NMBAQC

NE Atlantic Marine Biological Analytical Quality Control Scheme

Particle Size Report - PS63

Particle Size Component 2016/17

January 2017

Lydia Finbow & David Hall
nmbaqc@apemltd.co.uk

APEM

CONTENTS

BENCHMARK DATA

Table 1. Summary data for the benchmark replicates distributed as PS63.

	Method	% Gravel	% Sand	% Mud	Sediment Description (Post analysis)
BM REPLICATE 1	NMBAQC	100.00	0.00	0.00	Gravel
BM REPLICATE 2	NMBAQC	100.00	0.00	0.00	Gravel
BM REPLICATE 3	NMBAQC	100.00	0.00	0.00	Gravel
BM REPLICATE 4	NMBAQC	100.00	0.00	0.00	Gravel
BM REPLICATE 5	NMBAQC	100.00	0.00	0.00	Gravel
REP AVERAGE	NMBAQC	100.00	0.00	0.00	Gravel

Table 2. Summary of equipment used and sieve data for the benchmark replicates distributed as PS63.

	Sieves used	Phi; sieve mesh			Total Weight (g)	Laser used
		Weight (g)				
		< 0.00; >1 mm	> 0.00; <1 mm			
			Base Pan	Oven Dried		
BM REPLICATE 1	☑	1162.23	-	-	1162.23	☒
BM REPLICATE 2	☑	1160.68	-	-	1160.68	☒
BM REPLICATE 3	☑	1163.84	-	-	1163.84	☒
BM REPLICATE 4	☑	1162.59	-	-	1162.59	☒
BM REPLICATE 5	☑	1163.68	-	-	1163.68	☒
BM AVERAGE	☑	1162.60	-	-	1162.60	☒

Table 3. Summary of final laser data for the benchmark replicates distributed as PS63.

	% Sand			
	Coarse 0 - 1 phi	Medium 1 - 2 phi	Fine 2 - 3 phi	Very Fine 3 - 4 phi
BM REPLICATE 1	-	-	-	-
BM REPLICATE 2	-	**No Laser Analysis Required**		-
BM REPLICATE 3	-			-
BM REPLICATE 4	-			-
BM REPLICATE 5	-	-	-	-
BM AVERAGE	-	-	-	-

	% 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	-	-	-	-	-	-
BM REPLICATE 2	-	**No Laser Analysis Required**				-
BM REPLICATE 3	-					-
BM REPLICATE 4	-					-
BM REPLICATE 5	-	-	-	-	-	-
BM AVERAGE	-	-	-	-	-	-

BENCHMARK DATA

Table 4. Summary of descriptive statistics and coefficient of variance for the benchmark replicates distributed as PS63.

	D10 (µm) Result	D50 (µm) Result	D90 (µm) Result	Mean (µm) Result
BM REPLICATE 1	5818.85	8502.24	10616.26	8156.11
BM REPLICATE 2	5870.75	8491.49	10605.44	8167.53
BM REPLICATE 3	5836.85	8534.55	10616.28	8180.24
BM REPLICATE 4	5862.82	8468.22	10598.75	8151.14
BM REPLICATE 5	5854.41	8453.68	10610.98	8142.90
Mean	5848.73	8490.04	10609.54	8159.59
Standard Deviation	20.92	31.35	7.51	14.59
Coefficient of Variance (COV)	0.36	0.37	0.07	0.18

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

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 PS63 show a COV <3% for the D50 and <5% for the D10 and D90.

The replicates show good reproducibility.

Figure 1. Scatterplot of Benchmark Data for PS63 with error bars showing ± 1 SD.

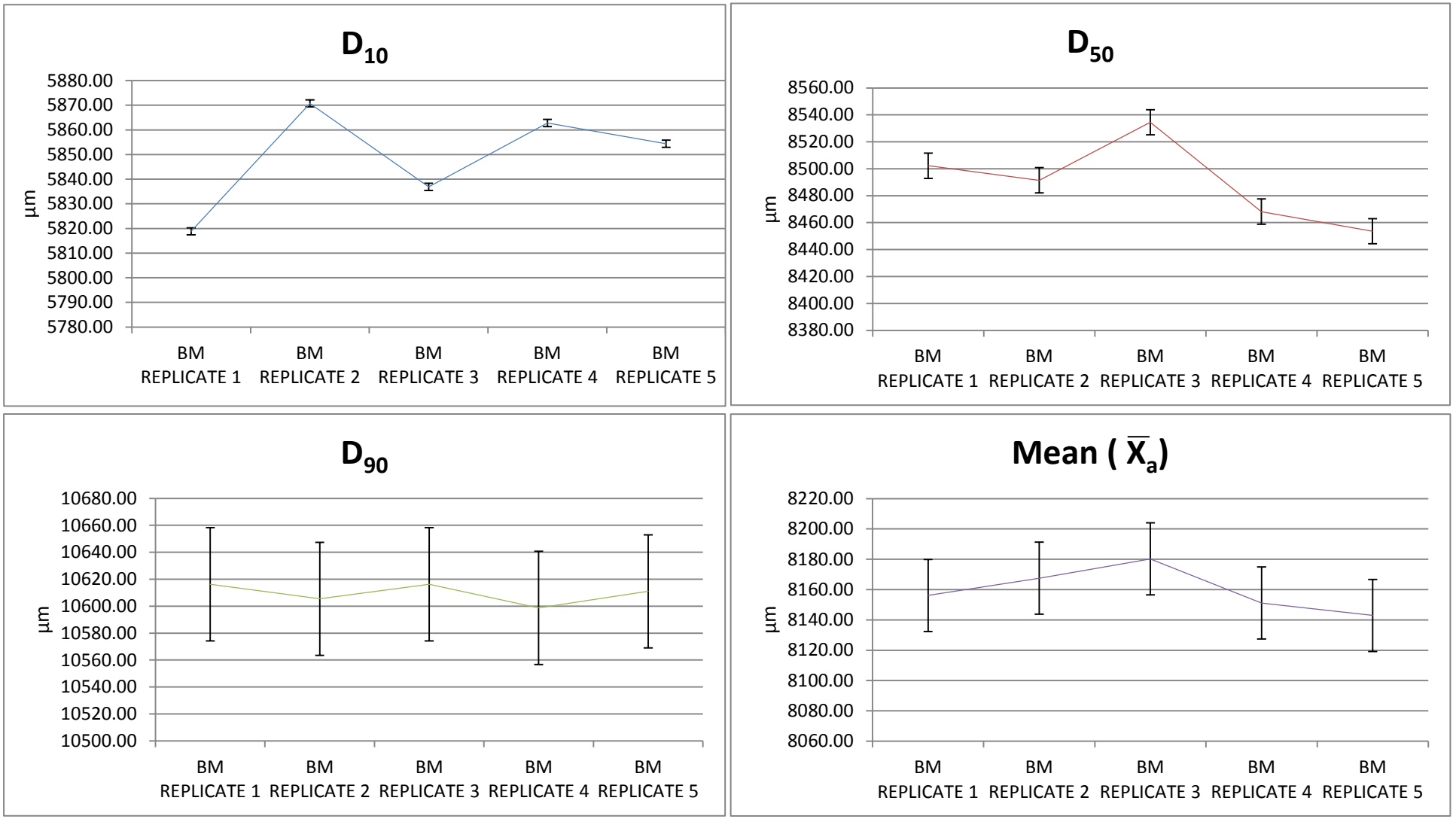
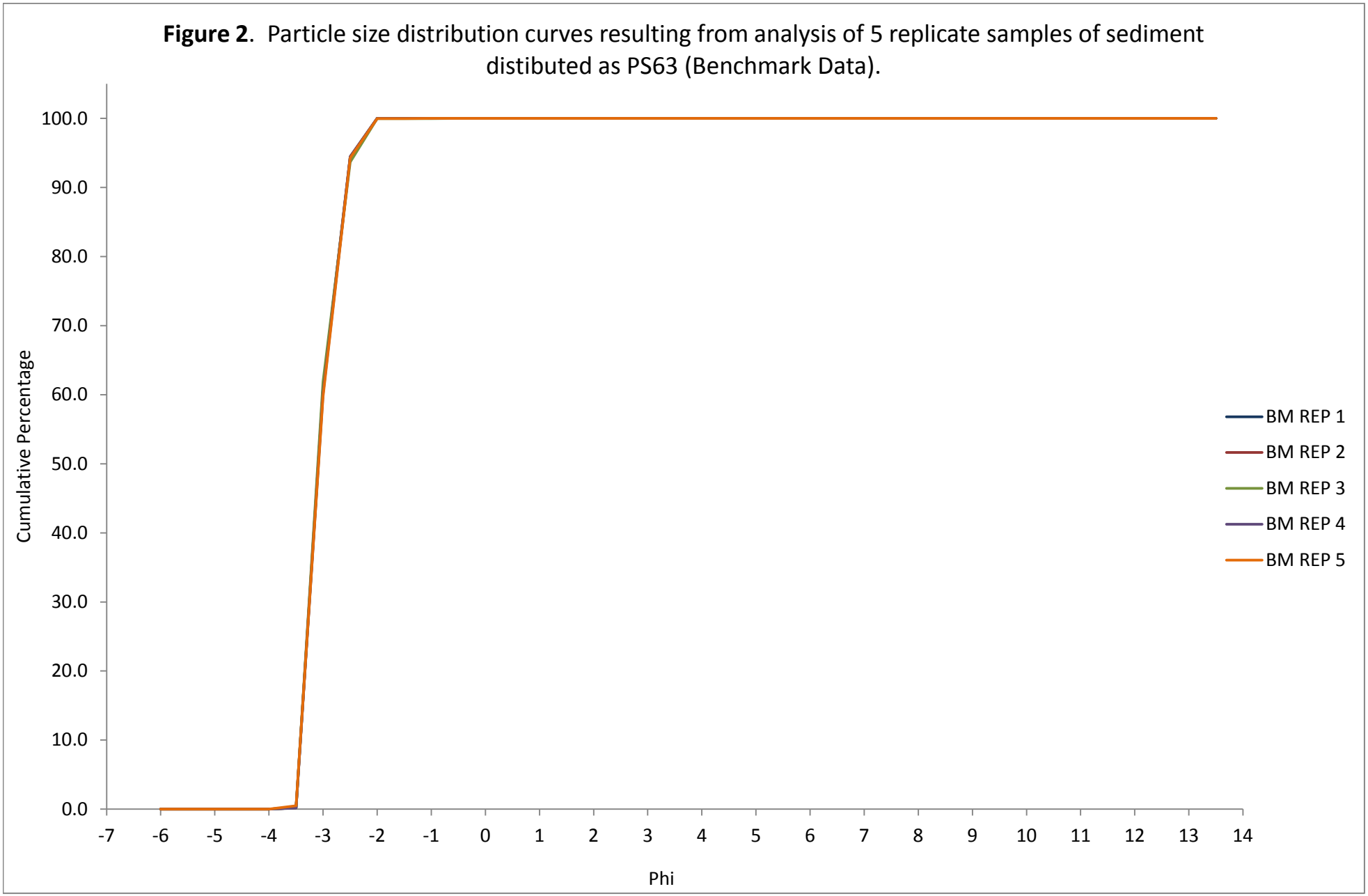


Figure 2. Particle size distribution curves resulting from analysis of 5 replicate samples of sediment distibuted as PS63 (Benchmark Data).



PARTICIPANT DATA

Table 5. Summary of equipment and methods used by participants and sample summary data for PS63.

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	YES	NO	NMBAQC	NO	NO	100.00	0.00	0.00	Gravel
PSA_2301	YES	NO	NMBAQC*	NO	NO	99.994	0.003	0.004	Gravel
PSA_2302	YES	N0	NMBAQC	NO	NO	99.98	0.02	0.00	Gravel
PSA_2303	YES	NO	NMBAQC	NO	NO	99.98	0.02	0.00	Gravel
PSA_2304	YES	NO	NMBAQC	NO	NO	100.00	0.00	0.00	Gravel
PSA_2305	YES	NO	OTHER[1]	NO	NO	100.00	0.00	0.00	Gravel
PSA_2306	YES	NO	NMBAQC	NO	NO	99.95	0.05	0.00	Gravel
PSA_2307	YES	NO	NMBAQC	NO	NO	100.00	0.00	0.00	Gravel
PSA_2308	YES	NO	NMBAQC	NO	NO	99.98	0.02	0.00	Gravel
PSA_2309	YES	NO	NMBAQC	NO	NO	100.00	0.00	0.00	Gravel
PSA_2310	YES	YES	OTHER[2]	NO	NO	99.96	0.03	0.01	Gravel
PSA_2311	YES	NO	NMBAQC	NO	NO	99.96	0.04	0.00	Gravel
PSA_2312	YES	NO	NMBAQC	NO	NO	100.00	0.00	0.00	Gravel
PSA_2313	YES	NO	NMBAQC	NO	NO	100.00	0.00	0.00	Gravel
PSA_2320	YES	NO	NMBAQC	NO	NO	100.00	0.00	0.00	Gravel

NB: Decimal places as supplied by participant.

NMBAQC* - PSA SOP for supporting biological data - incorporating BS1377: 1990 Parts 1-2 (sieving).

OTHER[1]- Sieved to 63microns.

OTHER[2] - In-house methodology used, details found in Appendix 1.

PARTICIPANT DATA

Table 6. Raw sieve data (weight in grams) provided by participants for PS63.

		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		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	0.00	0.00	0.00	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	0.00	0.00	0.00	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	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-4.00 to -3.50; 11.2 mm		3.24	0.00	9.14	12.40	0.00	30.13	7.11	19.58	42.64	16.77	0.00	13.68	18.43	2.15	18.21
-3.50 to -3.00; 8 mm		702.22	697.20	681.51	673.30	13.69	698.54	678.52	704.96	683.35	704.65	664.37	673.35	628.31	702.71	659.24
-3.00 to -2.50; 5.6 mm		388.27	406.65	354.88	422.81	714.02	380.65	401.26	384.17	365.23	392.95	441.27	419.83	331.19	391.59	437.03
-2.50 to -2.00; 4 mm		68.69	52.17	112.36	52.03	368.24	45.18	70.88	53.38	68.11	41.36	53.30	53.14	46.22	64.20	47.97
-2.00 to -1.50; 2.8 mm		0.12	0.00	0.34	0.15	65.45	0.00	0.20	0.00	0.20	0.00	0.60	0.55	0.19	0.03	0.16
-1.50 to -1.00; 2 mm		0.03	0.02	0.05	0.02	0.42	0.00	0.03	0.04	0.05	0.01	0.10	0.01	0.00	0.00	0.16
-1.00 to -0.50; 1.4 mm		0.04	0.00	0.01	0.03	0.01	0.04	0.00	0.02	0.03	0.00	0.07	0.03	0.00	0.03	0.03
-0.50 to 0.00; 1 mm		0.00	0.01	0.06	0.02	0.00	0.02	0.00	0.01	0.06	0.02	0.00	0.01	0.00	0.00	0.00
Total		1162.60	1156.05	1158.35	1160.76	1161.83	1154.55	1158.01	1162.16	1159.67	1155.76	1159.70	1160.60	1024.34	1160.71	1162.80
Summary Data																
< 0.00; >1 mm		1162.60	1156.05	1158.35	1160.76	1161.83	1154.55	1158.01	1162.16	1159.67	1155.76	1159.70	1160.60	1024.34	1160.71	1162.80
> 0.00; <1 mm	Base Pan	0.00	0.057	0.15	0.14	0.00	0.64	0.05	0.08	0.13	0.08	0.40	0.70	0.00	0.00	0.00
	Oven Dried	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.40	0.00	0.00	0.00
Total Sample Weight		1162.60	1156.11	1158.50	1160.90	1161.83	1155.19	1158.06	1162.24	1159.80	1156.07	1160.10	1161.70	1024.34	1160.71	1162.80

Table 7. Summary of final laser data for the participants for sediment distributed as PS63.

	Phi interval; (sieve mesh (µm))																												
	0.00 to 0.50; (707 µm)	0.50 to 1.00; (500 µm)	1.00 to 1.50; (353.6 µm)	1.50 to 2.00; (250 µm)	2.00 to 2.50; (176.8 µm)	2.50 to 3.00; (125 µm)	3.00 to 3.50; (88.39 µm)	3.50 to 4.00; (62.5 µm)	4.00 to 4.50; (44.19 µm)	4.50 to 5.00; (31.25 µm)	5.00 to 5.50; (22.097 µm)	5.50 to 6.00; (15.625 µm)	6.00 to 6.50; (11.049 µm)	6.50 to 7.00; (7.813 µm)	7.00 to 7.50; (5.524 µm)	7.50 to 8.00; (3.906 µm)	8.00 to 8.50; (2.762 µm)	8.50 to 9.00; (1.953 µm)	9.00 to 9.50; (1.381 µm)	9.50 to 10.00; (0.977 µm)	10.00 to 10.50; (0.691 µm)	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)	Total
BM Av	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2301	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2302	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2303	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2304	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2305	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2306	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2307	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2308	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2309	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2310	33.5	0.0	0.3	14.7	26.3	16.9	2.2	0.4	1.0	1.1	0.9	0.6	0.5	0.4	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.00
PSA_2311	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2313	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2320	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Correctly re-proportioned laser data should equal 100%.

- Did not use a laser anaslyser.

Figure 3. Particle size distribution curves from all participating laboratories and the Benchmark Average for sediment distributed as PS63.

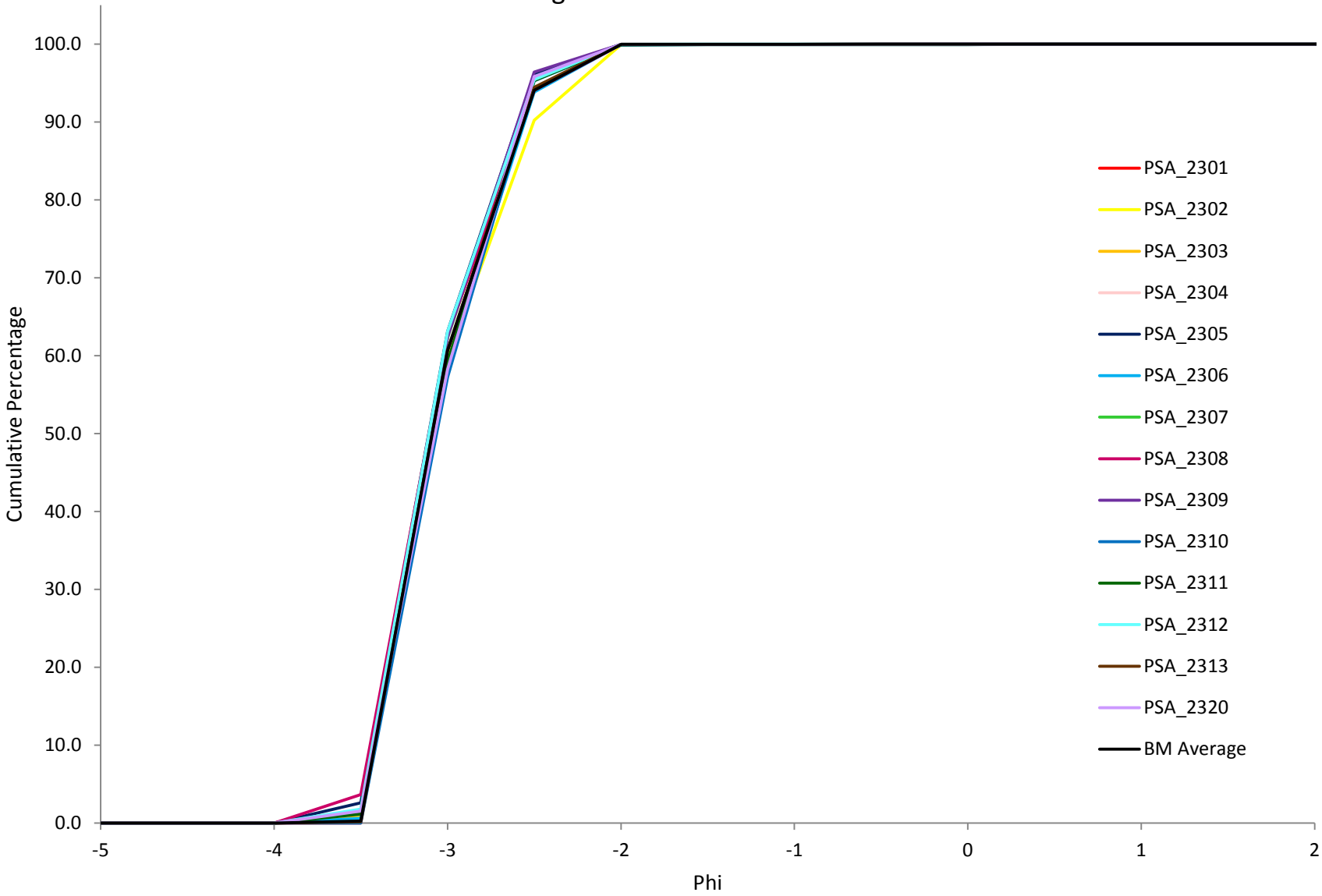


Figure 4. Bar chart showing the percentage medium gravel, fine gravel and very fine gravel recorded by each participating laboratory and the benchmark average for PS63.

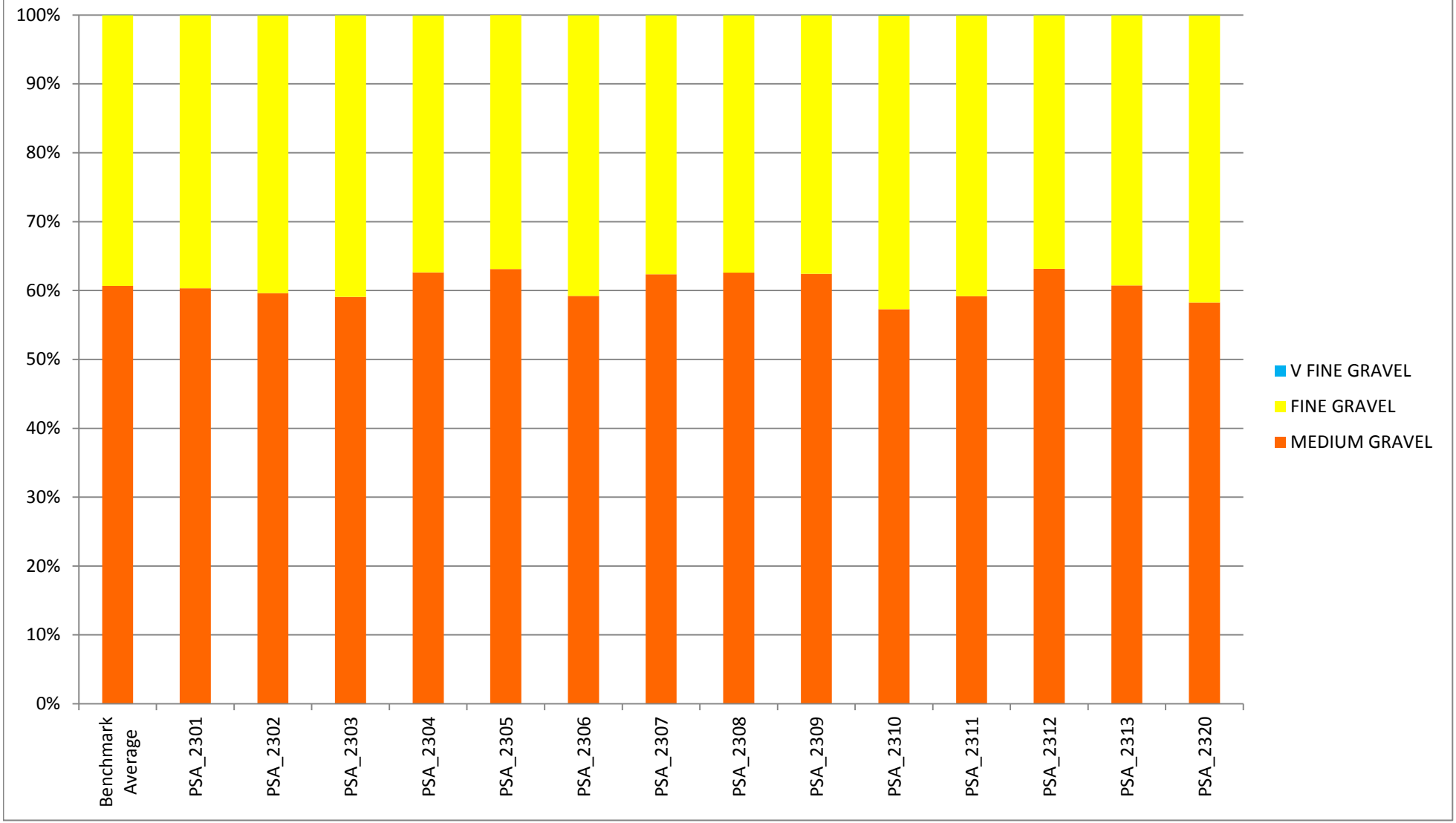


Figure 5. Bar chart of percentage sediment retained in each half-phi interval for the sieve (>1mm) data recorded by each participating laboratory and the benchmark average for sediment distributed as PS63.

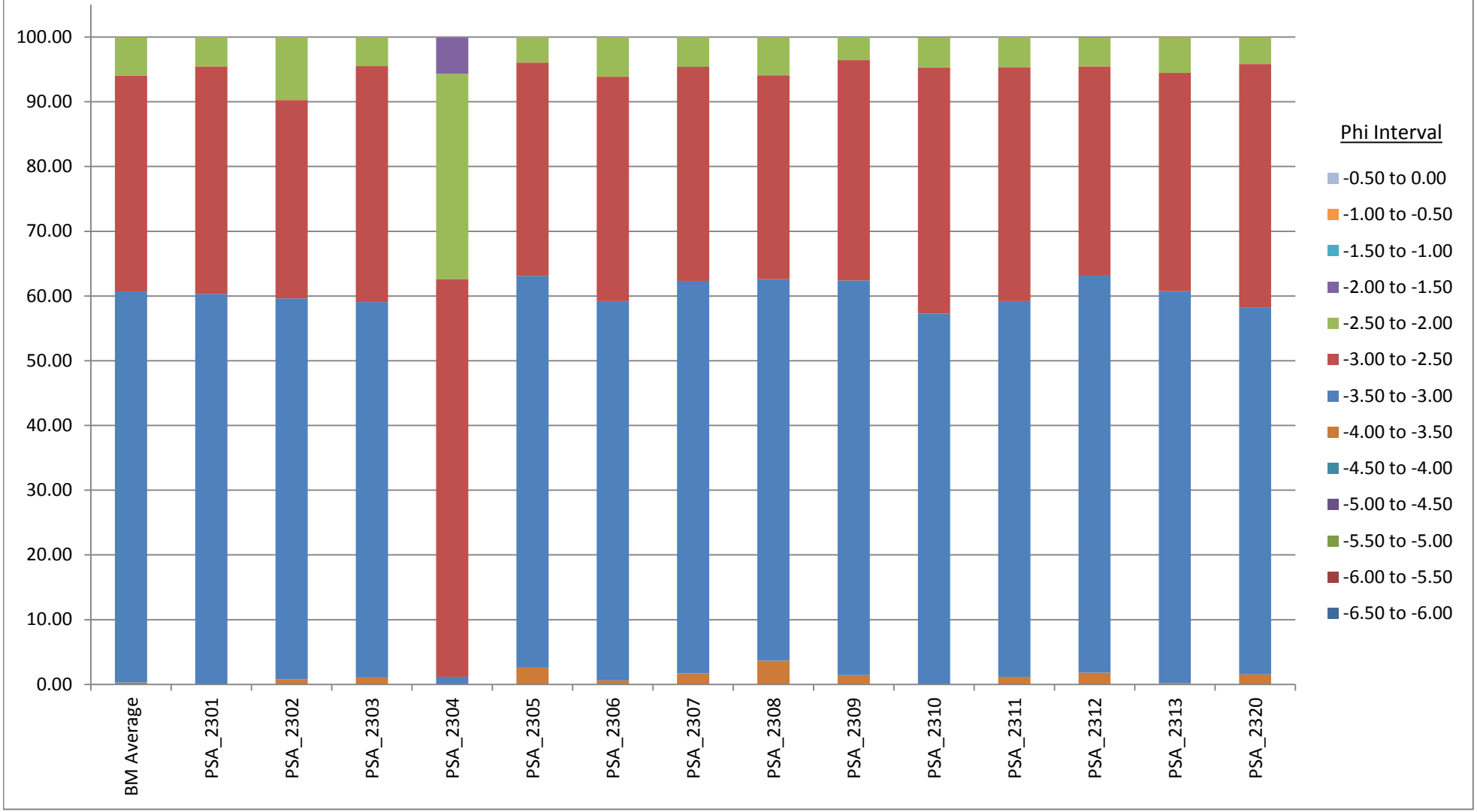
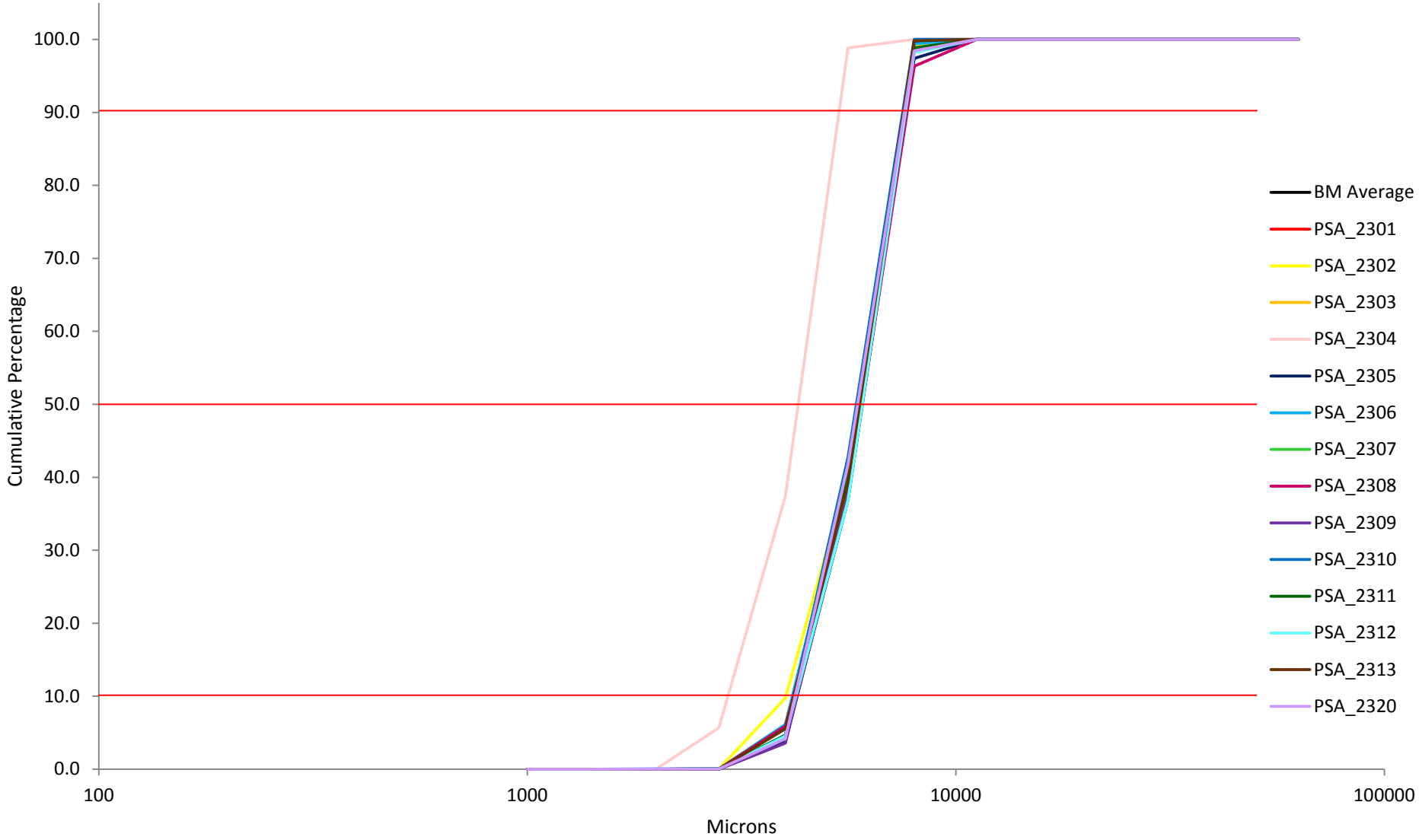


Figure 6. Cumulative percentage curves from all participating laboratories and the Benchmark Average for the sieve (>1mm) component of sediment distributed as PS63.



APPENDICIES

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2301**
Sample Code:	**PS63PSA_2301**

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	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	60.3055	697.1950
-3.00 to -2.50; 5.6 mm	35.1740	406.6490
-2.50 to -2.00; 4 mm	4.5124	52.1680
-2.00 to -1.50; 2.8 mm	0.0003	0.0040
-1.50 to -1.00; 2 mm	0.0014	0.0160
-1.00 to -0.50; 1.4 mm	0.0003	0.0030
-0.50 to 0.00; 1 mm	0.0012	0.0140
< 0.00; (< 1 mm)	0.0049	0.0570
Total	100.00	1156.11

COMMENTS: NMBAQC PSA SOP for supporting biological data - incorporating BS1377: 1990 Parts 1-2 (sieving).

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2302**
Sample Code:	**PS632302**

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	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	0.79	9.14
-3.50 to -3.00; 8 mm	58.83	681.51
-3.00 to -2.50; 5.6 mm	30.63	354.88
-2.50 to -2.00; 4 mm	9.70	112.36
-2.00 to -1.50; 2.8 mm	0.03	0.34
-1.50 to -1.00; 2 mm	0.00	0.05
-1.00 to -0.50; 1.4 mm	0.00	0.01
-0.50 to 0.00; 1 mm	0.01	0.06
0.00 to 0.50; (707 µm)	0.01	0.15
0.50 to 1.00; (500 µm)		
1.00 to 1.50; (353.6 µm)		
1.50 to 2.00; (250 µm)		
2.00 to 2.50; (176.8 µm)		
2.50 to 3.00; (125 µm)		
3.00 to 3.50; (88.39 µm)		
3.50 to 4.00; (62.5 µm)		
4.00 to 4.50; (44.19 µm)		
4.50 to 5.00; (31.25 µm)		
5.00 to 5.50; (22.097 µm)		
5.50 to 6.00; (15.625 µm)		
6.00 to 6.50; (11.049 µm)		
6.50 to 7.00; (7.813 µm)		
7.00 to 7.50; (5.524 µm)		
7.50 to 8.00; (3.906 µm)		
8.00 to 8.50; (2.762 µm)		
8.50 to 9.00; (1.953 µm)		
9.00 to 9.50; (1.381 µm)		
9.50 to 10.00; (0.977 µm)		
10.00 to 10.50; (0.691 µm)		
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)		
Total	100.00	1158.50

COMMENTS:

Red text calculated by APEM.

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2303**
Sample Code:	**PS632303**

Phi interval (explicit)	**Percentage**	**Grams**
+ sieve mesh (theoretical sieves shown in brackets)	**(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	1.07	12.40
-3.50 to -3.00; 8 mm	58.00	673.30
-3.00 to -2.50; 5.6 mm	36.42	422.81
-2.50 to -2.00; 4 mm	4.48	52.03
-2.00 to -1.50; 2.8 mm	0.01	0.15
-1.50 to -1.00; 2 mm	0.00	0.02
-1.00 to -0.50; 1.4 mm	0.00	0.03
-0.50 to 0.00; 1 mm	0.00	0.02
0.00 to 0.50; (707 µm)	0.01	0.14
0.50 to 1.00; (500 µm)		
1.00 to 1.50; (353.6 µm)		
1.50 to 2.00; (250 µm)		
2.00 to 2.50; (176.8 µm)		
2.50 to 3.00; (125 µm)		
3.00 to 3.50; (88.39 µm)		
3.50 to 4.00; (62.5 µm)		
4.00 to 4.50; (44.19 µm)		
4.50 to 5.00; (31.25 µm)		
5.00 to 5.50; (22.097 µm)		
5.50 to 6.00; (15.625 µm)		
6.00 to 6.50; (11.049 µm)		
6.50 to 7.00; (7.813 µm)		
7.00 to 7.50; (5.524 µm)		
7.50 to 8.00; (3.906 µm)		
8.00 to 8.50; (2.762 µm)		
8.50 to 9.00; (1.953 µm)		
9.00 to 9.50; (1.381 µm)		
9.50 to 10.00; (0.977 µm)		
10.00 to 10.50; (0.691 µm)		
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)		
Total	100.00	1160.90

COMMENTS:

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2304**
Sample Code:	**PS632304**

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		
-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	1.1783	13.69
-3.50 to -3.00; 8 mm	61.4565	714.02
-3.00 to -2.50; 5.6 mm	31.6948	368.24
-2.50 to -2.00; 4 mm	5.6334	65.45
-2.00 to -1.50; 2.8 mm	0.0361	0.42
-1.50 to -1.00; 2 mm	0.0009	0.01
-1.00 to -0.50; 1.4 mm		
-0.50 to 0.00; 1 mm		
0.00 to 0.50; (707 µm)		
0.50 to 1.00; (500 µm)		
1.00 to 1.50; (353.6 µm)		
1.50 to 2.00; (250 µm)		
2.00 to 2.50; (176.8 µm)		
2.50 to 3.00; (125 µm)		
3.00 to 3.50; (88.39 µm)		
3.50 to 4.00; (62.5 µm)		
4.00 to 4.50; (44.19 µm)		
4.50 to 5.00; (31.25 µm)		
5.00 to 5.50; (22.097 µm)		
5.50 to 6.00; (15.625 µm)		
6.00 to 6.50; (11.049 µm)		
6.50 to 7.00; (7.813 µm)		
7.00 to 7.50; (5.524 µm)		
7.50 to 8.00; (3.906 µm)		
8.00 to 8.50; (2.762 µm)		
8.50 to 9.00; (1.953 µm)		
9.00 to 9.50; (1.381 µm)		
9.50 to 10.00; (0.977 µm)		
10.00 to 10.50; (0.691 µm)		
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)		
Total	103.23	1161.83

COMMENTS:

Red text calculated by APEM.

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2305**
Sample Code:	**PS632305**

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	2.6094	30.128
-3.50 to -3.00; 8 mm	60.4999	698.542
-3.00 to -2.50; 5.6 mm	32.9676	380.649
-2.50 to -2.00; 4 mm	3.9129	45.179
-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	0.0035	0.0400
-0.50 to 0.00; 1 mm	0.0013	0.0150
0.00 to 0.50; (707 µm)	0.0004	0.0050
0.50 to 1.00; (500 µm)	0.0003	0.0030
1.00 to 1.50; (353.6 µm)	0.0005	0.0060
1.50 to 2.00; (250 µm)	0.0010	0.0110
2.00 to 2.50; (176.8 µm)	0.0005	0.0060
2.50 to 3.00; (125 µm)	0.0006	0.0070
3.00 to 3.50; (88.39 µm)	0.0010	0.0110
3.50 to 4.00; (62.5 µm)	0.0006	0.0070
4.00 to 4.50; (44.19 µm)	0.0007	0.0080
4.50 to 5.00; (31.25 µm)		
5.00 to 5.50; (22.097 µm)		
5.50 to 6.00; (15.625 µm)		
6.00 to 6.50; (11.049 µm)		
6.50 to 7.00; (7.813 µm)		
7.00 to 7.50; (5.524 µm)		
7.50 to 8.00; (3.906 µm)		
8.00 to 8.50; (2.762 µm)		
8.50 to 9.00; (1.953 µm)		
9.00 to 9.50; (1.381 µm)		
9.50 to 10.00; (0.977 µm)		
10.00 to 10.50; (0.691 µm)		
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)		
Total	100.00	1154.62

COMMENTS: Sieved to 63microns.

Red text calculated by APEM.

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2306**
Sample Code:	**PS632306**

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	0.6140	7.11
-3.50 to -3.00; 8 mm	58.5913	678.52
-3.00 to -2.50; 5.6 mm	34.6495	401.26
-2.50 to -2.00; 4 mm	6.1206	70.88
-2.00 to -1.50; 2.8 mm	0.0173	0.20
-1.50 to -1.00; 2 mm	0.0026	0.03
-1.00 to -0.50; 1.4 mm	0.0003	0.00
-0.50 to 0.00; 1 mm	0.0001	0.00
0.00 to 0.50; (707 µm)	0.0043	0.05
0.50 to 1.00; (500 µm)		
1.00 to 1.50; (353.6 µm)		
1.50 to 2.00; (250 µm)		
2.00 to 2.50; (176.8 µm)		
2.50 to 3.00; (125 µm)		
3.00 to 3.50; (88.39 µm)		
3.50 to 4.00; (62.5 µm)		
4.00 to 4.50; (44.19 µm)		
4.50 to 5.00; (31.25 µm)		
5.00 to 5.50; (22.097 µm)		
5.50 to 6.00; (15.625 µm)		
6.00 to 6.50; (11.049 µm)		
6.50 to 7.00; (7.813 µm)		
7.00 to 7.50; (5.524 µm)		
7.50 to 8.00; (3.906 µm)		
8.00 to 8.50; (2.762 µm)		
8.50 to 9.00; (1.953 µm)		
9.00 to 9.50; (1.381 µm)		
9.50 to 10.00; (0.977 µm)		
10.00 to 10.50; (0.691 µm)		
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)		
Total	100.00	1158.06

COMMENTS:

Red text calculated by APEM.

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2307**
Sample Code:	**PS632307**

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	0.00
-6.00 to -5.50; 45 mm	0.0000	0.00
-5.50 to -5.00; 31.5 mm	0.0000	0.00
-5.00 to -4.50; 22.4 mm	0.0000	0.00
-4.50 to -4.00; 16 mm	0.0000	0.00
-4.00 to -3.50; 11.2 mm	1.6848	19.58
-3.50 to -3.00; 8 mm	60.6595	704.96
-3.00 to -2.50; 5.6 mm	33.0565	384.17
-2.50 to -2.00; 4 mm	4.5932	53.38
-2.00 to -1.50; 2.8 mm	0.0000	0.00
-1.50 to -1.00; 2 mm	0.0034	0.04
-1.00 to -0.50; 1.4 mm	0.0017	0.02
-0.50 to 0.00; 1 mm	0.0009	0.01
0.00 to 0.50; (707 µm)	0.0000	0.00
0.50 to 1.00; (500 µm)	0.0000	0.00
1.00 to 1.50; (353.6 µm)	0.0000	0.00
1.50 to 2.00; (250 µm)	0.0000	0.00
2.00 to 2.50; (176.8 µm)	0.0000	0.00
2.50 to 3.00; (125 µm)	0.0000	0.00
3.00 to 3.50; (88.39 µm)	0.0000	0.00
3.50 to 4.00; (62.5 µm)	0.0000	0.00
4.00 to 4.50; (44.19 µm)	0.0000	0.00
4.50 to 5.00; (31.25 µm)	0.0000	0.00
5.00 to 5.50; (22.097 µm)	0.0000	0.00
5.50 to 6.00; (15.625 µm)	0.0000	0.00
6.00 to 6.50; (11.049 µm)	0.0000	0.00
6.50 to 7.00; (7.813 µm)	0.0000	0.00
7.00 to 7.50; (5.524 µm)	0.0000	0.00
7.50 to 8.00; (3.906 µm)	0.0000	0.00
8.00 to 8.50; (2.762 µm)	0.0000	0.00
8.50 to 9.00; (1.953 µm)	0.0000	0.00
9.00 to 9.50; (1.381 µm)	0.0000	0.00
9.50 to 10.00; (0.977 µm)	0.0000	0.00
10.00 to 10.50; (0.691 µm)	0.0000	0.00
10.50 to 11.00; (0.488 µm)	0.0000	0.00
11.00 to 11.50; (0.345 µm)	0.0000	0.00
11.50 to 12.00; (0.244 µm)	0.0000	0.00
12.00 to 12.50; (0.173 µm)	0.0000	0.00
12.50 to 13.00; (0.122 µm)	0.0000	0.00
13.00 to 13.50; (0.086 µm)	0.0000	0.00
Total	100.00	1162.16

COMMENTS: Sample appeared to be dry in sample pot on arrival. All visually assesed to be ≥1mm fraction. Dried for 24 hours, dry sieve only.

Red text calculated by APEM.

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2308**
Sample Code:	**PS632308**

Phi interval (explicit)	**Percentage**	**Grams**
+ sieve mesh (theoretical sieves shown in brackets)	**(mark as "0" for no material or not analysed)**	
-6.50 to -6.00; 63 mm	0.0000	0
-6.00 to -5.50; 45 mm	0.0000	0
-5.50 to -5.00; 31.5 mm	0.0000	0
-5.00 to -4.50; 22.4 mm	0.0000	0
-4.50 to -4.00; 16 mm	0.0000	0
-4.00 to -3.50; 11.2 mm	3.6765	42.64
-3.50 to -3.00; 8 mm	58.9196	683.35
-3.00 to -2.50; 5.6 mm	31.4908	365.23
-2.50 to -2.00; 4 mm	5.8726	68.11
-2.00 to -1.50; 2.8 mm	0.0172	0.2
-1.50 to -1.00; 2 mm	0.0043	0.05
-1.00 to -0.50; 1.4 mm	0.0026	0.0300
-0.50 to 0.00; 1 mm	0.0052	0.0600
0.00 to 0.50; (707 µm)		
0.50 to 1.00; (500 µm)		
1.00 to 1.50; (353.6 µm)		
1.50 to 2.00; (250 µm)		
2.00 to 2.50; (176.8 µm)		
2.50 to 3.00; (125 µm)		
3.00 to 3.50; (88.39 µm)		
3.50 to 4.00; (62.5 µm)		
4.00 to 4.50; (44.19 µm)		
4.50 to 5.00; (31.25 µm)		
5.00 to 5.50; (22.097 µm)		
5.50 to 6.00; (15.625 µm)		
6.00 to 6.50; (11.049 µm)		
6.50 to 7.00; (7.813 µm)		
7.00 to 7.50; (5.524 µm)		
7.50 to 8.00; (3.906 µm)		
8.00 to 8.50; (2.762 µm)		
8.50 to 9.00; (1.953 µm)		
9.00 to 9.50; (1.381 µm)		
9.50 to 10.00; (0.977 µm)		
10.00 to 10.50; (0.691 µm)		
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)		
Total	99.99	1159.67

COMMENTS: No sieving below 1mm so sand fraction <1mm and silt fraction not calculated.

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2309**
Sample Code:	**PS632309**

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	0
-6.00 to -5.50; 45 mm	0.00	0
-5.50 to -5.00; 31.5 mm	0.00	0
-5.00 to -4.50; 22.4 mm	0.00	0
-4.50 to -4.00; 16 mm	0.00	0
-4.00 to -3.50; 11.2 mm	1.45	16.77
-3.50 to -3.00; 8 mm	60.97	704.65
-3.00 to -2.50; 5.6 mm	34.00	392.95
-2.50 to -2.00; 4 mm	3.58	41.36
-2.00 to -1.50; 2.8 mm	0.00	0
-1.50 to -1.00; 2 mm	0.00	0.01
-1.00 to -0.50; 1.4 mm	0.00	0.0000
-0.50 to 0.00; 1 mm	0.00	0.0200
0.00 to 0.50; (707 µm)	0.00	0.0000
0.50 to 1.00; (500 µm)	0.00	0.0000
1.00 to 1.50; (353.6 µm)	0.00	0.0000
1.50 to 2.00; (250 µm)	0.00	0.0000
2.00 to 2.50; (176.8 µm)	0.00	0.0000
2.50 to 3.00; (125 µm)	0.00	0.0000
3.00 to 3.50; (88.39 µm)	0.00	0.0000
3.50 to 4.00; (62.5 µm)	0.00	0.0000
4.00 to 4.50; (44.19 µm)	0.00	0.0000
4.50 to 5.00; (31.25 µm)	0.00	0.0000
5.00 to 5.50; (22.097 µm)	0.00	0.0000
5.50 to 6.00; (15.625 µm)	0.00	0.0000
6.00 to 6.50; (11.049 µm)	0.00	0.0000
6.50 to 7.00; (7.813 µm)	0.00	0.0000
7.00 to 7.50; (5.524 µm)	0.00	0.0000
7.50 to 8.00; (3.906 µm)	0.00	0.0000
8.00 to 8.50; (2.762 µm)	0.00	0.0000
8.50 to 9.00; (1.953 µm)	0.00	0.0000
9.00 to 9.50; (1.381 µm)	0.00	0.0000
9.50 to 10.00; (0.977 µm)	0.00	0.0000
10.00 to 10.50; (0.691 µm)	0.00	0.0000
10.50 to 11.00; (0.488 µm)	0.00	0.0000
11.00 to 11.50; (0.345 µm)	0.00	0.0000
11.50 to 12.00; (0.244 µm)	0.00	0.0000
12.00 to 12.50; (0.173 µm)	0.00	0.0000
12.50 to 13.00; (0.122 µm)	0.00	0.0000
13.00 to 13.50; (0.086 µm)	0.00	0.0000
Total	100.00	1155.76

COMMENTS:

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2310**
Sample Code:	**PS632310**

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	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	57.2681	664.3667
-3.00 to -2.50; 5.6 mm	38.0370	441.2667
-2.50 to -2.00; 4 mm	4.5944	53.3000
-2.00 to -1.50; 2.8 mm	0.0517	0.6000
-1.50 to -1.00; 2 mm	0.0086	0.1000
-1.00 to -0.50; 1.4 mm	0.0057	0.0667
-0.50 to 0.00; 1 mm	0.0000	0.0000
0.00 to 0.50; (707 µm)	0.0115	0.1339
0.50 to 1.00; (500 µm)	0.0000	0.0000
1.00 to 1.50; (353.6 µm)	0.0001	0.0012
1.50 to 2.00; (250 µm)	0.0051	0.0589
2.00 to 2.50; (176.8 µm)	0.0091	0.1051
2.50 to 3.00; (125 µm)	0.0058	0.0678
3.00 to 3.50; (88.39 µm)	0.0008	0.0090
3.50 to 4.00; (62.5 µm)	0.0001	0.0017
4.00 to 4.50; (44.19 µm)	0.0004	0.0042
4.50 to 5.00; (31.25 µm)	0.0004	0.0045
5.00 to 5.50; (22.097 µm)	0.0003	0.0036
5.50 to 6.00; (15.625 µm)	0.0002	0.0023
6.00 to 6.50; (11.049 µm)	0.0002	0.0020
6.50 to 7.00; (7.813 µm)	0.0002	0.0018
7.00 to 7.50; (5.524 µm)	0.0001	0.0015
7.50 to 8.00; (3.906 µm)	0.0001	0.0011
8.00 to 8.50; (2.762 µm)	0.0001	0.0009
8.50 to 9.00; (1.953 µm)	0.0001	0.0006
9.00 to 9.50; (1.381 µm)	0.0000	0.0000
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
Total	100.00	1160.10

COMMENTS: Although only a minor fraction of sediment fines was found during our analyses, this was analysed using the Mastersizer. However, due to the small amount available only one run (3 reads) was obtaine

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2311**
Sample Code:	**PS632311**

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	0
-6.00 to -5.50; 45 mm	0.0000	0
-5.50 to -5.00; 31.5 mm	0.0000	0
-5.00 to -4.50; 22.4 mm	0.0000	0
-4.50 to -4.00; 16 mm	0.0000	0
-4.00 to -3.50; 11.2 mm	1.1782	13.68
-3.50 to -3.00; 8 mm	57.9939	673.35
-3.00 to -2.50; 5.6 mm	36.1589	419.83
-2.50 to -2.00; 4 mm	4.5768	53.14
-2.00 to -1.50; 2.8 mm	0.0474	0.55
-1.50 to -1.00; 2 mm	0.0009	0.01
-1.00 to -0.50; 1.4 mm	0.0026	0.0300
-0.50 to 0.00; 1 mm	0.0009	0.0100
0.00 to 0.50; (707 µm)	0.0405	0.4700
0.50 to 1.00; (500 µm)	0.0000	0.0000
1.00 to 1.50; (353.6 µm)	0.0000	0.0000
1.50 to 2.00; (250 µm)	0.0000	0.0000
2.00 to 2.50; (176.8 µm)	0.0000	0.0000
2.50 to 3.00; (125 µm)	0.0000	0.0000
3.00 to 3.50; (88.39 µm)	0.0000	0.0000
3.50 to 4.00; (62.5 µm)	0.0000	0.0000
4.00 to 4.50; (44.19 µm)	0.0000	0.0000
4.50 to 5.00; (31.25 µm)	0.0000	0.0000
5.00 to 5.50; (22.097 µm)	0.0000	0.0000
5.50 to 6.00; (15.625 µm)	0.0000	0.0000
6.00 to 6.50; (11.049 µm)	0.0000	0.0000
6.50 to 7.00; (7.813 µm)	0.0000	0.0000
7.00 to 7.50; (5.524 µm)	0.0000	0.0000
7.50 to 8.00; (3.906 µm)	0.0000	0.0000
8.00 to 8.50; (2.762 µm)	0.0000	0.0000
8.50 to 9.00; (1.953 µm)	0.0000	0.0000
9.00 to 9.50; (1.381 µm)	0.0000	0.0000
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
Total	100.00	1161.07

COMMENTS:

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2312**
Sample Code:	**PS632312**

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	0.00
-6.00 to -5.50; 45 mm	0.0000	0.00
-5.50 to -5.00; 31.5 mm	0.0000	0.00
-5.00 to -4.50; 22.4 mm	0.0000	0.00
-4.50 to -4.00; 16 mm	0.0000	0.00
-4.00 to -3.50; 11.2 mm	1.7992	18.43
-3.50 to -3.00; 8 mm	61.3380	628.31
-3.00 to -2.50; 5.6 mm	32.3320	331.19
-2.50 to -2.00; 4 mm	4.5122	46.22
-2.00 to -1.50; 2.8 mm	0.0185	0.19
-1.50 to -1.00; 2 mm	0.0000	0.00
-1.00 to -0.50; 1.4 mm	0.0000	0.00
-0.50 to 0.00; 1 mm	0.0000	0.00
0.00 to 0.50; (707 µm)	0.0000	
0.50 to 1.00; (500 µm)	0.0000	
1.00 to 1.50; (353.6 µm)	0.0000	
1.50 to 2.00; (250 µm)	0.0000	
2.00 to 2.50; (176.8 µm)	0.0000	
2.50 to 3.00; (125 µm)	0.0000	
3.00 to 3.50; (88.39 µm)	0.0000	
3.50 to 4.00; (62.5 µm)	0.0000	
4.00 to 4.50; (44.19 µm)	0.0000	
4.50 to 5.00; (31.25 µm)	0.0000	
5.00 to 5.50; (22.097 µm)	0.0000	
5.50 to 6.00; (15.625 µm)	0.0000	
6.00 to 6.50; (11.049 µm)	0.0000	
6.50 to 7.00; (7.813 µm)	0.0000	
7.00 to 7.50; (5.524 µm)	0.0000	
7.50 to 8.00; (3.906 µm)	0.0000	
8.00 to 8.50; (2.762 µm)	0.0000	
8.50 to 9.00; (1.953 µm)	0.0000	
9.00 to 9.50; (1.381 µm)	0.0000	
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	
Total	100.00	1024.34

COMMENTS:

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2313**
Sample Code:	**PS632313**

Phi interval (explicit)	**Percentage**	**Grams**
+ sieve mesh (theoretical sieves shown in brackets)	**(mark as "0" for no material or not analysed)**	
-6.50 to -6.00; 63 mm	0.0000	0
-6.00 to -5.50; 45 mm	0.0000	0
-5.50 to -5.00; 31.5 mm	0.0000	0
-5.00 to -4.50; 22.4 mm	0.0000	0
-4.50 to -4.00; 16 mm	0.0000	0
-4.00 to -3.50; 11.2 mm	0.1852	2.15
-3.50 to -3.00; 8 mm	60.5414	702.71
-3.00 to -2.50; 5.6 mm	33.7371	391.59
-2.50 to -2.00; 4 mm	5.5311	64.2
-2.00 to -1.50; 2.8 mm	0.0026	0.03
-1.50 to -1.00; 2 mm	0.0000	0
-1.00 to -0.50; 1.4 mm	0.0026	0.0300
-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)	0.0000	0.0000
1.50 to 2.00; (250 µm)	0.0000	0.0000
2.00 to 2.50; (176.8 µm)	0.0000	0.0000
2.50 to 3.00; (125 µm)	0.0000	0.0000
3.00 to 3.50; (88.39 µm)	0.0000	0.0000
3.50 to 4.00; (62.5 µm)	0.0000	0.0000
4.00 to 4.50; (44.19 µm)	0.0000	0.0000
4.50 to 5.00; (31.25 µm)	0.0000	0.0000
5.00 to 5.50; (22.097 µm)	0.0000	0.0000
5.50 to 6.00; (15.625 µm)	0.0000	0.0000
6.00 to 6.50; (11.049 µm)	0.0000	0.0000
6.50 to 7.00; (7.813 µm)	0.0000	0.0000
7.00 to 7.50; (5.524 µm)	0.0000	0.0000
7.50 to 8.00; (3.906 µm)	0.0000	0.0000
8.00 to 8.50; (2.762 µm)	0.0000	0.0000
8.50 to 9.00; (1.953 µm)	0.0000	0.0000
9.00 to 9.50; (1.381 µm)	0.0000	0.0000
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
Total	100.00	1160.71

COMMENTS:

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**PSA_2320**
Sample Code:	**PS632320**

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	0
-6.00 to -5.50; 45 mm	0.0000	0
-5.50 to -5.00; 31.5 mm	0.0000	0
-5.00 to -4.50; 22.4 mm	0.0000	0
-4.50 to -4.00; 16 mm	0.0000	0
-4.00 to -3.50; 11.2 mm	1.5660	18.21
-3.50 to -3.00; 8 mm	56.6942	659.24
-3.00 to -2.50; 5.6 mm	37.5843	437.03
-2.50 to -2.00; 4 mm	4.1254	47.97
-2.00 to -1.50; 2.8 mm	0.0138	0.16
-1.50 to -1.00; 2 mm	0.0138	0.16
-1.00 to -0.50; 1.4 mm	0.0026	0.0300
-0.50 to 0.00; 1 mm	0.0000	0.0000
0.00 to 0.50; (707 µm)		
0.50 to 1.00; (500 µm)		
1.00 to 1.50; (353.6 µm)		
1.50 to 2.00; (250 µm)		
2.00 to 2.50; (176.8 µm)		
2.50 to 3.00; (125 µm)		
3.00 to 3.50; (88.39 µm)		
3.50 to 4.00; (62.5 µm)		
4.00 to 4.50; (44.19 µm)		
4.50 to 5.00; (31.25 µm)		
5.00 to 5.50; (22.097 µm)		
5.50 to 6.00; (15.625 µm)		
6.00 to 6.50; (11.049 µm)		
6.50 to 7.00; (7.813 µm)		
7.00 to 7.50; (5.524 µm)		
7.50 to 8.00; (3.906 µm)		
8.00 to 8.50; (2.762 µm)		
8.50 to 9.00; (1.953 µm)		
9.00 to 9.50; (1.381 µm)		
9.50 to 10.00; (0.977 µm)		
10.00 to 10.50; (0.691 µm)		
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)		
Total	100.00	1162.80

COMMENTS:

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**BM REP 1**
Sample Code:	**PS63_ BM REP 1**

Phi interval (explicit)	**Percentage**	**Grams**
+ sieve mesh (theoretical sieves shown in brackets)	**(mark as "0" for no material or not analysed)**	
-6.50 to -6.00; 63 mm	0.0000	0
-6.00 to -5.50; 45 mm	0.0000	0
-5.50 to -5.00; 31.5 mm	0.0000	0
-5.00 to -4.50; 22.4 mm	0.0000	0
-4.50 to -4.00; 16 mm	0.0000	0
-4.00 to -3.50; 11.2 mm	0.3579	4.16
-3.50 to -3.00; 8 mm	60.6102	704.43
-3.00 to -2.50; 5.6 mm	32.5280	378.05
-2.50 to -2.00; 4 mm	6.4677	75.17
-2.00 to -1.50; 2.8 mm	0.0284	0.33
-1.50 to -1.00; 2 mm	0.0052	0.06
-1.00 to -0.50; 1.4 mm	0.0026	0.0300
-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)	0.0000	0.0000
1.50 to 2.00; (250 µm)	0.0000	0.0000
2.00 to 2.50; (176.8 µm)	0.0000	0.0000
2.50 to 3.00; (125 µm)	0.0000	0.0000
3.00 to 3.50; (88.39 µm)	0.0000	0.0000
3.50 to 4.00; (62.5 µm)	0.0000	0.0000
4.00 to 4.50; (44.19 µm)	0.0000	0.0000
4.50 to 5.00; (31.25 µm)	0.0000	0.0000
5.00 to 5.50; (22.097 µm)	0.0000	0.0000
5.50 to 6.00; (15.625 µm)	0.0000	0.0000
6.00 to 6.50; (11.049 µm)	0.0000	0.0000
6.50 to 7.00; (7.813 µm)	0.0000	0.0000
7.00 to 7.50; (5.524 µm)	0.0000	0.0000
7.50 to 8.00; (3.906 µm)	0.0000	0.0000
8.00 to 8.50; (2.762 µm)	0.0000	0.0000
8.50 to 9.00; (1.953 µm)	0.0000	0.0000
9.00 to 9.50; (1.381 µm)	0.0000	0.0000
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
Total	100.00	1162.23

COMMENTS:

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**BM REP 2**
Sample Code:	**PS63_ BM REP 2**

Phi interval (explicit)	**Percentage**	**Grams**
+ sieve mesh (theoretical sieves shown in brackets)	**(mark as "0" for no material or not analysed)**	
-6.50 to -6.00; 63 mm	0.0000	0
-6.00 to -5.50; 45 mm	0.0000	0
-5.50 to -5.00; 31.5 mm	0.0000	0
-5.00 to -4.50; 22.4 mm	0.0000	0
-4.50 to -4.00; 16 mm	0.0000	0
-4.00 to -3.50; 11.2 mm	0.1852	2.15
-3.50 to -3.00; 8 mm	60.5430	702.71
-3.00 to -2.50; 5.6 mm	33.7380	391.59
-2.50 to -2.00; 4 mm	5.5312	64.2
-2.00 to -1.50; 2.8 mm	0.0026	0.03
-1.50 to -1.00; 2 mm	0.0000	0
-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)	0.0000	0.0000
1.50 to 2.00; (250 µm)	0.0000	0.0000
2.00 to 2.50; (176.8 µm)	0.0000	0.0000
2.50 to 3.00; (125 µm)	0.0000	0.0000
3.00 to 3.50; (88.39 µm)	0.0000	0.0000
3.50 to 4.00; (62.5 µm)	0.0000	0.0000
4.00 to 4.50; (44.19 µm)	0.0000	0.0000
4.50 to 5.00; (31.25 µm)	0.0000	0.0000
5.00 to 5.50; (22.097 µm)	0.0000	0.0000
5.50 to 6.00; (15.625 µm)	0.0000	0.0000
6.00 to 6.50; (11.049 µm)	0.0000	0.0000
6.50 to 7.00; (7.813 µm)	0.0000	0.0000
7.00 to 7.50; (5.524 µm)	0.0000	0.0000
7.50 to 8.00; (3.906 µm)	0.0000	0.0000
8.00 to 8.50; (2.762 µm)	0.0000	0.0000
8.50 to 9.00; (1.953 µm)	0.0000	0.0000
9.00 to 9.50; (1.381 µm)	0.0000	0.0000
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
Total	100.00	1160.68

COMMENTS:

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**BM REP 3**
Sample Code:	**PS63_ BM REP 3**

Phi interval (explicit)	**Percentage**	**Grams**
+ sieve mesh (theoretical sieves shown in brackets)	**(mark as "0" for no material or not analysed)**	
-6.50 to -6.00; 63 mm	0.0000	0
-6.00 to -5.50; 45 mm	0.0000	0
-5.50 to -5.00; 31.5 mm	0.0000	0
-5.00 to -4.50; 22.4 mm	0.0000	0
-4.50 to -4.00; 16 mm	0.0000	0
-4.00 to -3.50; 11.2 mm	0.1908	2.22
-3.50 to -3.00; 8 mm	61.6630	717.56
-3.00 to -2.50; 5.6 mm	31.8447	370.57
-2.50 to -2.00; 4 mm	6.2715	72.98
-2.00 to -1.50; 2.8 mm	0.0129	0.15
-1.50 to -1.00; 2 mm	0.0069	0.08
-1.00 to -0.50; 1.4 mm	0.0103	0.1200
-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)	0.0000	0.0000
1.50 to 2.00; (250 µm)	0.0000	0.0000
2.00 to 2.50; (176.8 µm)	0.0000	0.0000
2.50 to 3.00; (125 µm)	0.0000	0.0000
3.00 to 3.50; (88.39 µm)	0.0000	0.0000
3.50 to 4.00; (62.5 µm)	0.0000	0.0000
4.00 to 4.50; (44.19 µm)	0.0000	0.0000
4.50 to 5.00; (31.25 µm)	0.0000	0.0000
5.00 to 5.50; (22.097 µm)	0.0000	0.0000
5.50 to 6.00; (15.625 µm)	0.0000	0.0000
6.00 to 6.50; (11.049 µm)	0.0000	0.0000
6.50 to 7.00; (7.813 µm)	0.0000	0.0000
7.00 to 7.50; (5.524 µm)	0.0000	0.0000
7.50 to 8.00; (3.906 µm)	0.0000	0.0000
8.00 to 8.50; (2.762 µm)	0.0000	0.0000
8.50 to 9.00; (1.953 µm)	0.0000	0.0000
9.00 to 9.50; (1.381 µm)	0.0000	0.0000
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
Total	100.00	1163.68

COMMENTS:

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**BM REP 4**
Sample Code:	**PS63_ BM REP 4**

Phi interval (explicit)	**Percentage**	**Grams**
+ sieve mesh (theoretical sieves shown in brackets)	**(mark as "0" for no material or not analysed)**	
-6.50 to -6.00; 63 mm	0.0000	0
-6.00 to -5.50; 45 mm	0.0000	0
-5.50 to -5.00; 31.5 mm	0.0000	0
-5.00 to -4.50; 22.4 mm	0.0000	0
-4.50 to -4.00; 16 mm	0.0000	0
-4.00 to -3.50; 11.2 mm	0.1651	1.92
-3.50 to -3.00; 8 mm	59.9730	697.24
-3.00 to -2.50; 5.6 mm	34.2683	398.4
-2.50 to -2.00; 4 mm	5.5901	64.99
-2.00 to -1.50; 2.8 mm	0.0034	0.04
-1.50 to -1.00; 2 mm	0.0000	0
-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)	0.0000	0.0000
1.50 to 2.00; (250 µm)	0.0000	0.0000
2.00 to 2.50; (176.8 µm)	0.0000	0.0000
2.50 to 3.00; (125 µm)	0.0000	0.0000
3.00 to 3.50; (88.39 µm)	0.0000	0.0000
3.50 to 4.00; (62.5 µm)	0.0000	0.0000
4.00 to 4.50; (44.19 µm)	0.0000	0.0000
4.50 to 5.00; (31.25 µm)	0.0000	0.0000
5.00 to 5.50; (22.097 µm)	0.0000	0.0000
5.50 to 6.00; (15.625 µm)	0.0000	0.0000
6.00 to 6.50; (11.049 µm)	0.0000	0.0000
6.50 to 7.00; (7.813 µm)	0.0000	0.0000
7.00 to 7.50; (5.524 µm)	0.0000	0.0000
7.50 to 8.00; (3.906 µm)	0.0000	0.0000
8.00 to 8.50; (2.762 µm)	0.0000	0.0000
8.50 to 9.00; (1.953 µm)	0.0000	0.0000
9.00 to 9.50; (1.381 µm)	0.0000	0.0000
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
Total	100.00	1162.59

COMMENTS:

NMBAQCS - PS Exercise Data Workbook	Return to APEM Ltd. by 16-12-16

Exercise Code:	**PS63**
LabCode:	**BM REP 5**
Sample Code:	**PS63_ BM REP 5**

Phi interval (explicit)	**Percentage**	**Grams**
+ sieve mesh (theoretical sieves shown in brackets)	**(mark as "0" for no material or not analysed)**	
-6.50 to -6.00; 63 mm	0.0000	0
-6.00 to -5.50; 45 mm	0.0000	0
-5.50 to -5.00; 31.5 mm	0.0000	0
-5.00 to -4.50; 22.4 mm	0.0000	0
-4.50 to -4.00; 16 mm	0.0000	0
-4.00 to -3.50; 11.2 mm	0.4923	5.73
-3.50 to -3.00; 8 mm	59.2152	689.17
-3.00 to -2.50; 5.6 mm	34.6027	402.72
-2.50 to -2.00; 4 mm	5.6803	66.11
-2.00 to -1.50; 2.8 mm	0.0043	0.05
-1.50 to -1.00; 2 mm	0.0026	0.03
-1.00 to -0.50; 1.4 mm	0.0026	0.0300
-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)	0.0000	0.0000
1.50 to 2.00; (250 µm)	0.0000	0.0000
2.00 to 2.50; (176.8 µm)	0.0000	0.0000
2.50 to 3.00; (125 µm)	0.0000	0.0000
3.00 to 3.50; (88.39 µm)	0.0000	0.0000
3.50 to 4.00; (62.5 µm)	0.0000	0.0000
4.00 to 4.50; (44.19 µm)	0.0000	0.0000
4.50 to 5.00; (31.25 µm)	0.0000	0.0000
5.00 to 5.50; (22.097 µm)	0.0000	0.0000
5.50 to 6.00; (15.625 µm)	0.0000	0.0000
6.00 to 6.50; (11.049 µm)	0.0000	0.0000
6.50 to 7.00; (7.813 µm)	0.0000	0.0000
7.00 to 7.50; (5.524 µm)	0.0000	0.0000
7.50 to 8.00; (3.906 µm)	0.0000	0.0000
8.00 to 8.50; (2.762 µm)	0.0000	0.0000
8.50 to 9.00; (1.953 µm)	0.0000	0.0000
9.00 to 9.50; (1.381 µm)	0.0000	0.0000
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
Total	100.00	1163.84

COMMENTS:

APPENDIX 2 - Data used to create Figure 4.

	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
% V COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% COARSE GRAVEL:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% MEDIUM GRAVEL:	60.68	60.31	59.62	59.07	62.63	63.11	59.21	62.34	62.60	62.42	57.27	59.17	63.14	60.73	58.26
% FINE GRAVEL:	39.30	39.69	40.33	40.90	37.33	36.88	40.77	37.65	37.37	37.58	42.63	40.74	36.84	39.27	41.71
% V FINE GRAVEL:	0.01	0.00	0.03	0.01	0.04	0.00	0.02	0.00	0.02	0.00	0.06	0.05	0.02	0.00	0.03
% V COARSE SAND:	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00
% COARSE SAND:	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.00	0.00	0.00
% MEDIUM SAND:	0.00	0.00	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
% FINE SAND:	0.00	0.00	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
% V FINE SAND:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% V COARSE SILT:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% COARSE SILT:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% MEDIUM SILT:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% FINE SILT:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% V FINE SILT:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% CLAY:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% GRAVEL	100.00	99.99	99.98	99.98	100.00	99.99	100.00	100.00	99.99	100.00	99.96	99.96	100.00	100.00	100.00
% SAND	0.00	0.01	0.02	0.02	0.00	0.01	0.00	0.00	0.01	0.00	0.04	0.04	0.00	0.00	0.00
% SILT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% CLAY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% MUD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX 3 - Data used to create figures 5 and 6.

Figure 5 - percentage recorded in each half-phi interal.

Phi Interval	BM 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-6.00 to -5.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-5.50 to -5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-5.00 to -4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-4.50 to -4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-4.00 to -3.50	0.28	0.00	0.79	1.07	0.00	2.61	0.61	1.68	3.68	1.45	0.00	1.18	1.80	0.19	1.57
-3.50 to -3.00	60.40	60.31	58.83	58.01	1.18	60.50	58.59	60.66	58.93	60.97	57.29	58.02	61.34	60.54	56.69
-3.00 to -2.50	33.40	35.18	30.64	36.43	61.46	32.97	34.65	33.06	31.49	34.00	38.05	36.17	32.33	33.74	37.58
-2.50 to -2.00	5.91	4.51	9.70	4.48	31.69	3.91	6.12	4.59	5.87	3.58	4.60	4.58	4.51	5.53	4.13
-2.00 to -1.50	0.01	0.00	0.03	0.01	5.63	0.00	0.02	0.00	0.02	0.00	0.05	0.05	0.02	0.00	0.01
-1.50 to -1.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
-1.00 to -0.50	0.00	0.00	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
-0.50 to 0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00

Figure 6 - Cumulative percentage for each half-phi interval.

Microns	BM 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
63000	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
45000	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
31500	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
22400	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
16000	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
11200	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
8000	99.72	100.00	99.21	98.93	100.00	97.39	99.39	98.32	96.32	98.55	100.00	98.82	98.20	99.81	98.43
5600	39.32	39.69	40.38	40.93	98.82	36.89	40.79	37.66	37.40	37.58	42.71	40.80	36.86	39.27	41.74
4000	5.92	4.52	9.74	4.50	37.37	3.92	6.14	4.60	5.90	3.58	4.66	4.63	4.53	5.54	4.16
2800	0.02	0.00	0.04	0.02	5.67	0.00	0.02	0.01	0.03	0.00	0.07	0.05	0.02	0.01	0.03
2000	0.01	0.00	0.01	0.01	0.04	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.02
1400	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00
1000	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00