NMBAQC

The National Marine Biological Analytical Quality Control Scheme

Particle Size Report - PS60

Particle Size Component 2016/17

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APEM

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BENCHMARK DATA

Table 1. Summary data for the benchmark replicates distributed as PS60.

	Method	% Gravel	% Sand	% Mud	Sediment Description (Post analysis)
BM REPLICATE 1	NMBAQC	0.00	22.02	77.98	Sandy Mud
BM REPLICATE 2	NMBAQC	0.00	21.98	78.02	Sandy Mud
BM REPLICATE 3	NMBAQC	0.00	20.60	79.40	Sandy Mud
BM REPLICATE 4	NMBAQC	0.00	19.45	80.55	Sandy Mud
BM REPLICATE 5	NMBAQC	0.00	21.61	78.39	Sandy Mud
REP AVERAGE	NMBAQC	0.00	21.13	78.87	Sandy Mud

Table 2. Summary of equipment used and sieve data for the benchmark replicates distributed as PS60.

	Sieves used	Phi; sieve mesh		Total Weight (g)	Laser used
		Weight (g) < 0.00; >1 mm	Weight (g) > 0.00; <1 mm		
BM REPLICATE 1	☒	-	-	-	☑
BM REPLICATE 2	☒	No Sieve Analysis Required.			☑
BM REPLICATE 3	☒				☑
BM REPLICATE 4	☒				☑
BM REPLICATE 5	☒	-	-	-	☑
BM AVERAGE	☒	-	-	-	☑

Table 3. Summary of final laser data for the benchmark replicates distributed as PS60.

	% Sand			
	Coarse 0 - 1 phi	Medium 1 - 2 phi	Fine 2 - 3 phi	Very Fine 3 - 4 phi
BM REPLICATE 1	0.40	1.99	5.96	13.67
BM REPLICATE 2	0.31	2.02	5.98	13.68
BM REPLICATE 3	0.25	1.91	5.56	12.88
BM REPLICATE 4	0.35	1.77	5.07	12.27
BM REPLICATE 5	0.40	2.15	5.84	13.22
BM AVERAGE	0.34	1.97	5.68	13.14

	% Silt					% Clay
	Very Coarse 4 - 5 phi	Coarse 5 - 6 phi	Medium 6 - 7 phi	Fine 7 - 8 phi	Very Fine 8 - 9 phi	>9 phi
BM REPLICATE 1	20.41	21.13	16.36	9.47	4.24	6.37
BM REPLICATE 2	20.48	21.13	16.16	9.36	4.27	6.62
BM REPLICATE 3	19.88	21.10	16.45	9.90	4.71	7.35
BM REPLICATE 4	20.00	21.47	16.57	9.97	4.83	7.70
BM REPLICATE 5	20.07	20.97	16.25	9.65	4.51	6.93
BM AVERAGE	20.17	21.16	16.36	9.67	4.51	6.99

BENCHMARK DATA

Table 4. Summary of descriptive statistics and coefficient of variance for the benchmark replicates distributed as PS60.

	D10 (µm) Result	D50 (µm) Result	D90 (µm) Result	Mean (µm) Result
BM REPLICATE 1	3.60	24.54	113.92	23.05
BM REPLICATE 2	3.47	24.58	113.59	22.94
BM REPLICATE 3	3.04	23.03	108.96	21.37
BM REPLICATE 4	2.88	22.42	104.32	20.54
BM REPLICATE 5	3.25	23.91	113.73	22.32
Mean	3.25	23.70	110.91	22.04
Standard Deviation	0.30	0.95	4.22	1.08
Coefficient of Variance (COV)	9.10	4.00	3.81	4.88

$$COV = 100 * (\frac{Std\ Dev}{Mean})$$

Good repoducibility when: - COV < 3% for D50
-COV < 5% for D10 and D90

All limits double when the D50 < 10 µm.

Benchmark replicates distributed as PS60 show a COV of 4.00% for the D_{50}, 9.10% for the D_{10} and 3.81% for the D_{90}.
The D10 and D50 are slightly above the reproducibilty limits, however this would be expected with natural sediments such as PS60.

The replicates show good reproducibility.

Figure 1. Scatterplot of Benchmark Data for PS60 with error bars showing ± 1 SD.

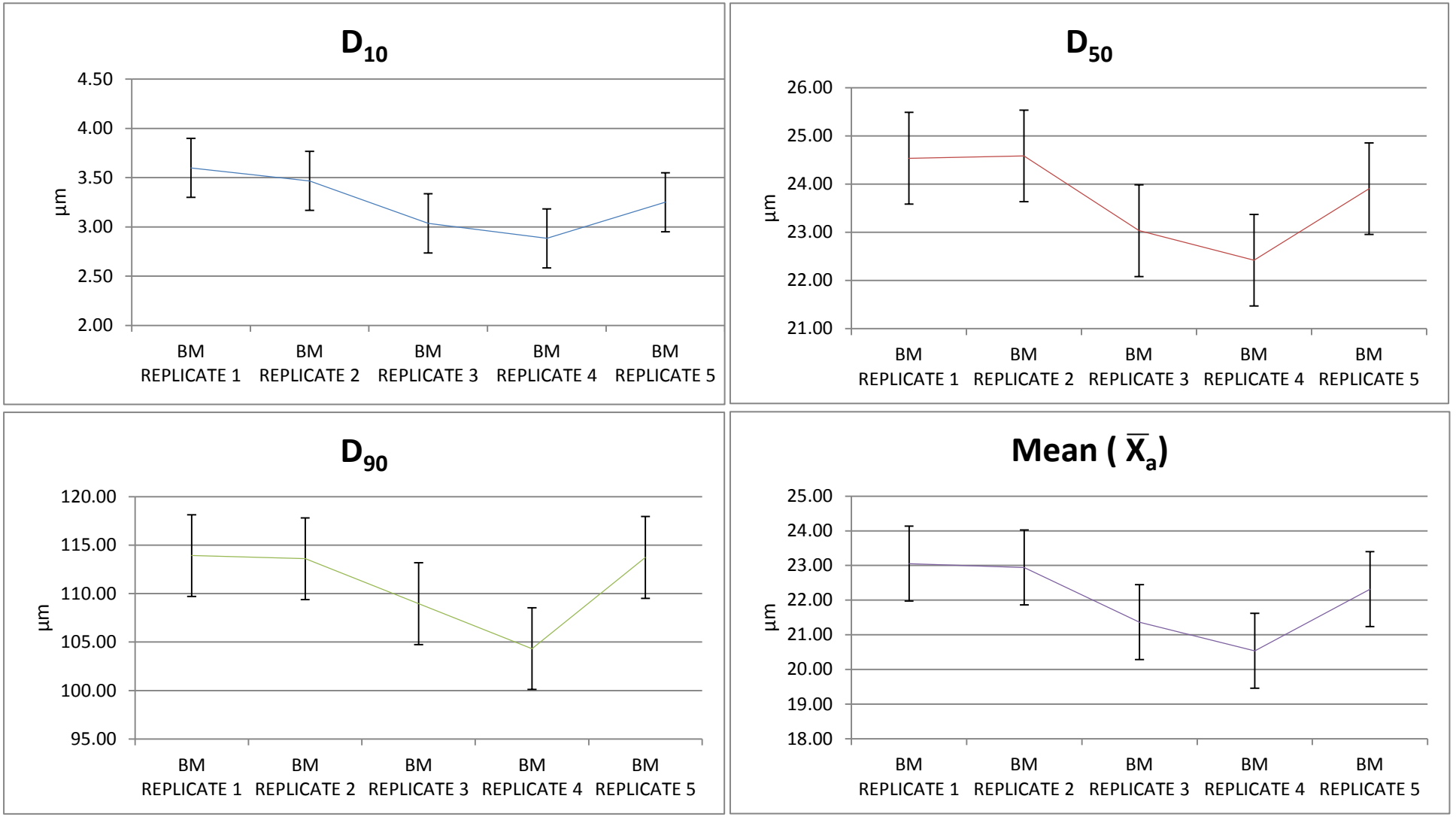
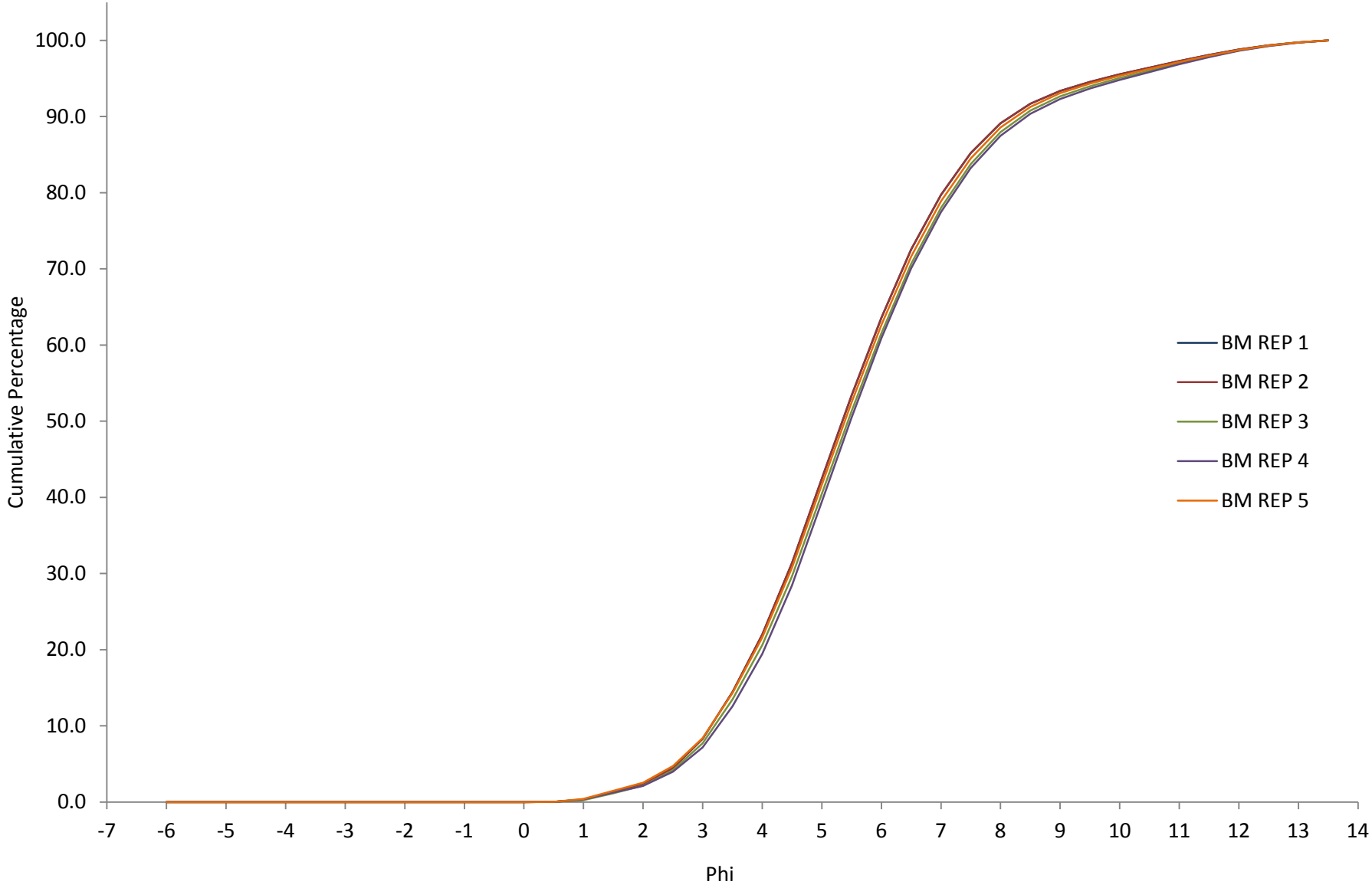


Figure 2. Particle size distribution curves resulting from analysis of 5 replicate samples of sediment distibuted as PS60 (Benchmark Data).



PARTICIPANT DATA

Table 5. Summary of equipment and methods used by participants and sample summary data for sediment distributed as PS60.

Lab	Equipment Used		Method Used	Chemical Dispersant Used	Peroxide pre-treatment Used	Summary Data			Sediment Description (Post Analysis)
	Sieves	Laser				% Gravel	% Sand	% Mud	
Benchmark Average	NO	YES	NMBAQC	NO	NO	0.00	21.13	78.87	Sandy Mud
PSA_2301	NO	YES	NMBAQC[1]	NO	NO	0.00	23.54	76.46	Sandy Mud
PSA_2302	NO	YES	NMBAQC	NO	NO	0.00	19.97	80.03	Sandy Mud
PSA_2303	NO	YES	NMBAQC	NO	NO	0.00	21.21	78.79	Sandy Mud
PSA_2304	NO	YES	NMBAQC	NO	NO	0.00	23.20	76.80	Sandy Mud
PSA_2305	YES	NO	OTHER[1]	YES[1]	NO	0.00	7.90	92.10	Mud
PSA_2306	NO	YES	NMBAQC	NO	NO	0.00	20.69	79.31	Sandy Mud
PSA_2307	NO	YES	NMBAQC	NO	NO	0.00	11.63	88.37	Sandy Mud
PSA_2308	NO	YES	NMBAQC	NO	NO	0.00	22.10	77.90	Sandy Mud
PSA_2309	NO	YES	NMBAQC	NO	NO	0.00	22.33	77.67	Sandy Mud
PSA_2310	NO	YES	OTHER[2]	NO	NO	0.00	21.53	78.47	Sandy Mud
PSA_2311	NO	YES	NMBAQC	NO	NO	0.00	22.74	77.26	Sandy Mud
PSA_2312	NO	YES	NMBAQC	NO	NO	0.00	24.20	75.80	Sandy Mud
PSA_2313	NO	YES	NMBAQC	NO	NO	0.00	23.09	76.91	Sandy Mud
PSA_2320	NO	YES	NMBAQC	NO	NO	0.00	38.81	61.19	Sandy Mud

OTHER[1] - Pippette method following British Standard methodology

OTHER[2] - In-house methodology - no details supplied

NMBAQC[1] - Incorporating BS1377: 1990 Parts 1-2 (sieving) and BS13320: 2009 (laser diffraction).

YES[1] - sodium hexametaphosphate

PARTICIPANT DATA

Table 6. Raw sieve data (weight in grams) provided by participants for sediment distributed as PS60.

		Participant													
Phi interval (explicit) + sieve mesh	Benchmark Average	PSA_2301	PSA_2302	PSA_2303	PSA_2304	PSA_2305	PSA_2306	PSA_2307	PSA_2308	PSA_2309	PSA_2310	PSA_2311	PSA_2312	PSA_2313	PSA_2320
-6.50 to -6.00; 63 mm	-	-	-		-	-	-	-	-	-	-	-	-	-	-
-6.00 to -5.50; 45 mm	-	-	-		-	-	-	-	-	-	-	-	-	-	-
-5.50 to -5.00; 31.5 mm	-	-	-		-	-	-	-	-	-	-	-	-	-	-
-5.00 to -4.50; 22.4 mm	-	No Sieve Analysis Required													-
-4.50 to -4.00; 16 mm	-														-
-4.00 to -3.50; 11.2 mm	-														-
-3.50 to -3.00; 8 mm	-														-
-3.00 to -2.50; 5.6 mm	-														-
-2.50 to -2.00; 4 mm	-														-
-2.00 to -1.50; 2.8 mm	-														-
-1.50 to -1.00; 2 mm	-	-	-		-	-	-	-	-	-	-	-	-	-	-
-1.00 to -0.50; 1.4 mm	-	-	-		-	-	-	-	-	-	-	-	-	-	-
-0.50 to 0.00; 1 mm	-	-	-		-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-		-	-	-	-	-	-	-	-	-	-	-
Summary Data															
< 0.00; >1 mm	-	-	-		-	-	-	-	-	-	-	-	-	-	-
> 0.00; <1 mm	-	-	-		-	-	-	-	-	-	-	-	-	-	-
Total Sample Weight	-	-	-		-	-	-	-	-	-	-	-	-	-	-

Table 7. Summary of final laser data for the participants for sediment distributed as PS60.

Phi interval; (sieve mesh (µm))	Benchmark Average	PSA_2301	PSA_2302	PSA_2303	PSA_2304	PSA_2305	PSA_2306	PSA_2307	PSA_2308	PSA_2309	PSA_2310	PSA_2311	PSA_2312	PSA_2313	PSA_2320
0.00 to 0.50; (707 µm)	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.50	0.00	0.00	0.01	0.00
0.50 to 1.00; (500 µm)	0.34	0.43	0.19	0.22	0.42	0.00	0.41	1.11	0.05	0.08	0.62	0.25	0.02	0.35	0.04
1.00 to 1.50; (353.6 µm)	0.96	1.09	0.96	0.27	1.02	0.60	0.99	1.29	0.60	0.75	0.62	0.88	0.47	1.00	1.02
1.50 to 2.00; (250 µm)	1.01	1.72	0.84	0.61	1.07	1.33	1.31	0.81	1.50	1.47	1.10	1.54	1.79	1.15	2.85
2.00 to 2.50; (176.8 µm)	2.06	2.59	1.94	3.13	2.24	1.62	1.88	0.52	2.29	2.30	1.97	2.46	2.98	2.30	4.54
2.50 to 3.00; (125 µm)	3.62	3.99	3.59	4.41	4.40	1.55	3.22	0.88	4.06	3.76	3.79	3.88	4.44	4.09	6.98
3.00 to 3.50; (88.39 µm)	5.88	5.86	5.52	5.40	6.11	1.18	5.31	2.18	5.52	5.92	5.22	5.86	6.39	6.44	10.34
3.50 to 4.00; (62.5 µm)	7.27	7.84	6.93	7.18	7.72	1.43	7.57	4.56	8.08	8.03	7.72	7.81	8.13	7.76	13.03
4.00 to 4.50; (44.19 µm)	9.18	9.53	8.86	9.05	8.79	3.42	9.39	7.59	8.85	9.45	9.64	9.23	9.24	9.52	13.49
4.50 to 5.00; (31.25 µm)	10.99	10.50	10.77	10.01	11.05	1.09	10.49	10.52	11.04	10.20	10.03	10.16	9.96	11.14	11.79
5.00 to 5.50; (22.097 µm)	10.86	10.58	10.72	10.00	10.51	2.01	10.84	12.05	11.06	10.45	11.12	10.70	10.40	10.90	9.26
5.50 to 6.00; (15.625 µm)	10.30	9.99	10.34	9.78	10.19	1.85	10.53	12.08	10.85	10.30	10.37	10.63	10.02	10.33	7.00
6.00 to 6.50; (11.049 µm)	9.04	9.00	9.32	9.22	9.78	2.41	9.76	11.03	10.00	9.63	9.70	9.83	8.94	9.04	5.28
6.50 to 7.00; (7.813 µm)	7.32	7.74	7.73	7.88	7.50	1.38	8.65	9.52	8.92	8.31	8.22	8.35	8.10	7.20	3.93
7.00 to 7.50; (5.524 µm)	5.62	6.25	6.03	6.26	5.93	1.28	7.23	8.24	7.67	6.55	6.62	6.48	6.56	5.36	2.88
7.50 to 8.00; (3.906 µm)	4.05	4.65	4.38	4.67	3.82	1.68	5.56	6.60	5.85	4.72	4.69	4.56	4.83	3.70	2.11
8.00 to 8.50; (2.762 µm)	2.72	3.13	2.93	3.24	2.53	1.09	3.79	5.03	3.07	3.12	2.96	2.90	3.42	2.37	1.61
8.50 to 9.00; (1.953 µm)	1.79	1.90	1.89	2.13	1.44	0.41	2.12	2.88	0.58	1.90	1.79	1.67	1.86	1.50	1.19
9.00 to 9.50; (1.381 µm)	1.27	1.11	1.30	1.39	1.01	75.68	0.83	0.79	0.01	1.09	1.06	0.92	1.04	1.05	0.83
9.50 to 10.00; (0.977 µm)	1.03	0.77	1.02	0.95	0.75	0.00	0.11	0.10	0.00	0.74	0.73	0.65	0.76	0.85	0.63
10.00 to 10.50; (0.691 µm)	0.94	0.69	0.92	0.77	0.70	0.00	0.00	0.76	0.00	0.66	0.81	0.65	0.65	0.79	0.61
10.50 to 11.00; (0.488 µm)	0.91	0.51	0.90	0.72	0.69	0.00	0.00	0.90	0.00	0.48	0.60	0.51	0.00	0.76	0.47
11.00 to 11.50; (0.345 µm)	0.86	0.10	0.86	0.70	0.64	0.00	0.00	0.30	0.00	0.08	0.14	0.10	0.00	0.71	0.11
11.50 to 12.00; (0.244 µm)	0.75	0.00	0.76	0.65	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00
12.00 to 12.50; (0.173 µm)	0.58	0.00	0.59	0.54	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	0.00
12.50 to 13.00; (0.122 µm)	0.42	0.00	0.43	0.42	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.00
13.00 to 13.50; (0.086 µm)	0.26	0.00	0.26	0.40	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.01	100.00	100.00	100.00	100.00	99.99	100.00	100.00

Figure 3. Particle size distribution curves from all participating laboratories and the Benchmark Average for sediment distributed as PS60.

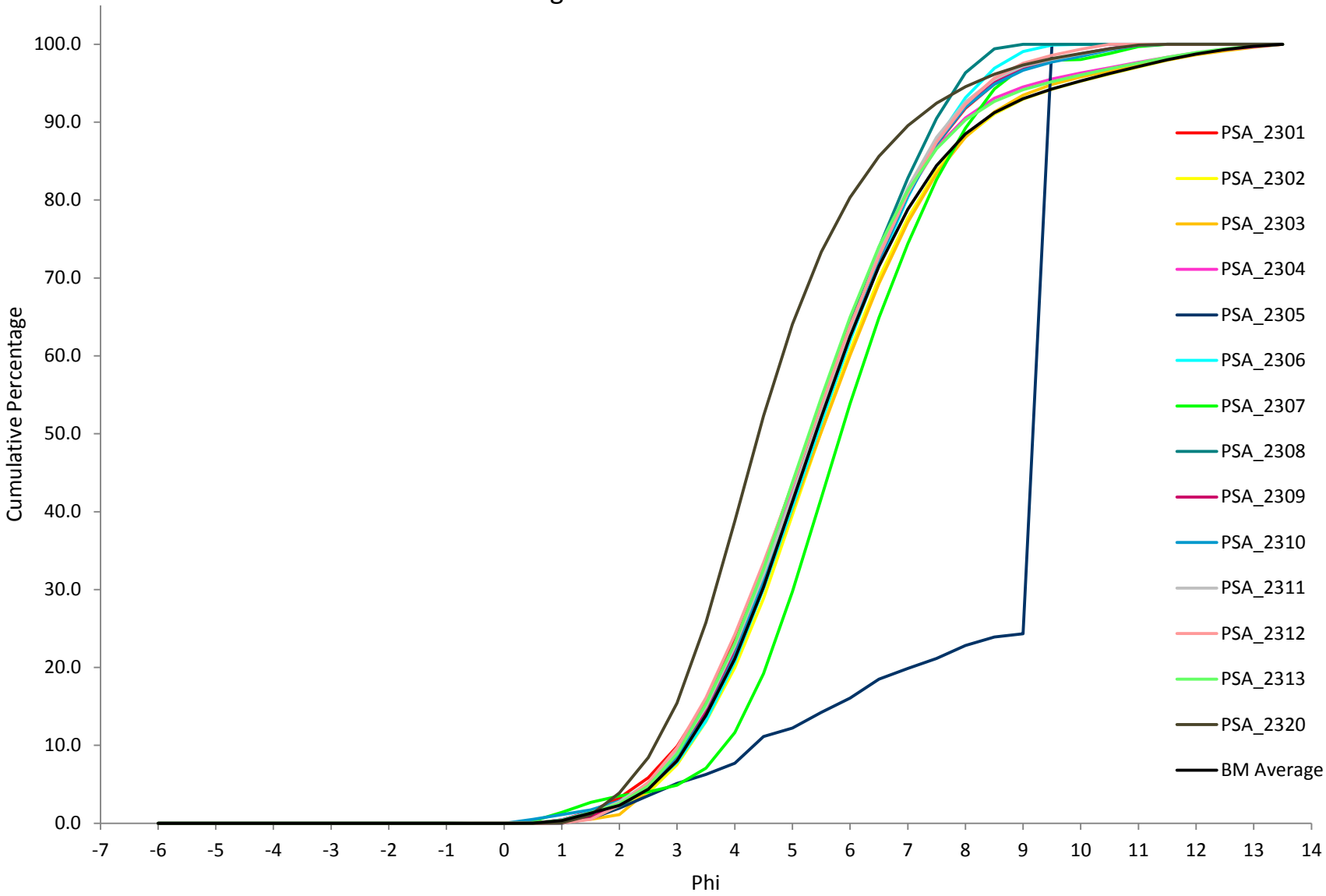


Figure 4. Bar chart showing the percentage sand, silt and clay recorded by each participating laboratory and the benchmark average for PS60.

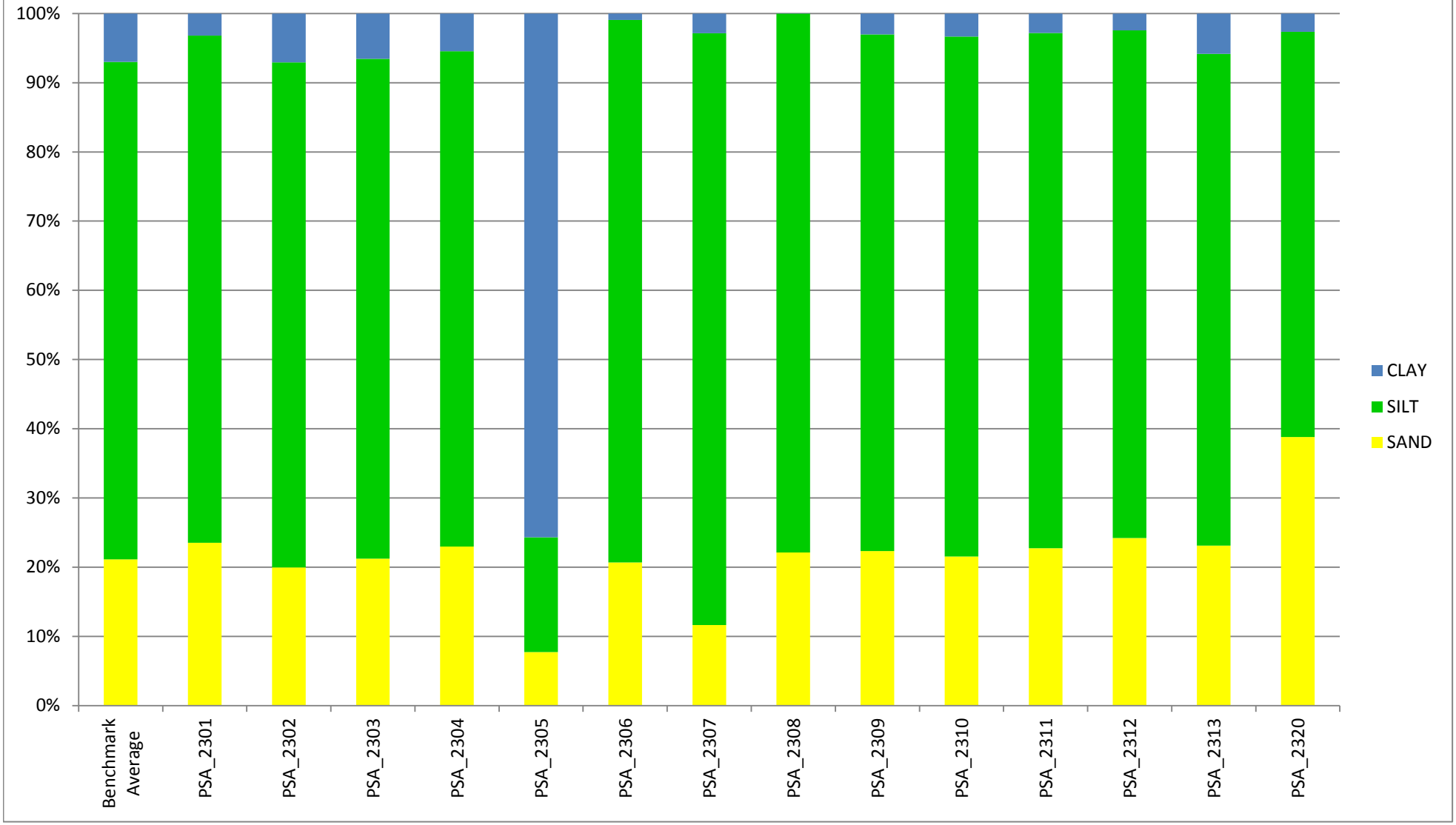


Figure 5. Bar chart showing the laser percentages (in one phi intervals) recorded by each participating laboratory and the benchmark average for PS60.

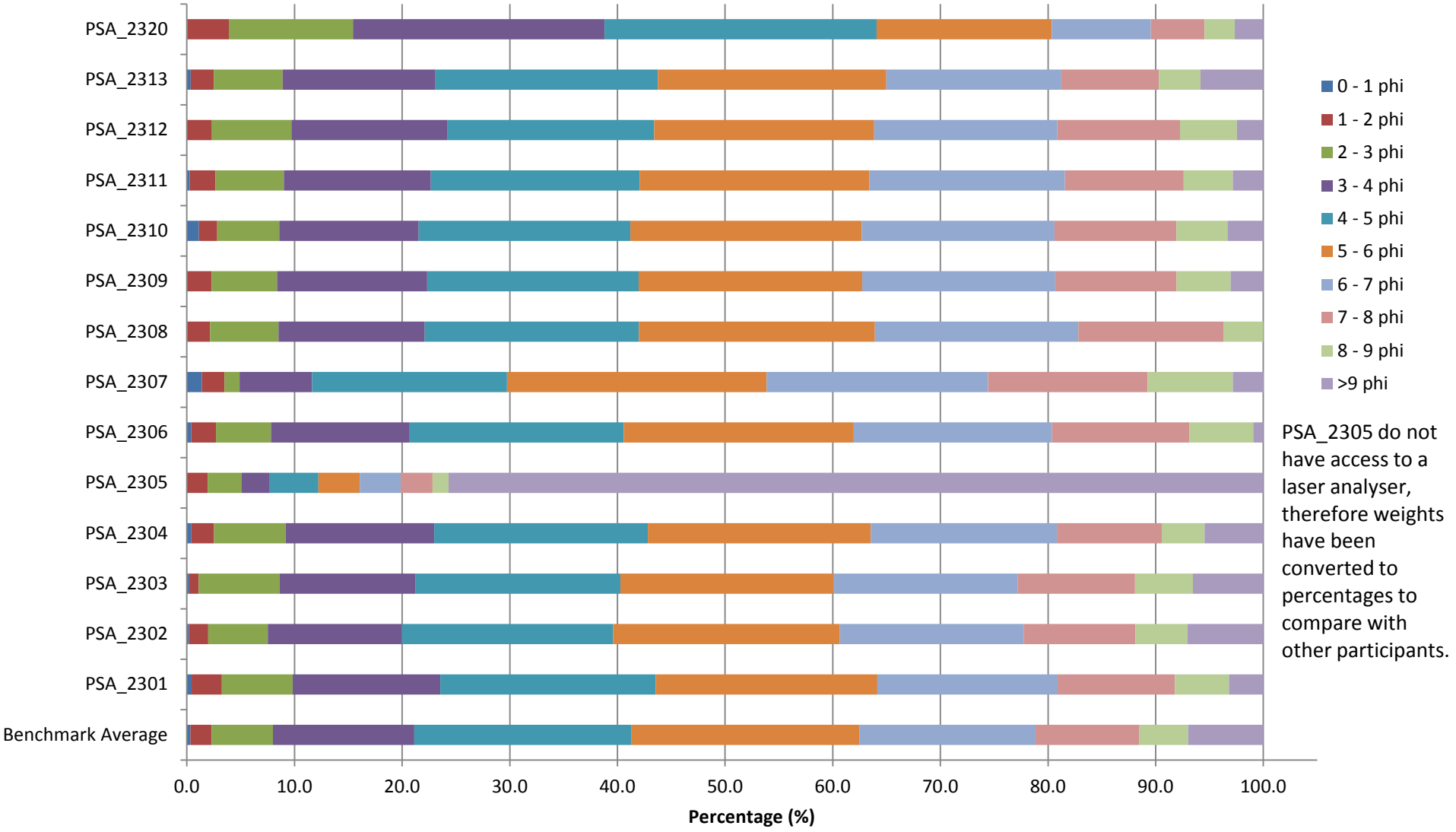
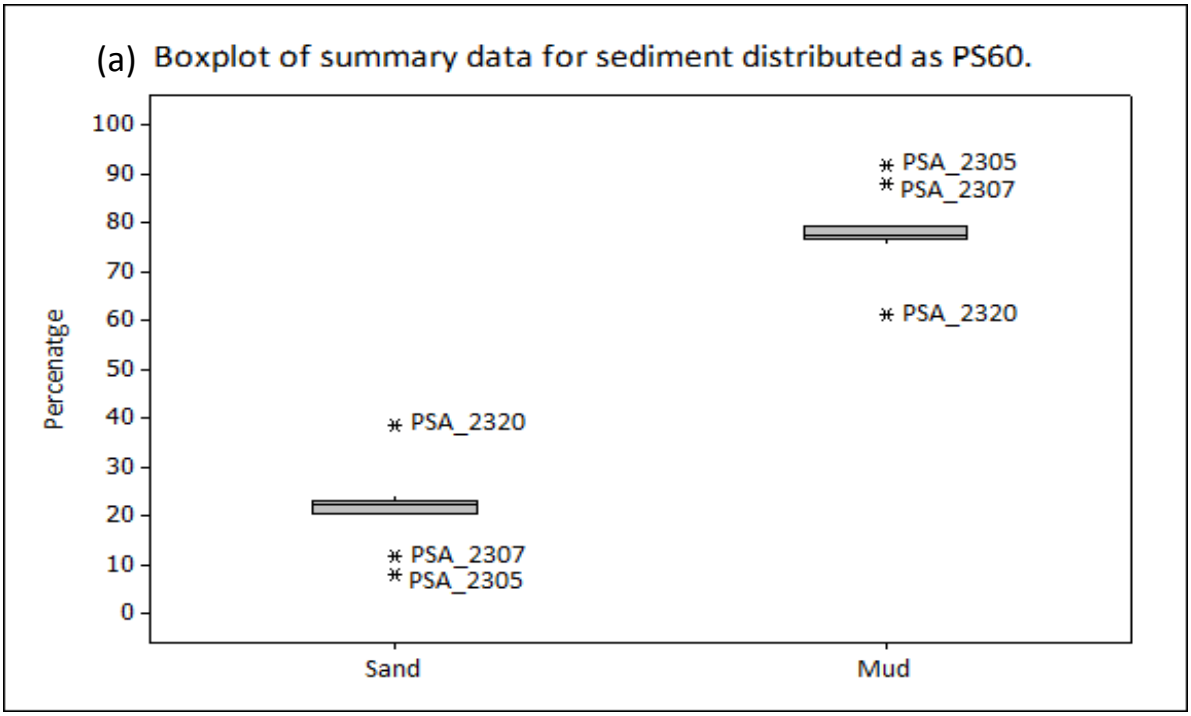
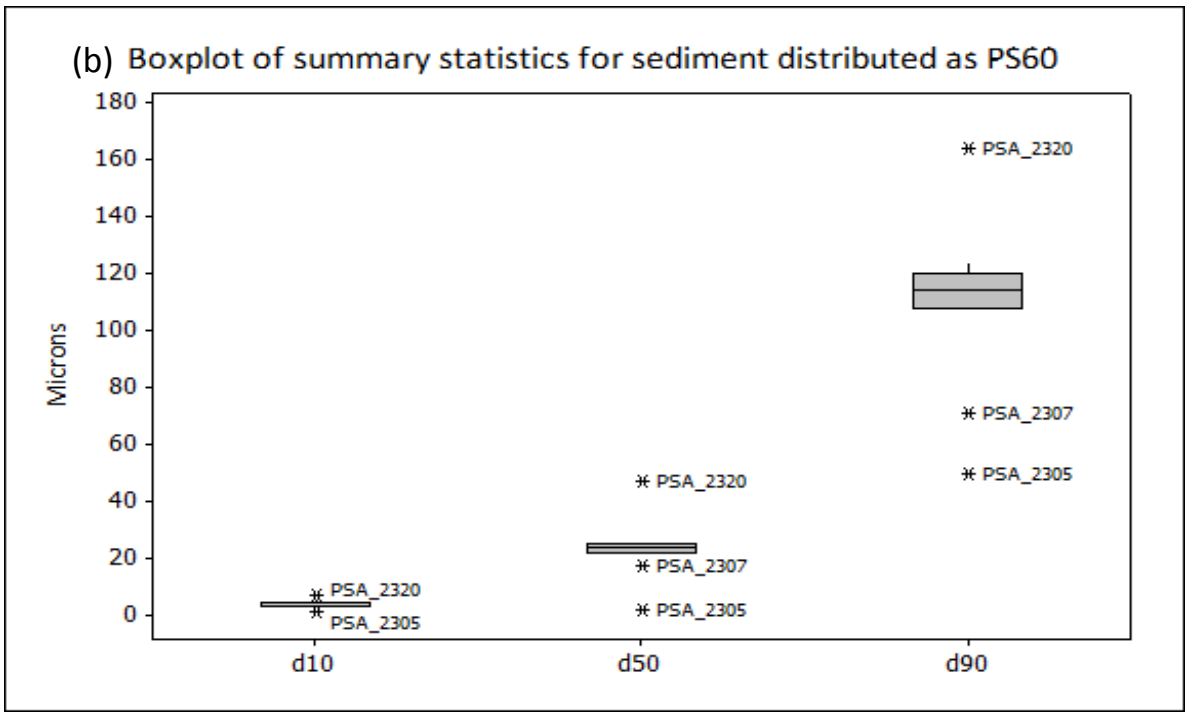


Figure 6. Boxplots of (a) the summary data and (b) summary statistics for sediment distributed as PS60.





APPENDICIES

NMBAQCS - PS Exercise Data Workbook (Page 2 - Final Merged Data Submission)	Return to APEM Ltd. By 29-07-16

Exercise Code:	PS60
LabCode:	PSA_2301_A
Sample Code:	PS602301_A

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage	Grams
	(mark as "0" for no material or not analysed)	
-6.50 to -6.00; 63 mm	0.0000	0.0000
-6.00 to -5.50; 45 mm	0.0000	0.0000
-5.50 to -5.00; 31.5 mm	0.0000	0.0000
-5.00 to -4.50; 22.4 mm	0.0000	0.0000
-4.50 to -4.00; 16 mm	0.0000	0.0000
-4.00 to -3.50; 11.2 mm	0.0000	0.0000
-3.50 to -3.00; 8 mm	0.0000	0.0000
-3.00 to -2.50; 5.6 mm	0.0000	0.0000
-2.50 to -2.00; 4 mm	0.0000	0.0000
-2.00 to -1.50; 2.8 mm	0.0000	0.0000
-1.50 to -1.00; 2 mm	0.0000	0.0000
-1.00 to -0.50; 1.4 mm	0.0000	0.0000
-0.50 to 0.00; 1 mm	0.0000	0.0000
0.00 to 0.50; (707 µm)	0.1551	0.0862
0.50 to 1.00; (500 µm)	0.7009	0.3896
1.00 to 1.50; (353.6 µm)	1.2927	0.7185
1.50 to 2.00; (250 µm)	1.8092	1.0055
2.00 to 2.50; (176.8 µm)	2.6045	1.4476
2.50 to 3.00; (125 µm)	3.9830	2.2138
3.00 to 3.50; (88.39 µm)	5.8399	3.2458
3.50 to 4.00; (62.5 µm)	7.7942	4.3320
4.00 to 4.50; (44.19 µm)	9.4400	5.2468
4.50 to 5.00; (31.25 µm)	10.3830	5.7709
5.00 to 5.50; (22.097 µm)	10.4726	5.8207
5.50 to 6.00; (15.625 µm)	9.8996	5.5022
6.00 to 6.50; (11.049 µm)	8.9324	4.9646
6.50 to 7.00; (7.813 µm)	7.6931	4.2758
7.00 to 7.50; (5.524 µm)	6.2156	3.4547
7.50 to 8.00; (3.906 µm)	4.6202	2.5679
8.00 to 8.50; (2.762 µm)	3.1057	1.7261
8.50 to 9.00; (1.953 µm)	1.8862	1.0484
9.00 to 9.50; (1.381 µm)	1.1005	0.6117
9.50 to 10.00; (0.977 µm)	0.7697	0.4278
10.00 to 10.50; (0.691 µm)	0.6907	0.3839
10.50 to 11.00; (0.488 µm)	0.5114	0.2843
11.00 to 11.50; (0.345 µm)	0.0997	0.0554
11.50 to 12.00; (0.244 µm)	0.0000	0.0000
12.00 to 12.50; (0.173 µm)	0.0000	0.0000
12.50 to 13.00; (0.122 µm)	0.0000	0.0000
13.00 to 13.50; (0.086 µm)	0.0000	0.0000

NMBAQCS - PS Exercise Data Workbook (Page 2 - Final Merged Data Submission)	Return to APEM Ltd. By 29-07-16

Exercise Code:	PS60
LabCode:	PSA_2301_B
Sample Code:	PS602301_B

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage	Grams
	(mark as "0" for no material or not analysed)	
-6.50 to -6.00; 63 mm	0.0000	0.0000
-6.00 to -5.50; 45 mm	0.0000	0.0000
-5.50 to -5.00; 31.5 mm	0.0000	0.0000
-5.00 to -4.50; 22.4 mm	0.0000	0.0000
-4.50 to -4.00; 16 mm	0.0000	0.0000
-4.00 to -3.50; 11.2 mm	0.0000	0.0000
-3.50 to -3.00; 8 mm	0.0000	0.0000
-3.00 to -2.50; 5.6 mm	0.0000	0.0000
-2.50 to -2.00; 4 mm	0.0000	0.0000
-2.00 to -1.50; 2.8 mm	0.0000	0.0000
-1.50 to -1.00; 2 mm	0.0000	0.0000
-1.00 to -0.50; 1.4 mm	0.0000	0.0000
-0.50 to 0.00; 1 mm	0.0000	0.0000
0.00 to 0.50; (707 µm)	0.0000	0.0000
0.50 to 1.00; (500 µm)	0.4454	0.2476
1.00 to 1.50; (353.6 µm)	1.0920	0.6069
1.50 to 2.00; (250 µm)	1.7196	0.9558
2.00 to 2.50; (176.8 µm)	2.5913	1.4402
2.50 to 3.00; (125 µm)	3.9891	2.2172
3.00 to 3.50; (88.39 µm)	5.8557	3.2546
3.50 to 4.00; (62.5 µm)	7.8420	4.3586
4.00 to 4.50; (44.19 µm)	9.5295	5.2965
4.50 to 5.00; (31.25 µm)	10.4960	5.8337
5.00 to 5.50; (22.097 µm)	10.5832	5.8821
5.50 to 6.00; (15.625 µm)	9.9920	5.5536
6.00 to 6.50; (11.049 µm)	9.0025	5.0036
6.50 to 7.00; (7.813 µm)	7.7440	4.3041
7.00 to 7.50; (5.524 µm)	6.2531	3.4755
7.50 to 8.00; (3.906 µm)	4.6485	2.5836
8.00 to 8.50; (2.762 µm)	3.1264	1.7377
8.50 to 9.00; (1.953 µm)	1.8998	1.0559
9.00 to 9.50; (1.381 µm)	1.1077	0.6157
9.50 to 10.00; (0.977 µm)	0.7736	0.4299
10.00 to 10.50; (0.691 µm)	0.6940	0.3858
10.50 to 11.00; (0.488 µm)	0.5143	0.2859
11.00 to 11.50; (0.345 µm)	0.1004	0.0558
11.50 to 12.00; (0.244 µm)	0.0000	0.0000
12.00 to 12.50; (0.173 µm)	0.0000	0.0000
12.50 to 13.00; (0.122 µm)	0.0000	0.0000
13.00 to 13.50; (0.086 µm)	0.0000	0.0000

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Exercise Code:	PS60
LabCode:	PSA_2302
Sample Code:	PS602302

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm	0.0000	
-6.00 to -5.50; 45 mm	0.0000	
-5.50 to -5.00; 31.5 mm	0.0000	
-5.00 to -4.50; 22.4 mm	0.0000	
-4.50 to -4.00; 16 mm	0.0000	
-4.00 to -3.50; 11.2 mm	0.0000	
-3.50 to -3.00; 8 mm	0.0000	
-3.00 to -2.50; 5.6 mm	0.0000	
-2.50 to -2.00; 4 mm	0.0000	
-2.00 to -1.50; 2.8 mm	0.0000	
-1.50 to -1.00; 2 mm	0.0000	
-1.00 to -0.50; 1.4 mm	0.0000	
-0.50 to 0.00; 1 mm	0.0000	
0.00 to 0.50; (707 µm)	0.0003	
0.50 to 1.00; (500 µm)	0.1861	
1.00 to 1.50; (353.6 µm)	0.9640	
1.50 to 2.00; (250 µm)	0.8416	
2.00 to 2.50; (176.8 µm)	1.9361	
2.50 to 3.00; (125 µm)	3.5944	
3.00 to 3.50; (88.39 µm)	5.5202	
3.50 to 4.00; (62.5 µm)	6.9295	
4.00 to 4.50; (44.19 µm)	8.8576	
4.50 to 5.00; (31.25 µm)	10.7733	
5.00 to 5.50; (22.097 µm)	10.7206	
5.50 to 6.00; (15.625 µm)	10.3392	
6.00 to 6.50; (11.049 µm)	9.3225	
6.50 to 7.00; (7.813 µm)	7.7349	
7.00 to 7.50; (5.524 µm)	6.0271	
7.50 to 8.00; (3.906 µm)	4.3776	
8.00 to 8.50; (2.762 µm)	2.9257	
8.50 to 9.00; (1.953 µm)	1.8914	
9.00 to 9.50; (1.381 µm)	1.3038	
9.50 to 10.00; (0.977 µm)	1.0241	
10.00 to 10.50; (0.691 µm)	0.9235	
10.50 to 11.00; (0.488 µm)	0.8994	
11.00 to 11.50; (0.345 µm)	0.8613	
11.50 to 12.00; (0.244 µm)	0.7606	
12.00 to 12.50; (0.173 µm)	0.5896	
12.50 to 13.00; (0.122 µm)	0.4306	
13.00 to 13.50; (0.086 µm)	0.2649	

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Exercise Code:	PS60
LabCode:	PSA_2303
Sample Code:	PS602303

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams (mark as "0" for no material or not analysed)
-6.50 to -6.00; 63 mm	0.00	0.00
-6.00 to -5.50; 45 mm	0.00	0.00
-5.50 to -5.00; 31.5 mm	0.00	0.00
-5.00 to -4.50; 22.4 mm	0.00	0.00
-4.50 to -4.00; 16 mm	0.00	0.00
-4.00 to -3.50; 11.2 mm	0.00	0.00
-3.50 to -3.00; 8 mm	0.00	0.00
-3.00 to -2.50; 5.6 mm	0.00	0.00
-2.50 to -2.00; 4 mm	0.00	0.00
-2.00 to -1.50; 2.8 mm	0.00	0.00
-1.50 to -1.00; 2 mm	0.00	0.00
-1.00 to -0.50; 1.4 mm	0.00	0.00
-0.50 to 0.00; 1 mm	0.00	0.00
0.00 to 0.50; (707 µm)	0.00	0.00
0.50 to 1.00; (500 µm)	0.22	0.12
1.00 to 1.50; (353.6 µm)	0.27	0.15
1.50 to 2.00; (250 µm)	0.61	0.34
2.00 to 2.50; (176.8 µm)	3.13	1.75
2.50 to 3.00; (125 µm)	4.41	2.46
3.00 to 3.50; (88.39 µm)	5.40	3.01
3.50 to 4.00; (62.5 µm)	7.18	4.01
4.00 to 4.50; (44.19 µm)	9.05	5.05
4.50 to 5.00; (31.25 µm)	10.01	5.59
5.00 to 5.50; (22.097 µm)	10.00	5.58
5.50 to 6.00; (15.625 µm)	9.78	5.46
6.00 to 6.50; (11.049 µm)	9.22	5.14
6.50 to 7.00; (7.813 µm)	7.88	4.40
7.00 to 7.50; (5.524 µm)	6.26	3.50
7.50 to 8.00; (3.906 µm)	4.67	2.61
8.00 to 8.50; (2.762 µm)	3.24	1.81
8.50 to 9.00; (1.953 µm)	2.13	1.19
9.00 to 9.50; (1.381 µm)	1.39	0.78
9.50 to 10.00; (0.977 µm)	0.95	0.53
10.00 to 10.50; (0.691 µm)	0.77	0.43
10.50 to 11.00; (0.488 µm)	0.72	0.40
11.00 to 11.50; (0.345 µm)	0.70	0.39
11.50 to 12.00; (0.244 µm)	0.65	0.36
12.00 to 12.50; (0.173 µm)	0.54	0.30
12.50 to 13.00; (0.122 µm)	0.42	0.23
13.00 to 13.50; (0.086 µm)	0.40	0.22

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Exercise Code:	PS60
LabCode:	PSA_2304
Sample Code:	PS602304

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm		
-6.00 to -5.50; 45 mm		
-5.50 to -5.00; 31.5 mm		
-5.00 to -4.50; 22.4 mm		
-4.50 to -4.00; 16 mm		
-4.00 to -3.50; 11.2 mm		
-3.50 to -3.00; 8 mm		
-3.00 to -2.50; 5.6 mm		
-2.50 to -2.00; 4 mm		
-2.00 to -1.50; 2.8 mm		
-1.50 to -1.00; 2 mm		
-1.00 to -0.50; 1.4 mm		
-0.50 to 0.00; 1 mm		
0.00 to 0.50; (707 µm)	0.0025	
0.50 to 1.00; (500 µm)	0.4224	
1.00 to 1.50; (353.6 µm)	1.0182	
1.50 to 2.00; (250 µm)	1.0742	
2.00 to 2.50; (176.8 µm)	2.2395	
2.50 to 3.00; (125 µm)	4.4037	
3.00 to 3.50; (88.39 µm)	6.1128	
3.50 to 4.00; (62.5 µm)	7.7161	
4.00 to 4.50; (44.19 µm)	8.7915	
4.50 to 5.00; (31.25 µm)	11.0465	
5.00 to 5.50; (22.097 µm)	10.5104	
5.50 to 6.00; (15.625 µm)	10.1912	
6.00 to 6.50; (11.049 µm)	9.7836	
6.50 to 7.00; (7.813 µm)	7.4996	
7.00 to 7.50; (5.524 µm)	5.9269	
7.50 to 8.00; (3.906 µm)	3.8192	
8.00 to 8.50; (2.762 µm)	2.5331	
8.50 to 9.00; (1.953 µm)	1.4438	
9.00 to 9.50; (1.381 µm)	1.0134	
9.50 to 10.00; (0.977 µm)	0.7518	
10.00 to 10.50; (0.691 µm)	0.6963	
10.50 to 11.00; (0.488 µm)	0.6894	
11.00 to 11.50; (0.345 µm)	0.6402	
11.50 to 12.00; (0.244 µm)	0.5766	
12.00 to 12.50; (0.173 µm)	0.4298	
12.50 to 13.00; (0.122 µm)	0.3498	
13.00 to 13.50; (0.086 µm)	0.3175	

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Exercise Code:	PS60
LabCode:	PSA_2305
Sample Code:	PS602305

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage	Grams
	(mark as "0" for no material or not analysed)	
-6.50 to -6.00; 63 mm	0.0000	0.0000
-6.00 to -5.50; 45 mm	0.0000	0.0000
-5.50 to -5.00; 31.5 mm	0.0000	0.0000
-5.00 to -4.50; 22.4 mm	0.0000	0.0000
-4.50 to -4.00; 16 mm	0.0000	0.0000
-4.00 to -3.50; 11.2 mm	0.0000	0.0000
-3.50 to -3.00; 8 mm	0.0000	0.0000
-3.00 to -2.50; 5.6 mm	0.0000	0.0000
-2.50 to -2.00; 4 mm	0.0000	0.0000
-2.00 to -1.50; 2.8 mm	0.0000	0.0000
-1.50 to -1.00; 2 mm	0.0000	0.0000
-1.00 to -0.50; 1.4 mm	0.0000	0.0000
-0.50 to 0.00; 1 mm	0.0000	0.0000
0.00 to 0.50; (707 µm)	0.0000	0.0000
0.50 to 1.00; (500 µm)	0.0000	0.0000
1.00 to 1.50; (353.6 µm)	0.6046	0.4820
1.50 to 2.00; (250 µm)	1.3259	1.0570
2.00 to 2.50; (176.8 µm)	1.6194	1.2910
2.50 to 3.00; (125 µm)	1.5504	1.2360
3.00 to 3.50; (88.39 µm)	1.1779	0.9390
3.50 to 4.00; (62.5 µm)	1.4338	1.1430
4.00 to 4.50; (44.19 µm)	3.4172	2.7242
4.50 to 5.00; (31.25 µm)	1.0903	0.8692
5.00 to 5.50; (22.097 µm)	2.0078	1.6006
5.50 to 6.00; (15.625 µm)	1.8482	1.4734
6.00 to 6.50; (11.049 µm)	2.4067	1.9186
6.50 to 7.00; (7.813 µm)	1.3829	1.1024
7.00 to 7.50; (5.524 µm)	1.2765	1.0176
7.50 to 8.00; (3.906 µm)	1.6754	1.3356
8.00 to 8.50; (2.762 µm)	1.0903	0.8692
8.50 to 9.00; (1.953 µm)	0.4122	0.3286
9.00 to 9.50; (1.381 µm)	75.6804	60.3320
9.50 to 10.00; (0.977 µm)	0.0000	0.0000
10.00 to 10.50; (0.691 µm)	0.0000	0.0000
10.50 to 11.00; (0.488 µm)	0.0000	0.0000
11.00 to 11.50; (0.345 µm)	0.0000	0.0000
11.50 to 12.00; (0.244 µm)	0.0000	0.0000
12.00 to 12.50; (0.173 µm)	0.0000	0.0000
12.50 to 13.00; (0.122 µm)	0.0000	0.0000
13.00 to 13.50; (0.086 µm)	0.0000	0.0000

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Exercise Code:	PS60
LabCode:	PSA_2306
Sample Code:	PS602306

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm	0.0000	
-6.00 to -5.50; 45 mm	0.0000	
-5.50 to -5.00; 31.5 mm	0.0000	
-5.00 to -4.50; 22.4 mm	0.0000	
-4.50 to -4.00; 16 mm	0.0000	
-4.00 to -3.50; 11.2 mm	0.0000	
-3.50 to -3.00; 8 mm	0.0000	
-3.00 to -2.50; 5.6 mm	0.0000	
-2.50 to -2.00; 4 mm	0.0000	
-2.00 to -1.50; 2.8 mm	0.0000	
-1.50 to -1.00; 2 mm	0.0000	
-1.00 to -0.50; 1.4 mm	0.0000	
-0.50 to 0.00; 1 mm	0.0000	
0.00 to 0.50; (707 µm)	0.0000	
0.50 to 1.00; (500 µm)	0.4062	
1.00 to 1.50; (353.6 µm)	0.9949	
1.50 to 2.00; (250 µm)	1.3131	
2.00 to 2.50; (176.8 µm)	1.8838	
2.50 to 3.00; (125 µm)	3.2182	
3.00 to 3.50; (88.39 µm)	5.3089	
3.50 to 4.00; (62.5 µm)	7.5676	
4.00 to 4.50; (44.19 µm)	9.3943	
4.50 to 5.00; (31.25 µm)	10.4936	
5.00 to 5.50; (22.097 µm)	10.8384	
5.50 to 6.00; (15.625 µm)	10.5350	
6.00 to 6.50; (11.049 µm)	9.7647	
6.50 to 7.00; (7.813 µm)	8.6455	
7.00 to 7.50; (5.524 µm)	7.2263	
7.50 to 8.00; (3.906 µm)	5.5606	
8.00 to 8.50; (2.762 µm)	3.7868	
8.50 to 9.00; (1.953 µm)	2.1188	
9.00 to 9.50; (1.381 µm)	0.8333	
9.50 to 10.00; (0.977 µm)	0.1100	
10.00 to 10.50; (0.691 µm)	0.0000	
10.50 to 11.00; (0.488 µm)	0.0000	
11.00 to 11.50; (0.345 µm)	0.0000	
11.50 to 12.00; (0.244 µm)	0.0000	
12.00 to 12.50; (0.173 µm)	0.0000	
12.50 to 13.00; (0.122 µm)	0.0000	
13.00 to 13.50; (0.086 µm)	0.0000	

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Exercise Code:	PS60
LabCode:	PSA_2307
Sample Code:	PS602307

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm	0.0000	
-6.00 to -5.50; 45 mm	0.0000	
-5.50 to -5.00; 31.5 mm	0.0000	
-5.00 to -4.50; 22.4 mm	0.0000	
-4.50 to -4.00; 16 mm	0.0000	
-4.00 to -3.50; 11.2 mm	0.0000	
-3.50 to -3.00; 8 mm	0.0000	
-3.00 to -2.50; 5.6 mm	0.0000	
-2.50 to -2.00; 4 mm	0.0000	
-2.00 to -1.50; 2.8 mm	0.0000	
-1.50 to -1.00; 2 mm	0.0000	
-1.00 to -0.50; 1.4 mm	0.0000	
-0.50 to 0.00; 1 mm	0.0000	
0.00 to 0.50; (707 µm)	0.2900	
0.50 to 1.00; (500 µm)	1.1100	
1.00 to 1.50; (353.6 µm)	1.2889	
1.50 to 2.00; (250 µm)	0.8144	
2.00 to 2.50; (176.8 µm)	0.5156	
2.50 to 3.00; (125 µm)	0.8767	
3.00 to 3.50; (88.39 µm)	2.1756	
3.50 to 4.00; (62.5 µm)	4.5578	
4.00 to 4.50; (44.19 µm)	7.5878	
4.50 to 5.00; (31.25 µm)	10.5211	
5.00 to 5.50; (22.097 µm)	12.0511	
5.50 to 6.00; (15.625 µm)	12.0756	
6.00 to 6.50; (11.049 µm)	11.0311	
6.50 to 7.00; (7.813 µm)	9.5233	
7.00 to 7.50; (5.524 µm)	8.2356	
7.50 to 8.00; (3.906 µm)	6.5978	
8.00 to 8.50; (2.762 µm)	5.0256	
8.50 to 9.00; (1.953 µm)	2.8833	
9.00 to 9.50; (1.381 µm)	0.7889	
9.50 to 10.00; (0.977 µm)	0.1000	
10.00 to 10.50; (0.691 µm)	0.7556	
10.50 to 11.00; (0.488 µm)	0.9044	
11.00 to 11.50; (0.345 µm)	0.3033	
11.50 to 12.00; (0.244 µm)	0.0000	
12.00 to 12.50; (0.173 µm)	0.0000	
12.50 to 13.00; (0.122 µm)	0.0000	
13.00 to 13.50; (0.086 µm)	0.0000	

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Exercise Code:	PS60
LabCode:	PSA_2308
Sample Code:	PS602308

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm	0.0000	
-6.00 to -5.50; 45 mm	0.0000	
-5.50 to -5.00; 31.5 mm	0.0000	
-5.00 to -4.50; 22.4 mm	0.0000	
-4.50 to -4.00; 16 mm	0.0000	
-4.00 to -3.50; 11.2 mm	0.0000	
-3.50 to -3.00; 8 mm	0.0000	
-3.00 to -2.50; 5.6 mm	0.0000	
-2.50 to -2.00; 4 mm	0.0000	
-2.00 to -1.50; 2.8 mm	0.0000	
-1.50 to -1.00; 2 mm	0.0000	
-1.00 to -0.50; 1.4 mm	0.0000	
-0.50 to 0.00; 1 mm	0.0000	
0.00 to 0.50; (707 µm)	0.0000	
0.50 to 1.00; (500 µm)	0.0533	
1.00 to 1.50; (353.6 µm)	0.5996	
1.50 to 2.00; (250 µm)	1.5046	
2.00 to 2.50; (176.8 µm)	2.2910	
2.50 to 3.00; (125 µm)	4.0567	
3.00 to 3.50; (88.39 µm)	5.5188	
3.50 to 4.00; (62.5 µm)	8.0809	
4.00 to 4.50; (44.19 µm)	8.8485	
4.50 to 5.00; (31.25 µm)	11.0382	
5.00 to 5.50; (22.097 µm)	11.0603	
5.50 to 6.00; (15.625 µm)	10.8530	
6.00 to 6.50; (11.049 µm)	9.9952	
6.50 to 7.00; (7.813 µm)	8.9167	
7.00 to 7.50; (5.524 µm)	7.6668	
7.50 to 8.00; (3.906 µm)	5.8506	
8.00 to 8.50; (2.762 µm)	3.0736	
8.50 to 9.00; (1.953 µm)	0.5849	
9.00 to 9.50; (1.381 µm)	0.0074	
9.50 to 10.00; (0.977 µm)	0.0000	
10.00 to 10.50; (0.691 µm)	0.0000	
10.50 to 11.00; (0.488 µm)	0.0000	
11.00 to 11.50; (0.345 µm)	0.0000	
11.50 to 12.00; (0.244 µm)	0.0000	
12.00 to 12.50; (0.173 µm)	0.0000	
12.50 to 13.00; (0.122 µm)	0.0000	
13.00 to 13.50; (0.086 µm)	0.0000	

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Exercise Code:	PS60
LabCode:	PSA_2309
Sample Code:	PS602309

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm		
-6.00 to -5.50; 45 mm		
-5.50 to -5.00; 31.5 mm		
-5.00 to -4.50; 22.4 mm		
-4.50 to -4.00; 16 mm		
-4.00 to -3.50; 11.2 mm		
-3.50 to -3.00; 8 mm		
-3.00 to -2.50; 5.6 mm		
-2.50 to -2.00; 4 mm		
-2.00 to -1.50; 2.8 mm		
-1.50 to -1.00; 2 mm		
-1.00 to -0.50; 1.4 mm		
-0.50 to 0.00; 1 mm		
0.00 to 0.50; (707 µm)	0.0000	
0.50 to 1.00; (500 µm)	0.0813	
1.00 to 1.50; (353.6 µm)	0.7518	
1.50 to 2.00; (250 µm)	1.4741	
2.00 to 2.50; (176.8 µm)	2.3032	
2.50 to 3.00; (125 µm)	3.7623	
3.00 to 3.50; (88.39 µm)	5.9236	
3.50 to 4.00; (62.5 µm)	8.0322	
4.00 to 4.50; (44.19 µm)	9.4488	
4.50 to 5.00; (31.25 µm)	10.1986	
5.00 to 5.50; (22.097 µm)	10.4493	
5.50 to 6.00; (15.625 µm)	10.3040	
6.00 to 6.50; (11.049 µm)	9.6281	
6.50 to 7.00; (7.813 µm)	8.3099	
7.00 to 7.50; (5.524 µm)	6.5515	
7.50 to 8.00; (3.906 µm)	4.7192	
8.00 to 8.50; (2.762 µm)	3.1233	
8.50 to 9.00; (1.953 µm)	1.9013	
9.00 to 9.50; (1.381 µm)	1.0930	
9.50 to 10.00; (0.977 µm)	0.7350	
10.00 to 10.50; (0.691 µm)	0.6553	
10.50 to 11.00; (0.488 µm)	0.4759	
11.00 to 11.50; (0.345 µm)	0.0783	
11.50 to 12.00; (0.244 µm)	0.0000	
12.00 to 12.50; (0.173 µm)	0.0000	
12.50 to 13.00; (0.122 µm)	0.0000	
13.00 to 13.50; (0.086 µm)	0.0000	

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Exercise Code:	PS60
LabCode:	PSA_2310
Sample Code:	PS602310

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams (mark as "0" for no material or not analysed)
-6.50 to -6.00; 63 mm		0.0000
-6.00 to -5.50; 45 mm		0.0000
-5.50 to -5.00; 31.5 mm		0.0000
-5.00 to -4.50; 22.4 mm		0.0000
-4.50 to -4.00; 16 mm		0.0000
-4.00 to -3.50; 11.2 mm		0.0000
-3.50 to -3.00; 8 mm		0.0000
-3.00 to -2.50; 5.6 mm		0.0000
-2.50 to -2.00; 4 mm		0.0000
-2.00 to -1.50; 2.8 mm		0.0000
-1.50 to -1.00; 2 mm		0.0000
-1.00 to -0.50; 1.4 mm		0.0000
-0.50 to 0.00; 1 mm		0.0000
0.00 to 0.50; (707 µm)	0.4995	
0.50 to 1.00; (500 µm)	0.6163	
1.00 to 1.50; (353.6 µm)	0.6151	
1.50 to 2.00; (250 µm)	1.0974	
2.00 to 2.50; (176.8 µm)	1.9733	
2.50 to 3.00; (125 µm)	3.7886	
3.00 to 3.50; (88.39 µm)	5.2168	
3.50 to 4.00; (62.5 µm)	7.7215	
4.00 to 4.50; (44.19 µm)	9.6419	
4.50 to 5.00; (31.25 µm)	10.0299	
5.00 to 5.50; (22.097 µm)	11.1191	
5.50 to 6.00; (15.625 µm)	10.3660	
6.00 to 6.50; (11.049 µm)	9.7016	
6.50 to 7.00; (7.813 µm)	8.2194	
7.00 to 7.50; (5.524 µm)	6.6191	
7.50 to 8.00; (3.906 µm)	4.6910	
8.00 to 8.50; (2.762 µm)	2.9623	
8.50 to 9.00; (1.953 µm)	1.7882	
9.00 to 9.50; (1.381 µm)	1.0631	
9.50 to 10.00; (0.977 µm)	0.7274	
10.00 to 10.50; (0.691 µm)	0.8086	
10.50 to 11.00; (0.488 µm)	0.5987	
11.00 to 11.50; (0.345 µm)	0.1352	
11.50 to 12.00; (0.244 µm)	0.0000	
12.00 to 12.50; (0.173 µm)	0.0000	
12.50 to 13.00; (0.122 µm)	0.0000	
13.00 to 13.50; (0.086 µm)	0.0000	

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Exercise Code:	PS60
LabCode:	PSA_2311
Sample Code:	PS602311

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage	Grams
	(mark as "0" for no material or not analysed)	
-6.50 to -6.00; 63 mm	0.0000	0.0000
-6.00 to -5.50; 45 mm	0.0000	0.0000
-5.50 to -5.00; 31.5 mm	0.0000	0.0000
-5.00 to -4.50; 22.4 mm	0.0000	0.0000
-4.50 to -4.00; 16 mm	0.0000	0.0000
-4.00 to -3.50; 11.2 mm	0.0000	0.0000
-3.50 to -3.00; 8 mm	0.0000	0.0000
-3.00 to -2.50; 5.6 mm	0.0000	0.0000
-2.50 to -2.00; 4 mm	0.0000	0.0000
-2.00 to -1.50; 2.8 mm	0.0000	0.0000
-1.50 to -1.00; 2 mm	0.0000	0.0000
-1.00 to -0.50; 1.4 mm	0.0868	0.0500
-0.50 to 0.00; 1 mm	0.0000	0.0000
0.00 to 0.50; (707 µm)	0.0000	0.0000
0.50 to 1.00; (500 µm)	0.2542	0.1465
1.00 to 1.50; (353.6 µm)	0.8743	0.5038
1.50 to 2.00; (250 µm)	1.5365	0.8854
2.00 to 2.50; (176.8 µm)	2.4581	1.4163
2.50 to 3.00; (125 µm)	3.8763	2.2335
3.00 to 3.50; (88.39 µm)	5.8536	3.3728
3.50 to 4.00; (62.5 µm)	7.8003	4.4945
4.00 to 4.50; (44.19 µm)	9.2188	5.3119
4.50 to 5.00; (31.25 µm)	10.1488	5.8477
5.00 to 5.50; (22.097 µm)	10.6900	6.1596
5.50 to 6.00; (15.625 µm)	10.6237	6.1214
6.00 to 6.50; (11.049 µm)	9.8167	5.6564
6.50 to 7.00; (7.813 µm)	8.3392	4.8050
7.00 to 7.50; (5.524 µm)	6.4704	3.7282
7.50 to 8.00; (3.906 µm)	4.5570	2.6258
8.00 to 8.50; (2.762 µm)	2.8995	1.6707
8.50 to 9.00; (1.953 µm)	1.6680	0.9611
9.00 to 9.50; (1.381 µm)	0.9196	0.5299
9.50 to 10.00; (0.977 µm)	0.6518	0.3755
10.00 to 10.50; (0.691 µm)	0.6457	0.3720
10.50 to 11.00; (0.488 µm)	0.5098	0.2937
11.00 to 11.50; (0.345 µm)	0.1010	0.0582
11.50 to 12.00; (0.244 µm)	0.0000	0.0000
12.00 to 12.50; (0.173 µm)	0.0000	0.0000
12.50 to 13.00; (0.122 µm)	0.0000	0.0000
13.00 to 13.50; (0.086 µm)	0.0000	0.0000

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Exercise Code:	PS60
LabCode:	PSA_2312
Sample Code:	PS602312

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm	0.0000	
-6.00 to -5.50; 45 mm	0.0000	
-5.50 to -5.00; 31.5 mm	0.0000	
-5.00 to -4.50; 22.4 mm	0.0000	
-4.50 to -4.00; 16 mm	0.0000	
-4.00 to -3.50; 11.2 mm	0.0000	
-3.50 to -3.00; 8 mm	0.0000	
-3.00 to -2.50; 5.6 mm	0.0000	
-2.50 to -2.00; 4 mm	0.0000	
-2.00 to -1.50; 2.8 mm	0.0000	
-1.50 to -1.00; 2 mm	0.0000	
-1.00 to -0.50; 1.4 mm	0.0000	
-0.50 to 0.00; 1 mm	0.0000	
0.00 to 0.50; (707 µm)	0.0000	
0.50 to 1.00; (500 µm)	0.0200	
1.00 to 1.50; (353.6 µm)	0.4700	
1.50 to 2.00; (250 µm)	1.7900	
2.00 to 2.50; (176.8 µm)	2.9800	
2.50 to 3.00; (125 µm)	4.4400	
3.00 to 3.50; (88.39 µm)	6.3900	
3.50 to 4.00; (62.5 µm)	8.1300	
4.00 to 4.50; (44.19 µm)	9.2400	
4.50 to 5.00; (31.25 µm)	9.9600	
5.00 to 5.50; (22.097 µm)	10.4000	
5.50 to 6.00; (15.625 µm)	10.0200	
6.00 to 6.50; (11.049 µm)	8.9400	
6.50 to 7.00; (7.813 µm)	8.1000	
7.00 to 7.50; (5.524 µm)	6.5600	
7.50 to 8.00; (3.906 µm)	4.8300	
8.00 to 8.50; (2.762 µm)	3.4200	
8.50 to 9.00; (1.953 µm)	1.8600	
9.00 to 9.50; (1.381 µm)	1.0400	
9.50 to 10.00; (0.977 µm)	0.7600	
10.00 to 10.50; (0.691 µm)	0.6500	
10.50 to 11.00; (0.488 µm)		
11.00 to 11.50; (0.345 µm)		
11.50 to 12.00; (0.244 µm)		
12.00 to 12.50; (0.173 µm)		
12.50 to 13.00; (0.122 µm)		
13.00 to 13.50; (0.086 µm)		

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Exercise Code:	PS60
LabCode:	PSA_2313
Sample Code:	PS602313

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm	0.00	
-6.00 to -5.50; 45 mm	0.00	
-5.50 to -5.00; 31.5 mm	0.00	
-5.00 to -4.50; 22.4 mm	0.00	
-4.50 to -4.00; 16 mm	0.00	
-4.00 to -3.50; 11.2 mm	0.00	
-3.50 to -3.00; 8 mm	0.00	
-3.00 to -2.50; 5.6 mm	0.00	
-2.50 to -2.00; 4 mm	0.00	
-2.00 to -1.50; 2.8 mm	0.00	
-1.50 to -1.00; 2 mm	0.00	
-1.00 to -0.50; 1.4 mm	0.00	
-0.50 to 0.00; 1 mm	0.00	
0.00 to 0.50; (707 µm)	0.01	
0.50 to 1.00; (500 µm)	0.35	
1.00 to 1.50; (353.6 µm)	1.00	
1.50 to 2.00; (250 µm)	1.15	
2.00 to 2.50; (176.8 µm)	2.30	
2.50 to 3.00; (125 µm)	4.09	
3.00 to 3.50; (88.39 µm)	6.44	
3.50 to 4.00; (62.5 µm)	7.76	
4.00 to 4.50; (44.19 µm)	9.52	
4.50 to 5.00; (31.25 µm)	11.14	
5.00 to 5.50; (22.097 µm)	10.90	
5.50 to 6.00; (15.625 µm)	10.33	
6.00 to 6.50; (11.049 µm)	9.04	
6.50 to 7.00; (7.813 µm)	7.20	
7.00 to 7.50; (5.524 µm)	5.36	
7.50 to 8.00; (3.906 µm)	3.70	
8.00 to 8.50; (2.762 µm)	2.37	
8.50 to 9.00; (1.953 µm)	1.50	
9.00 to 9.50; (1.381 µm)	1.05	
9.50 to 10.00; (0.977 µm)	0.85	
10.00 to 10.50; (0.691 µm)	0.79	
10.50 to 11.00; (0.488 µm)	0.76	
11.00 to 11.50; (0.345 µm)	0.71	
11.50 to 12.00; (0.244 µm)	0.62	
12.00 to 12.50; (0.173 µm)	0.48	
12.50 to 13.00; (0.122 µm)	0.36	
13.00 to 13.50; (0.086 µm)	0.22	

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Exercise Code:	PS60
LabCode:	PSA_2320
Sample Code:	PS602320

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm		
-6.00 to -5.50; 45 mm		
-5.50 to -5.00; 31.5 mm		
-5.00 to -4.50; 22.4 mm		
-4.50 to -4.00; 16 mm		
-4.00 to -3.50; 11.2 mm		
-3.50 to -3.00; 8 mm		
-3.00 to -2.50; 5.6 mm		
-2.50 to -2.00; 4 mm		
-2.00 to -1.50; 2.8 mm		
-1.50 to -1.00; 2 mm		
-1.00 to -0.50; 1.4 mm		
-0.50 to 0.00; 1 mm		
0.00 to 0.50; (707 µm)	0.0000	
0.50 to 1.00; (500 µm)	0.0400	
1.00 to 1.50; (353.6 µm)	1.0167	
1.50 to 2.00; (250 µm)	2.8467	
2.00 to 2.50; (176.8 µm)	4.5367	
2.50 to 3.00; (125 µm)	6.9800	
3.00 to 3.50; (88.39 µm)	10.3467	
3.50 to 4.00; (62.5 µm)	13.0333	
4.00 to 4.50; (44.19 µm)	13.4900	
4.50 to 5.00; (31.25 µm)	11.7900	
5.00 to 5.50; (22.097 µm)	9.2667	
5.50 to 6.00; (15.625 µm)	7.0000	
6.00 to 6.50; (11.049 µm)	5.2800	
6.50 to 7.00; (7.813 µm)	3.9267	
7.00 to 7.50; (5.524 µm)	2.8767	
7.50 to 8.00; (3.906 µm)	2.1133	
8.00 to 8.50; (2.762 µm)	1.6133	
8.50 to 9.00; (1.953 µm)	1.1933	
9.00 to 9.50; (1.381 µm)	0.8300	
9.50 to 10.00; (0.977 µm)	0.6333	
10.00 to 10.50; (0.691 µm)	0.6100	
10.50 to 11.00; (0.488 µm)	0.4667	
11.00 to 11.50; (0.345 µm)	0.1100	
11.50 to 12.00; (0.244 µm)	0.0000	
12.00 to 12.50; (0.173 µm)		
12.50 to 13.00; (0.122 µm)		
13.00 to 13.50; (0.086 µm)		

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Exercise Code:	PS60
LabCode:	BM_REP1
Sample Code:	PS60REP1

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm	0.0000	
-6.00 to -5.50; 45 mm	0.0000	
-5.50 to -5.00; 31.5 mm	0.0000	
-5.00 to -4.50; 22.4 mm	0.0000	
-4.50 to -4.00; 16 mm	0.0000	
-4.00 to -3.50; 11.2 mm	0.0000	
-3.50 to -3.00; 8 mm	0.0000	
-3.00 to -2.50; 5.6 mm	0.0000	
-2.50 to -2.00; 4 mm	0.0000	
-2.00 to -1.50; 2.8 mm	0.0000	
-1.50 to -1.00; 2 mm	0.0000	
-1.00 to -0.50; 1.4 mm	0.0000	
-0.50 to 0.00; 1 mm	0.0000	
0.00 to 0.50; (707 µm)	0.0087	
0.50 to 1.00; (500 µm)	0.3938	
1.00 to 1.50; (353.6 µm)	0.9919	
1.50 to 2.00; (250 µm)	0.9994	
2.00 to 2.50; (176.8 µm)	2.1120	
2.50 to 3.00; (125 µm)	3.8454	
3.00 to 3.50; (88.39 µm)	6.1541	
3.50 to 4.00; (62.5 µm)	7.5121	
4.00 to 4.50; (44.19 µm)	9.3526	
4.50 to 5.00; (31.25 µm)	11.0622	
5.00 to 5.50; (22.097 µm)	10.8446	
5.50 to 6.00; (15.625 µm)	10.2843	
6.00 to 6.50; (11.049 µm)	9.0512	
6.50 to 7.00; (7.813 µm)	7.3073	
7.00 to 7.50; (5.524 µm)	5.5445	
7.50 to 8.00; (3.906 µm)	3.9265	
8.00 to 8.50; (2.762 µm)	2.5776	
8.50 to 9.00; (1.953 µm)	1.6591	
9.00 to 9.50; (1.381 µm)	1.1576	
9.50 to 10.00; (0.977 µm)	0.9317	
10.00 to 10.50; (0.691 µm)	0.8520	
10.50 to 11.00; (0.488 µm)	0.8253	
11.00 to 11.50; (0.345 µm)	0.7795	
11.50 to 12.00; (0.244 µm)	0.6811	
12.00 to 12.50; (0.173 µm)	0.5253	
12.50 to 13.00; (0.122 µm)	0.3840	
13.00 to 13.50; (0.086 µm)	0.2364	

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Exercise Code:	PS60
LabCode:	BM_REP2
Sample Code:	PS60REP2

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm	0.0000	
-6.00 to -5.50; 45 mm	0.0000	
-5.50 to -5.00; 31.5 mm	0.0000	
-5.00 to -4.50; 22.4 mm	0.0000	
-4.50 to -4.00; 16 mm	0.0000	
-4.00 to -3.50; 11.2 mm	0.0000	
-3.50 to -3.00; 8 mm	0.0000	
-3.00 to -2.50; 5.6 mm	0.0000	
-2.50 to -2.00; 4 mm	0.0000	
-2.00 to -1.50; 2.8 mm	0.0000	
-1.50 to -1.00; 2 mm	0.0000	
-1.00 to -0.50; 1.4 mm	0.0000	
-0.50 to 0.00; 1 mm	0.0000	
0.00 to 0.50; (707 µm)	0.0019	
0.50 to 1.00; (500 µm)	0.3061	
1.00 to 1.50; (353.6 µm)	0.9707	
1.50 to 2.00; (250 µm)	1.0462	
2.00 to 2.50; (176.8 µm)	2.1336	
2.50 to 3.00; (125 µm)	3.8439	
3.00 to 3.50; (88.39 µm)	6.1488	
3.50 to 4.00; (62.5 µm)	7.5317	
4.00 to 4.50; (44.19 µm)	9.3904	
4.50 to 5.00; (31.25 µm)	11.0946	
5.00 to 5.50; (22.097 µm)	10.8774	
5.50 to 6.00; (15.625 µm)	10.2535	
6.00 to 6.50; (11.049 µm)	8.9560	
6.50 to 7.00; (7.813 µm)	7.2000	
7.00 to 7.50; (5.524 µm)	5.4660	
7.50 to 8.00; (3.906 µm)	3.8906	
8.00 to 8.50; (2.762 µm)	2.5806	
8.50 to 9.00; (1.953 µm)	1.6845	
9.00 to 9.50; (1.381 µm)	1.1929	
9.50 to 10.00; (0.977 µm)	0.9726	
10.00 to 10.50; (0.691 µm)	0.8926	
10.50 to 11.00; (0.488 µm)	0.8601	
11.00 to 11.50; (0.345 µm)	0.8069	
11.50 to 12.00; (0.244 µm)	0.7038	
12.00 to 12.50; (0.173 µm)	0.5448	
12.50 to 13.00; (0.122 µm)	0.4013	
13.00 to 13.50; (0.086 µm)	0.2486	

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Exercise Code:	PS60
LabCode:	BM_REP3
Sample Code:	PS60REP3

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm	0.0000	
-6.00 to -5.50; 45 mm	0.0000	
-5.50 to -5.00; 31.5 mm	0.0000	
-5.00 to -4.50; 22.4 mm	0.0000	
-4.50 to -4.00; 16 mm	0.0000	
-4.00 to -3.50; 11.2 mm	0.0000	
-3.50 to -3.00; 8 mm	0.0000	
-3.00 to -2.50; 5.6 mm	0.0000	
-2.50 to -2.00; 4 mm	0.0000	
-2.00 to -1.50; 2.8 mm	0.0000	
-1.50 to -1.00; 2 mm	0.0000	
-1.00 to -0.50; 1.4 mm	0.0000	
-0.50 to 0.00; 1 mm	0.0000	
0.00 to 0.50; (707 µm)	0.0025	
0.50 to 1.00; (500 µm)	0.2482	
1.00 to 1.50; (353.6 µm)	0.8985	
1.50 to 2.00; (250 µm)	1.0099	
2.00 to 2.50; (176.8 µm)	2.0195	
2.50 to 3.00; (125 µm)	3.5424	
3.00 to 3.50; (88.39 µm)	5.7519	
3.50 to 4.00; (62.5 µm)	7.1308	
4.00 to 4.50; (44.19 µm)	9.0190	
4.50 to 5.00; (31.25 µm)	10.8626	
5.00 to 5.50; (22.097 µm)	10.8080	
5.50 to 6.00; (15.625 µm)	10.2933	
6.00 to 6.50; (11.049 µm)	9.0633	
6.50 to 7.00; (7.813 µm)	7.3894	
7.00 to 7.50; (5.524 µm)	5.7254	
7.50 to 8.00; (3.906 µm)	4.1748	
8.00 to 8.50; (2.762 µm)	2.8329	
8.50 to 9.00; (1.953 µm)	1.8809	
9.00 to 9.50; (1.381 µm)	1.3371	
9.50 to 10.00; (0.977 µm)	1.0775	
10.00 to 10.50; (0.691 µm)	0.9815	
10.50 to 11.00; (0.488 µm)	0.9519	
11.00 to 11.50; (0.345 µm)	0.9022	
11.50 to 12.00; (0.244 µm)	0.7882	
12.00 to 12.50; (0.173 µm)	0.6039	
12.50 to 13.00; (0.122 µm)	0.4375	
13.00 to 13.50; (0.086 µm)	0.2668	

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Exercise Code:	PS60
LabCode:	BM_REP4
Sample Code:	PS60REP4

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm	0.0000	
-6.00 to -5.50; 45 mm	0.0000	
-5.50 to -5.00; 31.5 mm	0.0000	
-5.00 to -4.50; 22.4 mm	0.0000	
-4.50 to -4.00; 16 mm	0.0000	
-4.00 to -3.50; 11.2 mm	0.0000	
-3.50 to -3.00; 8 mm	0.0000	
-3.00 to -2.50; 5.6 mm	0.0000	
-2.50 to -2.00; 4 mm	0.0000	
-2.00 to -1.50; 2.8 mm	0.0000	
-1.50 to -1.00; 2 mm	0.0000	
-1.00 to -0.50; 1.4 mm	0.0000	
-0.50 to 0.00; 1 mm	0.0000	
0.00 to 0.50; (707 µm)	0.0037	
0.50 to 1.00; (500 µm)	0.3425	
1.00 to 1.50; (353.6 µm)	0.8824	
1.50 to 2.00; (250 µm)	0.8846	
2.00 to 2.50; (176.8 µm)	1.8569	
2.50 to 3.00; (125 µm)	3.2126	
3.00 to 3.50; (88.39 µm)	5.3996	
3.50 to 4.00; (62.5 µm)	6.8714	
4.00 to 4.50; (44.19 µm)	8.9884	
4.50 to 5.00; (31.25 µm)	11.0139	
5.00 to 5.50; (22.097 µm)	11.0075	
5.50 to 6.00; (15.625 µm)	10.4626	
6.00 to 6.50; (11.049 µm)	9.1506	
6.50 to 7.00; (7.813 µm)	7.4215	
7.00 to 7.50; (5.524 µm)	5.7510	
7.50 to 8.00; (3.906 µm)	4.2180	
8.00 to 8.50; (2.762 µm)	2.8912	
8.50 to 9.00; (1.953 µm)	1.9433	
9.00 to 9.50; (1.381 µm)	1.3964	
9.50 to 10.00; (0.977 µm)	1.1313	
10.00 to 10.50; (0.691 µm)	1.0311	
10.50 to 11.00; (0.488 µm)	0.9995	
11.00 to 11.50; (0.345 µm)	0.9470	
11.50 to 12.00; (0.244 µm)	0.8266	
12.00 to 12.50; (0.173 µm)	0.6319	
12.50 to 13.00; (0.122 µm)	0.4567	
13.00 to 13.50; (0.086 µm)	0.2778	

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Exercise Code:	PS60
LabCode:	BM_REP5
Sample Code:	PS60REP5

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Percentage (mark as "0" for no material or not analysed)	Grams
-6.50 to -6.00; 63 mm	0.0000	
-6.00 to -5.50; 45 mm	0.0000	
-5.50 to -5.00; 31.5 mm	0.0000	
-5.00 to -4.50; 22.4 mm	0.0000	
-4.50 to -4.00; 16 mm	0.0000	
-4.00 to -3.50; 11.2 mm	0.0000	
-3.50 to -3.00; 8 mm	0.0000	
-3.00 to -2.50; 5.6 mm	0.0000	
-2.50 to -2.00; 4 mm	0.0000	
-2.00 to -1.50; 2.8 mm	0.0000	
-1.50 to -1.00; 2 mm	0.0000	
-1.00 to -0.50; 1.4 mm	0.0000	
-0.50 to 0.00; 1 mm	0.0000	
0.00 to 0.50; (707 µm)	0.0065	
0.50 to 1.00; (500 µm)	0.3917	
1.00 to 1.50; (353.6 µm)	1.0591	
1.50 to 2.00; (250 µm)	1.0865	
2.00 to 2.50; (176.8 µm)	2.1608	
2.50 to 3.00; (125 µm)	3.6807	
3.00 to 3.50; (88.39 µm)	5.9229	
3.50 to 4.00; (62.5 µm)	7.2976	
4.00 to 4.50; (44.19 µm)	9.1521	
4.50 to 5.00; (31.25 µm)	10.9218	
5.00 to 5.50; (22.097 µm)	10.7627	
5.50 to 6.00; (15.625 µm)	10.2121	
6.00 to 6.50; (11.049 µm)	8.9682	
6.50 to 7.00; (7.813 µm)	7.2811	
7.00 to 7.50; (5.524 µm)	5.6034	
7.50 to 8.00; (3.906 µm)	4.0498	
8.00 to 8.50; (2.762 µm)	2.7204	
8.50 to 9.00; (1.953 µm)	1.7904	
9.00 to 9.50; (1.381 µm)	1.2656	
9.50 to 10.00; (0.977 µm)	1.0158	
10.00 to 10.50; (0.691 µm)	0.9229	
10.50 to 11.00; (0.488 µm)	0.8948	
11.00 to 11.50; (0.345 µm)	0.8492	
11.50 to 12.00; (0.244 µm)	0.7435	
12.00 to 12.50; (0.173 µm)	0.5715	
12.50 to 13.00; (0.122 µm)	0.4151	
13.00 to 13.50; (0.086 µm)	0.2539	

APPENDIX 2

Appendix 2.1 - Percentage of sand, silt and clay recorded by each participant, calculated in GRADISTAT from final merged data used to create Figure 4.

	sand	silt	clay
PSA_2301	23.54	73.27	3.19
PSA_2302	19.97	72.97	7.06
PSA_2303	21.21	72.24	6.54
PSA_2304	22.99	71.55	5.47
PSA_2305	7.71	16.61	75.68
PSA_2306	20.69	78.36	0.94
PSA_2307	11.63	85.52	2.85
PSA_2308	22.10	77.89	0.01
PSA_2309	22.33	74.63	3.04
PSA_2310	21.53	75.14	3.33
PSA_2311	22.74	74.43	2.83
PSA_2312	24.22	73.33	2.45
PSA_2313	23.09	71.07	5.84
PSA_2320	38.80	58.55	2.65
BM Average	21.13	71.87	7.00

Appendix 2.2 - Summary of final laser data provided by each participant used to create Figure 5.

	Percentage									
	0 - 1 phi	1 - 2 phi	2 - 3 phi	3 - 4 phi	4 - 5 phi	5 - 6 phi	6 - 7 phi	7 - 8 phi	8 - 9 phi	>9 phi
PSA_2301	0.45	2.81	6.58	13.70	20.03	20.58	16.75	10.90	5.03	3.19
PSA_2302	0.19	1.81	5.53	12.45	19.63	21.06	17.06	10.40	4.82	7.06
PSA_2303	0.22	0.87	7.54	12.58	19.06	19.78	17.09	10.94	5.37	6.54
PSA_2304	0.42	2.09	6.64	13.83	19.84	20.70	17.28	9.75	3.98	5.46
PSA_2305	0.00	1.93	3.17	2.61	4.51	3.86	3.79	2.95	1.50	75.68
PSA_2306	0.41	2.31	5.10	12.88	19.89	21.37	18.41	12.79	5.91	0.94
PSA_2307	1.40	2.10	1.39	6.73	18.11	24.13	20.55	14.83	7.91	2.85
PSA_2308	0.05	2.10	6.35	13.60	19.89	21.91	18.91	13.52	3.66	0.01
PSA_2309	0.08	2.23	6.07	13.96	19.65	20.75	17.94	11.27	5.02	3.04
PSA_2310	1.12	1.71	5.76	12.94	19.67	21.49	17.92	11.31	4.75	3.33
PSA_2311	0.25	2.41	6.34	13.67	19.38	21.33	18.17	11.04	4.57	2.83
PSA_2312	0.02	2.27	7.43	14.51	19.20	20.42	17.04	11.39	5.28	2.45
PSA_2313	0.36	2.15	6.39	14.20	20.66	21.22	16.24	9.06	3.88	5.84
PSA_2320	0.04	3.86	11.52	23.38	25.28	16.26	9.20	4.99	2.81	2.65
BM Average	0.34	1.97	5.68	13.14	20.17	21.16	16.36	9.67	4.51	6.99

APPENDIX 2

Appendix 2.3 - Percentage sand and mud as provided by the participant in the summary data and the D_{10}, D_{50} and D_{90} (microns) of final merged data calculated using GRADISTAT, used to create Figures 6 (a) and (b).

	sand	mud	d10	d50	d90
			microns		
PSA_2301	23.54	76.46	4.5	25.3	123.8
PSA_2302	19.97	80.03	3.1	22.3	107.0
PSA_2303	21.21	78.79	3.2	22.3	114.5
PSA_2304	23.20	76.80	4.1	24.7	119.2
PSA_2305	7.90	92.10	1.4	1.7	49.6
PSA_2306	20.69	79.31	4.8	23.1	108.4
PSA_2307	11.63	88.37	3.7	17.5	70.7
PSA_2308	22.10	77.90	5.6	24.3	113.8
PSA_2309	22.33	77.67	4.5	23.9	113.6
PSA_2310	21.53	78.47	4.5	23.8	113.8
PSA_2311	22.74	77.26	4.8	24.2	118.4
PSA_2312	24.20	75.80	4.6	25.1	123.0
PSA_2313	23.09	76.91	4.0	25.6	117.8
PSA_2320	38.81	61.19	7.4	46.9	163.6
BM Average	21.13	78.87	3.2	23.7	110.9