor (lb/lb rubber) would then be multiplied by the amount of rubber processed. To calculate species emissions, the emissions for a given pollutant category (e.g., volatiles) would be multiplied by the speciation factor for the desired compound (e.g., butanol). In cases where emissions for a specific chemical compound are required, the user may obtain a species-specific-emission-factor (lb/lb rubber) from Volume 2 of the report series.

When applying the factors generated in this project, it must be understood that the relative contribution of each process must be accounted for. For instance, the application of these factors to tire production must take into account the percentage of compound by weight in the tire and the ratio of calendered versus extruded components. Assuming the ratio of 30% calendered, 55% extruded and the remainder non-rubber components, greater than 70% of

VOC emissions (exclusive of adhesive application) are associated with the curing step and the remainder with the mixing, milling, calendering and grinding steps. An illustration of this is shown graphically in Figure 5-1.

For belt manufacturing an engineered rubber product, more than 75% of VOC emissions are attributable to the grinding process. Again, this illustration is exclusive of any adhesive application steps. Figure 5-2 provides a graphic presentation of this example.

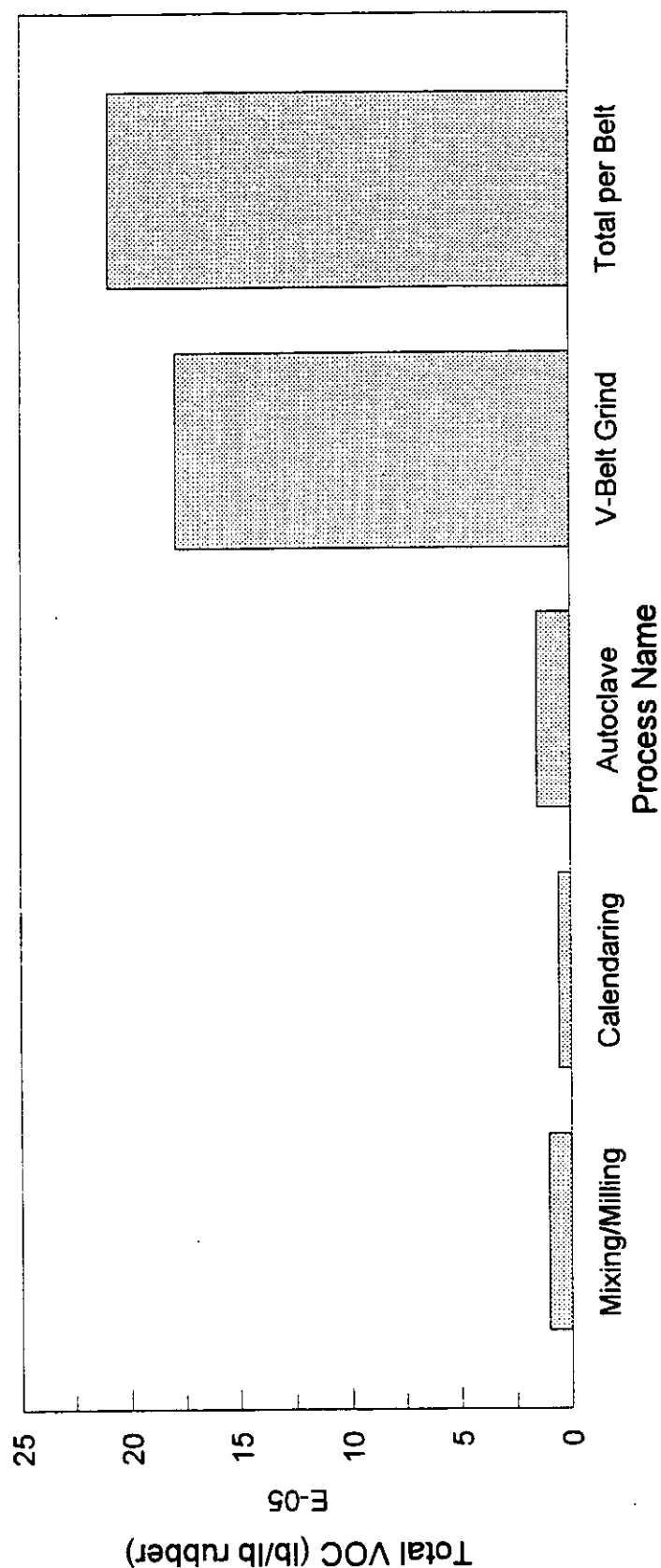
Figure 5-1. Application Approach - Tire Manufacturing



This is to demonstrate for an example plant how the emission factor data may be used to prepare an emissions inventory. This example does not include emissions from adhesive application and uncured tire spraying operations.

Assume average 20 pounds per tire at 85 percent rubber (17 pounds rubber per tire). Assume 25 percent of rubber is calendered and 60 percent of rubber is extruded. Total VOC per tire is 7.31E-03 pounds per tire. Sidewall Grinding emissions factor is pounds VOC per pound of rubber removed (average 0.067 pounds removed per tire).

Figure 5-2 - Application Approach - Belt Manufacturing



This is to demonstrate for an example plant how the emission factor data may be used to prepare an emissions inventory. This example does not include emissions from adhesive application and uncured tire spraying operations.

Total VOC per belt is 2.03E-03 pounds per pound. V-Belt Grinding emission factor is pounds VOC per pound of rubber removed.

## SECTION 6

### CONCLUSIONS AND RECOMMENDATIONS

The results of this study demonstrate the wide variety of HAPs emanating from the various processes used to manufacture rubber products. For tire manufacturing, the majority of organic pollutants are generated by the curing process. For belt manufacturing, the predominant emission source is the grinding operation. Figures 5-1 and 5-2 in the preceding section are illustrative examples for tire and engineered products manufacturing.

Several key conclusions can be drawn from the data. It should be noted that these conclusions are empirically based but nonetheless will aid the facility owner in applying the data.

- It appears that compounds with low accelerator contents inhibit the release of sulfur compounds during the various heating processes within the plant. This conclusion is based on the fact that Compound No. 2, which contains the highest amount of sulfur compound and one of the lowest accelerator content, exhibited minimal sulfur emissions during testing.
- Compounds containing carbon black had lower VOC emissions than compounds not containing carbon black. All compounds in the mixing tests contained carbon black with the exception of one compound. A comparison of Compounds 8 and 10 illustrates this conclusion. Both compounds are similar except for the carbon black component. VOC emissions are on the order of 8-10 times higher for the non-carbon black compound.
- Solution based polymers appear to release lower amounts of VOC during the mixing process when compared to emulsion and oil extended polymers. Data from Compounds 24, 25, and 26 illustrate this conclusion.
- Elevated temperatures result in the release of more VOC. When comparing compounds exposed to 220°F temperatures versus those at 340°F, VOC emissions are generally higher by about an order of magnitude. Compounds cured at the same temperatures in the autoclave and platen press exhibit VOC emissions one-half to an order of magnitude higher for the platen process.

## SECTION 7 REFERENCES

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