TRC

July 20, 1999

Rubber Manufacturers Association
1400 K Street, NW
Washington, D.C. 20005

Attention: Ms. Tracey Norberg

Subject: RMA Program Data

Dear Tracey,

Regarding the outstanding questions from the meeting in June, they have been resolved and are explained below.

1. *Question regarding the source of the volatiles data (toluene as an example) shown in Table B.1-3 of Volume 2 and in the subsequent database and emission factors.*

The volatiles results are based on two analytical approaches in order to obtain the comprehensive volatiles list required by RMA. These approaches are referred to as TO-14 and Ozone Precursors and employ slightly different analytical methodologies. Both approaches utilized the whole air samples from the SUMMA canisters collected during each test run (per rubber compound).

Briefly, the TO-14 method uses gas chromatography/mass spectrometry (GC/MS) with cryogenic concentration to determine the volatile compounds of interest. In addition to the TO-14 volatiles list, tentatively identified compounds (TICs) were also identified. Ozone precursor volatiles were determined using GC/FID with purge and trap. The results from these analytical approaches are reported in essentially three separate lists: TO-14 volatiles, TO-14 volatile TICs, and ozone precursors.

The TO-14 results were reported by the lab in concentration units of $\mu g/m^3$, while the ozone precursor data are reported as ppbC (as carbon). To add to the intricacy of handling this data, there were several volatile compounds reported on both analyte lists or as TICs (toluene, o-xylene, and propane are examples). As one of the goals of the emission factor development program was to present a comprehensive list of factors for volatiles, the analytical lists had to be combined with no duplication of compounds. The data reduction procedure is best described in a stepwise fashion.

- Convert all analytical data to units of $\mu g/m^3$. This only had to be done for the ozone precursor data and is accomplished by converting ppbC to ppb(compound) to $\mu g/m^3$. An example is given for toluene, Mixer 2 data, Run 1, on which the emission factor is based. (This is also the example we sought to explain in the meeting.)

- Detected: 260 ppbC of toluene (taken from the ozone precursor analytical report). Convert to ppb toluene by dividing by the number of carbons per molecule of toluene (7 carbons). $260 \div 7 = 37.1$ ppb toluene.

- Convert to $\mu g/m^3$ by multiplying by toluene's molecular weight (92.14) and dividing by 24.04. $37.1 \times 92.14 \div 24.04 = 142.36$ $\mu g/m^3$. This is the concentration shown in the tables and throughout the subsequent iterations.

TRC Environmental Corporation
Boott Mills South, Foot of John Street • Lowell, Massachusetts 01852
Telephone 978-970-5600 • Fax 978-453-1995

- Combine the concentration data for the TO-14, TICs, and ozone precursor analyte lists and sort by volatile compound.

- Further data reduction to pounds per hour and pounds emitted per pound of rubber processed then proceeds using a gas flow rate of 22 dscfm and a rubber processing rate of 7.11 lbs rubber per hour. The final emission factor of 1.65×10^{-6} lbs emitted per lb of rubber processed is obtained.

  My confusion in the meeting was which list the toluene concentration was taken from, and how the conversion to $\mu g/m^3$ was achieved. As noted above, this particular data was taken from the ozone precursor list. In the early versions of Volume 2, the volatile compounds are tagged and footnoted as to the applicable source list.

Incidentally, I did not find any evidence of blank or background concentration corrections being made to the data. Therefore, all reported concentrations are "as analyzed" and are not reduced by blank-corrections. As discussed in the meeting and over the past few years, the methylene chloride concentrations from the mixing data is suspected to be due to background concentrations.

2. *Missing Large and Small Banbury Mixer data (Farrell) and Mixer Control Device data (Dunlop - Torit fabric filter).*

The single box containing all data associated with Large and Small Mixer 1 from the Farrell facility, and the Torit Control Device from the Dunlop facility was located in our warehouse. All data is intact and available for review, if EPA deems it necessary. Please note that the large and small mixers at Farrell were tested on only three rubber compounds (EPDM, sidewall, and SBR) to establish a correllation between the large and small units, prior to embarking on testing the full complement of compounds on the small mixer at Goodrich. Only the data from the Goodrich mixer (Mixer No. 2) was used in developing the RMA emission factors.

I hope this clarifies the questions brought up in the meeting. If you require additional information, please do not hesitate to contact me at (978) 656-3543. It was a pleasure meeting you and I look forward to future opportunities to work with RMA.

Sincerely,

Mark S. Gollands
Project Manager

cc: Ed Peduto

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MICHELIN NORTH AMERICA, INC.
Post Office Box 2846
Greenville, South Carolina 29602

May 21, 1998

Mr. Mike Landis, Air Quality Director
North Carolina Department of Environment,
Health, and Natural Resources
Mooresville Regional Office
919 North Main Street
Mooresville, NC 28115

Re: Grinding Operations Emission Factors (Carcass)
Draft AP42 - Rubber Industry

Dear Mr. Mike Landis:

The development of emission factors for the rubber industry was a very intensive project that was undertaken by the Rubber Manufacturer Association (RMA) at a cost of over $1.5 million dollars. The emission factor testing program was setup to minimize the chance of error by isolating process equipment to be tested with enclosures, as well as having quality assurance/quality control procedures that conformed with EPA recommendations. However, with the immense size of this project (over 30,000 pages of data) some error did occur whether due to testing error or due to transcribing of the information. The RMA has tried to review the emission factors for each rubber process for obvious error, but some do not become apparent until the emission factors are used. This is the case for the emission factors for toluene and methylene chloride in the tire carcass grinding operation.

Chemical	Carcass Grinding (lb/lb)	Curing Press (lb/lb)	Autoclaving (lb/lb)	Extruding (lb/lb)
Toluene	9.59E-03	2.22E-05	1.03E-05	9.26E-06
Methylene Chloride	4.19E-03	6.41E-06	9.11E-05	1.32E-05
Total VOCs (method 25A read as methane)	5.21E-04	2.90E-04	1.56E-04	1.23E-05

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As the above data chart indicates the toluene and the methylene chloride emission factors for the tire carcass grinding operation are much higher than the other tire re-tread operation emission factors. In fact, the carcass grinding emission factor for toluene is 400 to 1000 times higher, while the carcass grinding emission factor for methylene chloride is 50 to 700 times higher. This error becomes more obvious when you consider that during the emission testing it took 5 to 6 minutes to grind a tire at ambient temperature, while the tire curing presses were operated at 330F to 355F and took 10 to 15 minutes to cure a tire. Thus, the greatest chance of toluene or methylene chloride being off-gassed would be during the tire curing press operation rather than the tire carcasses grinding operation. Additionally, toluene is 3 times higher and methylene chloride is 8 times higher than the total VOCs measured during the emission tests of the tire carcass grinding operation.

As all the above information indicates, there is an obvious error in the toluene and methylene chloride emission factor for the tire carcasses grinding operation. To be conservative until the source of the error can be tracked down, the total VOC emission factor as indicated by test method 25A results will be used as the emission factor for permitting purposes.

Chemical	Tire Carcass Grinding Emission Factor (lb/lb)	
Total VOCs	5.21E-04	(method 25A read as methane)
Toluene	3.65E-03	(method 25A reading x 7 to adjusted for 100% Toluene)
Methylene Chloride	5.47E-04	(method 25A reading x 1.05 to adjust for 100% methylene chloride)

If you have any questions or need additional information, please contact me at (864)458-1353 (phone) or (864)458-0782 (fax).

Sincerely,

Dave E. Clark
Environmental Engineer

☐ FAX COVER SHEET ☐ MEMORANDUM

Dave Clark
Michelin North America, Inc.
Environmental Department
GE/US0
P.O. Box 2846
Greenville, SC 29502-9001

FROM: PHONE: (864) 458-1353 FAX: (864) 458-0782

TO: Ron Ryan COMPANY: EPA

DEPT: EFIG FAX NUMBER: (919) 541-0684

DATE: _____ TIME: _____ TOTAL NO. OF PAGES 3

REFERENCE: This attachment explains some of the issues for toluene & methylene chloride associated w/ tire carcass grinding emission factors for N.C. This franchise shop agreed to production limits to stay under the applicability threshholds based on using the erroneous draft AP42 factors. The permit was left that we would re-test for the emission factors and update the RMA emission factors based on the findings. Thank you for your help in this matter.

Dave Clark

DISTRIBUTION: _____

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September 7, 1999

Mr. Ronald Ryan
U.S. Environmental Protection Agency
Emissions, Monitoring and Analysis Division
Emission Factors & Inventory Group
(MD-14)
Research Triangle Park, NC 27711

Re: Draft AP42 - Rubber Manufacturing Industry
(1) Data Review Update
(2) Tire Carcass Grinding Update

Dear Ron:

First, I want to thank you for taking the time to review the files from the RMA Emission Factor Study at TRC Corporation in June 1999. I hope the meeting gave you a greater comfort level with the RMA project, and will facilitate finalization of the AP-42 section for rubber processing. Enclosed you will find a letter from Mark Gollands at TRC, which answers the outstanding question we had about treatment of volatiles results that were detected by more than one analytical approach. I can be of further help, please call.

Tire Carcass Grinding Update

As I described in my January 12, 1999 letter, Michelin North America recently conducted additional emissions testing on tire grinding operations to update the emission factors for toluene and methylene chloride. As anticipated, the results showed the emissions of methylene chloride and toluene to be much lower than previously reported in the RMA Emission Factor Study. This data supports RMA's view that the original data were the result of laboratory contamination. Enclosed for your review is the sampling report from Trigon Engineering, which details the Michelin testing.

Accordingly, the EPA AP-42 emission factors carcass grinding operations for methylene chloride and toluene should be revised immediately as follows:

Methylene Chloride revised emission factor: 2.5E-07 lb emission/lb rubber removed

Toluene revised emission factor: 6.3E-06 lb emission/lb rubber removed

Also, you and I had discussed the tire carcass grinding data currently reflected in AP-42. Since our discussion, I have been able to verify that all of the data currently in AP-42 does correspond to the cyclone inlet data. The Volume 2 factors (average inlet factors) that are not consistent with the present AP-42 factors are a result of the L/2 method that RMA eventually used to treat the non-detects for averaging purposes. This ~~is~~ modification is consistent with the treatment of averaging in all emission factors across the various manufacturing processes tested. RMA members currently are considering whether inlet or outlet concentrations are more appropriate representations in this situation, and I expect to discuss this with you further in the coming weeks.

I look forward to receiving your draft AP-42 section narrative for our review. Finalization of the AP-42 section for the rubber processing industry is of paramount importance to RMA's members. The emission factors are indispensible tools used for many permitting and reporting purposes nationwide. Likewise, I am interested to see the factors in Excel format available on the Internet. This format will allow for easier and more efficient use of the factors. If you have any questions or need additional information, please contact me at (202)682-4839 (phone), (202)682-4854 (fax) or tracey@rma.org (e-mail).

Sincerely,

Tracey J. Norberg
Director, Environmental Affairs

Enclosures

	original RMA at:	Revised
MC	4.19e-3	2.5e-7
Toluene	9.59e-3	6.3e-6
lbs/lb rubber removed		lbs/lb rubber removed

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January 26, 1999

Ron Ryan
U.S. Environmental Protection Agency
(MD-14)
Research Triangle Park, NC 27711

Re: Grinding Operations Emission Factors (Carcass)
Draft AP42 - Rubber Manufacturing Industry

Dear Ron:

As previously discussed, we have found an obvious error in the emission factors for toluene and methylene chloride listed under the tire carcass grinding operation. The emission factors are several orders of magnitude higher than has been seen for the other rubber processing operations that operated at higher temperatures and for longer duration. Based on research, we feel this testing error occurred due to laboratory contamination. Toluene and methylene chloride are laboratory solvents that are commonly used for chemical extractions, chemical petitions, and for sampling media cleaning. Contamination errors due to these solvents are not uncommon based on discussions with other air testing companies. To rectify the emission factors a RMA member company, Michelin North America Inc. (Michelin), proposes to re-test the tire carcass grinding operation on 28 January 1999 for total VOCs, toluene, and methylene chloride. As we have previously offered, we welcome you or any of your EPA staff to witness the emission tests at Michelin's Retread Technology Facility located in Duncan, South Carolina. This facility was the site of the previous tire carcasses grinding emissions testing used in developing the draft AP42 emission factors. Michelin has contracted with Trigon Engineering Consultants, Inc. to perform the emissions testing. A copy of testing protocol is being forwarded to you from Trigon. The tire grinding operation is a mechanical process that physically grinds off the old tire tread using a rotating rasp. The emission testing will be performed using EPA approved test methods as summarized in the below listed table:

Test Method	Comment
Method 1	Location of sampling port, number of traverse points, and presence or absence of cyclonic flow
Method 2	Determination of velocity and volumetric flows
Method 3	Determination of dry molecular weight of pollutant gas stream
Method 4	Moisture content of emission source
Method 25A	Total gaseous organic(s) as carbon (will also be used to estimated the approximate organic concentrations to determine the Method 30 run time)
Method 30	Toluene and methylene chloride sampling system
Method 8240	Determination of toluene and methylene chloride compounds (gas chromatography/mass spectrometry)

To make the testing results universally acceptable, tire carcasses grinding will be performed on a cross section of the RMA members' used truck tire carcasses. The laboratory contracted to perform the Method 30 (VOST) is Triangle Laboratories of RTP, Inc. Based on discussions, Triangle Laboratories has initiated procedures to insure that there is no cross contamination caused by solvents being used in other testing procedures. The primary procedure is to perform all testing using either toluene or methylene chloride solvents in a laboratory that is physically separated from the laboratory that performs the Method 8240 gas chromatography/mass spectrometry.

We appreciate the EPA taking a central role in the re-testing and re-issuance of these emission factors. Since these are draft AP42 emission factors, there is some reluctance on the part of the states to perform testing that will change the emission factors for the whole rubber manufacturing industry. There is also concern by the RMA that the testing approved by South Carolina for a particular retread vendor would not necessarily be readily accepted by other states for a competing vendor since the draft AP42 emission factor would contradict the test results.

Upon completion of this emission factor update, all the relevant information will be sent to the EPA for review including the test report, process information, and example emission factor calculations. If you have any questions or need additional information, please contact me at (202)682-4839 (phone) or (202)682-4854 (fax).

Sincerely,

Tracey J. Norberg
Director, Environmental Affairs

Emission Factor and Inventory Group
Emissions Monitoring and Analysis Division (MD-14)
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency
Research Triangle Park, NC 27711
FAX Number: (919) 541-0684

FAX TRANSMISSION

Date: 12-15-99

To:

NAME	PHONE NUMBER
Fred G. Troppe	330-375-1900
COMPANY/OFFICE	FAX NUMBER
	330-375-1904

From:

NAME	PHONE NUMBER
Ron Ryan	919-541-4330

COMMENTS:

Fred,

You will need to access the info on our web page in order to assess what it is that you really need, & to see the full range of info & caveats that go with it. I ~~cannot~~ should not be selecting only pieces of the information for you.

Number of Pages (including cover sheet): 1

If you did not receive all the pages, please contact the following person:

Name: _____ **Phone Number:** _____

The Office of Fred G. Troppe, P.E.
T. Environmental Consulting
(330) 375-1900

The Nantucket Building
23 South Main Street
Akron, OH 44308
Suite 402

→ Repeat Dec. 2nd

Date: Nov. 26, 1999 Fax#(919)541-0684 Phone#

To: Ron Ryan Company: USEPA - RTP

From: Fred Troppe Re: Emissions Factors

If a transmission problem exist, i.e. you don't receive 2 page (s) with cover sheet please call (330) 375-1900

If you receive this transmission mistakenly, please contact our office at this number, for the information contained herein may be considered intellectual property and/or may be considered confidential or germane to legal proceedings. Your cooperation is both anticipated and appreciated.

Dear Mr. Ryan

Reid EFs for calendaring only; need Mixing, Milling & Grinding

? Are all EFs to characterize VOCs, HAPs only? or are there any new data regarding particulates, or PM_{10}, etc. for any of the above unit process operations?

Appreciately greatly any help!

Fred

P.S. My fax # is (330) 375-1904

included as part of the draft AP-42 section and the ZIP file is provided below.

27 EF Tables (See list below)

25 WPD files (as posted 12-17-97) with the same names as those supplied by RMA and transmitted to requestors, plus 2 .XLS files (replacing 6 .WPD files for calendering and tire curing, 6-8-99). In addition to Table and page numbers being added, all efs previously shown as "0.00e+00" now show as "<", indicating less than detection limit, and the first ef line of each table, previously labeled "Total VOC", has been relabeled "Total Method 25A Organics", because these numbers appear to be M25A results, rather than a summation of all GC-speciated organics which are not exempted from EPA's definition of "VOC".

MIX1.WPD	1 - 6	Table 4.12-4 Internal Mixing & Milling
MIX2.WPD	7 - 12	
MIX3.WPD	13 - 18	
MIX4.WPD	19 - 23	
MILLING1.WPD	1 - 6	Table 4.12-5 Milling
MILLING2.WPD	7 - 13	
MILLING3.WPD	14 - 19	
MILLING4.WPD	20 - 23	
EXTRUD1.WPD	1 - 6	Table 4.12-6 Extruder
EXTRUD2.WPD	7 - 12	
EXTRUD3.WPD	13 - 18	
EXTRUD4.WPD	19 - 23	
CAL_5_99.XLS	1 - 23	Table 4.12-7 Calender
PLATEN1.WPD	1 - 6	Table 4.12-8 Platen Press Curing
PLATEN2.WPD	7 - 12	
PLATEN3.WPD	13 - 18	
PLATEN4.WPD	19 - 23	
AUTOCLV1.WPD	1 - 6	Table 4.12-9 Autoclave Curing
AUTOCLV2.WPD	7 - 12	
AUTOCLV3.WPD	13 - 18	
AUTOCLV4.WPD	19 - 23	
HOTAIR1.WPD	1 - 6	Table 4.12-10 Hot Air Cure
HOTAIR2.WPD	7 - 12	
HOTAIR3.WPD	13 - 18	
HOTAIR4.WPD	19 - 23	
TIR_5_99.XLS A - I		Table 4.12-11 TireCure
GRIND.WPD		Table 4.12-12 Grinding Operations

Rec'd truncated data, i.e. cut-off @ Acetophenone, & no more ..... Summaries of VOC, HAPs, may be adequate

Attn: Ron Ryan fax (919) 541-0684

Could you provide emission factors for the above "#" as to "VOC" & "particulates" as we are not able to access these files of the Draft Document. Thank

FRED G. TROPPE
(330) 375-1900 fone
375-1904 fax

included as part of the draft AP-42 section and the ZIP file is provided below.

27 EF Tables (See list below)

25 WPD files (as posted 12-17-97) with the same names as those supplied by RMA and transmitted to requestors, plus 2 .XLS files (replacing 6 .WPD files for calendering and tire curing, 6-8-99). In addition to Table and page numbers being added, all efs previously shown as "0.00e+00" now show as "<", indicating less than detection limit, and the first ef line of each table, previously labeled "Total VOC", has been relabeled "Total Method 25A Organics", because these numbers appear to be M25A results, rather than a summation of all GC-speciated organics which are not exempted from EPA's definition of "VOC".

MIX1.WPD	1 - 6	Table 4.12-4 Internal Mixing & Milling ← 4 pgs
MIX2.WPD	7 - 12	
MIX3.WPD	13 - 18	
MIX4.WPD	19 - 23	
MILLING1.WPD	1 - 6	Table 4.12-5 Milling ← 4 pgs
MILLING2.WPD	7 - 13	
MILLING3.WPD	14 - 19	
MILLING4.WPD	20 - 23	
EXTRUD1.WPD	1 - 6	Table 4.12-6 Extruder
EXTRUD2.WPD	7 - 12	
EXTRUD3.WPD	13 - 18	
EXTRUD4.WPD	19 - 23	
CAL_5_99.XLS	1 - 23	Table 4.12-7 Calender ← 3 pgs
PLATEN1.WPD	1 - 6	Table 4.12-8 Platen Press Curing
PLATEN2.WPD	7 - 12	
PLATEN3.WPD	13 - 18	
PLATEN4.WPD	19 - 23	
AUTOCLV1.WPD	1 - 6	Table 4.12-9 Autoclave Curing
AUTOCLV2.WPD	7 - 12	
AUTOCLV3.WPD	13 - 18	
AUTOCLV4.WPD	19 - 23	
HOTAIR1.WPD	1 - 6	Table 4.12-10 Hot Air Cure
HOTAIR2.WPD	7 - 12	
HOTAIR3.WPD	13 - 18	
HOTAIR4.WPD	19 - 23	
TIR_5_99.XLS A - I		Table 4.12-11 TireCure
GRIND.WPD		Table 4.12-12 Grinding Operations ← 1 pg, under review

9th: Ron Ryan fax (919) 541-0684

Could you provide emission factors for the above" ← 4 as to "VOC" & "particulates" as we are not able to access these files of the Draft Document. Thank

FRED G. TROPPE
(330) 375-1900 fone
375-1904 fax

****
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Emission Factor and Inventory Group
Emissions Monitoring and Analysis Division (MD-14)
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency
Research Triangle Park, NC 27711
FAX Number: (919) 541-0684

FAX TRANSMISSION

Date: 11-18-99

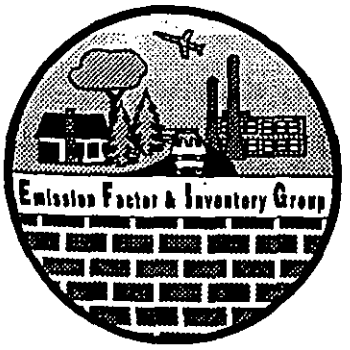
To:

NAME	PHONE NUMBER
Fred G. Troppe	330-375-1900
COMPANY/OFFICE	**FAX NUMBER**
	330-375-1904

From:

NAME	PHONE NUMBER
Ron Ryan	

COMMENTS:



Emission Factor and Inventory Group
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From:

NAME	PHONE NUMBER
Ron Ryan	

COMMENTS:

Number of Pages (including cover sheet): 13

If you did not receive all the pages, please contact the following person:

Name: _____ **Phone Number:** _____

4.12-7. Calender Emission Factors

(All EFs in Lbs/Lb Rubber Processed)

Analyte Name	CAS #	Cmpd #1	Cmpd #2	Cmpd #3	Cmpd #4	Cmpd #5	Cmpd #6	Cmpd #7	Cmpd #8
Total Method 25A Organics		5.33E-05	5.59E-05	1.17E-04	3.35E-05	1.86E-04	3.34E-05	1.05E-04	1.27E-05
Total Speciated Organics		3.68E-05	7.66E-05	6.47E-05	3.85E-05	4.48E-05	7.14E-05	6.45E-05	5.35E-05
Total Organic HAPs		1.52E-05	1.27E-05	4.28E-05	1.84E-05	3.03E-05	3.53E-05	3.04E-05	4.05E-05
Total Other HAPs									
Acetaldehyde	75-07-0	5.04E-07	<	<	<		<	<	<
Acetaldehyde + Isobutane						4.44E-07			
Acetonitrile	75-05-8	<	<	<	<	<	<	<	<
Acetophenone	98-86-2	1.68E-06	4.94E-07	3.72E-08	2.72E-09	1.34E-08	5.56E-08	8.95E-08	9.35E-09

4.12-7. Calender Emission Factors

(All EFs in Lbs/Lb Rubber Processed)

Analyte Name	CAS #	Cmpd #9	Cmpd #10	Cmpd #11	Cmpd #12	Cmpd #13	Cmpd #14	Cmpd #15	Cmpd #16
Total Method 25A Organics		2.52E-05	2.52E-04	2.84E-05	**4.62E-06**	1.97E-04	1.98E-04	8.12E-06	7.06E-05
Total Speciated Organics		4.16E-05	2.04E-04	2.55E-05	**4.47E-06**	1.11E-04	1.10E-04	4.44E-05	2.20E-05
Total Organic HAPs		1.11E-05	8.70E-05	8.28E-06	**2.81E-06**	1.16E-05	3.07E-05	4.03E-05	3.41E-06
Total Other HAPs									
Acetaldehyde	75-07-0	<	<	<	<	<	<	3.71E-07	<
Acetaldehyde + Isobutane									
Acetonitrile	75-05-8	<	<	<	<	<	<	<	<
Acetophenone	98-86-2	1.07E-06	6.14E-08	1.66E-07	**1.17E-09**	3.78E-08	1.23E-08	7.97E-09	8.03E-09

4.12-7. Calender Emission Factors

(All EFs in Lbs/Lb Rubber Processed)

Analyte Name	CAS #	Cmpd #17	Cmpd #18	Cmpd #19	Cmpd #20	Cmpd #21	Cmpd #22	Cmpd #23
Total Method 25A Organics		3.84E-04	5.62E-05	2.39E-05	6.50E-06	1.35E-04	1.06E-04	2.65E-05
Total Speciated Organics		2.17E-04	8.90E-05	1.44E-05	1.00E-05	9.71E-05	6.07E-05	2.57E-05
Total Organic HAPs		1.02E-04	3.38E-05	2.67E-06	4.83E-06	8.17E-06	2.16E-05	2.15E-05
Total Other HAPs								
Acetaldehyde	75-07-0	<	<	<	<	<	<	<
Acetaldehyde + Isobutane								
Acetonitrile	75-05-8	<	<	3.36E-07	<	<	<	<
Acetophenone	98-86-2	1.05E-08	4.15E-08	1.80E-08	1.16E-07	1.27E-08	2.12E-08	6.54E-09

4.12-12. Grinding Operations

Emission Factors

(EFs in Lbs/Lb Rubber Removed, except Retread Buffing in Lbs/Lb Rubber Processed)

Analyte Name	CAS #	Belt Grinding	Retread Carcass Grinding	Retread Buffing *	Sidewall/ Whitewall Grinding
Total Method 25A Organics		1.78E-03	5.21E-04	2.43E-04	1.59E-02
Total Speciated Organics (not shown)		2.66E-03	2.54E-03	6.36E-04	1.10E-02
Total Organic HAPs (below)		2.15E-03	1.37E-04	1.33E-05	1.12E-03
Total Metal HAPs (below)		1.34E-05	6.35E-06	6.44E-08	3.72E-05
Total HAPs = sum of above		2.17E-03	1.43E-04	1.33E-05	1.16E-03
Total Particulate Matter		2.26E-04	5.45E-01	9.09E-07	1.96E-04
Acetaldehyde	75-07-0	1.53E-05	<	<	<
Acetonitrile	75-05-8	<	<	<	<
Acetophenone	98-86-2	1.77E-05	7.13E-07	1.89E-08	3.37E-06
Acrolein	107-02-8	6.44E-06	1.68E-06	4.70E-07	<
Acrylonitrile	107-13-1	<	<	<	<
Allyl chloride	107-05-1	<	<	<	<
4-Aminobiphenyl	92-67-1	<	<	<	<
Aniline	62-53-3	<	1.97E-05	6.66E-08	4.05E-04
o-Anisidine	90-04-0	<	<	<	<
Benzene	71-43-2	<	4.13E-06	9.96E-06	1.33E-05
Benzidine	92-87-5	<	<	<	<
Benzotrichloride	98-07-7	<	<	<	<
Benzyl chloride	100-44-7	<	<	<	<
Biphenyl	92-52-4	<	<	6.63E-09	<
Bis(2-Ethylhexyl)phthalate	117-81-7	5.30E-05	7.94E-06	1.99E-08	2.76E-05
Bromoform	75-25-2	<	<	<	<
1,3-Butadiene	106-99-0	2.41E-05	2.65E-05	4.39E-08	2.40E-05
Carbon disulfide	75-15-0	3.03E-04	2.58E-06	6.77E-07	1.90E-05
Carbon tetrachloride	56-23-5	<	<	<	<
Carbonyl sulfide	463-58-1	7.14E-06	8.70E-06	<	<
2-Chloroacetophenone	532-27-4	<	<	<	<
Chlorobenzene	108-90-7	<	<	<	<
Chloroform	67-66-3	<	<	<	<
Chloroprene	126-99-8	8.16E-05	<	<	<
o-Cresol	95-48-7	<	<	3.91E-09	<
Cumene	98-82-8	<	<	<	1.13E-06
Dibenzofuran	132-64-9	<	1.59E-07	<	<
1,2-Dibromo-3-chloropropane	96-12-8	<	<	<	<
Dibutylphthalate	84-74-2	3.31E-06	2.24E-06	3.87E-08	2.54E-06
1,4-Dichlorobenzene	106-46-7	<	<	6.77E-09	<
3,3-Dichlorobenzidine	91-94-1	<	<	<	<
Dichloroethyl ether	111-44-4	<	<	<	<
3,3-Dimethoxybenzidine	119-90-4	<	<	<	<
Dimethyl aminoazobenzene	60-11-7	<	<	<	<
3,3'-Dimethyl benzidine	119-93-7	<	<	<	<
N,N-Dimethylaniline	121-69-7	<	<	<	<
Dimethylphthalate	131-11-3	<	<	<	<
2,4-Dinitrophenol	51-28-5	<	<	<	<
2,4-Dinitrotoluene	121-14-2	<	<	<	<
1,4-Dioxane	123-91-1	<	<	<	<
Epichlorohydrin	106-89-8	<	<	<	<
Ethyl benzene	100-41-4	<	<	<	5.70E-05
Ethyl chloride	75-00-3	<	<	<	<
Ethylene dibromide	106-93-4	<	<	<	<
Ethylene dichloride	107-06-2	<	<	<	<
Ethylidene dichloride	75-34-3	<	<	<	<
Hexachlorobenzene	118-74-1	<	<	<	<
Hexachlorobutadiene	87-68-3	<	<	<	<
Hexachlorocyclopentadiene	77-47-4	<	<	<	<
Hexachloroethane	67-72-1	<	<	<	<
Hexane	110-54-3	4.18E-05	1.60E-05	<	1.24E-04
Hydroquinone	123-31-9	<	<	<	<

organic HAPS

3 PM factors under review. May be significantly Low.

Table 4.12-4. INTERNAL MIXING & MILLING EMISSION FACTORS

Analyte Name	CAS #	Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
Total Method 25A Organics		6.17e-05	3.91e-05	1.36e-04	3.88e-05	2.15e-04	3.86e-05
Total Speciated Organics		5.08e-05	5.53e-05	8.92e-05	5.31e-05	6.18e-05	9.84e-05
Total Organic HAPs		2.10e-05	1.33e-05	5.90e-05	2.54e-05	4.19e-05	4.87e-05
Total Metal HAPs		9.67e-08	9.71e-09	1.74e-07	7.06e-08	7.72e-08	6.43e-09
Total HAPs		2.11e-05	1.33e-05	5.91e-05	2.55e-05	4.19e-05	4.87e-05
Total Particulate Matter		1.75e-04	4.02e-04	9.00e-04	3.00e-04	9.25e-04	4.00e-04
1,1,1-Trichloroethane	71-55-6	<	8.03e-08	3.19e-07	4.23e-08	1.84e-07	<
1,1,2,2-Tetrachloroethane	79-34-5	<	<	<	<	<	<
1,1,2-Trichloroethane	79-00-5	<	<	<	<	<	<
1,1-Dichloroethane	75-34-3	<	<	<	<	<	<
1,1-Dichloroethene	75-35-4	<	<	<	5.47e-07	<	<
1,2,4-Trichlorobenzene	120-82-1	<	<	<	<	<	<
1,2-Dibromo-3-Chloropropane	96-12-8	<	<	<	<	<	<
1,2-Dibromoethane	106-93-4	<	<	<	<	<	<
1,2-Dichloroethane	107-06-2	<	<	<	<	<	<
1,2-Dichloropropane	78-87-5	<	<	<	<	<	<
1,3-Butadiene	106-99-0	9.78e-08	<	<	2.17e-07	<	<
1,4-Dichlorobenzene	106-46-7	<	<	2.86e-09	7.30e-10	1.52e-09	1.22e-09
1,4-Dioxane	123-91-1	<	<	<	<	<	<
1,4-Phenylenediamine	106-50-3	<	<	<	<	<	<
2,4,5-Trichlorophenol	95-95-4	<	<	<	<	<	<
2,4,6-Trichlorophenol	88-06-2	<	<	<	<	<	<
2,4-Dinitrophenol	51-28-5	<	<	<	<	<	<
2,4-Dinitrotoluene	121-14-2	<	<	<	<	<	<

Table 4.12-4. INTERNAL MIXING & MILLING EMISSION FACTORS

Analyte Name	CAS #	Cmpd #7 lb/lb rubber	Cmpd #8 lb/lb rubber	Cmpd #9 lb/lb rubber	Cmpd #10 lb/lb rubber	Cmpd #11 lb/lb rubber	Cmpd #12 lb/lb rubber
Total Method 25A Organics		1.22e-04	1.47e-05	2.91e-05	2.91e-04	3.28e-05	1.54e-05
Total Speciated Organics		8.89e-05	7.38e-05	5.74e-05	2.81e-04	3.52e-05	6.69e-05
Total Organic HAPs		4.19e-05	5.58e-05	1.52e-05	1.20e-04	1.14e-05	5.55e-05
Total Metal HAPs		1.37e-07	3.91e-08	2.65e-09	5.19e-08	1.82e-09	2.86e-08
Total HAPs		4.21e-05	5.58e-05	1.52e-05	1.20e-04	1.14e-05	5.55e-05
Total Particulate Matter		5.66e-04	2.22e-04	4.92e-05	3.58e-04	7.83e-05	1.83e-04
1,1,1-Trichloroethane	71-55-6	<	2.67e-08	7.30e-08	1.34e-07	<	2.94e-08
1,1,2,2-Tetrachloroethane	79-34-5	<	<	<	<	<	<
1,1,2-Trichloroethane	79-00-5	<	<	<	<	<	<
1,1-Dichloroethane	75-34-3	<	<	<	<	<	<
1,1-Dichloroethene	75-35-4	<	1.00e-07	1.90e-07	<	<	<
1,2,4-Trichlorobenzene	120-82-1	<	<	<	<	<	<
1,2-Dibromo-3-Chloropropane	96-12-8	<	<	<	<	<	<
1,2-Dibromoethane	106-93-4	<	<	<	<	<	<
1,2-Dichloroethane	107-06-2	<	<	<	<	<	<
1,2-Dichloropropane	78-87-5	<	<	<	<	<	<
1,3-Butadiene	106-99-0	4.67e-07	1.13e-07	1.70e-07	<	3.82e-07	8.57e-08
1,4-Dichlorobenzene	106-46-7	1.82e-09	4.48e-09	<	5.95e-10	1.50e-09	3.30e-09
1,4-Dioxane	123-91-1	<	<	<	<	<	<
1,4-Phenylenediamine	106-50-3	<	<	<	<	<	<
2,4,5-Trichlorophenol	95-95-4	<	<	<	<	<	<
2,4,6-Trichlorophenol	88-06-2	<	<	<	<	<	<
2,4-Dinitrophenol	51-28-5	<	<	<	<	<	<
2,4-Dinitrotoluene	121-14-2	<	<	<	<	<	<

Table 4.12-4. INTERNAL MIXING & MILLING EMISSION FACTORS

Analyte Name	CAS #	Cmpd #13 lb/lb rubber	Cmpd #14 lb/lb rubber	Cmpd #15 lb/lb rubber	Cmpd #16 lb/lb rubber	Cmpd #17 lb/lb rubber	Cmpd #18 lb/lb rubber
Total Method 25A Organics		2.28e-04	2.30e-04	9.39e-06	8.16e-05	4.44e-04	6.50e-05
Total Speciated Organics		1.53e-04	1.52e-04	6.12e-05	3.04e-05	2.99e-04	1.23e-04
Total Organic HAPs		1.61e-05	4.23e-05	5.56e-05	4.70e-06	1.40e-04	4.66e-05
Total Metal HAPs		4.85e-08	1.28e-08	2.54e-08	1.44e-09	7.67e-08	4.04e-08
Total HAPs		1.61e-05	4.24e-05	5.56e-05	4.71e-06	1.40e-04	4.66e-05
Total Particulate Matter		2.46e-04	1.30e-04	1.42e-04	3.17e-04	8.96e-05	1.92e-04
1,1,1-Trichloroethane	71-55-6	5.32e-08	3.61e-08	1.83e-08	1.75e-08	6.03e-08	<
1,1,2,2-Tetrachloroethane	79-34-5	<	<	<	<	<	<
1,1,2-Trichloroethane	79-00-5	<	<	<	<	<	<
1,1-Dichloroethane	75-34-3	<	<	<	<	<	<
1,1-Dichloroethene	75-35-4	<	2.19e-07	1.39e-08	<	<	8.80e-08
1,2,4-Trichlorobenzene	120-82-1	<	<	<	<	<	<
1,2-Dibromo-3-Chloropropane	96-12-8	<	<	<	<	<	<
1,2-Dibromoethane	106-93-4	<	<	<	<	<	<
1,2-Dichloroethane	107-06-2	<	<	<	<	<	<
1,2-Dichloropropane	78-87-5	<	<	<	<	<	<
1,3-Butadiene	106-99-0	1.12e-07	2.39e-07	6.17e-08	<	<	1.80e-07
1,4-Dichlorobenzene	106-46-7	<	<	<	<	<	<
1,4-Dioxane	123-91-1	<	<	<	<	<	<
1,4-Phenylenediamine	106-50-3	<	<	<	<	<	<
2,4,5-Trichlorophenol	95-95-4	<	<	<	<	<	<
2,4,6-Trichlorophenol	88-06-2	<	<	<	<	<	<
2,4-Dinitrophenol	51-28-5	<	<	<	<	<	<
2,4-Dinitrotoluene	121-14-2	<	<	<	<	<	<
2-Butanone	78-93-3	3.22e-07	3.10e-07	8.78e-08	3.95e-08	1.04e-06	1.26e-06

Table 4.12-4. INTERNAL MIXING & MILLING EMISSION FACTORS

Analyte Name	CAS #	Cmpd #19 lb/lb rubber	Cmpd #20 lb/lb rubber	Cmpd #21 lb/lb rubber	Cmpd #22 lb/lb rubber	Cmpd #23 lb/lb rubber
Total Method 25A Organics		2.76e-05	7.52e-06	1.57e-04	1.23e-04	3.07e-05
Total Speciated Organics		1.98e-05	1.38e-05	1.34e-04	8.38e-05	3.54e-05
Total Organic HAPs		3.69e-06	6.66e-06	1.13e-05	2.98e-05	2.97e-05
Total Metal HAPs		2.90e-08	1.07e-08	1.70e-09	1.16e-08	5.15e-08
Total HAPs		3.71e-06	6.67e-06	1.13e-05	2.98e-05	2.97e-05
Total Particulate Matter		6.90e-05	7.84e-04	7.50e-05	4.50e-04	3.39e-04
1,1,1-Trichloroethane	71-55-6	1.14e-07	7.31e-07	1.04e-08	6.55e-08	<
1,1,2,2-Tetrachloroethane	79-34-5	<	<	<	<	<
1,1,2-Trichloroethane	79-00-5	<	<	<	<	<
1,1-Dichloroethane	75-34-3	<	<	<	<	<
1,1-Dichloroethene	75-35-4	<	<	<	<	<
1,2,4-Trichlorobenzene	120-82-1	<	<	<	<	<
1,2-Dibromo-3-Chloropropane	96-12-8	<	<	<	<	<
1,2-Dibromoethane	106-93-4	<	<	<	<	<
1,2-Dichloroethane	107-06-2	<	<	<	<	<
1,2-Dichloropropane	78-87-5	<	<	<	<	<
1,3-Butadiene	106-99-0	5.79e-08	<	<	1.31e-07	1.43e-07
1,4-Dichlorobenzene	106-46-7	<	<	<	<	<
1,4-Dioxane	123-91-1	<	<	<	<	<
1,4-Phenylenediamine	106-50-3	<	<	<	<	<
2,4,5-Trichlorophenol	95-95-4	<	<	<	<	<
2,4,6-Trichlorophenol	88-06-2	<	<	<	<	<
2,4-Dinitrophenol	51-28-5	1.62e-08	<	<	<	<
2,4-Dinitrotoluene	121-14-2	<	<	<	<	<

Table 4.12-5. MILLING EMISSION FACTORS

Analyte Name	CAS #	Interpolated Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Interpolated Cmpd #5 lb/lb rubber	Interpolated Cmpd #6 lb/lb rubber
Total Method 25A Organics		8.99e-05	1.10e-04	1.13e-04	8.37e-05	3.14e-04	5.64e-05
Total Speciated Organics		2.63e-05	3.48e-05	4.31e-05	5.04e-05	3.21e-05	5.10e-05
Total Organic HAPs		1.09e-05	6.39e-06	2.06e-05	1.59e-05	2.17e-05	2.53e-05
Total HAPs		1.09e-05	6.39e-06	2.06e-05	1.59e-05	2.17e-05	2.53e-05
1,1,1-Trichloroethane	71-55-6	<	3.32e-08	<	<	9.52e-08	<
1,1,2,2-Tetrachloroethane	79-34-5	<	<	<	<	<	<
1,1,2-Trichloroethane	79-00-5	<	<	<	<	<	<
1,1-Dichloroethane	75-34-3	<	<	<	<	<	<
1,1-Dichloroethene	75-35-4	<	<	<	<	<	<
1,2,4-Trichlorobenzene	120-82-1	<	<	<	<	<	<
1,2-Dibromo-3-Chloropropane	96-12-8	<	<	<	<	<	<
1,2-Dibromoethane	106-93-4	<	<	<	<	<	<
1,2-Dichloroethane	107-06-2	<	4.06e-08	<	<	<	<
1,2-Dichloropropane	78-87-5	<	<	<	<	<	<
1,3-Butadiene	106-99-0	5.07e-08	<	<	<	<	<
1,4-Dichlorobenzene	106-46-7	<	<	<	<	7.90e-10	6.32e-10
1,4-Dioxane	123-91-1	<	<	<	<	<	<
1,4-Phenylenediamine	106-50-3	<	<	<	<	<	<
2,4,5-Trichlorophenol	95-95-4	<	<	<	<	<	<
2,4,6-Trichlorophenol	88-06-2	<	<	<	<	<	<
2,4-Dinitrophenol	51-28-5	<	<	<	<	<	<
2,4-Dinitrotoluene	121-14-2	<	<	<	<	<	<

Table 4.12-5. MILLING EMISSION FACTORS

Analyte Name	CAS #	Interpolated Cmpd #7 lb/lb rubber	Interpolated Cmpd #8 lb/lb rubber	Interpolated Cmpd #9 lb/lb rubber	Interpolated Cmpd #10 lb/lb rubber	Interpolated Cmpd #11 lb/lb rubber	Cmpd #12 lb/lb rubber	Interpolated Cmpd #13 lb/lb rubber
Total Method 25A Organics		1.78e-04	2.14e-05	4.25e-05	4.25e-04	4.79e-05	4.97e-07	3.32e-04
Total Speciated Organics		4.61e-05	3.83e-05	2.98e-05	1.46e-04	1.83e-05	9.31e-07	7.95e-05
Total Organic HAPs		2.17e-05	2.89e-05	7.90e-06	6.22e-05	5.92e-06	3.00e-07	8.33e-06
Total HAPs		2.17e-05	2.89e-05	7.90e-06	6.22e-05	5.92e-06	3.00e-07	8.33e-06
1,1,1-Trichloroethane	71-55-6	<	1.39e-08	3.78e-08	6.96e-08	<	<	2.76e-08
1,1,2,2-Tetrachloroethane	79-34-5	<	<	<	<	<	<	<
1,1,2-Trichloroethane	79-00-5	<	<	<	<	<	<	<
1,1-Dichloroethane	75-34-3	<	<	<	<	<	<	<
1,1-Dichloroethene	75-35-4	<	5.19e-08	9.87e-08	<	<	<	<
1,2,4-Trichlorobenzene	120-82-1	<	<	<	<	<	<	<
1,2-Dibromo-3-Chloropropane	96-12-8	<	<	<	<	<	<	<
1,2-Dibromoethane	106-93-4	<	<	<	<	<	<	<
1,2-Dichloroethane	107-06-2	<	<	<	<	<	<	<
1,2-Dichloropropane	78-87-5	<	<	<	<	<	<	<
1,3-Butadiene	106-99-0	2.42e-07	5.84e-08	8.79e-08	<	1.98e-07	<	5.82e-08
1,4-Dichlorobenzene	106-46-7	9.44e-10	2.32e-09	<	3.09e-10	7.79e-10	<	<
1,4-Dioxane	123-91-1	<	<	<	<	<	<	<
1,4-Phenylenediamine	106-50-3	<	<	<	<	<	<	<
2,4,5-Trichlorophenol	95-95-4	<	<	<	<	<	<	<
2,4,6-Trichlorophenol	88-06-2	<	<	<	<	<	<	<
2,4-Dinitrophenol	51-28-5	<	<	<	<	<	<	<
2,4-Dinitrotoluene	121-14-2	<	<	<	<	<	<	<
2-Butanone	78-93-3	7.26e-07	2.63e-07	2.55e-07	6.14e-07	4.48e-08	<	1.67e-07

Table 4.12-5. MILLING EMISSION FACTORS

Analyte Name	CAS #	Interpolated Cmpd #14 lb/lb rubber	Interpolated Cmpd #15 lb/lb rubber	Interpolated Cmpd #16 lb/lb rubber	Interpolated Cmpd #17 lb/lb rubber	Interpolated Cmpd #18 lb/lb rubber	Interpolated Cmpd #19 lb/lb rubber
Total Method 25A Organics		3.35e-04	1.37e-05	1.19e-04	6.48e-04	9.48e-05	4.03e-05
Total Speciated Organics		7.88e-05	3.17e-05	1.58e-05	1.55e-04	6.37e-05	1.03e-05
Total Organic HAPs		2.20e-05	2.88e-05	2.44e-06	7.28e-05	2.42e-05	1.91e-06
Total HAPs		2.20e-05	2.88e-05	2.44e-06	7.28e-05	2.42e-05	1.91e-06
1,1,1-Trichloroethane	71-55-6	1.87e-08	9.48e-09	9.10e-09	3.13e-08	<	5.91e-08
1,1,2,2-Tetrachloroethane	79-34-5	<	<	<	<	<	<
1,1,2-Trichloroethane	79-00-5	<	<	<	<	<	<
1,1-Dichloroethane	75-34-3	<	<	<	<	<	<
1,1-Dichloroethene	75-35-4	1.14e-07	7.20e-09	<	<	4.56e-08	<
1,2,4-Trichlorobenzene	120-82-1	<	<	<	<	<	<
1,2-Dibromo-3-Chloropropane	96-12-8	<	<	<	<	<	<
1,2-Dibromoethane	106-93-4	<	<	<	<	<	<
1,2-Dichloroethane	107-06-2	<	<	<	<	<	<
1,2-Dichloropropane	78-87-5	<	<	<	<	<	<
1,3-Butadiene	106-99-0	1.24e-07	3.20e-08	<	<	9.33e-08	3.00e-08
1,4-Dichlorobenzene	106-46-7	<	<	<	<	<	<
1,4-Dioxane	123-91-1	<	<	<	<	<	<
1,4-Phenylenediamine	106-50-3	<	<	<	<	<	<
2,4,5-Trichlorophenol	95-95-4	<	<	<	<	<	<
2,4,6-Trichlorophenol	88-06-2	<	<	<	<	<	<
2,4-Dinitrophenol	51-28-5	<	<	<	<	<	8.39e-09
2,4-Dinitrotoluene	121-14-2	<	<	<	<	<	<
2-Butanone	78-93-3	1.61e-07	4.55e-08	2.05e-08	5.39e-07	6.52e-07	3.27e-08

Table 4.12-5. MILLING EMISSION FACTORS

Analyte Name	CAS #	Interpolated Cmpd #20 lb/lb rubber	Interpolated Cmpd #21 lb/lb rubber	Interpolated Cmpd #22 lb/lb rubber	Interpolated Cmpd #23 lb/lb rubber
Total Method 25A Organics		1.10e-05	2.28e-04	1.79e-04	4.47e-05
Total Speciated Organics		7.17e-06	6.94e-05	4.34e-05	1.84e-05
Total Organic HAPs		3.45e-06	5.84e-06	1.54e-05	1.54e-05
Total HAPs		3.45e-06	5.84e-06	1.54e-05	1.54e-05
1,1,1-Trichloroethane	71-55-6	3.79e-07	5.41e-09	3.40e-08	<
1,1,2,2-Tetrachloroethane	79-34-5	<	<	<	<
1,1,2-Trichloroethane	79-00-5	<	<	<	<
1,1-Dichloroethane	75-34-3	<	<	<	<
1,1-Dichloroethene	75-35-4	<	<	<	<
1,2,4-Trichlorobenzene	120-82-1	<	<	<	<
1,2-Dibromo-3-Chloropropane	96-12-8	<	<	<	<
1,2-Dibromoethane	106-93-4	<	<	<	<
1,2-Dichloroethane	107-06-2	<	<	<	<
1,2-Dichloropropane	78-87-5	<	<	<	<
1,3-Butadiene	106-99-0	<	<	6.77e-08	7.40e-08
1,4-Dichlorobenzene	106-46-7	<	<	<	<
1,4-Dioxane	123-91-1	<	<	<	<
1,4-Phenylenediamine	106-50-3	<	<	<	<
2,4,5-Trichlorophenol	95-95-4	<	<	<	<
2,4,6-Trichlorophenol	88-06-2	<	<	<	<
2,4-Dinitrophenol	51-28-5	<	<	<	<
2,4-Dinitrotoluene	121-14-2	<	<	<	<
2-Butanone	78-93-3	6.73e-08	2.45e-07	2.27e-06	<

RMA.
RUBBER MANUFACTURERS ASSOCIATION

April 29, 1998

Ron Ryan
U.S. Environmental Protection Agency
(MD-14)
RTP, NC 27711

Dear Ron:

I am writing this note to you to confirm our phone conversation regarding the AP-42 comments filed by the Rubber Manufacturers Association. As we discussed, please disregard the section of the RMA comments on the extruder data table. This portion of the comments was based on review of an outdated section of the emission factors. The numbers contained in the extruder table in the draft AP-42 currently posted on the internet are correct and do not need to be revised. I appreciate your understanding in correcting this error.

I will also conduct quality control on the data tables in Excel format and provide you with a copy of them for your use. I look forward to working with you as you finalize the AP-42 section for the rubber industry.

Sincerely,

Tracey J. Norberg

Cc: Tony Wayne

1400 K STREET, N.W., WASHINGTON, D.C. 20005 • TELEPHONE (202) 682-4800 • FAX (202) 682-4854

From: TONY WAYNE
To: RTP10.RTPTSD.RYAN-RON
Date: 4/13/98 10:56am
Subject: RMA - AP-42

Ron.

ESD is attempting to coordinate the process and technical description of the Rubber tire manufacturing industry between the write-ups in the "New" AP-42, NSPS Background information documents and the soon to be distributed PMACT for the Rubber Tire MACT. The description will also go toward our Section 3 of the BID for the MACT.

What you can help us with is a current copy of what you have for the AP-42 industry and process descriptions in the AP-42, either by directing us to where the current description is that you are using or whether a hard copy is all you have. I would like to get one or the other to QA our information.

Thanks.

CC: RTPMAINHUB.internet."overcash-ecr@mindspring.com"

From: Wally Sanford <wsanford@mindspring.com>
To: "ryan.ron@epamail.epa.gov" <ryan.ron@epamail.epa...
Date: 4/15/98 10:26am
Subject: RMA comments on EFs

Ron,

4/3/98 version
4-1-98 - Harlow's e-mail from?

Hope you are well.

Yesterday I saw some lengthy comments/corrections on or to the rubber tire manufacturing emission factors from the RMA. I am still working on the NESHAP (through EC/R), and we will probably be soon called upon to revise the existing BID draft.

Do you know if, how, or when the RMA corrections will be incorporated? I noticed that some of the numbers have changed a little, and they are baying at us to use the most current ones. ?

Thanks in advance if you can enlighten me on the matter.

Wally Sanford
Sanford Consulting
Email: wsanford@mindspring.com
Web: http://wsanford.home.mindspring.com

From: Tnorberg <Tnorberg@aol.com>
To: RTP10.RTPTSD(RYAN-RON)
Date: 4/1/98 3:57pm
Subject: AP-42

Ron -- Attached you will find a zip file containing RMA's comments on AP-42 section 4.12. Unfortunately, due to an administrative problem yesterday, the originals were not mailed to you as they should have been. I hope this is not a problem. I will make sure it is in the mail today. Thanks.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

January 27, 1998

Mr. Ron Ryan
Emission Factors and Inventory Group
U.S. Environmental Protection Agency
RTP, North Carolina 27711

Re: AP-42, Proposed Section 12 of Chapter 4,
"Manufacture of Rubber Products"

Dear Mr. Ryan:

This is in response to the U.S. Environmental Protection Agency December 17, 1997 Internet posting of a proposed Section 12, "Manufacture of Rubber Products," to be added to Chapter 4 of AP-42, and your solicitation of comments on the proposed section. The proposed section is based on information supplied by the Rubber Manufacturers of America (RMA) who completed a study on emission factors for subject industry in 1995. This State has only one tire manufacturing facility, and we do have a file on that source. We were able to apply RMA factors in a recent evaluation of that source, so we are generally supportive of the proposed section with the understanding that our experience with this type of source is limited. We found the RMA information especially helpful in clarifying related potential volatile organic compounds emissions. We do not have stack testing data to submit.

Thank you for this opportunity to provide comments on the proposed section.

Sincerely,

Victoria J. L. Hsu, P.E.
Director
New Source Review Permits Division

VH/HP/jb

cc: Ms. Jole Luehrs, Chief, New Source Review Section (6PD-R), Environmental Protection Agency, Region 6, Dallas

From: TONY WAYNE
To: RTP10.RTPTSD(RYAN-RON)
Date: 12/15/97 8:40am
Subject: rma emission factor position -Reply

Ron.

Hopefully this will give you a little of my thoughts.

I have no problem with your letter to RMA. I have an understanding that some permiting agencies use the information, some don't. I have heard that they do not use the information because EPA has not provided a "needed" level of recognition to the factors. ESD will use this information for MACT evaluation as some of the best information we have pending the gathering of better information. For our process the information is primarily used for facility applicability and potential MACT floor impacts (emission reduction, emission charactorization, standards, costs, etc.).

Since recieving the information from the RMA a few years ago, we have been in contact with them over the information. In addition we have been to the facilities in the source category observing the various operations within a tire manufacturing facility to gain additional knowledge of the processes that are represented by the emission factors.

During the intervening time we have also worked with the RMA to understand the development of the factors, their creation; as well as the possible conservativeness of the numbers. The later is based on the fact that emission factors representing processes downstream of those operations that include cementing or solvent use will include the HAPs associated with the solvent or cement. The industry has conceded that facilities that use the emission factors will no doubt count additional HAPs. Inventories appear to conclude that all solvents used (either in finishing or cementing) at a facility are represented as a 100 perceent emission. They are not represented seperately in the Emission Factor submittal because each facility uses a different cement formulation or different set of solvents that may or may not contain HAPs.

Given the preliminary informal agreements and reviews by EMAD's EMC regarding the plans and collection of the information by RMA; quality assurance activities for review of RMA in our efforts to assess MACT: ESD has accepted these emission factors for use in our charactorizations of the industry and deliberations on MACT.

Memorandum

DATE: April 6, 1998

TO: Ron Ryan, EPA

FROM: Christine Flass, Teknor Apex

RE: Rubber AP-42 Emission Factor Comments

Ron,

Thanks for your help with the Draft AP-42 Rubber Emission Factors. We are very glad that RMA was able to pull all of this data together and that EPA is working to make these factors official. I hope my comments are not too late to help.

I spent some time reviewing the following rubber AP-42 sections, which at this point I believe are all that apply to my company:

4.12 - Introduction

4.12.1 General Process Description

Table 4.12-4 Internal Mixing & Milling

Table 4.12-5 Milling

Table 4.12-8 Platen Press Curing

Briefly, I wanted to tell you how these factors effect Teknor Apex. First, we have two plants that manufacture rubber products:

a "job shop" that conducts compounding per customers request. The rubber lines are therefore not dedicated to any specific product lines. Compounding consists of:
- banbury (internal mixer, T= 180 to 350 degr.),
- drop mill (n/c cooling water, T < 260 degr),
- blender mill (n/c cooling water, T< 230 degr), and
- sheeter mill (n/c cooling water, T< 230 degr).

Cooled rubber is either sold or pressed in platen presses into engineered products.

larger compounding facility that makes tire retread, but can also do "job shop" type compounding. Compounding consists of the same steps. Pressing consists of tire retread platen presses.

Because of this variability in products, my comments on the AP-42 may be from a somewhat unique perspective -- I believe most larger rubber manufactures tend to have specific product lines.

Emission Factors:

As you know, the emissions can vary widely from compound to compound. As a job shop, we do not want to use the "worst case" emission factor -- that would make our facility's emissions unrealistically high. We are now struggling with how to set up recordkeeping to keep track of a number of rubber compounds. It would be helpful if we were able to get an emission factor table on a spreadsheet that we could manipulate (to obtain averages, for instance).

The tables should say "VOC" emissions, since that is how emissions are regulated. Or somewhere on the table define "Total Method 25A Organics" to mean VOCs.

Would it be easier to use emission factors presented as lbs of VOC per MMlbs rubber produced?

Equipment:

The main question I have is regarding "mills;" can you better define them in the write-up? The description of the Mills (Section 3.3.1 Warm-up Milling) is somewhat helpful, but what about Section 4 (Data Analysis); it does not address how mills were tested.

I have trouble believing that VOC emissions from the third and forth processing steps in a continuous process (blender mill and sheeter mill) will be equal, or in some cases greater than, the first and second process steps (banbury @ 330 deg and drop mill @ 260). If there is any unique testing issues that could effect internal mixer/drop mill emissions vs. milling emissions, this should be addressed (i.e., temperature of mills or rubber?) If the milling emission factor is specifically for warm-up mills (i.e., raising temperature of rubber) as opposed to cooling mills the text should be clear about this!

Overall, we were very impressed with the work that went into this document. We were also pleased that a number of your emission factor numbers corresponded with our stack test emissions (it provided us a degree of certainty that we were on the right track!) Thank you for your time and effort.

From: RON RYAN
To: RTPMAINHUB.INTERNET."tracey@rma.org"
Date: 2/23/98 1:21pm
Subject: switched emission factors?

I mentioned in our telecon last Fri and at the mtg in RTP a few weeks ago that someone had commented that some repeating of emission factors measured for one process was showing up under a second process. I have finally gotten around to checking what we have on the web site, but I don't see the repeat. I have a call in to Mark Mortar of Standard Products Co-Chrysler Products Div. (I think they own a subsidiary called Oliver something that makes retreads) to try to straighten out communications. Mark says that the values given in the material on our web site for HOT AIR OVENS processing COMPOUND #6 are not correct. He says the values given in that current draft for HOT AIR OVENS are actually copied over erroneously from the values for EXTRUDERS. He says the real values for HOT AIR OVENS should be much higher, and that he saw the actual values in an electronic version of the material sent to him by RMA in Sept 1996.

I have checked the values for compounds #6 and #8 (which Mark mentioned they also use at his facility) for HOT AIR OVENS and EXTRUDERS, and can't find any duplicates.

Also, I had the Comments Requested By date changed to 3/31/98 on the web page this AM.

Mark Mortar called back - he can't find switch

From: TONY WAYNE
To: RTP10.RTPTSD(RYAN-RON)
Date: 12/15/97 8:40am
Subject: rma emission factor position -Reply

Ron.

Hopefully this will give you a little of my thoughts.

I have no problem with your letter to RMA. I have an understanding that some permiting agencies use the information, some don't. I have heard that they do not use the information because EPA has not provided a "needed" level of recognition to the factors. ESD will use this information for MACT evaluation as some of the best information we have pending the gathering of better information. For our process the information is primarily used for facility applicability and potential MACT floor impacts (emission reduction, emission charactorization, standards, costs, etc.).

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During the intervening time we have also worked with the RMA to understand the development of the factors, their creation; as well as the possible conservativeness of the numbers. The later is based on the fact that emission factors representing processes downstream of those operations that include cementing or solvent use will include the HAPs associated with the solvent or cement. The industry has conceded that facilities that use the emission factors will no doubt count additional HAPs. Inventories appear to conclude that all solvents used (either in finishing or cementing) at a facility are represented as a 100 perceent emission. They are not represented seperately in the Emission Factor submittal because each facility uses a different cement formulation or different set of solvents that may or may not contain HAPs.

Given the preliminary informal agreements and reviews by EMAD's EMC regarding the plans and collection of the information by RMA; quality assurance activities for review of RMA in our efforts to assess MACT: ESD has accepted these emission factors for use in our charactorizations of the industry and deliberations on MACT.

From: Jim Hadley <jhadley@netinfo.ci.lincoln.ne.us>
To: RTP10.RTPTSD(RYAN-RON)
Date: 4/24/98 5:00pm
Subject: Comments on AP-42 Chapter 4, draft Section 12,"Rubber Products Manufacturing"

Dear Ron:

Attached are comments to replace my comments emailed on 3/26/98.

I have also sent you a paper-copy of the WordPerfect (6.1) document and a disk-copy of the Lotus-123 (Release 5) file, in case you have trouble opening the attachments.

Yours, Jim

****

Jim Hadley, PE
Lincoln-Lancaster County Health Department
3140 "N" Street
Lincoln, Nebraska 68510-1514

voice: 402-441-6235
fax: 402-441-8323
email: jhadley@ci.lincoln.ne.us
http://interlinc.ci.lincoln.ne.us/InterLinc/city/health/environ/pollu/index.htm
****

CC: "Willhite, Marcia" <mwilhite@netinfo.ci.lincoln.ne...

Lincoln-Lancaster County
HEALTH DEPARTMENT

3140 "N" STREET
LINCOLN, NE 68510-1514
402-441-8000
TDD 402-441-6284

24 April 1998

Mr. Ron Ryan
U.S. Environmental Protection Agency, (MD-14)
RTP, NC 27711

Advanced Copy Via E-mail Attachment: ryan.ron@epamail.epa.gov

RE: Comments on Draft AP-42 Section 4.12, "Manufacture of Rubber Products" (Replaces summary of comments e-mailed to Ron Ryan on March 26, 1998)

Dear Mr. Ryan:

1. BACKGROUND

The development of emission factors for rubber products manufacturing by the Rubber Manufacturers Association (RMA) clearly required a formidable effort. This effort has produced a large quantity of useful information, which makes a good addition to AP-42. The Goodyear Tire and Rubber Company plant in Lincoln, Nebraska has diligently used this information to provide the Lincoln-Lancaster County Health Department with useful emission inventory reports. The comments below regard clarifing and expanding the information published in draft Section 4.12 in areas that are important for conducting risk analysis.

The following comments on the draft AP-42 Section 4.12, Compilation of Air Pollutant Emission Factors, "Manufacture of Rubber Products" are based on review of the draft section and on an analysis of the public emission inventory for the Goodyear Tire and Rubber Company's Lincoln, Nebraska hose and belt plant. A toxicity-weighted analysis of the Lincoln plant's Hazardous Air Pollutant (HAP) emissions from 1994 to 1997 (four years) was conducted. The masses of respective HAP emissions were multiplied by a toxicity weight to give a "toxicity-weighted emission unit." These units allow relative comparisons of the potential public health risk of each HAP emission. The term potential public health risk is used because no analysis of actual exposure was conducted. The Texas Effects Screening Levels (ESL) were used for the toxicity weight. The Texas ESLs were compared to three other potential toxicity weighting scales to evaluate their appropriateness. The comparison scales were the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values for 8-hour time-weighted average concentrations, the U.S. EPA Sector Facility Indexing Project's Inhalation Toxicity Weights, and the U.S. EPA's Reference Concentrations for non-cancer effects. This comparison was done for 60 important HAPs out of the approximately 105 HAPs reported in the Goodyear emission inventory. Toxicity information was found at the following frequencies: for

7% of compounds none of the four sources had toxicity information; 13 % had one source, 20% had two sources; 38% had three sources, and 22% of had all four sources. The four scales agreed within a factor of ten for 55% of the compounds, and they agreed within a factor of 100 for 80% of the compounds. Comments below regarding importance to public health and "toxicity-weighted emission units" are based on this toxicity-weighted analysis of the emissions.

2. SUBSTANTIVE COMMENTS

2.1 Mercury Emissions

Emission factors for mercury are not included in the draft Section 4.12. The Lincoln plant's emission inventory indicates that actual mercury emissions averaged 110 lb/year from 1994 to 1997. This may be a conservatively high estimate of actual mercury emissions. Yet if accurate, this is a significant quantity of mercury, accounting for 1% to 10% of the toxicity-weighted emission units, due to the toxicity of mercury. The chemical form of the mercury (alkyl, aryl, elemental, etc.) affects its toxicity. Causes of mercury emissions should be discussed in AP-42, along with any available information on chemical form, emission factors, pollution prevention, and control options.

2.2 Speciation of Metal Compound Emissions

Data on the chemical and physical form of emitted metal compounds should be included when available. This information is crucial for assessing the toxicity of metal emissions. If such data are not available, a theoretical discussion (based on process chemistry and physics) of what metal species are likely to be emitted and the likely particulate size range for the metal emissions, should be included. For instance, nickel emissions from the Lincoln plant also averaged approximately 110 lb/year from 1994 to 1997. If this nickel is emitted as a fine sulfide particle, its potential health effects are relatively significant, 2% to 4% of the toxicity-weighted emission units from the Lincoln plant, which is greater than if the potential risk if nickel is emitted as a zero-valent metal particle. Measuring metal speciation is difficult and costly, but any information that could be made available on this subject would greatly improve risk assessment.

2.3 Evaluation or Measurement of Metals Emissions from Rubber Curing

Evaluation or measurement of metals emissions from rubber curing should be included. There may be a possibility that volatile metal species, such as mercury and some organic-metal complexes, are released during curing operations (due to the presence of elevated temperatures and sometimes high pressure steam). Any available measurements or theoretical evaluations of metals emissions from rubber curing may significantly improve risk assessment because of the high toxicity of some of the heavy-metal species.

2.4 Isocyanate Emissions

Isocyanate emissions should be discussed in the draft section. Isocyanates are emitted when

polyurethanes are produced. Significant quantities of methylene diphenyl diisocyanate (MDI) have been reported in the emission inventories for the Lincoln plant, where it accounts for up to half (50%) of the total toxicity-weighted emission units. Emission factors for isocyanates are error prone, and the emission inventory may report a conservatively high estimate of actual MDI emissions. However, safe threshold levels for isocyanates are extremely low because of epidemiological evidence regarding their action as sensitizers (occupational asthma). Discussion of when isocyanate emissions can be expected, or cross-references to AP-42 chapters on polyurethane-containing products production, would be a useful addition to the draft Section 4.12.

2.5 Method for Handling Non-Detects in Calculation of Emission Factors

The method for handling non-detects in the calculation of the emission factors needs to be critically evaluated. The draft section indicates that:

> 4.12.4 Emission Factors (8) Target analytes detected in one or more runs were averaged with target analytes at less than detect at the detection limit divided by two.

It may be useful to clarify within Section 4.12 that a run refers to a single test on a process/rubber type combination and also to publish the number of runs that each set of process/rubber type emission factors was based on.

The quoted method makes assumptions, regarding the "population distribution" of the concentrations for compounds emitted in small quantities, which may not be correct. The distribution may be log-normal. The assumption that non-detects equal half the detection limit could greatly overestimate the emissions of compounds that are only emitted in small quantities. If such compounds are also highly toxic, such an overestimation could make risk assessments inaccurate.

An alternative approach would be to publish a range of possible emission factors. For the lower boundary, assume all non-detects equaled zero. For the upper boundary, assume that non-detects equaled the detection limit, when target analytes were detected in one or more runs.

2.6 Method for Interpolating Emission Factors

The method for interpolating emission factors needs to be clarified. Many of the tables have column headings marked "interpolated". Yet, I could not find a description of the interpolation method.

2.7. Publication of Precision and Accuracy Information

Any available information regarding the precision and accuracy of emission factors would greatly improve their usefulness for decision making. For instance, laboratory and field blank

sample results could be summarized and published (converted into emission factor units if possible). This may help assess the error in emission factors for compounds measured near the detection limit. Such low-concentration compounds can turn out to be important for risk analysis if they are highly toxic.

Section 2.2 of the Emission Factor Background Report for AP-42 Section 4.12 (file d04s12b.wpd) indicates, "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". Yet, the draft Section 4.12 tables contained only "<" symbols, and I could not find the detection limits. At a minimum, publishing the detection limits (converted into emission factor units) would help in the assessment of precision and accuracy.

3. FORMATTING & OTHER COMMENTS

3.1 Placing WordPerfect Tables into a Spreadsheet Format

The data in draft 4.12 is presented in WordPerfect tables. The large number of emission factors are easier to analyze and use when placed in a spreadsheet. I have attached an example Lotus 123 spreadsheet that contains all the data from the WordPerfect tables, which I downloaded over the internet.

3.2 Metal Emissions Reported for Grinding

Metal emissions from grinding were reported in Table 4.12-12, the following text from the draft section appears inconsistent with Table 4.12-12:

> 4.12.4 Emission Factors (9) Metals were expected to be detected in the particulate matter emitted during rubber mixing but were not expected to be a significant emission in any other process. [...] Metal emissions were therefore considered to be insignificant in other processes.

In addition, Section 2.2 of the Emission Factor Background Report for AP-42 Section 4.12 (file d04s12b.wpd) indicates that "three processes (extruder, internal mixers, and grinding) were tested for particulate matter and metals".

Thank you for your consideration.

Sincerely Yours,

Jim Hadley

Jim Hadley, PE

Enclosure: Disk containing Lotus 123 file.

From: Jim Hadley <jhadley@netinfo.ci.lincoln.ne.us>
To: Ron Ryan <ryan.ron@epamail.epa.gov>
Date: 3/26/98 7:41pm
Subject: Comments to Draft AP-42 Section 4.12, Manufacture of Rubber Products

Ron:

& 4/24/98 resend w/ more details

I am writing to let you know that I plan to submit comments on the Draft AP-42 Section 4.12. These comments are undergoing review and will be available in early April. To avoid missing the boat, I have summarized my comments below, which will be elaborated and substantiated in a subsequent submission.

1. Emission factors for mercury are not included in the draft section, and they should be due to the toxicity and bioaccumulation of mercury. Mercury is emitted in significant quantities from the Lincoln, Nebraska Goodyear hose and belt plant, according to their 1994 to 1996 public emission inventories.

2. Data on the chemical and physical form of emitted metal compounds should be included when available. This information is crucial for assessing the toxicity of metal emissions. If such data are not available, a theoretical discussion (based on process chemistry and physics) of what metal species are likely to be emitted and the likely particulate size range for the metal emission, should be included.

3. Measurements of metals emissions from rubber curing should have been made. There may be a possibility that volatile and highly toxic metal species, such as mercury or nickel sulfides, are released during curing operations. Any available information or theoretical analyses of metals emissions from rubber curing should be included.

4. Isocyanate emissions should be discussed in the draft section. Isocyanates are emitted when polyurethanes are produced, and they have been reported in the emission inventories for the Lincoln plant. Discussion of when isocyanate emission can be expected, or cross-references to AP-42 chapters on polyurethane-containing products production should be included.

5. The method for handling non-detects in the calculation of the emission factors needs to be clarified and critically evaluated. The assumption that non-detects equal half the detection limit, which appears to have been made in some cases, could greatly overestimate the emissions of compounds that are only emitted in small quantities. If such compounds are also highly toxic, such an overestimation could make risk assessments inaccurate.

6. The method for extrapolating or interpolating emission factors needs to be clarified.

7. Any available information regarding the precision and accuracy of emission factors should be included in the tables.

8. The data should be presented in a spreadsheet, in addition to WordPerfect tables, for ease of analysis and manipulation.

Thanks for your consideration. I will send a more detailed set of comments in early April.

****

Jim Hadley, PE

Lincoln-Lancaster County Health Department
3140 "N" Street
Lincoln, Nebraska 68510-1514

voice: 402-441-6235
fax: 402-441-8323
email: jhadley@ci.lincoln.ne.us
http://interlinc.ci.lincoln.ne.us/InterLinc/city/health/environ/pollu/index.htm
****

CC: "Willhite, Marcia" <mwilhite@netinfo.ci.lincoln.ne...

Tues ~~1-13-98~~

weds ~~3/25/98~~ he called back & said he can't find it / oliver makes retread

Mark Mortar of Standard Products Co
248-299-7775 x178
Chrysler Products DIV.

says material on BBS for extruders
for compound ~~#6~~ copied into hot air

2/24/98
I checked well past ~~total~~ voc's for #6, #8, hot air, extruder, ~~extr~~ old file, new file (same), also compared extruder #6 to other curing 95.
NOTHING MATCHES!

~~SBR~~-retread
#6 & #~~8~~ -auto window trim

~~ef~~ #'s for ~~extruder~~ ~~for #6~~ ~~hot~~ air ovens

↑ ~~real~~ #'s for hot air would be higher

sept '96
RMA
sent ~~[illegible]~~ him
electronic

Bandag

oliver rubber - retreading

carcass grinding - grinding off old tread from old tire
big pieces

vs.

retread buffing → fine pieces
← to get more

$\frac{7}{2}$" wide
×33 ft long
$\frac{1}{2}$" thick or 1" thick
but only ~~[illegible]~~ $\frac{1}{4}$" gets hot

Emission Factor and Inventory Group
Emissions Monitoring and Analysis Division (MD-14)
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency
Research Triangle Park, NC 27711
FAX Number: (919) 541-0684

FAX TRANSMISSION

Date: 1-12-98

To:

NAME	PHONE NUMBER
Rob Haberlein	410-268-7367
COMPANY/OFFICE	FAX NUMBER
Engineering Environmental	410-267-8174

From:

NAME	PHONE NUMBER
Ron Ryan	919-541-4330

COMMENTS:

minor typos in the 9-18-97 memo as discussed today.

Number of Pages (including cover sheet): 6

If you did not receive all the pages, please contact the following person:

Name: _____ Phone Number: _____

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Not Sent?

Ms. Tracy Norburg
Rubber Manufacturer's Association
1400 K Street, NW
Washington, DC 20005

Dear Ms. Norburg:

The purpose of this letter is to explain the current position of the U.S. Environmental Protection Agency's (EPA) Emission Factors and Inventory Group (EFIG) regarding the emissions estimation material for rubber processing operations. The Rubber Manufacturer's Association (RMA) submitted this material to EPA in November 1996 for consideration for inclusion in EPA's AP-42 document under EFIG's Public Participation Plan (PPP). The material consists of 31 electronic files (5.6 MB) containing the emission factor tables, six electronic files (200 KB) containing both the explanatory text for a draft AP-42 section and a draft background report, and a four-volume hard copy report containing more detailed summaries of the test protocol and results. It is my understanding that the actual "raw" test reports amount to 13 file cabinets of hard copy materials, and are available for viewing by EPA at the office of an RMA contractor. The EPA has not requested to view these files as yet.

I have transmitted copies of the electronic materials via e-mail to a number of State air agencies and consultants over the past several months upon request. In transmitting this information I have been telling the requestors that the information was developed and submitted by the RMA, and that it has not received EPA's oversight and review that has been typical for AP-42 sections. I have also been telling the requestors that I have no reason to doubt the veracity of the information, nor do I have any other data sources to suggest for estimating these emissions. For these reasons, I have been making the materials available for review and use at the requestor's discretion, while trying to make it clear that the material does not have any EPA "blessing" that may be perceived by the requestor solely because the material was provided to them by EPA. This continues to be EFIG's position on these materials.

Users of the RMA developed material or of existing AP-42 sections developed by EPA should be aware that there is, in fact, no EPA "blessing", guarantee, or enhanced legal status afforded to material published by EPA, although we hope that in the absence of site-specific tests or other significant relevant and credible information that AP-42 will provide a useful benchmark. The decision on whether this data is sufficient for any particular use must be made

CONCURRENCES

SYMBOL	EFIG							
SURNAME	Ryan							
DATE	12-19-97							

by the source and the regulating agency considering the use. Users should be aware that any emission factor is simply an average of results from similar sources, and that individual source results will vary over time and may be significantly higher or lower than the average.

I regret that I have not had sufficient time nor contractor resources to take this project to its proposed completion, a final AP-42 section, but hope that I have not hindered user's access to the substantial body of work developed by the RMA. I propose that we make the electronic materials (along with this letter) available "as is" on the EFIG's web page as a proposed draft AP-42 section for review and comment. I am aware of a few items which we should work to resolve while the draft is posted for review. Some formatting questions still need to be addressed by me; I need to review how non-detects are presented in the tables; and I would like to formalize an agreement about how much of the material (including the raw test reports) can be made available to who and in what format.

I look forward to working with you to facilitate access to and understanding of the material that RMA has developed.

Sincerely,

Ronald B. Ryan
Environmental Engineer
Emission Factors and Inventory Group

OAQPS:EMAD:EFIG:RRYAN:ew:4330:4201ALEX:12/19/97:**NORBUG:RR**

RMA.

Facsimile Cover Sheet

To: Ron Ryan

Company: EPA

Phone:

Fax: 919-541-0684

From: ~~Owen~~ Drey

Company: RMA

Phone: 202-682-4839 ✓ Tracey Harberg

Fax: 202-682-4854 ✓

Date: 5/27/97

Pages including this cover Page: 18 pages

Comments: Thank you for the return call. You can expect an official letter from the RMA expressing concern over the AP42 application time table. I hope that you will be able to get it on the bulletin board this week. Thank you.

Arkansas

meeting date: October 13, 1994

RMA attendees: Ernie Karger, Gates
Chris Conley, GenCorp
Arvis McKamie, Bridgestone/Firestone
Tom Wood, Cooper.

state attendees: gone J.B. Jones, Chief, Air Division
Cecil Harrell, Chief Engineer, Air Division
gone Karen Ekse, Engineer

state contact: Arkansas Department of Pollution Control and Ecology
PO Box 9583
Little Rock, Arkansas 77219

501.562.7444 voice

682-0744 info
682-7890 main
682-7891 FAX
501 682-0739 Air Division

ADEQ.STATE.AR.US

HARRELL

Georgia

meeting date: December 9, 1994

attendees: Tom Wood, Cooper
Dave Lawson, Freudenberg-NOK
Rick Cattanach, Standard Products

Laura Taylor got some files by e-mail 4-16-97

state contact: Marlin Lowry 404-363-7014 ⇒ Jack Taylor

Air Protection Branch
Environmental Protection Division
Georgia Department of Natural Resources
4244 International Parkway, Suite 120
Atlanta, Georgia 30354

permitting: 404-363-7022
air toxics: 363-7018

Illinois

meeting date: October 25, 1994

RMA attendees: John Finn, General
Kathy Bowley, Goodyear
Alva King, Bridgestone/Firestone
Keith Pearson, General;

state attendees: Donald Sutton, Manager, Permit Section – 2209?
Chris Romaine, Air Permit Coordinator – 2148
Dan Punzak, Air Permit Engineer – 2147
Jason Schnee, Air Toxics Group. – 2303

state contact: Donald E. Sutton – 217-782-2113
Manager, Permit Section
Air Pollution Control Division
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706

217-782-3397

EPA2209@EPA.STATE.IL.US

Indiana

meeting date: November 2, 1994

RMA attendees: Chris Conley, GenCorp
Dale Bertelson, GenCorp
Tom Wood, Cooper; Lynn Cooper, Michelin

state attendees: Donald Poole, Air Management, Permits Branch
Terrence Hoya, Air Management, Permits Branch
Mike Brooks, Air Management, Permits Branch/Air Toxics
Jon Bates, Air Management, Permits Branch/Air Toxics
Jean Beauchamp, IDEM Title V Implementaion
Roger Letterman, IDEM Permit Division, Title V.

state contact: Terrence Hoya
Indiana Department of Environmental Management
Office of Air Management – 317-233-0178
100 North Senate Avenue
PO Box 6015
Indianapolis, Indiana 46206-6015

THOYA @ DEM . STATE . IN . US

Iowa

meeting date: October 28, 1994

RMA attendees: Martin Trembly, Goodyear
Brian Monk, Goodyear.

state attendees: Dale Ziege, Chief, Permits Section
Paul Yeung, Engineer, New Source Review Unit
Krista M. Knight, Air Management Specialist
Glen Cook, Engineer

state contact: Pete Hamlin
515-281-8752 & e-mail
Iowa Department of Natural Resources
Air Quality Section
900 East Grand
Des Moines, Iowa 50319

Kansas

meeting date: October 19, 1994

RMA attendees: Nancy Ray Jandrokovic, Goodyear
Larry Kagel, CR Industries
Ernie Karger, Gates
Dale Louda, RMA

state attendees: Chuck Layman, Title V
Jan Sides, Emissions Calculation
Dana Morris, Emission Calculation

state contact: Charles Layman - 785-296-6422
Chief, Air Permitting
Bureau of Air and Radiation
Department of Health and Environment
Forbes Field, Building 740
Topeka, Kansas 66620

1 central
JIRWIN@KDHE.STATE.KS.US

Kentucky

meeting date: November 2, 1994

RMA attendees:
John Finn, General
Frank Praeger, Gates
Bill May, Gates
Ernie Karger, Gates
Gary Gandhok, General

state attendees:
Bill Dills, Manager, Permit Review Branch
Ken Hines, Manager, Program Planning, and Administration Branch - 502-573-3382
Roger Cook, Section Supervisor - e-mail ✓ 502-573-3382 x308
James Neal, Permit Reviewer

state contact:
James W. Dills 502-573-3382
Permit Review
Division for Air Quality
Department of Environmental Protection
803 Schenkel Lane
Frankfort, Kentucky 40601

502.573.3787 fax

Mississippi

meeting date: **December 13, 1994**

RMA attendees: **Tom Wood, Cooper Tire and Rubber**
Chuck Myskowski, Beloit Manhattan
John Hines, Avon North America

state attendees: **Don Watts, Mississippi Department of Environmental Quality**

DON_WATTS @ DEQ.STATE.MS.US 601-961-5171

Missouri

meeting: October 12, 1994

RMA attendees: Ernie Karger, Gates
Chris Conley, GenCorp.

state attendees: ~~Scott Honing~~ Barahanum Getahun — Haz Waste

state contact: Jefferson, Missouri

~~313.751.4817~~ voice

BGETAHUN @ MAIL. STATE. MO. US
DEQ
573 - 751-0763
Div. Air Qual
573 751-4817

Nebraska

meeting: October 20, 1994

RMA attendees: Dave Chapman, Goodyear
Jeff Epperson, Goodyear Lincoln
John Foged, Dayco McCook

state attendees: Joe Francis, Assistant Director, Environmental Quality
Susan Fields, Program Specialist
~~Jim Riddle~~, Supervisor; ~~Jim Foben~~, Environmental Engineer
Shelly Kaderly, Environmental Engineer
Darrel Harmon, Environmental Engineer

state contact: Joe Francis
Assistant Director
The Nebraska Department of Environmental Quality
The Atrium
1200 N Street
Suite 400
Lincoln, Nebraska 68508

North Carolina

meeting date: **November 8, 1994**

RMA attendees: **Alva King, Bridgestone/Firestone**
John Finn, Continental General
Lynn Cooper, Michelin
Kathy Bowley, Goodyear

State attendees: **Donald van der Vaart, Supervisor, Permitting, DEHNR**
William Willets, Environmental Engineer, DEHNR
John Evans, Environmental Engineer, DEHNR - 919-715-6252 - email ✓
Robert Tourville, Mecklenberg County Environmental Protection

state contact: **Donald van Der Vaart, Supervisor, Permitting, DEHNR**

Ohio

meeting date: **November 2, 1994**

RMA attendees:
Dave Chapman, Goodyear
Chuck Taylor, TRC
Ray Hahn, Cooper
Sanat Bhavsar, Yokohama
Rick Rupert, DTR
Mike McNally, General
Mary Trembly, Goodyear
Leo Fowler, Dayco

state attendees:
Bob Hodanbosi, Air Division Chief
Bill Juris, Engineering – e-mail ✓ 644-3593
Paul Koval, MACT
Sherri Swihart ✓

Darren Machuga got mixer files & text 6-10-97

state contact:
Bob Hodanbosi to e-mail
Chief, Air Pollution Control Division
Ohio EPA
1800 Watermark Drive
PO Box 163669
Columbus, Ohio 43216-3669

614-644-2270, 71, 72

Tennessee

meeting date: **February 7, 1995**

RMA attendees: **Dave Chapman, Goodyear**
Alva King, Bridgestone/Firestone

state attendees: **Rob Raney, Nashville Metro Agency**
Tupili Reddy, Tennessee DEC

state contact: **Tupile S. Reddy, P.E.**
Tennessee Department of Environment
Air Pollution Control Division
9th Floor, L & C Annex
401 Church Street
Nashville, Tennessee 37243-1531

- Pirelli-Armstrong Tire - no testing
- 615-340-5653
& conversation
1-800-511-7991
615-532-0220
532-0554
-0589
TReddy@MAIL.STATE.TN.US

Texas

meeting date: **April 5, 1995**

RMA attendees: **Dave Chapman, Goodyear**
Kathy Bowley, Goodyear
Ernest Davis, Kelly-Tyler Plant
Don Steelhammer, Kelly-Tyler Plant
Jon Hood, Kelly-Tyler Plant
Larry Minton, JM Clipper Corp.

state attendees: **Jeffrey Saitas**

512-239-5440

state contact: **Jeffrrey A. Saitas**
Program Director
New Source Review Program
Office of Air Quality
Texas Natural Resource Conservation Commission
Post Office Box 13087
Austin, Texas 78711-3087

JSAITAS @ THRCC. STATE.TX.US

Virginia

meeting date: October 12, 1994

RMA attendees: Sanat Bhavsar, Yokohama
Dave Chapman, Goodyear
Debbie Dauterman, Goodyear.

state attendees: Robert Beasley, Director, Office of Permit Evaluation
Tom Creasy, Jr., Environmental Engineer Consultant, Air Division

state contact: Robert L. Beasley — email ✓ 804-698-4115
Director, Office of Permit Evaluation
Department of Environmental Quality, Air Division 1-800-592-5482
4800 Cox Road, Innsbrook Corporate Center
Glen Allen, VA 23060

Wisconsin

meeting date: October 28, 1994

RMA attendees: Martin Trembly, Goodyear
Brian Monk, Goodyear.

state attendees: Dale Ziege, Chief, Permits Section
Paul Yeung, Engineer, New Source Review Unit - email ✓ 608-266-0672
Krista M. Knight, Air Management Specialist email ✓ 608-266-9857
~~Glen Cook~~, Engineer

state contact: Dale Ziege email ✓ - 608-267-7533
Chief, Air Permits Section
Bureau of Air Management
Wisconsin Department of Natural Resources
101 South Webster Street
Box 7921
Madison, WI 53707-7921

From: RON RYAN
To: RTPMAINHUB:RTPMAINHUB.INTERNET:"hddowns@deq.state.... [see attached info page for addressees & User Unknowns (4)]
Date: 12/30/97 4:22pm
Subject: Rubber Manufacturing Emission Factors

RR 1-6-98

On December 17, 1997 the USEPA's Emission Factors and Inventory Group posted a proposed draft AP-42 section for estimating air emissions from rubber manufacturing on our CHIEF web site for review and comment. (www.epa.gov/ttn/chief/ap42dsur.html)

You have received this e-mail because over the past year you have either attended a presentation given by the Rubber Manufacturer's Association (RMA) discussing the preliminary results of their studies, or because you have requested and received via e-mail from EPA an electronic copy of the RMA drafts. The README file for our web posting is attached to this e-mail for your information. It describes some minor formatting and nomenclature edits which have been made to the material you may have seen. We are requesting any comments on this material by February 28, 1998, if possible. We would be interested to know of any stack tests results (even if only for PM or VOC) for facilities in your area which may be useful in helping to evaluate the representativeness of the emission factors presented in the draft materials.

(Note to JIRWIN@KDHE - please forward this to Chuck Layman).

CC: RTPMAINHUB.INTERNET."tnorberg@aol.com"

ATTACHED TO E-MAIL: D04512RD.TXT

Mail Envelope Info: (34A96619.3AC : 15 : 15048)

Subject: Rubber Manufacturing Emission Factors
Creation Date: 12/30/97 4:22pm
From: RON RYAN

Created By: RTP10.RTPTSD:RYAN-RON

sent to personal email groups: RMA-recv RMA-read RMA-rd2

Recipients	Action	Date & Time
Post Office RTPMAINHUB	Transferred	12/30/97 04:25pm
No More Status		12/30/97 04:25pm
"bill.juris@epa.state.oh.us"		
"chaney.tom@acd.net" – dusty currie		
"cook@mail.nr.state.ky.us"		
Joe Francis – (have 3 others) not sent to, yet) 1/6/98 + Brent Lvebbe "DEQ184@vmhost.cdp.state.ne.us" < DEQ184 unknown [went to DEQSTAFF@Neb.]		
"DOLEHANM@STATE.MI.US" – mary ann dolehanty		
"hddowns@deq.state.va.us" – dean downs		
"john_evans@aq.ehnr.state.nc.us"		
"knighk@dnr.state.wi.us"		
"LOWVI@SNC-LAVALIN.COM" – victor		
"phamlin@max.state.ia.us"		
"ray.bishop@oklaosf.state.ok.us" ~~chuck cornell~~		
"richd@charlotte.deltaenv.com"		
"rlbeasley@deq.state.va.us"		
"sherri.swihart@epa.state.oh. us"		
"tnoteboo@neo.lrun.com" – terry noteboom		
"tomanda@ucarb.com" – drew		
"yeungp@dnr.state.wi.us"		
"zieged@dnr.state.wi.us"		

re-sent 1/6/98 to
DEQ028 – darrel harmon < user unknown
" 156 – shelley koderly
" 209 – swan fields
" 227 – brent lvebbe

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"air.laura_taylor@mail.dnr.state.ga.us"		
"air.marvin_lowry@mail.dnr.state.ga.us"		
"bgetahun@mail.state.mo.us"		
"chuck.cornell@oklaosf.state.ok.us"		
"darren_machuga@central.epa.ohio.gov"		
"DEQSTAFF@DOC.STATE.NE.us" ~~Brent Lvebbe~~		
"don_watts@deq.state.ms.us"		
"dpoole@state.in.us" < user unknown [went to 5 others in Indiana]		
"epa2147@epa.state.il.us" – dan punzak		
"epa2148@epa.state.il.us" – chris romaine		
"epa2209@epa.state.il.us" – ~~jason schnepp~~ donald sutton		
"epa2303@epa.state.il.us" – jason schnepp		
"harrell@adeq.state.ar.us" < user unknown [only Ark addressee]		
"jbates@dem.state.in.us"		
"jbeaucha@dem.state.in.us"		
"jirwin@kdhe.state.ks.us" – chuck Layman		
"jsaitas@tnrcc.state.tx.us"		
"mancarella_o@pns1.dep.state.fl.us" – owen mancarella		
"mbrooks@dem.state.in.us"		
"rletterm@dem.state.in.us"		
"ron29@ix.netcom.com"		
"thoya@dem.state.in.us"		
"tnorberg@aol.com" CC – rma		
"treddy@mail.state.tn.us" < user unknown [only TN addressee]		

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RTPMAINHUB.INTERNET		RTPMAINHUB.INTERNET

Files	Size	Date & Time
D04S12RD.TXT	7650	12/30/97 10:24am
MESSAGE	1153	12/30/97 04:22pm

File: D04S12RD.TXT

December 17, 1997

The USEPA's Emission Factors and Inventory Group (EFIG) is making available today for review and comment a draft proposed AP-42 section for the Manufacture of Rubber Products. This material does not replace any existing material in AP-42. We have labeled the draft as Chapter 4, Section 12. VOC emissions from such facilities have typically been estimated in the past by using a material balance approach with the assumption that 100% of the solvents present in cements, solvent tackifiers, and release agents would be emitted to the atmosphere. The draft section does not change that assumption - solvent emissions should still be estimated using such a material balance approach. The draft section provides emission factors for a number of chemicals that may or may not be a portion of the solvents, from processes both upstream and downstream of the solvent introduction steps. Thus, while there is potential for a small amount of emissions to be double-counted, it is recommended that the emissions estimated from the factors in the draft AP-42 section be added to the solvent material balance estimates to provide an overall emissions estimate.

This draft section is perhaps different from existing AP-42 sections in that it is the first time that a section developed by a group outside of the USEPA has been proposed for inclusion in AP-42. The Rubber Manufacturer's Association (RMA) submitted this material to EPA in November 1996 for consideration for inclusion in AP-42 under EFIG's Public Participation Plan (PPP). The submitted material consists of 31 electronic files (5.6MB) containing the emission factor tables, six electronic files (200KB) containing both the explanatory text for a draft AP-42 section and a draft background report, and a four-volume hard copy report containing more detailed summaries of the test protocol and results. The actual "raw" test reports amount to13 file cabinets of hard copy materials, and are available for viewing by EPA at the offices of an RMA contractor. EFIG has not requested to view these files as yet.

The electronic portions of these materials have been transmitted via e-mail to a number of State air agencies and consultants by EFIG over the past several months upon request. The requestors were told that the information was developed and submitted by RMA, that it had not received the EFIG oversight and review that might be typical for AP-42 sections, but also that we knew of no reason to doubt the veracity of the information, and that we knew of no other data sources to suggest for estimating these emissions. For these reasons, the electronic files described above have been transmitted for review and use at the requestor's discretion, while trying to make it clear that the material does not have any EPA "blessing" that may be perceived by the requestor solely because the material was provided to them by EPA. This continues to be EFIG's position on these materials.

Users of the RMA-developed material or of existing AP-42 sections developed by EFIG should be aware that there is, in fact, no EPA "blessing", guarantee, or enhanced legal status afforded to material published by EPA, although we hope that in the absence of site-specific tests or other significant relevant and credible information that AP-42 will provide a useful benchmark. The decision on whether this data is sufficient for any particular use must be made by the source and the regulating agency considering the use. Users should be aware that any emission factor is simply an average of results from similar sources, and that individual source results will vary over time and may be significantly higher or lower than the average.

Send comments to:

Ron Ryan
U.S. EPA (MD-14)
RTP, NC 27711
Phone - (919) 541-4330
FAX - (919) 541-0684
EMAIL - ryan.ron@epamail.epa.gov

The files provided as part of this draft AP-42 section and its associated background report have been slightly reformatted and re-named from the files that were submitted by RMA and transmitted to requestors. The files provided today and their relation to earlier files is as follows:

File Name	Contains
D04S12.ZIP	PKZIP file containing this text file (D04S12RD.TXT), the

background report (D04S12B.WPD), and the draft AP-42 section (D04S12A.WPD + 31 .WPD files containing the emission factor tables).

D04S12B.WPD the background report for the draft AP-42 section, created by combining the files labeled by RMA as VOL1.1, VOL1.2, VOL1.3, and VOL1.4. Text contained in file VOL1.2 which duplicated text in the draft AP-42 section has been removed for simplicity.

D04S12A.WPD the explanatory text portion of the draft AP-42 section, created from the file labeled by RMA as VOL2.1. Only minor editorial changes and changes to the page and section numbering formats have been made at this time. A table (4.12-3) providing a key to the 31 emission factor files considered part of the complete draft AP-42 section has also been added. A list of the 31 ef table files included as part of the draft AP-42 section and the ZIP file is provided below.

31 EF Tables (See list below) WPD files with the same names as those supplied by RMA and transmitted to requestors. In addition to Table and page numbers being added, all efs previously shown as "0.00e+00" now show as "<", indicating less than detection limit, and the first ef line of each table, previously labeled "Total VOC", has been relabeled "Total Method 25A Organics", because these numbers appear to be M25A results, rather than a summation of all GC-speciated organics which are not exempted from EPA's definition of "VOC".

MIX1.WPD	1 - 6	Table 4.12-4 Internal Mixing & Milling
MIX2.WPD	7 - 12	
MIX3.WPD	13 - 18	
MIX4.WPD	19 - 23	
MILLING1.WPD	1 - 6	Table 4.12-5 Milling
MILLING2.WPD	7 - 13	
MILLING3.WPD	14 - 19	
MILLING4.WPD	20 - 23	
EXTRUD1.WPD	1 - 6	Table 4.12-6 Extruder
EXTRUD2.WPD	7 - 12	
EXTRUD3.WPD	13 - 18	
EXTRUD4.WPD	19 - 23	
CALEND1.WPD	1 - 7	Table 4.12-7 Calender
CALEND2.WPD	8 - 13	
CALEND3.WPD	14 - 20	
CALEND4.WPD	21 - 23	
PLATEN1.WPD	1 - 6	Table 4.12-8 Platen Press Curing
PLATEN2.WPD	7 - 12	
PLATEN3.WPD	13 - 18	
PLATEN4.WPD	19 - 23	
AUTOCLV1.WPD	1 - 6	Table 4.12-9 Autoclave Curing
AUTOCLV2.WPD	7 - 12	
AUTOCLV3.WPD	13 - 18	
AUTOCLV4.WPD	19 - 23	
HOTAIR1.WPD	1 - 6	Table 4.12-10 Hot Air Cure
HOTAIR2.WPD	7 - 12	
HOTAIR3.WPD	13 - 18	
HOTAIR4.WPD	19 - 23	
TIRECUR1.WPD	A - F	Table 4.12-11 TireCure
TIRECUR2.WPD	G - I	
GRIND.WPD		Table 4.12-12 Grinding Operations

END

benzidine
$VC – shows up ONLY for #15 – must have been measured?
Acetaldehyde – shows #1 & #15] only
+1,3 – shows #5

WHAT CMPDS WERE NOT EXTRM?

Acetonitrile – #19
Acrolein – 13, 14, 21, 22

Table 4.12-4.

INTERNAL MIXING & MILLING HAP EMISSION FACTOR SUMMARY

remove shade

Analyte Name	CAS #	Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
Total ~~VOC~~ Meth 25A		6.17e-05	3.91e-05	1.36e-04	3.88e-05	2.15e-04	3.86e-05
Total Speciated Organics		5.08e-05	5.53e-05	8.92e-05	5.31e-05	6.18e-05	9.84e-05
Total Organic HAPs		2.10e-05	1.33e-05	5.90e-05	2.54e-05	4.19e-05	4.87e-05
Total Metal HAPs		9.67e-08	9.71e-09	1.74e-07	7.06e-08	7.72e-08	6.43e-09
Total HAPs		2.11e-05	1.33e-05	5.91e-05	2.55e-05	4.19e-05	4.87e-05
Total Particulate Matter		1.75e-04	4.02e-04	9.00e-04	3.00e-04	9.25e-04	4.00e-04
1,1,1-Trichloroethane	71-55-6	0.00e+00	8.03e-08	3.19e-07	4.23e-08	1.84e-07	0.00e+00
1,1,2,2-Tetrachloroethane	79-34-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1,2-Trichloroethane	79-00-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1-Dichloroethane	75-34-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1-Dichloroethene	75-35-4	0.00e+00	0.00e+00	0.00e+00	5.47e-07	0.00e+00	0.00e+00
1,2,4-Trichlorobenzene	120-82-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dibromo-3-Chloropropane	96-12-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dibromoethane	106-93-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dichloroethane	107-06-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dichloropropane	78-87-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,3-Butadiene	106-99-0	9.78e-08	0.00e+00	0.00e+00	2.17e-07	0.00e+00	0.00e+00
1,4-Dichlorobenzene	106-46-7	0.00e+00	0.00e+00	2.86e-09	7.30e-10	1.52e-09	1.22e-09
1,4-Dioxane	123-91-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,4-Phenylenediamine	106-50-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4,5-Trichlorophenol	95-95-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4,6-Trichlorophenol	88-06-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4-Dinitrophenol	51-28-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4-Dinitrotoluene	121-14-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

replace w/ 10 #2

INTERNAL MIXING & MILLING
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
2-Butanone	78-93-3	5.91e-06	1.59e-06	9.01e-07	2.74e-06	1.53e-06	4.40e-07
2-Chloroacetophenone	532-27-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2-Methylphenol	95-48-7	0.00e+00	0.00e+00	8.64e-08	8.34e-10	1.30e-08	6.00e-09
3,3'-Dichlorobenzidine	91-94-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
3,3'-Dimethoxybenzidine	119-90-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
3,3'-Dimethylbenzidine	119-93-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4,4'-Methylenedianiline	101-77-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Aminobiphenyl	92-67-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Methyl-2-Pentanone	108-10-1	0.00e+00	1.97e-07	1.26e-05	1.49e-05	0.00e+00	3.06e-05
4-Nitrobiphenyl	92-93-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Nitrophenol	100-02-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
a,a,a-Trichlorotoluene	98-07-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetaldehyde	75-07-0	6.95e-07	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetaldehyde + Isobutane		0.00e+00	0.00e+00	0.00e+00	0.00e+00	6.12e-07	0.00e+00
Acetonitrile	75-05-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetophenone	98-86-2	2.32e-06	2.13e-08	5.13e-08	3.75e-09	1.85e-08	7.67e-08
Acrolein	107-02-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acrylonitrile	107-13-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Allyl Chloride	107-05-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Aniline	62-53-3	0.00e+00	4.80e-07	0.00e+00	4.30e-07	0.00e+00	9.97e-08
Benzene	71-43-2	5.46e-08	4.62e-08	1.13e-07	1.14e-07	2.98e-07	0.00e+00
Benzidine	92-87-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Benzyl Chloride	100-44-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Biphenyl	92-52-4	0.00e+00	0.00e+00	5.63e-08	5.42e-09	0.00e+00	1.17e-08

INTERNAL MIXING & MILLING
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
bis(2-Chloroethyl)ether	111-44-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
bis(2-Ethylhexyl)phthalate	117-81-7	3.91e-08	3.01e-08	1.19e-07	0.00e+00	2.29e-08	1.79e-07
Bromoform	75-25-2	2.78e-07	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Bromomethane	74-83-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cadmium (Cd) Compounds		9.35e-09	2.40e-09	7.01e-09	2.55e-09	5.05e-09	2.18e-09
Carbon Disulfide	75-15-0	0.00e+00	0.00e+00	0.00e+00	1.99e-07	1.84e-07	3.83e-06
Carbon Tetrachloride	56-23-5	0.00e+00	0.00e+00	1.19e-07	0.00e+00	0.00e+00	0.00e+00
Carbonyl Sulfide	463-58-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	5.34e-07	1.59e-06
Chlorobenzene	108-90-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloroethane	75-00-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloroform	67-66-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloromethane	74-87-3	0.00e+00	3.12e-08	0.00e+00	2.98e-08	0.00e+00	3.25e-07
Chromium (Cr) Compounds		3.18e-08	6.99e-09	5.91e-08	2.38e-08	2.72e-08	4.26e-09
Cumene	98-82-8	2.92e-09	0.00e+00	4.00e-09	1.67e-09	1.41e-09	1.21e-08
Di-n-butylphthalate	84-74-2	8.00e-08	1.61e-08	5.49e-08	0.00e+00	0.00e+00	1.50e-08
Dibenzofuran	132-64-9	0.00e+00	2.11e-09	3.42e-08	1.41e-09	0.00e+00	3.31e-09
Dimethylaminoazobenzene	60-11-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Dimethylphthalate	131-11-3	0.00e+00	0.00e+00	1.57e-08	1.56e-09	0.00e+00	0.00e+00
Epichlorohydrin	106-89-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ethyl Acrylate	140-88-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ethylbenzene	100-41-4	0.00e+00	1.45e-07	2.13e-07	1.17e-07	1.18e-07	2.43e-07
Hexachlorobenzene	118-74-1	0.00e+00	0.00e+00	9.29e-09	0.00e+00	0.00e+00	0.00e+00
Hexachlorobutadiene	87-68-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexachlorocyclopentadiene	77-47-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

INTERNAL MIXING & MILLING
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
Hexachloroethane	67-72-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexane	110-54-3	8.24e-06	1.08e-06	1.58e-06	1.56e-06	5.91e-06	1.49e-06
Hydroquinone	123-31-9	0.00e+00	0.00e+00	0.00e+00	8.10e-07	2.62e-05	0.00e+00
Isooctane	540-84-1	8.95e-08	7.69e-07	2.87e-07	9.60e-08	1.03e-07	1.59e-07
Isophorone	78-59-1	0.00e+00	6.63e-07	0.00e+00	5.93e-08	0.00e+00	0.00e+00
Lead (Pb) Compounds		6.35e-09	3.24e-10	1.25e-08	3.42e-09	2.03e-08	0.00e+00
m-Xylene + p-Xylene —		2.62e-07	5.79e-07	7.11e-07	5.15e-07	4.11e-07	6.24e-07
Methylene bis-chloroaniline	101-14-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Methylene Chloride	75-09-2	1.10e-06	9.51e-07	3.86e-05	1.86e-06	4.18e-07	2.49e-06
N,N-Dimethylaniline	121-69-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
N-Nitrosodimethylamine	62-75-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
N-Nitrosomorpholine	59-89-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Naphthalene	91-20-3	2.50e-08	3.33e-08	3.08e-07	1.73e-08	2.52e-07	5.11e-08
Nickel (Ni) Compounds		4.92e-08	0.00e+00	9.53e-08	4.09e-08	2.47e-08	0.00e+00
Nitrobenzene	98-95-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
o-Anisidine	90-04-0	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
o-Toluidine	95-53-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.23e-07
o-Xylene —	95-47-6	9.60e-08	3.89e-07	3.20e-07	3.77e-07	1.52e-07	9.51e-07
Pentachloronitrobenzene	82-68-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pentachlorophenol	87-86-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Phenol	108-95-2	7.21e-08	4.90e-08	2.77e-07	1.47e-08	7.61e-07	4.43e-08
Propanal	123-38-6	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Propylene Oxide	75-56-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Styrene	100-42-5	0.00e+00	0.00e+00	0.00e+00	4.44e-08	0.00e+00	4.25e-06

INTERNAL MIXING & MILLING
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
t-Butyl Methyl Ether	1634-04-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	3.25e-07
Tetrachloroethene	127-18-4	0.00e+00	4.10e-06	9.65e-08	6.59e-08	0.00e+00	1.01e-07
Toluene	108-88-3	1.65e-06	2.06e-06	2.11e-06	5.99e-07	1.73e-06	5.45e-07
Trichloroethene	79-01-6	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Trifluralin	1582-09-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Vinyl Acetate	108-05-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.35e-06	0.00e+00
Vinyl Chloride	75-01-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Emission factor is a combination of emissions from productive and non-productive passes. Emissions from non-productive mixing are approximately 90% of the total.

Particulate matter collection efficiency of 99.3% was observed on a baghouse control device used on this process.

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MIXI.WPD

FORMALDEHYDE OR ALDEHYDE TESTED FOR?

(N. TABLE #'S)

what is separate set for?

old file?

INTERNAL MIXING & MILLING
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
Total VOC – 25A? or reg defn?		6.17e-05	3.91e-05	1.36e-04	3.88e-05	2.15e-04	3.86e-05
Total Speciated Organics		5.08e-05	5.53e-05	8.92e-05	5.31e-05	6.18e-05	9.84e-05
Total Organic HAPs		2.10e-05	1.33e-05	5.90e-05	2.54e-05	4.19e-05	4.87e-05
Total Metal HAPs		9.67e-08	9.71e-09	1.74e-07	7.06e-08	7.72e-08	6.43e-09
Total HAPs		2.11e-05	1.33e-05	5.91e-05	2.55e-05	4.19e-05	4.87e-05
Total Particulate Matter		2.45e-03	4.16e-03	1.11e-02	3.90e-03	1.36e-02	5.41e-03
1,1,1-Trichloroethane	71-55-6	0.00e+00	8.03e-08	3.19e-07	4.23e-08	1.84e-07	0.00e+00
1,1,2,2-Tetrachloroethane	79-34-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1,2-Trichloroethane	79-00-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1-Dichloroethane	75-34-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1-Dichloroethene	75-35-4	0.00e+00	0.00e+00	0.00e+00	5.47e-07	0.00e+00	0.00e+00
1,2,4-Trichlorobenzene	120-82-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dibromo-3-Chloropropane	96-12-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dibromoethane	106-93-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dichloroethane	107-06-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dichloropropane	78-87-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,3-Butadiene	106-99-0	9.78e-08	0.00e+00	0.00e+00	2.17e-07	0.00e+00	0.00e+00
1,4-Dichlorobenzene	106-46-7	0.00e+00	0.00e+00	2.86e-09	7.30e-10	1.52e-09	1.22e-09
1,4-Dioxane	123-91-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,4-Phenylenediamine	106-50-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4,5-Trichlorophenol	95-95-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4,6-Trichlorophenol	88-06-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4-Dinitrophenol	51-28-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4-Dinitrotoluene	121-14-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

ND LIMITS?

INTERNAL MIXING & MILLING
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
2-Butanone	78-93-3	5.91e-06	1.59e-06	9.01e-07	2.74e-06	1.53e-06	4.40e-07
2-Chloroacetophenone	532-27-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2-Methylphenol	95-48-7	0.00e+00	0.00e+00	8.64e-08	8.34e-10	1.30e-08	6.00e-09
3,3'-Dichlorobenzidine	91-94-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
3,3'-Dimethoxybenzidine	119-90-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
3,3'-Dimethylbenzidine	119-93-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4,4'-Methylenedianiline	101-77-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Aminobiphenyl	92-67-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Methyl-2-Pentanone	108-10-1	0.00e+00	1.97e-07	1.26e-05	1.49e-05	0.00e+00	3.06e-05
4-Nitrobiphenyl	92-93-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Nitrophenol	100-02-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
a,a,a-Trichlorotoluene	98-07-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetaldehyde	75-07-0	6.95e-07	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetaldehyde + Isobutane		0.00e+00	0.00e+00	0.00e+00	0.00e+00	6.12e-07	0.00e+00
Acetonitrile	75-05-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetophenone	98-86-2	2.32e-06	2.13e-08	5.13e-08	3.75e-09	1.85e-08	7.67e-08
Acrolein	107-02-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acrylonitrile	107-13-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Allyl Chloride	107-05-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Aniline	62-53-3	0.00e+00	4.80e-07	0.00e+00	4.30e-07	0.00e+00	9.97e-08
Benzene	71-43-2	5.46e-08	4.62e-08	1.13e-07	1.14e-07	2.98e-07	0.00e+00
Benzidine	92-87-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Benzyl Chloride	100-44-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Biphenyl	92-52-4	0.00e+00	0.00e+00	5.63e-08	5.42e-09	0.00e+00	1.17e-08

INTERNAL MIXING & MILLING
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
bis(2-Chloroethyl)ether	111-44-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
bis(2-Ethylhexyl)phthalate	117-81-7	3.91e-08	3.01e-08	1.19e-07	0.00e+00	2.29e-08	1.79e-07
Bromoform	75-25-2	2.78e-07	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Bromomethane	74-83-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cadmium (Cd) Compounds		9.35e-09	2.40e-09	7.01e-09	2.55e-09	5.05e-09	2.18e-09
Carbon Disulfide	75-15-0	0.00e+00	0.00e+00	0.00e+00	1.99e-07	1.84e-07	3.83e-06
Carbon Tetrachloride	56-23-5	0.00e+00	0.00e+00	1.19e-07	0.00e+00	0.00e+00	0.00e+00
Carbonyl Sulfide	463-58-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	5.34e-07	1.59e-06
Chlorobenzene	108-90-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloroethane	75-00-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloroform	67-66-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloromethane	74-87-3	0.00e+00	3.12e-08	0.00e+00	2.98e-08	0.00e+00	3.25e-07
Chromium (Cr) Compounds		3.18e-08	6.99e-09	5.91e-08	2.38e-08	2.72e-08	4.26e-09
Cumene	98-82-8	2.92e-09	0.00e+00	4.00e-09	1.67e-09	1.41e-09	1.21e-08
Di-n-butylphthalate	84-74-2	8.00e-08	1.61e-08	5.49e-08	0.00e+00	0.00e+00	1.50e-08
Dibenzofuran	132-64-9	0.00e+00	2.11e-09	3.42e-08	1.41e-09	0.00e+00	3.31e-09
Dimethylaminoazobenzene	60-11-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Dimethylphthalate	131-11-3	0.00e+00	0.00e+00	1.57e-08	1.56e-09	0.00e+00	0.00e+00
Epichlorohydrin	106-89-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ethyl Acrylate	140-88-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ethylbenzene	100-41-4	0.00e+00	1.45e-07	2.13e-07	1.17e-07	1.18e-07	2.43e-07
Hexachlorobenzene	118-74-1	0.00e+00	0.00e+00	9.29e-09	0.00e+00	0.00e+00	0.00e+00
Hexachlorobutadiene	87-68-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexachlorocyclopentadiene	77-47-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

INTERNAL MIXING & MILLING
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
Hexachloroethane	67-72-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexane	110-54-3	8.24e-06	1.08e-06	1.58e-06	1.56e-06	5.91e-06	1.49e-06
Hydroquinone	123-31-9	0.00e+00	0.00e+00	0.00e+00	8.10e-07	2.62e-05	0.00e+00
Isooctane	540-84-1	8.95e-08	7.69e-07	2.87e-07	9.60e-08	1.03e-07	1.59e-07
Isophorone	78-59-1	0.00e+00	6.63e-07	0.00e+00	5.93e-08	0.00e+00	0.00e+00
Lead (Pb) Compounds		6.35e-09	3.24e-10	1.25e-08	3.42e-09	2.03e-08	0.00e+00
m-Xylene + p-Xylene		2.62e-07	5.79e-07	7.11e-07	5.15e-07	4.11e-07	6.24e-07
Methylene bis-chloroaniline	101-14-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Methylene Chloride	75-09-2	1.10e-06	9.51e-07	3.86e-05	1.86e-06	4.18e-07	2.49e-06
N,N-Dimethylaniline	121-69-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
N-Nitrosodimethylamine	62-75-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
N-Nitrosomorpholine	59-89-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Naphthalene	91-20-3	2.50e-08	3.33e-08	3.08e-07	1.73e-08	2.52e-07	5.11e-08
Nickel (Ni) Compounds		4.92e-08	0.00e+00	9.53e-08	4.09e-08	2.47e-08	0.00e+00
Nitrobenzene	98-95-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
o-Anisidine	90-04-0	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
o-Toluidine	95-53-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.23e-07
o-Xylene	95-47-6	9.60e-08	3.89e-07	3.20e-07	3.77e-07	1.52e-07	9.51e-07
Pentachloronitrobenzene	82-68-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pentachlorophenol	87-86-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Phenol	108-95-2	7.21e-08	4.90e-08	2.77e-07	1.47e-08	7.61e-07	4.43e-08
Propanal	123-38-6	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Propylene Oxide	75-56-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Styrene	100-42-5	0.00e+00	0.00e+00	0.00e+00	4.44e-08	0.00e+00	4.25e-06

INTERNAL MIXING & MILLING
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Cmpd #1 lb/lb rubber	Cmpd #2 lb/lb rubber	Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
t-Butyl Methyl Ether	1634-04-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	3.25e-07
Tetrachloroethene	127-18-4	0.00e+00	4.10e-06	9.65e-08	6.59e-08	0.00e+00	1.01e-07
Toluene	108-88-3	1.65e-06	2.06e-06	2.11e-06	5.99e-07	1.73e-06	5.45e-07
Trichloroethene	79-01-6	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Trifluralin	1582-09-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Vinyl Acetate	108-05-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.35e-06	0.00e+00
Vinyl Chloride	75-01-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Emission factor is a combination of emissions from productive and non-productive passes. Emissions from non-productive mixing are approximately 90% of the total.

Particulate matter collection efficiency of 99.3% was observed on a baghouse control device used on this process.

"GRIND" - on disk w/ EXTRUD

Table 4.12-12.

GRINDING OPERATIONS
HAP EMISSION FACTOR SUMMARY

3 points were tested — ALL had some type of controls

ODD THAT THESE ARE SIMILAR EVEN THOUGH ON DIFF DENOMINATOR

Analyte Name	CAS #	Belt lb/lb rubber removed	Carcass lb/lb rubber removed	Retread lb/lb rubber processed	Sidewall / Whitewall lb/lb rubber removed
Total VOC M25A		1.78e-03	5.21e-04	2.43e-04	1.59e-02
Total Speciated Organics		2.66e-03	1.63e-02	6.36e-04	1.10e-02
Total Organic HAPs		2.15e-03	1.39e-02	1.33e-05	1.12e-03
Total Metal HAPs		1.34e-05	6.35e-06	6.44e-08	3.72e-05
Total HAPs		2.17e-03	1.39e-02	1.33e-05	1.16e-03
Total Particulate Matter		2.26e-04	5.45e-01	9.09e-07	1.96e-04
1,1,1-Trichloroethane	71-55-6.	0.00e+00	3.58e-07	2.19e-08	0.00e+00
1,1,2,2-Tetrachloroethane	79-34-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1,2-Trichloroethane	79-00-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1-Dichloroethane	75-34-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1-Dichloroethene	75-35-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2,4-Trichlorobenzene	120-82-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dibromo-3-Chloropropane	96-12-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dibromoethane	106-93-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dichloroethane	107-06-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dichloropropane	78-87-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,3-Butadiene	106-99-0	2.41e-05	2.65e-05	4.39e-08	2.40e-05
1,4-Dichlorobenzene	106-46-7	0.00e+00	0.00e+00	6.77e-09	0.00e+00
1,4-Dioxane	123-91-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,4-Phenylenediamine	106-50-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4,5-Trichlorophenol	95-95-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4,6-Trichlorophenol	88-06-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4-Dinitrophenol	51-28-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4-Dinitrotoluene	121-14-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2-Butanone	78-93-3	6.22e-06	5.13e-07	1.51e-08	2.97e-05

← EXPAND TITLES

— CONTROLLED OR UNCONTROL.?

5 lbs emitted per lb collected? doesn't match collection efficiency

Does not seem to sum

which are ... which are semivolatile?

0.636 lb/1000 lbs ... 16.3 ... lbs rem.

30 lbs/tire ... x30 = 19 lb/1000 tires

or 16.3 ...

x 158

GRINDING OPERATIONS
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Belt lb/lb rubber removed	Carcass lb/lb rubber removed	Retread lb/lb rubber processed	Sidewall / Whitewall lb/lb rubber removed
2-Chloro-1,3-Butadiene	126-99-8	8.16e-05	0.00e+00	0.00e+00	0.00e+00
2-Chloroacetophenone	532-27-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2-Methylphenol	95-48-7	0.00e+00	0.00e+00	3.91e-09	0.00e+00
3,3'-Dichlorobenzidine	91-94-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00
3,3'-Dimethoxybenzidine	119-90-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00
3,3'-Dimethylbenzidine	119-93-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4,4'-Methylenedianiline	101-77-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Aminobiphenyl	92-67-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Methyl-2-pentanone	108-10-1	0.00e+00	1.92e-05	8.44e-07	0.00e+00
4-Nitrobiphenyl	92-93-3	3.80e-07	0.00e+00	0.00e+00	0.00e+00
4-Nitrophenol	100-02-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00
a,a,a-Trichlorotoluene	98-07-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetaldehyde	75-07-0	1.53e-05	0.00e+00	0.00e+00	0.00e+00
Acetonitrile	75-05-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetophenone	98-86-2	1.77e-05	7.13e-07	1.89e-08	3.37e-06
Acrolein	107-02-8	6.44e-06	1.68e-06	4.70e-07	0.00e+00
Acrylonitrile	107-13-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Allyl Chloride	107-05-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Aniline	62-53-3	0.00e+00	1.97e-05	6.66e-08	4.05e-04
Benzene	71-43-2	0.00e+00	4.13e-06	9.96e-06	1.33e-05
Benzidine	92-87-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Benzyl Chloride	100-44-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Biphenyl	92-52-4	0.00e+00	0.00e+00	6.63e-09	0.00e+00
bis(2-Chloroethyl)ether	111-44-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00
bis(2-Ethylhexyl)phthalate	117-81-7	5.30e-05	7.94e-06	1.99e-08	2.76e-05

GRINDING OPERATIONS
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Belt lb/lb rubber removed	Carcass lb/lb rubber removed	Retread lb/lb rubber processed	Sidewall / Whitewall lb/lb rubber removed
Bromoform	75-25-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Bromomethane	74-83-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Cadmium (Cd) Compounds		1.40e-07	8.58e-07	0.00e+00	7.38e-07
Carbon Disulfide	75-15-0	3.03e-04	2.58e-06	6.77e-07	1.90e-05
Carbon Tetrachloride	56-23-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Carbonyl Sulfide	463-58-1	7.14e-06	8.70e-06	0.00e+00	0.00e+00
Chlorobenzene	108-90-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloroethane	75-00-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloroform	67-66-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloromethane	74-87-3	0.00e+00	0.00e+00	7.12e-09	0.00e+00
Chromium (Cr) Compounds		2.58e-06	1.44e-06	3.79e-08	1.34e-05
Cobalt (Co) Compounds		0.00e+00	0.00e+00	8.74e-09	0.00e+00
Cumene	98-82-8	0.00e+00	0.00e+00	0.00e+00	1.13e-06
Di-n-butylphthalate	84-74-2	3.31e-06	2.24e-06	3.87e-08	2.54e-06
Dibenzofuran	132-64-9	0.00e+00	1.59e-07	0.00e+00	0.00e+00
Dimethylaminoazobenzene	60-11-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Dimethylphthalate	131-11-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Epichlorohydrin	106-89-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ethylbenzene	100-41-4	0.00e+00	0.00e+00	0.00e+00	5.70e-05
Hexachlorobenzene	118-74-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexachlorobutadiene	87-68-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexachlorocyclopentadiene	77-47-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexachloroethane	67-72-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexane	110-54-3	4.18e-05	1.60e-05	0.00e+00 ?	1.24e-04
Hydroquinone	123-31-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00

3/60

GRINDING OPERATIONS
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Belt lb/lb rubber removed	Carcass lb/lb rubber removed	Retread lb/lb rubber processed	Sidewall / Whitewall lb/lb rubber removed
Isooctane	540-84-1	0.00e+00	1.09e-05	0.00e+00	1.15e-04
Isophorone	78-59-1	0.00e+00	0.00e+00	6.46e-09	0.00e+00
Lead (Pb) Compounds		1.59e-06	2.02e-06	0.00e+00	1.55e-05
m-Xylene + p-Xylene		8.51e-06	2.23e-06	5.36e-08	3.18e-05
Methylene bis-chloroaniline	101-14-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Methylene Chloride	75-09-2	4.98e-05	4.19e-03	1.67e-07	2.76e-05
N,N-Dimethylaniline	121-69-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00
N-Nitrosodimethylamine	62-75-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00
N-Nitrosomorpholine	59-89-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Naphthalene	91-20-3	4.02e-06	5.81e-07	2.11e-08	3.81e-06
Nickel (Ni) Compounds		9.13e-06	2.03e-06	1.78e-08	7.51e-06
Nitrobenzene	98-95-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00
o-Anisidine	90-04-0	0.00e+00	0.00e+00	0.00e+00	0.00e+00
o-Toluidine	95-53-4	0.00e+00	2.55e-06	0.00e+00	0.00e+00
o-Xylene	95-47-6	5.40e-06	0.00e+00	4.17e-08	1.86e-05
Pentachloronitrobenzene	82-68-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pentachlorophenol	87-86-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Phenol	108-95-2	8.88e-06	1.66e-06	3.04e-07	1.57e-05
Propylene Oxide	75-56-9	3.06e-05	0.00e+00	0.00e+00	0.00e+00
Styrene	100-42-5	0.00e+00	0.00e+00	9.86e-08	1.69e-05
t-Butyl Methyl Ether	1634-04-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tetrachloroethene	127-18-4	1.39e-04	0.00e+00	7.58e-09	0.00e+00
Toluene	108-88-3	1.35e-03	9.59e-03	3.82e-07	1.86e-04
Trichloroethene	79-01-6	0.00e+00	1.95e-06	0.00e+00	0.00e+00
Trifluralin	1582-09-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00

GRINDING OPERATIONS
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Belt lb/lb rubber removed	Carcass lb/lb rubber removed	Retread lb/lb rubber processed	Sidewall / Whitewall lb/lb rubber removed
Vinyl Acetate	108-05-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Vinyl Chloride	75-01-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Sidewall, carcass, and belt grinding are reported in pounds emitted per pound of rubber removed or ground-off.

Retread buffing is reported in pounds emitted per pound of rubber processed.

Particulate Matter Control:

Sidewall by cyclone - 91.9%
Carcass by cyclone - 97.8%
Belt by cyclone and ESP - 99.97%
Retread by cyclone and baghouse - 97.9%

For uncontrolled PM emissions sidewall, carcass or belt use a factor of 1.0 lb emitted per pound of rubber removed.

How about Retread?

HOTAIR1.WPD

4.12-10

HOT AIR CURE
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Interpolated Cmpd #1 lb/lb rubber	Interpolated Cmpd #2 lb/lb rubber	Interpolated Cmpd #3 lb/lb rubber	Interpolated Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Interpolated Cmpd #6 lb/lb rubber
Total VOC		3.46e-03	2.19e-03	7.62e-03	2.17e-03	9.37e-04	2.17e-03
Total Speciated Organics		1.25e-03	1.36e-03	2.20e-03	1.31e-03	7.50e-04	2.42e-03
Total HAPs		5.18e-04	3.28e-04	1.45e-03	6.25e-04	3.65e-05	1.20e-03
Total Organic HAPs		5.18e-04	3.28e-04	1.45e-03	6.25e-04	3.65e-05	1.20e-03
1,1,1-Trichloroethane	71-55-6	0.00e+00	1.98e-06	7.85e-06	1.04e-06	1.12e-06	0.00e+00
1,1,2,2-Tetrachloroethane	79-34-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1,2-Trichloroethane	79-00-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1-Dichloroethane	75-34-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1-Dichloroethene	75-35-4	0.00e+00	0.00e+00	0.00e+00	1.35e-05	0.00e+00	0.00e+00
1,2,4-Trichlorobenzene	120-82-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dibromo-3-Chloropropane	96-12-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dibromoethane	106-93-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dichloroethane	107-06-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dichloropropane	78-87-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,3-Butadiene	106-99-0	2.41e-06	0.00e+00	0.00e+00	5.34e-06	0.00e+00	0.00e+00
1,4-Dichlorobenzene	106-46-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,4-Dioxane	123-91-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,4-Phenylenediamine	106-50-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4,5-Trichlorophenol	95-95-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4,6-Trichlorophenol	88-06-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4-Dinitrophenol	51-28-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4-Dinitrotoluene	121-14-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2-Butanone	78-93-3	1.46e-04	3.92e-05	2.22e-05	6.74e-05	1.62e-06	1.08e-05
2-Chloroacetophenone	532-27-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

+122

HOT AIR CURE
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Interpolated Cmpd #1 lb/lb rubber	Interpolated Cmpd #2 lb/lb rubber	Interpolated Cmpd #3 lb/lb rubber	Interpolated Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Interpolated Cmpd #6 lb/lb rubber
2-Methylphenol	95-48-7	0.00e+00	0.00e+00	2.13e-06	2.05e-08	0.00e+00	1.48e-07
3,3'-Dichlorobenzidine	91-94-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
3,3'-Dimethoxybenzidine	119-90-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
3,3'-Dimethylbenzidine	119-93-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4,4'-Methylenedianiline	101-77-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Aminobiphenyl	92-67-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Methyl-2-pentanone	108-10-1	0.00e+00	4.85e-06	3.09e-04	3.67e-04	0.00e+00	7.54e-04
4-Nitrobiphenyl	92-93-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Nitrophenol	100-02-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
a,a,a-Trichlorotoluene	98-07-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetaldehyde	75-07-0	1.71e-05	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetonitrile	75-05-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	6.31e-07	0.00e+00
Acetophenone	98-86-2	5.71e-05	5.25e-07	1.26e-06	9.24e-08	3.06e-07	1.89e-06
Acrolein	107-02-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	7.92e-07	0.00e+00
Acrylonitrile	107-13-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Allyl Chloride	107-05-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Aniline	62-53-3	0.00e+00	1.18e-05	0.00e+00	1.06e-05	0.00e+00	2.46e-06
Benzene	71-43-2	1.35e-06	1.14e-06	2.79e-06	2.82e-06	1.46e-06	0.00e+00
Benzidine	92-87-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Benzyl Chloride	100-44-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Biphenyl	92-52-4	0.00e+00	0.00e+00	1.39e-06	1.33e-07	3.77e-07	2.89e-07
bis(2-Chloroethyl)ether	111-44-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
bis(2-Ethylhexyl)phthalate	117-81-7	9.62e-07	7.42e-07	2.93e-06	0.00e+00	0.00e+00	4.40e-06
Bromoform	75-25-2	6.85e-06	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

HOT AIR CURE
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Interpolated Cmpd #1 lb/lb rubber	Interpolated Cmpd #2 lb/lb rubber	Interpolated Cmpd #3 lb/lb rubber	Interpolated Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Interpolated Cmpd #6 lb/lb rubber
Bromomethane	74-83-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Carbon Disulfide	75-15-0	0.00e+00	0.00e+00	0.00e+00	4.90e-06	1.60e-06	9.43e-05
Carbon Tetrachloride	56-23-5	0.00e+00	0.00e+00	2.93e-06	0.00e+00	0.00e+00	0.00e+00
Carbonyl Sulfide	463-58-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	3.92e-05
Chlorobenzene	108-90-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloroethane	75-00-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloroform	67-66-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloromethane	74-87-3	0.00e+00	7.67e-07	0.00e+00	7.35e-07	4.21e-07	8.02e-06
Cumene	98-82-8	7.18e-08	0.00e+00	9.86e-08	4.11e-08	0.00e+00	2.98e-07
Di-n-butylphthalate	84-74-2	1.97e-06	3.97e-07	1.35e-06	0.00e+00	7.61e-06	3.69e-07
Dibenzofuran	132-64-9	0.00e+00	5.20e-08	8.42e-07	3.47e-08	1.95e-06	8.14e-08
Dimethylaminoazobenzene	60-11-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Dimethylphthalate	131-11-3	0.00e+00	0.00e+00	3.87e-07	3.85e-08	4.65e-08	0.00e+00
Epichlorohydrin	106-89-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ethyl Acrylate	140-88-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ethylbenzene	100-41-4	0.00e+00	3.57e-06	5.25e-06	2.87e-06	0.00e+00	5.99e-06
Hexachlorobenzene	118-74-1	0.00e+00	0.00e+00	2.29e-07	0.00e+00	0.00e+00	0.00e+00
Hexachlorobutadiene	87-68-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexachlorocyclopentadiene	77-47-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexachloroethane	67-72-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexane	110-54-3	2.03e-04	2.65e-05	3.90e-05	3.85e-05	3.90e-06	3.66e-05
Hydroquinone	123-31-9	0.00e+00	0.00e+00	0.00e+00	1.99e-05	0.00e+00	0.00e+00
Isooctane	540-84-1	2.20e-06	1.89e-05	7.06e-06	2.36e-06	1.79e-06	3.92e-06
Isophorone	78-59-1	0.00e+00	1.63e-05	0.00e+00	1.46e-06	0.00e+00	0.00e+00

HOT AIR CURE
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Interpolated Cmpd #1 lb/lb rubber	Interpolated Cmpd #2 lb/lb rubber	Interpolated Cmpd #3 lb/lb rubber	Interpolated Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Interpolated Cmpd #6 lb/lb rubber
m-Xylene	108-38-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
m-Xylene + p-Xylene		6.46e-06	1.43e-05	1.75e-05	1.27e-05	0.00e+00	1.54e-05
Methylene bis-chloroaniline	101-14-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Methylene Chloride	75-09-2	2.71e-05	2.34e-05	9.51e-04	4.59e-05	2.38e-06	6.13e-05
N,N-Dimethylaniline	121-69-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
N-Nitrosodimethylamine	62-75-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
N-Nitrosomorpholine	59-89-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Naphthalene	91-20-3	6.15e-07	8.19e-07	7.59e-06	4.26e-07	3.23e-06	1.26e-06
Nitrobenzene	98-95-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
o-Anisidine	90-04-0	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
o-Toluidine	95-53-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	5.50e-06
o-Xylene	95-47-6	2.36e-06	9.59e-06	7.88e-06	9.30e-06	5.44e-07	2.34e-05
p-Xylene	106-42-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.93e-06	0.00e+00
Pentachloronitrobenzene	82-68-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pentachlorophenol	87-86-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Phenol	108-95-2	1.78e-06	1.21e-06	6.82e-06	3.62e-07	1.20e-06	1.09e-06
Propanal	123-38-6	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Propylene Oxide	75-56-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Styrene	100-42-5	0.00e+00	0.00e+00	0.00e+00	1.09e-06	8.61e-07	1.05e-04
Substituted Quinoline	91-22-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
t-Butyl Methyl Ether	1634-04-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	8.02e-06
Tetrachloroethene	127-18-4	0.00e+00	1.01e-04	2.38e-06	1.62e-06	0.00e+00	2.50e-06
Toluene	108-88-3	4.06e-05	5.09e-05	5.21e-05	1.48e-05	2.75e-06	1.34e-05
Trichloroethene	79-01-6	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

HOT AIR CURE
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Interpolated Cmpd #1 lb/lb rubber	Interpolated Cmpd #2 lb/lb rubber	Interpolated Cmpd #3 lb/lb rubber	Interpolated Cmpd #4 lb/lb rubber	Cmpd #5 lb/lb rubber	Interpolated Cmpd #6 lb/lb rubber
Trifluralin	1582-09-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Vinyl Acetate	108-05-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Vinyl Chloride	75-01-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

All compounds were interpolated except for 5 and 22.
Methylene Chloride - Subsequent background testing at the lab indicated high background levels. Concentrations are reported at detection levels.

Consider: cmpd 1 2 3 4 5 6 | VOC | PM | org HAP | metal HAP | total HAP

Add exempt cmpds?

EXTRUDER
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Interpolated Cmpd #1 lb/lb rubber	Interpolated Cmpd #2 lb/lb rubber	Interpolated Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Interpolated Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
Total ~~VOC~~ Meth 25A		1.48e-05	9.37e-06	3.25e-05	5.67e-06	5.15e-05	1.23e-05
Total Speciated Organics incl exempts		2.72e-05	2.97e-05	4.78e-05	2.11e-05 TIC	3.31e-05	9.04e-05
Total Particulate Matter		2.12e-08	4.85e-08	1.08e-07	3.11e-08	1.12e-07	7.77e-09
Total Organic HAPs		1.13e-05	7.14e-06	3.16e-05	9.87e-06	2.24e-05	3.51e-05
Total Metal HAPs		5.00e-09	4.31e-10	9.52e-09	4.67e-07	3.20e-09	1.05e-07
Total HAPs		1.13e-05	7.14e-06	3.16e-05	1.03e-05	2.24e-05	3.52e-05
1,1,1-Trichloroethane (TCA)	71-55-6	0.00e+00	4.31e-08	1.71e-07	8.47e-08	9.84e-08	9.37e-08
1,1,2,2-Tetrachloroethane	79-34-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1,2-Trichloroethane	79-00-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1-Dichloroethane	75-34-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,1-Dichloroethene	75-35-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2,4-Trichlorobenzene	120-82-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dibromo-3-Chloropropane	96-12-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dibromoethane	106-93-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dichloroethane	107-06-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,2-Dichloropropane	78-87-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,3-Butadiene	106-99-0	5.24e-08	0.00e+00	0.00e+00	8.92e-08	0.00e+00	5.06e-07
1,4-Dichlorobenzene	106-46-7	0.00e+00	0.00e+00	0.00e+00	8.36e-09	0.00e+00	0.00e+00
1,4-Dioxane	123-91-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
1,4-Phenylenediamine	106-50-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4,5-Trichlorophenol	95-95-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4,6-Trichlorophenol	88-06-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4-Dinitrophenol	51-28-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2,4-Dinitrotoluene	121-14-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
2-Butanone	78-93-3	3.17e-06	8.52e-07	4.83e-07	1.34e-07	8.20e-07	1.17e-07
2-Chloroacetophenone	532-27-4	0.00e+00	0.00e+00	0.00e+00	6.48e-09	0.00e+00	1.68e-09

1 of 5?

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EXTRUDER
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Interpolated Cmpd #1 lb/lb rubber	Interpolated Cmpd #2 lb/lb rubber	Interpolated Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Interpolated Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
2-Methylphenol	95-48-7	0.00e+00	0.00e+00	4.63e-08	0.00e+00	6.94e-09	0.00e+00
3,3'-Dichlorobenzidine	91-94-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00-	0.00e+00	0.00e+00
3,3'-Dimethoxybenzidine	119-90-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
3,3'-Dimethylbenzidine	119-93-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4,4'-Methylenedianiline	101-77-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Aminobiphenyl	92-67-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Methyl-2-Pentanone	108-10-1	0.00e+00	1.05e-07	6.73e-06	5.54e-06	0.00e+00	2.66e-06
4-Nitrobiphenyl	92-93-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
4-Nitrophenol	100-02-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
a,a,a-Trichlorotoluene	98-07-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetaldehyde	75-07-0	3.73e-07	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Acetaldehyde + Isobutane		0.00e+00	0.00e+00	0.00e+00	0.00e+00	3.28e-07	0.00e+00
Acetonitrile	75-05-8	0.00e+00	0.00e+00	0.00e+00	1.09e-07	0.00e+00	2.19e-07
Acetophenone	98-86-2	1.24e-06	1.14e-08	2.75e-08	3.65e-08	9.92e-09	3.32e-06
Acrolein	107-02-8	0.00e+00	0.00e+00	0.00e+00	2.03e-07	0.00e+00	3.10e-07
Acrylonitrile	107-13-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Allyl Chloride	107-05-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Aniline	62-53-3	0.00e+00	2.57e-07	0.00e+00	5.08e-07	0.00e+00	2.19e-07
Benzene	71-43-2	2.93e-08	2.47e-08	6.07e-08	4.46e-08	1.60e-07	2.69e-07
Benzidine	92-87-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Benzyl Chloride	100-44-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Biphenyl	92-52-4	0.00e+00	0.00e+00	3.02e-08	4.65e-09	0.00e+00	1.68e-08
bis(2-Chloroethyl)ether	111-44-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
bis(2-Ethylhexyl)phthalate	117-81-7	2.09e-08	1.61e-08	6.37e-08	1.94e-07	1.22e-08	1.13e-07
Bromoform	75-25-2	1.49e-07	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Bromomethane	74-83-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

EXTRUDER
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS #	Interpolated Cmpd #1 lb/lb rubber	Interpolated Cmpd #2 lb/lb rubber	Interpolated Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Interpolated Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
Carbon Disulfide	75-15-0	0.00e+00	0.00e+00	0.00e+00	1.09e-07	9.84e-08	2.66e-07
Carbon Tetrachloride	56-23-5	0.00e+00	0.00e+00	6.38e-08	0.00e+00	0.00e+00	0.00e+00
Carbonyl Sulfide	463-58-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	2.86e-07	0.00e+00
Chlorobenzene	108-90-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloroethane	75-00-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloroform	67-66-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Chloromethane	74-87-3	0.00e+00	1.67e-08	0.00e+00	7.06e-08	0.00e+00	6.64e-08
Chromium (Cr) Compounds		1.96e-09	4.31e-10	3.65e-09	2.45e-07	1.68e-09	2.25e-08
Cobalt (Co) Compounds		0.00e+00	0.00e+00	0.00e+00	1.90e-08	0.00e+00	9.92e-09
Cumene	98-82-8	1.56e-09	0.00e+00	2.15e-09	3.66e-08	7.54e-10	1.36e-07
Di-n-butylphthalate	84-74-2	4.29e-08	8.64e-09	2.94e-08	1.87e-07	0.00e+00	1.98e-07
Dibenzofuran	132-64-9	0.00e+00	1.13e-09	1.83e-08	3.52e-09	0.00e+00	3.24e-09
Dimethylaminoazobenzene	60-11-7	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Dimethylphthalate	131-11-3	0.00e+00	0.00e+00	8.43e-09	0.00e+00	0.00e+00	4.27e-09
Epichlorohydrin	106-89-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ethyl Acrylate	140-88-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Ethylbenzene	100-41-4	0.00e+00	7.76e-08	1.14e-07	3.30e-08	6.34e-08	8.10e-08
Hexachlorobenzene	118-74-1	0.00e+00	0.00e+00	4.98e-09	0.00e+00	0.00e+00	0.00e+00
Hexachlorobutadiene	87-68-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexachlorocyclopentadiene	77-47-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexachloroethane	67-72-1	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Hexane	110-54-3	4.42e-06	5.77e-07	8.49e-07	1.02e-07	3.17e-06	3.94e-07
Hydroquinone	123-31-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.41e-05	0.00e+00
Isooctane	540-84-1	4.80e-08	4.12e-07	1.54e-07	3.81e-08	5.52e-08	4.51e-08
Isophorone	78-59-1	0.00e+00	3.55e-07	0.00e+00	3.50e-08	0.00e+00	0.00e+00
m-Xylene + p-Xylene		1.41e-07	3.10e-07	3.81e-07	7.01e-08	2.20e-07	3.32e-07

EXTRUDER
HAP EMISSION FACTOR SUMMARY

Analyte Name	CAS#	Interpolated Cmpd #1 lb/lb rubber	Interpolated Cmpd #2 lb/lb rubber	Interpolated Cmpd #3 lb/lb rubber	Cmpd #4 lb/lb rubber	Interpolated Cmpd #5 lb/lb rubber	Cmpd #6 lb/lb rubber
Methylene bis-chloroaniline	101-14-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Methylene Chloride	75-09-2	5.90e-07	5.10e-07	2.07e-05	1.60e-06	2.24e-07	1.32e-05
N,N-Dimethylaniline	121-69-7	0.00e+00	0.00e+00	0.00e+00	5.45e-09	0.00e+00	0.00e+00
N-Nitrosodimethylamine	62-75-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
N-Nitrosomorpholine	59-89-2	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Naphthalene	91-20-3	1.34e-08	1.78e-08	1.65e-07	1.08e-07	1.35e-07	1.98e-07
Nickel (Ni) Compounds		3.03e-09	0.00e+00	5.88e-09	1.99e-07	1.53e-09	7.24e-08
Nitrobenzene	98-95-3	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
o-Anisidine	90-04-0	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
o-Toluidine	95-53-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.50e-07
o-Xylene	95-47-6	5.14e-08	2.09e-07	1.71e-07	3.49e-08	8.15e-08	2.58e-07
Pentachloronitrobenzene	82-68-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Pentachlorophenol	87-86-5	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Phenol	108-95-2	3.86e-08	2.63e-08	1.48e-07	3.11e-07	4.08e-07	1.84e-07
Propanal	123-38-6	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Propylene Oxide	75-56-9	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.75e-06
Styrene	100-42-5	0.00e+00	0.00e+00	0.00e+00	9.61e-09	0.00e+00	7.25e-07
t-Butyl Methyl Ether	1634-04-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Tetrachloroethene	127-18-4	0.00e+00	2.20e-06	5.17e-08	5.32e-08	0.00e+00	4.44e-08
Toluene	108-88-3	8.84e-07	1.11e-06	1.13e-06	1.07e-07	9.28e-07	9.26e-06
Trichloroethene	79-01-6	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Trifluralin	1582-09-8	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00
Vinyl Acetate	108-05-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	1.26e-06	0.00e+00
Vinyl Chloride	75-01-4	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00	0.00e+00

Emission factors for all compounds except 4, 6, 9 and 22 were interpolated.
Cobalt was not found in mixing so ratios could not be set up to determine interpolation values, therefore, it is only reported in compounds tested in extruding.

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from VOL 2 — TRC's JAN 1995 report
PROJECT DATA

TABLE F.2-1
CARCASS GRINDING SUMMARY

	Run 1		Run 2		Run 3		Averages	
	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
Total Number of Tires	20		21		19		20	
Total Rubber Removed (lbs/run)	230.4		229.5		188.9		216.3	
Total Rubber Removed (lbs/hr)	131.65		113.80		101.21		115.55	
Run Time (min)	105		121		112		113	
Total VOCs (ppm/run)	3.2	5.0	6.2	6.9	2.6	6.3	4.0	6.1
Total VOCs (lbs/hr)	4.98E-02	7.59E-02	9.03E-02	1.09E-01	3.86E-02	1.00E-01	5.96E-02	9.50E-02
Total VOCs (lbs/lb rubber removed)	3.79E-04	5.76E-04	7.93E-04	9.60E-04	3.82E-04	9.92E-04	5.18E-04	8.43E-04
Standard Deviation (lbs/lb rubber removed)	3.63E-04	3.24E-04	4.48E-04	4.76E-04	2.66E-04	4.50E-04	3.59E-04	4.17E-04
Total Speciated Semi Vols. (µg/m³)	4392.56	144.76	12070.75	133.01	9363.63	181.16	8608.98	152.98
Total Speciated Semi Vols. (lbs/hr)	3.73E-02	1.25E-03	9.83E-02	1.16E-03	7.37E-02	1.59E-03	6.98E-02	1.33E-03
Total Speciated Semi Vols. (lbs/lb rubber removed) Detected	2.84E-04	9.51E-06	8.64E-04	1.02E-05	7.28E-04	1.57E-05	6.25E-04	1.18E-05
Total Speciated Semi Vols. (lbs/lb rubber removed) with non-detects	< 4.07E-04	< 3.59E-05	< 9.91E-04	< 4.33E-05	< 8.72E-04	< 5.34E-05	< 7.57E-04	< 4.42E-05
Total Speciated Vols. (µg/m³)	161615.7	28642.0	254464.1	16959.5	238860.0	7443.4	218313.28	17681.62
Total Speciated Vols. (lbs/hr)	1.37E+00	2.48E-01	2.07E+00	1.48E-01	1.88E+00	6.51E-02	1.78E+00	1.54E-01
Total Speciated Vols. (lbs/lb rubber removed) Detected	1.04E-02	1.88E-03	1.82E-02	1.30E-03	1.86E-02	6.44E-04	1.57E-02	1.27E-03
Total Speciated Vols. (lbs/lb rubber removed) with non-detects	< 1.05E-02	< 1.19E-03	< 1.83E-02	< 1.34E-03	< 1.87E-02	< 6.86E-04	< 1.58E-02	< 1.31E-03
Total Sulfur (µg/m³)	109	76.2	160	ND	147.4	ND	138.80	25.40
Total Sulfur (lbs/hr)	9.26E-04	6.59E-04	1.30E-03	ND	1.16E-03	ND	1.13E-03	2.20E-04
Total Sulfur (lbs/lb rubber removed) Detected	7.04E-06	5.01E-06	1.15E-05	ND	1.15E-05	ND	9.99E-06	1.67E-06
Total Sulfur (lbs/lb rubber removed) with non-detects	< 2.21E-05	< 1.96E-05	< 2.73E-05	< 1.86E-05	< 2.87E-05	< 2.10E-05	< 2.60E-05	< 1.97E-05
Total Metals (µg/m³)	300,652.8	90.2	167,444.5	78.7	134,983.7	85.3	201,027.0	84.7
Total Metals (lbs/hr)	2.55E+00	8.60E-04	1.34E+00	7.91E-04	1.05E+00	8.53E-04	1.64E+00	8.34E-04
Total Metals (lbs/lb rubber removed) Detected	1.93E-02	6.53E-06	1.18E-02	6.95E-06	1.04E-02	8.43E-06	1.38E-02	7.30E-06
Total Metals (lbs/lb rubber removed) with non-detects	1.93E-02	< 6.85E-06	1.18E-02	< 7.19E-06	1.04E-02	< 8.71E-06	1.38E-02	< 7.58E-06
Total POM (mg/m³)	8.62	17.78	13.74	5.57	11.90	14.32	11.42	12.56
Total POM(lbs/hr)	7.35E-02	1.51E-01	1.11E-01	4.89E-02	9.31E-02	1.25E-01	9.27E-02	1.08E-01
Total POM (lb/lb rubber removed) Detected	5.59E-04	1.15E-03	9.79E-04	4.30E-04	9.20E-04	1.24E-03	8.19E-04	9.38E-04
Total PM (mg/m³)	8810.7	18.0	8075.5	15.3	6531.6	16.2	7805.9	16.5
Total PM (lbs/hr)	7.46E+01	1.53E-01	6.46E+01	1.32E-01	5.08E+01	1.40E-01	6.33E+01	1.42E-01
Total PM (lb/lb rubber removed) Detected	5.67E-01	1.16E-03	5.68E-01	1.16E-03	5.02E-01	1.38E-03	5.45E-01	1.23E-03

x? Total VOCs (ppm/run) / Total VOCs (lbs/hr) — ? of what?

x? Total Speciated Semi Vols. (µg/m³) / (lbs/hr) / (lbs/lb rubber removed) Detected / with non-detects — TABLE F.2-2 TOTAL DETECTED; pg. 2 / pg. 4 / pg. 6 / pg. 6

all checked vs. Table F.2-2 source 7-17-98 RR

Total Speciated Vols. (µg/m³) / (lbs/hr) / (lbs/lb rubber removed) Detected / with non-detects — Table F.2-3 TOTAL DETECTED; pg. 2 / pg. 4 / pg. 6 / pg. 6

all checked vs. F.2-3 7-17-98 RR

Total Sulfur (µg/m³) / (lbs/hr) / (lbs/lb rubber removed) Detected / with non-detects — TABLE F.2-4 TOTAL DETECTED; pg. 1 / " " pg. 1 / pg. 1 / pg. 1

all checked vs. F.2-4 7-17-98 RR

TRC