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/

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.

AP42 Section:	11.20
Background Chapter	4
Reference:	19
Title:	Emission Test Results for No. 2 Aggregate Kiln, Solite Corporation, Hubers Plant, Brooks, Kentucky, IEA, Research Triangle Park, NC, August 12, 1992.

REF 18 (AP-42)
Ref 4-19

SOLITE CORPORATION, BROOKS (KY) PLANT

D. Emission Data/Mass Flux Rates/Emission Factors Date: 04/20/93

Test ID	Parameter	Units	Values reported				
			Run 1	Run 2	Run 3	Run 4	
1	Stack temperature	Deg. F	317.1	298	315		
Kiln #2	Moisture	%	12.7	12.5	13		
	Oxygen	%	17.6	17.8	17.7		
	Volumetric flow, actual	acfm	47,600	44,900	47,500		
	Volumetric flow, standard	dscfm	27,800	26,900	27,700		27,467
	Isokinetic variation	%	97	94.7	98.9		
Circle: Production or feed rate Capacity:		TPH feed	8.64	8.54	8.61		8.60
	Pollutant concentrations:						
	Filterable PM	G/dscf	0.013	0.026	0.016		
	Hydrogen chloride	mg/cu. m	439.0	400.0	440.0		
	Chlorine	mg/cu. m	3.100	1.480	0.835		
	CO2	%	2.4	2.4	2.4		
	CO	ppm	116.98	59.13	99.57	101.43	
	Total hyrocarbons	ppm	7.49	6.3	6.14	3.58	
	Pollutant mass flux rates:						
	Filterable PM	lb/hr	3.098	5.995	3.799		
	Hydrogen chloride	lb/hr	45.7	40.3	45.7		
	Chlorine	lb/hr	0.323	0.149	0.087		
	CO2	lb/hr	4,580	4,431	4,563		
	CO	lb/hr	14.0	7.1	11.9	12.2	
	Total hyrocarbons	lb/hr	0.513	0.432	0.421	0.245	
	Emission factors:						Average
	Filterable PM	lb/ton	0.359	0.702	0.441		0.501
	Hydrogen chloride	lb/ton	5.3	4.7	5.3		5.1
	Chlorine	lb/ton	0.037	0.017	0.010		0.022
	CO2	lb/ton	530	519	530		526
	CO	lb/ton	1.6	0.83	1.4	1.4	1.32
	Total hyrocarbons	lb/ton	0.060	0.050	0.049	0.029	0.047

1. Mass flux rates differ from those reported in test report because an average volumetric flow rate was used in the test report calculations.
2. Run specific process & volumetric flow rates not provided for CO, THC tests; average rates used for mass flux and emission factors calculations

Test ID	Parameter	Units	Values reported				
			Run 1	Run 2	Run 3		Run 4
3	Stack temperature	Deg. F	319.3	311	320		
Kiln #2	Moisture	%	11.2	12.3	11.9		
	Oxygen	%	17.7	17.7	17.8		
	Volumetric flow, actual	acfm	48,000	44,900	47,500		
	Volumetric flow, standard	dscfm	28,500	28,600	28,900		
	Isokinetic variation	%	94.7	9.39	95.2		
Circle: Production or feed rate Capacity:		TPH feed					
	Pollutant concentrations:		42.27	41.83	45.18		
	Antimony	ug/dscf	4.92	22.2	22.4		
	Arsenic	ug/dscf	170	379	398		
	Barium	ug/dscf	321	381	370		
	Beryllium	ug/dscf	5.34	10.85	18.32		
	Cadmium	ug/dscf	179	365	345		
	Chromium	ug/dscf	74.0	156	146		
	Hexavalent Chromium	ug/dscf	0.0421	ND	ND		
	Copper	ug/dscf	17.2	39.0	41.3		
	Lead	ug/dscf	14,540	26,875	24,688		
	Manganese	ug/dscf	185	278	229		
	Nickel	ug/dscf	37.2	75.7	69.9		
	Phosphorus	ug/dscf	212	327	319		
	Selenium	ug/dscf	0.625	1.206	0.542		
	Silver	ug/dscf	0.152	0.567	0.238		
	Thallium	ug/dscf	0.359	0.242	0.698		
	Zinc	ug/dscf	102	177	163		
	CO2 (Cr+6 test)	%	2.6	2.3	2.6		
	CO2 (metals)	%	2.5	2.4	2.3		
	Pollutant mass flux rates:						
	Antimony	lb/hr	0.019	0.084	0.085		
	Arsenic	lb/hr	0.64	1.44	1.52		
	Barium	lb/hr	1.21	1.44	1.42		
	Beryllium	lb/hr	0.0201	0.0410	0.0701		
	Cadmium	lb/hr	0.676	1.381	1.318		
	Chromium	lb/hr	0.279	0.589	0.557		
	Hexavalent Chromium	lb/hr	1.59E-04	ND	ND		
	Copper	lb/hr	0.065	0.148	0.158		
	Lead	lb/hr	54.8	101.7	94.4		
	Manganese	lb/hr	0.698	1.052	0.874		
	Nickel	lb/hr	0.140	0.286	0.267		
	Phosphorus	lb/hr	0.801	1.24	1.22		
	Selenium	lb/hr	0.00235	0.00456	0.00207		
	Silver	lb/hr	0.00057	0.00215	0.00091		
	Thallium	lb/hr	0.00135	0.00092	0.00267		
	Zinc	lb/hr	0.386	0.671	0.625		
	CO2 (Cr+6 test)	lb/hr	5,836	5,210	5,479		
	CO2 (metals)	lb/hr	5,491	5,469	4,847		

	Emission factors:						Average
	Antimony	lb/ton	0.0021	0.0098	0.0099		0.0073
	Arsenic	lb/ton	0.074	0.17	0.18		0.14
	Barium	lb/ton	0.14	0.17	0.16		0.16
	Beryllium	lb/ton	0.0023	0.0048	0.0081		0.0051
	Cadmium	lb/ton	0.078	0.16	0.15		0.13
	Chromium	lb/ton	0.032	0.069	0.065		0.055
	Hexavalent Chromium	lb/ton	1.837E-05	0	0		ND
	Copper	lb/ton	0.0075	0.017	0.018		0.014
	Lead	lb/ton	6.3	12	11		9.7
	Manganese	lb/ton	0.081	0.12	0.10		0.10
	Nickel	lb/ton	0.016	0.034	0.031		0.027
	Phosphorus	lb/ton	0.093	0.14	0.14		0.13
	Selenium	lb/ton	0.00027	0.00053	0.00024		0.000349
	Silver	lb/ton	6.6E-05	0.00025	0.00011		0.000141
	Thallium	lb/ton	0.00016	0.00011	0.00031		0.000191
	Zinc	lb/ton	0.045	0.079	0.073		0.065
	CO2 (Cr+6 test)	lb/ton	675	610	636		641
	CO2 (metals)	lb/ton	636	640	563		613

1. One-half detection limit used for back half concentrations below detection limit.

SOLITE CORPORATION, ARVONIA PLANT

Ref 4-20

D. Emission Data/Mass Flux Rates/Emission Factors Date: 04/20/93

Test ID	Parameter	Units	Values reported Run 1	Run 2	Run 3	Average
1	Stack temperature	Deg. F	344	349	341	
Kiln #7	Moisture	%	11.4	11.4	12.3	
	Oxygen	%	15	14.8	14.6	
	Volumetric flow, actual	acfm	37,400	38,300	33,600	
	Volumetric flow, standard	dscfm	21,700	22,100	19,400	
	Isokinetic variation	%	98.5	99	100.5	
Circle: Production or feed rate Capacity:		TPH feed	12.3	12.5	12.2	
	Pollutant concentrations:					
	Filterable PM	G/dscf	0.00817	0.006364	0.006064	
	Hydrogen chloride	mg/cu. m	1,020	1,020	1,030	
	Chlorine	mg/cu. m	2.700	0.782	7.250	
	CO2	%	4.1	4.4	4.4	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	1.520	1.206	1.008	
	Hydrogen chloride	lb/hr	82.9	84.4	74.8	
	Chlorine	lb/hr	0.219	0.065	0.527	
	CO2	lb/hr	6,107	6,675	5,859	
	Emission factors:					Average
	Filterable PM	lb/ton	0.124	0.096	0.083	0.101
	Hydrogen chloride	lb/ton	6.7	6.8	6.1	6.54
	Chlorine	lb/ton	0.0178	0.0052	0.0432	0.0221
	CO2	lb/ton	496	534	480	504

Mass flux rates differ from those reported in test report because an average volumetric flow rate was used in the test report calculations.

Test ID	Parameter	Units	Values reported Run 1	Run 2	Run 3	Average
2	Stack temperature	Deg. F	364	357	366	
Kiln #8	Moisture	%	9.4	9.4	11.3	
	Oxygen	%	15.5	15.2	15.6	
	Volumetric flow, actual	acfm	38,900	41,900	38,400	
	Volumetric flow, standard	dscfm	22,700	24,400	22,600	
	Isokinetic variation	%	94.1	100	95.9	
Circle: Production or feed rate Capacity:		TPH feed	14.7	14.1	14.9	
	Pollutant concentrations:					
	Filterable PM	G/dscf	0.01310	0.02955	0.03273	
	Hydrogen chloride	mg/cu. m	584.6	549.6	571.0	
	Chlorine	mg/cu. m	1.319	1.297	0.995	
	CO2	%	3.8	3.8	3.9	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	2.55	6.18	6.34	
	Hydrogen chloride	lb/hr	49.7	50.2	48.3	
	Chlorine	lb/hr	0.112	0.119	0.084	
	CO2	lb/hr	5,921	6,364	6,050	
	Emission factors:					Average
	Filterable PM	lb/ton	0.17	0.44	0.43	0.35
	Hydrogen chloride	lb/ton	3.4	3.6	3.2	3.4
	Chlorine	lb/ton	0.0076	0.0084	0.0057	0.0072
	CO2	lb/ton	403	451	406	420

Mass flux rates differ from those reported in test report because an average volumetric flow rate was used in the test report calculations.

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Average
3	Stack temperature	Deg. F	340	341	336	
Kiln #7	Moisture	%	10.4	13	12.9	
	Oxygen	%	15.1	14.7	14.6	
	Volumetric flow, actual	acfm	39,700	34,900	35,000	
	Volumetric flow, standard	dscfm	23,400	19,900	20,100	
	Isokinetic variation	%	100.4	98.4	102.5	
Circle: Production or feed rate Capacity:		TPH feed	12.3	12.5	12.2	12.3
	Pollutant concentrations:		50.753	33.754	44.561	
	Antimony	ug/dscf	3.6037	3.2604	2.6133	
	Arsenic	ug/dscf	0.0242	0.4352	0.4030	
	Barium	ug/dscf	0.1884	0.3616	0.4030	
	Beryllium	ug/dscf	0.0147	0.0311	0.0182	
	Cadmium	ug/dscf	0.0197	0.0296	0.0224	
	Chromium	ug/dscf	0.1304	0.2366	0.1587	
	Hexavalent Chromium	ug/dscf	0.0187	0.0111	0.0263	
	Lead	ug/dscf	2.6182	16.9544	5.4745	
	Mercury	ug/dscf	ND	ND	ND	
	Silver	ug/dscf	ND	ND	ND	
	Thallium	ug/dscf	ND	ND	ND	
	CO2 (Cr+6 test)	%	4.1	4.3	4.4	
	CO2 (metals)	%	4.1	4.3	4.5	
	CO	ppm	26.2	15.4	14.3	
	Total hydrocarbons	ppm	3.9	3.7	3.0	
	Pollutant mass flux rates:					
	Antimony	lb/hr	0.01115	0.00858	0.00695	
	Arsenic	lb/hr	7.477E-05	0.0011456	0.0010716	
	Barium	lb/hr	0.000583	0.0009518	0.0010716	
	Beryllium	lb/hr	4.54E-05	8.18E-05	4.85E-05	
	Cadmium	lb/hr	6.099E-05	7.80E-05	5.97E-05	
	Chromium	lb/hr	0.0004037	0.0006227	0.0004218	
	Hexavalent Chromium	lb/hr	5.64E-05	3.289E-05	7.097E-05	
	Lead	lb/hr	0.008104	0.0446	0.0146	
	Mercury	lb/hr	ND	ND	ND	
	Silver	lb/hr	ND	ND	ND	
	Thallium	lb/hr	ND	ND	ND	
	CO2 (Cr+6 test)	lb/hr	6,416	6,611	6,161	
	CO2 (metals)	lb/hr	6,585	5,874	6,208	
	CO	lb/hr	2.67	1.33	1.25	
	Total hydrocarbons	lb/hr	0.228	0.184	0.151	
	Emission factors:					Average
	Antimony	lb/ton	0.00091	0.00069	0.00057	0.00072
	Arsenic	lb/ton	6.1E-06	9.2E-05	8.8E-05	6.2E-05
	Barium	lb/ton	4.7E-05	7.6E-05	8.8E-05	7.0E-05
	Beryllium	lb/ton	3.7E-06	6.5E-06	4.0E-06	4.7E-06
	Cadmium	lb/ton	5.0E-06	6.2E-06	4.9E-06	5.4E-06
	Chromium	lb/ton	3.3E-05	5.0E-05	3.5E-05	3.9E-05
	Hexavalent Chromium	lb/ton	4.6E-06	2.6E-06	5.8E-06	4.3E-06
	Lead	lb/ton	0.00066	0.0036	0.0012	0.0018
	Mercury	lb/ton	ND	ND	ND	ND
	Silver	lb/ton	ND	ND	ND	ND
	Thallium	lb/ton	ND	ND	ND	ND
	CO2 (Cr+6 test)	lb/ton	522	529	505	519
	CO2 (metals)	lb/ton	535	470	509	505
	CO	lb/ton	0.22	0.11	0.10	0.14
	Total hydrocarbons	lb/ton	0.019	0.015	0.012	0.015

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Average
4	Stack temperature	Deg. F	357	357	351	
Kiln #8	Moisture	%	9.4	7	11	
	Oxygen	%	15.2	15.5	15.2	
	Volumetric flow, actual	acfm	39,800	40,100	39,300	
	Volumetric flow, standard	dscfm	23,400	24,100	22,900	
	Isokinetic variation	%	95.8	99.6	100.4	
Circle: Production or feed rate Capacity:		TPH feed	14.7	14.1	14.9	14.6
	Pollutant concentrations:		48.626	50.749	45.278	
	Antimony	ug/dscf	0.1240	0.1793	0.5627	
	Arsenic	ug/dscf	0.6766	1.1222	1.6282	
	Barium	ug/dscf	0.8644	0.7196	0.7889	
	Beryllium	ug/dscf	0.0274	0.0504	0.0514	
	Cadmium	ug/dscf	0.9686	1.2944	1.0833	
	Chromium	ug/dscf	1.0200	0.6627	0.4070	
	Hexavalent Chromium	ug/dscf	0.0061	0.0146	0.0103	
	Lead	ug/dscf	17.8228	19.4132	23.3138	
	Mercury	ug/dscf	ND	ND	ND	
	Silver	ug/dscf	0.0331	0.0373	0.0269	
	Thallium	ug/dscf	0.0218	0.0137	0.0196	
	CO2 (Cr+6 test)	%	3.8	3.9	4	
	CO2 (metals)	%	4	3.8	3.9	
	CO	ppm	4	3	2.2	
	Total hydrocarbons	ppm	2.9	5.3	4.1	
	Pollutant mass flux rates:					
	Antimony	lb/hr	0.0001025	0.0005716	0.0017046	
	Arsenic	lb/hr	0.0020943	0.0035774	0.004932	
	Barium	lb/hr	0.0026754	0.0022941	0.0023897	
	Beryllium	lb/hr	8.466E-05	0.0001607	0.0001556	
	Cadmium	lb/hr	0.0029982	0.00413	0.0032816	
	Chromium	lb/hr	0.0031573	0.00211	0.001233	
	Hexavalent Chromium	lb/hr	1.78E-05	0.00005	2.85E-05	
	Lead	lb/hr	0.05517	0.0619	0.0706	
	Mercury	lb/hr				
	Silver	lb/hr	0.0001025	0.000119	8.145E-05	
	Thallium	lb/hr	6.747E-05	4.366E-05	5.948E-05	
	CO2 (Cr+6 test)	lb/hr	5,764	6,264	5,766	
	CO2 (metals)	lb/hr	6,425	6,286	6,130	
	CO	lb/hr	0.407	0.315	0.219	
	Total hydrocarbons	lb/hr	0.169	0.319	0.234	
	Emission factors:					Average
	Antimony	lb/ton	7.0E-06	4.1E-05	1.1E-04	5.4E-05
	Arsenic	lb/ton	0.00014	0.00025	0.00033	0.00024
	Barium	lb/ton	0.00018	0.00016	0.00016	0.00017
	Beryllium	lb/ton	5.8E-06	1.1E-05	1.0E-05	9.2E-06
	Cadmium	lb/ton	0.00020	0.00029	0.00022	0.00024
	Chromium	lb/ton	0.00021	0.00015	8.3E-05	0.00015
	Hexavalent Chromium	lb/ton	ND	ND	ND	ND
	Lead	lb/ton	0.0038	0.0044	0.0047	0.0043
	Mercury	lb/ton				
	Silver	lb/ton	7.0E-06	8.4E-06	5.5E-06	7.0E-06
	Thallium	lb/ton	4.6E-06	3.1E-06	4.0E-06	3.9E-06
	CO2 (Cr+6 test)	lb/ton	392	444	387	408
	CO2 (metals)	lb/ton	437	446	411	431
	CO	lb/ton	0.028	0.022	0.015	0.022
	Total hydrocarbons	lb/ton	0.012	0.023	0.016	0.017

Brooks

TRIANGLE LABORATORIES of RTP, INC.
PO BOX 13485
RTP, NC 27709

INORGANICS ANALYSIS REPORT

TLI PROJECT #: 21435
CLIENT: IEA
DATE RECIEVED: 07/15/92
DATE REPORTED: 08/10/92

RESULTS REPORTED IN TOTAL ug

CLIENT SAMPLE ID	Ag	As	Ba	Be	Cd	Cr	Cu	Mn
KY-1-INLET FH	5.99	6,670	13,400	213	7,030	2,960	707	7,700
KY-1-INLET BH	< .875	508	162	12.9	549	167	22.9	125
KY-2-INLET FH	8.52	15,800	15,900	452	15,200	6,490	1,620	11,600
KY-2-INLET BH	15.2	68.4	33.1	1.83	73.6	18.6	12.6	27.4
KY-3-INLET FH	7.60	17,900	16,700	824	15,500	6,560	1,860	10,300
KY-3-INLET BH	3.14	84.3	31.1	3.93	80.1	23.8	5.96	27.64

CLIENT SAMPLE ID	Ni	P	Pb	Sb	Se	Tl	Zn
KY-1-INLET FH	1,520	4,510	581,000	208	20.9	12.8	4,190
KY-1-INLET BH	53.3	4,470	33,600	*	5.50	2.38	137
KY-2-INLET FH	3,160	9,400	1,120,000	930	45.8	9.37	7,390
KY-2-INLET BH	4.92	4,270	4,197	< .639	4.63	.767	33.9
KY-3-INLET FH	3,150	10,100	1,110,000	1,010	23.2	31.1	7,350
KY-3-INLET BH	8.55	4,321	5,390	7.21	1.30	.417	34.3

*IT WAS NOT POSSIBLE TO OBTAIN THE Sb CONCENTRATION FOR THIS SAMPLE:
SEE THE EXPLANATION ON THE ANALYTE SUMMARY REPORT

%RPD QC SUMMARY

CLIENT SAMPLE ID	Ag	As	Ba	Be	Cd	Cr	Cu	Mn
KY-1-INLET FH(D)	58.6%	7.08%	.10%	28.4%	.84%	.39%	2.34%	1.85%
KY-1-INLET BH(D)	N/A	4.77%	.49%	7.83%	.60%	1.20%	5.07%	1.67%

CLIENT SAMPLE ID	Ni	P	Pb	Sb	Se	Tl	Zn
KY-1-INLET FH(D)	.74%	7.57%	.04%	N/A	N/A	N/A	.61%
KY-1-INLET BH(D)	3.95%	.42%	.58%	N/A	N/A	N/A	.26%
KY-1-INLET FH(S)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
KY-1-INLET BH(S)	N/A	N/A	N/A	N/A	N/A	N/A	N/A