



2820 S. English Station Road - Louisville, KY 40299
 Tel: (502) 357-0132 Fax (502) 267-8379

Date: 30-Apr-14 TEST NO. 14-796Rev1

Federal Register Part 63 Method 319 TEST REPORT

Filter Description

Manufacturer	Filter Systems
Filter Model	319N3F
Part Number	319N3F-202012/5
Generic Filter Type	NESHAP 319 Final Stage Bag Filter
Nominal Dimensions (H x W x D)	20"x20"x12"
Pocket / Pleat Quantity	5 Pockets
Media Type	Synthetic
Est. Gross Media Area	20 Ft ²
Adhesive Type	N A



Test Conditions

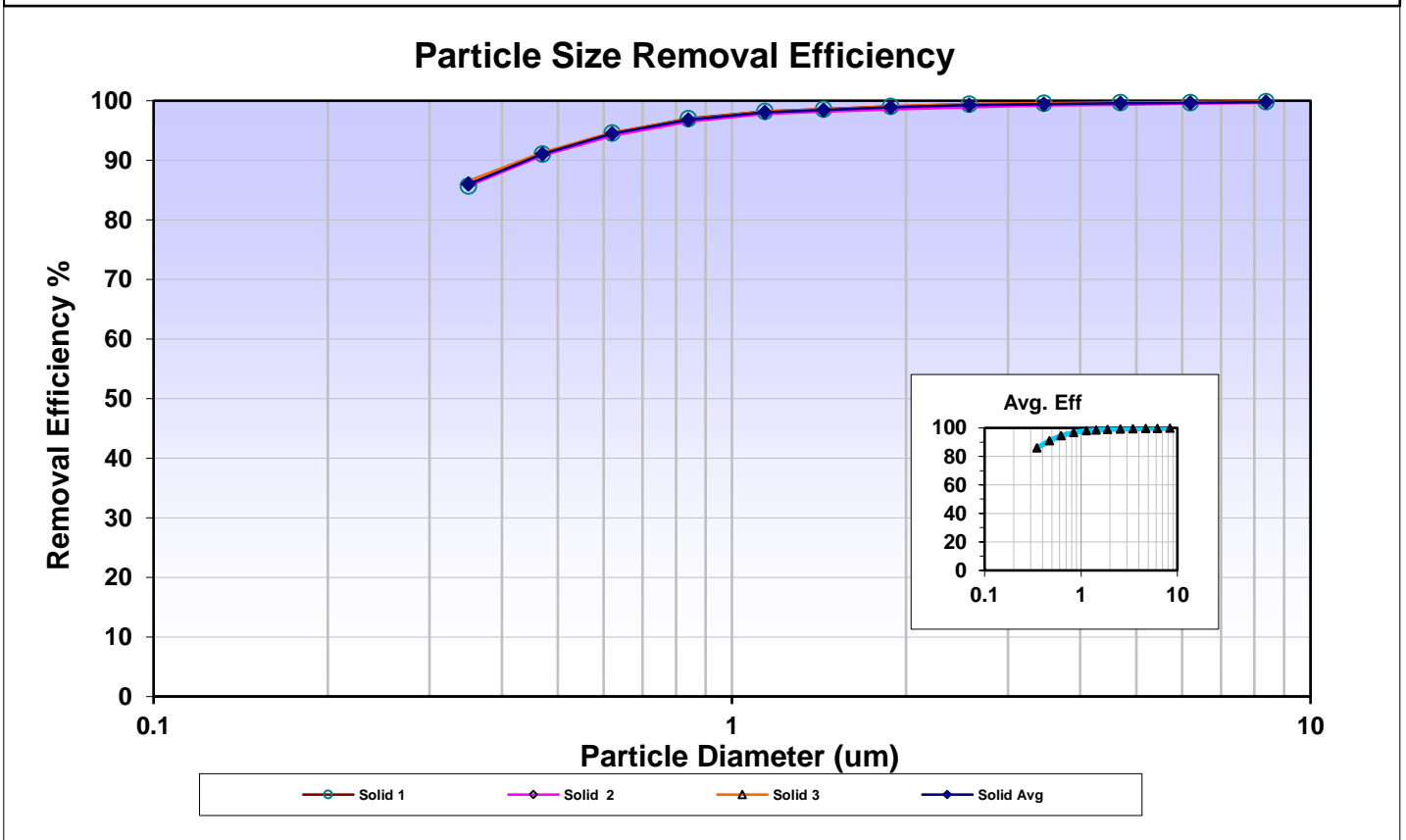
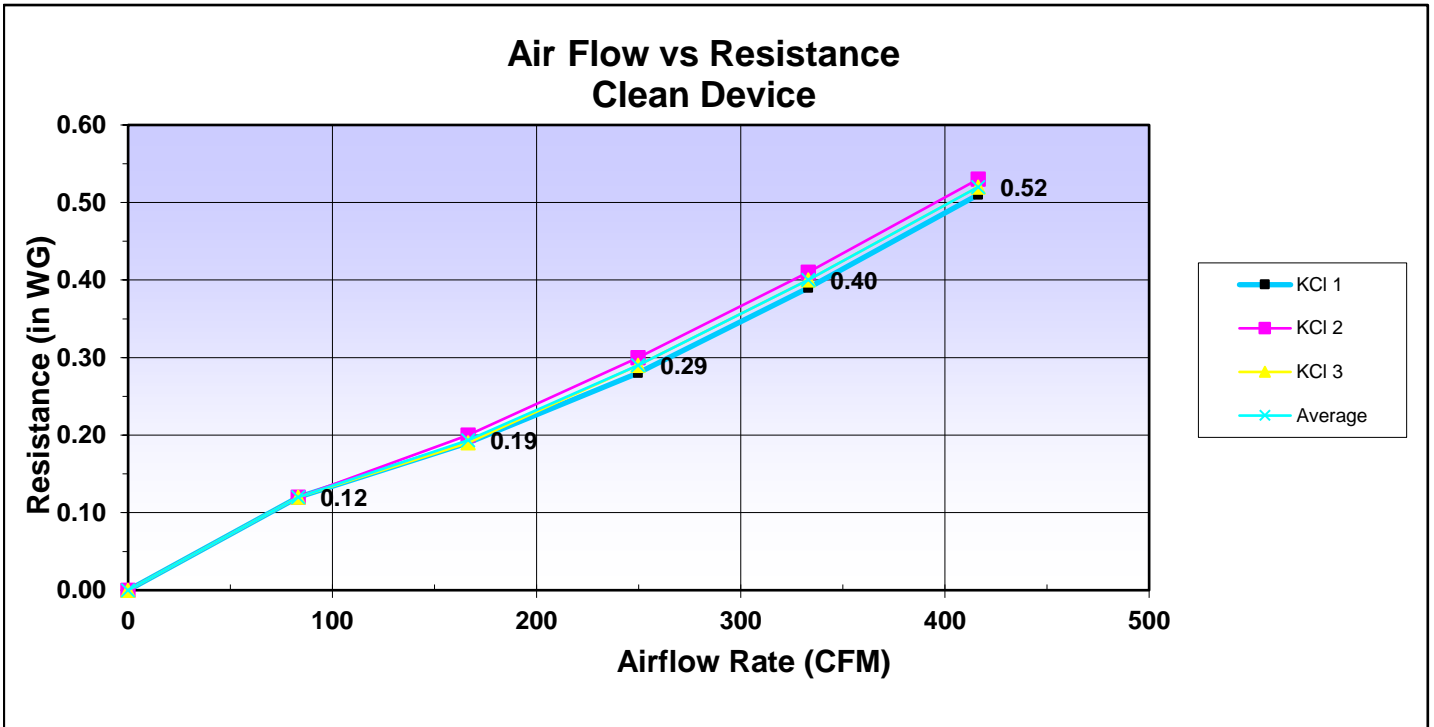
Loading Dust Type	N A	Test Air Temp (degrees F.)	71
Barometric Pressure (In. Hg.)	29.23	Relative Humidity (%)	43

Test Results

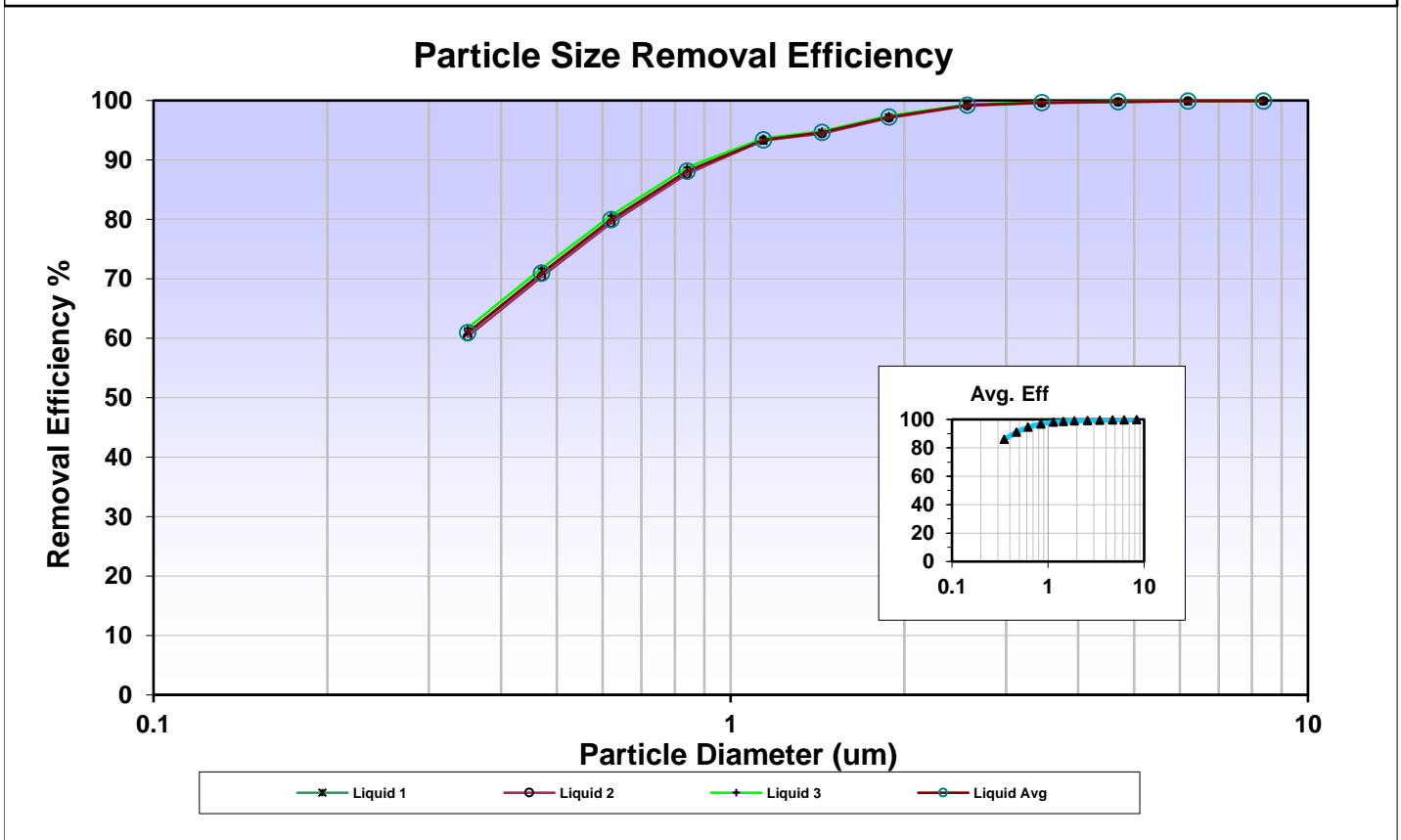
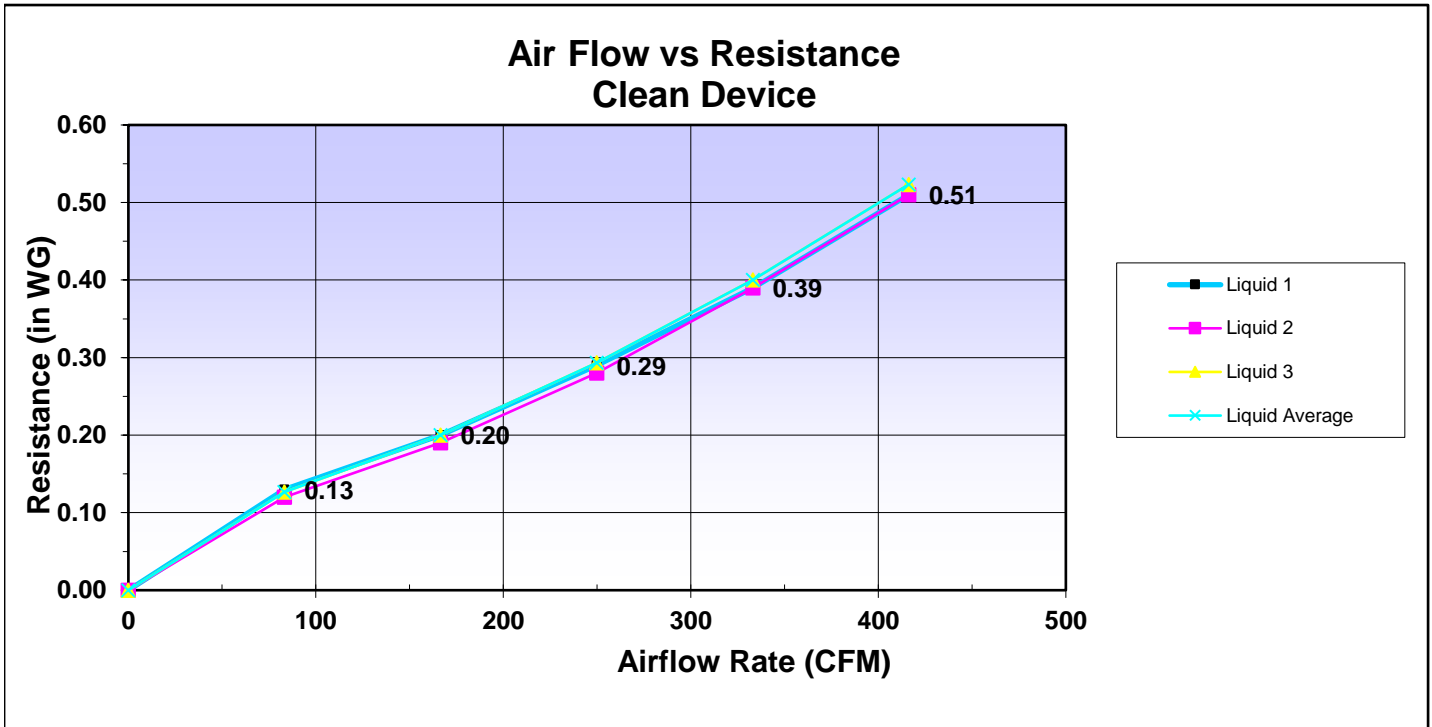
Airflow Rate (CFM)	333		
Nominal Face Velocity (fpm)	120		
Avg. Initial Resistance (in WG)		Solid	Liquid
		0.40	0.40
(%) Composite Avg. Efficiency 0.30 - 1.0 um		92	75
(%) Composite Avg. Efficiency 1.0 - 3.0 um		99	96
(%) Composite Avg. Efficiency 3.0 - 10.0 um		100	100

Comments Tested For: Filter Systems
 Solid Phase Challenge - KCL
 Liquid Phase Challenge - Oleic Acid
 This Filter Passes The Requirements Of Federal Register Part 63 Method 319 For New And Existing Sources

Approval:



Test No. 14-796Rev1
 Date: 30-Apr-14



Test No. 14-796Rev1

Date: 30-Apr-14

Data - Initial Resistance

Airflow (CFM)	Solid 1	Solid 2	Solid 3	Solid Avg
	Resistance (in WG)	Resistance (in WG)	Resistance (in WG)	Resistance (in WG)
0	0.00	0.00	0.00	0.00
83	0.12	0.12	0.12	0.12
167	0.19	0.20	0.19	0.19
250	0.28	0.30	0.29	0.29
333	0.39	0.41	0.40	0.40
416	0.51	0.53	0.52	0.52

Data - Particle Removal Efficiency

Particle Size Range (um)	Geometric Mean Diam (um)	Particle Removal Efficiency (%)			
		Solid 1	Solid 2	Solid 3	Solid Avg
0.30 - 0.40	0.35	85.7	85.7	86.5	86.0
0.40 - 0.55	0.47	91.1	90.8	91.3	91.1
0.55 - 0.70	0.62	94.6	94.1	94.7	94.5
0.70 - 1.00	0.84	97.0	96.5	96.9	96.8
1.00 - 1.30	1.14	98.2	97.8	98.2	98.1
1.30 - 1.60	1.44	98.6	98.2	98.5	98.4
1.60 - 2.20	1.88	99.0	98.5	99.1	98.9
2.20 - 3.00	2.57	99.4	98.9	99.5	99.3
3.00 - 4.00	3.46	99.6	99.2	99.6	99.4
4.00 - 5.50	4.69	99.7	99.3	99.7	99.6
5.50 - 7.00	6.20	99.7	99.5	99.8	99.7
7.00 - 10.00	8.37	99.8	99.6	99.8	99.8
		Solid 1	Solid 2	Solid 3	Solid Avg

Interpolated Data		Minimum
Micron Size	Efficiency%	
8.1	99.8	>90
5.0	99.6	>50
2.6	99.3	>10

Solid Phase - Pass
Existing Sources

Interpolated Data		Minimum
Micron Size	Efficiency%	
2.5	99.3	>95
1.1	97.9	>85
0.7	95.3	>75

Solid Phase - Pass
New Sources

Data - Initial Resistance

Airflow (CFM)	Liquid 1	Liquid 2	Liquid 3	Liquid Avg
	Resistance (in WG)	Resistance (in WG)	Resistance (in WG)	Resistance (in WG)
0	0.00	0.00	0.00	0.00
83	0.13	0.13	0.12	0.13
167	0.20	0.21	0.19	0.20
250	0.29	0.31	0.28	0.29
333	0.39	0.42	0.39	0.40
416	0.51	0.55	0.51	0.52

Data - Particle Removal Efficiency

Particle Size Range (um)	Geometric Mean Diam (um)	Particle Removal Efficiency (%)			
		Liquid 1	Liquid 2	Liquid 3	Liquid Avg
0.30 - 0.40	0.35	60.8	60.3	61.7	60.9
0.40 - 0.55	0.47	70.8	70.3	71.8	71.0
0.55 - 0.70	0.62	79.7	79.4	80.7	79.9
0.70 - 1.00	0.84	87.9	87.6	88.8	88.1
1.00 - 1.30	1.14	93.2	93.3	93.6	93.4
1.30 - 1.60	1.44	94.6	94.4	94.9	94.6
1.60 - 2.20	1.88	97.2	97.1	97.4	97.2
2.20 - 3.00	2.57	99.3	99.1	99.3	99.2
3.00 - 4.00	3.46	99.6	99.6	99.7	99.6
4.00 - 5.50	4.69	99.8	99.7	99.8	99.8
5.50 - 7.00	6.20	99.8	99.9	99.9	99.9
7.00 - 10.00	8.37	99.9	99.9	99.9	99.9
		Liquid 1	Liquid 2	Liquid 3	Liquid Avg

Interpolated Data		Minimum
Micron Size	Efficiency%	
5.7	99.9	>90
4.1	99.7	>50
2.2	98.1	>10

Liquid Phase - Pass
Existing Sources

Interpolated Data		Minimum
Micron Size	Efficiency%	
2.0	97.6	>95
1.0	90.9	>80
0.42	66.8	>65

Liquid Phase - Pass
New Sources

Solid 1

Test No. 14-796Rev1

Date: 30-Apr-14

Geo. Mean Dia. (uM)	0.350 Up	0.475 Up	0.625 Up	0.850 Up	1.150 Up	1.450 Up	1.900 Up	2.600 Up	3.500 Up	4.750 Up	6.250 Up	8.500 Up
bin #	bin 1	bin 2	bin 3	bin 4	bin 5	bin 6	bin 7	bin 8	bin 9	bin 10	bin 11	bin 12

Upstream	150784	87799	49773	62812	15723	7369	30997	19515	9452	6589	3402	2001
Upstream	143753	83681	47147	59413	15076	7121	29291	18743	9221	6516	3193	1951
Upstream	137134	79386	45363	57031	14355	6570	28192	17840	8744	6271	3155	1814
Upstream	141076	83031	46559	58908	14759	7041	29325	18694	9100	6347	3280	2025
Upstream	127581	74321	41907	53223	13257	6191	26429	16715	8247	5802	3067	1858
Upstream	137195	78727	44458	56546	14288	6697	27918	18090	8878	6196	3174	1898
Upstream	128819	75025	42320	53472	13486	6454	26685	17053	8442	6043	3097	1850
Upstream	122494	71293	40100	51045	12699	6036	25489	16563	8156	5921	2952	1844
Upstream	117640	68438	38724	48949	12301	5874	24619	16061	7888	5640	2966	1840
Upstream	113558	65835	37498	46551	11844	5669	23707	15285	7421	5533	2817	1780
Average Ub	6.30	0.50	0.20	0.30	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00
Average U	132003.40	76753.60	43384.90	54795.00	13778.80	6502.20	27265.20	17455.90	8554.90	6085.80	3110.30	1886.10
StdDev Ub	2.36	0.71	0.42	0.48	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00
95% Ub,ucl	7.9877	1.0058	0.5016	0.6455	0.0000	0.0000	0.3262	0.0000	0.0000	0.0000	0.0000	0.0000

Downstream	22146	8371	2975	1828	263	102	321	121	44	26	18	2
Downstream	21756	8434	2952	1819	294	98	270	115	39	21	14	1
Downstream	20250	7820	2651	1737	301	104	285	107	36	13	10	7
Downstream	21005	7883	2711	1733	253	96	268	109	36	33	8	3
Downstream	18686	7090	2375	1558	269	114	254	109	37	20	9	4
Downstream	19449	7405	2464	1621	260	98	284	116	37	16	10	2
Downstream	19069	7403	2533	1692	222	95	271	113	37	29	9	1
Downstream	17221	6652	2233	1468	228	86	254	109	30	17	13	4
Downstream	17287	6578	2304	1481	240	81	270	95	33	15	11	5
Downstream	16225	6078	2148	1296	245	79	250	81	26	15	5	2
Average Db	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average D	19309.40	7371.40	2534.60	1623.30	257.50	95.30	272.70	107.50	35.50	20.50	10.70	3.10
StdDev Db	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95% Db,ucl	1.3786	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Average R	1.021	1.075	1.077	0.984	1.055	1.038	1.052	1.053	1.030	1.083	1.101	1.051
-----------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Average P	0.1461	0.0959	0.0583	0.0296	0.0187	0.0147	0.0100	0.0062	0.0041	0.0034	0.0034	0.0017
StdDev P	0.0034	0.0026	0.0022	0.0011	0.0017	0.0015	0.0006	0.0004	0.0004	0.0010	0.0010	0.0011
Corrected P	0.1431	0.0892	0.0542	0.0301	0.0178	0.0141	0.0095	0.0058	0.0040	0.0031	0.0031	0.0016

PSE	85.69	91.08	94.58	96.99	98.22	98.59	99.05	99.42	99.60	99.69	99.69	99.84
E1	92.08											
E2	98.82											
E3	99.71											

Solid 2

Test No. 14-796Rev1
Date: 30-Apr-14

Geo. Mean Dia. (µM)	0.350 Up	0.475 Up	0.625 Up	0.850 Up	1.150 Up	1.450 Up	1.900 Up	2.600 Up	3.500 Up	4.750 Up	6.250 Up	8.500 Up
bin #	bin 1	bin 2	bin 3	bin 4	bin 5	bin 6	bin 7	bin 8	bin 9	bin 10	bin 11	bin 12
Upstream	91248	51675	29308	36682	9321	4464	19131	12477	6557	4747	2507	1600
Upstream	88975	50770	28406	35191	9128	4410	18485	12527	6263	4584	2516	1539
Upstream	83102	47076	26597	33062	8333	4071	17329	11467	6030	4484	2221	1517
Upstream	83576	46902	26825	33437	8599	4025	17564	11507	5780	4311	2281	1496
Upstream	80392	45179	25471	31397	7937	3923	16547	10993	5741	4213	2192	1516
Upstream	77154	43211	24692	30266	7975	3684	16299	10783	5574	4175	2134	1510
Upstream	74975	42639	23536	29519	7704	3715	15696	10400	5263	4053	2229	1422
Upstream	69765	38908	22034	27086	7058	3283	14471	9668	5001	3824	2099	1376
Upstream	72184	40264	22756	27948	7102	3450	15060	10161	5262	3889	2052	1471
Upstream	69007	38099	21678	26513	7036	3330	14400	9821	5048	3863	2101	1464
Average Ub	6.90	0.70	0.00	0.10	0.00	0.00	0.10	0.20	0.00	0.00	0.00	0.00
Average U	79037.80	44472.30	25130.30	31110.10	8019.30	3835.50	16498.20	10980.40	5651.90	4214.30	2233.20	1491.10
StdDev Ub	3.07	0.82	0.00	0.32	0.00	0.00	0.32	0.42	0.00	0.00	0.00	0.00
95% Ub,ucl	9.0970	1.2889	0.0000	0.3262	0.0000	0.0000	0.3262	0.5016	0.0000	0.0000	0.0000	0.0000

Downstream	13374	5179	1802	1241	192	84	305	144	49	30	17	9
Downstream	13375	5215	1861	1208	203	76	274	128	55	25	17	10
Downstream	12242	4676	1716	1154	203	83	255	139	60	28	18	4
Downstream	12421	4701	1671	1121	208	84	259	120	51	30	12	8
Downstream	11556	4485	1638	1128	220	59	261	123	48	45	11	2
Downstream	11437	4337	1500	1076	179	62	253	132	39	39	11	5
Downstream	11265	4031	1500	1066	184	81	208	139	48	24	8	7
Downstream	10177	3873	1444	941	135	58	254	118	41	28	9	3
Downstream	10172	3874	1437	971	176	70	246	99	46	25	9	3
Downstream	9516	3717	1337	931	164	72	208	100	34	26	8	5
Average Db	2.00	0.30	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00
Average D	11553.50	4408.80	1590.60	1083.70	186.40	72.90	252.30	124.20	47.10	30.00	12.00	5.60
StdDev Db	1.15	0.48	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00
95% Db,ucl	2.8260	0.6455	0.0000	0.3262	0.0000	0.0000	0.0000	0.0000	0.0000	0.3262	0.0000	0.0000

Average R	1.021	1.075	1.077	0.984	1.055	1.038	1.052	1.053	1.030	1.083	1.101	1.051
-----------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Average P	0.1460	0.0990	0.0633	0.0349	0.0233	0.0191	0.0153	0.0113	0.0083	0.0071	0.0053	0.0037
StdDev P	0.0040	0.0023	0.0017	0.0008	0.0024	0.0023	0.0012	0.0012	0.0010	0.0016	0.0015	0.0018
Corrected P	0.1430	0.0921	0.0588	0.0354	0.0221	0.0184	0.0146	0.0108	0.0081	0.0066	0.0048	0.0035

PSE	85.70	90.79	94.12	96.46	97.79	98.16	98.54	98.92	99.19	99.34	99.52	99.65
E1	91.77											
E2	98.36											
E3	99.42											

Solid 3

Test No. 14-796Rev1
Date: 30-Apr-14

Geo. Mean Dia. (uM)	0.350 Up	0.475 Up	0.625 Up	0.850 Up	1.150 Up	1.450 Up	1.900 Up	2.600 Up	3.500 Up	4.750 Up	6.250 Up	8.500 Up
bin #	bin 1	bin 2	bin 3	bin 4	bin 5	bin 6	bin 7	bin 8	bin 9	bin 10	bin 11	bin 12
Upstream	66247	36309	20808	25323	6650	3093	13975	9455	5074	3733	1983	1391
Upstream	65374	36331	20541	25695	6703	3139	13660	9391	4946	3646	2032	1362
Upstream	62291	34590	19467	23969	6334	3023	13365	8803	4628	3515	1974	1319
Upstream	59641	33085	18565	22828	5941	2857	12319	8530	4566	3491	1824	1346
Upstream	54818	29964	17023	20908	5346	2611	11517	7860	4043	3081	1797	1256
Upstream	54892	30355	17200	21030	5421	2736	11517	7814	4216	3164	1802	1266
Upstream	53739	29890	16448	20689	5259	2642	11219	7791	4134	3213	1741	1203
Upstream	49857	27472	15411	19199	4979	2408	10749	7321	3960	2985	1637	1198
Upstream	52408	28320	16232	20248	5309	2526	10834	7555	4079	2988	1659	1273
Upstream	53657	29547	16944	20883	5417	2624	11301	7631	4070	3179	1685	1248
Average Ub	7.90	1.30	0.30	0.30	0.10	0.00	0.00	0.00	0.00	0.10	0.00	0.00
Average U	57292.40	31586.30	17863.90	22077.20	5735.90	2765.90	12045.60	8215.10	4371.60	3299.50	1813.40	1286.20
StdDev Ub	3.21	1.06	0.48	0.48	0.32	0.00	0.00	0.00	0.00	0.32	0.00	0.00
95% Ub,ucl	10.1982	2.0578	0.6455	0.6455	0.3262	0.0000	0.0000	0.0000	0.0000	0.3262	0.0000	0.0000

Downstream	9090	3384	1156	750	120	41	144	44	25	12	5	3
Downstream	9180	3405	1208	771	135	53	122	56	24	11	4	0
Downstream	8565	3343	1160	723	122	49	125	50	27	16	8	5
Downstream	8211	3105	1063	772	111	45	132	51	26	11	1	6
Downstream	7572	2782	933	584	112	28	114	44	16	12	5	0
Downstream	7523	2826	978	608	105	42	117	41	13	6	4	2
Downstream	7084	2780	953	623	92	36	98	46	12	14	5	1
Downstream	6880	2552	920	615	81	41	106	38	18	12	2	0
Downstream	7195	2672	880	615	103	39	113	46	18	7	5	3
Downstream	7463	2711	954	648	112	45	100	53	22	15	7	3
Average Db	1.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average D	7876.30	2956.00	1020.50	670.90	109.30	41.90	117.10	46.90	20.10	11.60	4.60	2.30
StdDev Db	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95% Db,ucl	1.9564	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Average R	1.021	1.075	1.077	0.984	1.055	1.038	1.052	1.053	1.030	1.083	1.101	1.051
-----------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Average P	0.1374	0.0935	0.0571	0.0304	0.0190	0.0151	0.0097	0.0057	0.0046	0.0035	0.0025	0.0018
StdDev P	0.0022	0.0013	0.0019	0.0016	0.0015	0.0020	0.0007	0.0006	0.0010	0.0009	0.0011	0.0016
Corrected P	0.1346	0.0870	0.0530	0.0309	0.0180	0.0146	0.0092	0.0054	0.0044	0.0032	0.0023	0.0017

PSE	86.54	91.30	94.70	96.91	98.20	98.54	99.08	99.46	99.56	99.68	99.77	99.83
E1	92.36											
E2	98.82											
E3	99.71											

Liquid 1

Test No. 14-796Rev1
Date: 30-Apr-14

Geo. Mean Dia. (uM)	0.350 Up	0.475 Up	0.625 Up	0.850 Up	1.150 Up	1.450 Up	1.900 Up	2.600 Up	3.500 Up	4.750 Up	6.250 Up	8.500 Up
bin #	bin 1	bin 2	bin 3	bin 4	bin 5	bin 6	bin 7	bin 8	bin 9	bin 10	bin 11	bin 12
Upstream	216377	177443	99815	85252	18120	11541	43839	9950	2961	1508	314	77
Upstream	223222	184227	103503	88235	18794	12058	44927	10426	2973	1561	304	67
Upstream	226752	185436	104255	89058	19030	12150	45545	10415	2957	1586	320	86
Upstream	229439	187658	105876	90150	19093	12431	46167	10724	3138	1563	332	81
Upstream	225393	185643	104942	88492	19133	12285	45242	10360	3054	1532	286	79
Upstream	220166	180416	101835	86836	18605	11886	44449	10252	2940	1492	315	79
Upstream	222400	182296	103167	87626	18579	12045	44711	10250	2943	1559	301	75
Upstream	225446	184248	104264	88425	18721	11977	45130	10408	2983	1555	309	111
Upstream	237093	193672	109560	92965	19875	12828	47242	10952	3193	1660	320	66
Upstream	238781	195336	109753	93996	19903	12846	48084	11058	3214	1648	282	80
Average Ub	6.20	2.40	0.70	0.40	0.00	0.00	0.10	0.10	0.00	0.00	0.00	0.00
Average U	226506.90	185637.50	104697.00	89103.50	18985.30	12204.70	45533.60	10479.50	3035.60	1566.40	308.30	80.10
StdDev Ub	5.55	2.72	0.95	0.70	0.00	0.00	0.32	0.32	0.00	0.00	0.00	0.00
95% Ub,ucl	10.1727	4.3429	1.3786	0.9001	0.0000	0.0000	0.3262	0.3262	0.0000	0.0000	0.0000	0.0000

Downstream	84840	52988	21661	10367	1293	593	1278	74	11	2	1	0
Downstream	88484	54697	22023	10404	1444	636	1397	85	10	3	0	0
Downstream	90685	55886	22556	10609	1335	597	1250	92	11	1	1	0
Downstream	89750	55638	22062	10706	1285	676	1338	74	10	5	0	0
Downstream	87876	54676	21918	10234	1430	629	1372	92	13	3	0	0
Downstream	85842	52875	21653	10226	1255	594	1296	79	10	6	2	0
Downstream	88180	54404	22267	10355	1434	698	1422	87	13	2	0	0
Downstream	89021	55515	22355	10438	1397	659	1315	95	12	2	2	0
Downstream	92004	56749	22670	10872	1288	687	1339	103	9	8	0	0
Downstream	92212	57350	22960	11070	1332	668	1370	98	17	7	0	1
Average Db	1.50	0.80	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average D	88889.40	55077.80	22212.50	10528.10	1349.30	643.70	1337.70	87.90	11.60	3.90	0.60	0.10
StdDev Db	2.17	1.48	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95% Db,ucl	3.0544	1.8556	0.5016	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Average R	1.002	1.016	1.047	0.977	1.051	0.975	1.038	1.131	1.066	1.151	1.273	1.325
-----------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Average P	0.3925	0.2967	0.2122	0.1182	0.0711	0.0527	0.0294	0.0084	0.0038	0.0025	0.0019	0.0013
StdDev P	0.0043	0.0032	0.0037	0.0015	0.0045	0.0026	0.0013	0.0008	0.0007	0.0015	0.0027	0.0040
Corrected P	0.3917	0.2919	0.2026	0.1210	0.0677	0.0541	0.0283	0.0074	0.0036	0.0021	0.0015	0.0009

PSE	60.83	70.81	79.74	87.90	93.23	94.59	97.17	99.26	99.64	99.79	99.85	99.91
E1	74.82											
E2	96.06											
E3	99.80											

Liquid 2

Test No. 14-796Rev1
Date: 30-Apr-14

Geo. Mean Dia. (uM)	0.350 Up	0.475 Up	0.625 Up	0.850 Up	1.150 Up	1.450 Up	1.900 Up	2.600 Up	3.500 Up	4.750 Up	6.250 Up	8.500 Up
bin #	bin 1	bin 2	bin 3	bin 4	bin 5	bin 6	bin 7	bin 8	bin 9	bin 10	bin 11	bin 12
Upstream	222643	180902	102720	86725	18932	12022	44928	10610	3044	1494	300	93
Upstream	227585	185913	105681	88817	19500	12192	46266	10662	3162	1658	277	90
Upstream	226329	184462	104475	88616	19429	12113	46242	10627	3009	1621	307	97
Upstream	226885	185801	105112	89031	19591	12115	45862	10830	3069	1592	348	91
Upstream	231573	189929	107329	91085	19924	12283	46908	11027	3217	1643	347	87
Upstream	229888	187882	106356	90427	19667	12200	46791	11001	3054	1610	296	81
Upstream	222762	182699	103251	87421	18923	11851	45118	10432	2996	1591	345	83
Upstream	236863	194453	109426	93299	20097	12709	48008	11358	3285	1629	353	99
Upstream	237517	194704	109962	94259	20377	12672	48730	11316	3198	1653	309	109
Upstream	241183	197772	112027	94937	20878	12892	49346	11424	3281	1676	337	87
Average Ub	6.10	2.20	0.40	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average U	230322.80	188451.70	106633.90	90461.70	19731.80	12304.90	46819.90	10928.70	3131.50	1616.70	321.90	91.70
StdDev Ub	4.28	2.86	0.84	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95% Ub,ucl	9.1618	4.2456	1.0032	0.5016	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Downstream	88205	55091	22260	10589	1346	669	1375	126	13	4	0	0
Downstream	87745	54250	22013	10544	1294	586	1417	94	10	4	0	0
Downstream	89385	55967	22523	10819	1279	652	1331	91	8	5	0	0
Downstream	93092	57477	23104	10937	1422	670	1411	104	10	6	1	0
Downstream	92977	57660	23286	11061	1417	701	1446	116	21	4	1	1
Downstream	89447	55579	22563	10620	1289	667	1410	106	11	6	0	0
Downstream	87858	54493	22039	10264	1427	610	1416	105	14	4	1	0
Downstream	94401	58514	23772	11255	1416	718	1432	110	12	7	1	0
Downstream	97239	60360	24412	11331	1508	707	1618	126	13	3	1	0
Downstream	96990	59671	24238	11712	1412	692	1477	107	20	6	0	0
Average Db	1.90	1.40	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average D	91733.90	56906.20	23021.00	10913.20	1381.00	667.20	1433.30	108.50	13.20	4.90	0.50	0.10
StdDev Db	1.85	1.26	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95% Db,ucl	3.2254	2.3048	0.3262	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Average R	1.002	1.016	1.047	0.977	1.051	0.975	1.038	1.131	1.066	1.151	1.273	1.325
-----------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Average P	0.3982	0.3019	0.2159	0.1206	0.0700	0.0542	0.0306	0.0099	0.0042	0.0030	0.0015	0.0011
StdDev P	0.0080	0.0056	0.0039	0.0022	0.0035	0.0027	0.0012	0.0010	0.0013	0.0008	0.0016	0.0036
Corrected P	0.3974	0.2970	0.2061	0.1235	0.0666	0.0556	0.0295	0.0088	0.0039	0.0026	0.0012	0.0009

PSE	60.26	70.30	79.39	87.65	93.34	94.44	97.05	99.12	99.61	99.74	99.88	99.91
E1	74.40											
E2	95.99											
E3	99.79											

Liquid 3

Test No. 14-796Rev1
Date: 30-Apr-14

Geo. Mean Dia. (uM)	0.350 Up	0.475 Up	0.625 Up	0.850 Up	1.150 Up	1.450 Up	1.900 Up	2.600 Up	3.500 Up	4.750 Up	6.250 Up	8.500 Up
bin #	bin 1	bin 2	bin 3	bin 4	bin 5	bin 6	bin 7	bin 8	bin 9	bin 10	bin 11	bin 12
Upstream	238439	195331	110809	94791	20231	12758	48162	11440	3260	1723	353	82
Upstream	240886	197088	111458	95970	20322	12726	48950	11416	3399	1731	328	89
Upstream	241164	198593	112288	96357	20583	12923	48866	11172	3266	1717	358	99
Upstream	243989	200806	112880	97083	20457	13071	49471	11646	3241	1728	331	99
Upstream	246300	202772	113745	97238	20777	12973	49767	11641	3379	1666	352	92
Upstream	243379	200961	112903	97171	20645	12991	48800	11741	3274	1744	328	83
Upstream	234574	192493	108361	92751	19895	12413	47508	11205	3246	1669	381	77
Upstream	240206	196328	110385	95381	20121	12697	48409	11324	3315	1751	362	91
Upstream	244735	200841	113183	97262	20537	13068	49869	11528	3315	1796	353	95
Upstream	254163	208596	118552	101964	21571	13604	51963	12207	3493	1844	343	89
Average Ub	9.60	4.40	0.80	0.20	0.00	0.10	0.20	0.10	0.00	0.00	0.00	0.00
Average U	242783.50	199380.90	112456.40	96596.80	20513.90	12922.40	49176.50	11532.00	3318.80	1736.90	348.90	89.60
StdDev Ub	5.44	4.25	0.63	0.42	0.00	0.32	0.42	0.32	0.00	0.00	0.00	0.00
95% Ub,ucl	13.4917	7.4385	1.2524	0.5016	0.0000	0.3262	0.5016	0.3262	0.0000	0.0000	0.0000	0.0000

Downstream	91909	56126	22460	10278	1422	590	1276	85	17	0	0	0
Downstream	90103	55212	22161	10238	1303	633	1245	91	10	5	1	1
Downstream	93943	58170	23111	10743	1331	677	1308	78	8	6	1	0
Downstream	93335	57662	22914	10780	1362	636	1377	73	9	0	1	0
Downstream	96069	58977	23528	10853	1506	652	1351	94	16	2	1	0
Downstream	93651	56970	22894	10733	1321	632	1308	99	12	5	0	0
Downstream	90685	55907	22186	10459	1328	620	1213	104	10	5	0	0
Downstream	92261	56658	22468	10393	1411	646	1345	92	8	3	1	0
Downstream	94216	57895	22709	10614	1415	682	1371	77	5	5	0	0
Downstream	95432	58711	23330	10957	1349	712	1354	98	14	8	0	0
Average Db	3.20	1.00	0.20	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00
Average D	93160.40	57228.80	22776.10	10604.80	1374.80	648.00	1314.80	89.10	10.90	3.90	0.50	0.10
StdDev Db	3.77	1.25	0.42	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00
95% Db,ucl	5.8934	1.8921	0.5016	0.0000	0.0000	0.0000	0.3262	0.0000	0.0000	0.0000	0.0000	0.0000

Average R	1.002	1.016	1.047	0.977	1.051	0.975	1.038	1.131	1.066	1.151	1.273	1.325
-----------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Average P	0.3838	0.2871	0.2026	0.1098	0.0670	0.0501	0.0267	0.0077	0.0033	0.0022	0.0014	0.0011
StdDev P	0.0053	0.0042	0.0031	0.0020	0.0033	0.0020	0.0009	0.0009	0.0011	0.0015	0.0015	0.0036
Corrected P	0.3830	0.2824	0.1934	0.1124	0.0638	0.0514	0.0258	0.0068	0.0031	0.0019	0.0011	0.0008

PSE	61.70	71.76	80.66	88.76	93.62	94.86	97.42	99.32	99.69	99.81	99.89	99.92
E1	75.72											
E2	96.30											
E3	99.83											