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:	20
Title:	Emission Test Results for No. 7 and No. 8 Aggregate Kilns, Solite Corporation, A. F. Old Plant, Arvonia, Virginia, IEA, Research Triangle Park, NC, August 8, 1992.

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SOLITE CORPORATION, LEAKSVILLE PLANT

D. Emission Data/Mass Flux Rates/Emission Factors

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
1	Stack temperature	Deg. F	339.5	340.9	339.6	
Kiln #2	Moisture	%	6.1	6.3	6.9	
	Oxygen	%	17	17.2	17.2	
	Volumetric flow, actual	acfm	52200	50800	49100	
	Volumetric flow, standard	dscfm	32800	31000	29700	
	Isokinetic variation	%	91.2	92.9	92.3	
Circle: Production or feed rate Capacity:		TPH feed	13.7	13.7	13.8	
	Pollutant concentrations:					
	Filterable PM	G/dscf	0.001138	0.001795	0.001493	
	Hydrogen chloride	mg/cu. m	558.9104	470.8418	515.5475	
	Chlorine	mg/cu. m	25.46037	3.094022	6.041502	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	0.319941	0.476957	0.380075	
	Hydrogen chloride	lb/hr	68.66674	54.67227	57.35292	
	Chlorine	lb/hr	3.128016	0.359265	0.672097	
	Emission factors:					
	Filterable PM	lb/ton	0.023	0.035	0.028	0.029
	Hydrogen chloride	lb/ton	5.0	4.0	4.2	4.4
	Chlorine	lb/ton	0.23	0.026	0.049	0.10

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

ADD CO_2 numbers ~~CO_2 % 3.9 3.8 3.9~~

Continuous Average (60 min)	Kiln 2	Kiln 4
CO (ppm)	58.8	90.1
THC (ppm)	4.81	3.29

		Run 1	2	3
Kiln 2 CO_2	%	3.9	3.8	3.9

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
2	Stack temperature	Deg. F	346.2	333.5	349.5	
Kiln #4	Moisture	%	9.7	10	9.5	
	Oxygen	%	15.9	15.9	16.2	
	Volumetric flow, actual	acfm	46300	45800	47100	
	Volumetric flow, standard	dscfm	27100	27100	27500	
	Isokinetic variation	%	93.5	94.7	96.8	
Circle: Production or feed rate Capacity:		TPH feed	13.7	13.7	13.8	
	Pollutant concentrations:					
	Filterable PM	G/dscf	0.002454	0.001729	0.006203	
	Hydrogen chloride	mg/cu. m	697.9722	723.0171	558.8675	
	Chlorine	mg/cu. m	27.00536	0.191054	8.350243	
	Pollutant mass flux rates:					
	Filterable PM	lb/hr	0.570029	0.401622	1.462136	
	Hydrogen chloride	lb/hr	70.84967	73.39192	57.56678	
	Chlorine	lb/hr	2.741256	0.019393	0.860126	
	Emission factors:					
	Filterable PM	lb/ton	0.042	0.029	0.106	0.059
	Hydrogen chloride	lb/ton	5.2	5.4	4.2	4.9
	Chlorine	lb/ton	0.20	0.001	0.062	0.09

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	Run 4
3	Stack temperature	Deg. F	355	349	344.3	
Kiln #2	Moisture	%	5.4	6	6.7	
	Oxygen	%	17	17.1	17.2	
	Volumetric flow, actual	acfm	52800	54700	50900	
	Volumetric flow, standard	dscfm	32000	33200	30700	
	Isokinetic variation	%	100.3	97.5	109.4	
Circle: Production or feed rate Capacity:		TPH feed	13.7	13.7	13.8	
	Pollutant concentrations:					
	Antimony	ug/dscf	0.026573	0.043917	0.015241	
	Arsenic	ug/dscf	0.055163	0.085293	0.032021	
	Barium	ug/dscf	0.391086	0.275842	0.188976	
	Beryllium	ug/dscf	0.009401	0.015806	0.010604	
	Cadmium	ug/dscf	0.137448	1.034408	3.167104	
	Chromium	ug/dscf	0.179416	0.226844	0.208224	
	Hexavalent Chromium	ug/dscf	ND	ND	ND	
	Lead	ug/dscf	1.314005	2.304733	4.094488	
	Mercury	ug/dscf	0.085768	0.142276	0.115836	
	Silver	ug/dscf	0.021442	0.595238	0.020822	
	Thallium	ug/dscf	0.008284	0.019962	0.003998	
	Pollutant mass flux rates:					
	Antimony	lb/hr	0.000112	0.000193	6.19E-05	
	Arsenic	lb/hr	0.000233	0.000375	0.00013	
	Barium	lb/hr	0.001655	0.001211	0.000767	
	Beryllium	lb/hr	3.98E-05	6.94E-05	4.31E-05	
	Cadmium	lb/hr	0.000582	0.004543	0.012861	
	Chromium	lb/hr	0.000759	0.000996	0.000846	
	Hexavalent Chromium	lb/hr	ND	ND	ND	
	Lead	lb/hr	0.005562	0.010121	0.016627	
	Mercury	lb/hr	0.000363	0.000625	0.00047	
	Silver	lb/hr	9.08E-05	0.002614	8.46E-05	
	Thallium	lb/hr	3.51E-05	8.77E-05	1.62E-05	
	Emission factors:					
	Antimony	lb/ton	8.21E-06	1.41E-05	4.48E-06	
	Arsenic	lb/ton	1.7E-05	2.73E-05	9.42E-06	
	Barium	lb/ton	0.000121	8.84E-05	5.56E-05	
	Beryllium	lb/ton	2.9E-06	5.07E-06	3.12E-06	
	Cadmium	lb/ton	4.25E-05	0.000332	0.000932	
	Chromium	lb/ton	5.54E-05	7.27E-05	6.13E-05	
	Hexavalent Chromium	lb/ton	ND	ND	ND	
	Lead	lb/ton	0.000406	0.000739	0.001205	
	Mercury	lb/ton	2.65E-05	4.56E-05	3.41E-05	
	Silver	lb/ton	6.62E-06	0.000191	6.13E-06	
	Thallium	lb/ton	2.56E-06	6.4E-06	1.18E-06	

Test ID	Parameter	Units	Values reported			
			Run 1	Run 2	Run 3	Run 4
4	Stack temperature	Deg. F	340	340.1	347.5	
Kiln #4	Moisture	%	10.3	10.9	6.7	
	Oxygen	%	16.2	15.8	16.3	
	Volumetric flow, actual	acfm	47800	48200	49500	
	Volumetric flow, standard	dscfm	28000	28100	30000	
	Isokinetic variation	%	100.1	103.3	108.3	
Circle: Production or feed rate Capacity:		TPH feed	13.7	13.7	13.8	
	Pollutant concentrations:					
	Antimony	ug/dscf	0.041215	0.039559	0.042645	
	Arsenic	ug/dscf	0.042845	0.101596	0.042645	
	Barium	ug/dscf	0.096866	0.323668	0.243369	
	Beryllium	ug/dscf	0.005262	0.020769	0.005001	
	Cadmium	ug/dscf	0.626368	0.867611	0.102036	
	Chromium	ug/dscf	0.263121	0.377613	0.087747	
	Hexavalent Chromium	ug/dscf	ND	ND	ND	
	Lead	ug/dscf	1.022214	5.551809	4.108243	
	Mercury	ug/dscf	0.097564	0.075972	0.079039	
	Silver	ug/dscf	0.037489	0.050798	0.032375	
	Thallium	ug/dscf	0.005239	0.010047	0.015652	
	Pollutant mass flux rates:					
	Antimony	lb/hr	0.000139	0.000147	0.000169	
	Arsenic	lb/hr	0.000159	0.000378	0.000169	
	Barium	lb/hr	0.000359	0.001203	0.000966	
	Beryllium	lb/hr	1.95E-05	7.72E-05	1.98E-05	
	Cadmium	lb/hr	0.00232	0.003225	0.000405	
	Chromium	lb/hr	0.000975	0.001404	0.000348	
	Hexavalent Chromium	lb/hr	ND	ND	ND	
	Lead	lb/hr	0.003786	0.020636	0.016303	
	Mercury	lb/hr	0.000361	0.000282	0.000314	
	Silver	lb/hr	0.000139	0.000189	0.000128	
	Thallium	lb/hr	1.94E-05	3.73E-05	6.21E-05	
	Emission factors:					
	Antimony	lb/ton	1.01E-05	1.07E-05	1.23E-05	
	Arsenic	lb/ton	1.16E-05	2.76E-05	1.23E-05	
	Barium	lb/ton	2.62E-05	8.78E-05	7E-05	
	Beryllium	lb/ton	1.42E-06	5.63E-06	1.44E-06	
	Cadmium	lb/ton	0.000169	0.000235	2.93E-05	
	Chromium	lb/ton	7.11E-05	0.000102	2.52E-05	
	Hexavalent Chromium	lb/ton	ND	ND	ND	
	Lead	lb/ton	0.000276	0.001506	0.001181	
	Mercury	lb/ton	2.64E-05	2.06E-05	2.27E-05	
	Silver	lb/ton	1.01E-05	1.38E-05	9.31E-06	
	Thallium	lb/ton	1.42E-06	2.73E-06	4.5E-06	

Kiln 2 Metals

µg → Front + back (if ND then .5 of detection limit added)

	Run 1	Run 2	Run 3
Ag	1.17	32.8	1.19
As	✓3.01	✓4.70	✓1.83
Ba	21.34	15.2	10.8
Be	0.513	0.871	0.606
Cd	✓7.50	✓57.0	✓181
Cr	9.79	12.5	11.9
Pb	✓71.7	✓127	✓234
Sb	1.45	✓ (2.42)	✓ 0.871
Tl	0.452	1.10	ND (0.229)
Hg	4.68	7.84	6.62

Kiln 4

	Run 1	Run 2	Run 3
Ag	1.61	2.26	1.45
As	1.84 ✓	4.52 ✓	1.91 ✓
Ba	4.16	14.4	10.9
Be	ND (.226)	0.924	ND (.224)
Cd	26.9 ✓	38.6 ✓	4.57 ✓
Cr	11.3 ✓	16.8	3.93
Pb	43.9 ✓	247 ✓	184 ✓
Sb	1.77 ✓	1.76 ✓	2.66 ✓
Tl	ND (0.225)	0.447	0.701
Hg	4.19	3.38	3.54
	dscf	dscf	dscf
	42.946	44.49	44.788

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Metals Emissions — Kiln #7

Run 1

FlowRate dscfh	Sample Vol dscf		(ug) Front	(ug) Back	(ug) Total	ug/cu.M	Mass Flows lbs./hr.	g/hr.
1404000	50.753	Ag	< 0.7	< 0.98	< 1.68	< 1.169	<1.024E-04	0.046
1404000	50.753	As	0.8	0.426	1.226	0.853	7.471E-05	0.034
1404000	50.753	Ba	6.33	3.23	9.56	6.652	5.825E-04	0.264
1404000	50.753	Be	0.442	0.302	0.744	0.518	4.534E-05	0.021
1404000	50.753	Cd	9.891	3.32	13.211	9.193	8.050E-04	0.365
1404000	50.753	Cr	5.78	< 1.68	< 7.46	< 5.191	<4.546E-04	0.206
1404000	50.753	Pb	128.25	4.63	132.88	92.463	8.097E-03	3.676
1404000	50.753	Sb	3.43	179.55	182.98	127.324	1.115E-02	5.062
1404000	50.753	Tl	< 0.2	< 0.28	< 0.48	< 0.334	<2.925E-05	0.013
1404000	50.753	Hg	0	< 0.2	< 0.2	< 0.139	<1.219E-05	0.006

Run 2

FlowRate dscfh	Sample Vol dscf		(ug) Front	(ug) Back	(ug) Total	ug/cu.M	Mass Flows lbs./hr.	g/hr.
1194000	33.754	Ag	1.08	< 1.03	< 2.11	< 2.208	<1.644E-04	0.075
1194000	33.754	As	14.01	0.68	14.69	15.370	1.145E-03	0.520
1194000	33.754	Ba	10.73	< 2.95	< 13.68	< 14.313	<1.066E-03	0.484
1194000	33.754	Be	0.536	0.513	1.049	1.098	8.174E-05	0.037
1194000	33.754	Cd	17.391	1.64	19.031	19.912	1.483E-03	0.673
1194000	33.754	Cr	7.1	< 1.77	< 8.87	< 9.280	<6.911E-04	0.314
1194000	33.754	Pb	563.35	8.93	572.28	598.758	4.459E-02	20.244
1194000	33.754	Sb	12.2	97.85	110.05	115.142	8.575E-03	3.893
1194000	33.754	Tl	< 0.2	0.723	< 0.923	< 0.966	<7.192E-05	0.033
1194000	33.754	Hg	0	< 0.04	< 0.04	< 0.042	<3.117E-06	0.001

Run 3

FlowRate dscfh	Sample Vol dscf		(ug) Front	(ug) Back	(ug) Total	ug/cu.M	Mass Flows lbs./hr.	g/hr.
1206000	44.561	Ag	< 0.7	< 0.933	< 1.633	< 1.294	<9.735E-05	0.044
1206000	44.561	As	17.81	0.15	17.96	14.234	1.071E-03	0.486
1206000	44.561	Ba	10.33	3.43	13.76	10.905	8.203E-04	0.372
1206000	44.561	Be	0.424	0.389	0.813	0.644	4.847E-05	0.022
1206000	44.561	Cd	16.691	1.44	18.131	14.369	1.081E-03	0.491
1206000	44.561	Cr	6.27	< 1.6	< 7.87	< 6.237	<4.692E-04	0.213
1206000	44.561	Pb	234.65	9.3	243.95	193.337	1.454E-02	6.602
1206000	44.561	Sb	20.5	95.95	116.45	92.290	6.942E-03	3.152
1206000	44.561	Tl	< 0.2	< 0.267	< 0.467	< 0.370	<2.784E-05	0.013
1206000	44.561	Hg	0	< 0.4	< 0.4	< 0.317	<2.385E-05	0.011

Note: ALL VALUES ARE CORRECTED FOR BLANKS PER SPECIFIED METHOD

Metals Emissions

Kiln #8

Run 1

FlowRate dscfh	Sample Vol dscf		Front	Back	Total	ug/cu.M	Mass Flows lbs./hr.	g/hr.
1404000	48.626	Ag	1.09	< 1.051	< 2.14	< 1.554	<1.361E-04	0.062
1404000	48.626	As	28.71	4.19	32.9	23.894	2.092E-03	0.950
1404000	48.626	Ba	29.13	12.9	42.03	30.525	2.673E-03	1.214
1404000	48.626	Be	1.01	0.32	1.33	0.966	8.459E-05	0.038
1404000	48.626	Cd	42.691	4.41	47.101	34.208	2.996E-03	1.360
1404000	48.626	Cr	48.7	< 1.8	< 50.5	< 36.677	<3.212E-03	1.458
1404000	48.626	Pb	855.95	10.7	866.65	629.424	5.512E-02	25.023
1404000	48.626	Sb	0.04	5.99	6.03	4.379	3.835E-04	0.174
1404000	48.626	Tl	< 0.2	0.96	< 1.16	< 0.842	<7.378E-05	0.033
1404000	48.626	Hg	0	9.3	9.3	6.754	5.915E-04	0.269

Run 2

FlowRate dscfh	Sample Vol dscf		Front	Back	Total	ug/cu.M	Mass Flows lbs./hr.	g/hr.
1446000	50.749	Ag	1.41	< 0.969	< 2.379	< 1.656	<1.493E-04	0.068
1446000	50.749	As	56.61	0.34	56.95	39.631	3.574E-03	1.623
1446000	50.749	Ba	35.13	< 2.77	< 37.9	< 26.374	<2.379E-03	1.080
1446000	50.749	Be	2.42	< 0.277	< 2.697	< 1.877	<1.693E-04	0.077
1446000	50.749	Cd	64.691	1	65.691	45.714	4.123E-03	1.872
1446000	50.749	Cr	32.8	< 1.66	< 34.46	< 23.980	<2.163E-03	0.982
1446000	50.749	Pb	974.7	10.5	985.2	685.591	6.183E-02	28.071
1446000	50.749	Sb	4.53	4.57	9.1	6.333	5.711E-04	0.259
1446000	50.749	Tl	< 0.2	0.595	< 0.795	< 0.553	<4.990E-05	0.023
1446000	50.749	Hg	0	16.1	16.1	11.204	1.010E-03	0.459

Run 3

FlowRate dscfh	Sample Vol dscf		Front	Back	Total	ug/cu.M	Mass Flows lbs./hr.	g/hr.
1374000	45.278	Ag	0.733	< 0.969	< 1.702	< 1.328	<1.138E-04	0.052
1374000	45.278	As	73.31	0.41	73.72	57.500	4.928E-03	2.237
1374000	45.278	Ba	34.33	< 2.77	< 37.1	< 28.937	<2.480E-03	1.126
1374000	45.278	Be	1.91	0.416	2.326	1.814	1.555E-04	0.071
1374000	45.278	Cd	47.191	1.86	49.051	38.259	3.279E-03	1.488
1374000	45.278	Cr	17.6	< 1.66	< 19.26	< 15.022	<1.287E-03	0.584
1374000	45.278	Pb	1045	10.6	1055.6	823.342	7.056E-02	32.033
1374000	45.278	Sb	22.1	3.38	25.48	19.874	1.703E-03	0.773
1374000	45.278	Tl	< 0.2	0.789	< 0.989	< 0.771	<6.611E-05	0.030
1374000	45.278	Hg	0	15	15	11.700	1.003E-03	0.455