

STACK TEST RESULTS SUMMARY

DA-9
62

Arc Melt Baghouse (IDNR # 74-A-069)

PARTICULATE EMISSIONS	AVERAGE	ARC-1	ARC-2	ARC-3
TSP Conc. (front & back) gr/scf (Cs)	0.000964	0.001327	0.000847	0.000719
TSP Emission Rate, lbs/hr (E)	0.710	0.996	0.632	0.502
Emission Rate Basis-Flowrate, scfm	85,319	87,520	87,030	81,406
EMISSION LIMITS				
PM10 Concentration, gr/scf	0.0010			
PM10 Emission Rate, lbs/hr	NA			
PM10 Emission Rate, tons/year	NA			
Emission Rate Basis-Flowrate, scfm	NA			

Melting rate during tests: 5.65 tons/hr
Avg. of 3 runs, total for both furnaces.

05701
per telephone conversation w/ Mark Willett, Clow Valve 6/12/02
positive pressure Baghouse tested in 1996
EPA Method 5 D → 7 stacks on baghouse, all stacks tested each run.
12 points x 7 stacks.

Probe	0.0072	0.0045	0.0027	
Filter	0.0014	0.0020	0.0013	
Sample dscf	160.291	159.596	149.094	
Front-half PM conc. 9"/dscf	0.00083	0.00063	0.00041	

Ave = 0.00062 9"/dscf.

CALCULATIONS

DATA

DATA

DATA



National Emission Standards for Hazardous Air Pollutants (NESHAP) for Iron and Steel Foundries - Background Information for Proposed Standards

(This page is intentionally blank)

EPA-453/R-02-013
December 2002

National Emission Standards for Hazardous Air Pollutants (NESHAP) for
Iron and Steel Foundries--
Background Information for Proposed Standards

Prepared by:
RTI International
Research Triangle Park, NC

Prepared for:
Kevin Cavender, Project Leader
Emission Standards Division

Contract No. 68-D01-73
Work Assignment No. 1-14

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Emission Standards Division
Metals Group
Research Triangle Park, NC

APPENDIX F

SOURCE TEST PARTICULATE MATTER DATA FOR ELECTRIC ARC FURNACE BAGHOUSES

F.1 INTRODUCTION

This appendix presents the individual sampling run data for the source tests available to characterize the control performance for baghouses applied to EAF (Chapter 4). Summary test data are given in Table F-1 along with information on furnace melting rates and capacities and a description of the control systems and the processes they serve.

The data in Table F-1 represent a range of furnace sizes and types of baghouses. The design furnace melting rates range from 2.5 to 15 tons per hour, and ventilation rates range from 31,000 to 225,000 acfm. The baghouses include both negative and positive pressure operating modes and employ both shaker and pulse jet cleaning systems. Some were installed about 30 years ago, and some are relatively new (rebuilt). The design air-to-cloth ratios cover a range of 2.3 to 5.7 ft/min. No information is available on the ages of the bags in service when the tests were conducted.

The reported results were checked to ensure the weights of PM from the filter and the probe catch were above detection limits. When the reported catch was less than 3 mg, a detection limit value of 3 mg and the sample volume were used to estimate the detection limit in gr/dscf. Values calculated in this manner are reported as “less than” (<).

TABLE F-1. PM TEST RESULTS FOR BAGHOUSES SERVING EAF

Foundry IN-7 (tested December 1997)								
Run	PM loading (gr/dscf)	PM mass flow rate (lb/hr)	Flow rate (dscfm)	Flow rate (acfm)	Temp, (°F)	Air-to-cloth ratio (ft/min)	Melt rate (tph)	Baghouse design and service data
1	0.0006	0.15	29,200				3.7	Negative pressure; shaker cleaning. Fabric: Dacron/cotton. Design gas flow rate: 31,200 acfm. Design operating temperature: 100 °F. Design air-to-cloth ratio: 2.51 ft/min. Rebuilt 1985. Serves one EAF, 3.6 tons/hr design melt rate.
2	0.0004	0.11	32,100				3.7	
3	0.0005	0.13	30,300				3.1	
Average	0.0005	0.13	30,500				3.5	
Foundry IA-09 (tested August 1996)								
Run	PM loading (gr/dscf)	PM mass flow rate (lb/hr)	Flow rate (dscfm)	Flow rate (acfm)	Temp, (°F)	Air-to-cloth ratio (ft/min)	Melt rate (tph)	Baghouse design and service data
1	0.00083	0.62	85,099	87,520	127	2.4	5.65	Positive pressure; shaker cleaning. Fabric: 10.5 oz. polyester. Design gas flow rate: 85,000 acfm Design operating temperature: 90 °F. Design air-to-cloth ratio: 2.36 ft/min. Installed 1974. Serves two EAFs, 6.0 tons/hr design melt rate each, one holding furnace with 61 tons capacity, and one holding furnace with 40 tons capacity.
2	0.00063	0.47	85,200	87,030	129	2.4		
3	0.00041	0.29	79,414	81,406	126	2.3		
Average	0.00062	0.46	83,238	85,319	127	2.4		

Foundry IA-09 (tested July 2002)								
Run	PM loading (gr/dscf)	PM mass flow rate (lb/hr)	Flow rate (dscfm)	Flow rate (acfm)	Temp, (°F)	Air-to-cloth ratio (ft/min)	Melt rate (tph)	Baghouse design and service data
1	0.0007	0.51	85,927	93,624	127	2.6	5.65	Positive pressure; shaker cleaning. Fabric: 10.5 oz. polyester. Design gas flow rate: 85,000 acfm Design operating temperature: 90 °F. Design air-to-cloth ratio: 2.36 ft/min. Installed 1974. Serves two EAFs, 6.0 tons/hr design melt rate each, one holding furnace with 61 tons capacity, and one holding furnace with 40 tons capacity.
2	0.0007	0.50	83,992	89,854	117	2.5		
3	0.0006	0.42	80,727	86,978	121	2.4		
Average	0.00067	0.48	83,549	90,152	122	2.5		
Foundry IA-09 (tested May 1995)								
Run	PM loading, gr/dscf	PM mass flow rate, lb/hr	Flow rate, dscfm	Flow rate, acfm	Temp, °F	Air-to-cloth ratio, ft/min	Melt rate (tph)	Baghouse design and service data
1	0.0013	1.0	87,520				---	Positive pressure; shaker cleaning. Fabric: 10.5 oz. polyester. Design gas flow rate: 85,000 acfm Design operating temperature: 90 °F. Design air-to-cloth ratio: 2.36 ft/min. Installed 1974. Serves two EAFs, 6.0 tons/hr design melt rate each, one holding furnace with 61 tons capacity, and one holding furnace with 40 tons capacity.
2	0.001	0.63	87,030				---	
3	0.00072	0.50	81,406				---	
Average	0.0010	0.71	85,319				5.65 total	

Foundry TX-19 (January 1995)								
Run	PM loading, gr/dscf	PM mass flow rate, lb/hr	Flow rate, dscfm	Flow rate, acfm	Temp, °F	Air-to-cloth ratio, ft/min	Melt rate (tph)	Baghouse design and service data
1	0.0030	1.18	46,100	51,000	114	2.34		Negative pressure; shaker cleaning. Fabric: 10.5 oz. seamless polyester. Design gas flow rate: 50,000 acfm. Design operating temperature: 250 °F. Design air-to-cloth ratio: 2.30 ft/min. Serves two EAFs, 5 tons/hr design melt rate each.
2	<0.0013	<0.5	47,700	52,500	114	2.41		
3	<0.0013	<0.5	46,700	51,600	118	2.37		
Average	<0.002	<0.7	46,800	51,700	115	2.37		
Foundry AL-11 (tested September 1995)								
Run	PM loading, gr/dscf	PM mass flow rate, lb/hr	Flow rate, dscfm	Flow rate, acfm	Temp, °F	Air-to-cloth ratio, ft/min	Melt rate (tph)	Baghouse design and service data
1	0.0019	1.77	109,000	122,000	121	3.05	9.1, 9.4	Negative pressure; pulse jet cleaning. Fabric: 18 oz. polyester dual density felt. Design gas flow rate: 140,000 acfm. Design operating temperature: 200 °F. Design air-to-cloth ratio: 3.50 ft/min. Rebuilt 1995. Serves two EAFs, 9.25 tons/hr design melt rate each.
2	0.0017	1.58	108,000	123,000	130	3.08	9.4, 9.5	
3	0.0009	0.87	113,000	127,000	126	3.18	9.1, 9.5	
Average	0.0015	1.41	110,000	124,000	126	3.10	9.2, 9.5	

Foundry MN-3 (tested May 1993)								
Run	PM loading, gr/dscf	PM mass flow rate, lb/hr	Flow rate, dscfm	Flow rate, acfm	Temp, °F	Air-to-cloth ratio, ft/min	Melt rate (tph)	Baghouse design and service data
1	0.0021	2.64	146,200	155,600	84	2.27	4.8, 3.9	Negative pressure; shaker cleaning. Fabric: polyester. Design gas flow rate: 180,000 acfm Design operating temperature: 100°F Design air-to-cloth ratio: 2.4 ft/min Installed 1980. Serves two EAFs, 4.3 tons/hr design melt rate each.
2	0.0019	2.29	142,200	150,000	85	2.19	4.8, 4.4	
3	0.0019	2.45	151,000	157,100	85	2.30	6.3, 4.4	
Average	0.0020	2.46	146,500	154,200	85	2.25	5.3, 4.2	
Foundry MI-09 (tested October 1996)								
Run	PM loading (gr/dscf)	PM mass flow rate (lb/hr)	Flow rate (dscfm)	Flow rate (acfm)	Temp, (°F)	Air-to-cloth ratio (ft/min)	Melt rate (tph)	Baghouse design and service data
1	0.0044	1.03	26,702	31,467	144		12	Positive pressure; shaker cleaning. Fabric: Polyester. Design gas flow rate: 200,000 acfm. Design operating temperature: 170 °F. Design air-to-cloth ratio: 2.33 ft/min. Built 1987. Serves three EAF, 15 tons/hr design melt rate.
2	0.0030	0.69	26,365	31,868	159			
3	0.0017	0.39	26,716	31,447	143			
4	0.0015	0.35	26,544	31,654	151			
Average	0.0027	0.62	26,582	31,609	149			

Foundry OH-1 (tested March 1994)								
Run	PM loading, gr/dscf	PM mass flow rate, lb/hr	Flow rate, dscfm	Flow rate, acfm	Temp, °F	Air-to-cloth ratio, ft/min	Melt rate (tph)	Baghouse design and service data
1	0.0025	4.45	208,000	234,000	96			Design gas flow rate: 225,000 acfm. Design operating temperature: 150 °F. Design air-to-cloth ratio: Serves three EAFs, 13 tons/hr design melt rate each.
2	0.0030	5.26	205,000	230,000	103			
3	0.0025	4.42	206,000	230,000	102			
Average	0.0027	4.71	206,000	231,000	100			
Foundry OH-1 (tested May 1997)								
Run	PM loading, gr/dscf	PM mass flow rate, lb/hr	Flow rate, dscfm	Flow rate, acfm	Temp, °F	Air-to-cloth ratio, ft/min	Melt rate (tph)	Baghouse design and service data
1	0.0063							
2	0.0076							
3	0.0059							
Average	0.0066							

Foundry WI-45 (tested September 1990)								
Run	PM loading, gr/dscf	PM mass flow rate, lb/hr	Flow rate, dscfm	Flow rate, acfm	Temp, °F	Air-to-cloth ratio, ft/min	Melt rate (tph)	Baghouse design and service data
1	0.0033	1.97	33,550				2.07	Positive pressure; shaker cleaning. Fabric: polyester/cotton. Design gas flow rate: 35,000 Design operating temperature: 125 °F. Design air-to-cloth ratio: 5.7 ft/min. Installed 1979. Serves one EAF, 2.5 tons/hr design melt rate and sand mulling.
2	0.0025	1.45	33,800				2.16	
3	0.0035	1.77	33,667				2.46	
Average	0.0031	1.73	33,700				2.23	
Foundry IA-17 (tested January 1995)								
Run	PM loading, gr/dscf	PM mass flow rate, lb/hr	Flow rate, dscfm	Flow rate, acfm	Temp, °F	Air-to-cloth ratio, ft/min	Melt rate (tph)	Baghouse design and service data
1	0.0069	5.35	82,000				8.3, 11.6	Negative pressure; shaker cleaning. Fabric: woven Dacron. Design gas flow rate: 120,383. Design operating temperature: 182 °F. Design air-to-cloth ratio: 2.59 ft/min. Installed 1972. Serves two EAFs, 12 tons/hr design melt rate each.
2	0.0029	2.55	92,100				9.6, 14.1	
3	0.0035	2.68	85,200					
Average	0.0044	3.53	86,400					

Foundry PA-11 (tested November 1994)								
Run	PM loading, gr/dscf	PM mass flow rate, lb/hr	Flow rate, dscfm	Flow rate, acfm	Temp, °F	Air-to-cloth ratio, ft/min	Melt rate (tph)	Baghouse design and service data
1	0.0058	4.9	99,000				15.1	Negative pressure; shaker cleaning. Fabric: polyester. Design gas flow rate: 120,000. Design operating temperature: 130 °F. Design air-to-cloth ratio: 3.2 ft/min. Installed 1977. Serves one EAF, 15 tons/hr design melt rate.
2	0.0080	6.3	92,000				15.1	
3	0.0103	7.6	86,000				8.2	
Average	0.0080	6.3	92,000				12.8	

APPENDIX G

SOURCE TEST PARTICULATE MATTER DATA FOR POURING, COOLING AND SHAKEOUT