



NMBAQC

NE Atlantic Marine Biological Analytical Quality Control Scheme

NMBAQC Scheme 2025/26

PS97 Report



Client: North-East Atlantic Marine Biological Analytical Quality Control Scheme

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Revision and Amendment Register

Version Number	Version Type	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1.0	Interim	12/01/2026	All	All		LMB
2.0	Final	11/05/2026	2	9-17	Updated PSA_3210 data	LMB

Contents

1.	BENCHMARK DATA.....	1
2.	PARTICIPANT DATA	9
3.	APPENDICES.....	17

Figures

Figure 1 Particle size distribution curves resulting from final laser analysis of 5 replicate samples of sediment distributed as PS97 (Benchmark Data).....	4
Figure 2 Particle size distribution curves resulting from laser analysis of five replicate samples of sediment distributed as PS97.	6
Figure 3 Particle size distribution curves resulting from analysis of 5 replicate samples of sediment distributed as PS97 (Benchmark Data).	8
Figure 5 Final sieve data (in percentages) provided by each participant for sediment distributed as PS97.....	11
Figure 6 Final laser data (in percentages) provided by each participant and the Benchmark average for sediment distributed as PS97.	14
Figure 7 Particle size distribution curves from all participating laboratories and the Benchmark average for sediment distributed as PS97.....	15
Figure 8 Bar charts showing the percentage gravel, sand, silt and clay recorded by each participating laboratory and the Benchmark average for PS97.	16

Tables

Table 1 Summary data for the Benchmark replicates distributed as PS97.	1
Table 2 Summary of the sieve data the Benchmark replicates distributed as PS97.	1
Table 3 Summary of the final laser data for the Benchmark replicates distributed as PS97.	3
Table 4 Summary of Coefficient of Variation for Benchmark laser replicates for PS97.....	5
Table 5 Laser Metadata for the Benchmark replicates for PS97.	5
Table 6 Summary of equipment and methods used by participants and sample summary data provided by participants for sediment distributed as PS97.	9
Table 7 Summary of the sieve data provided by participants for sediment distributed as PS97.	10

Table 8 Summary of final laser data for the participants for sediment distributed as PS97 with Gradistat output.....	12
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Participation

At time of issue no results have been received by participants PSA_3203, PSA_3216 or PSA_3217. Participants PSA_3202 and PSA-3205 chose not to participate in this exercise.

1. BENCHMARK DATA

Table 1 Summary data for the Benchmark replicates distributed as PS97.

Sample	Method	% Gravel	% Sand	% Mud	Sediment Description
PSA_3136 BM REP 1	NMBAQC	66.21	32.91	0.88	Sandy Gravel
PSA_3137 BM REP2	NMBAQC	65.56	33.80	0.64	Sandy Gravel
PSA_3138 BM REP 3	NMBAQC	65.53	33.88	0.59	Sandy Gravel
PSA_3139 BM REP 4	NMBAQC	65.48	33.99	0.53	Sandy Gravel
PSA_3140 BM REP 5	NMBAQC	65.50	33.97	0.53	Sandy Gravel
BM Rep Average	NMBAQC	65.66	33.71	0.63	Sandy Gravel

Table 2 Summary of the sieve data the Benchmark replicates distributed as PS97.

Phi Interval; microns	PSA_3236 BM REP 1	PSA_3237 BM REP 2	PSA_3238 BM REP 3	PSA_3239 BM REP 4	PSA_3240 BM REP 5	BM Rep Average
Starting Weight	1038.67	1008.30	1006.96	1008.31	1008.42	1014.13
-6.50 to -6.00; 63 mm	0.00	0.00	0.00	0.00	0.00	0.00
-6.00 to -5.50; 45 mm	0.00	0.00	0.00	0.00	0.00	0.00
-5.50 to -5.00; 31.5 mm	0.00	0.00	0.00	0.00	0.00	0.00
-5.00 to -4.50; 22.4 mm	0.00	0.00	0.00	0.00	0.00	0.00
-4.50 to -4.00; 16 mm	0.00	0.00	0.00	0.00	0.00	0.00
-4.00 to -3.50; 11.2 mm	51.50	52.07	48.12	48.46	46.96	49.42
-3.50 to -3.00; 8 mm	453.83	427.11	437.88	432.13	427.70	435.73
-3.00 to -2.50; 5.6 mm	220.54	220.77	209.24	216.59	213.31	216.09
-2.50 to -2.00; 4 mm	165.41	159.69	165.85	162.36	171.96	165.05
-2.00 to -1.50; 2.8 mm	86.12	87.87	85.09	86.44	86.33	86.37
-1.50 to -1.00; 2 mm	42.37	41.50	41.66	41.90	41.43	41.77
-1.00 to -0.50; 1.4 mm	18.13	18.48	18.27	19.38	19.41	18.73
-0.50 to 0.00; 1.0 mm	0.44	0.34	0.47	0.43	0.63	0.46
>1.0mm	1038.34	1007.83	1006.58	1007.69	1007.73	1013.63
<1.0mm	Base Pan	0.24	0.35	0.31	0.38	0.37
	Oven dried	501.62	500.32	500.61	500.58	499.62
	Total	501.86	500.67	500.92	500.96	500.18
Total Weight	1540.20	1508.50	1507.50	1508.65	1507.91	1514.55
% increase/ decrease	-0.01	-0.01	-0.01	-0.02	-0.01	-0.01

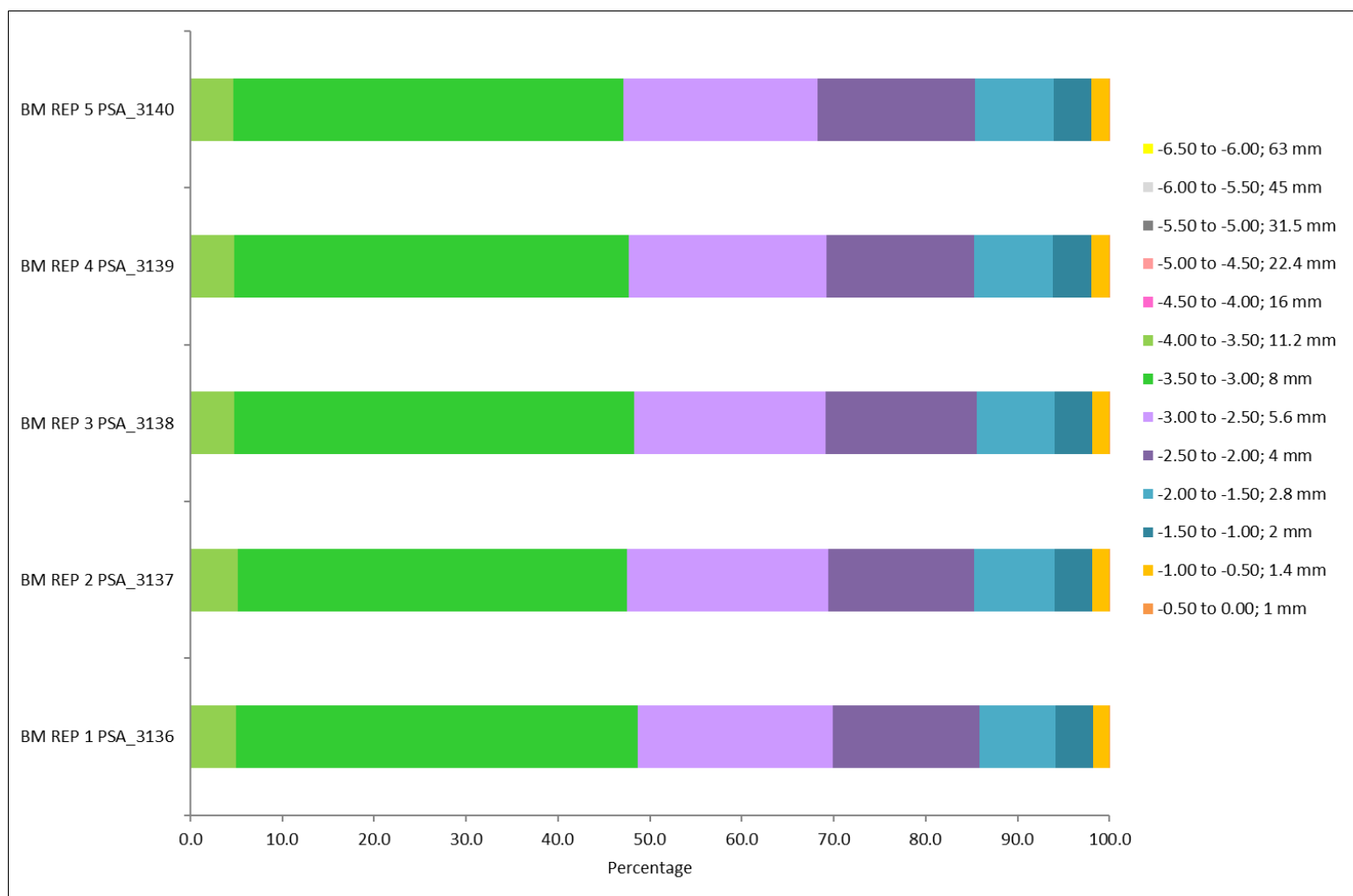


Figure 1 Bar charts resulting from sieve (>1mm) analysis of 5 replicate samples of sediment distributed as PS97 (Benchmark Data)

Table 3 Summary of the final laser data for the Benchmark replicates distributed as PS97.

Phi Interval; microns	PSA_3236 BM REP 1	PSA_3237 BM REP2	PSA_3238 BM REP 3	PSA_3239 BM REP 4	PSA_3240 BM REP 5	BM Rep Average
0.00 to 0.50; (707 μm)	50.18	49.73	50.79	49.92	50.87	50.30
0.50 to 1.00; (500 μm)	33.44	34.43	33.78	34.30	34.13	34.01
1.00 to 1.50; (353.6 μm)	9.40	9.70	9.33	9.93	9.32	9.54
1.50 to 2.00; (250 μm)	2.37	2.37	2.35	2.41	2.28	2.36
2.00 to 2.50; (176.8 μm)	0.92	0.94	0.97	0.99	0.90	0.94
2.50 to 3.00; (125 μm)	0.43	0.43	0.47	0.41	0.41	0.43
3.00 to 3.50; (88.39 μm)	0.30	0.29	0.33	0.30	0.29	0.30
3.50 to 4.00; (62.5 μm)	0.26	0.20	0.22	0.16	0.19	0.21
4.00 to 4.50; (44.19 μm)	0.30	0.22	0.21	0.17	0.18	0.21
4.50 to 5.00; (31.25 μm)	0.34	0.23	0.20	0.18	0.18	0.22
5.00 to 5.50; (22.097 μm)	0.33	0.21	0.18	0.17	0.16	0.21
5.50 to 6.00; (15.625 μm)	0.28	0.18	0.16	0.14	0.14	0.18
6.00 to 6.50; (11.049 μm)	0.25	0.16	0.14	0.13	0.13	0.16
6.50 to 7.00; (7.813 μm)	0.19	0.13	0.11	0.11	0.11	0.13
7.00 to 7.50; (5.524 μm)	0.16	0.11	0.10	0.09	0.09	0.11
7.50 to 8.00; (3.906 μm)	0.13	0.10	0.09	0.08	0.08	0.10
8.00 to 8.50; (2.762 μm)	0.10	0.07	0.07	0.06	0.07	0.07
8.50 to 9.00; (1.953 μm)	0.08	0.06	0.06	0.05	0.05	0.06
9.00 to 9.50; (1.381 μm)	0.08	0.06	0.06	0.05	0.05	0.06
9.50 to 10.00; (0.977 μm)	0.08	0.06	0.06	0.05	0.06	0.06
10.00 to 10.50; (0.691 μm)	0.08	0.06	0.06	0.06	0.06	0.07
10.50 to 11.00; (0.488 μm)	0.08	0.06	0.06	0.06	0.06	0.06
11.00 to 11.50; (0.345 μm)	0.07	0.06	0.05	0.05	0.05	0.06
11.50 to 12.00; (0.244 μm)	0.06	0.05	0.05	0.05	0.05	0.05
12.00 to 12.50; (0.173 μm)	0.04	0.04	0.04	0.04	0.04	0.04
12.50 to 13.00; (0.122 μm)	0.03	0.03	0.03	0.03	0.03	0.03
13.00 to 13.50; (0.086 μm)	0.02	0.02	0.02	0.02	0.02	0.02
13.50 to 14.00; (0.061 μm)	0.01	0.01	0.01	0.01	0.01	0.01
14.00 to 14.50; (0.043 μm)	0.00	0.00	0.00	0.00	0.00	0.00
>14.50; (0.01 μm)	0.00	0.00	0.00	0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00

Summary Data

Mean	678.56	681.00	684.36	681.65	685.47	682.73
Sorting	1.41	1.38	1.38	1.37	1.37	1.38
Skewness	-0.37	-0.32	-0.34	-0.32	-0.32	-0.33
Kurtosis	1.23	1.13	1.13	1.08	1.08	1.13
Mode	Unimodal	Unimodal	Unimodal	Unimodal	Unimodal	Unimodal
Primary Mode	853.5	853.5	853.5	853.5	853.5	853.5

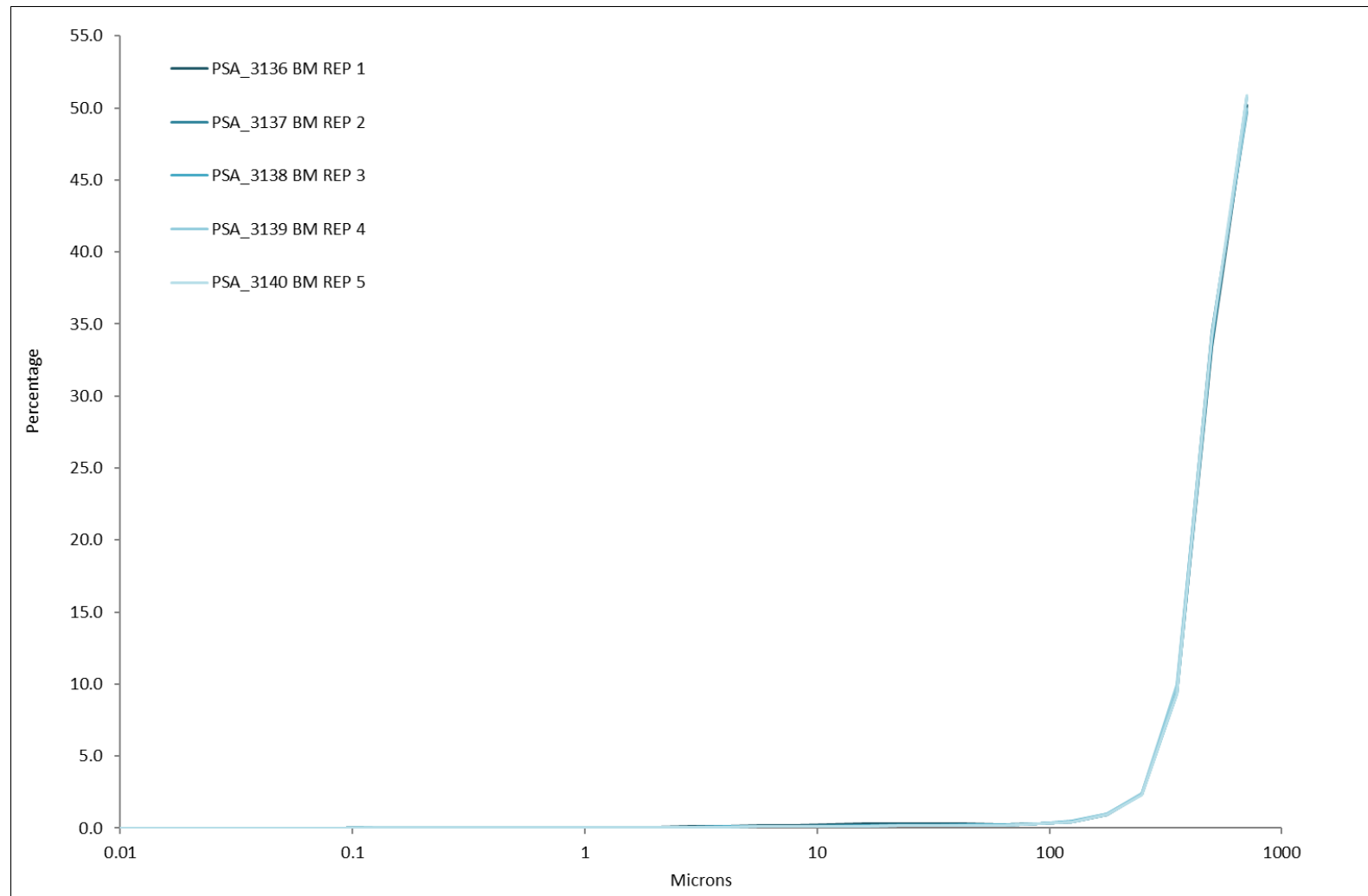


Figure 2 Particle size distribution curves resulting from final laser analysis of 5 replicate samples of sediment distributed as PS97 (Benchmark Data)

Table 4 Summary of Coefficient of Variation for Benchmark laser replicates for PS97.

		PSA_3236 BM REP 1	PSA_3237 BM REP2	PSA_3238 BM REP 3	PSA_3239 BM REP 4	PSA_3140 BM REP 5
D ₁₀	Sub-sample 1	1.97	1.06	1.13	0.60	0.39
	Sub-sample 2	1.45	1.13	1.10	0.72	0.80
	Sub-sample 3	1.52	1.22	0.68	0.66	0.92
D ₅₀	Sub-sample 1	0.24	0.12	0.19	0.05	0.10
	Sub-sample 2	0.17	0.28	0.18	0.15	0.01
	Sub-sample 3	0.47	0.43	0.14	0.14	0.19
D ₉₀	Sub-sample 1	0.05	0.02	0.04	0.01	0.02
	Sub-sample 2	0.03	0.04	0.04	0.02	0.00
	Sub-sample 3	0.06	0.06	0.03	0.02	0.04

$$COV = \left(\frac{StDev}{Mean} \right) * 100$$

ISO 133020 defines good reproducibility when: COV is <3% for D50

COV is <5% for D10 and D90

All limits double when the D50 is <10microns.

In reality 3% and 5% are low and greater variability is expected for natural sediment samples therefore a maximum of 20% (based on three replicates being measured) will be used as a guide.

The Benchmark replicates show good reproducibility.

Table 5 Laser Metadata for the Benchmark replicates for PS97.

	Benchmark Lab
Laser used:	Beckman Coulter LS 13320
Dispersion Unit:	Universal Liquid Module
Analysis model:	Mie
Dispersion Used	Water (RI – 1.33)
Particle Refractive Index	1.55
Particle Absorption Index:	0.1
Fines extension	PIDS system
Obscuration	10%
Pump Speed (% or rpm)	80%
Stirrer speed (% or rpm)	n/a
Ultrasonic duration	20
Ultrasonic level	2

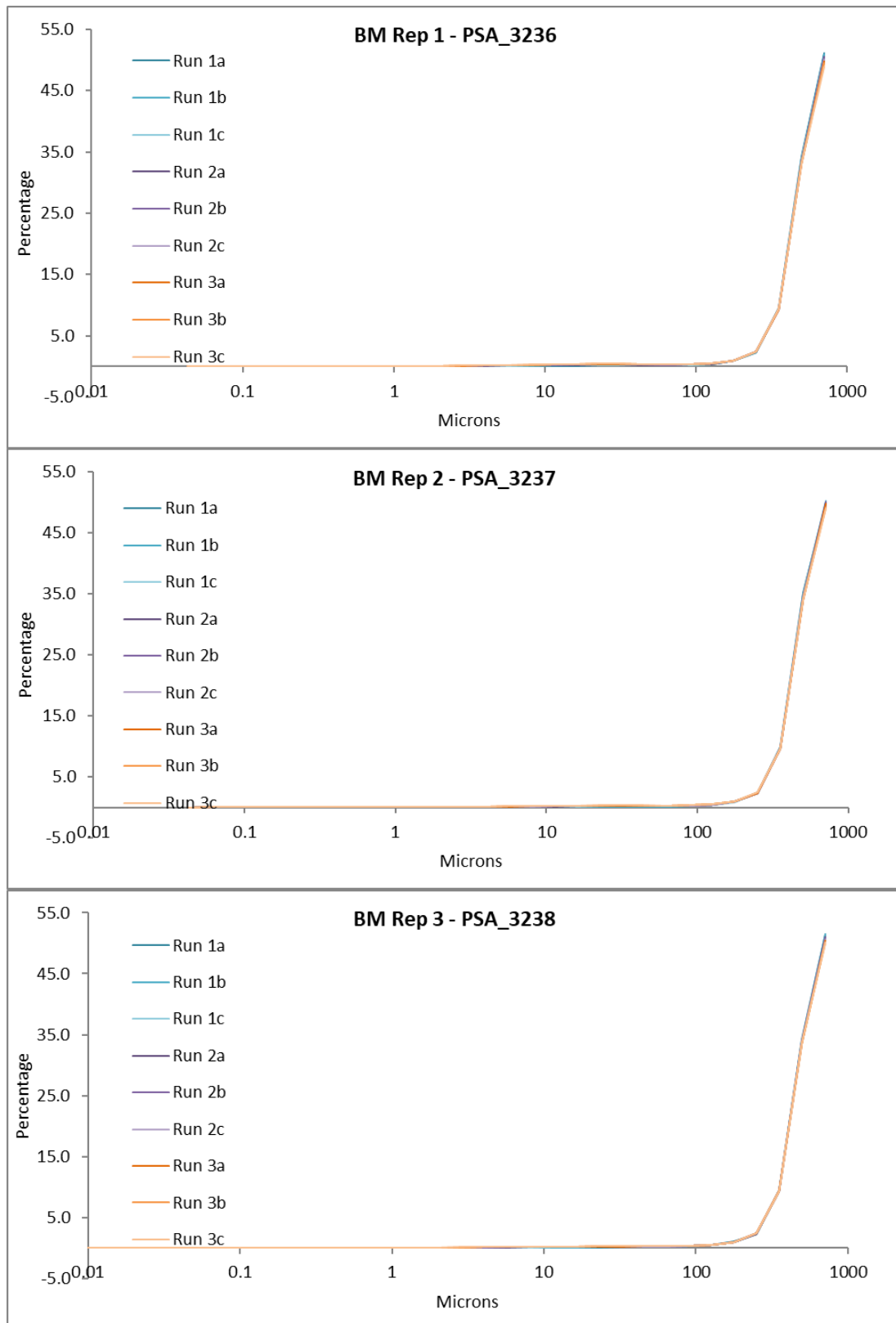


Figure 3 Particle size distribution curves resulting from laser analysis of five replicate samples of sediment distributed as PS97.

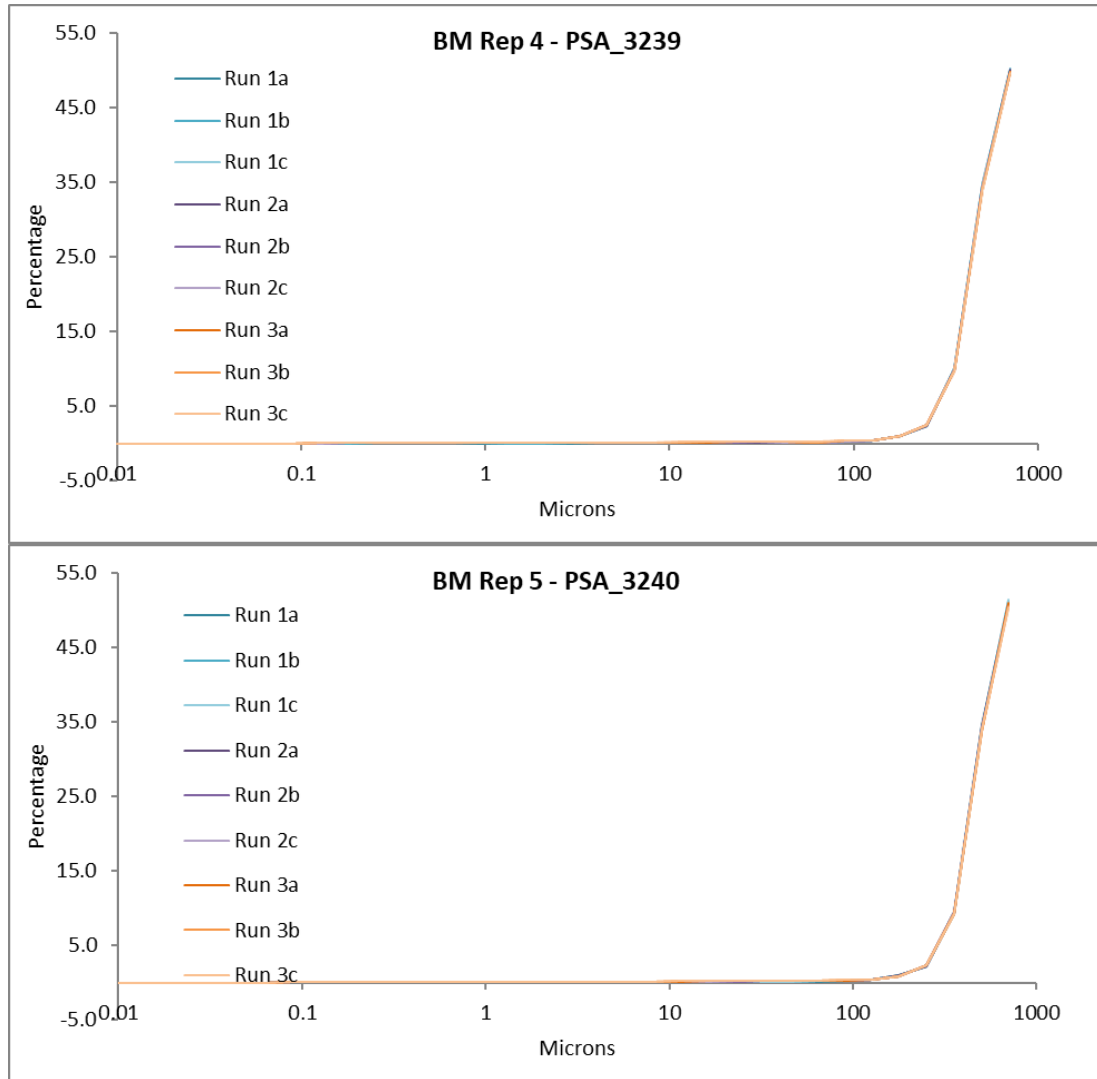


Figure 3 Particle size distribution curves resulting from laser analysis of five replicate samples of sediment distributed as PS97.

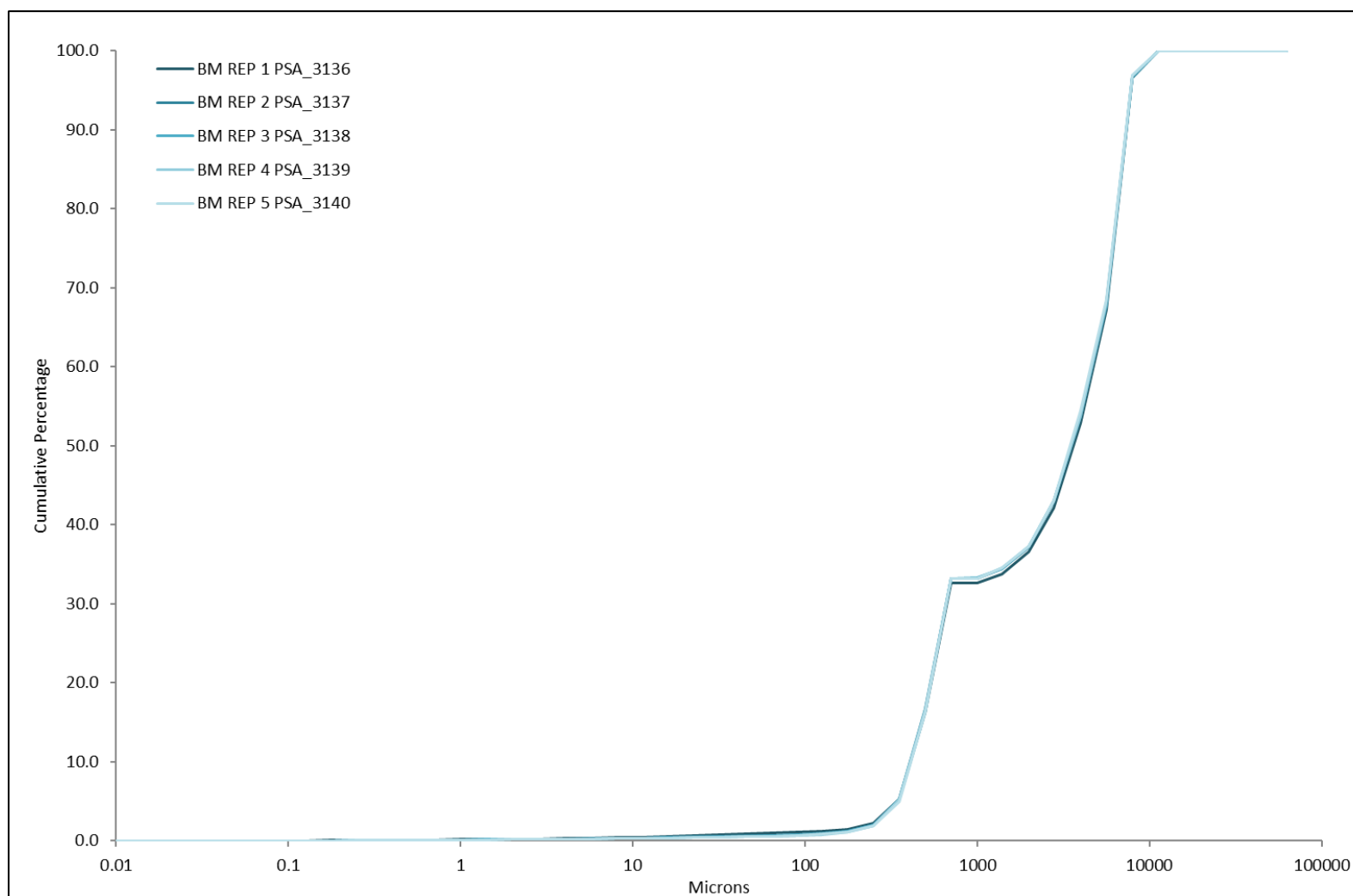


Figure 4 Particle size distribution curves resulting from analysis of 5 replicate samples of sediment distributed as PS97 (Benchmark Data).

2. PARTICIPANT DATA

Table 6 Summary of equipment and methods used by participants and sample summary data provided by participants for sediment distributed as PS97.

Lab	Equipment Used		Method Used	Chemical Dispersant	Peroxide pre-treatment	Summary Data			Sediment Description	
	Sieves	Laser				% Gravel	% Sand	% Mud	(post analysis)	Gradistat Textural Group
BM Average	Yes	Yes	NMBAQC	No	No	65.66	33.71	0.63	Sandy Gravel	Sandy Gravel
PSA_3201	Yes	Yes	NMBAQC	No	No	66.83	6.56	0.00	Sandy Gravel	Sandy Gravel
PSA_3204	Yes	Yes	NMBAQC	No	No	66.83	33.42	0.00	Sandy Gravel	Sandy Gravel
PSA_3206_a	Yes	Yes	NMBAQC	No	No	65.98	26.62	7.40	Muddy Sandy Gravel	Muddy Sandy Gravel
PSA_3206_b	Yes	Yes	NMBAQC	No	No	65.98	34.02	0.00	Sandy Gravel	Sandy Gravel
PSA_3207	Yes	Yes	NMBAQC	No	No	65.82	34.18	0.00	Sandy Gravel	Sandy Gravel
PSA_3208	Yes	Yes	NMBAQC	No	No	66.30	33.70	0.00	Sandy Gravel	Sandy Gravel
PSA_3209	Yes	Yes	NMBAQC	No	No	65.40	34.60	0.00	Sandy Gravel	Sandy Gravel
PSA_3210	Yes	Yes	NMBAQC	No	No	52.44	47.56	0.00	Fine sandy gravel	Sandy Gravel
PSA_3211	Yes	Yes	NMBAQC	No	No	66.92	33.08	0.00	Sandy Gravel	Sandy Gravel
PSA_3212	Yes	Yes	NMBAQC	No	No	67.10	32.90	0.00	Sandy Gravel	Sandy Gravel
PSA_3213	Yes	Yes	NMBAQC	No	No	65.63	33.71	0.66	Coarse sediment	Sandy Gravel
PSA_3214	Yes	Yes	NMBAQC	No	No	65.63	34.02	0.34	Sandy Gravel	Sandy Gravel
PSA_3215	Yes	Yes	NMBAQC	No	No	65.41	34.02	0.57	Sandy Gravel	Sandy Gravel

Table 7 Summary of the sieve data provided by participants for sediment distributed as PS97.

Phi interval (explicit); Sieve mesh (mm)	BM Average	PSA_3201	PSA_3204	PSA_3206	PSA_3207	PSA_3208	PSA_3209	PSA_3210	PSA_3211	PSA_3212	PSA_3213	PSA_3214	PSA_3215
Starting weight (>1.0mm)	1014.13	1378.21	993.82	1521.52	1003.70	979.94	1001.90	1163.00	953.00	986.41	966.49	1010.02	1005.37
-6.50 to -6.00; 63 mm	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-6.00 to -5.50; 45 mm	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-5.50 to -5.00; 31.5 mm	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-5.00 to -4.50; 22.4 mm	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-4.50 to -4.00; 16 mm	0.00	0.00	11.48	0.00	0.00	0.000	0.00	81.33	3.62	0.00	0.00	0.00	0.00
-4.00 to -3.50; 11.2 mm	49.42	87.15	37.90	54.47	56.567	51.269	54.36	426.27	77.53	50.18	50.40	71.31	42.47
-3.50 to -3.00; 8 mm	435.73	353.74	405.39	421.80	391.267	393.369	396.20	228.20	390.40	411.36	403.22	413.84	424.97
-3.00 to -2.50; 5.6 mm	216.09	226.24	247.89	233.78	262.467	252.786	223.24	143.53	196.60	228.63	220.68	226.51	215.81
-2.50 to -2.00; 4 mm	165.05	132.17	142.63	151.36	140.433	135.248	169.04	96.79	150.30	146.81	140.81	148.43	167.95
-2.00 to -1.50; 2.8 mm	86.37	82.31	80.02	101.93	95.333	80.207	91.94	42.19	82.80	85.41	86.95	88.63	91.92
-1.50 to -1.00; 2 mm	41.77	39.38	44.37	40.45	39.067	38.558	48.03	17.06	37.50	40.76	42.41	42.72	42.65
-1.00 to -0.50; 1.4 mm	18.73	14.50	16.07	17.88	16.233	15.742	18.48	3.51	15.30	19.39	18.38	17.53	18.41
-0.50 to 0.00; 1 mm	0.46	0.59	0.44	0.49	0.867	0.888	0.62	117.06	0.80	0.31	0.86	0.63	0.69
Total	1013.63	936.08	986.19	1022.16	1002.23	968.07	1001.90	1155.94	954.85	982.85	963.71	1009.60	1004.87
Summary Data													
>1.00 mm	1013.63	936.08	986.19	1022.16	1002.233	968.07	1001.90	1155.94	954.85	982.85	963.71	1009.60	1004.87
<1.0mm	Base pan	0.37	-	7.91	499.28	-	11.95	7.00	7.06	5.00	3.80	3.19	0.40
	Oven dried	500.55	-	462.27	0.00	494.467	454.95	493.71	811.41	465.90	447.85	472.23	500.74
	Total	500.92	-	470.18	499.28	494.467	466.90	500.71	818.47	470.90	451.65	475.42	501.03
Total Sample Weight	1514.55	936.08	1456.37	1521.44	1496.700	1434.97	1502.60	1974.41	1425.75	1434.50	1439.13	1510.63	1507.03
% increase/ decrease	-0.01	-	0.03	-0.01	-	0.01	0.70	0.00	0.72	0.02	0.04	-0.01	-0.01

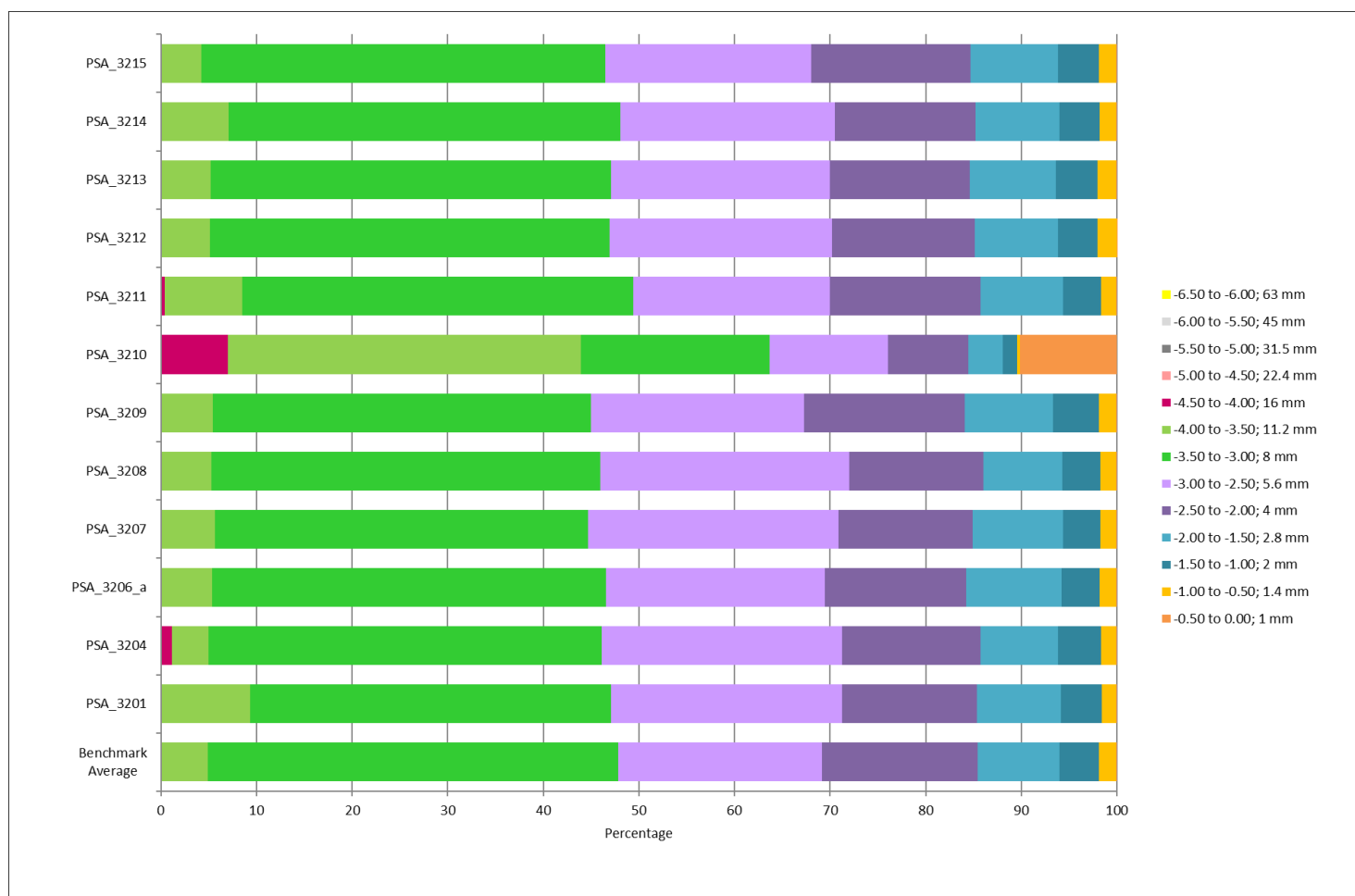


Figure 5 Final sieve data (in percentages) provided by each participant for sediment distributed as PS97.

Table 8 Summary of final laser data for the participants for sediment distributed as PS97 with Gradistat output.

Microns	BM Average	PSA_3201	PSA_3204	PSA_3206_ a	PSA_3206_ b	PSA_3207	PSA_3208	PSA_3109
707	50.30	63.00	48.20	52.43	64.29	54.41	50.83	46.57
500	34.01	19.04	37.16	22.90	25.62	34.88	35.80	36.59
353.6	9.54	10.59	13.74	2.10	9.13	10.24	12.04	15.34
250	2.36	6.27	0.90	0.03	0.66	0.47	0.93	1.50
176.8	0.94	1.10	0.00	0.00	0.00	0.00	0.00	0.00
125	0.43	0.00	0.00	0.00	0.05	0.00	0.11	0.00
88.39	0.30	0.00	0.00	0.00	0.19	0.00	0.19	0.00
62.5	0.21	0.00	0.00	0.00	0.05	0.00	0.10	0.00
44.19	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31.25	0.22	0.00	0.00	0.01	0.00	0.00	0.00	0.00
22.097	0.21	0.00	0.00	0.29	0.00	0.00	0.00	0.00
15.625	0.18	0.00	0.00	1.27	0.00	0.00	0.00	0.00
11.049	0.16	0.00	0.00	1.72	0.00	0.00	0.00	0.00
7.813	0.13	0.00	0.00	2.84	0.00	0.00	0.00	0.00
5.524	0.11	0.00	0.00	2.87	0.00	0.00	0.00	0.00
3.906	0.10	0.00	0.00	1.89	0.00	0.00	0.00	0.00
2.762	0.07	0.00	0.00	2.19	0.00	0.00	0.00	0.00
1.953	0.06	0.00	0.00	1.77	0.00	0.00	0.00	0.00
1.381	0.06	0.00	0.00	1.15	0.00	0.00	0.00	0.00
0.977	0.06	0.00	0.00	1.37	0.00	0.00	0.00	0.00
0.691	0.07	0.00	0.00	1.25	0.00	0.00	0.00	0.00
0.488	0.06	0.00	0.00	0.87	0.00	0.00	0.00	0.00
0.345	0.06	0.00	0.00	1.06	0.00	0.00	0.00	0.00
0.244	0.05	0.00	0.00	0.90	0.00	0.00	0.00	0.00
0.173	0.04	0.00	0.00	0.52	0.00	0.00	0.00	0.00
0.122	0.03	0.00	0.00	0.45	0.00	0.00	0.00	0.00
0.086	0.02	0.00	0.00	0.14	0.00	0.00	0.00	0.00
0.061	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MEAN:	682.73	688.29	679.53	168.66	723.95	702.07	688.94	668.03
SORTING:	1.38	1.41	1.32	9.51	1.30	1.30	1.32	1.33
SKEWNESS:	-0.33	-0.50	-0.20	-0.91	-0.37	-0.26	-0.24	-0.19
KURTOSIS:	1.13	1.10	0.89	5.45	0.99	0.89	0.90	0.88
MODE:	Unimodal	Unimodal	Unimodal	Unimodal	Unimodal	Unimodal	Unimodal	Unimodal
Primary Mode	853.50	853.50	853.50	853.5	853.5	853.5	853.5	853.5

Table 8 Summary of final laser data for the participants for sediment distributed as PS97 with Gradistat output.

Microns	Benchmark Average	PSA_3210	PSA_3211	PSA_3212	PSA_3213	PSA_3214	PSA_3215
707	50.30	47.45	50.96	53.45	53.54	54.12	51.69
500	34.01	36.96	37.97	34.87	31.54	32.83	33.16
353.6	9.54	14.25	8.69	11.00	8.62	8.65	9.22
250	2.36	1.34	2.09	0.68	2.32	1.77	2.33
176.8	0.94	0.00	0.30	0.00	1.01	0.89	0.95
125	0.43	0.00	0.00	0.00	0.47	0.41	0.45
88.39	0.30	0.00	0.00	0.00	0.34	0.19	0.31
62.5	0.21	0.00	0.00	0.00	0.18	0.11	0.19
44.19	0.21	0.00	0.00	0.00	0.19	0.14	0.20
31.25	0.22	0.00	0.00	0.00	0.12	0.11	0.18
22.097	0.21	0.00	0.00	0.00	0.18	0.10	0.16
15.625	0.18	0.00	0.00	0.00	0.10	0.09	0.14
11.049	0.16	0.00	0.00	0.00	0.10	0.07	0.13
7.813	0.13	0.00	0.00	0.00	0.15	0.06	0.11
5.524	0.11	0.00	0.00	0.00	0.16	0.05	0.10
3.906	0.10	0.00	0.00	0.00	0.14	0.04	0.09
2.762	0.07	0.00	0.00	0.00	0.12	0.03	0.07
1.953	0.06	0.00	0.00	0.00	0.11	0.03	0.06
1.381	0.06	0.00	0.00	0.00	0.10	0.03	0.06
0.977	0.06	0.00	0.00	0.00	0.10	0.03	0.07
0.691	0.07	0.00	0.00	0.00	0.09	0.04	0.07
0.488	0.06	0.00	0.00	0.00	0.08	0.04	0.06
0.345	0.06	0.00	0.00	0.00	0.07	0.04	0.06
0.244	0.05	0.00	0.00	0.00	0.06	0.04	0.05
0.173	0.04	0.00	0.00	0.00	0.05	0.03	0.04
0.122	0.03	0.00	0.00	0.00	0.04	0.02	0.03
0.086	0.02	0.00	0.00	0.00	0.03	0.02	0.02
0.061	0.01	0.00	0.00	0.00	0.01	0.01	0.01
0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.00	0.00			0.00	0.00	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MEAN:	682.73	778.91	693.66	698.06	691.02	696.54	686.84
SORTING:	1.38	1.45	1.31	1.31	1.39	1.34	1.37
SKEWNESS:	-0.33	-0.09	-0.23	-0.26	-0.38	-0.32	-0.34
KURTOSIS:	1.13	0.91	0.93	0.90	1.17	0.99	1.11
MODE:	Unimodal	Unimodal	Unimodal	Unimodal	Unimodal	Unimodal	Unimodal
Primary Mode	853.50	853.5	853.5	853.5	853.5	853.5	853.5

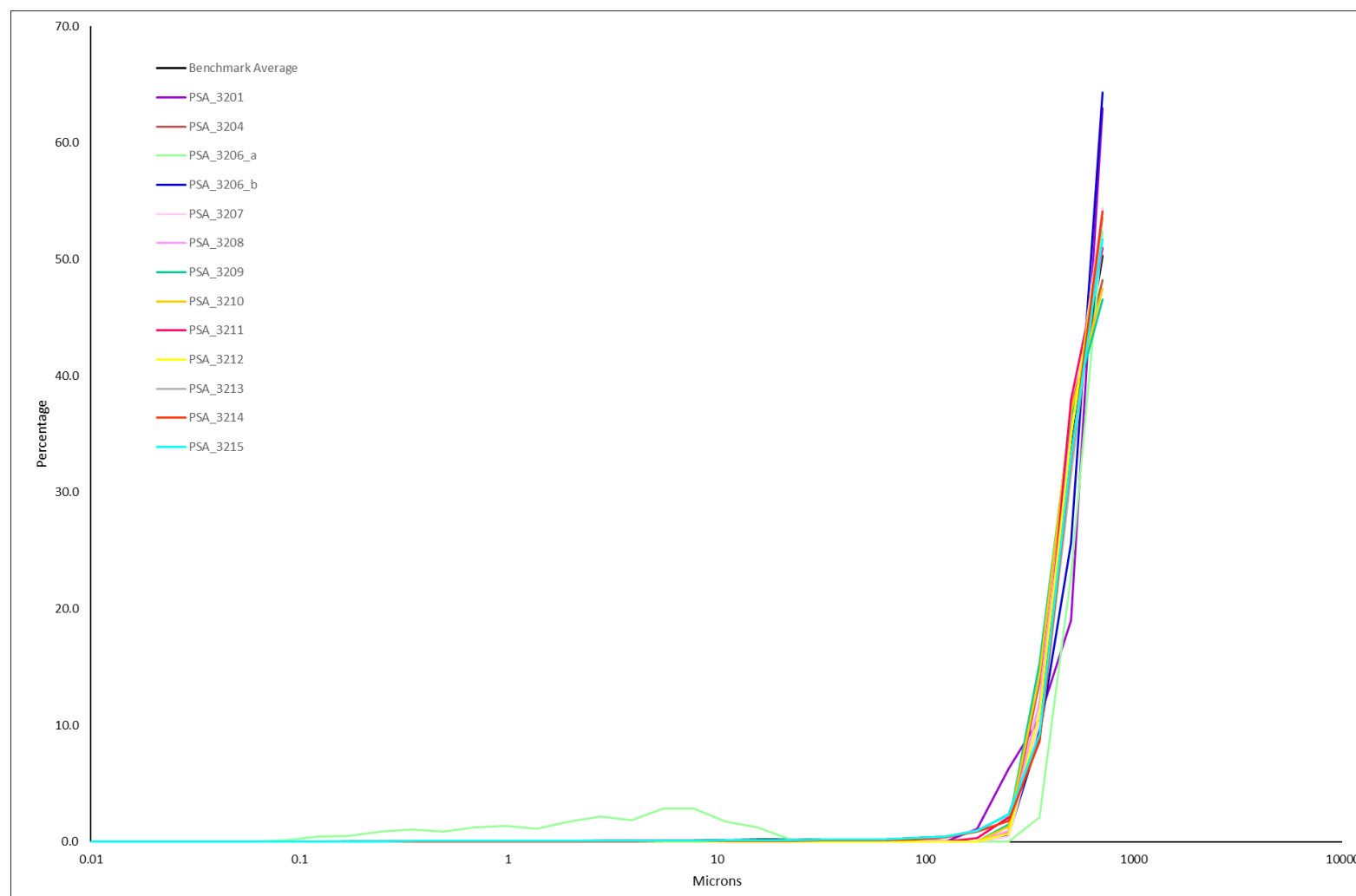


Figure 6 Final laser data (in percentages) provided by each participant and the Benchmark average for sediment distributed as PS97.

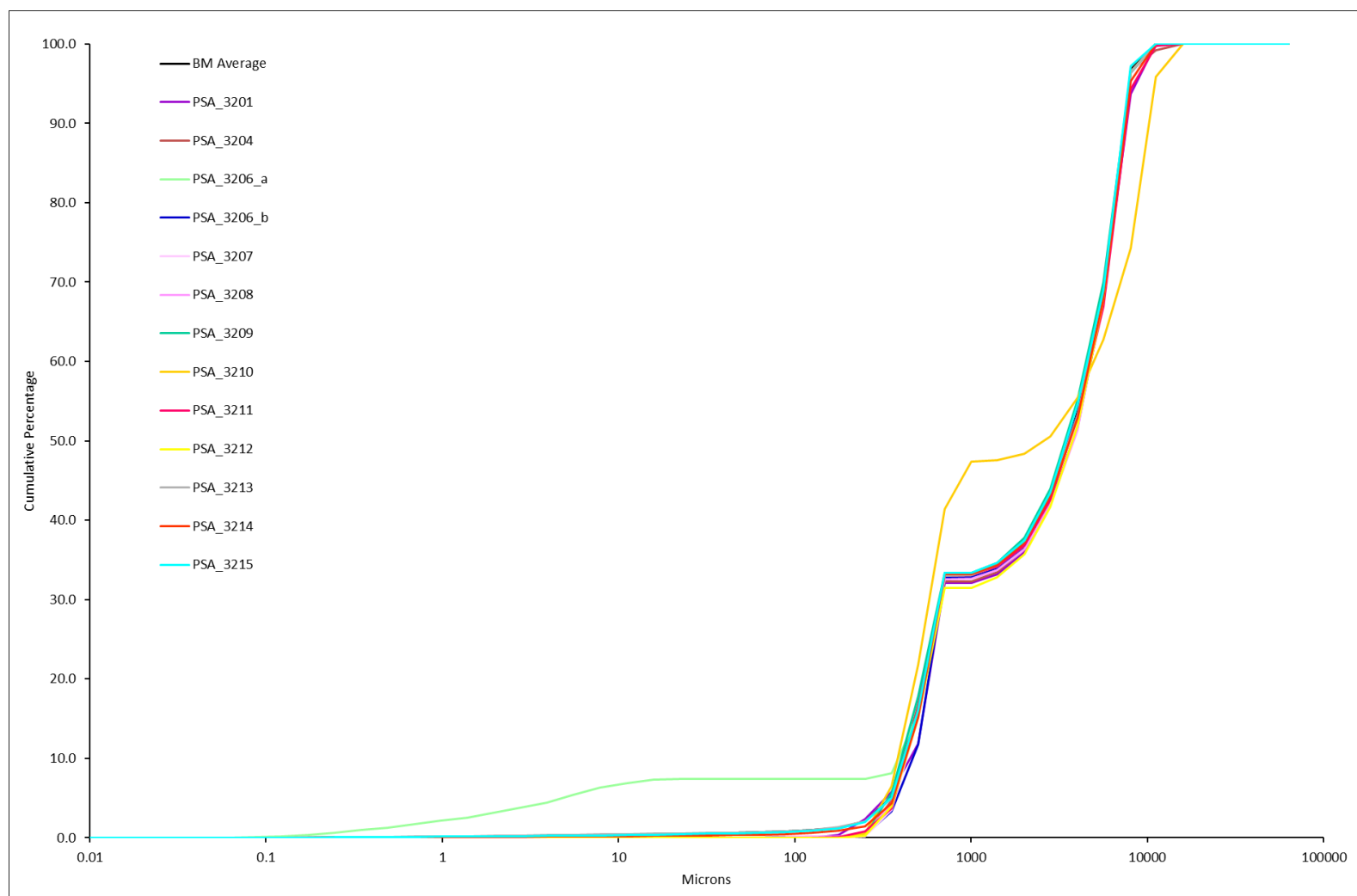


Figure 7 Particle size distribution curves from all participating laboratories and the Benchmark average for sediment distributed as PS97.

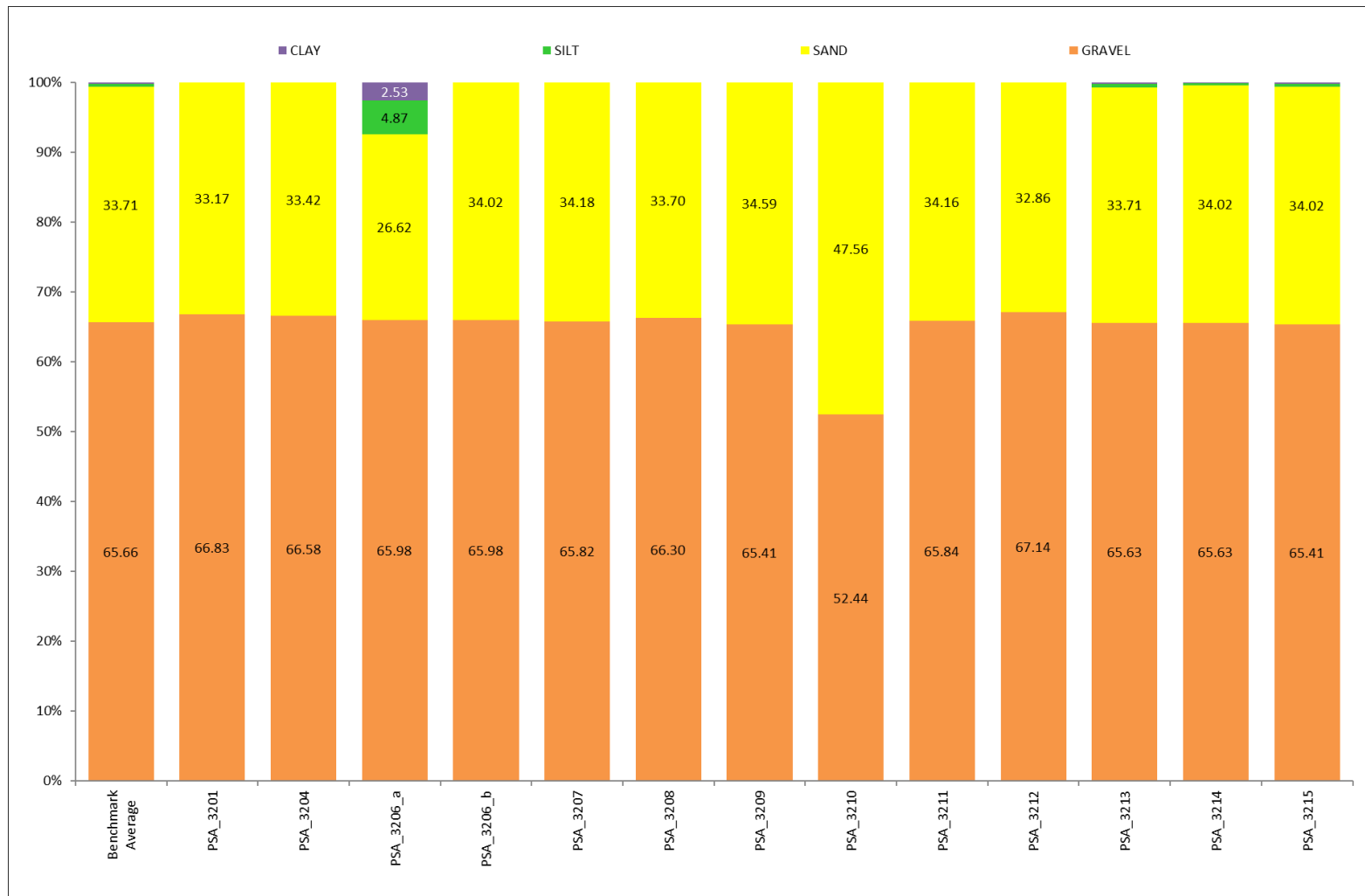
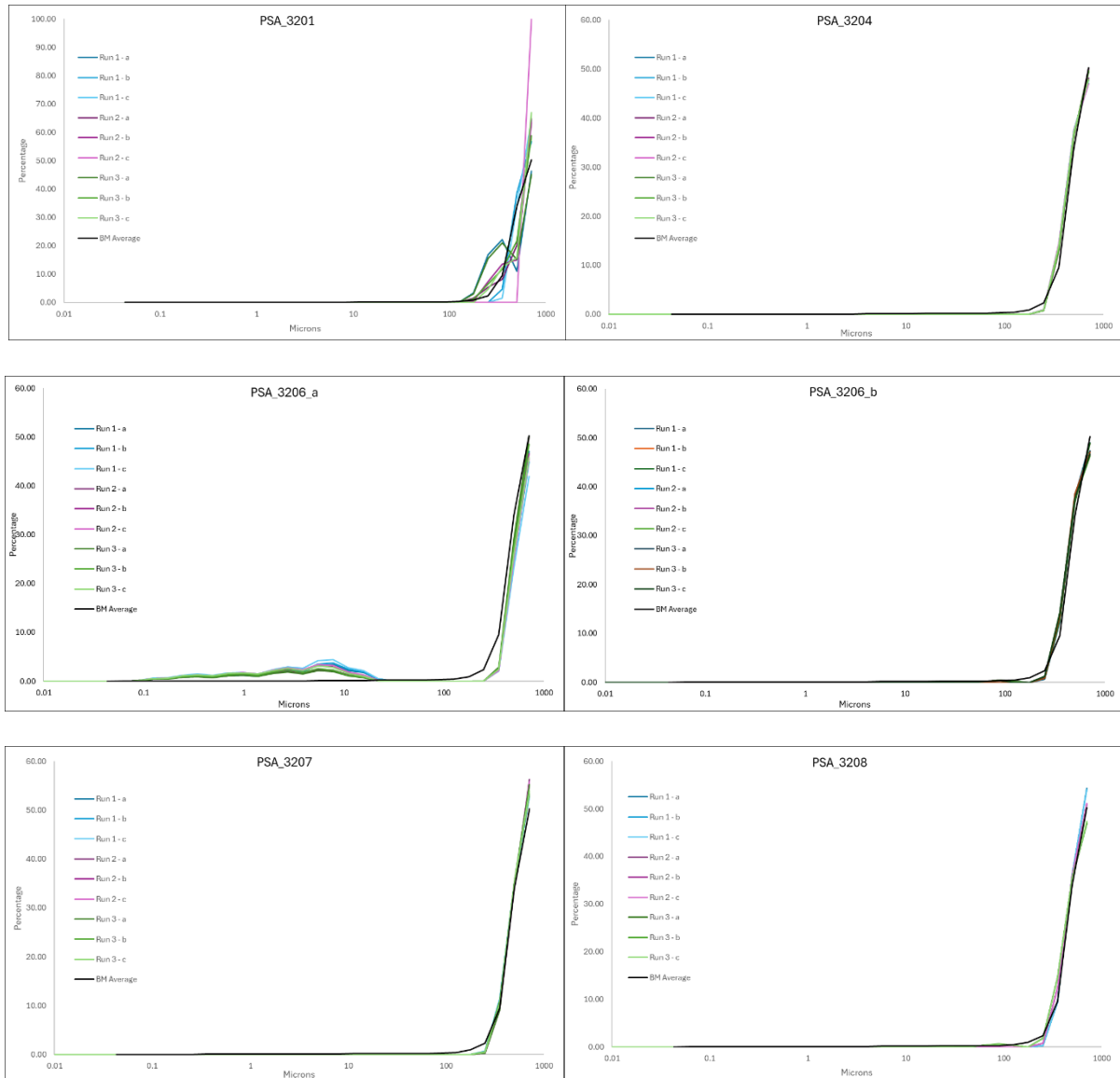


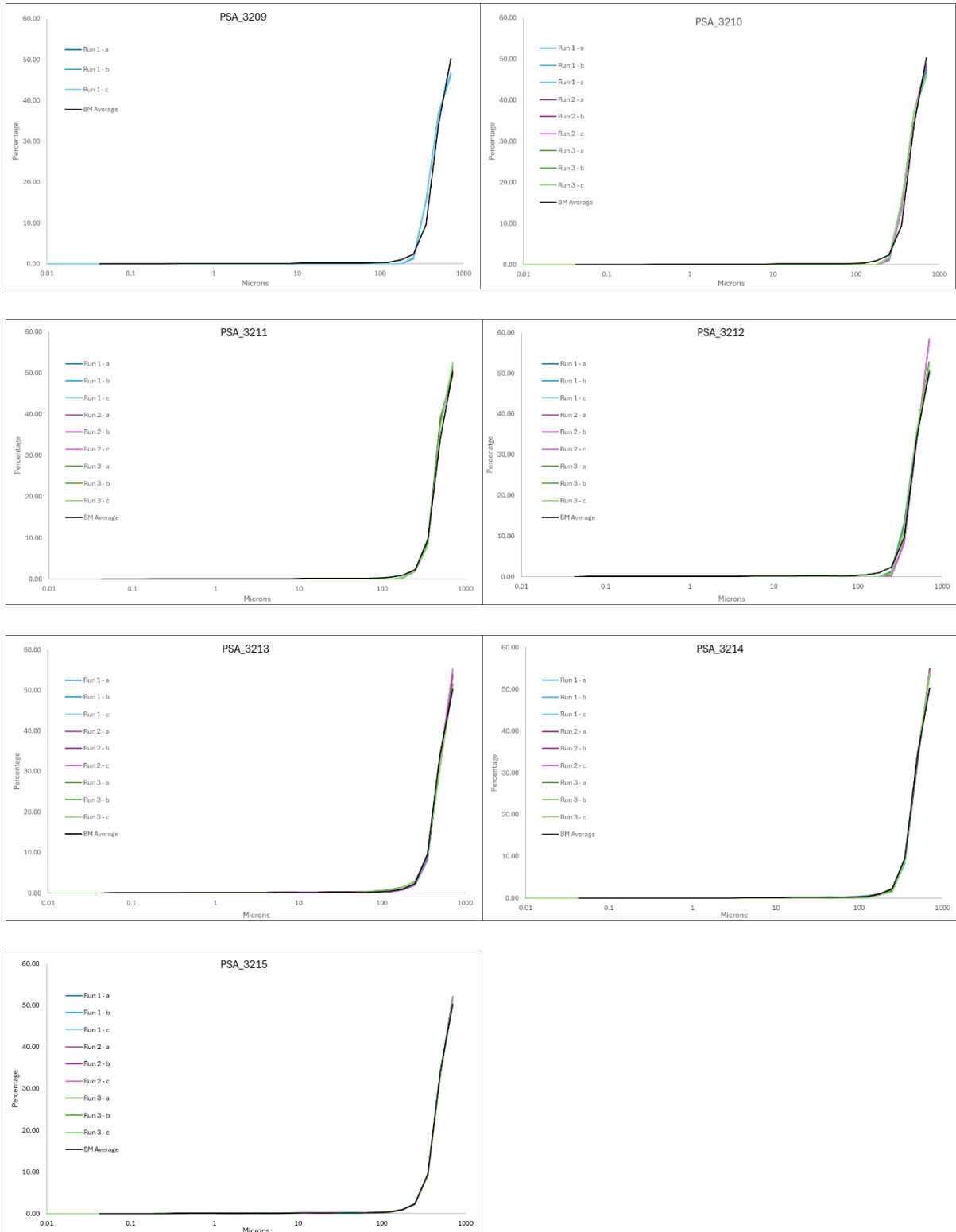
Figure 8 Bar charts showing the percentage gravel, sand, silt and clay recorded by each participating laboratory and the Benchmark average for PS97.

3. APPENDICES

Appendix 1 – Participant Laser Replicate Graphs

Benchmark and Participant laser replicate data can be found in the associated embedded Excel file – PS97 Appendix 1.





Appendix 2 – Gradistat output of size categories based on final merged data provided by each participant and the Benchmark Average for sediment distributed as PS97.

Data can be found in the associated embedded Excel file – PS97 Appendix 2.

Appendix 3 – Benchmark Lab and Participant Final Merged Data for sediment distributed as PS97.

Data can be found in the associated embedded Excel file – PS97 Appendix 3.

Appendix 4 – Individual comparison of participant and Benchmark sieve data for sediment distributed as PS97.

Data can be found in the associated embedded Excel file – PS97 Appendix 4.

