

June, 1997

COMPLIANCE REPORT

SOURCE EMISSION
COMPLIANCE PROGRAM
and
EVALUATION PROGRAM
for
NON-METALLIC MINERAL PROCESSING PLANT

Prepared for:
OMYA, Inc.
61 Main Street
Proctor, Vermont 05765

Purchase Order Number: 87512

Prepared by:
Air Quality Technical Services, Inc.
18 Morse Drive
Essex Junction, Vermont 05452

Project Numbers: 971216/971217

July 14, 1997

FOREWORD

Air Quality Technical Services, Inc., an environmental consulting company specializing in air resource management and air quality assessment, has been contracted by OMYA, Inc. to conduct a source emission compliance program and an emission evaluation program at the non-metallic mineral processing facility it owns and operates in Florence, Vermont.

This report serves as a protocol to the State of Vermont Agency of Natural Resources, Air Pollution Control Division outlining test methods and analytical procedures to be used in the performance of the compliance program.

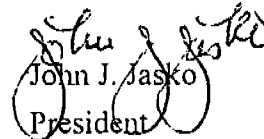

John J. Jasko
President

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1.0 INTRODUCTION

On September 13, 1996, the State of Vermont Agency of Natural Resources, Air Pollution Control Division (APCD), issued OMYA, Inc. (OMYA) an amended Air Pollution Control Permit (#AP-89-049d) to install and operate two new flash dryers systems, designated as Flash Dryer #1 and Flash Dryer #2, at the Verpol Plant it owns and operates in Florence, Vermont.

An Emissions Limitations section of the Permit address the discharge of air contaminants released to the atmosphere from the facility as follows:

Permit Condition (7) Visible Emission Standards (a) sets a limit on visible emissions (VE) of no greater than 7 percent opacity for fabric filter dust collectors, and, (c) requires that compliance with opacity standards be determined in accordance with Code of Federal Regulations (CFR) 40, Appendix A, Reference Method 9.

Permit Condition (8) specifies that emission concentrations of particulate matter (PM) from fabric filter dust collectors not exceed 0.01 grains per dry standard cubic foot (gr/dscf) and further limits the overall emission rates of PM from Flash Dryers #1 or #2 to 0.86 pounds per hour (lbs/hr), and states that compliance with emission limits be determined in accordance with CFR 40, Appendix A, Reference Method 5.

Permit Condition (10) specifies that emission rates of sulfur dioxide (SO₂) for Flash Dryers #1 or #2 not exceed 2.6 lbs/hr, and states that compliance with emission limit be determined in accordance with CFR 40, Appendix A, Reference Method 6C or other approved alternative method.

Permit Condition (32) requires that emission testing of the new flash dryers be conducted to demonstrate compliance with applicable emission limitations and a written report of the results be submitted within 180 days after the initial start-up date.

In addition, OMYA wished to conduct the necessary emission testing specified in Permit Condition (14) of the Operational Restrictions section of the Permit in order to increase the maximum allowable production rates of Surface Treater B and Spray Dryer #1. Surface Treater B is currently limited to an allowable production rate of 12.8 MtpH; Spray Dryer #1 is currently limited to 18.2 MtpH.

Permit Condition (8) specifies that emission concentrations of particulate matter (PM) from fabric filter dust collectors not exceed 0.01 grains per dry standard cubic foot (gr/dscf) and further limits the overall emission rates of PM from Surface Treater B to 2.1 lbs/hr,

Permit Condition (9) specifies that the emission rate of particulate matter (PM) from Spray Dryer #1 shall not exceed 0.060 lbs/short ton of solids entering the spray dryer on an hourly basis, and 1.3 lbs/hr.

OMYA also wanted to include the evaluation of SO₂ emissions from Spray Dryer #1 in the testing program to obtain data necessary to investigate the potential for applying for applicable emission credits.

The field portion of the compliance and evaluation test program was performed June 9 - 13, 1997. The major on-site representatives that participated in the program and their respective affiliations were:

OMYA, Inc.

Neal Jordan - Environmental Manager

Jim Prior - Engineer

State of Vermont Agency of Natural Resources, Air Pollution Control Division

Dave Manning - Environmental Technician

Air Quality Technical Services, Inc.

John Jasko - Project Director

Tim Tomasi - Environmental Technician

Simon Majahad - Environmental Technician

2.0 SUMMARY OF RESULTS

Particulate matter was measured as a non-filterable sample fraction collected by a filter media and preceding section of sample train. This fraction includes particulates greater than or equal to the particle cut point size of the filter media (0.3μ).

Sulfur dioxide was collected as a gaseous sample fraction in the particulate sample train back half condensing unit impingers in a solution of 3% hydrogen peroxide (H_2O_2).

Visible emissions were measured as the density of the plumes observed at 15 second intervals over the course of a one hour time period.

2.1 COMPLIANCE TESTING

2.1.1 FLASH DRYER #1

2.1.1.1 Particulate Matter

The concentrations of PM for the three test runs conducted were 0.0017, 0.0021, and 0.0029 gr/dscf, respectively, with an average of 0.0022 gr/dscf. The corresponding emission rates of PM were 0.12, 0.15 and 0.20 lbs/hr with an average of 0.16 lbs/hr.

2.1.1.2 Sulfur Dioxide

The concentrations of SO_2 for the three test runs conducted were 0, 0, and 0 ppm, respectively, with an overall average of 0 ppm. The corresponding average emission rates of SO_2 for the three test runs were 0, 0, and 0 lbs/hr with an overall average of 0 lbs/hr.

2.1.1.3 Visible Emissions

The highest average opacities determined for the highest 6 minute period during each hour of observation were 0, 0, and 0 percent.

A summary of the PM, SO_2 , and VE test determinations for Flash Dryer #1 is presented in Table 2-1.

TEST DATA SUMMARY

FLASH DRYER #1

Test Run	4-1	4-2	4-4	Average
Date	06/12/97	06/12/97	06/13/97	----
Clock Time (24 hour)	1225-1427	1540-1742	1225-1427	----
Test Duration (minutes)	120	120	120	----
Test Measurements				
Isokinetics (%)	101.4	98.4	102.1	----
Moisture Content (%)	21.7	21.7	20.8	21.4
Temperature (°F)	294	300.5	294.2	296.2
Gas Composition - CO ₂ (%)	1	1	1	1
O ₂ (%)	18	18	18	18
CO (%)	0	0	0	0
N ₂ (%)	81	81	81	81
Gas Velocity (fps)	51.1	52.7	52.5	52.1
Gas Volumetric Flow (dscfm)	8170	8334	8445	8316
(acfm)	15051	15522	15463	15345
Emission Determinations				
Particulate:				
Concentration (gr/dscf)	0.0017	0.0022	0.0028	0.0022
(mg/dscm)	3.94	4.92	6.44	5.1
(lbs/dcsf)	2.46×10^{-7}	3.07×10^{-7}	4.02×10^{-7}	3.91×10^{-7}
Emission Rate (lbs/hr)	0.12	0.16	0.2	0.16
Sulfur Dioxide:				
Concentration (ppm)	0	0	0	0
(mg/dscm)	0	0	0	0
(lbs/dcsf)	0	0	0	0
Emission Rate (lbs/hr)	0	0	0	0
Visible Emissions:				
Highest Average Opacity (%)	0	0	0	----
Number of Readings >7% Limit	0	0	0	----

Table 1-1

3.0 COMPLIANCE PROCEDURES

The procedures used in the source emission compliance/evaluation programs were conducted in accordance with standard methods described in 40 CFR 60 (revised July 1, 1995), Standards of Performance for New Stationary Sources, Appendix A - Test Methods.

The specific EPA methods are referenced as follows:

- Method 1 - Sample Velocity Traverses for Stationary Sources;
- Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube);
- Method 3 - Gas Analysis for Determination of Dry Molecular Weight;
- Method 4 - Determination of Moisture Content in Stack Gas
- Method 6 - Determination of Sulfur Dioxide Emissions from Stationary Sources;
- Method 5 - Determination of Particulate Emissions from Stationary Sources;
- Method 8 - Determination of Sulfuric Acid Mist and Sulfur Dioxide Emissions from Stationary Sources;
- Method 9 - Visual Determination of the Opacity of Emissions from Stationary Sources.

3.1 SAMPLING LOCATION

The sampling ports were positioned according to Method 1 - Sample and Velocity Traverses for Stationary Sources (40 CFR 60, App. A, pp. 489 - 495).

3.1.1 Flash Dryer #1

The inside diameter of the stack at the sample location was 30 inches. Two sample ports were located approximately 126 inches from a 45° transition in the ductwork and approximately 30 inches from the outlet of the stack. These dimensions placed the sample ports 4.2 diameters downstream and 1.0 diameters upstream from respective flow disturbances.

In accordance with Method 1 a minimum of twenty-four sample points were required for a particulate traverse. Twelve traverse points positioned at 1.0, 2.0, 3.5, 5.3, 7.5, 10.7, 19.3, 22.5, 24.7, 26.5, 28.0 and 29.0 inches from the stack wall were sampled through each port.

3.2 PARTICULATE/SULFUR DIOXIDE

For sources requiring PM emission determination, sample collection and analysis was performed according to procedures outlined in Method 5 - Determination of Particulate Emissions from Stationary Sources (40 CFR 60, App. A, pp. 541 - 565); for sources requiring PM/SO₂ emission determination, sample collection and analyses was performed according to Method 8 - Determination of Sulfuric Acid Mist and Sulfur Dioxide Emissions From Stationary Sources (40 CFR 60, App. A, pp. 648 - 656) using the option for simultaneous determination of filterable particulate matter (§1.2 Applicability).

A total of three test runs were conducted for the purpose of determining compliance or evaluating emissions. Each test run conducted for compliance had a minimum sample duration of 60 minutes and collected a minimum volume of the 60 dscf required by 40 CFR Part 60, Subpart OOO for PM concentration determination (§ 60.675 Test Methods and Procedures). Each test run conducted for evaluation had a minimum sample duration of 60 minutes and collected a minimum volume of 31.4 dscf. A sampling rate, +/- 10 percent of the isokinetic rate, was maintained over the course of each test run.

3.2.1 Sampling Apparatus

3.2.1.1 Particulate

The PM sample train consisted of:

- a) a stainless steel nozzle sized to maintain isokinetic sampling;
- b) a borosilicate glass-lined probe heated to a temperature greater than the stack temperature;
- c) an encased glass fiber filter heated to a temperature greater than the stack temperature;
- d) a sample/moisture condensing unit with four 500 ml glass impingers immersed in an ice water bath:
 - 1 modified Greenburg-Smith type containing 100 ml of H₂O,
 - 1 Greenburg-Smith type containing 100 ml of H₂O,
 - 1 modified Greenburg-Smith type empty; and,
 - 1 modified Greenburg-Smith type containing 200 grams of silica gel;
- e) an umbilical; and,

- f) a metering console with: main valve and by-pass valve for flow adjustment, leak-free pump, calibrated dry gas meter with inlet and outlet temperature gauges, calibrated orifice, and inclined manometer.

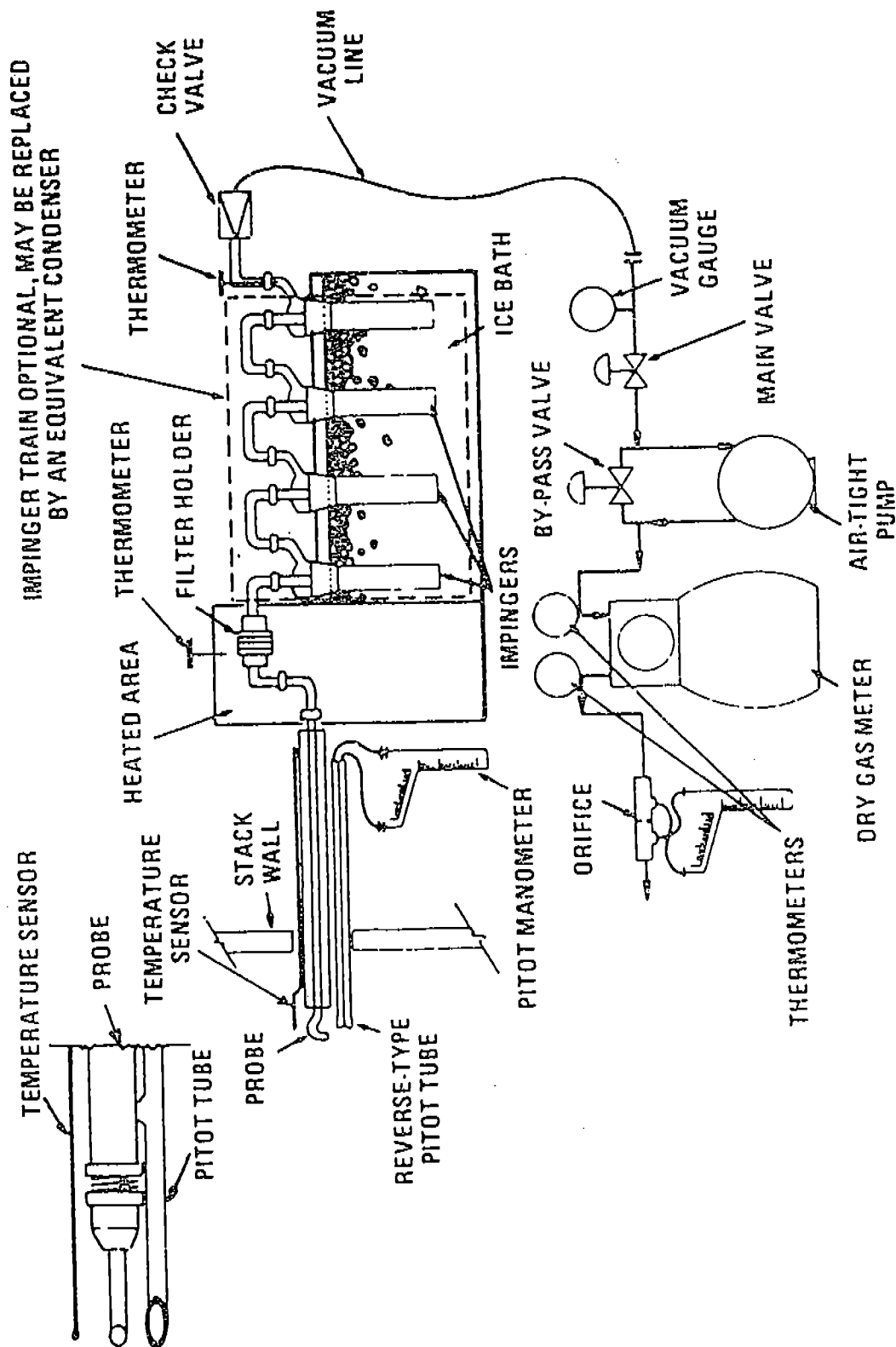
3.2.1.2 Particulate/Sulfur Dioxide

The PM/SO₂ sample train consisted of:

- a) a stainless steel nozzle sized to maintain isokinetic sampling;
- b) a borosilicate glass-lined probe heated to a temperature greater than the stack temperature;
- c) an encased glass fiber filter heated to a temperature greater than the stack temperature;
- d) a sample/moisture condensing unit with four 500 ml glass impingers immersed in an ice water bath:
 - 1 modified Greenburg-Smith type containing 100 ml of 80% IPA fitted with a glass wool plug at the exit to prevent carryover and weighed to the nearest 0.5 g,
 - 1 Greenburg-Smith type containing 100 ml of 3% H₂O₂ and weighed to the nearest 0.5 g,
 - 1 modified Greenburg-Smith type containing 100 ml of 3% H₂O₂ and weighed to the nearest 0.5 g, and,
 - 1 modified Greenburg-Smith type containing 200 grams of silica gel;
- e) an umbilical; and,
- f) a metering console with: main valve and by-pass valve for flow adjustment, leak-free pump, calibrated dry gas meter with inlet and outlet temperature gauges, calibrated orifice, and inclined manometer.

The typical sampling apparatus is depicted in Figure 3-1.

Method 5 - Particulate Sampling Train



3.2.2 Sample Recovery

3.2.2.1 Particulate

The samples were handled or recovered in the field using the procedures outlined below:

Filter - The filter was removed from the filter holder, placed in it's original container, sealed, labeled for identification, and secured for transport.

Front half - The nozzle and probe were internally brushed and rinsed with acetone to remove any particulate matter which may have been deposited during a test run. The rinse was collected in a glass jar, sealed with a Teflon lined cap, labeled for identification noting the volume of the contents, and secured for transport.

Impinger catch - The volumes in the first three impingers were measured, recorded, and discarded.

Silica gel - The silica gel was transferred from the last impinger to a tared container, weighed, and the weight was recorded.

3.2.2.2 Particulate/Sulfur Dioxide

The samples were recovered in the field using the procedures outlined below:

Filter - The filter was removed from the filter holder, placed in it's original container, sealed, labeled for identification, and secured for transport.

Front half - The nozzle, probe, front half of the filter holder and connecting glassware were internally brushed and rinsed with acetone to remove any particulate matter which may have been deposited during a test run. The rinse was collected in a glass jar, sealed with a Teflon lined cap, sealed, and labeled for identification noting the volume of the contents, and secured for transport.

Impinger catch - The first impinger was weighed to the nearest 0.5 g., the weight was recorded and the contents was discarded. The second and third impingers were weighed to the nearest 0.5 g., the weights were recorded and the contents was transferred to a sample jar. The second and third impingers and connecting glassware were then rinsed with distilled deionized water, the rinse was added to the same sample jar containing the impinger catch, sealed, and labeled for identification noting the volume of the contents, and secured for transport.

Silica gel - The silica gel was transferred from the last impinger to a tared container, weighed, and the weight was recorded.

3.2.3 Sample Analysis

3.2.3.1 Particulate

Prior to use in the program, glass fiber filters were marked with an identifying number, desiccated for a minimum of 24 hours, weighed, re-desiccated for a minimum of 6 hours, re-weighed to establish a final constant weight (<0.5 mg difference), and, sealed in individual plastic petri dish containers that were labeled with the identifying number and tare weight of the filter.

After use in the program, the filters were placed in a dessicator, desiccated for a minimum of 24 hours, weighed, re-desiccated for a minimum of 6 hours, re-weighed to establish a final constant weight (<0.5 mg difference).

The front half acetone washes were transferred to tared beakers, evaporated, desiccated for a minimum of 24 hours, weighed, re-desiccated for a minimum of 6 hours, re-weighed to establish a final constant weight (<0.5 mg difference).

3.2.3.2 Sulfur Dioxide

The SO_2 samples were quantitatively transferred to 500-ml volumetric flasks. The sample jars were rinsed with distilled dionized water and the rinses were added to the volumetric flasks. The contents of the flasks were then brought to volume with distilled dionized water. A 50 ml aliquot of each diluted sample was then pipetted to separate 250 ml Erlenmeyer flasks, 40 ml of IPA and thorin indicator were added, and the solutions were titrated to a faint pink endpoint with 0.01 N barium perchlorate. Titrations were repeated with additional sample aliquots until the titrant volumes agree within 1 percent or 0.2 ml, whichever was greater.

3.3 GAS VELOCITY/VOLUMETRIC FLOW

Measurements of stack gas velocity and volumetric flow were performed according to procedures outlined in Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate (40 CFR 60, App. A, pp. 489 - 495).

3.3.1 Measurement Apparatus

The apparatus used to measure stack differential pressure and temperature profiles consisted of:

- a) a Type S (Stausscheibe) pitot tube with an assigned design coefficient of 0.84 connected to an inclined manometer; and,
- b) Type-K thermocouple probe connected to a digital pyrometer.

3.4 GAS COMPOSITION

Carbon dioxide (CO_2) and oxygen (O_2) sample collection and analyses was performed according to procedures outlined in using EPA Test Method 3 - Gas Analysis for the Determination of Dry Molecular Weight (40 CFR 60, App. A, pp. 523 - 527).

A single-point grab sample was taken and analyzed with Fyrite analyzers to measure the CO_2 and O_2 concentrations. The balance of the gas composition was considered N_2 . The results were used to determine the dry molecular weight of the effluent stream.

3.5 VISIBLE EMISSIONS

Visible emission (VE) evaluation was performed according to procedures outlined in using EPA Test Method 9 - Visible Determination of the Opacity of Emissions from Stationary Sources (40 CFR 60, App. A, pp. 656 - 662).

Visible emission observations were made by a certified observer at the point of greatest opacity in that portion of the plume where condensed water vapor was not present. The observer was situated so the plume was viewed against the best available contrasting background while the sun was positioned within a 140° sector to his back. In accordance with Subpart OOO requirements the minimum distance between the observer and the emission source was 15 feet. A total of three test runs of 60 minute duration were performed. A run will consisted of 10 sets of 24 consecutive observations, recorded to the nearest 5 percent, made at 15 second intervals.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

Air Quality Technical Services, Inc. maintains a QA/QC program to ensure sampling techniques and analytical procedures are valid and data generated from test programs are accurate.

4.1 CHAIN OF CUSTODY

AQTS utilizes chain-of-custody procedures. While in the field, samples collected during each test run are sealed in appropriate sample vessels, labeled and identified by field number, and placed in secure containers. Storage containers are the responsibility of the project director or assigned personnel. Upon return to AQTS facilities, samples are logged in and assigned sample identification numbers. Samples are safely and properly stored until processed and/or shipped to an outside laboratory.

4.2 EQUIPMENT CALIBRATIONS

Dry gas meters and orifices undergo semi-annual calibration according to procedures outlined in Method 5, Section 5 - Calibration (§5.3 Metering System, §5.3.1 Calibration Prior to Use). After completion of compliance programs, dry gas meter calibrations are rechecked for accuracy according to procedures outlined in Method 5, Section 5 - Calibration (§5.3 Metering System, §5.3.2 Calibration After Use).

Prior to use in compliance programs, probe nozzles are calibrated according to procedures outlined in Method 5, Section 5 - Calibration (§5.1 Probe Nozzle).

Thermometers and barometers are calibrated according to Method 6, §5.2 and §5.4.

Prior to field use, pitot tube assemblies are checked for conformity with the design specifications listed in Method 2 (4. Calibration, §4.1 Type S Pitot Tube, §4.1.1 Type S Pitot Tube Assemblies).

Thermocouple probes undergo annual calibration according to procedures outlined in the Quality Assurance Handbook, Section 3.1 - Method 2 (§3.1.2 Calibration of Apparatus).

4.3 EQUIPMENT LEAK CHECKS

4.3.1 Particulate Sample Trains

Sample trains are leak checked according to procedures outlined in Method 5, Section 4 - Procedure (§4.1 Sampling, §4.1.4 Leak-Check Procedures). Before the start of each test run, the inlet of the probe nozzle is plugged and a vacuum of approximately 15" Hg is drawn and held. The metering dial is timed for a period of one minute and any movement during that period is noted. At the end of each test run, the same procedure is followed using the highest vacuum attained during the run. In each instance, the maximum acceptable leakage rate is 0.02 cfm.

4.3.2 Pitot Tubes

Pitot tubes are leak checked according to procedures outlined in Method 2 (§3. Procedure, §3.1). The pitot tubes are subjected to leak checks prior to and after a test run. The impact opening of a pitot is blown through until a minimum pressure of 3" H₂O registers on an inclined manometer. The impact opening is then closed off and a pressure reading observed. The reading must remain stable for a period of 15 seconds to be accepted. The same procedure is used to check the static pressure side of the pitot by applying suction to the static opening.

4.4 METHOD BLANKS

Method blanks (filters, absorbing solution, rinses, and digestion media) are handled and processed like actual samples. The blanks are weighed, evaporated, digested, and analyzed accordingly. Blanks reported greater than analytical detection levels are subtracted from sample results.

4.5 DATA REDUCTION AND HANDLING

Data are generally reported in English units, however, metric units are reported as requested by clients or regulatory agencies. The flow of data conforms to standard chain-of-custody procedures. Raw data generated from AQTS emission evaluation and compliance test programs are reduced using Lotus 1-2-3 or data acquisition systems. Calculations generally follow equations found in 40 CFR 60, Appendix A, Test Methods or other air pollution and engineering references. Spreadsheet equations and calculations are frequently verified using scientific calculators. Isokinetic tests are manually recorded on data sheets and/or

Lotus spreadsheets. Isokinetic sample rates are adjusted using a spreadsheet and/or slide rule nomograph.

APPENDIX A

METHOD 5 PARTICULATE EQUATION FORMAT

Volume of dry gas sampled at standard conditions, 68 °F, 29.92 "Hg - $V_{m_{std}}$ (scf):

$$V_{m_{std}} = 17.65 (Vm) (Y) \sqrt{\frac{Pb + \frac{\Delta H}{13.6}}{Tm + 460}}$$

Stack gas moisture condensed at standard conditions - $V_{w_{std}}$ (scf):

$$V_{w_{std}} = 0.04707 (Vlc)$$

Decimal fraction stack gas proportion of water by volume - Bwo

$$Bwo = \frac{V_{w_{std}}}{V_{w_{std}} + V_{m_{std}}}$$

Stack gas dry molecular weight - MW_d (lb/lb-mole):

$$MW_d = 0.44 (\%CO_2) + 0.32 (\%O_2) + 0.28 (\%N_2 + \%CO)$$

Stack gas molecular weight - MW_s (lb/lb-mole):

$$MW_s = MW_d (1 - Bwo) + 18 (Bwo)$$

Pressure of stack - P_s (in. Hg):

$$P_s = Pb + (Pst/13.6)$$

Stack gas velocity at stack conditions - V_s (fps):

$$V_s = 85.49 (Cp) \left(\sqrt{\Delta P} \right)_{avg} \sqrt{\frac{T_s + 460}{(P_s) (MW_s)}}$$

Stack gas volumetric flow rate at standard conditions - Q_{s_s} (scfm):

$$Q_{s_s} = 60 (V_s) (A_s) \left(\frac{528}{T_s + 460} \right) \left(\frac{P_s}{29.92} \right)$$

Stack gas volumetric flow rate at actual conditions - Q_{s_a} (acfm):

$$Q_{s_a} = 60 (V_s) (A_s)$$

Stack gas volumetric flow at dry standard conditions - Q_{s_d} (dscfm):

$$Q_{s_d} = (60) (1 - B_{wo}) (V_s) (A_s) \left(\frac{528}{T_s + 460} \right) \left(\frac{P_s}{29.92} \right)$$

Concentration of particulate matter in stack gas, dry basis, standard conditions - C_s
(gr/dscf)

$$C_s = 15.432 \left(\frac{M_p}{V_{m_{std}}} \right)$$

Emission rate of particulate matter, dry basis, standard conditions - ER (lbs/hr)

$$ER = 0.00857 (Q_{s_d}) (C_s)$$

Isokinetic variation - Iso (%)

$$Iso = \frac{17.33 (T_s + 460) [0.04707 (V_{lc}) + V_{m_{std}}]}{\theta (V_s) (P_s) (D_n^2)}$$

Where:

A_s = Cross section area of stack (ft²)

C_p = Pitot tube coefficient

D_n = Diameter of nozzle (in.)

ΔH = Pressure differential across orifice (in. H₂O)

M_p = Mass of particulate in grams

P_b = Barometric pressure (in. Hg)

P_{st} = Static pressure of stack (in. H₂O)

P_{std} = Standard pressure, 29.92 (in. H₂O)

ΔP = Stack differential pressure (in. H₂O)

T_m = Average temperature of dry gas meter (°F)

T_s = Average stack temperature (°F)

T_{std} = Standard temperature, 68 (°F)

V_{lc} = Volume of liquid condensate (ml)

V_m = Volume of dry gas sample metered (ft³)

Y = Dry gas meter correction factor

θ = Sample duration (min.)

0.00857 = Conversion factor, gr to lbs and min. to hr.

0.04707 = Conversion factor, ml to ft³

0.264 = ratio of O₂ to N₂ in air, v/v

15.432 = Conversion factor, g/ft³ to gr/ft³

17.65 = Conversion factor, standard temperature and pressure

17.33 = Isokinetic constant from factoring

18 = Molecular weight of water

85.49 = Pitot tube constant

APPENDIX B

FIELD DATA TEST RESULTS

CLIENT: OMYA, INC.
 FACILITY: FLORENCE, VT
 PROJECT: 971216
 UNIT: FLASH DRYER 1
 TEST DATE: JUNE 12, 1997
 TEST RUN: 4-1

TEST DATA SUMMARY

INPUT VALUES

Pitot Coefficient - Cp:	0.84	Average Delta P ("H ₂ O):	0.535
Nozzle Diameter - Dn (in):	0.25	Average Delta H ("H ₂ O):	1.333
Dry Gas Meter Cal. (Y):	1.002	Stack Temperature - Ts (°F):	294
Stack Area (ft²):	4.909	Meter Temperature - Tm (°F):	113.9
Barometric Press. - Pb ("Hg):	29.65	Average Square Root of Delta P:	0.727
Static Press. - Pst ("Hg):	-0.35	Mass of Particulate Collected - Mp (g.):	0.0077
Sample Duration (min.):	120		
Volume of Gas Metered - Vm (ft³):	75.585		
Volume of Water Condensed - Vlc (g.):	406.2		
Oxygen - O ₂ (%):	18		
Carbon Dioxide - CO ₂ (%):	1		
Carbon Monoxide - CO (%):	0		
Nitrogen - N ₂ (%):	81		

OUTPUT VALUES

Dry Gas Volume (Standard) - Vmstd (dscf):	69.002
Volume of Water (Standard) - Vwstd (scf):	19.12
Stack Gas Water Proportion by Volume - Bwo:	0.217
Molecular Weight of Dry Stack Gas - MWd (lb/lb-mole):	28.88
Molecular Weight of Stack Gas - MWs (lb/lb-mole):	26.52
Pressure of Stack - Ps ("Hg):	29.62
Velocity of Stack Gas - Vs (fps):	51.1
Dry Standard Volumetric Flow of Stack Gas - Qdscfm:	8170
Actual Volumetric Flow of Stack Gas - Qacfm:	15051
Test Isokinetic Sample Rate (%):	101.4
Particulate Concentration of Stack Gas - Cs (gr/dscf):	0.0017
Particulate Emission Rate - ER (lbs/hr):	0.12

FIELD DATA TEST RESULTS

CLIENT: OMYA, INC.
FACILITY: FLORENCE, VT
PROJECT: 971216
UNIT: FLASH DRYER 1
TEST DATE: JUNE 12, 1997
TEST RUN: 4-2

TEST DATA SUMMARY

INPUT VALUES

Pitot Coefficient - Cp:	0.84	Average Delta P ("H ₂ O):	0.562
Nozzle Diameter - Dn (in):	0.255	Average Delta H ("H ₂ O):	1.419
Dry Gas Meter Cal. (Y):	1.002	Stack Temperature - Ts (°F):	300.5
Stack Area (ft ²):	4.909	Meter Temperature - Tm (°F):	104.2
Barometric Press. - Pb ("Hg):	29.58	Average Square Root of Delta P:	0.745
Static Press. - Pst ("Hg):	-0.35	Mass of Particulate Collected - Mp - (g.):	0.0099
Sample Duration (min.):	120		
Volume of Gas Metered - Vm (ft ³):	76.693		
Volume of Water Condensed - Vlc (g.):	418.1		
Oxygen - O ₂ (%):	18		
Carbon Dioxide - CO ₂ (%):	1		
Carbon Monoxide - CO (%):	0		
Nitrogen - N ₂ (%):	81		

OUTPUT VALUES

Dry Gas Volume (Standard) - Vmstd (dscf):	71.049
Volume of Water (Standard) - Vwstd (scf):	19.68
Stack Gas Water Proportion by Volume - Bwo:	0.217
Molecular Weight of Dry Stack Gas - MWd (lb/lb-mole):	28.88
Molecular Weight of Stack Gas - MWs (lb/lb-mole):	26.52
Pressure of Stack - Ps ("Hg):	29.55
Velocity of Stack Gas - Vs (fps):	52.7
Dry Standard Volumetric Flow of Stack Gas - Qdscfm:	8334
Actual Volumetric Flow of Stack Gas - Qacfm:	15522
Test Isokinetic Sample Rate (%):	98.4
Particulate Concentration of Stack Gas - Cs (gr/dscf):	0.0022
Particulate Emission Rate - ER (lbs/hr):	0.16

FIELD DATA TEST RESULTS

CLIENT: OMYA, INC.
 FACILITY: FLORENCE, VT
 PROJECT: 971216
 UNIT: FLASH DRYER 1
 TEST DATE: JUNE 13, 1997
 TEST RUN: 4-3

TEST DATA SUMMARY

INPUT VALUES

Pitot Coefficient - Cp:	0.84	Average Delta P (" H2O):	0.563
Nozzle Diameter - Dn (in):	0.25	Average Delta H ("H2O):	1.41
Dry Gas Meter Cal. (Y):	1.002	Stack Temperature - Ts (°F):	294.2
Stack Area (ft²):	4.909	Meter Temperature - Tm (°F):	101.1
Barometric Press. - Pb ("Hg):	29.5	Average Square Root of Delta P:	0.745
Static Press. - Pst ("Hg):	-0.35	Mass of Particulate Collected - Mp - (g.):	0.0131
Sample Duration (min.):	120		
Volume of Gas Metered - Vm (ft³):	77.267		
Volume of Water Condensed - Vlc (g.):	401		
Oxygen - O2 (%):	18		
Carbon Dioxide - CO2 (%):	1		
Carbon Monoxide - CO (%):	0		
Nitrogen - N2 (%):	81		

OUTPUT VALUES

Dry Gas Volume (Standard) - Vmstd (dscf):	71.781
Volume of Water (Standard) - Vwstd (scf):	18.875
Stack Gas Water Proportion by Volume - Bwo:	0.208
Molecular Weight of Dry Stack Gas - MWd (lb/lb-mole):	28.88
Molecular Weight of Stack Gas - MWs (lb/lb-mole):	26.62
Pressure of Stack - Ps ("Hg.):	29.47
Velocity of Stack Gas - Vs (fps):	52.5
Dry Standard Volumetric Flow of Stack Gas - Qdscfm:	8445
Actual Volumetric Flow of Stack Gas - Qacfm:	15463
Test Isokinetic Sample Rate (%):	102.1
Particulate Concentration of Stack Gas - Cs (gr/dscf):	0.0028
Particulate Emission Rate - ER (lbs/hr):	0.20

APPENDIX C

OMYA, INC., FLORENCE, VT

PROJECT: 971216

FLASH DRYER #1

PARTICULATE CONCENTRATION AND EMISSION DATA

SAMPLE ID	TEST RUN	GROSS SAMPLE MASS (g)	NET SAMPLE MASS (g)	AIR VOLUME SAMPLED (dscf)	EMISSION CONCENTRATIONS			VOLUMETRIC AIR FLOW (dscfm)	EMISSION RATE (lbs/hr)
					(gr/dscf)	(mg/dscm)	(lbs/dscf)		
C611/C612	4-1	0.0081	0.0077	69.002	0.0017	3.94	2.46E-07	8225	0.12
C614/C615	4-2	0.0103	0.0099	71.049	0.0022	4.92	3.07E-07	8437	0.16
C617/C618	4-3	0.0135	0.0131	71.781	0.0028	6.44	4.02E-07	8225	0.20
C621	BLANK	0.0004							
AVERAGES					0.0022	5.1	3.19E-07	8296	0.16

APPENDIX D

ISOKINETIC STACK CALCULATOR
(Revised 06/03/96)

INPUT PARAMETERS

PITOT COEFFICIENT (Cp):	0.84
METER TEMPERATURE (°F):	115
STACK TEMPERATURE (°F):	300
AVERAGE DELTA P ("H2O):	0.545
MAXIMUM DELTA P ("H2O):	0.9
ESTIMATED MOISTURE (%):	18
METER BOX NUMBER:	1284-239
DELTA H @:	1.965

NOZZLE DIAMETER (Dn) DATA

CALCULATED DIAMETER (in.):	0.2681
SELECTED SIZE (in.):	0.25

CALCULATED PARAMETERS

K FACTOR =	2.513
ISOKINETIC DELTA H ("H2O) =	1.37
MAX DELTA H ("H2O) =	2.26

SAMPLING PARAMETERS

MINIMUM SAMPLE VOLUME REQUIRED (dscf):	60
SAMPLE TIME REQUIRED (min):	108
AVERAGE SAMPLE RATE (cfm):	0.63
MAX SAMPLE RATE > 0.75 cfm:	0.8

PROJECT NUMBER: 971216
TEST RUN NUMBER: 4-1

METHOD 5

CLIENT: OMYA, INC.
FACILITY: FLORENCE, VT
PROJECT: 971216
UNIT: FLASH DRYER 1
TEST DATE: JUNE 12, 1997
TEST RUN: 4-1

Barometric Press. - Pb ("Hg): 29.65
Static Press. - Pst ("H2O): -0.35
Stack Press. - Ps ("Hg.): 29.62
Pitot Coefficient - Cp: 0.84
Nozzle Number: B-4
Nozzle Diameter - Dn (in): 0.250
Meter Box Number: 1284-239
Dry Gas Meter Cal. (Y): 1.002
Stack area (ft²): 4.909
Filter Number(s): 110-753

Run Clock Time (24-Hr.): 1225-1427
Sample Duration (min.): 120
Number of Sample Points: 24

Impinger Volume (ml)	
Initial	Final
1>	570.7
2>	614.6
3>	621.1
Silica Gel (g)	
Initial	Final
4>	721.1
Total Volume>	406.2

Pitot Leak Checks	
Pre-test:	Positive OK
	Negative OK
Post-test:	Positive OK
	Negative OK

Vacuum Leak Check	
Leak Rate (cf)	Vacuum ("Hg.)
Pre-test:	0.009 15
Post-test:	0.003 9

Gas Composition	
O2	18
CO2	1
CO	0
N2	81

SAMPLE POINT	CLOCK TIME (24 Hr)	GAS METER READING (cf)	DELTA P (in. H2O)	DESIRED DELTA H (in. H2O)	ACTUAL DELTA H (in. H2O)	STACK	TEMPERATURES (°F)		PERCENT ISO
							INLET	OUTLET	
A1	12:25	952.601	0.8	2.01	2	292	104	90	0.894
2	12:30	956.43	0.6	1.51	1.5	289	117	93	0.775
3	12:35	959.71	0.3	0.75	0.75	293	116	96	0.548
4	12:40	962.14	0.7	1.76	1.75	295	119	97	0.837
5	12:45	965.7	0.6	1.51	1.5	294	121	99	0.775
6	12:50	969	0.65	1.63	1.6	294	125	101	0.806
7	12:55	972.46	0.55	1.38	1.4	293	127	103	0.742
8	13:00	975.69	0.45	1.13	1.1	291	127	104	0.671
9	13:05	978.6	0.45	1.13	1.1	296	126	105	0.671
10	13:10	981.47	0.5	1.26	1.25	291	127	107	0.707
11	13:15	984.54	0.45	1.13	1.1	285	127	101	0.671
12	13:20	987.46	0.45	1.13	1.1	280	127	108	0.671
END	13:25	990.395							
B1	13:27	990.395	0.6	1.51	1.5	294	124	108	0.775
2	13:32	993.7	0.65	1.63	1.6	298	127	108	0.806
3	13:37	997.15	0.7	1.76	1.75	297	127	109	0.837
4	13:42	1000.75	0.5	1.26	1.25	296	125	109	0.707
5	13:47	1003.84	0.56	1.41	1.4	296	125	108	0.748
6	13:52	1007.07	0.5	1.26	1.25	298	124	108	0.707
7	13:57	1010.16	0.55	1.38	1.4	297	125	107	0.742
8	14:02	1013.42	0.56	1.41	1.4	301	126	108	0.748
9	14:07	1016.73	0.5	1.26	1.25	302	127	109	0.707
10	14:12	1019.79	0.36	0.9	0.9	300	125	109	0.6
11	14:17	1022.5	0.5	1.26	1.25	295	124	108	0.707
12	14:22	1025.52	0.36	0.9	0.9	290	123	108	0.6
END	14:27	1028.186							

ISOKINETIC STACK CALCULATOR

(Revised 06/03/96)

INPUT PARAMETERS

PITOT COEFFICIENT (Cp):	0.84
METER TEMPERATURE (°F):	115
STACK TEMPERATURE (°F):	300
AVERAGE DELTA P ("H2O):	0.545
MAXIMUM DELTA P ("H2O):	0.9
ESTIMATED MOISTURE (%):	18
METER BOX NUMBER:	1284-239
DELTA H @:	1.965

NOZZLE DIAMETER (Dn) DATA

CALCULATED DIAMETER (in.):	0.2681
SELECTED SIZE (in.):	0.255

CALCULATED PARAMETERS

K FACTOR =	2.7202
ISOKINETIC DELTA H ("H2O) =	1.48
MAX DELTA H ("H2O) =	2.45

SAMPLING PARAMETERS

MINIMUM SAMPLE VOLUME REQUIRED (dscf):	60
SAMPLE TIME REQUIRED (min):	105
AVERAGE SAMPLE RATE (cfm):	0.65
MAX SAMPLE RATE > 0.75 cfm:	0.84

PROJECT NUMBER: 971216
TEST RUN NUMBER: 4-2

METHOD 5

CLIENT: OMYA, INC.
 FACILITY: FLORENCE, VT
 PROJECT: 971216
 UNIT: FLASH DRYER 1
 TEST DATE: JUNE 12, 1997
 TEST RUN: 4-2

Barometric Press. - Pb ("Hg): 29.58
 Static Press. - Pst ("H₂O): -0.35
 Stack Press. - Ps ("Hg.): 29.55
 Pilot Coefficient - Cp: 0.84
 Nozzle Number: A-4
 Nozzle Diameter - Dn (in): 0.255
 Meter Box Number: 1284-239
 Dry Gas Meter Cal. (Y): 1.002
 Stack area (ft²): 4.909
 Filter Number(s): 110-754

Run Clock Time (24-Hr.): 1540-1742
 Sample Duration (min.): 120
 Number of Sample Points: 24

Impinger Volume (ml)	
Initial	Final
1>	590.7
2>	623.7
3>	618.8
Silica Gel (g)	
Initial	Final
4>	690.1
Total Volume>	
418.1	

Pilot Leak Checks	
Pre-test:	Positive OK
	Negative OK
Post-test:	Positive OK
	Negative OK

Vacuum Leak Check	
Leak Rate (cf.)	Vacuum ("Hg.)
Pre-test:	0.006
Post-test:	0.001
	15
	9

Gas Composition	
O ₂	18
CO ₂	1
CO	0
N ₂	81

SAMPLE POINT	CLOCK TIME (24 Hr)	GAS METER READING (cf)	DELTA P (in. H ₂ O)	DESIRED DELTA H (in. H ₂ O)	ACTUAL DELTA H (in. H ₂ O)	TEMPERATURES (°F)		SQUARE ROOT DELTA P	PERCENT ISO
						STACK	DRY GAS METER INLET - OUTLET		
B1	15:40	28.501	0.75	2.04	1.9	295	99	0.866	96.1
2	15:45	32.16	0.55	1.5	1.4	302	111	0.742	95.8
3	15:50	35.33	0.6	1.63	1.5	305	111	0.775	94.8
4	15:55	38.6	0.5	1.36	1.25	304	110	0.707	95.3
5	16:00	41.61	0.34	0.92	0.85	305	107	0.583	96.3
6	16:05	44.11	0.64	1.74	1.6	308	109	0.8	94.5
7	16:10	47.47	0.6	1.63	1.5	305	113	0.775	93.2
8	16:15	50.7	0.55	1.5	1.4	303	113	0.742	94.8
9	16:20	53.85	0.58	1.58	1.45	301	113	0.762	94.1
10	16:25	57.07	0.3	0.82	0.75	299	111	0.548	96.2
11	16:30	59.44	0.55	1.5	1.5	298	113	0.742	95.1
12	16:35	62.62	0.5	1.36	1.25	291	115	0.707	94.1
END	16:40	65.638							
A1	16:42	65.638	0.55	1.5	1.4	295	113	0.742	95.3
2	16:47	68.83	0.75	2.04	1.9	302	119	0.866	95.4
3	16:52	72.56	0.75	2.04	1.9	301	122	0.866	95.2
4	16:57	76.3	0.7	1.9	1.75	299	122	0.837	94.3
5	17:02	79.89	0.6	1.63	1.5	302	122	0.775	95.7
6	17:07	83.26	0.55	1.5	1.4	305	122	0.742	94.8
7	17:12	86.45	0.6	1.63	1.5	307	121	0.775	94.7
8	17:17	89.77	0.62	1.69	1.55	305	121	0.787	96.5
9	17:22	93.21	0.55	1.5	1.4	302	120	0.742	94.8
10	17:27	96.4	0.55	1.5	1.4	299	117	0.742	95.5
11	17:32	99.61	0.4	1.09	1	294	116	0.632	97.8
12	17:37	102.42	0.4	1.09	1	285	116	0.632	96
END	17:42	105.194							

ISOKINETIC STACK CALCULATOR
(Revised 06/03/96)

INPUT PARAMETERS

PITOT COEFFICIENT (Cp):	0.84
METER TEMPERATURE (°F):	115
STACK TEMPERATURE (°F):	300
AVERAGE DELTA P ("H2O):	0.545
MAXIMUM DELTA P ("H2O):	0.9
ESTIMATED MOISTURE (%):	18
METER BOX NUMBER:	1284-239
DELTA H @:	1.965

NOZZLE DIAMETER (Dn) DATA

CALCULATED DIAMETER (in.):	0.2681
SELECTED SIZE (in.):	0.25

CALCULATED PARAMETERS

K FACTOR =	2.513
ISOKINETIC DELTA H ("H2O) =	1.37
MAX DELTA H ("H2O) =	2.26

SAMPLING PARAMETERS

MINIMUM SAMPLE VOLUME REQUIRED (dscf):	60
SAMPLE TIME REQUIRED (min):	108
AVERAGE SAMPLE RATE (cfm):	0.63
MAX SAMPLE RATE > 0.75 cfm:	0.8

PROJECT NUMBER: 971216
TEST RUN NUMBER: 4-3

METHOD 5

CLIENT: OMYA, INC.
 FACILITY: FLORENCE, VT
 PROJECT: 971216
 UNIT: FLASH DRYER 1
 TEST DATE: JUNE 13, 1997
 TEST RUN: 4-3

Barometric Press. - Pb ("Hg): 29.5
 Static Press. - Pst ("H₂O): -0.35
 Stack Press. - Ps ("Hg.): 29.47
 Pilot Coefficient - Cp: 0.84
 Nozzle Number: B-4
 Nozzle Diameter - Dn (in): 0.250
 Meter Box Number: 1284-239
 Dry Gas Meter Cal. (Y): 1.002
 Stack area (ft²): 4.909
 Filter Number(s): 110-755

Run Clock Time (24-Hr.): 1225-1427
 Sample Duration (min.): 120
 Number of Sample Points: 24

Impinger Volume (ml)	
Initial	Final
1>	564.1
2>	611.5
3>	622.3
Silica Gel (g)	
Initial	Final
4>	679.7
Total Volume>	401.0

Gas Composition	
O ₂	18
CO ₂	1
CO	0
N ₂	81

Vacuum Leak Check	
Leak Rate (cf.)	Vacuum ("Hg.)
Pre-test:	0.009
Post-test:	0.003
	15
	9.5

Pilot Leak Checks	
Pre-test:	OK
Positive	OK
Negative	OK
Post-test:	OK
Positive	OK
Negative	OK

SAMPLE POINT	CLOCK TIME	GAS METER READING (cf)	DELTA P (In. H ₂ O)	DESIRED DELTA H (In. H ₂ O)	ACTUAL DELTA H (In. H ₂ O)	STACK TEMPERATURES (°F)	TEMPERATURES (°F)		PERCENT ISO
							INLET	OUTLET	
A1	10:43	105.502	0.55	1.38	1.4	290	79	74	101.6
2	10:48	108.63	0.7	1.76	1.75	293	90	74	100.9
3	10:53	112.16	0.8	2.01	2	290	100	76	100.1
4	10:58	115.95	0.75	1.88	1.9	290	108	79	99.9
5	11:03	119.65	0.7	1.76	1.75	298	112	82	98.8
6	11:08	123.19	0.5	1.26	1.25	297	113	84	101.3
7	11:13	126.27	0.24	0.6	0.6	294	108	88	101.7
8	11:18	128.42	0.5	1.26	1.25	298	110	87	99.7
9	11:23	131.45	0.5	1.26	1.25	298	115	90	100.3
10	11:28	134.52	0.6	1.51	1.5	293	115	92	99.1
11	11:33	137.86	0.5	1.26	1.25	290	113	93	97.4
12	11:38	140.86	0.4	1.01	1	285	113	94	100.5
END	11:43	143.642							
B1	11:45	143.662	0.68	1.71	1.7	294	114	95	98.3
2	11:50	147.19	0.6	1.51	1.5	295	118	95	97.5
3	11:55	150.49	0.65	1.63	1.6	296	117	98	100.2
4	12:00	154.02	0.6	1.51	1.5	299	118	98	99.6
5	12:05	157.39	0.6	1.51	1.5	298	117	96	99.2
6	12:10	160.74	0.52	1.31	1.3	295	117	97	99.6
7	12:15	163.88	0.55	1.38	1.4	295	116	97	99
8	12:20	167.09	0.6	1.51	1.5	299	116	97	98.4
9	12:25	170.41	0.5	1.26	1.25	297	116	97	100.2
10	12:30	173.5	0.55	1.38	1.4	298	117	97	101.6
11	12:35	176.79	0.58	1.46	1.45	293	119	97	99.7
12	12:40	180.12	0.34	0.85	0.85	286	119	97	103
END	12:45	182.769							

SQUARE ROOT DELTA P	
74	0.742
74	0.837
76	0.894
79	0.886
82	0.837
84	0.707
88	0.49
87	0.707
90	0.707
92	0.775
93	0.707
94	0.632

APPENDIX E

SAMPLE LOG RECORD

AQTS CLIENT:	OMYA Inc.
PROJECT:	971216/971217
CLIENT P.O. NUMBER:	VE087512

[illegible]

Samples Logged By: John J. Jasko

Date: 06/14/97

Time: 700

FILTER TARE WEIGHT LOG

CLIENT:	OMYA, Inc.
PROJECT:	971216/971217
FILTER TYPE:	GFF
SIZE:	110 mm

Filter Number	Date/Time	Weight (g)		
110 750	7/3/96 0800	7/3/96 1400		
		0.5836 0.5835		
110 751	7/3/96 0800	7/3/96 1400		
		0.5828 0.5827		
110 752	7/3/96 0800	7/3/96 1400		
		0.5742 0.5741		
110 753	7/3/96 0800	7/3/96 1400		
		0.5813 0.5814		
110 754	7/3/96 0800	7/3/96 1400		
		0.5781 0.5782		
110 755	7/3/96 0800	7/3/96 1400		
		0.5803 0.5802		
110 756	7/3/96 0800	7/3/96 1400		
		0.5803 0.5803		
110 757	7/3/96 0800	7/3/96 1400		
		0.5844 0.5844		
110 758	7/3/96 0800	7/3/96 1400		
		0.5786 0.5787		
110 759	7/3/96 0800	7/3/96 1400		
		0.5851 0.585		
110 760	7/3/96 0800	7/3/96 1400		
		0.5835 0.5835		
110 761	7/3/96 0800	7/3/96 1400		
		0.5824 0.5824		
110 762	7/3/96 0800	7/3/96 1400		
		0.5825 0.5825		
110 763	7/3/96 0800	7/3/96 1400		
		0.5875 0.5876		
110 764	7/3/96 0800	7/3/96 1400		
		0.5856 0.5857		
110 765	7/3/96 0800	7/3/96 1400		
		0.583 0.583		
110 766	7/3/96 0800	7/3/96 1400		
		0.5852 0.5851		
110 767	7/3/96 0800	7/3/96 1400		
		0.5843 0.5842		
110 768	7/3/96 0800	7/3/96 1400		
		0.5908 0.591		
110 769	7/3/96 0800	7/3/96 1400		
		0.5895 0.5896		

BEAKER TARE WEIGHT LOG SHEET

Client: OMYA, Inc.
Facility: Florence, VT
Project: 971216/971217

[illegible]

SAMPLE WEIGHT LOG SHEET

Client: OMYA, Inc.
 Facility: Florence, VT
 Project: 971216/971217

Sample Number	Identification	Date/Time			
	Tare Weight (g.)	Gross Weight (g.)			
C611	GFF 110-753	6/15 2010	6/16 1020	6/22 1050	
	0.5814	0.5818	0.5805	0.5803	
C612	Beaker 25/13	6/22 1100	6/23 0705	6/23 1325	
	94.0647	94.0741	94.0734	94.0739	
C614	GFF 110-754	6/15 2010	6/16 1020	6/22 1030	6/23 0715
	0.5782	0.5811	0.5790	0.5780	0.5778
C615	Beaker 25/14	6/22 1100	6/23 0705	6/23 1320	
	97.8125	97.8243	97.8254	97.8232	
C617	GFF 110-755	6/15 2035	6/16 1020	6/22 1030	6/23 0715
	0.5802	0.5774	0.5766	0.5760	0.5759
C618	Beaker 25/15	6/22 1100	6/23 0655	6/23 1320	
	106.1153	106.1337	106.1334	106.1331	
C620	GFF 110-756	6/15 2010			
	0.5803	0.5803			
C621	Beaker 25/16	6/22 1100	6/23 0705		
	105.7692	105.7697	105.7696		

PARTICULATE LAB ANALYSIS SUMMARY SHEET

Client: OMYA, Inc. Project Number: 971216 Test/Run: 4-1 FD#1

Sample Identification

Number	Description
C611	GFF 110-753
C612	Front half acetone wash - 300 ml as processed
C621	Acetone blank - 300 ml as processed

Acetone Blank Background Data

Manufacturer: Anachemia Lot/Batch: 690120 Density: 0.7857 g/ml
 C_a = Acetone blank residue concentration (mg/mg)
 m_a = Mass of acetone residue after evaporation (mg)
 V_a = Volume of acetone blank (ml)
 ρ = Density of acetone (mg/ml)

$$C_a = m_a / (V_a \rho_a) = (0.4) / (300)(0.0007857) = 1.697 \text{ mg/mg}$$

Front Half Acetone Wash Data

W_a = Weight of acetone residue in wash (mg)
 V_{aw} = Volume of acetone wash (ml)

$$W_a = C_a V_a \rho_a = (1.697)(300)(0.0007857) = 0.4 \text{ mg}$$

Acetone Wash Data

Beaker Number: <u>25/13</u>	Gross Weight (g): 94.0739
	Tare Weight (g): 94.0647
	Blank Weight (g): 0.0004
	Net Weight (g): 0.0088

Filter Data

Filter Number: <u>110-753</u>	Gross Weight (g): 0.5803
	Tare Weight (g): 0.5814
	Net Weight (g): -0.0011

Particulate Weight Summary

Weight of particulate in front half wash (g):	0.0088
Weight of particulate on filter (g):	-0.0011
Total weight of particulate catch (g):	0.0077

PARTICULATE LAB ANALYSIS SUMMARY SHEET

Client: OMYA, Inc. Project Number: 971216 Test/Run: 4-2 FD#1

Sample Identification

Number	Description
C614	GFF 110-754
C615	Front half acetone wash - 300 ml as processed

Acetone Blank Background Data

Manufacturer: Anachemia Lot/Batch: 690120 Density: 0.7857 g/ml
 C_a = Acetone blank residue concentration (mg/mg)
 m_a = Mass of acetone residue after evaporation (mg)
 V_a = Volume of acetone blank (ml)
 ρ_a = Density of acetone (mg/ml)

$$C_a = m_a / (V_a \rho_a) = (0.4) / (300)(0.0007857) = \underline{1.697} \text{ mg/mg}$$

Front Half Acetone Wash Data

W_a = Weight of acetone residue in wash (mg)
 V_{aw} = Volume of acetone wash (ml)

$$W_a = C_a V_a \rho_a = (1.697)(300)(0.0007857) = \underline{0.4} \text{ mg}$$

Acetone Wash Data

Beaker Number: 25/14

Gross Weight (g): 97.8232
Tare Weight (g): 97.8125
Blank Weight (g): 0.0004
Net Weight (g): 0.0103

Filter Data

Filter Number: 110-754

Gross Weight (g): 0.5778
Tare Weight (g): 0.5782
Net Weight (g): -0.0004

Particulate Weight Summary

Weight of particulate in front half wash (g): 0.0103
Weight of particulate on filter (g): -0.0004
Total weight of particulate catch (g): 0.0099

PARTICULATE LAB ANALYSIS SUMMARY SHEET

Client: OMYA, Inc. Project Number: 971216 Test/Run: 4-3 FD#1

Sample Identification

Number	Description
C617	GFF 110-755
C618	Front half acetone wash - 300 ml as processed

Acetone Blank Background Data

Manufacturer: Anachemia Lot/Batch: 690120 Density: 0.7857 g/ml
 C_a = Acetone blank residue concentration (mg/mg)
 m_a = Mass of acetone residue after evaporation (mg)
 V_a = Volume of acetone blank (ml)
 ρ_a = Density of acetone (mg/ml)

$$C_a = m_a / (V_a \rho_a) = (0.4) / (300)(0.0007857) = \underline{1.697} \text{ mg/mg}$$

Front Half Acetone Wash Data

W_a = Weight of acetone residue in wash (mg)
 V_{aw} = Volume of acetone wash (ml)

$$W_a = C_a V_a \rho_a = (1.697)(300)(0.0007857) = \underline{0.4} \text{ mg}$$

Acetone Wash Data

Beaker Number: <u>25/15</u>	Gross Weight (g): 106.1331
	Tare Weight (g): 106.1153
	Blank Weight (g): 0.0004
	Net Weight (g): 0.0174

Filter Data

Filter Number: <u>110-755</u>	Gross Weight (g): 0.5759
	Tare Weight (g): 0.5802
	Net Weight (g): -0.0043

Particulate Weight Summary

Weight of particulate in front half wash (g):	0.0174
Weight of particulate on filter (g):	-0.0043
Total weight of particulate catch (g):	0.0131

APPENDIX F

METER BOX CALIBRATION (ANNUAL)

METER BOX NUMBER: 1084-239
NEXT CAL DUE: 03-Aug-97

DATE: 01-Feb-97
CALIBRATED BY: Tom Perry

BAROMETRIC PRESSURE (In. Hg)	ORIFICE MANOMETER SETTING (In. H ₂ O)	WET TEST METER VOLUME (cf)	DRY GAS METER VOLUME		WET TEST METER (°F)	TEMPERATURES		TIME (min)	Y _i	DELTA H@
			INITIAL (cf)	FINAL (cf)		INLET (°F)	OUTLET (°F)			
29.63	0.5	5	472.010	477.109	57.0	77	61	73.25	1.01	1.832
29.63	1.0	5	477.661	482.869	58.0	88	67	83.5	1.005	1.895
29.63	1.5	10	483.184	493.769	58.0	91	71	90.75	1.001	2.047
29.63	2.0	10	494.335	505.026	58.0	97	75	96.75	1	1.987
29.63	3.0	10	505.456	516.211	59.0	108	82	101	0.998	2.02
29.63	4.0	10	516.656	527.460	59.0	105	86	104	0.996	2.011
						114	82	AVERAGE	1.002	1.965

TOLERANCES FROM AVERAGE FOR Y_i and DELTA H@ ARE <0.02 AND 0.20, RESPECTIVELY

Y _i	Y _i DIFF	DELTA H@	DELTA H@ DIFF
1.01	0.008	1.832	-0.133
1.005	0.003	1.895	-0.07
1.001	-0.001	2.047	0.082
1	-0.002	1.987	0.022
0.998	-0.004	2.02	0.055
0.996	-0.006	2.011	0.046

AQTS PROJECT: 971216/971217

METER BOX CALIBRATION (POST-TEST)

DATE: June 17, 1997
CALIBRATED BY: Tim Tomasi

METER BOX NUMBER: 1084-239
PRETEST CAL Y: 1.002

BAROMETRIC PRESSURE (In. Hg)	ORIFICE MANOMETER SETTING (In. H2O)	MAXIMUM VACUUM (In. H2O)	WET TEST METER VOLUME (cf)	DRY GAS METER VOLUME		WET TEST METER (°F)	TEMPERATURES			TIME (min)	Yr
				INITIAL (cf)	FINAL (cf)		INLET (°F)	OUTLET (°F)	AVERAGE (°F)		
29.51	1.40	7	10.00	197.320	207.620	71.5	95	80	93	16.56	1.007
29.51	1.40	7	10.00	207.620	218.035	71.5	112	85	97	16.22	1.003
29.51	1.40	7	10.00	218.035	228.566	71.5	98	84	101.5	16.28	1
AVERAGE											1.003

ACCEPTABLE VARIATION IN CALIBRATION
(Must be less than 5% of Pretest Meter Calibration)

Difference from Pretest Calibration : 0.1 % >>>> ACCEPTABLE

METER BOX CALIBRATION (ANNUAL)

METER BOX NUMBER: 1286-340
NEXT CAL DUE: 03-Aug-97

DATE: 01-Feb-97
CALIBRATED BY: Tom Perry

BAROMETRIC PRESSURE (In. Hg)	ORIFICE MANOMETER SETTING (In. H ₂ O)	WET TEST METER VOLUME (cf)	DRY GAS METER VOLUME		WET TEST METER (°F)	TEMPERATURES DRY GAS METER		TIME (min)	Y _i	DELTA H@
			INITIAL (cf)	FINAL (cf)		INLET (°F)	OUTLET (°F)			
30.53	0.5	5	255.896	261.001	61.0	90	77	12.09	1.024	1.511
30.53	1.0	5	261.420	266.635	61.0	95	79	8.82	1.003	1.606
30.53	1.5	10	266.955	277.439	61.0	90	78	8.82	1.003	1.606
30.53	2.0	10	277.624	288.149	61.0	98	79	14.89	1.002	1.706
30.53	3.0	10	288.376	298.945	61.0	94	79	89.5	1.002	1.706
30.53	4.0	10	299.401	309.965	61.0	103	82	13.26	1.004	1.792
						100	82	10.65	1.002	1.726
						106	84	9.32	0.999	1.764
						104	84			
						109	86			
						102	85			
						108	85			
								AVERAGE	1.006	1.684

TOLERANCES FROM AVERAGE FOR Y_i and DELTA H@ ARE <0.02 AND 0.20, RESPECTIVELY

Y _i	Y _i DIFF	DELTA H@	DELTA H@ DIFF
1.024	0.018	1.511	-0.173
1.003	-0.003	1.606	-0.078
1.002	-0.004	1.706	0.022
1.004	-0.002	1.792	0.108
1.002	-0.004	1.726	0.042
0.999	-0.007	1.764	0.08

AQTS PROJECT: 971216/971217

METER BOX CALIBRATION (POST-TEST)

DATE: June 17, 1997
CALIBRATED BY: Tim Tomasi

METER BOX NUMBER: 1286-340
PRETEST CAL Y: 1.006

BAROMETRIC PRESSURE (In. Hg)	ORIFICE MANOMETER SETTING (In. H2O)	MAXIMUM VACUUM (IN. H2O)	WET TEST METER VOLUME (cf)	DRY GAS METER VOLUME		WET TEST METER (°F)	TEMPERATURES			TIME (min)	Yf
				INITIAL (cf)	FINAL (cf)		INLET (°F)	OUTLET (°F)	AVERAGE (°F)		
29.51	1.40	6	10.00	54.228	64.568	71.5	93	75	90	14.85	0.997
29.51	1.40	6	10.00	64.568	75.030	71.5	111	81	96.25	14.92	0.997
29.51	1.40	6	10.00	75.030	85.585	71.5	100	82	101	14.97	0.997
AVERAGE											0.997

ACCEPTABLE VARIATION IN CALIBRATION
(Must be less than 5% of Pretest Meter Calibration)

Difference from Pretest Calibration : -0.9 % >>>> ACCEPTABLE

REQUIREMENTS FOR ASSIGNING A BASELINE CORRECTION FACTOR
OF 0.84 TO AN "S" TYPE PITOT TUBE

PITOT # EE 103 DATE 6-6-97 OBSERVATIONS BY LIAROMAS

- 1.) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

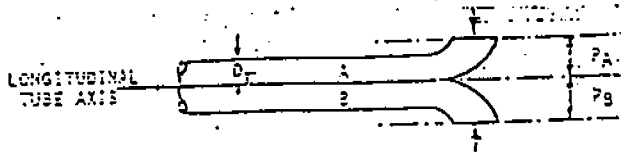
REQUIRED MEASUREMENTS

- a. External tubing diameter, D_t , $0.23 \text{ in.} < D_t < 0.38 \text{ in.}$
 b. Base to plane opening Distance, P_A and P_B , $0.40 \text{ in.} < P_A=P_B < 0.60 \text{ in.}$

$D_t = 0.375$

$P_A = .49$

$P_B = .49$



- 1.) All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

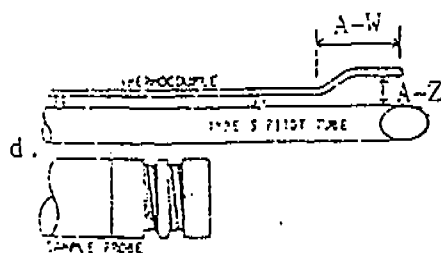
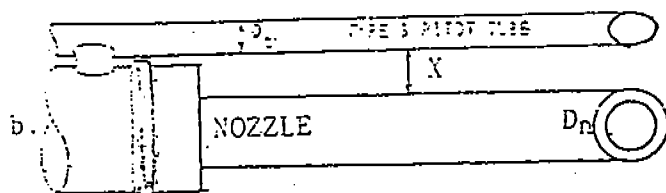
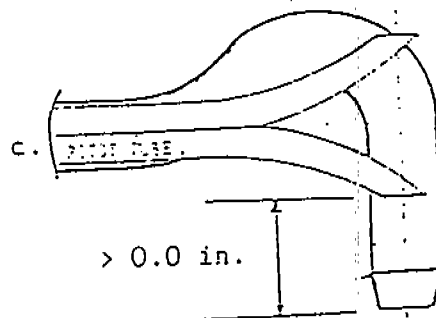
- a. External tubing diameter. See 1.a. above
 b. Pitot / nozzle separation, X , $X \geq 0.75 \text{ in.}$ for nozzle diameter, $D_n = 0.50 \text{ in.}$
 c. Plane of impact side of pitot in relation to plane of nozzle opening.
 d. Thermocouple placement, Z , $A-Z \geq 0.75 \text{ in.}$, $A-W \geq 3.0 \text{ in.}$, $B-Z \geq 2.0 \text{ in.}$
 e. Pitot / probe sheath distance, Y , $Y \geq 3.0 \text{ in.}$

$D_n = 0.5$

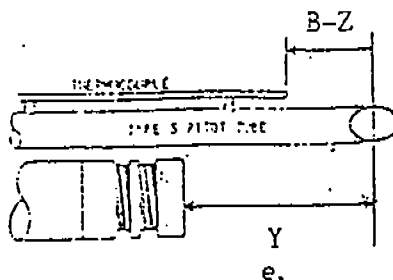
$X = 1.1$

$Z = 2.10$

$Y = 3.0$



OR



REQUIREMENTS FOR ASSIGNING A BASELINE COEFFICIENT VALUE
OF 0.84 TO AN "S" TYPE PITOT TUBE

PITOT # FE-103 DATE 6-6-97 OBSERVATIONS BY Jim Tomas

- 1) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

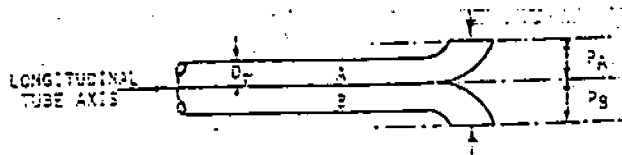
REQUIRED MEASUREMENTS

- External tubing diameter, D_t , 0.23 in. $< D_t < 0.38$ in.
- Base to plane opening Distance, P_A and P_B , 0.40 in. $< P_A=P_B < 0.60$ in.

$D_t = 0.375$

$P_A = 0.49$

$P_B = 0.49$



- All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

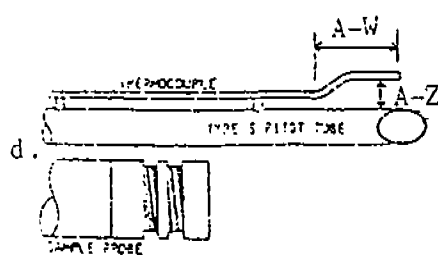
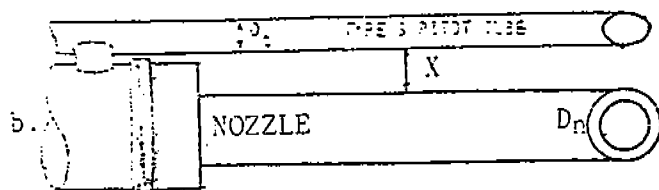
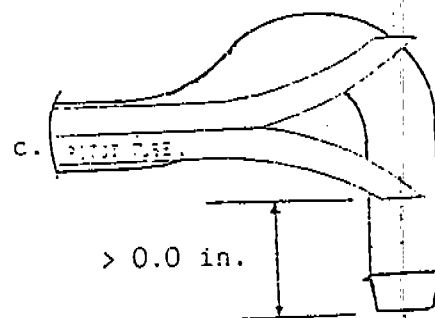
- External tubing diameter. See 1.a. above
- Pitot / nozzle separation, X , $X \geq 0.75$ in. for nozzle diameter, $D_n = 0.50$ in.
- Plane of impact side of pitot in relation to plane of nozzle opening.
- Thermocouple placement, Z , $A-Z \geq 0.75$ in., $A-W \geq 3.0$ in., $B-Z \geq 2.0$ in.
- Pitot / probe sheath distance, Y , $Y \geq 3.0$ in.

$D_n = .375$

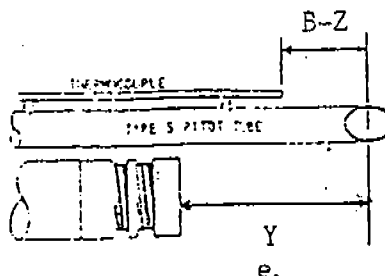
$X = 1.1$

$Z = 2.10$

$Y = 3.0$



OR



e.

REQUIREMENTS FOR ASSIGNING A BASELINE COEFFICIENT VALUE
OF 0.84 TO AN "S" TYPE PITOT TUBE

PITOT # FE 104 DATE 6-6-77 OBSERVATIONS BY Jim Comasi

- 1.) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

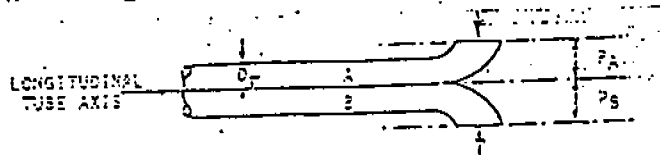
REQUIRED MEASUREMENTS

- a. External tubing diameter, D_t , 0.23 in. $< D_t < 0.38$ in.
b. Base to plane opening Distance, P_A and P_B , 0.40 in. $< P_A=P_B < 0.60$ in.

$D_t = 0.375$

$P_A = .49$

$P_B = .49$



- 2.) All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

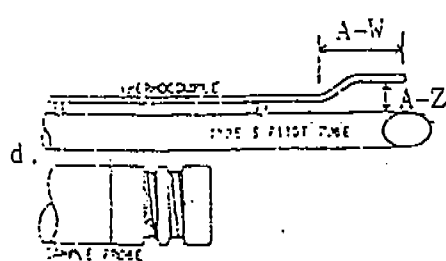
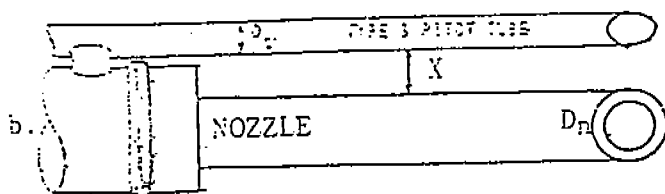
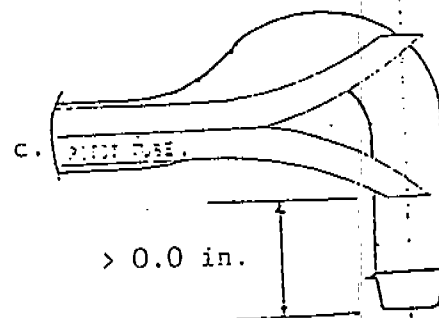
- a. External tubing diameter. See 1.a. above
b. Pitot / nozzle separation, X , $X \geq 0.75$ in. for nozzle diameter, $D_n = 0.50$ in.
c. Plane of impact side of pitot in relation to plane of nozzle opening.
d. Thermocouple placement, Z , $A-Z \geq 0.75$ in., $A-W \geq 3.0$ in., $B-Z \geq 2.0$ in.
e. Pitot / probe sheath distance, Y , $Y \geq 3.0$ in.

$D_n = 0.25$

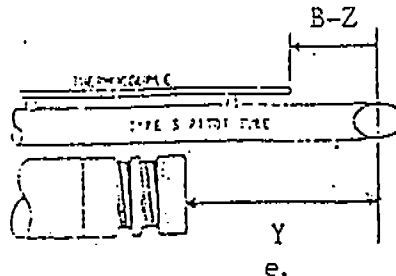
$X = 1.1$

$Z = 2.10$

$Y = 3.0$



OR



e.

REQUIREMENTS FOR ASSIGNING A BASELINE COEFFICIENT VALUE
OF 0.84 TO AN "S" TYPE PITOT TUBE

PITOT # FE-104 DATE 6-6-97 OBSERVATIONS BY Tim TOMASI

- 1.) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

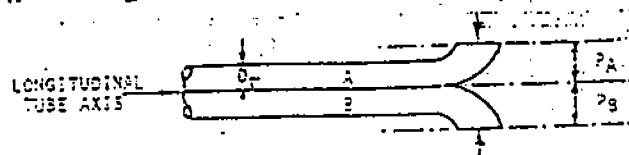
REQUIRED MEASUREMENTS

- a. External tubing diameter, D_t , $0.23 \text{ in.} < D_t < 0.38 \text{ in.}$
 b. Base to plane opening Distance, P_A and P_B , $0.40 \text{ in.} < P_A=P_B < 0.60 \text{ in.}$

$D_t = 0.375$

$P_A = 0.45$

$P_B = 0.49$



- 2.) All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

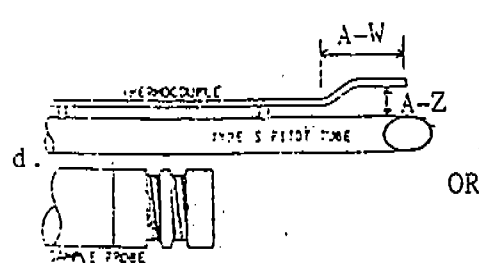
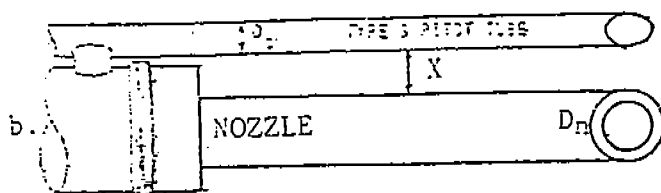
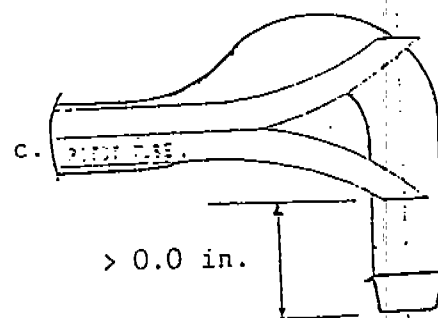
- a. External tubing diameter. See 1.a. above
 b. Pitot / nozzle separation, X , $X \geq 0.75 \text{ in.}$ for nozzle diameter, $D_n = 0.50 \text{ in.}$
 c. Plane of impact side of pitot in relation to plane of nozzle opening.
 d. Thermocouple placement, Z , $A-Z \geq 0.75 \text{ in.}$, $A-W \geq 3.0 \text{ in.}$, $B-Z \geq 2.0 \text{ in.}$
 e. Pitot / probe sheath distance, Y , $Y \geq 3.0 \text{ in.}$

$D_n = 0.370$

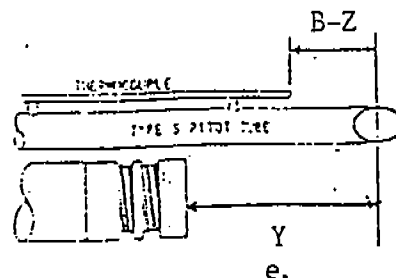
$X = 1.1$

$Z = 2.10$

$Y = 3.0$



OR



e.

REQUIREMENTS FOR ASSIGNING A BASELINE COEFFICIENT VALUE
OF 0.84 TO AN "S" TYPE PITOT TUBE

PITOT # FS-105 DATE 6-6-57 OBSERVATIONS BY TIM TOMAS

- 1) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

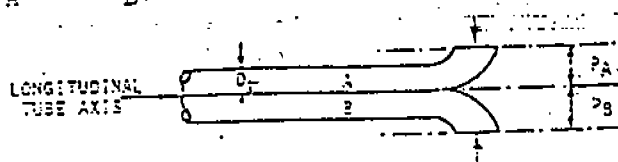
REQUIRED MEASUREMENTS

- External tubing diameter, D_t , 0.23 in. $< D_t < 0.38$ in.
- Base to plane opening Distance, P_A and P_B , 0.40 in. $< P_A=P_B < 0.60$ in.

$D_t = 0.375$

$P_A = 0.49$

$P_B = 0.49$



- All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

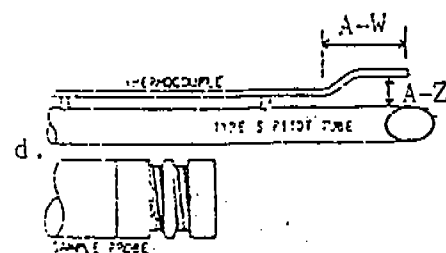
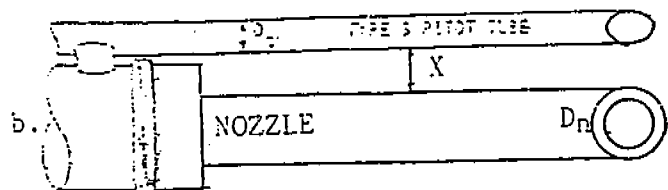
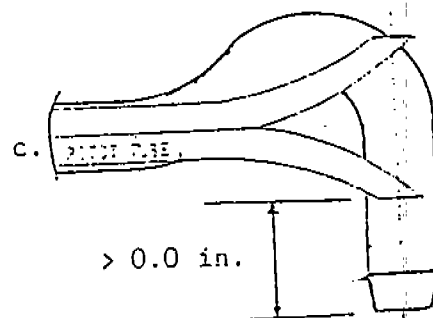
- External tubing diameter. See 1.a. above
- Pitot / nozzle separation, X , $X \geq 0.75$ in. for nozzle diameter, $D_n = 0.50$ in.
- Plane of impact side of pitot in relation to plane of nozzle opening.
- Thermocouple placement, Z , $A-Z \geq 0.75$ in., $A-W \geq 3.0$ in., $B-Z \geq 2.0$ in.
- Pitot / probe sheath distance, Y , $Y \geq 3.0$ in.

$D_n = 0.187$

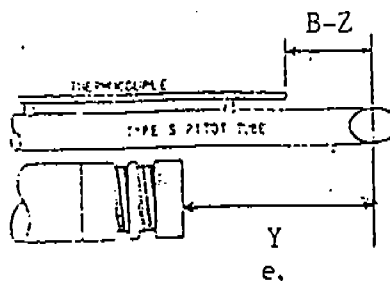
$X = 1.1$

$Z = 2.6$

$Y = 3.0$



OR



REQUIREMENTS FOR ASSIGNING A BASELINE COEFFICIENT VALUE
OF 0.84 TO AN "S" TYPE PITOT TUBE

PITOT # FE-106 DATE 6-6-57 OBSERVATIONS BY Tim Tomasi

- a.) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

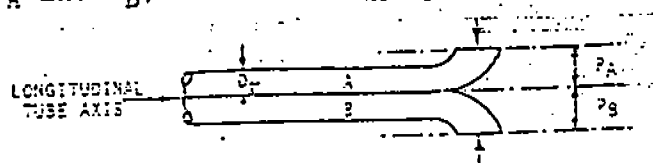
REQUIRED MEASUREMENTS

- a. External tubing diameter, D_t , $0.23 \text{ in.} < D_t < 0.38 \text{ in.}$
 b. Base to plane opening Distance, P_A and P_B , $0.40 \text{ in.} < P_A=P_B < 0.60 \text{ in.}$

$D_t = 0.175$

$P_A = 0.49$

$P_B = 0.49$



- a.) All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

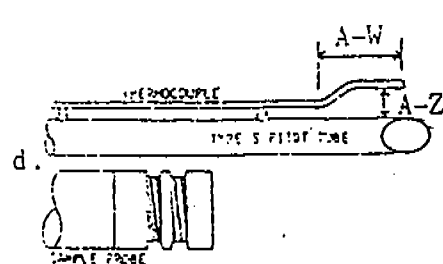
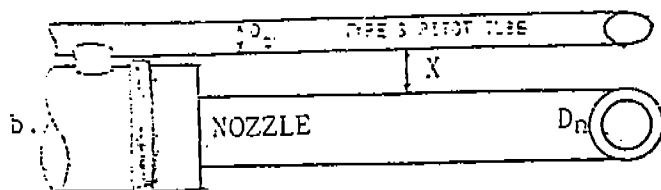
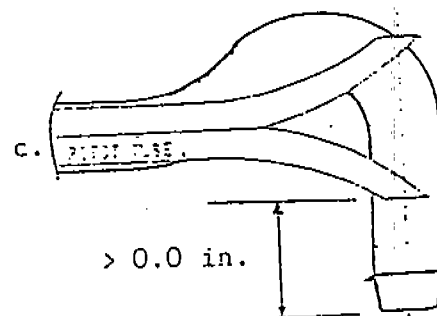
- a. External tubing diameter. See 1.a. above
 b. Pitot / nozzle separation, X , $X \geq 0.75 \text{ in.}$ for nozzle diameter, $D_n = 0.50 \text{ in.}$
 c. Plane of impact side of pitot in relation to plane of nozzle opening.
 d. Thermocouple placement, Z , $A-Z \geq 0.75 \text{ in.}$, $A-W \geq 3.0 \text{ in.}$, $B-Z \geq 2.0 \text{ in.}$
 e. Pitot / probe sheath distance, Y , $Y \geq 3.0 \text{ in.}$

$D_n = 0.187$

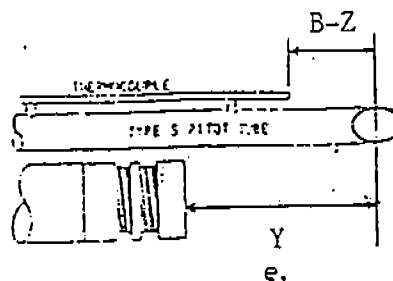
$X = 1.1$

$Z = 2.10$

$Y = 3.0$



OR



REQUIREMENTS FOR ASSIGNING A BASELINE COEFFICIENT OF 0.84 TO AN "S" TYPE PITOT TUBE

PITOT # FE-108 DATE 6-6-57 OBSERVATIONS BY TIM TOMAS

- a.) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

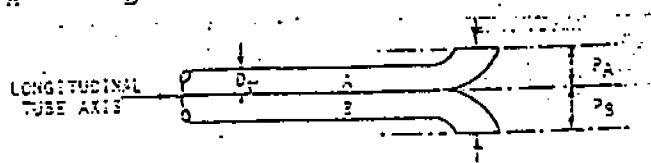
REQUIRED MEASUREMENTS

- a. External tubing diameter, D_t , 0.23 in. $< D_t < 0.38$ in.
 b. Base to plane opening Distance, P_A and P_B , 0.40 in. $< P_A=P_B < 0.60$ in.

$D_t = .375$

$P_A = .49$

$P_B = .49$



- a.) All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

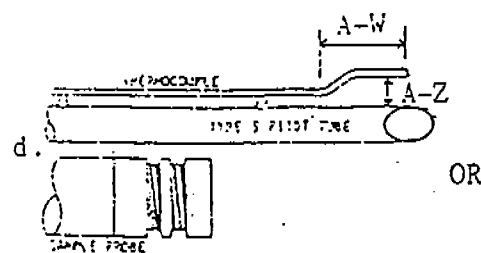
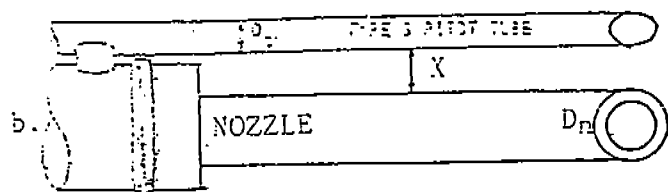
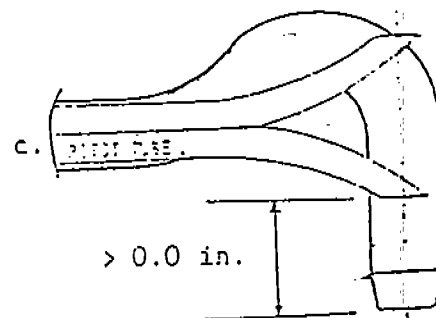
- a. External tubing diameter. See 1.a. above
 b. Pitot / nozzle separation, X , $X \geq 0.75$ in. for nozzle diameter, $D_n = 0.50$ in.
 c. Plane of impact side of pitot in relation to plane of nozzle opening.
 d. Thermocouple placement, Z , $A-Z \geq 0.75$ in., $A-W \geq 3.0$ in., $B-Z \geq 2.0$ in.
 e. Pitot / probe sheath distance, Y , $Y \geq 3.0$ in.

$D_n = .625$

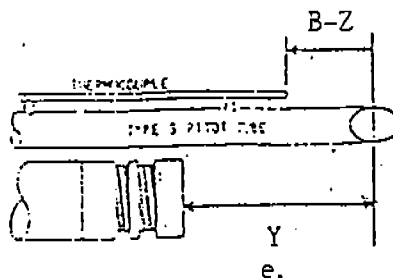
$X = 1.1$

$Z = 2.10$

$Y = 3.0$



OR



REQUIREMENTS FOR ASSIGNING A BASELINE CODE
OF 0.84 TO AN "S" TYPE PITOT TUBE

PITOT # FE-109 DATE 6-6-97 OBSERVATIONS BY Jim Thomas

- 1.) All construction criteria for an isolated "S" type pitot are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

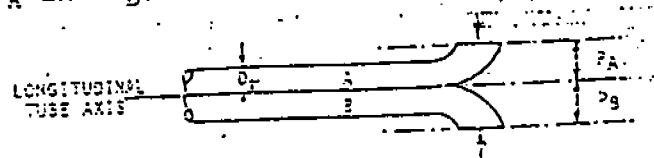
REQUIRED MEASUREMENTS

- a. External tubing diameter, D_t , 0.23 in. $< D_t < 0.38$ in.
 b. Base to plane opening Distance, P_A and P_B , 0.40 in. $< P_A=P_B < 0.60$ in.

$D_t = 0.375$

$P_A = .49$

$P_B = .49$



- 2.) All assembly criteria to prevent aerodynamic interference for a sampling arrangement of an "S" type pitot, nozzle and thermocouple, are within given tolerances prescribed in Federal Register, Vol. 42, No. 160. Thursday, August 18, 1977.

REQUIRED MEASUREMENTS

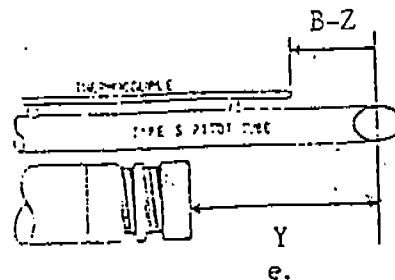
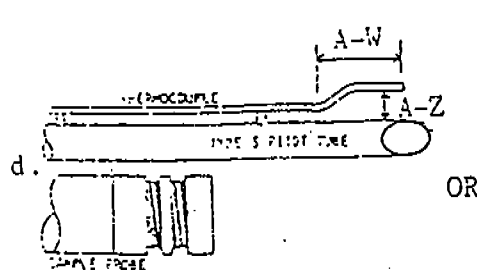
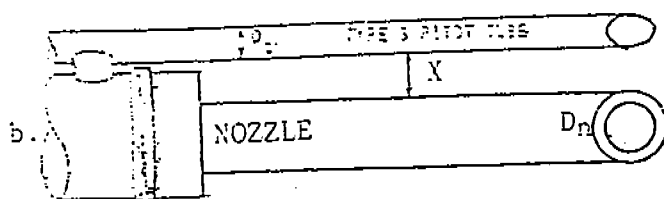
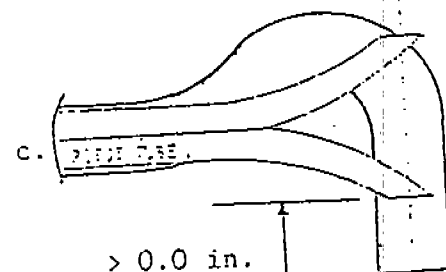
- a. External tubing diameter. See 1.a. above
 b. Pitot / nozzle separation, X , $X \geq 0.75$ in. for nozzle diameter, $D_n = 0.50$ in.
 c. Plane of impact side of pitot in relation to plane of nozzle opening.
 d. Thermocouple placement, Z , $A-Z \geq 0.75$ in., $A-W \geq 3.0$ in., $B-Z \geq 2.0$ in.
 e. Pitot / probe sheath distance, Y , $Y \geq 3.0$ in.

$D_n = .255$

$X = 1.1$

$Z = 2.10$

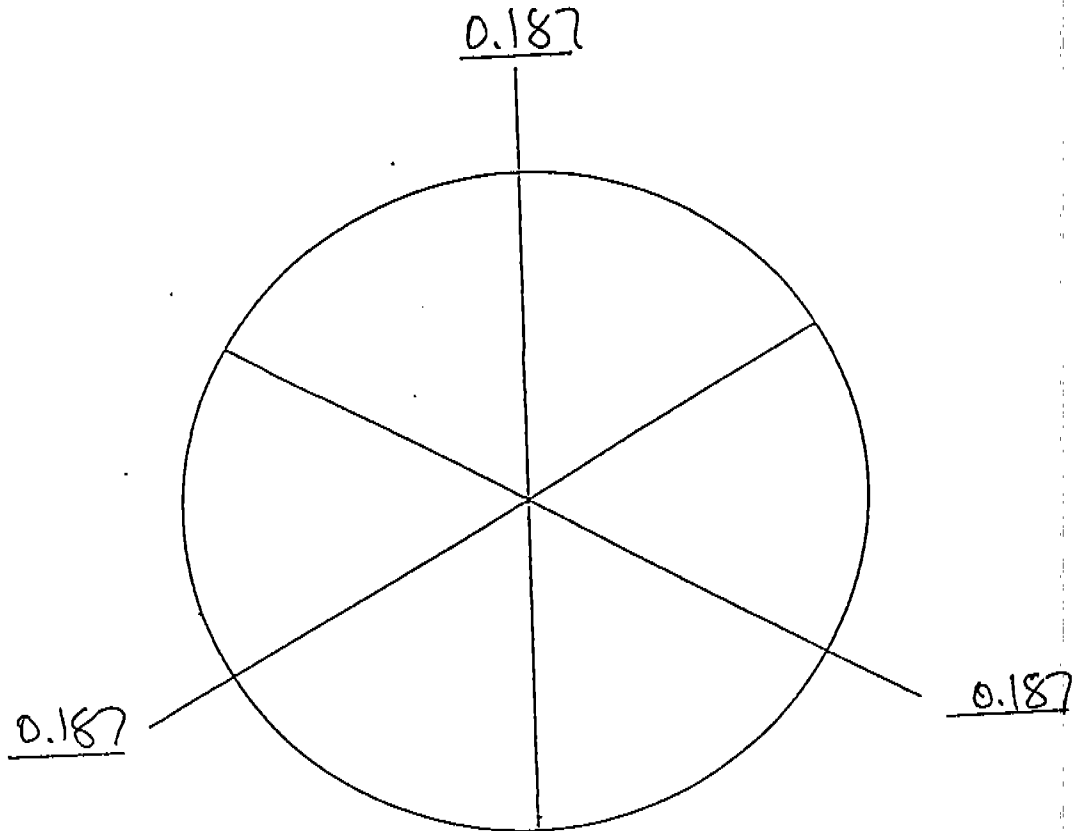
$Y = 3.0$



NOZZLE CALIBRATION DATA FORM

Date: 6-6-97

Calibrated by: Tim Tomasi



Nozzle Identification Number	Nozzle Diameter ^a			ΔD^b mm (in.)	D_{avg}^c
	D_1 mm (in.)	D_2 mm (in.)	D_3 mm (in.)		
B-3	0.187	0.187	0.187	0	.187

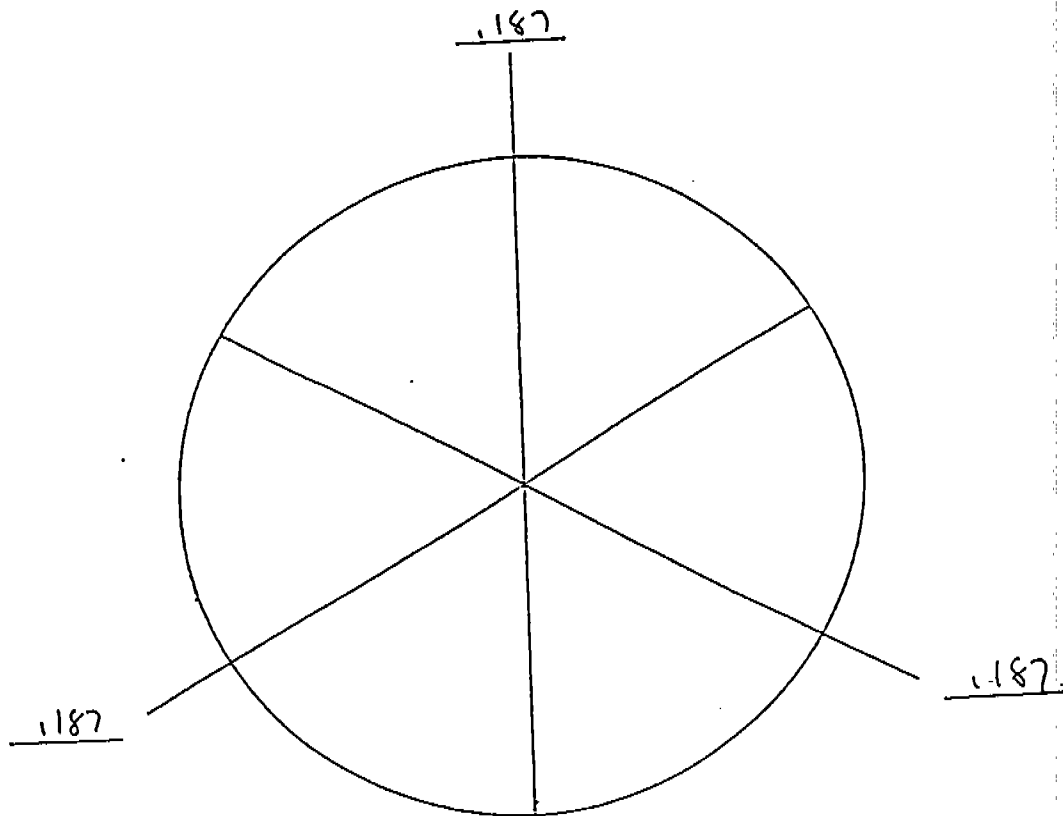
Where:

a = nozzle diameters b = maximum difference c = average diameter

NOZZLE CALIBRATION DATA FORM

Date: 6-6-97

Calibrated by: SIM TOMAS



Nozzle Identification Number	Nozzle Diameter ^a			ΔD^b mm (in.)	D_{avg}^c
	D_1 mm (in.)	D_2 mm (in.)	D_3 mm (in.)		
C-3	.187	.187	.187	0	.187

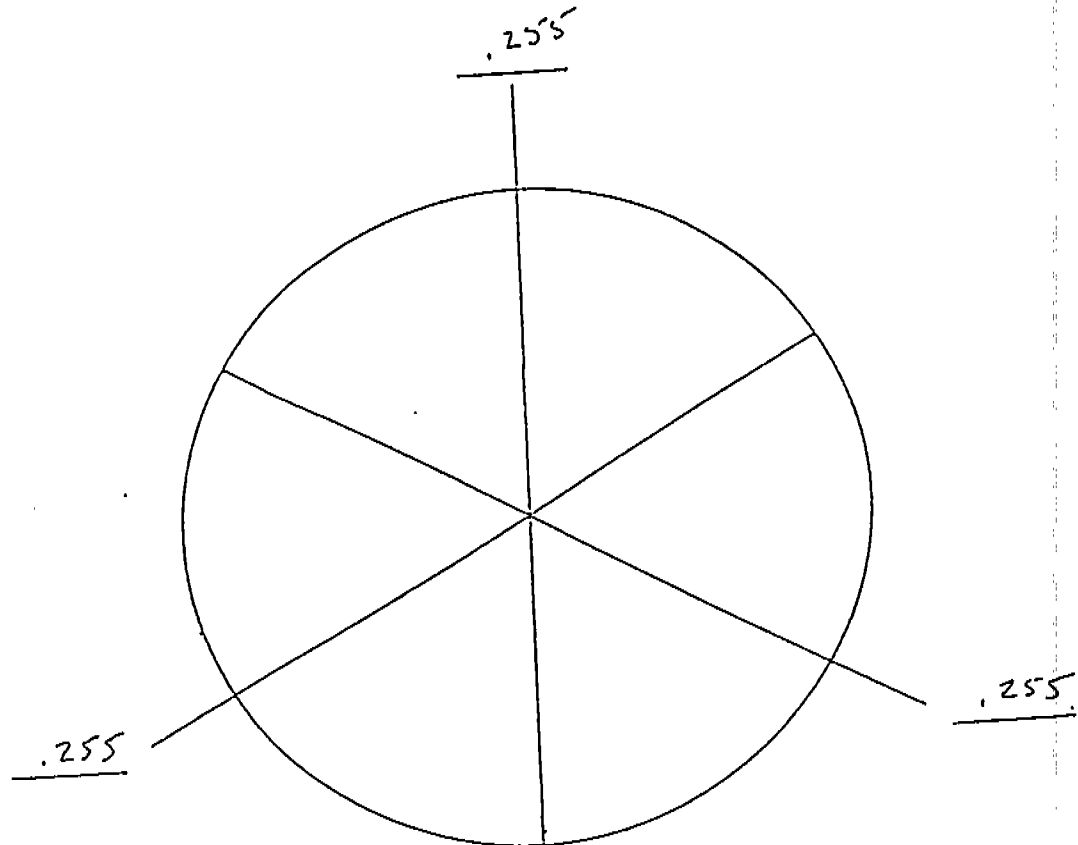
Where:

a = nozzle diameters b = maximum difference c = average diameter

NOZZLE CALIBRATION DATA FORM

Date: 6-6-97

Calibrated by: Tim Thomas



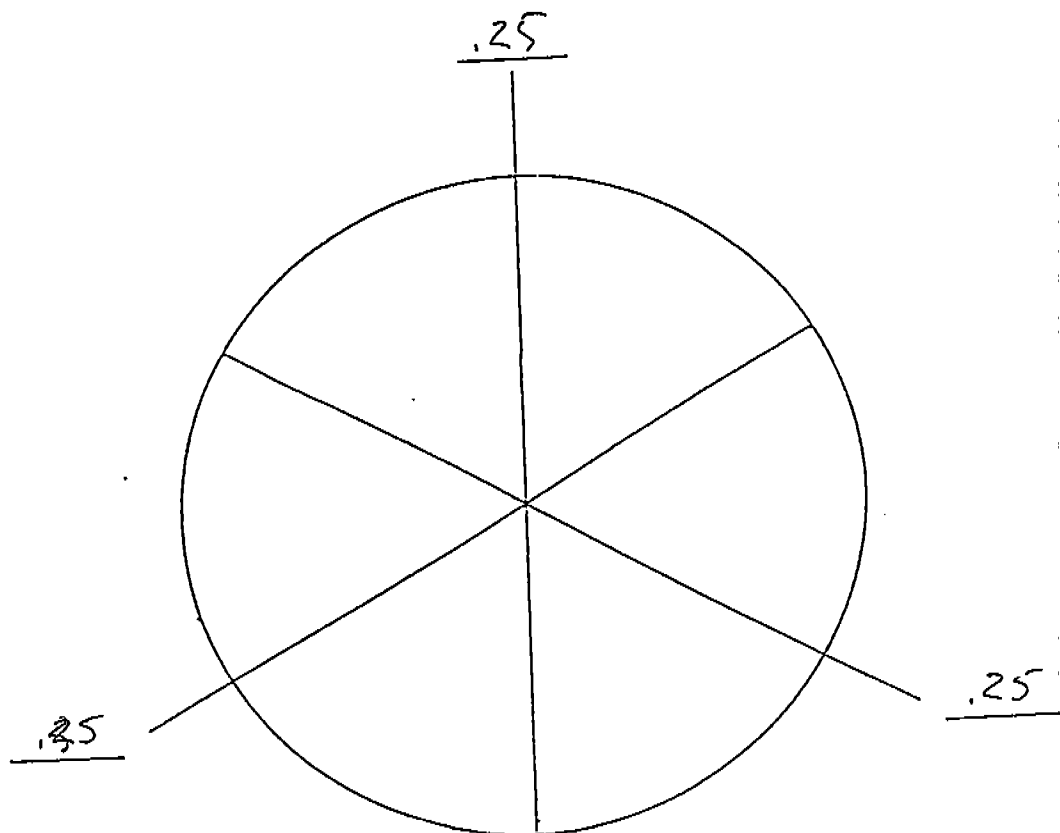
Nozzle Identification Number	Nozzle Diameter ^a			ΔD^b mm (in.)	D_{avg}^c
	D_1 mm (in.)	D_2 mm (in.)	D_3 mm (in.)		
A-4	.255	.255	.255	0	.255

Where:
a = nozzle diameters b = maximum difference c = average diameter

NOZZLE CALIBRATION DATA FORM

Date: 6-6-97

Calibrated by: Jim Tomasi



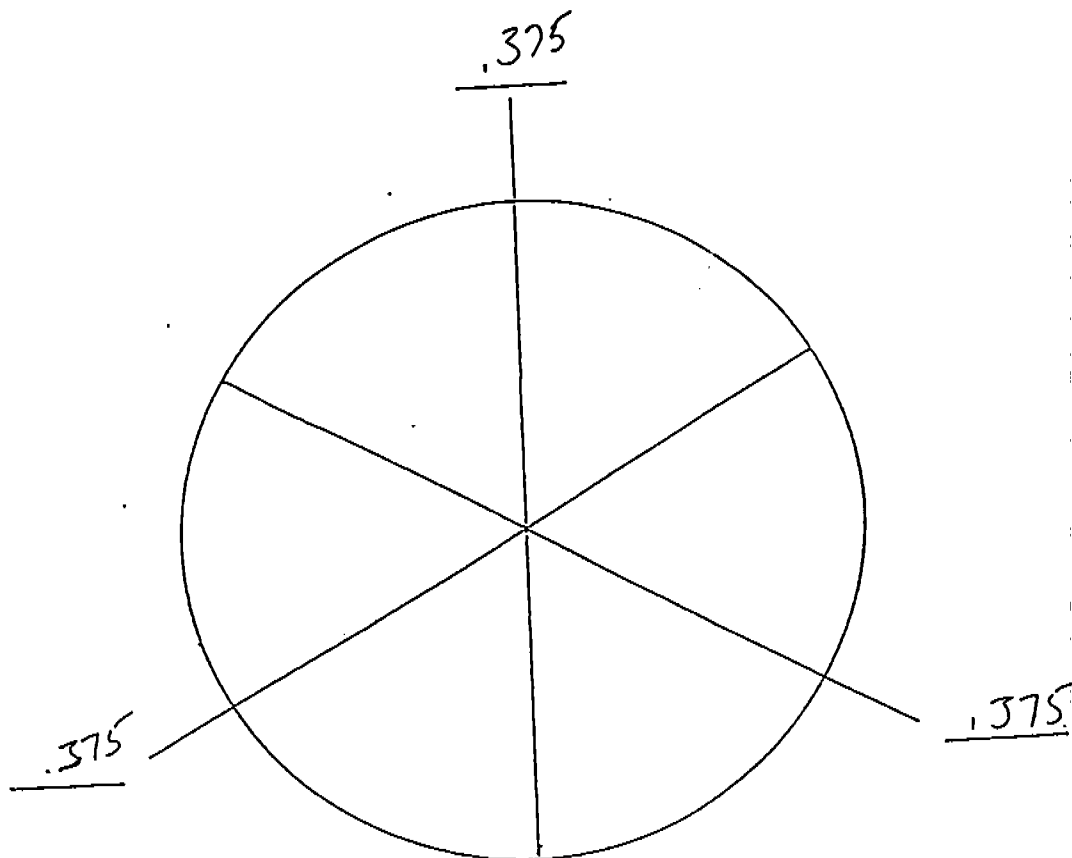
Nozzle Identification Number	Nozzle Diameter ^a			ΔD^b mm (in.)	D_{avg}^c
	D_1 mm (in.)	D_2 mm (in.)	D_3 mm (in.)		
B-4	.25	.25	.25	0	.25

Where:
a = nozzle diameters b = maximum difference c = average diameter

NOZZLE CALIBRATION DATA FORM

Date: 6-6-97

Calibrated by: Tim Thomas



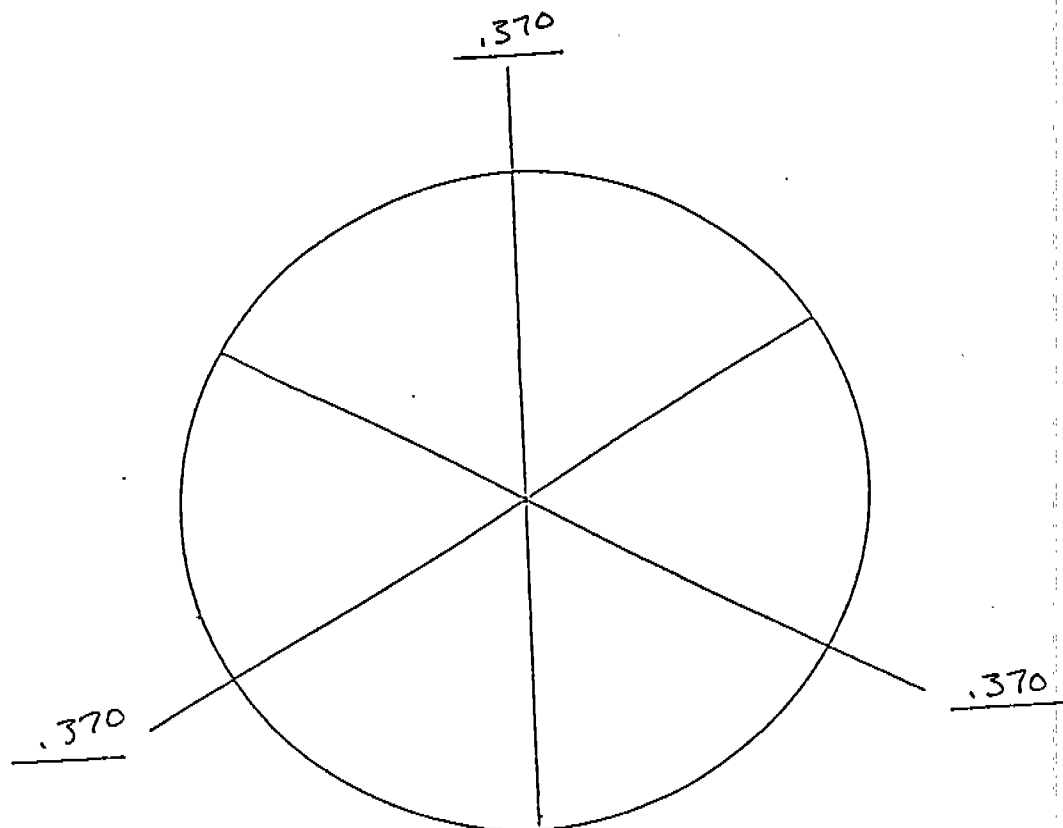
Nozzle Identification Number	Nozzle Diameter ^a			ΔD^b mm (in.)	D_{avg}^c
	D_1 mm (in.)	D_2 mm (in.)	D_3 mm (in.)		
A-6	.375	.375	.375	0	.375

Where:
a = nozzle diameters b = maximum difference c = average diameter

NOZZLE CALIBRATION DATA FORM

Date: 6-6-52

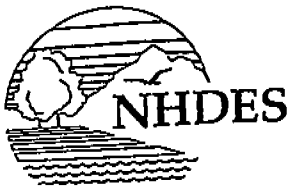
Calibrated by: L. M. Lomas



Nozzle Identification Number	Nozzle Diameter ^a			ΔD^b mm (in.)	D_{avg}^c
	D_1 mm (in.)	D_2 mm (in.)	D_3 mm (in.)		
b-4	.370	.370	.370	0	.370

Where:
a = nozzle diameters b = maximum difference c = average diameter

APPENDIX J



State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
64 No. Main Street, P.O. Box 2033, Concord, NH 03302-2033
(603) 271-1370 FAX (603) 271-1381



May 29, 1997

Mr. John J. Jasko
Air Quality Technical Services, Inc.
18 Morse Drive
Essex Junction, VT 05452

Subject: N.H. "Visible Emissions Evaluation" Session, Spring 1997

Dear Mr. Jasko:

The New Hampshire Department of Environmental Services, Air Resources Division is pleased to advise you that you have successfully completed the recent "Visible Emissions Evaluation" session held in Concord, New Hampshire on April 24 & 25, 1997. Having participated in the smoke evaluation sessions, you have met the following certification criteria:

- (1) The average deviation for the sets of 25 black smoke and 25 white smoke emissions was less than 7.5%.
- (2) The deviation of each reading was 15%, or less.

This certification is valid until October 25, 1997. A copy of your test sheet will be supplied upon request.

Sincerely,

Kenneth A. Colburn

Kenneth A. Colburn
Director
Air Resources Division

KAC/sec/a:\smoke97.sch

SOURCE:		OBSERVATION DATE:				START TIME:				STOP TIME:			
ADDRESS:		SEC	MIN	0	15	30	45	SEC	MIN	0	15	30	45
OMYA DUC		6/12/97						12:45					
P.O. Box 10		1	0	0	0	0	0	31	0	0	0	0	0
FLORENCE ROAD		2	0	0	0	0	0	32	0	0	0	0	0
CITY:	FLORENCE	3	0	0	0	0	0	33	0	0	0	0	0
STATE:	VT	4	0	0	0	0	0	34	0	0	0	0	0
ZIP:	05744	5	0	0	0	0	0	35	0	0	0	0	0
PHONE:	802-459-3311	6	0	0	0	0	0	36	0	0	0	0	0
PROCESS:	FLASH DRYER #1	7	0	0	0	0	0	37	0	0	0	0	0
CONTROL EQUIPMENT:	BAG HOUSE	8	0	0	0	0	0	38	0	0	0	0	0
OPERATING MODE:	STANDARD	9	0	0	0	0	0	39	0	0	0	0	0
OPERATING MODE:	STANDARD	10	0	0	0	0	0	40	0	0	0	0	0
EMISSION POINT DESCRIPTION:	STACK ON ROOFTOP	11	0	0	0	0	0	41	0	0	0	0	0
HEIGHT ABOVE GROUND LEVEL:	DISCHARGE ~ 12' ABOVE ROOF	12	0	0	0	0	0	42	0	0	0	0	0
HEIGHT RELATIVE TO OBSERVER:	+6'	13	0	0	0	0	0	43	0	0	0	0	0
DIRECTION FROM OBSERVER:	NE	14	0	0	0	0	0	44	0	0	0	0	0
EMISSION DESCRIPTION:	NONE VISIBLE	15	0	0	0	0	0	45	0	0	0	0	0
EMISSION COLOR:	NONE	16	0	0	0	0	0	46	0	0	0	0	0
PLUME TYPE:	NONE	17	0	0	0	0	0	47	0	0	0	0	0
POINT AT WHICH OPACITY WAS DETERMINED:	~4' ABOVE DISCHARGE	18	0	0	0	0	0	48	0	0	0	0	0
BACKGROUND DESCRIPTION:	GREEN HILLSIDE	19	0	0	0	0	0	49	0	0	0	0	0
BACKGROUND COLOR:	GREEN	20	0	0	0	0	0	50	0	0	0	0	0
SKY CONDITIONS:	Blue Sky with some broken clouds/LIGHT overcast	21	0	0	0	0	0	51	0	0	0	0	0
WIND SPEED:	<5 mph	22	0	0	0	0	0	52	0	0	0	0	0
WIND DIRECTION:	S CHANGING TO W	23	0	0	0	0	0	53	0	0	0	0	0
WET BULB TEMPERATURE:		24	0	0	0	0	0	54	0	0	0	0	0
AMBIENT TEMPERATURE:		25	0	0	0	0	0	55	0	0	0	0	0
OBSERVATION LAYOUT SKETCH:		26	0	0	0	0	0	56	0	0	0	0	0
		27	0	0	0	0	0	57	0	0	0	0	0
		28	0	0	0	0	0	58	0	0	0	0	0
OBSERVERS NAME PRINTED: JOHN J. JASKO		29	0	0	0	0	0	59	0	0	0	0	0
OBSERVERS SIGNATURE: [Signature]		30	0	0	0	0	0	60	0	0	0	0	0
DATE: 6/12/97		AVERAGE OPACITY FOR HIGHEST PERIOD: 0											
OBSERVERS AFFILIATION: AIR QUALITY TECHNICAL SERVICES INC.		OPACITY LIMIT: 7%											
CERTIFYING AGENCY: NHARD-DES		NUMBER OF READINGS ABOVE LIMIT: 0											
CERTIFICATION DATE: 4/24/97		READING RANGE: 0% MINIMUM 0% MAXIMUM											

SOURCE: OMYA DUC		OBSERVATION DATE: 6/12/97				START TIME: 16:29				STOP TIME: 17:29			
ADDRESS: P.O. Box 10 FLORENCE ROAD		SEC MIN	0	15	30	45	SEC MIN	0	15	30	45		
CITY: FLORENCE	STATE: VT	ZIP: 05744	1	0	0	0	0	31	0	0	0	0	
PHONE: 802-459-3311	SOURCE ID NUMBER:		2	0	0	0	0	32	0	0	0	0	
PROCESS: FLASH DRYER #1	OPERATING MODE: STANDARD		3	0	0	0	0	33	0	0	0	0	
CONTROL EQUIPMENT: BAG HOUSE	OPERATING MODE: STANDARD		4	0	0	0	0	34	0	0	0	0	
EMISSION POINT DESCRIPTION: STACK ON ROOFTOP			5	0	0	0	0	35	0	0	0	0	
HEIGHT ABOVE GROUND LEVEL: DISCHARGE ~12' ABOVE ROOF	HEIGHT RELATIVE TO OBSERVER: +6'		6	0	0	0	0	36	0	0	0	0	
DISTANCE FROM OBSERVER: 40'	DIRECTION FROM OBSERVER: ESE		7	0	0	0	0	37	0	0	0	0	
EMISSION DESCRIPTION: NONE VISIBLE	EMISSION COLOR: NONE		8	0	0	0	0	38	0	0	0	0	
PLUME TYPE: NONE			9	0	0	0	0	39	0	0	0	0	
POINT AT WHICH OPACITY WAS DETERMINED: ~4' ABOVE DISCHARGE			10	0	0	0	0	40	0	0	0	0	
BACKGROUND DESCRIPTION: SKY	BACKGROUND COLOR: GRAY		11	0	0	0	0	41	0	0	0	0	
SKY CONDITIONS: OVERCAST			12	0	0	0	0	42	0	0	0	0	
WIND SPEED: ~10 mph	WIND DIRECTION: SW		13	0	0	0	0	43	0	0	0	0	
AMBIENT TEMPERATURE:	WET BULB TEMPERATURE:		14	0	0	0	0	44	0	0	0	0	
OBSERVATION LAYOUT SKETCH:			15	0	0	0	0	45	0	0	0	0	
The sketch shows a building with a stack on the roof. An observer is positioned to the left of the building. A dashed line indicates the line of sight from the observer to the stack. The plume is shown as a dashed line extending from the stack. A north arrow points to the right.			16	0	0	0	0	46	0	0	0	0	
			17	0	0	0	0	47	0	0	0	0	
			18	0	0	0	0	48	0	0	0	0	
			19	0	0	0	0	49	0	0	0	0	
			20	0	0	0	0	50	0	0	0	0	
			21	0	0	0	0	51	0	0	0	0	
			22	0	0	0	0	52	0	0	0	0	
			23	0	0	0	0	53	0	0	0	0	
			24	0	0	0	0	54	0	0	0	0	
			25	0	0	0	0	55	0	0	0	0	
			26	0	0	0	0	56	0	0	0	0	
			27	0	0	0	0	57	0	0	0	0	
			28	0	0	0	0	58	0	0	0	0	
			29	0	0	0	0	59	0	0	0	0	
			30	0	0	0	0	60	0	0	0	0	
			SUN. ☉ WIND. ----> PLUME. ~~~~ NORTH. →			AVERAGE OPACITY FOR HIGHEST PERIOD: 0%							
OBSERVERS NAME PRINTED: JOHN J. JASKO			DATE: 6/12/97										
OBSERVERS SIGNATURE: [Signature]			OPACITY LIMIT: 7%										
OBSERVERS AFFILIATION: ABC QUALITY TECHNICAL SERVICES INC.			NUMBER OF READINGS ABOVE LIMIT: 0										
CERTIFYING AGENCY: NHARD-DES			READING RANGE: 0% MINIMUM 0% MAXIMUM										

SOURCE:		OBSERVATION DATE:				START TIME:				STOP TIME:			
ADDRESS:		SEC MIN	0	15	30	45	SEC MIN	0	15	30	45		
OMYA DUC		6/13/97					10:45					11:45	
P.O. Box 10		1	0	0	0	0	31	0	0	0	0		
FLORENCE ROAD		2	0	0	0	0	32	0	0	0	0		
CITY:	STATE:	3	0	0	0	0	33	0	0	0	0		
FLORENCE	VT	4	0	0	0	0	34	0	0	0	0		
PHONE:	SOURCE ID NUMBER:	5	0	0	0	0	35	0	0	0	0		
802-459-3311		6	0	0	0	0	36	0	0	0	0		
PROCESS:	OPERATING MODE:	7	0	0	0	0	37	0	0	0	0		
FLASH DRYER #1	STANDARD	8	0	0	0	0	38	0	0	0	0		
CONTROL EQUIPMENT:	OPERATING MODE:	9	0	0	0	0	39	0	0	0	0		
BAQ HOUSE	STANDARD	10	0	0	0	0	40	0	0	0	0		
EMISSION POINT DESCRIPTION:		11	0	0	0	0	41	0	0	0	0		
STACK ON ROOFTOP		12	0	0	0	0	42	0	0	0	0		
HEIGHT ABOVE GROUND LEVEL:	HEIGHT RELATIVE TO OBSERVER:	13	0	0	0	0	43	0	0	0	0		
DISCHARGE $\approx$ 12' ABOVE ROOF	+6'	14	0	0	0	0	44	0	0	0	0		
DISTANCE FROM OBSERVER:	DIRECTION FROM OBSERVER:	15	0	0	0	0	45	0	0	0	0		
$\approx$ 30'	NW	16	0	0	0	0	46	0	0	0	0		
EMISSION DESCRIPTION:	EMISSION COLOR:	17	0	0	0	0	47	0	0	0	0		
NONE VISIBLE	NONE	18	0	0	0	0	48	0	0	0	0		
PLUME TYPE:		19	0	0	0	0	49	0	0	0	0		
NONE		20	0	0	0	0	50	0	0	0	0		
POINT AT WHICH OPACITY WAS DETERMINED:		21	0	0	0	0	51	0	0	0	0		
$\approx$ 4' ABOVE DISCHARGE		22	0	0	0	0	52	0	0	0	0		
BACKGROUND DESCRIPTION:	BACKGROUND COLOR:	23	0	0	0	0	53	0	0	0	0		
SKY	GRAY	24	0	0	0	0	54	0	0	0	0		
SKY CONDITIONS:		25	0	0	0	0	55	0	0	0	0		
OVERCAST		26	0	0	0	0	56	0	0	0	0		
WIND SPEED:	WIND DIRECTION:	27	0	0	0	0	57	0	0	0	0		
5-10 mph	SSW	28	0	0	0	0	58	0	0	0	0		
AMBIENT TEMPERATURE:	WET BULB TEMPERATURE:	29	0	0	0	0	59	0	0	0	0		
		30	0	0	0	0	60	0	0	0	0		
OBSERVATION LAYOUT SKETCH:													
SUN.		WIND.											
PLUME.		NORTH.											
OBSERVERS NAME PRINTED:		AVERAGE OPACITY FOR HIGHEST PERIOD:											
JOHN J. JASKO		0%											
OBSERVERS SIGNATURE:		DATE:		OPACITY LIMIT:									
		6/13/97		7%									
OBSERVERS AFFILIATION:		NUMBER OF READINGS ABOVE LIMIT:											
AIR QUALITY TECHNICAL SERVICES INC.		0											
CERTIFYING AGENCY:		CERTIFICATION DATE:		READING RANGE:									
NHARD-DES		4/24/97		0% MINIMUM 0% MAXIMUM									