

12  
#2

Note: This is a reference cited in AP 42, *Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources*. AP42 is located on the EPA web site at [www.epa.gov/ttn/chief/ap42/](http://www.epa.gov/ttn/chief/ap42/)

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02\_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

PARTICULATED EMISSION MEASUREMENTS  
FROM THE ROTOCONE AND GENERAL  
CASTING SHAKOUT OPERATIONS OF  
UNITED STATES PIPE & FOUNDRY, INC.  
ANNISTON, ALABAMA

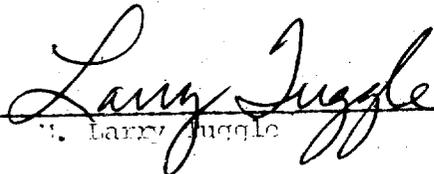
Presented To

United States Pipe & Foundry, Inc.  
Anniston, Alabama

Prepared By

THOMPSON AND SUGGIE DIVISION  
BLACK, GRAY, AND PIPEWORK, INC.  
777 South Lawrence Street  
Montgomery, Alabama 36104

APPROVED BY:

  
\_\_\_\_\_  
L. Larry Suggie

## CHAPTER II

### SUMMARY OF RESULTS

#### Rotoclone

Table I is a summary of the various parameters measured during the three (3) particulate runs on the rotoclone. As indicated by this table, average process weight rates for the first two (2) tests was 4.07 tons/hour. For run #3 the process weight was 3.91 tons/hour. For a Class #1 county the allowable emission for these process weights are calculated with the following equation:

$$E = 3.59P^{.62} \quad \text{for } P \leq 30 \text{ tons/hr.}$$

Where

E = Emissions in lbs/hr

P = Process Weight in tons/hr

Using the above equation for 4.07 tons/hr the allowable emission rate for Runs #1 and #2 was 8.57 lbs/hr. For a process weight of 3.91 tons /hr the allowable emission rate for Run #3 was 8.36 lbs/hr.

As indicated by Table 1 the measured emissions during Run #2 was slightly in excess of the allowable. However, Runs #1 and #3 showed a measured emission rate significantly lower than the allowable emission rate. The average emission rate obtained for the three (3) runs is also somewhat lower than the allowable emissions based on the average process weight for the test series. Therefore, the results of these three (3) particulate emission tests indicate that the rotoclone operation at the U.S. Pipe and Foundry Company operations in Anniston, Alabama is in compliance with the Alabama Air Pollution Rules and Regulations regarding the emission of particulate matter.

TABLE 1

SUMMARY OF TEST RESULTS ON ROTOCLONE

Parameter	Run #1	Run #2	Run #3	Average
Date of Test	11/6/73	11/6/73	11/7/73	-
Sampling Period (Time of Day)	0925-1110	1210-1353	0620-0800	-
Stack Gas Temperature (°F)	61	67.8	49.4	59.4
Moisture Content (%Vol)	1.2	1.4	1.5	1.4
Stack Gas Velocity (fps)	81.54	81.62	79.22	80.79
Gas Volumetric Flow Rate (SDCFH) <sup>a</sup>	846400	833060	835054	838171
Particulate emissions (grains/SDCF)	0.061	0.072	0.052	0.062
Particulate Emissions (lbs/hr)	7.43	8.62	6.21	7.42
Average Process Weight (tons/hr)	4.07	4.07	3.91	4.02
Allowable Emissions (lbs/hr)	8.57	8.57	8.36	8.51
Percent of Isokinetic Rate	97.1	98.8	101.1	99.0

a - Dry Basis, standard conditions of 70°F and 29.92" of Hg.

### General Casting Shakeout

Table 2 is a summary of the various parameters measured during the three (3) particulate tests on the general casting shakeout stack. As indicated by this table there was not a sufficient quantity of material processed during Run #3 to provide a representative indication of what the average particulate emissions were from the stack. For this reason Run #3 is not included in calculations for measured emission and allowable emissions at this source.

As indicated by Table 2, average process weight for Run #1 was 6.92 tons/hr and for Run #2 was 9.12 tons/hr. Using the equation previously listed in this Chapter, the allowable emissions for Run #1 was 11.91 lbs/hr and for run #2 was 14.13 lbs/hr. The average particulate emission rate of Runs #1 and #2 was 14.64 lbs/hr which exceeds the allowable emission rate of 13.05 lbs/hr based on the average process weight rate of Runs #1 and #2. Based on the results obtained from Runs #1 and #2, the general casting shakeout operation at U.S. Pipe and Foundry's facilities in Anniston, Alabama is not in compliance with the Alabama Air Pollution Rules and Regulations regarding the emission of particulate matter.

TABLE 2

## SUMMARY OF TEST RESULTS ON GENERAL CASTING SHAKEOUT

Parameters	Run #1	Run #2	Run #3	Average <sup>a</sup>
Date of Test	11/7/73	11/7/73	11/7/73	-
Sampling Period (Time of Day)	0930-1125	1142-1410	1425-1620	-
Stack Gas Temperature (°F)	61.0	64.6	54.1	62.8
Moisture Content (% Vol.)	1.3	1.5	1.4	1.4
Stack Gas Velocity (fps)	32.89	35.07	33.81	33.98
Gas Volumetric Flow Rate (SDCFH) <sup>b</sup>	1509240	1593334	1566511	1551287
Particulate Emissions (grains/SDCF)	0.079	0.053	0.011	0.066
Particulate Emissions (lbs/hr)	17.11	12.16	2.39	14.64
Average Process Weight (tons/hr)	6.92	9.12	- 0 -	8.02
Allowable Emissions (lbs/hr)	11.91	14.13	- 0 -	13.05
Percent of Isokinetic Rate	93.0	91.9	103.7	92.5

a - Average of Runs #1 and #2 only

b - Dry basis, standard conditions of 70°F and 29.92" of Hg

## CHAPTER III

### DESCRIPTION OF OPERATION

#### Rotoclone

As previously mentioned the operations tested were located at United States Pipe and Foundry Company's soil pipe plant in Anniston, Alabama. This plant is engaged in the production of grey iron soil pipe, fittings and general castings. Included in the manufacturing process of fittings is a blasting chamber where mold sand is removed from the fittings. Grinding the clean fittings removes fins from the casting. The emissions from the various grinding operations and the blasting chamber are collected and removed by a scrubber. Emission data shown for the rotoclone covers these two sources. Figure 1 shows a schematic of the process flow of material which contributes to particulate emissions collected by the rotoclone.

#### General Casting Shakeout

The other emission source tested during the study was a general casting shakeout stack. Mold sand remaining on the hot castings from the general casting operation is removed on a shakeout table. The emissions from this operation are exhausted through a hood and out the stack. There is no control equipment presently located on this emission source. A schematic of this operation is shown by Figure 2.

The process weight rate data for both the rotoclone and the general casting shakeout operations was determined by weighing the total amounts of materials processed during the specific test periods. This data was furnished to Thompson and Tuggle Environmental Consultants by U.S. Pipe and Foundry Co. personnel and is a part of the data shown in Tables 1 and 2 of Chapter II.

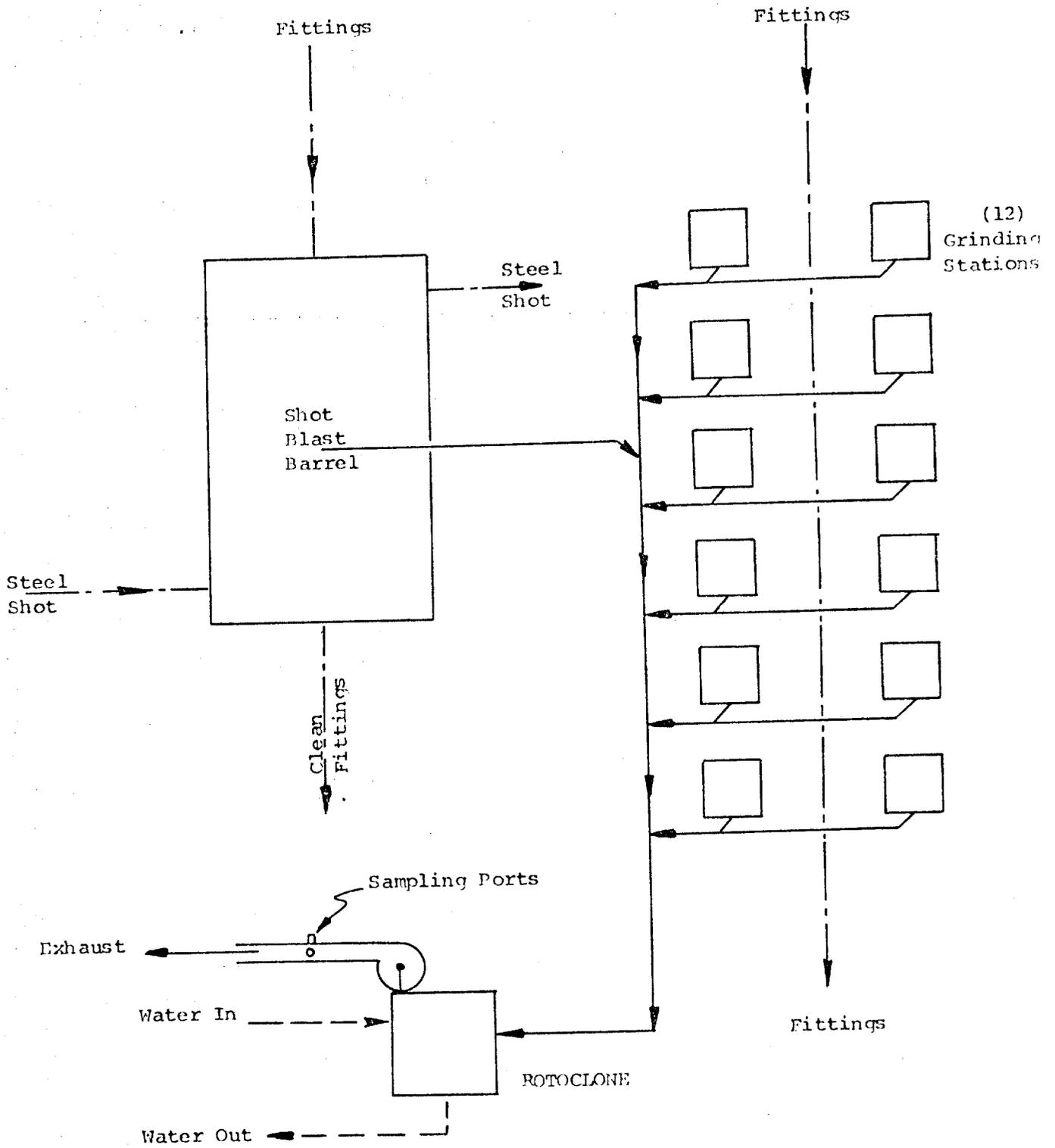


FIGURE 1 - MATERIAL FLOW DIAGRAM - ROTOCLONE

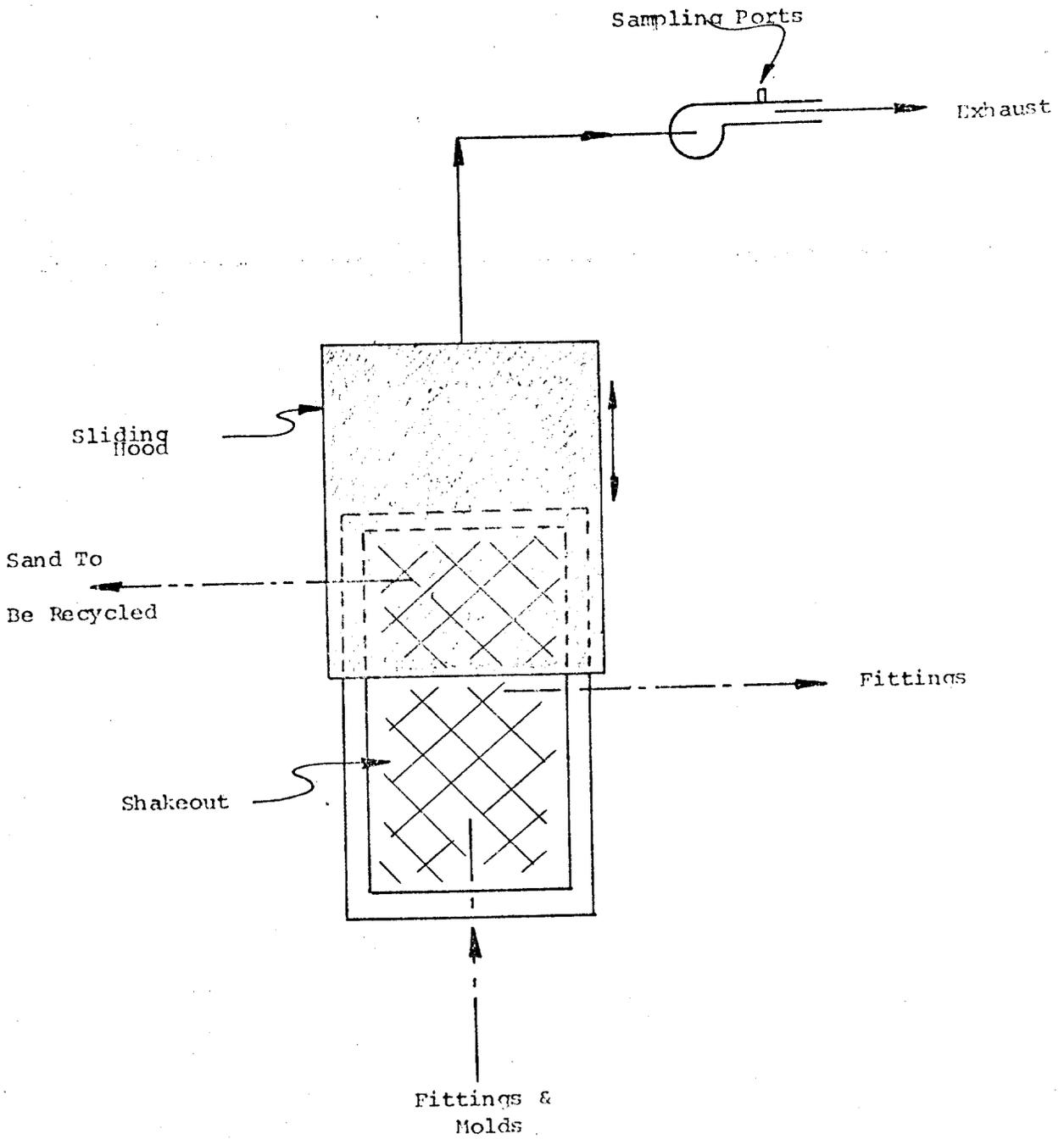


FIGURE 2 - MATERIAL FLOW DIAGRAM - GENERAL CASTING SHAKEOUT

## TEST EVALUATION

1

U.S. PIPE  
CONDUCTED BY

THOMPSON-TUGGLE

301-0011

NOV. 7, 1973

SHAKE-OUT

PARAMETER	RUN 1	RUN 2	RUN 3
AVG DELTA H	1.09	1.19	1.29
AVG SQRT DELTA P	0.60	0.63	0.62
BAROMETRIC PRESS	30.24	30.21	30.16
STACK PRESS	30.25	30.22	30.17
METER TEMP	73.40	81.20	75.30
STACK TEMP	61.00	64.60	54.10
VOLUME METERED	61.16	64.78	71.19
VOLUME METERED STD	61.57	64.23	71.25
TOTAL VOLUME H2O	17.00	20.50	20.90
VOLUME H2O VAPOR	0.80	0.97	0.99
% MOISTURE	1.29	1.49	1.37
MOL WT DRY	28.84	28.84	28.84
MOL WT WET	28.69	28.67	28.69
AVG STACK VEL	32.97	35.16	33.89
FLOW RATE ACTUAL	24851.36	26497.93	25546.75
FLOW RATE STD	25229.31	26636.15	26192.78
PART WT	316.30	222.20	49.20
CONCENTRATION	0.0791	0.0532	0.0106
PART MASS RATE	17.10	12.16	2.38
% ISOKINETIC	92.79	91.68	103.43

EVALUATED BY

  
E.F. LEDBETTER

Acc.

## TEST EVALUATION

U.S. PIPE  
CONDUCTED BY THOMPSON-TUGGLE

301-0011

NOV. 6, 1973

ROTOCLONE

PARAMETER	RUN 1	RUN 2	RUN 3
AVG DELTA H	2.32	2.41	2.32
AVG SQRT DELTA P	1.49	1.48	1.46
BAROMETRIC PRESS	30.33	30.28	30.21
STACK PRESS	30.33	30.28	30.21
METER TEMP	70.70	96.90	62.60
STACK TEMP	61.00	67.80	49.40
VOLUME METERED	80.74	84.97	82.13
VOLUME METERED STD	82.18	82.30	84.56
TOTAL VOLUME H2O	22.00	25.50	27.20
VOLUME H2O VAPOR	1.04	1.20	1.28
% MOISTURE	1.25	1.44	1.50
MOL WT DRY	28.84	28.84	28.84
MOL WT WET	28.70	28.68	28.67
AVG STACK VEL	81.77	81.85	79.42
FLOW RATE ACTUAL	13885.98	13899.06	13487.10
FLOW RATE STD	14140.00	13920.50	13955.75
PART WT	327.00	386.00	284.90
CONCENTRATION	0.0612	0.0722	0.0518
PART MASS RATE	7.42	8.61	6.20
% ISOKINETIC	96.83	98.51	100.95

EVALUATED BY

  
 E.F. LEDBETTER

Acc

T-13-1c