AP42 Section: 13.2.6

Background Chapter 4

Reference: 3

Title: **Determination of Particulate Emission Rates & Baghouse Removal Efficiency, Hamilton Foundry, Harrison, Ohio, K&B Design, Inc., Cincinnati, OH, September 3, 1991**

SECTION 4
REFERENCE 3

5A

APPENDIX K

OEPA STACK TEST REVIEW SUMMARY FORM

APPLICATION NUMBER 1431233202/PTI 14-1995 P007

FACILITY NAME Hamilton Foundry

SOURCE DESCRIPTION (OR SCC CODE) BMD Pellet Blasting

CONTROL EQUIPMENT Baghouse

DATE(S) OF TEST August 20 & 21, 1991

FINAL TEST REPORT RECEIVED ON September 18, 1991

POLLUTANT(S) TESTED Particulate Emissions

TEST METHOD USEPA Reference Methods 1-4 & 17

TEST FIRM K. & B. Design, Inc. (Cincinnati, Ohio)

EMISSION RATES*: 99.9% control efficiency >99% control efficiency

ACTUAL (lb(s)/Hr) 0.5 #/HR PX ALLOWABLE** 0.6 #/HR PX

OPERATING RATES*:

DURING TEST** 5,888 #/HR MAXIMUM** 8,500 #/HR

EMISSION FACTOR***

COMMENTS:

I HEREBY VERIFY THAT THE INFORMATION CONTAINED WITHIN THE STACK TEST REPORT HAS BEEN REVIEWED AND IT HAS BEEN DETERMINED THAT THE TEST PROCEDURES, ANALYSES AND CALCULATIONS ARE:

[X] AN ACCEPTABLE DEMONSTRATION OF CONFORMANCE WITH THE APPROVED TESTING METHODOLOGY.

[ ] AN UNACCEPTABLE DEMONSTRATION OF CONFORMANCE WITH THE APPROVED TESTING METHODOLOGY.

October 3, 1991
DATE OF REVIEW

Prepared By: Denise L. Bien, AQS
REVIEWED BY: LeRoy R. Gruber, AQE

LRG

* BASED ON - RUN AVERAGE
** SPECIFY APPLICATION UNITS
*** SPECIFY IN UNITS OF MASS/INPUT

OBSERVER'S REPORT

Compliance Test

for

Particulate Emissions

Conducted On: August 20 & 21, 1991

Source: Hamilton Foundry
Premise Number: 1431233202/PTI 14-1995 PØØ7

Test Firm: K&B Design, Inc.
Cincinnati, Ohio

Prepared By: Denise L. Bien, AQS
LeRoy R. Gruber, AQE

Date Prepared: October 3, 1991

SOUTHWESTERN OHIO AIR POLLUTION CONTROL AGENCY
(S.W.O.A.P.C.A)

Hamilton Foundry
P.N. 1431233202/PTI 14-1995

Testing for particulate emissions (all size fractions) was conducted on August 20th and 21st, 1991 at Hamilton Foundry in Harrison, Ohio. The facility's Fuller baghouse was tested to determine compliance. A new BMD pellet blasting cleaning device (7,100 #/HR throughput) was added to the baghouse. It also controls emissions from several blasting machines, a sand cast vibrator belt and other plant processes. The foundry has no controls on the melting furnaces. Testing was done to determine if the baghouse could achieve 99% control efficiency when the new blaster and the other processes were running. That would satisfy Best Available Technology (BAT) requirements (OAC Rule 3745-31-05) for the new cleaner. An outlet emission rate of less than .6 #/HR is also specified.

The test series was performed by K&B Design under the direction of Craig Jones. The test was witnessed by William L. Ausdenmoore and Hollie M. Barger of SWOAPCA. USEPA Reference Methods 1-4, 17 (in-stack filtration method) was used due to a vertical inlet traverse. Three sixty minute runs were done at both the inlet and the outlet of the baghouse. The inlet samples were taken in the main trunk line. An ID fan pulls the dust laden air from the building, through the baghouse, and exhausts the cleaned air stream to the atmosphere. Outlet samples were taken on the discharge side of the fan.

Results from the test averaged 721.3 #/HR at the inlet and <u>0.5 #/HR at the outlet</u>. That represents a 99.9% control efficiency. Stack gas flow was 44,203 dscfm at 100 degrees F and 4.1% moisture (inlet). Fyrite analysis resulted in 20.9% O_2 and an undetectable amount of CO_2 on the inlet. The outlet averaged a stack gas flow of 48,627 dscfm at 105 degrees F and 3.6% moisture.

New bagging was put in June 1991.

The amount of poured and cleaned iron during the test was recorded. It was comparable to average amounts in October 1990.

Quality assurance measures utilized for the test included calibrations of dry gas meters, thermometers, pitot tubes, and sample nozzles. Equipment leak checks and proper documentation were in the test report. The emission rate, stack flow and other calculations were checked and found to be correct.

In conclusion, data of sufficient precision and accuracy was obtained to determine compliance.

<u>Prepared By:</u> Denise L. Bien, AQS
LeRoy R. Gruber, AQE

DLB/LRG/sal

DETERMINATION OF
PARTICULATE EMISSION RATES
& BAGHOUSE REMOVAL EFFICIENCY
HAMILTON FOUNDRY
HARRISON, OHIO

Craig R. Jones

Craig R. Jones
Vice President

Job # C-335
September 3, 1991

K&B Design, Inc.
3131 Disney Street
Cincinnati, OH 45209
(513) 351-6200

Table of Contents

1.0 EXECUTIVE SUMMARY

K&B Design, Inc. was retained by Hamilton Foundry to determine the particulate removal efficiency of the Fuller baghouse which controls emissions from the BMD shot blast, the spin blast, and the sand shakeout. Three samples were collected from the inlet and the outlet of the baghouse using USEPA Reference Methods for stationary source sampling.

The results of the tests are summarized below:

TEST #	REMOVAL EFFICIENCY (%)
1	99.95
2	99.90
3	99.96
Average	99.94

2.0 *INTRODUCTION*

K&B Design, Inc. was retained by Hamilton Foundry to determine the removal efficiency of particulate matter of the Fuller baghouse. Three, 60 minute samples were taken at the inlet and outlet of the baghouse using USEPA Reference Methods 1-4 and 17. The tests were conducted on August 20 and 21, 1991. Measurements were also made of the stack gas temperature, moisture content, velocity and volumetric flow rate.

Mr. William Ausdenmoore and Ms. Hollie M. Barger of the Southwestern Ohio Air Pollution Control Agency (SWOAPCA) were on-site to observe the test procedures and the process conditions. Mr. Harry Beeman of Hamilton Foundry coordinated the sampling activities with the plant production activities. Craig Jones, Tom Bayer, Ron Wittich, and Dennis Larrick of K&B Design conducted the stack tests.

3.0 *DESCRIPTION OF OPERATIONS*

Particulate emissions from the BMD shot blast, the spin blast, and the sand shakeout are ducted to the Fuller baghouse. The emission control system consists of several pickup points that converge into a common manifold upstream of the baghouse. The inlet samples were taken in the main truck line. An ID fan pulls the dust laden air from the building, through the baghouse, and exhausts the clean air stream to the atmosphere. The outlet samples were taken on the discharge side of the fan.

Process data is included In Appendix A.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

The sampling and analytical procedures used in these emission tests conform to the most recent revisions of USEPA Reference Methods for stationary source sampling. The following procedures were employed:

° **Measurement Sites**
Location of measurement sites and the number of traverse points that were sampled was determined as specified in USEPA Reference Method 1, *"Sample and Velocity Traverses for Stationary Sources"*. Drawings of the sampling sites are included in Figure 4.1 and Figure 4.2.

° **Velocity and Temperature**
Stack gas velocity and temperature were determined using USEPA Reference Method 2, *"Determination of Stack Gas Velocity and Volumetric Flow Rate (Standard Pitot Tube)"*. The velocity pressure was measured with an 'S' type pitot tube and manometer.

° **Dry Molecular Weight**
The dry molecular weight was determined using USEPA Reference Method 3, *"Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight"*. Since this is a non-combustion source which conveys ambient air, the oxygen content was assumed to be 20.9% and the carbon dioxide concentration was assumed to be <1.0%.

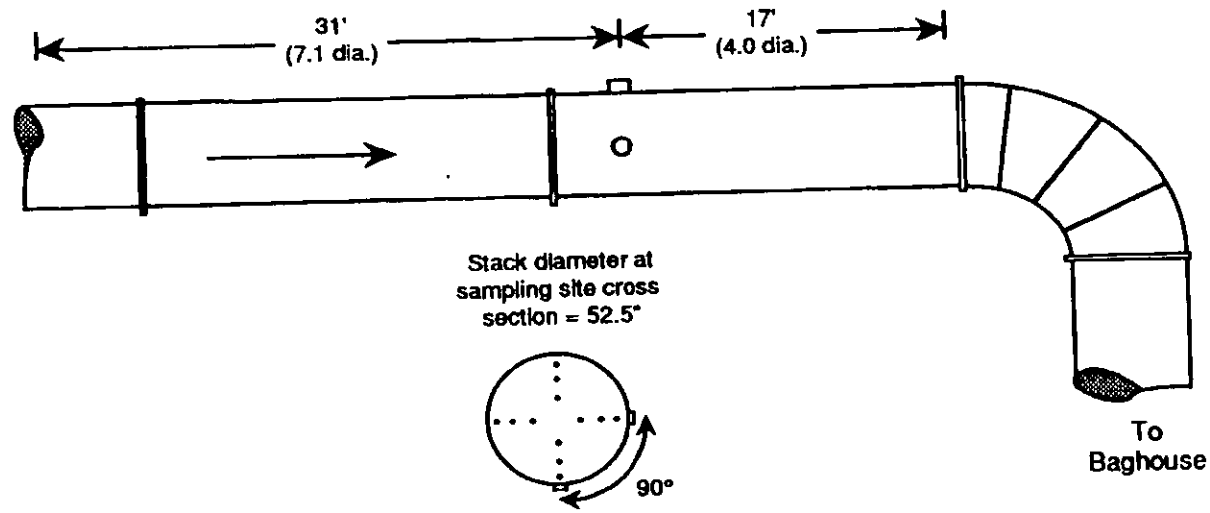
° **Stack Gas Moisture**
Stack gas moisture content was determined using USEPA Reference Method 4, *"Determination of Moisture Content in Stack Gases"*. The impingers were weighed to the nearest 0.5 g with a digital electronic balance before and after each test.

° **Particulate**
Particulate emissions were determined using USEPA Reference Method 17, *"Determination of Particulate Emissions From Stationary Sources (In-Stack Filtration Method)"*. A drawing of the sampling train is included in Figure 4.3.

In the laboratory, the filter was desiccated to dryness for 24 hours and then weighed on an analytical balance to a constant weight. (A constant weight is a difference of no more than 0.5 mg. or 1 percent of the the total weight less tare weight between two consecutive analysis with no less than six hours of desiccation between analysis). A blank filter was analyzed in the same manner. The acetone from the front-half rinse was transferred to a tared glass beaker and evaporated to dryness. The resulting residue was then desiccated for 24 hours and weighed to a constant weight. An acetone blank was analyzed in the same manner for sample weight correction.

° **Condensible Particulate**
Condensible particulate emissions were determined by recovering the impinger contents, evaporating the liquid catch to dryness in a tared beaker, and weighing the remaining residue to a constant weight.

° **Quality Assurance**
Our Quality Assurance procedures includes equipment calibration as per USEPA and manufacturers guidelines, adherence to standard procedures for sample col-

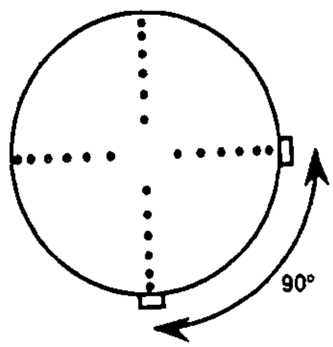


TRAVERSE POINT #	DISTANCE FROM EDGE OF STACK
1	3.1"
2	5.6"
3	8.2
4	11.3"
5	15.1"
6	20.7"
7	35.8"
8	41.4"
9	45.2"
10	48.3"
11	51.0"
12	53.4"

TRAVERSE POINT LOCATION

FIGURE 4.1 INLET SITE DETAIL

Stack diameter at sampling site cross section = 54"



TRAVERSE POINT #	DISTANCE FROM EDGE OF STACK
1	3.1"
2	5.6"
3	8.4"
4	11.6"
5	15.5"
6	21.2"
7	36.8"
8	42.5"
9	46.4"
10	49.6"
11	52.4"
12	54.9"

TRAVERSE POINT LOCATION

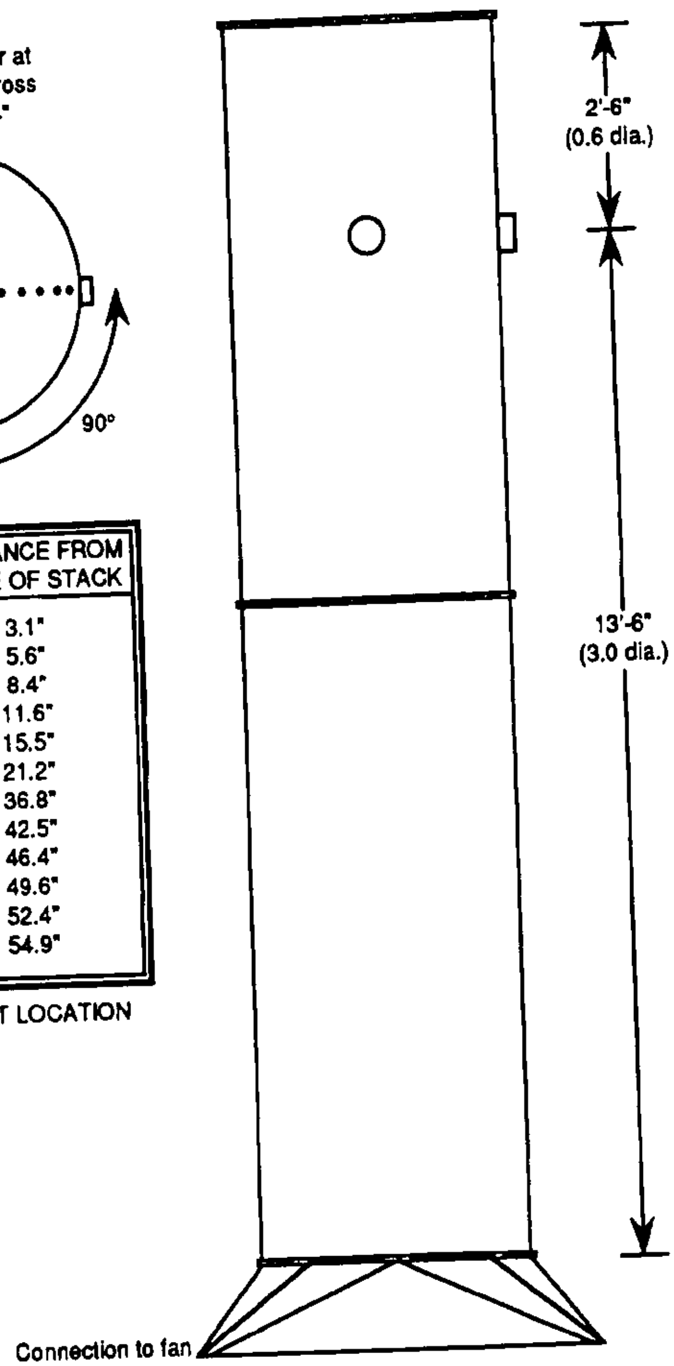


FIGURE 4.2 OUTLET SAMPLING SITE DETAIL

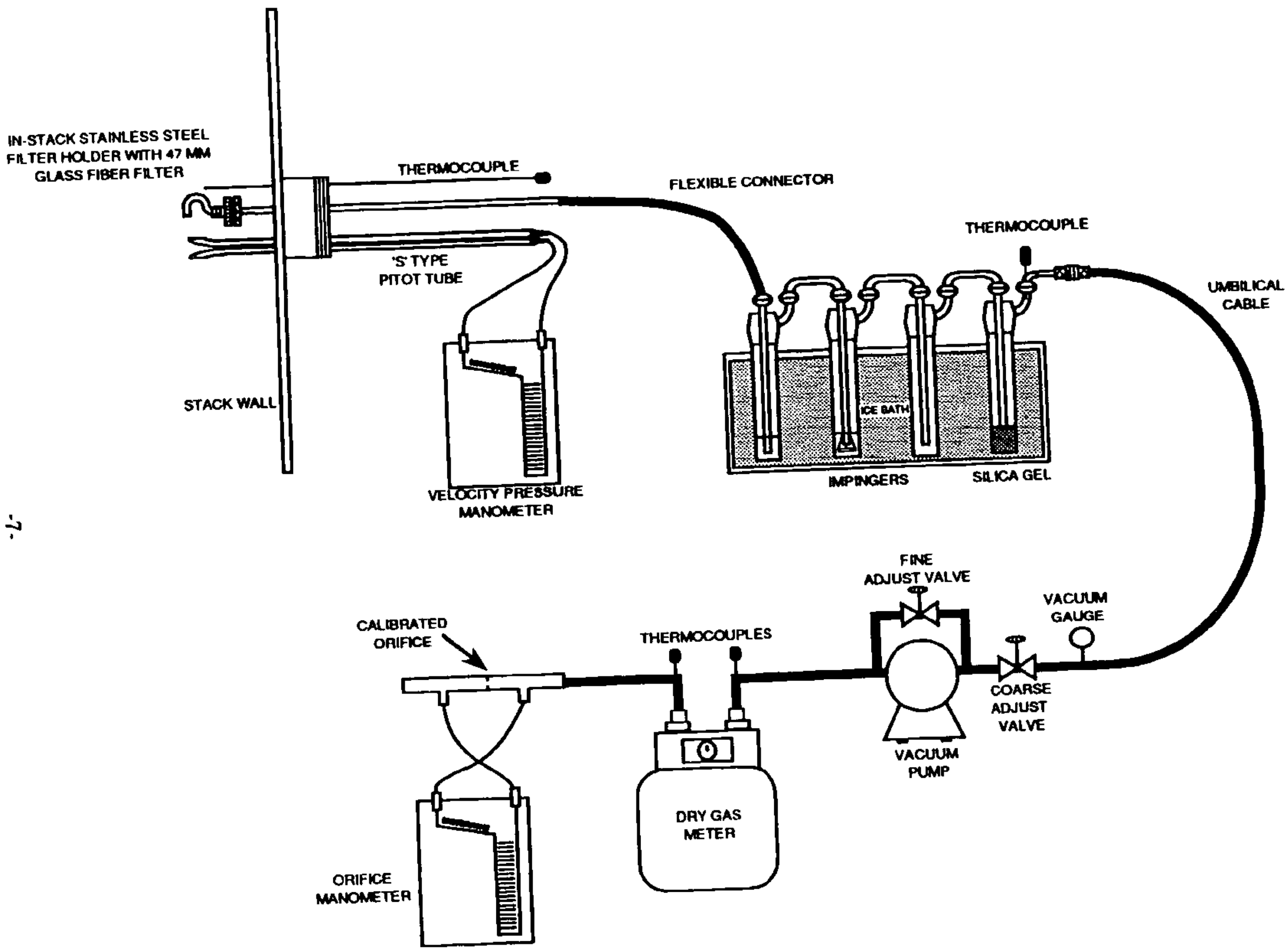


FIGURE 4.3 USEPA REFERENCE METHOD 17 SAMPLING TRAIN

lection and analysis, and attention to the suggested QA procedures included in the Reference Methods. We participate in the USEPA's National Source Audit Program for Methods 3, 5, 6, and 7. All relevant calibration data is included in Appendix B.

5.0 TEST RESULTS

The stack gas flow rates, temperature, etc. are summarized in Table 5.1. The average flow rate at the inlet site was 50,535 acfm (44,203 dscfm) at 100°F and 4.1% water vapor. The average flow rate at the outlet test site was 55,441 acfm (48,627 dscfm) at 105°F and 3.6% water vapor. We recognize the discrepancy between the measured flow rates at the measurement sites, however cyclonic flow checks conducted during the October, 1990 tests indicated the tests sites were free of turbulence and all pitot tube leak checks made during the survey were acceptable. The discrepancy may be attributable to leaks in the baghouse.

Table 5.1 Summary of stack gas conditions

RUN NO.	VELOCITY (fps)[1]	FLOW RATE (acfm)[2]	(dscfm)[3]	TEMP. (°F)	MOISTURE (%)	O2 (%)	CO2 (%)
Inlet							
1	56.9	51,292	45,555	98	2.8	20.9	ND
2	56.4	50,882	43,804	103	4.9	20.9	ND
3	54.8	49,431	43,251	100	4.5	20.9	ND
Ave.	56.0	50,535	44,203	100	4.1	20.9	ND
Outlet							
1	57.9	55,245	49,018	103	2.7	20.9	ND
2	58.9	56,159	48,908	109	3.5	20.9	ND
3	57.6	54,918	47,954	104	4.6	20.9	ND
Ave.	58.1	55,441	48,627	105	3.6	20.9	ND

[1]Feet per second at stack conditions.
[2]Actual cubic feet per minute at stack temperature and pressure.
[3]Dry, standard cubic feet per minute at 68°F and 29.92" Hg.

Particulate emissions are summarized in Table 5.2. The average particulate matter concentration at the inlet was 1.91 gr/dscf (2.73 E-04 lb/dscf). The average particulate emission rate at the inlet site was 721.3 lb/hr. The average particulate matter concentration at the outlet was 0.0011 gr/dscf (1.58 E-07 lb/dscf). The average particulate emission rate at the outlet site was 0.5 lb/hr.

Two filters were required at the inlet site to complete runs 1 and 2 because the high grain loading was blinding the filters and completly filling the filter holders with particulate matter. After the first filter from the first run plugged, a smaller diameter nozzle was used for the remaining tests to decrease the sample flow rates and sample volumes.

Table 5.2 Summary of particulate emission rates

RUN NO.	CONCENTRATION (gr/dscf)	(lb/dscf)	MASS EMISSION RATE (lb/hr)
Inlet			
1	1.4759	2.11E-04	576.5
2	1.9964	2.85E-04	749.8
3	2.2585	3.23E-04	837.5
Average	1.9103	2.73E-04	721.3
Outlet			
1	0.0007	1.03E-07	0.3
2	0.0017	2.46E-07	0.7
3	0.0009	1.26E-07	0.4
Average	0.0011	1.58E-07	0.5

The removal efficiency ranged from 99.96% to 99.90% with average of 99.94%. These data are summarized in Table 5.3.

Table 5.3 Summary of particulate removal efficiency

RUN	INLET (lb/hr)	OUTLET (lb/hr)	EFFICIENCY (%)
1	576.5	0.3	99.95
2	749.8	0.7	99.90
3	837.5	0.4	99.96
Average	721.3	0.5	99.94

The condensible particulate results are summarized in Table 5.4.

Table 5.4 Summary of condensible particulate emission rates

RUN NO.	CONCENTRATION (gr/dscf)	(lb/dscf)	MASS EMISSION RATE (lb/hr)
Inlet			
1	0.0006	9.15E-08	0.3
2	0.0024	3.47E-07	0.9
3	0.0011	1.61E-07	0.4
Average	0.0014	2.00E-07	0.5
Outlet			
1	0.0010	1.39E-07	0.4
2	0.0009	1.33E-07	0.4
3	0.0047	6.74E-07	1.9
Average	0.0022	3.15E-07	0.9

The Appendices to this report contain the process data, the QA/QC data,copies of the field data forms, the laboratory data forms, and emission calculations for each run.

Statement of Process Rate

The following process rates were recorded during the stack tests conducted on the Fuller Baghouse.

Date	# poured	# cleaned
8-20-91	141,300	~~6,866~~ 76,418
8-21-91	160,000	64,247

By: H.O. Beeman, II 9/10/91
Harry Beeman
Hamilton Foundry
367-6900

QUALITY ASSURANCE PROCEDURES AND RESULTS

The sampling and analytical equipment used in this survey has been calibrated and maintained as recommended in USEPA Reference Methods for Stationary Source Sampling, the Quality Assurance Handbook for Air Pollution Measurement Systems, and in the manufacturers owners manuals. The paragraphs below summarize the calibration procedures that were employed. All relevant calibration data for the specific field equipment used in this survey is included in this Appendix. (Laboratory calibration results may appear in other Appendices).

- **Analytical Balance**
  Gravimetric analysis is performed on a Sartorius Model B 120 S analytical balance that is readable to 0.1 mg. The analytical balance is permanently mounted on a slab of granite in the laboratory. The balance is calibrated on each day of use with a series of standard weights. The results of the daily calibration are recorded in a logbook.

- **Nozzles**
  Nozzles are regularly inspected in the field for obvious signs of damage and irregularities. If the nozzle shows signs of damage, it is not used until the damage is repaired. The nozzle diameter is determined in the field by measuring three different diameters with a precision micrometer. The three measurements are averaged to establish the nozzle diameter. The nozzle is acceptable if the difference between the high and low measurements is less than 0.004 in.

- **Pitot Tubes**
  The 'S'-type pitot tubes are built to the design specifications cited in Reference Method 2 and are assigned a coefficient of 0.84. Standard pitot tubes have a coefficient of 0.99. The pitot tubes, connecting lines, and manometers are leak-checked in the field before and after each test run.

- **Thermocouples**
  Thermocouples are calibrated on an annual basis. The thermocouples are calibrated against an NBS traceable mercury in glass thermometer The thermocouples are calibrated at approximately 32°F, 70°F, 212°F, and 400°F.

- **Digital Readouts**
  The digital readouts that display temperature are calibrated with a Omega Engineering thermocouple simulator which generates millivolt signals corresponding to temperatures from 0°F to 1000° F in 100° increments.

- **Orsat Analyzer**
  The Orsat analyzer is calibrated in the field with a standard gas mixture of oxygen and carbon dioxide in nitrogen. The calibration standard is certified to ±1% by the supplier. Analyzer reagents are changed when analysis indicates slow adsorption, lack of agreement between runs, or when the calibration standards cannot be accurately measured.

- **Fyrite Analyzers**
  The Fyrite analyzers are routinely leak checked and reagents are changed as performance dictates.

- **Control Consoles**
  The Method 5 control consoles are Nutech Model 2010 consoles with digital temperature controllers. The dry gas meter coefficient (Y-factor) and the orifice constant ($\Delta H_@$) are established by calibrating the control consoles at six flow

rates over a range from 0 to 4 inches of water (ΔH). A dry gas meter serves as the reference standard. The reference meter, which is dedicated for calibration use only, is calibrated against a wet test meter annually. The Method 5 control consoles are calibrated after each test series to confirm the Y-factor has not changed more than plus or minus 5%.

- **NOx Flasks**

  The NOx flasks and stopcocks are calibrated by filling the flask and matching stopcock with deionized water. The flask and stopcock are then weighed on a digital balance to the nearest 0.1 gram. The water is drained, the glass ware is dried and the weight is recorded. The difference in the tare weight and the gross weight is the flask volume in milliliters.

- **Personal Sampling Pumps**

  Personal sampling pumps are calibrated against a soap film bubble meter with representative sampling media in line to simulate actual sampling conditions. Triplicate calibration runs are made and the run values are averaged to arrive at the actual sampling rate.

- **Method 25 Sample Tanks**

  The Method 25 sample tanks are calibrated prior to being placed into field service. The calibration procedure consists weighing the empty tank to nearest 1 gram on a calibrated digital balance . The tank is then filled with water and weighed again. The difference in the tare weight and the gross weight is the tank volume in milliliters.

- **Method 25 Sample Flow Controllers**

  The Method 25 sample flow controllers are calibrated upon receipt from the manufacturer. They are calibrated with a soap bubble meter at two points to establish linearity.

- **Method 25 A Span Gas**

  The Method 25A span gases are propane in air and are certified by the manufacturer using USEPA Protocol 1 for Traceability Protocol for Establishing True Concentrations of Gases Used for Calibration and Audits of Continuous Source Emission Monitors. Copies of the Certifications are included in this Appendix.

- **Barometers**

  The aneroid field barometers are calibrated with a stationary mercury column barometer prior to each field use. The reference barometer is permanently mounted in the laboratory.

- **Reagents**

  All reagents used for the preparation of sample trains, collection and recovery of samples, and analysis meet the requirements of the Reference Methods.

ANALYTICAL BALANCE CALIBRATION LOG

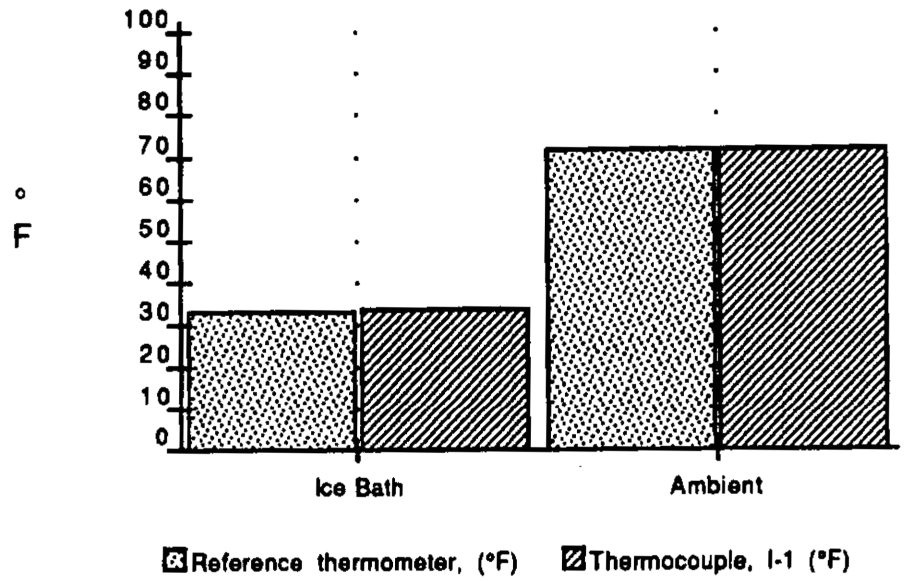
Balance Sartorous Balance ID B-205

DATE	0.020 g	0.100 g	100.000 g	ANALYST
5/30	0.0200	0.1001	100.000	BF
5/31	0.0199	0.1000	100.0000	Sg
6/5	0.0200	0.1000	100.0000	BF
6/6	0.0200	0.1001	100.0000	BF
6/9	0.0200	0.1001	100.0000	Sg
6/10	0.0200	0.1000	100.0000	Sg
6/11	0.0200	0.1001	100.0000	Sg
6/21	0.0200	0.1001	100.0001	BF
6/25	0.0200	0.1000	100.0000	TB
7/2	0.0200	0.1002	100.0000	Sg
7/2	—	0.1000	—	Sg
7/8	0.0200	0.1000	100.0001	BF
7/9	0.0200	0.1001	99.9999	BF
7/12	0.0200	0.1000	100.0000	TB
7/17	0.0200	0.1000	[illegible]0.0000	BF
8/21	0.0199	0.0999	100.0000	TB
8/26	0.0200	0.1000	99.9999	TB
8/27	0.0200	0.0999	100.0000	TB
8/28	0.0201	0.1000	100.000	Sg
8/29	0.0200	0.1000	100.0000	

THERMOCOUPLE CALIBRATION

Thermocouple ID I-1 Reference thermometer 9N911

Date 4-29-91 Calibrated by B. Finn



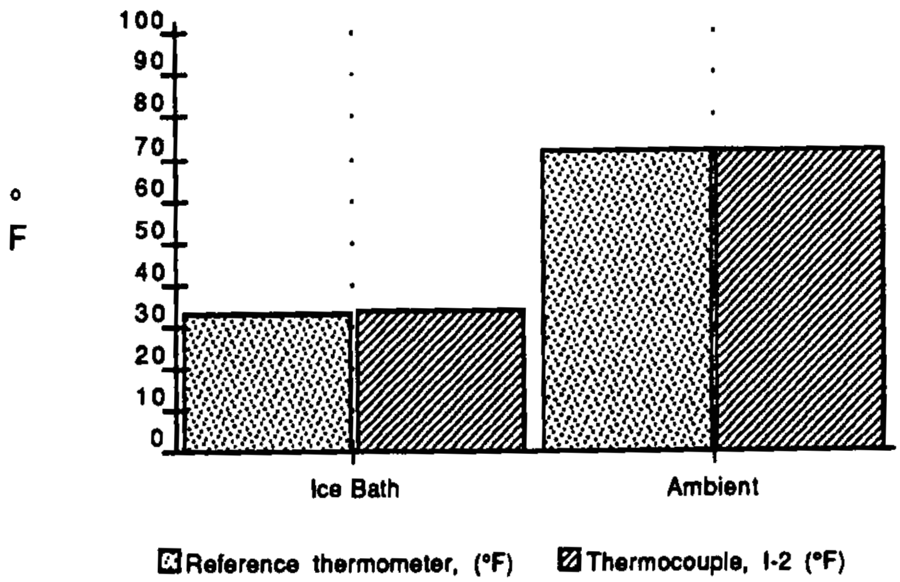
	Ice Bath	Ambient	Boiling Water	Boiling Oil
Reference thermometer, (°F)	32	71	NA	NA
Thermocouple, I-1 (°F)	33	71	NA	NA
Difference, (°F)	1	0	NA	NA

Note: Thermocouple temperature must be ± 2°F of reference temperature.

THERMOCOUPLE CALIBRATION

Thermocouple ID I-2 Reference thermometer 9N911

Date 4-29-91 Calibrated by B. Finn



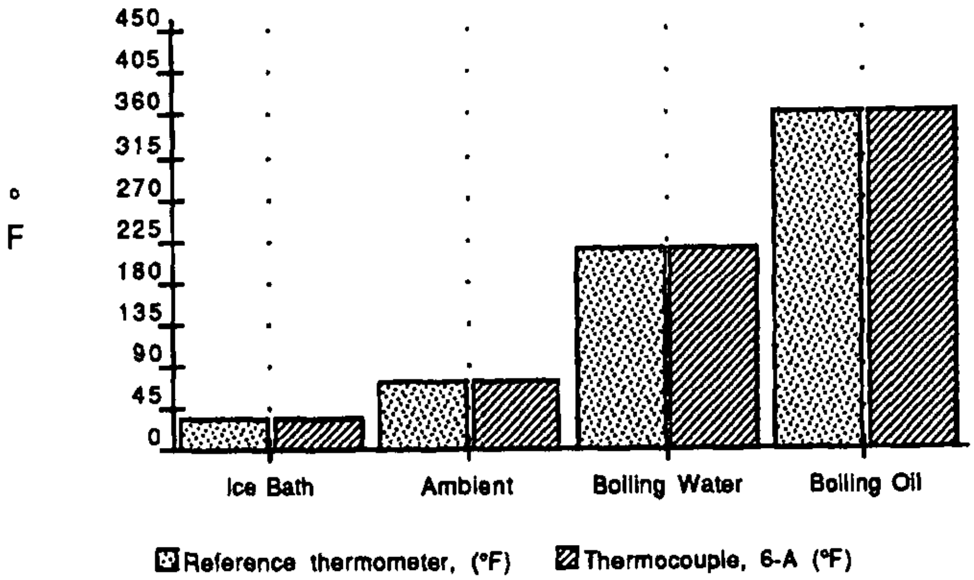
	Ice Bath	Ambient	Boiling Water	Boiling Oil
Reference thermometer, (°F)	32	71	NA	NA
Thermocouple, I-1 (°F)	33	71	NA	NA
Difference, (°F)	1	0	NA	NA

Note: Thermocouple temperature must be ± 2°F of reference temperature.

THERMOCOUPLE CALIBRATION

Thermocouple ID 6-A Reference thermometer 9N911

Date 4-24-91 Calibrated by B. Finn



	Ice Bath	Ambient	Boiling Water	Boiling Oil
Reference thermometer, (°F)	32	70	212	360
Thermocouple, 6-A (°F)	33	70	212	360
% Difference	0.2%	0.0%	0.0%	0.0%

Note:

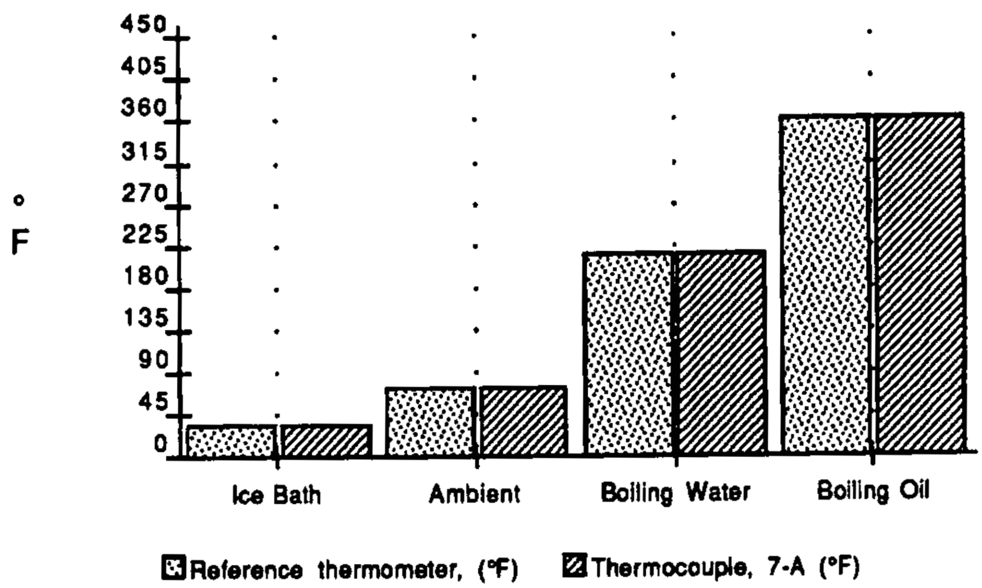
$$\% \text{ Difference} = \frac{(\text{Ref. temp, °F} + 460) - (\text{Thermocouple temp., °F} + 460)}{(\text{Ref. temp, °F} + 460)} \times 100$$

The absolute value of the% Difference must be ≤1.5%

THERMOCOUPLE CALIBRATION

Thermocouple ID 7-A Reference thermometer 9N911

Date 4-29-91 Calibrated by B. Finn



	Ice Bath	Ambient	Boiling Water	Boiling Oil
Reference thermometer, (°F)	32	71	212	360
Thermocouple, 7-A (°F)	33	71	213	360
% Difference	0.2%	0.0%	0.1%	0.0%

Note:

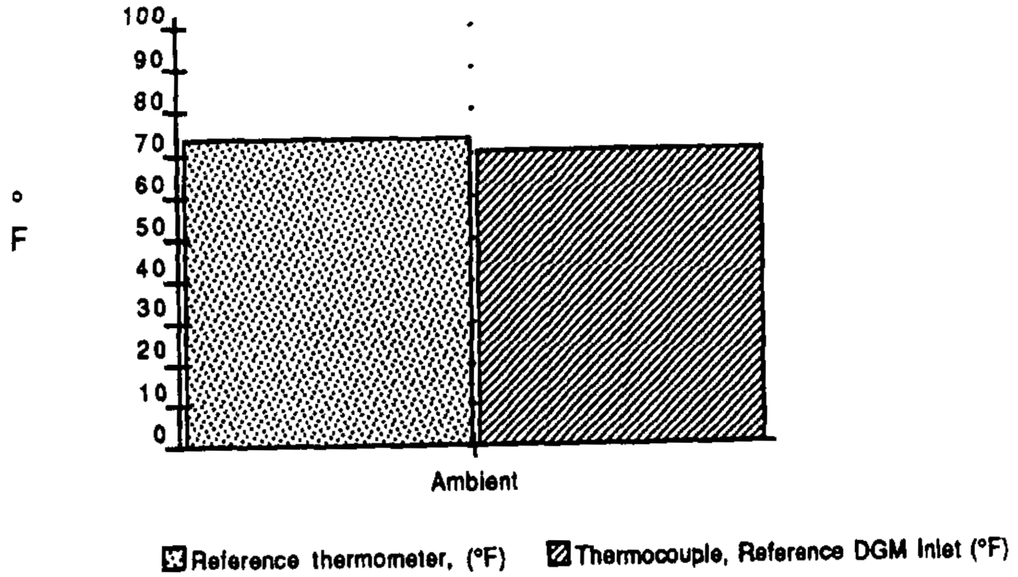
$$\% \text{ Difference} = \frac{(\text{Ref. temp, °F} + 460) - (\text{Thermocouple temp., °F} + 460)}{(\text{Ref. temp, °F} + 460)} \times 100$$

The absolute value of the% Difference must be ≤1.5%

THERMOCOUPLE CALIBRATION

Thermocouple ID Reference DGM Inlet Reference thermometer 9N911

Date 5-1-91 Calibrated by C. Jones



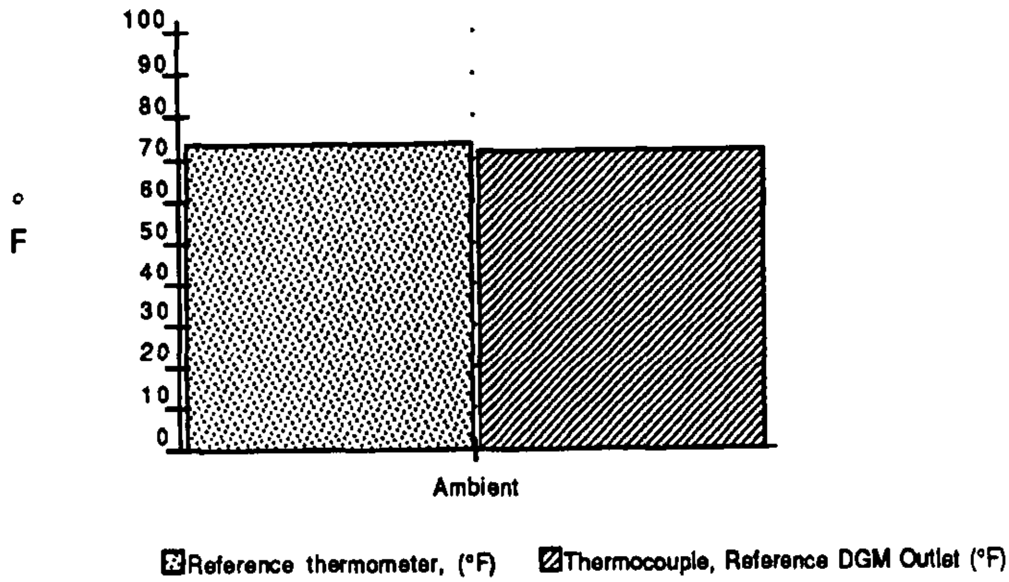
	Ice Bath	Ambient	Boiling Water	Boiling Oil
Reference thermometer, (°F)	NA	73	NA	NA
T/C, Reference DGM Inlet (°F)	NA	72	NA	NA
Difference, (°F)	NA	1	NA	NA

Note: Thermocouple temperature must be ± 5.4°F of reference temperature.

THERMOCOUPLE CALIBRATION

Thermocouple ID Reference DGMOutlet Reference thermometer 9N911

Date 5-1-91 Calibrated by C. Jones



	Ice Bath	Ambient	Boiling Water	Boiling Oil
Reference thermometer, (°F)	NA	73	NA	NA
T/C, Reference DGM Outlet (°F)	NA	71	NA	NA
Difference, (°F)	NA	2	NA	NA

Note: Thermocouple temperature must be ± 5.4°F of reference temperature.

Dr. Michael J. Wax, Ph.D
Deputy Director
Institute of Clean Air Companies
1707 L Street NW
Suite 570
Washington, D.C. 20036-4201

Dear Dr. Wax:

As we discussed by telephone on June 12, 1997, the U. S. Environmental Protection Agency is in the process of developing a national emission standard for hazardous air pollutants (NESHAP) for the chromium refractory manufacturing industry. Recent test results indicate that dryers used for curing resin-bonded refractories emit significant quantities of the organic hazardous air pollutant (HAP) compounds found in the refractory resins. We are now trying to identify options for controlling those HAP emissions. To that end, we would like to request your assistance in identifying the most suitable types of add-on devices for controlling organic HAP emissions from refractory dryers. In addition, we are interested in obtaining information on the costs of installing and operating those emission controls. The enclosure summarizes the stack and emission data for the refractory dryers tested. We also would appreciate information on the performance of the recommended emission controls on sources with similar emission stream characteristics.

Please contact me at (919) 541-5167 if you need additional information or wish to discuss this request. We look forward to hearing from you.

Sincerely,

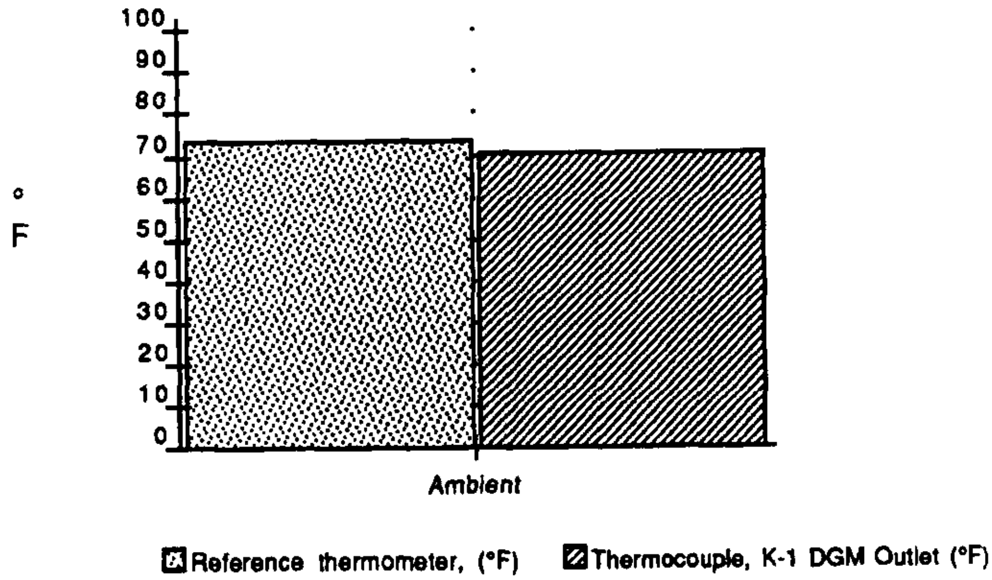
Susan Zapata
Minerals and Inorganic Chemicals Group
Emission Standards Division

Enclosure

THERMOCOUPLE CALIBRATION

Thermocouple ID K-1 DGM Outlet   Reference thermometer 9N911

Date 5-1-91   Calibrated by C. Jones



	Ice Bath	Ambient	Boiling Water	Boiling Oil
Reference thermometer, (°F)	NA	73	NA	NA
T/C, K-1 DGM Outlet (°F)	NA	70	NA	NA
Difference, (°F)	NA	3	NA	NA

Note: Thermocouple temperature must be ± 5.4°F of reference temperature.