NMBAQC

NE Atlantic Marine Biological Analytical Quality Control Scheme

Particle Size Report - PS62

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 PS62.

	Method	% Gravel	% Sand	% Mud	Sediment Description (Post analysis)
BM REPLICATE 1	NMBAQC	45.26	49.02	5.72	Muddy Sandy Gravel
BM REPLICATE 2	NMBAQC	45.86	48.24	5.90	Muddy Sandy Gravel
BM REPLICATE 3	NMBAQC	45.18	49.08	5.74	Muddy Sandy Gravel
BM REPLICATE 4	NMBAQC	45.20	48.92	5.88	Muddy Sandy Gravel
BM REPLICATE 5	NMBAQC	45.14	49.08	5.78	Muddy Sandy Gravel
REP AVERAGE	NMBAQC	45.33	48.87	5.80	Muddy Sandy Gravel

Table 2. Summary of equipment used and sieve data for the benchmark replicates distributed as PS62.

	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	☑	428.85	0.24	388.45	817.54	☑
BM REPLICATE 2	☑	437.50	0.41	388.20	826.11	☑
BM REPLICATE 3	☑	424.78	0.38	384.75	809.91	☑
BM REPLICATE 4	☑	430.52	0.47	389.84	820.83	☑
BM REPLICATE 5	☑	431.59	0.37	391.51	823.47	☑
BM AVERAGE	☑	430.65	0.37	388.55	819.57	☑

Table 3. Summary of final laser data for the benchmark replicates distributed as PS62.

	% Sand			
	Coarse 0 - 1 phi	Medium 1 - 2 phi	Fine 2 - 3 phi	Very Fine 3 - 4 phi
BM REPLICATE 1	26.44	46.83	12.76	1.93
BM REPLICATE 2	24.29	46.98	13.85	2.33
BM REPLICATE 3	27.07	46.05	12.71	2.09
BM REPLICATE 4	25.44	47.32	12.81	2.05
BM REPLICATE 5	24.88	46.91	13.89	2.18
BM AVERAGE	25.62	46.82	13.21	2.12

	% 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	1.67	2.07	2.25	2.15	1.33	2.57
BM REPLICATE 2	1.75	2.10	2.33	2.22	1.41	2.73
BM REPLICATE 3	1.66	2.15	2.37	2.20	1.34	2.37
BM REPLICATE 4	1.65	2.16	2.39	2.26	1.38	2.53
BM REPLICATE 5	1.76	2.12	2.28	2.14	1.32	2.52
BM AVERAGE	1.70	2.12	2.32	2.19	1.36	2.54

BENCHMARK DATA

Table 4. Summary of descriptive statistics and coefficient of variance for the benchmark replicates distributed as PS62.

	D10 (µm) Result	D50 (µm) Result	D90 (µm) Result	Mean (µm) Result
BM REPLICATE 1	203.34	1330.35	7965.25	1359.36
BM REPLICATE 2	193.97	1412.24	8224.64	1388.02
BM REPLICATE 3	201.41	1356.07	7996.16	1359.64
BM REPLICATE 4	199.48	1338.55	8181.01	1367.31
BM REPLICATE 5	195.88	1328.17	7939.32	1347.95
Mean	198.82	1353.07	8061.28	1364.46
Standard Deviation	3.86	34.85	131.68	14.88
Coefficient of Variance (COV)	1.94	2.58	1.63	1.09

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

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 PS62 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 PS62 with error bars showing ± 1 SD.

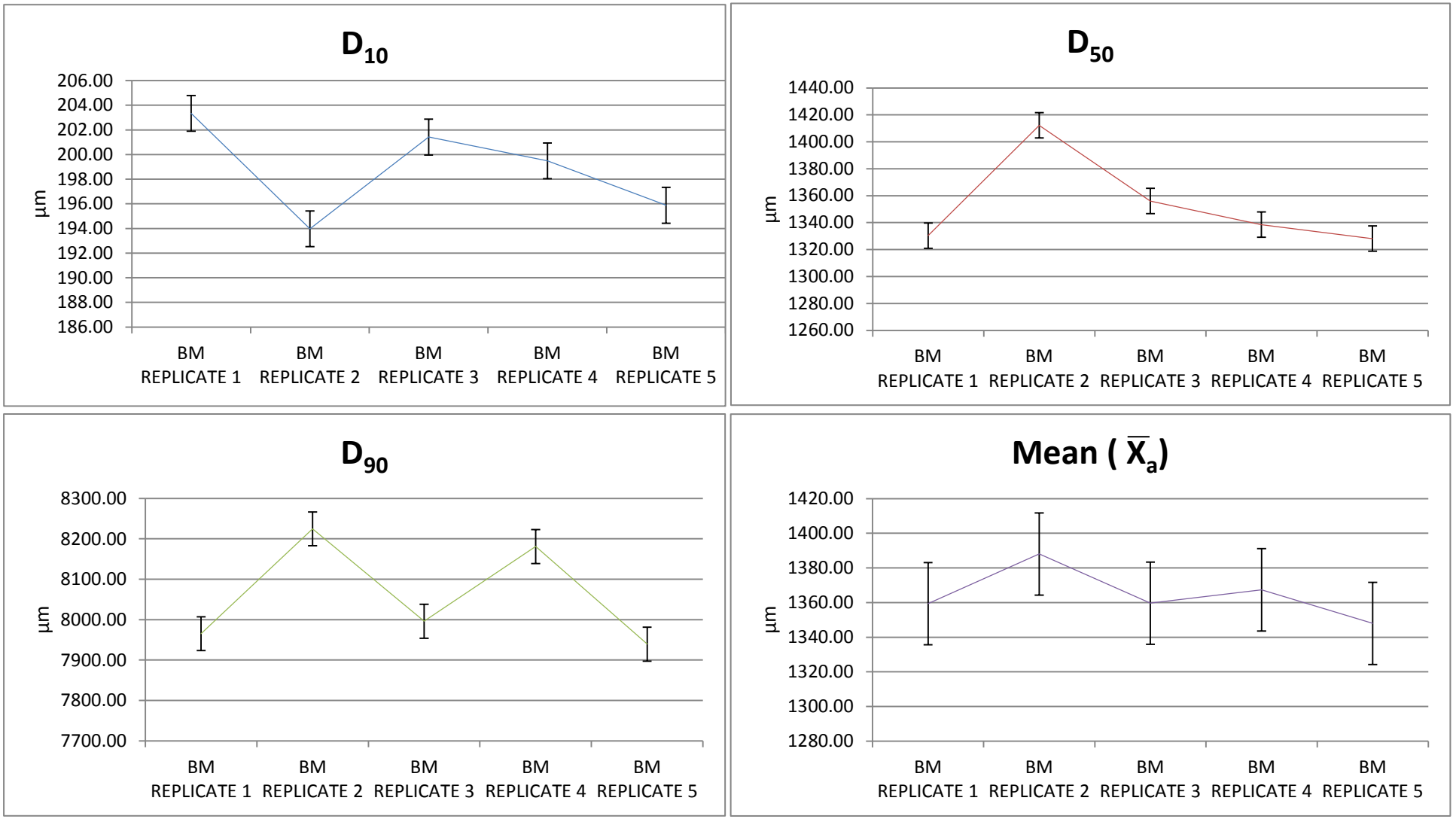
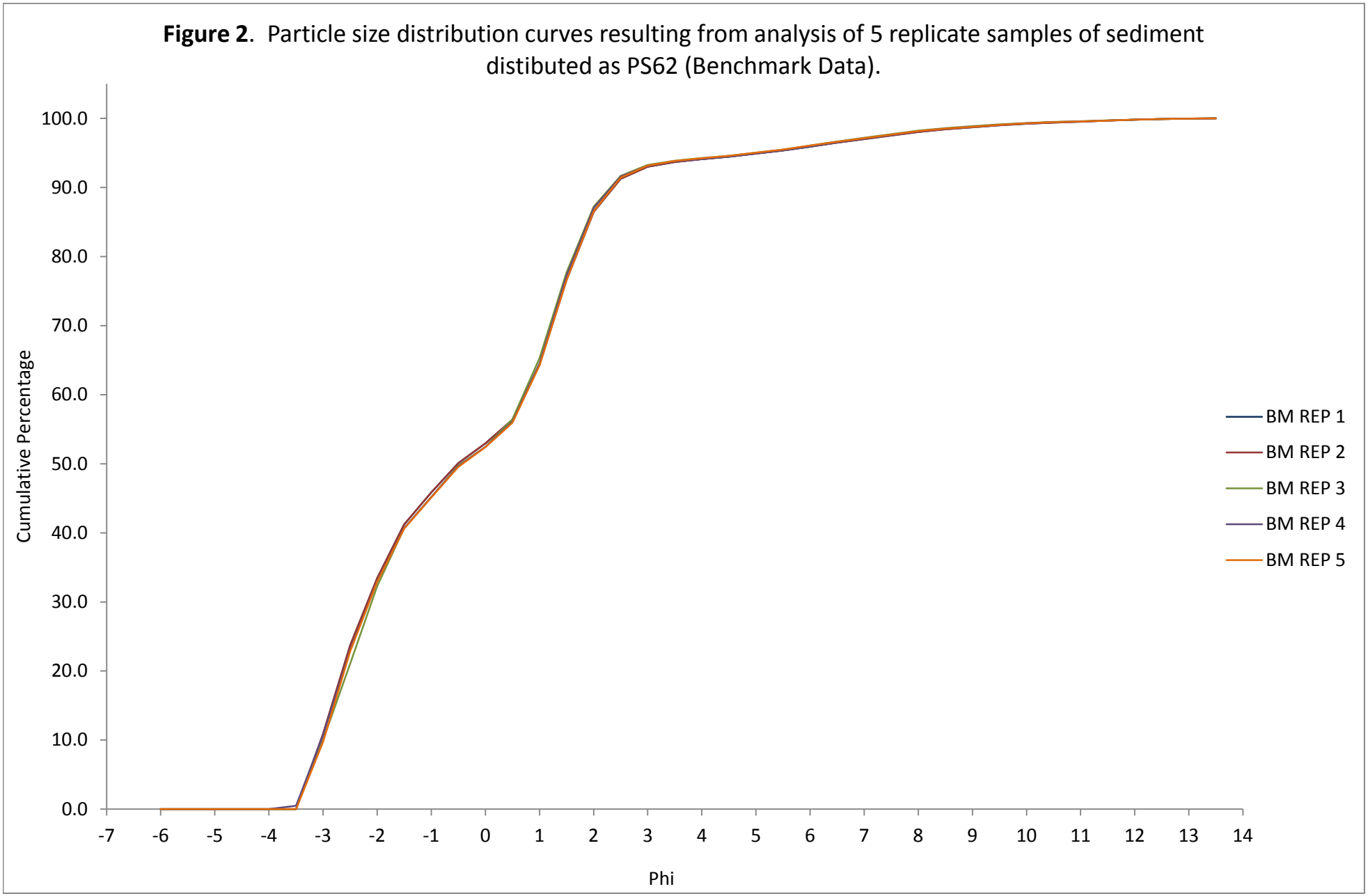


Figure 2. Particle size distribution curves resulting from analysis of 5 replicate samples of sediment distibuted as PS62 (Benchmark Data).



PARTICIPANT DATA

Table 5. Summary of equipment and methods used by participants and sample summary data for PS62.

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	YES	NMBAQC	NO	NO	45.33	48.87	5.80	Muddy Sandy Gravel
PSA_2301	YES	YES	NMBAQC*	NO	NO	44.29	48.31	7.40	Muddy Sandy Gravel
PSA_2302	YES	YES	NMBAQC	NO	NO	43.94	47.60	8.46	Muddy Sandy Gravel
PSA_2303	YES	YES	NMBAQC	NO	NO	45.17	44.31	10.51	Muddy Sandy Gravel
PSA_2304	YES	NO	OTHER[1]	NO	NO	45.10	51.70	3.20	Sandy gravel
PSA_2305	YES	NO	OTHER[2]	YES[1]	NO	45.40	51.40	3.20	Sandy gravel
PSA_2306	YES	YES	NMBAQC	NO	NO	44.08	47.04	8.88	Muddy Sandy Gravel
PSA_2307	YES	YES	NMBAQC	NO	NO	44.97	47.39	7.64	Muddy Sandy Gravel
PSA_2308	YES	YES	NMBAQC	NO	NO	46.16	36.08	17.76	Muddy Sandy Gravel
PSA_2309	YES	YES	NMBAQC	NO	NO	40.24	44.05	15.70	Muddy Sandy Gravel
PSA_2310	YES	YES	OTHER[3]	NO	NO	46.15	44.08	9.77	Muddy Sandy Gravel
PSA_2311	YES	YES	NMBAQC	NO	NO	42.55	48.27	9.18	Muddy Sandy Gravel
PSA_2312	YES	YES	NMBAQC	NO	NO	43.90	53.14	2.90	Sandy gravel
PSA_2313	YES	YES	NMBAQC	NO	NO	45.28	48.53	6.19	Muddy Sandy Gravel
PSA_2320	YES	YES	NMBAQC	NO	NO	46.01	45.82	8.17	Muddy Sandy Gravel

NMBAQC* - PSA SOP for supporting biological data - incorporating BS1377: 1990 Parts 1-2 (sieving) and BS13320: 2009 (laser diffraction).

OTHER[1] - See participant data sheet in Appendix 1 for details.

OTHER[2]- British Standard pipette method (Participant does not have access to a laser analyser).

OTHER[3] - In-house methodology used, no details provided.

YES[1] - Sodium hexametaphosphate used on sediment less than 63 microns.

PARTICIPANT DATA

Table 6. Raw sieve data (weight in grams) provided by participants for PS62.

		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	2.42	0.00	0.00	0.00	0.00	0.00	0.00
-4.00 to -3.50; 11.2 mm		1.35	0.00	0.00	1.74	3.95	0.00	0.00	4.30	4.71	6.57	0.00	1.29	9.16	5.34	0.00
-3.50 to -3.00; 8 mm		82.46	68.89	58.02	74.58	88.26	93.01	61.43	76.09	71.08	73.58	82.87	60.53	57.18	70.71	75.60
-3.00 to -2.50; 5.6 mm		101.56	103.82	89.98	104.82	115.35	118.62	83.58	108.33	95.39	118.95	114.83	100.16	95.84	110.09	132.03
-2.50 to -2.00; 4 mm		84.01	81.94	67.75	85.58	84.35	89.84	80.66	88.41	93.77	80.47	86.03	67.26	69.77	80.48	87.99
-2.00 to -1.50; 2.8 mm		64.66	62.65	51.90	61.33	71.23	64.94	56.68	65.18	67.34	61.76	80.97	64.13	56.38	67.64	66.58
-1.50 to -1.00; 2 mm		37.45	38.59	29.26	38.81	42.90	42.34	32.84	38.29	38.79	38.27	42.67	35.42	36.43	37.84	45.98
-1.00 to -0.50; 1.4 mm		35.97	32.42	31.61	34.65	37.57	36.38	32.57	34.40	34.45	33.27	36.97	32.50	28.85	35.54	36.42
-0.50 to 0.00; 1 mm		23.18	26.92	23.46	26.26	30.93	30.03	25.05	27.20	27.47	27.36	28.60	24.98	23.77	23.96	30.72
Total		430.65	415.23	351.98	427.77	474.54	475.17	372.81	442.20	435.42	440.23	472.93	386.27	377.38	431.60	475.32
Summary Data																
< 0.00; >1 mm		430.65	415.23	351.98	427.77	474.54	475.17	372.81	442.20	435.42	440.23	472.93	386.27	377.38	431.60	475.32
> 0.00; <1 mm	Base Pan	0.37	0.86	1.48	1.71	29.11	28.63	1.45	0.98	1.79	0.21	-	0.51	0.72	0.28	0.80
	Oven Dried	388.55	387.41	322.32	382.65	396.87	395.78	340.68	403.15	371.89	407.66	409.80	385.96	360.89	389.82	410.96
Total Sample Weight		819.57	803.50	675.78	812.13	900.52	899.58	714.94	846.33	809.10	848.10	882.73	772.74	738.99	821.70	887.08

- Data not provided.

Table 7. Summary of final laser data for the participants for sediment distributed as PS62.

	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	7.7	17.9	26.2	20.6	9.8	3.4	1.4	0.8	0.7	1.0	1.0	1.2	1.2	1.1	1.1	1.1	0.8	0.6	0.6	0.5	0.3	0.3	0.3	0.3	0.2	0.1	0.1	100.00
PSA_2301	8.1	17.0	22.4	19.8	11.6	4.2	0.9	0.7	1.2	1.5	1.5	1.6	1.7	1.7	1.7	1.5	1.2	0.8	0.5	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	100.00
PSA_2302	7.0	16.7	22.1	19.3	11.2	4.1	1.1	0.8	1.2	1.5	1.6	1.7	1.8	1.9	1.9	1.8	1.5	1.1	0.7	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	100.00
PSA_2303	6.8	13.9	20.4	17.7	10.4	4.7	2.2	1.5	1.5	1.5	1.8	2.1	2.3	2.2	2.1	1.9	1.5	1.2	0.9	0.7	0.5	0.5	0.4	0.3	0.3	0.2	0.2	100.00
PSA_2304	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2305	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PSA_2306	7.1	16.9	22.2	19.1	10.8	3.7	0.9	0.8	1.3	1.5	1.5	1.7	1.9	2.1	2.1	1.9	1.6	1.2	0.7	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	100.00
PSA_2307	4.2	15.0	23.1	21.9	13.1	4.9	1.0	0.7	1.2	1.4	1.4	1.6	1.7	1.8	1.7	1.5	1.2	0.8	0.3	0.1	0.3	0.4	0.4	0.1	0.0	0.0	0.0	100.00
PSA_2308	5.8	13.1	17.0	14.8	8.2	3.8	1.7	2.0	2.3	3.2	3.8	4.5	4.8	4.7	4.3	3.4	1.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.00
PSA_2309	8.5	14.9	17.3	12.5	7.4	2.9	2.0	2.2	2.6	3.2	3.3	3.5	3.7	3.5	3.2	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	98.09
PSA_2310	8.7	16.3	20.0	17.9	10.1	4.2	0.9	0.7	1.3	1.6	2.0	2.2	2.4	2.4	2.4	2.0	1.6	1.1	0.7	0.5	0.4	0.3	0.1	0.0	0.0	0.0	0.0	100.00
PSA_2311	15.7	20.7	19.8	14.0	7.0	2.4	1.0	1.1	1.5	1.7	1.9	2.1	2.3	2.3	2.1	1.6	1.2	0.7	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	100.00
PSA_2312	8.2	19.2	26.0	22.6	12.5	4.2	0.8	0.5	0.7	0.6	0.5	0.6	0.7	0.8	0.7	0.7	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.00
PSA_2313	7.4	17.7	26.1	20.7	9.7	3.3	1.3	0.7	0.7	1.0	1.1	1.3	1.3	1.2	1.2	1.2	0.8	0.6	0.6	0.5	0.3	0.3	0.3	0.3	0.2	0.1	0.1	100.00
PSA_2320	4.0	14.3	20.3	18.6	12.1	6.4	3.7	3.1	3.0	2.6	2.2	1.8	1.6	1.5	1.2	1.0	0.9	0.6	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	100.00

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 PS62.

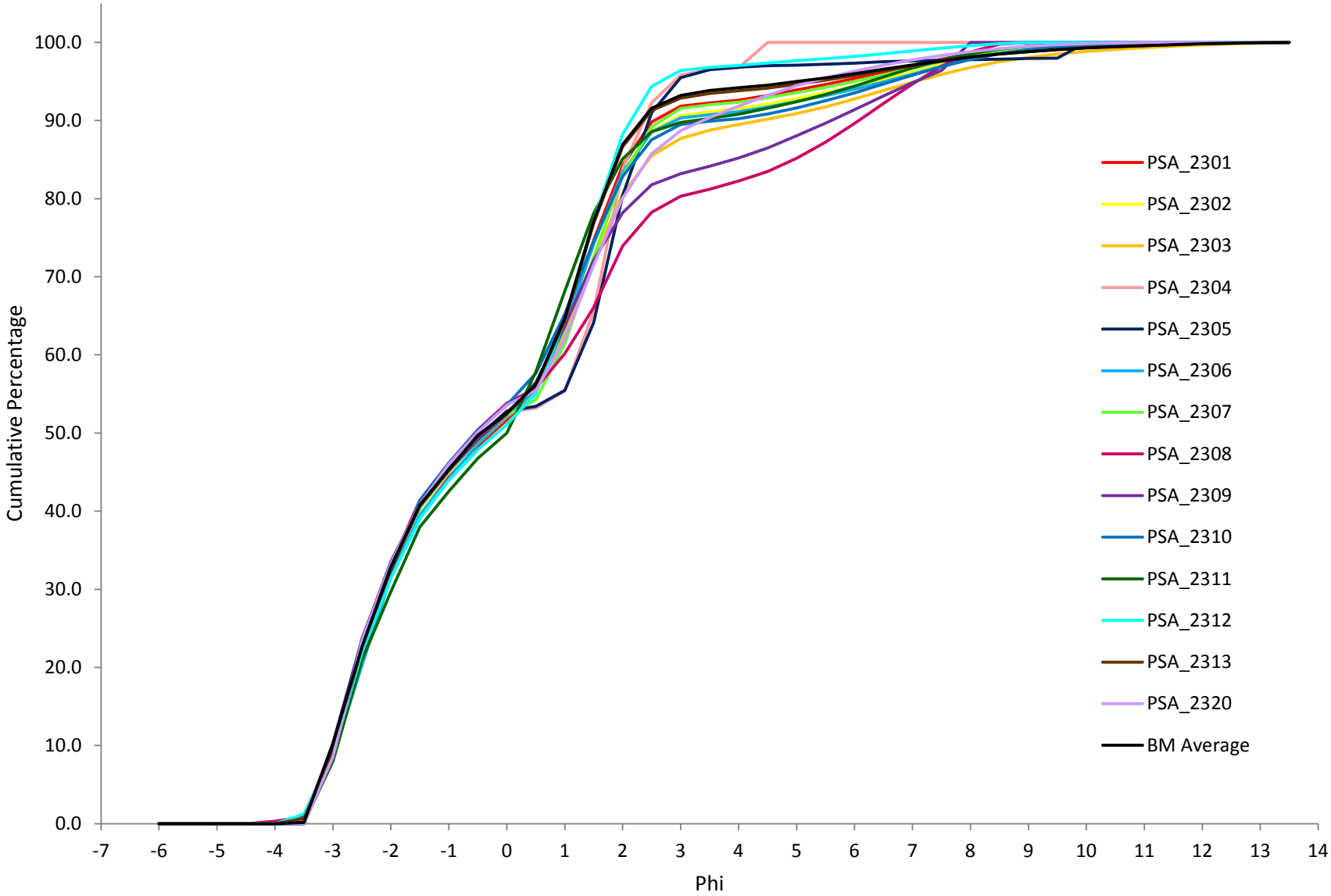


Figure 4. Bar chart showing the percentage gravel, sand, silt and clay recorded by each participating laboratory and the benchmark average for PS62.

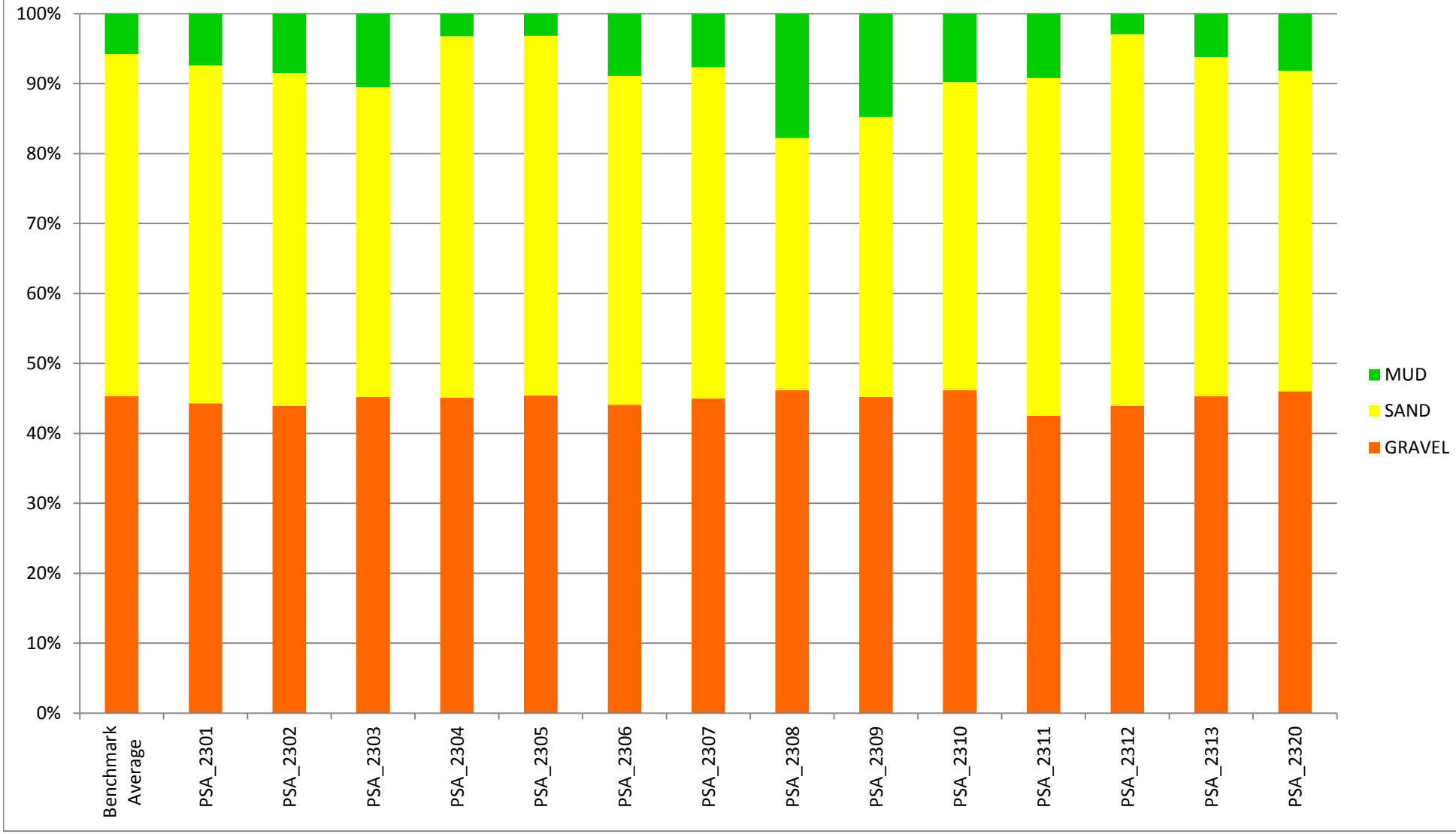


Figure 5. Bar chart of percentage sediment retained in each half-phi interval for the sieve (>1mm) data recorded by each participating laboratory and the benchmark average for sediment distributed as PS62.

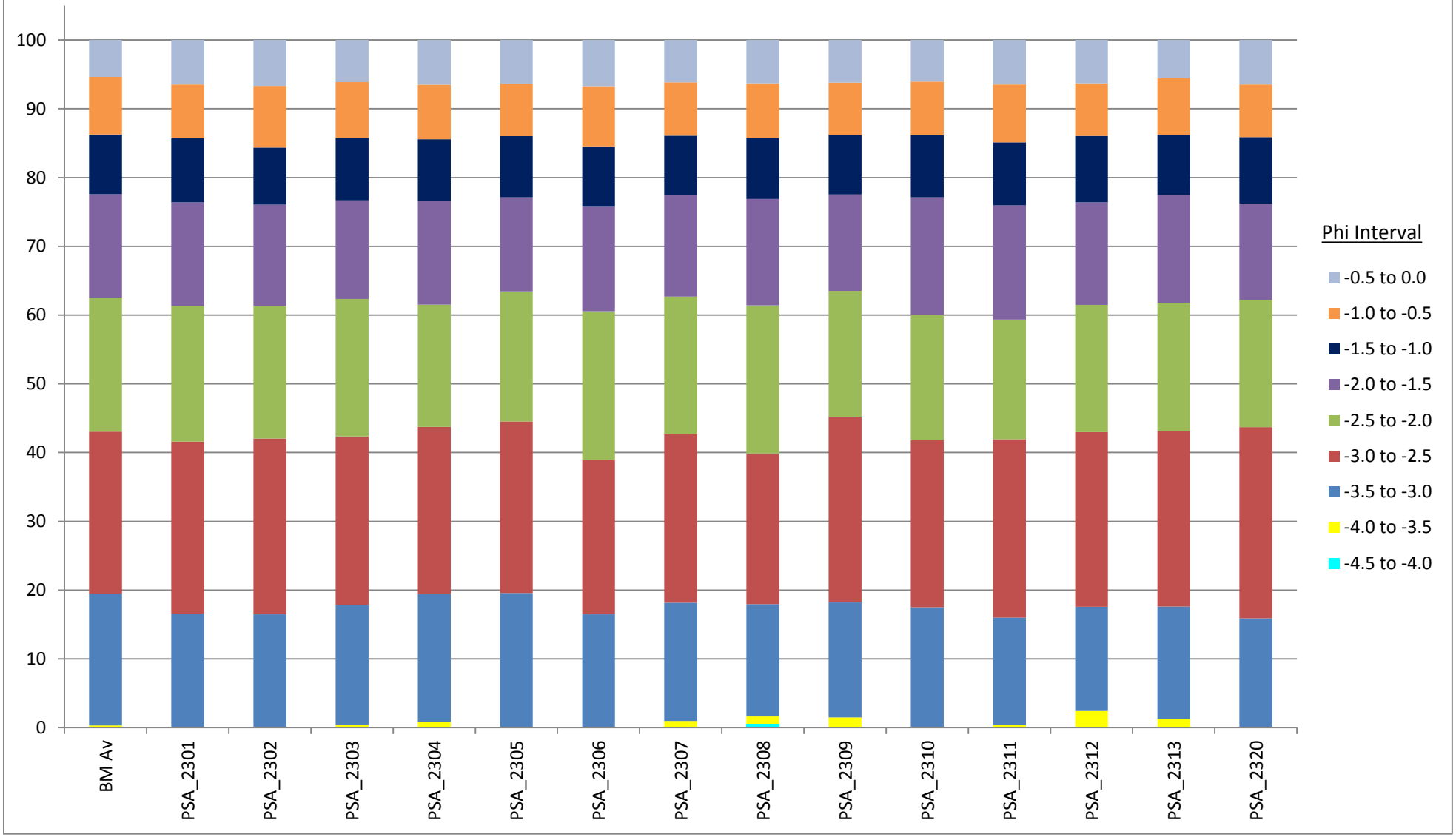


Figure 6. Cumulative percentage curves from all participating laboratories and the Benchmark Average for the sieve (>1mm) component of sediment distributed as PS62.

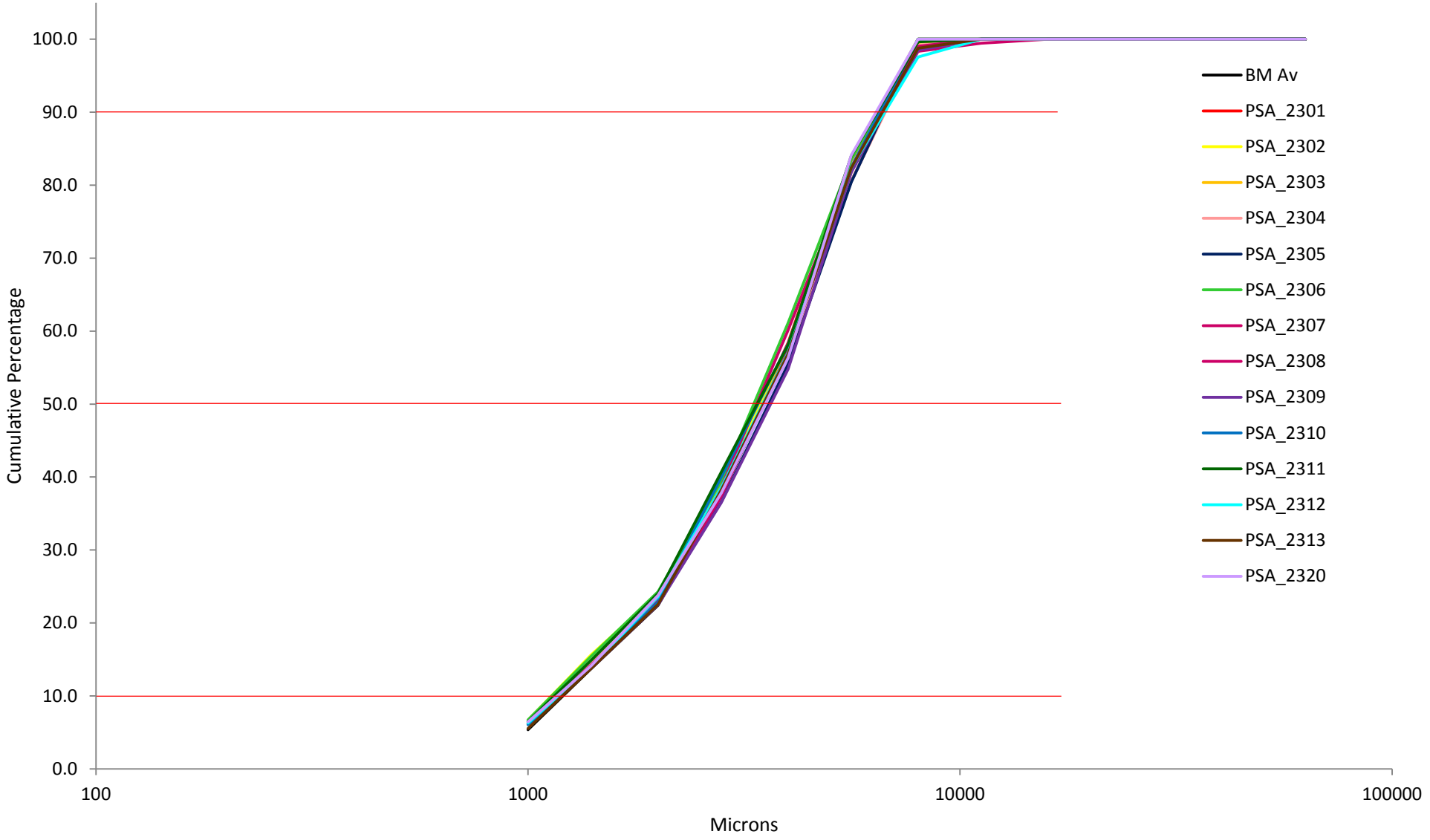


Figure 7. Bar chart of percentage sediment retained in each phi interval for the laser (<1mm) data recorded by each participating laboratory and the benchmark average for PS62.

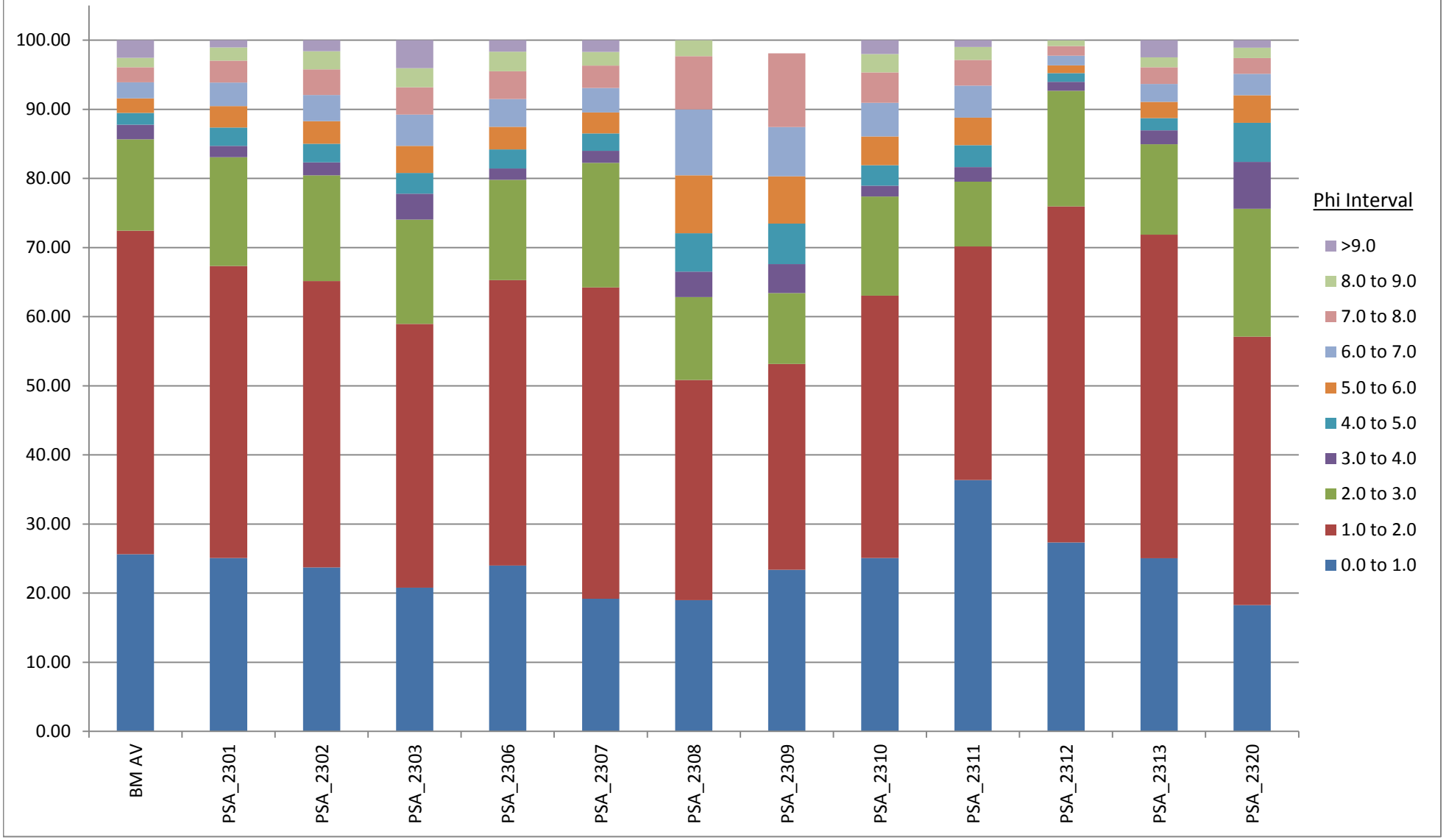
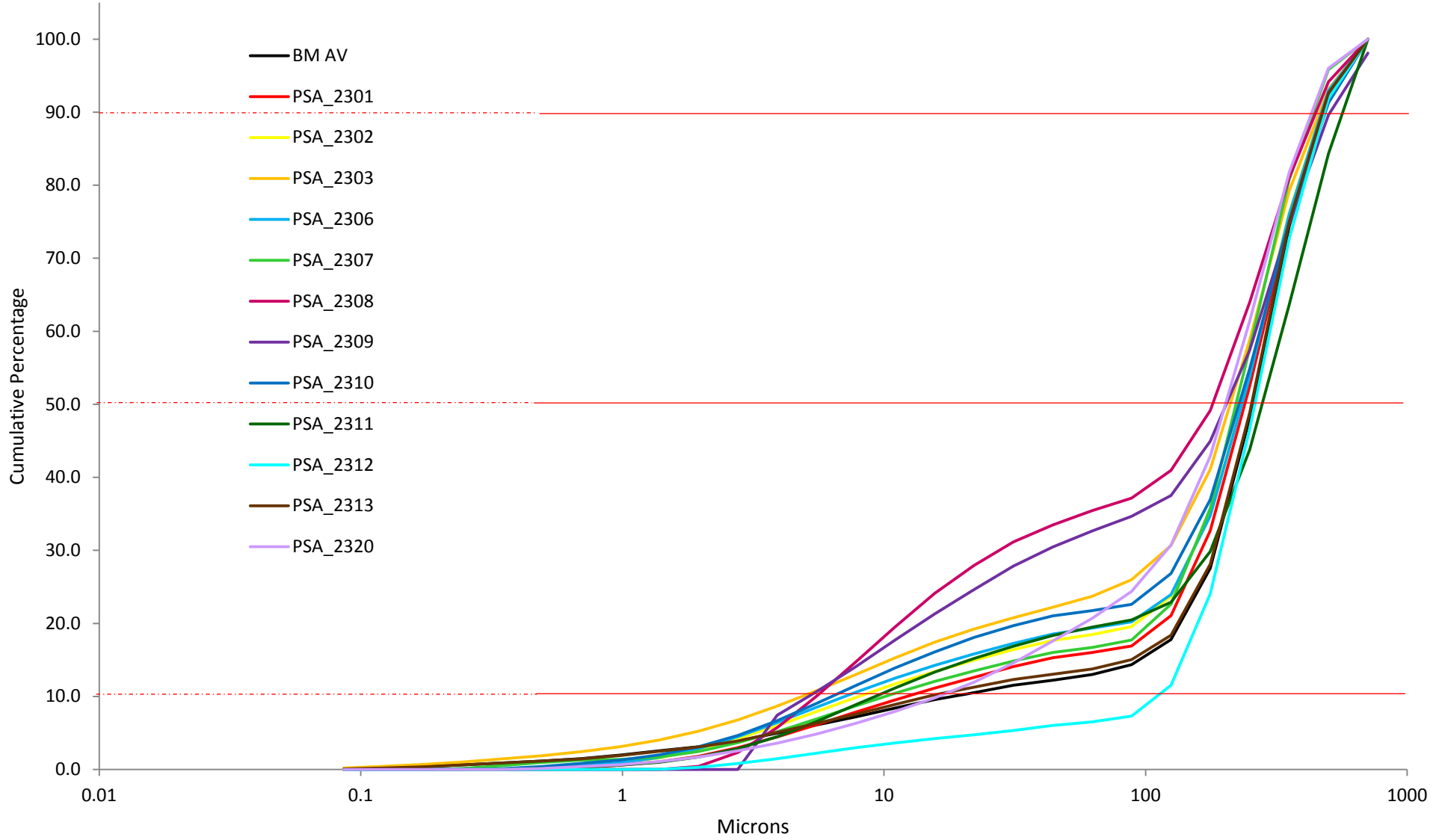


Figure 8. Cumulative percentage curves from all participating laboratories and the Benchmark Average for the laser (<1mm) component of sediment distributed as PS62.



APPENDICIES

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

Exercise Code:	**PS62**
LabCode:	**PSA_2301**
Sample Code:	**PS62A_2301**

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	0.0000
-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	8.5734	68.8870
-3.00 to -2.50; 5.6 mm	12.9212	103.8220
-2.50 to -2.00; 4 mm	10.1976	81.9380
-2.00 to -1.50; 2.8 mm	7.7973	62.6510
-1.50 to -1.00; 2 mm	4.8032	38.5940
-1.00 to -0.50; 1.4 mm	4.0347	32.4190
-0.50 to 0.00; 1 mm	3.3498	26.9160
0.00 to 0.50; (707 µm)	3.9239	31.5282
0.50 to 1.00; (500 µm)	8.1915	65.8183
1.00 to 1.50; (353.6 µm)	10.8336	87.0475
1.50 to 2.00; (250 µm)	9.5800	76.9749
2.00 to 2.50; (176.8 µm)	5.6055	45.0403
2.50 to 3.00; (125 µm)	2.0096	16.1473
3.00 to 3.50; (88.39 µm)	0.4397	3.5333
3.50 to 4.00; (62.5 µm)	0.3410	2.7396
4.00 to 4.50; (44.19 µm)	0.5916	4.7538
4.50 to 5.00; (31.25 µm)	0.7023	5.6428
5.00 to 5.50; (22.097 µm)	0.7252	5.8268
5.50 to 6.00; (15.625 µm)	0.7660	6.1550
6.00 to 6.50; (11.049 µm)	0.8166	6.5617
6.50 to 7.00; (7.813 µm)	0.8369	6.7245
7.00 to 7.50; (5.524 µm)	0.8065	6.4799
7.50 to 8.00; (3.906 µm)	0.7140	5.7368
8.00 to 8.50; (2.762 µm)	0.5588	4.4902
8.50 to 9.00; (1.953 µm)	0.3762	3.0230
9.00 to 9.50; (1.381 µm)	0.2229	1.7912
9.50 to 10.00; (0.977 µm)	0.1368	1.0988
10.00 to 10.50; (0.691 µm)	0.1017	0.8173
10.50 to 11.00; (0.488 µm)	0.0424	0.3409
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	803.50

COMMENTS: NMBAQC PSA SOP for supporting biological data - incorporating BS1377: 1990 Parts 1-2 (sieving) and BS13320: 2009 (laser diffraction).

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

Exercise Code:	**PS62**
LabCode:	**PSA_2302**
Sample Code:	**PS622302**

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	0.00
-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	0.0000	0.00
-3.50 to -3.00; 8 mm	8.5856	58.02
-3.00 to -2.50; 5.6 mm	13.3150	89.98
-2.50 to -2.00; 4 mm	10.0255	67.75
-2.00 to -1.50; 2.8 mm	7.6800	51.90
-1.50 to -1.00; 2 mm	4.3298	29.26
-1.00 to -0.50; 1.4 mm	4.6776	31.61
-0.50 to 0.00; 1 mm	3.4715	23.46
0.00 to 0.50; (707 µm)	3.3513	22.65
0.50 to 1.00; (500 µm)	8.0121	54.14
1.00 to 1.50; (353.6 µm)	10.5971	71.61
1.50 to 2.00; (250 µm)	9.2480	62.50
2.00 to 2.50; (176.8 µm)	5.3625	36.24
2.50 to 3.00; (125 µm)	1.9695	13.31
3.00 to 3.50; (88.39 µm)	0.5120	3.46
3.50 to 4.00; (62.5 µm)	0.3945	2.67
4.00 to 4.50; (44.19 µm)	0.5953	4.02
4.50 to 5.00; (31.25 µm)	0.6984	4.72
5.00 to 5.50; (22.097 µm)	0.7463	5.04
5.50 to 6.00; (15.625 µm)	0.8142	5.50
6.00 to 6.50; (11.049 µm)	0.8860	5.99
6.50 to 7.00; (7.813 µm)	0.9257	6.26
7.00 to 7.50; (5.524 µm)	0.9197	6.22
7.50 to 8.00; (3.906 µm)	0.8574	5.79
8.00 to 8.50; (2.762 µm)	0.7275	4.92
8.50 to 9.00; (1.953 µm)	0.5369	3.63
9.00 to 9.50; (1.381 µm)	0.3368	2.28
9.50 to 10.00; (0.977 µm)	0.2002	1.35
10.00 to 10.50; (0.691 µm)	0.1377	0.93
10.50 to 11.00; (0.488 µm)	0.0856	0.58
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	675.78

COMMENTS:

Red text calculated by APEM.

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

Exercise Code:	**PS62**
LabCode:	**PSA_2303**
Sample Code:	**PS622303**

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	0.21	1.74
-3.50 to -3.00; 8 mm	9.18	74.58
-3.00 to -2.50; 5.6 mm	12.91	104.82
-2.50 to -2.00; 4 mm	10.54	85.58
-2.00 to -1.50; 2.8 mm	7.55	61.33
-1.50 to -1.00; 2 mm	4.78	38.81
-1.00 to -0.50; 1.4 mm	4.27	34.65
-0.50 to 0.00; 1 mm	3.23	26.26
0.00 to 0.50; (707 µm)	3.24	26.32
0.50 to 1.00; (500 µm)	6.59	53.55
1.00 to 1.50; (353.6 µm)	9.66	78.47
1.50 to 2.00; (250 µm)	8.39	68.16
2.00 to 2.50; (176.8 µm)	4.92	39.94
2.50 to 3.00; (125 µm)	2.23	18.10
3.00 to 3.50; (88.39 µm)	1.06	8.61
3.50 to 4.00; (62.5 µm)	0.72	5.82
4.00 to 4.50; (44.19 µm)	0.69	5.59
4.50 to 5.00; (31.25 µm)	0.73	5.92
5.00 to 5.50; (22.097 µm)	0.84	6.84
5.50 to 6.00; (15.625 µm)	1.01	8.18
6.00 to 6.50; (11.049 µm)	1.09	8.87
6.50 to 7.00; (7.813 µm)	1.06	8.58
7.00 to 7.50; (5.524 µm)	0.99	8.05
7.50 to 8.00; (3.906 µm)	0.89	7.20
8.00 to 8.50; (2.762 µm)	0.73	5.94
8.50 to 9.00; (1.953 µm)	0.57	4.65
9.00 to 9.50; (1.381 µm)	0.44	3.54
9.50 to 10.00; (0.977 µm)	0.33	2.67
10.00 to 10.50; (0.691 µm)	0.26	2.10
10.50 to 11.00; (0.488 µm)	0.22	1.75
11.00 to 11.50; (0.345 µm)	0.19	1.52
11.50 to 12.00; (0.244 µm)	0.16	1.31
12.00 to 12.50; (0.173 µm)	0.13	1.06
12.50 to 13.00; (0.122 µm)	0.10	0.82
13.00 to 13.50; (0.086 µm)	0.10	0.78
Total	100.00	812.13

COMMENTS:

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

Exercise Code:	**PS62**
LabCode:	**PSA_2304**
Sample Code:	**PS622304**

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	0.4386	3.95
-3.50 to -3.00; 8 mm	9.8010	88.26
-3.00 to -2.50; 5.6 mm	12.8093	115.35
-2.50 to -2.00; 4 mm	9.3668	84.35
-2.00 to -1.50; 2.8 mm	7.9099	71.23
-1.50 to -1.00; 2 mm	4.7639	42.90
-1.00 to -0.50; 1.4 mm	4.1720	37.57
-0.50 to 0.00; 1 mm	3.4347	30.93
0.00 to 0.50; (707 µm)	0.4953	4.46
0.50 to 1.00; (500 µm)	2.1865	19.69
1.00 to 1.50; (353.6 µm)	10.1663	91.55
1.50 to 2.00; (250 µm)	18.2572	164.41
2.00 to 2.50; (176.8 µm)	8.4740	76.31
2.50 to 3.00; (125 µm)	3.5135	31.64
3.00 to 3.50; (88.39 µm)	0.7407	6.67
3.50 to 4.00; (62.5 µm)	0.2376	2.14
4.00 to 4.50; (44.19 µm)	3.2325767334429*	29.11
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	900.52

COMMENTS: Sample was first wet-screened at 2mm to remove gravel. Residual sediment was then wet-screened through a 63µm sieve. The three fractions were then dried at 80oC; the >2mm fraction was dry-sieved, the 2-0.063mm fraction was dry-sieved and the <0.063mm fraction was weighed.

*mass of <63µm fraction - sample not further fractionated.
Red text calculated by APEM.

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

Exercise Code:	**PS62**
LabCode:	**PSA_2305**
Sample Code:	**PS622305**

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	10.34	93.013
-3.00 to -2.50; 5.6 mm	13.19	118.624
-2.50 to -2.00; 4 mm	9.99	89.837
-2.00 to -1.50; 2.8 mm	7.22	64.941
-1.50 to -1.00; 2 mm	4.71	42.342
-1.00 to -0.50; 1.4 mm	4.04	36.3810
-0.50 to 0.00; 1 mm	3.34	30.0290
0.00 to 0.50; (707 µm)	0.58	5.2460
0.50 to 1.00; (500 µm)	2.06	18.5290
1.00 to 1.50; (353.6 µm)	8.65	77.7900
1.50 to 2.00; (250 µm)	16.31	146.6800
2.00 to 2.50; (176.8 µm)	10.59	95.2700
2.50 to 3.00; (125 µm)	4.48	40.2930
3.00 to 3.50; (88.39 µm)	1.01	9.0460
3.50 to 4.00; (62.5 µm)	0.33	2.9300
4.00 to 4.50; (44.19 µm)	0.20	1.7719
4.50 to 5.00; (31.25 µm)	0.07	0.5922
5.00 to 5.50; (22.097 µm)	0.13	1.1750
5.50 to 6.00; (15.625 µm)	0.13	1.1374
6.00 to 6.50; (11.049 µm)	0.18	1.6262
6.50 to 7.00; (7.813 µm)	0.11	0.9870
7.00 to 7.50; (5.524 µm)	0.10	0.8977
7.50 to 8.00; (3.906 µm)	0.05	0.4277
8.00 to 8.50; (2.762 µm)	0.09	0.7990
8.50 to 9.00; (1.953 µm)	0.08	0.7332
9.00 to 9.50; (1.381 µm)	0.03	0.2914
9.50 to 10.00; (0.977 µm)	2.02	18.1929
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	899.58

COMMENTS: Data was calculated to 1 micron using the British Standard pipette method with less than 1 micron data submitted as an overall figure of 18.1929.

Red text calculated by APEM.

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

Exercise Code:	**PS62**
LabCode:	**PSA_2306**
Sample Code:	**PS622306**

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	0.00
-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	0.0000	0.00
-3.50 to -3.00; 8 mm	8.5902	61.43
-3.00 to -2.50; 5.6 mm	11.6875	83.58
-2.50 to -2.00; 4 mm	11.2792	80.66
-2.00 to -1.50; 2.8 mm	7.9259	56.68
-1.50 to -1.00; 2 mm	4.5922	32.84
-1.00 to -0.50; 1.4 mm	4.5545	32.57
-0.50 to 0.00; 1 mm	3.5029	25.05
0.00 to 0.50; (707 µm)	3.3815	24.18
0.50 to 1.00; (500 µm)	8.0584	57.63
1.00 to 1.50; (353.6 µm)	10.6070	75.85
1.50 to 2.00; (250 µm)	9.1536	65.46
2.00 to 2.50; (176.8 µm)	5.1882	37.10
2.50 to 3.00; (125 µm)	1.8005	12.88
3.00 to 3.50; (88.39 µm)	0.4175	2.99
3.50 to 4.00; (62.5 µm)	0.3821	2.73
4.00 to 4.50; (44.19 µm)	0.6127	4.38
4.50 to 5.00; (31.25 µm)	0.7028	5.03
5.00 to 5.50; (22.097 µm)	0.7436	5.32
5.50 to 6.00; (15.625 µm)	0.8294	5.93
6.00 to 6.50; (11.049 µm)	0.9305	6.65
6.50 to 7.00; (7.813 µm)	0.9931	7.10
7.00 to 7.50; (5.524 µm)	0.9953	7.12
7.50 to 8.00; (3.906 µm)	0.9267	6.63
8.00 to 8.50; (2.762 µm)	0.7816	5.59
8.50 to 9.00; (1.953 µm)	0.5729	4.10
9.00 to 9.50; (1.381 µm)	0.3565	2.55
9.50 to 10.00; (0.977 µm)	0.2089	1.49
10.00 to 10.50; (0.691 µm)	0.1413	1.01
10.50 to 11.00; (0.488 µm)	0.0834	0.60
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	715.12

COMMENTS:

Red text calculated by APEM.

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

Exercise Code:	**PS62**
LabCode:	**PSA_2307**
Sample Code:	**PS622307**

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	0.00
-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	0.5081	4.30
-3.50 to -3.00; 8 mm	8.9906	76.09
-3.00 to -2.50; 5.6 mm	12.8000	108.33
-2.50 to -2.00; 4 mm	10.4463	88.41
-2.00 to -1.50; 2.8 mm	7.7015	65.18
-1.50 to -1.00; 2 mm	4.5242	38.29
-1.00 to -0.50; 1.4 mm	4.0646	34.40
-0.50 to 0.00; 1 mm	3.2139	27.20
0.00 to 0.50; (707 µm)	1.9943	16.88
0.50 to 1.00; (500 µm)	7.1719	60.70
1.00 to 1.50; (353.6 µm)	11.0471	93.49
1.50 to 2.00; (250 µm)	10.4613	88.54
2.00 to 2.50; (176.8 µm)	6.2711	53.07
2.50 to 3.00; (125 µm)	2.3355	19.77
3.00 to 3.50; (88.39 µm)	0.4886	4.14
3.50 to 4.00; (62.5 µm)	0.3369	2.85
4.00 to 4.50; (44.19 µm)	0.5496	4.65
4.50 to 5.00; (31.25 µm)	0.6473	5.48
5.00 to 5.50; (22.097 µm)	0.6908	5.85
5.50 to 6.00; (15.625 µm)	0.7582	6.42
6.00 to 6.50; (11.049 µm)	0.8287	7.01
6.50 to 7.00; (7.813 µm)	0.8621	7.30
7.00 to 7.50; (5.524 µm)	0.8292	7.02
7.50 to 8.00; (3.906 µm)	0.7258	6.14
8.00 to 8.50; (2.762 µm)	0.5751	4.87
8.50 to 9.00; (1.953 µm)	0.3629	3.07
9.00 to 9.50; (1.381 µm)	0.1533	1.30
9.50 to 10.00; (0.977 µm)	0.0536	0.45
10.00 to 10.50; (0.691 µm)	0.1448	1.23
10.50 to 11.00; (0.488 µm)	0.2106	1.78
11.00 to 11.50; (0.345 µm)	0.1804	1.53
11.50 to 12.00; (0.244 µm)	0.0716	0.61
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	846.33

COMMENTS:

Red text calculated by APEM.

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

Exercise Code:	**PS62**
LabCode:	**PSA_2308**
Sample Code:	**PS622308**

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	0.2991	2.42
-4.00 to -3.50; 11.2 mm	0.5821	4.71
-3.50 to -3.00; 8 mm	8.7851	71.08
-3.00 to -2.50; 5.6 mm	11.7896	95.39
-2.50 to -2.00; 4 mm	11.5894	93.77
-2.00 to -1.50; 2.8 mm	8.3228	67.34
-1.50 to -1.00; 2 mm	4.7942	38.79
-1.00 to -0.50; 1.4 mm	4.2578	34.4500
-0.50 to 0.00; 1 mm	3.3951	27.4700
0.00 to 0.50; (707 µm)	1.9020	15.3892
0.50 to 1.00; (500 µm)	4.4631	36.1113
1.00 to 1.50; (353.6 µm)	5.8841	47.6085
1.50 to 2.00; (250 µm)	7.8635	63.6234
2.00 to 2.50; (176.8 µm)	4.3448	35.1540
2.50 to 3.00; (125 µm)	2.0188	16.3338
3.00 to 3.50; (88.39 µm)	0.8962	7.2514
3.50 to 4.00; (62.5 µm)	1.0566	8.5489
4.00 to 4.50; (44.19 µm)	1.2262	9.9208
4.50 to 5.00; (31.25 µm)	1.7028	13.7773
5.00 to 5.50; (22.097 µm)	2.0403	16.5080
5.50 to 6.00; (15.625 µm)	2.4072	19.4768
6.00 to 6.50; (11.049 µm)	2.5599	20.7124
6.50 to 7.00; (7.813 µm)	2.5068	20.2826
7.00 to 7.50; (5.524 µm)	2.2760	18.4153
7.50 to 8.00; (3.906 µm)	1.8082	14.6301
8.00 to 8.50; (2.762 µm)	1.0038	8.1217
8.50 to 9.00; (1.953 µm)	0.2228	1.8023
9.00 to 9.50; (1.381 µm)	0.0015	0.0121
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	809.10

COMMENTS:

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

Exercise Code:	**PS62**
LabCode:	**PSA_2309**
Sample Code:	**PS622309**

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
-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	0.78	6.57
-3.50 to -3.00; 8 mm	8.76	73.58
-3.00 to -2.50; 5.6 mm	14.16	118.95
-2.50 to -2.00; 4 mm	9.58	80.47
-2.00 to -1.50; 2.8 mm	7.35	61.76
-1.50 to -1.00; 2 mm	4.55	38.27
-1.00 to -0.50; 1.4 mm	3.96	33.2700
-0.50 to 0.00; 1 mm	3.26	27.3600
0.00 to 0.50; (707 µm)	4.11	34.5328
0.50 to 1.00; (500 µm)	7.24	60.8368
1.00 to 1.50; (353.6 µm)	8.38	70.4416
1.50 to 2.00; (250 µm)	6.06	50.9402
2.00 to 2.50; (176.8 µm)	3.60	30.2859
2.50 to 3.00; (125 µm)	1.39	11.6606
3.00 to 3.50; (88.39 µm)	0.97	8.1850
3.50 to 4.00; (62.5 µm)	1.06	8.8963
4.00 to 4.50; (44.19 µm)	1.27	10.7115
4.50 to 5.00; (31.25 µm)	1.56	13.1369
5.00 to 5.50; (22.097 µm)	1.62	13.5965
5.50 to 6.00; (15.625 µm)	1.71	14.3548
6.00 to 6.50; (11.049 µm)	1.78	14.9677
6.50 to 7.00; (7.813 µm)	1.68	14.0950
7.00 to 7.50; (5.524 µm)	1.56	13.1362
7.50 to 8.00; (3.906 µm)	3.60	30.2819
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	840.29

COMMENTS:We experienced technical difficulties with the Malvern Mastersizer during the laser granulometer analysis which meant that a portion of the sample aliquot was lost. With the limited volume of sample material remaining we completed the remaining replicate analysis however there was not enough to achieve optimum laser obscuration. (The Mastersizer terminated the SOP prematurely and discarded the sample before sample completion).

Red Text calculated by APEM.

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

Exercise Code:	**PS62**
LabCode:	**PSA_2310**
Sample Code:	**PS622310**

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	0.0000
-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	9.3875	82.8667
-3.00 to -2.50; 5.6 mm	13.0088	114.8333
-2.50 to -2.00; 4 mm	9.7462	86.0333
-2.00 to -1.50; 2.8 mm	9.1723	80.9667
-1.50 to -1.00; 2 mm	4.8335	42.6667
-1.00 to -0.50; 1.4 mm	4.1878	36.9667
-0.50 to 0.00; 1 mm	3.2399	28.6000
0.00 to 0.50; (707 µm)	4.0575	35.8165
0.50 to 1.00; (500 µm)	7.5805	66.9158
1.00 to 1.50; (353.6 µm)	9.3047	82.1353
1.50 to 2.00; (250 µm)	8.3284	73.5175
2.00 to 2.50; (176.8 µm)	4.6926	41.4228
2.50 to 3.00; (125 µm)	1.9575	17.2793
3.00 to 3.50; (88.39 µm)	0.4020	3.5482
3.50 to 4.00; (62.5 µm)	0.3330	2.9398
4.00 to 4.50; (44.19 µm)	0.6192	5.4660
4.50 to 5.00; (31.25 µm)	0.7497	6.6179
5.00 to 5.50; (22.097 µm)	0.9243	8.1595
5.50 to 6.00; (15.625 µm)	1.0113	8.9275
6.00 to 6.50; (11.049 µm)	1.1292	9.9681
6.50 to 7.00; (7.813 µm)	1.1349	10.0178
7.00 to 7.50; (5.524 µm)	1.0919	9.6385
7.50 to 8.00; (3.906 µm)	0.9391	8.2898
8.00 to 8.50; (2.762 µm)	0.7196	6.3523
8.50 to 9.00; (1.953 µm)	0.5143	4.5400
9.00 to 9.50; (1.381 µm)	0.3364	2.9696
9.50 to 10.00; (0.977 µm)	0.2099	1.8526
10.00 to 10.50; (0.691 µm)	0.1984	1.7514
10.50 to 11.00; (0.488 µm)	0.1469	1.2965
11.00 to 11.50; (0.345 µm)	0.0427	0.3773
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	882.73

COMMENTS:

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

Exercise Code:	**PS62**
LabCode:	**PSA_2311**
Sample Code:	**PS622311**

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	0.1669	1.29
-3.50 to -3.00; 8 mm	7.8332	60.53
-3.00 to -2.50; 5.6 mm	12.9617	100.16
-2.50 to -2.00; 4 mm	8.7041	67.26
-2.00 to -1.50; 2.8 mm	8.2990	64.13
-1.50 to -1.00; 2 mm	4.5837	35.42
-1.00 to -0.50; 1.4 mm	4.2058	32.5000
-0.50 to 0.00; 1 mm	3.2327	24.9800
0.00 to 0.50; (707 µm)	7.8583	60.7245
0.50 to 1.00; (500 µm)	10.3315	79.8353
1.00 to 1.50; (353.6 µm)	9.9081	76.5640
1.50 to 2.00; (250 µm)	6.9861	53.9846
2.00 to 2.50; (176.8 µm)	3.4808	26.8977
2.50 to 3.00; (125 µm)	1.2070	9.3269
3.00 to 3.50; (88.39 µm)	0.4894	3.7815
3.50 to 4.00; (62.5 µm)	0.5689	4.3962
4.00 to 4.50; (44.19 µm)	0.7426	5.7385
4.50 to 5.00; (31.25 µm)	0.8369	6.4671
5.00 to 5.50; (22.097 µm)	0.9380	7.2484
5.50 to 6.00; (15.625 µm)	1.0682	8.2547
6.00 to 6.50; (11.049 µm)	1.1630	8.9866
6.50 to 7.00; (7.813 µm)	1.1539	8.9164
7.00 to 7.50; (5.524 µm)	1.0276	7.9409
7.50 to 8.00; (3.906 µm)	0.8171	6.3142
8.00 to 8.50; (2.762 µm)	0.5766	4.4559
8.50 to 9.00; (1.953 µm)	0.3584	2.7697
9.00 to 9.50; (1.381 µm)	0.2018	1.5594
9.50 to 10.00; (0.977 µm)	0.1278	0.9872
10.00 to 10.50; (0.691 µm)	0.1029	0.7952
10.50 to 11.00; (0.488 µm)	0.0679	0.5250
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	772.74

COMMENTS:

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

Exercise Code:	**PS62**
LabCode:	**PSA_2312**
Sample Code:	**PS622312**

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	0.00
-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	1.2395	9.16
-3.50 to -3.00; 8 mm	7.7376	57.18
-3.00 to -2.50; 5.6 mm	12.9691	95.84
-2.50 to -2.00; 4 mm	9.4413	69.77
-2.00 to -1.50; 2.8 mm	7.6293	56.38
-1.50 to -1.00; 2 mm	4.9297	36.43
-1.00 to -0.50; 1.4 mm	3.9040	28.85
-0.50 to 0.00; 1 mm	3.2166	23.77
0.00 to 0.50; (707 µm)	3.9883	29.47
0.50 to 1.00; (500 µm)	9.3897	69.39
1.00 to 1.50; (353.6 µm)	12.7330	94.10
1.50 to 2.00; (250 µm)	11.0589	81.72
2.00 to 2.50; (176.8 µm)	6.1203	45.23
2.50 to 3.00; (125 µm)	2.0631	15.25
3.00 to 3.50; (88.39 µm)	0.3841	2.84
3.50 to 4.00; (62.5 µm)	0.2511	1.86
4.00 to 4.50; (44.19 µm)	0.3250	2.40
4.50 to 5.00; (31.25 µm)	0.2856	2.11
5.00 to 5.50; (22.097 µm)	0.2560	1.89
5.50 to 6.00; (15.625 µm)	0.2905	2.15
6.00 to 6.50; (11.049 µm)	0.3250	2.40
6.50 to 7.00; (7.813 µm)	0.3693	2.73
7.00 to 7.50; (5.524 µm)	0.3644	2.69
7.50 to 8.00; (3.906 µm)	0.3200	2.37
8.00 to 8.50; (2.762 µm)	0.2560	1.89
8.50 to 9.00; (1.953 µm)	0.1379	1.02
9.00 to 9.50; (1.381 µm)	0.0148	0.11
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	738.99

COMMENTS:

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

Exercise Code:	**PS62**
LabCode:	**PSA_2313**
Sample Code:	**PS622313**

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	0.6499	5.34
-3.50 to -3.00; 8 mm	8.6053	70.71
-3.00 to -2.50; 5.6 mm	13.3978	110.09
-2.50 to -2.00; 4 mm	9.7943	80.48
-2.00 to -1.50; 2.8 mm	8.2317	67.64
-1.50 to -1.00; 2 mm	4.6051	37.84
-1.00 to -0.50; 1.4 mm	4.3252	35.5400
-0.50 to 0.00; 1 mm	2.9159	23.9600
0.00 to 0.50; (707 µm)	3.5001	28.7601
0.50 to 1.00; (500 µm)	8.3881	68.9250
1.00 to 1.50; (353.6 µm)	12.3942	101.8434
1.50 to 2.00; (250 µm)	9.8406	80.8601
2.00 to 2.50; (176.8 µm)	4.6263	38.0143
2.50 to 3.00; (125 µm)	1.5789	12.9740
3.00 to 3.50; (88.39 µm)	0.6161	5.0624
3.50 to 4.00; (62.5 µm)	0.3415	2.8064
4.00 to 4.50; (44.19 µm)	0.3397	2.7916
4.50 to 5.00; (31.25 µm)	0.4940	4.0592
5.00 to 5.50; (22.097 µm)	0.5048	4.1480
5.50 to 6.00; (15.625 µm)	0.6167	5.0673
6.00 to 6.50; (11.049 µm)	0.6399	5.2581
6.50 to 7.00; (7.813 µm)	0.5923	4.8667
7.00 to 7.50; (5.524 µm)	0.5836	4.7956
7.50 to 8.00; (3.906 µm)	0.5660	4.6505
8.00 to 8.50; (2.762 µm)	0.3882	3.1898
8.50 to 9.00; (1.953 µm)	0.2810	2.3092
9.00 to 9.50; (1.381 µm)	0.2732	2.2447
9.50 to 10.00; (0.977 µm)	0.2211	1.8171
10.00 to 10.50; (0.691 µm)	0.1480	1.2158
10.50 to 11.00; (0.488 µm)	0.1194	0.9808
11.00 to 11.50; (0.345 µm)	0.1232	1.0123
11.50 to 12.00; (0.244 µm)	0.1194	0.9810
12.00 to 12.50; (0.173 µm)	0.0896	0.7363
12.50 to 13.00; (0.122 µm)	0.0582	0.4780
13.00 to 13.50; (0.086 µm)	0.0307	0.2521
Total	100.00	821.70

COMMENTS:

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

Exercise Code:	**PS62**
LabCode:	**PSA_2320**
Sample Code:	**PS622320**

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	0.0000	0
-3.50 to -3.00; 8 mm	8.5223	75.6
-3.00 to -2.50; 5.6 mm	14.8837	132.03
-2.50 to -2.00; 4 mm	9.9191	87.99
-2.00 to -1.50; 2.8 mm	7.5055	66.58
-1.50 to -1.00; 2 mm	5.1833	45.98
-1.00 to -0.50; 1.4 mm	4.1056	36.4200
-0.50 to 0.00; 1 mm	3.4630	30.7200
0.00 to 0.50; (707 µm)	1.8448	16.3652
0.50 to 1.00; (500 µm)	6.6367	58.8725
1.00 to 1.50; (353.6 µm)	9.4171	83.5370
1.50 to 2.00; (250 µm)	8.6161	76.4318
2.00 to 2.50; (176.8 µm)	5.6366	50.0014
2.50 to 3.00; (125 µm)	2.9480	26.1513
3.00 to 3.50; (88.39 µm)	1.6989	15.0704
3.50 to 4.00; (62.5 µm)	1.4493	12.8561
4.00 to 4.50; (44.19 µm)	1.4013	12.4306
4.50 to 5.00; (31.25 µm)	1.2234	10.8522
5.00 to 5.50; (22.097 µm)	1.0031	8.8986
5.50 to 6.00; (15.625 µm)	0.8505	7.5444
6.00 to 6.50; (11.049 µm)	0.7602	6.7437
6.50 to 7.00; (7.813 µm)	0.6746	5.9842
7.00 to 7.50; (5.524 µm)	0.5787	5.1333
7.50 to 8.00; (3.906 µm)	0.4827	4.2823
8.00 to 8.50; (2.762 µm)	0.3966	3.5183
8.50 to 9.00; (1.953 µm)	0.2976	2.6398
9.00 to 9.50; (1.381 µm)	0.1950	1.7294
9.50 to 10.00; (0.977 µm)	0.1289	1.1438
10.00 to 10.50; (0.691 µm)	0.1093	0.9699
10.50 to 11.00; (0.488 µm)	0.0665	0.5902
11.00 to 11.50; (0.345 µm)	0.0015	0.0137
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)		
13.00 to 13.50; (0.086 µm)		
Total	100.00	887.08

COMMENTS:

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

Exercise Code:	**PS62**
LabCode:	**BM REP 1**
Sample Code:	**PS62_ 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	0.3303	2.7
-3.50 to -3.00; 8 mm	9.5164	77.8
-3.00 to -2.50; 5.6 mm	12.5682	102.75
-2.50 to -2.00; 4 mm	10.2711	83.97
-2.00 to -1.50; 2.8 mm	7.9446	64.95
-1.50 to -1.00; 2 mm	4.6334	37.88
-1.00 to -0.50; 1.4 mm	4.2970	35.1300
-0.50 to 0.00; 1 mm	2.8953	23.6700
0.00 to 0.50; (707 µm)	3.7366	30.5482
0.50 to 1.00; (500 µm)	8.8344	72.2245
1.00 to 1.50; (353.6 µm)	12.5119	102.2901
1.50 to 2.00; (250 µm)	9.7549	79.7503
2.00 to 2.50; (176.8 µm)	4.5379	37.0991
2.50 to 3.00; (125 µm)	1.5305	12.5121
3.00 to 3.50; (88.39 µm)	0.5735	4.6886
3.50 to 4.00; (62.5 µm)	0.3434	2.8074
4.00 to 4.50; (44.19 µm)	0.3248	2.6554
4.50 to 5.00; (31.25 µm)	0.4690	3.8341
5.00 to 5.50; (22.097 µm)	0.4462	3.6480
5.50 to 6.00; (15.625 µm)	0.5370	4.3899
6.00 to 6.50; (11.049 µm)	0.5570	4.5537
6.50 to 7.00; (7.813 µm)	0.5127	4.1918
7.00 to 7.50; (5.524 µm)	0.5105	4.1739
7.50 to 8.00; (3.906 µm)	0.5093	4.1638
8.00 to 8.50; (2.762 µm)	0.3614	2.9544
8.50 to 9.00; (1.953 µm)	0.2728	2.2306
9.00 to 9.50; (1.381 µm)	0.2734	2.2354
9.50 to 10.00; (0.977 µm)	0.2280	1.8638
10.00 to 10.50; (0.691 µm)	0.1568	1.2816
10.50 to 11.00; (0.488 µm)	0.1261	1.0312
11.00 to 11.50; (0.345 µm)	0.1271	1.0390
11.50 to 12.00; (0.244 µm)	0.1218	0.9959
12.00 to 12.50; (0.173 µm)	0.0923	0.7549
12.50 to 13.00; (0.122 µm)	0.0612	0.5002
13.00 to 13.50; (0.086 µm)	0.0333	0.2720
Total	100.00	817.54

COMMENTS:

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

Exercise Code:	**PS62**
LabCode:	**BM REP 2**
Sample Code:	**PS62_ 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	0.0000	0
-3.50 to -3.00; 8 mm	10.8969	90.02
-3.00 to -2.50; 5.6 mm	12.8143	105.86
-2.50 to -2.00; 4 mm	9.7324	80.4
-2.00 to -1.50; 2.8 mm	7.7726	64.21
-1.50 to -1.00; 2 mm	4.6459	38.38
-1.00 to -0.50; 1.4 mm	4.2416	35.0400
-0.50 to 0.00; 1 mm	2.8556	23.5900
0.00 to 0.50; (707 µm)	3.4150	28.2120
0.50 to 1.00; (500 µm)	8.0113	66.1820
1.00 to 1.50; (353.6 µm)	12.2307	101.0392
1.50 to 2.00; (250 µm)	9.8711	81.5460
2.00 to 2.50; (176.8 µm)	4.7958	39.6185
2.50 to 3.00; (125 µm)	1.7208	14.2156
3.00 to 3.50; (88.39 µm)	0.6956	5.7467
3.50 to 4.00; (62.5 µm)	0.4025	3.3254
4.00 to 4.50; (44.19 µm)	0.3464	2.8615
4.50 to 5.00; (31.25 µm)	0.4773	3.9427
5.00 to 5.50; (22.097 µm)	0.4491	3.7099
5.50 to 6.00; (15.625 µm)	0.5385	4.4485
6.00 to 6.50; (11.049 µm)	0.5700	4.7088
6.50 to 7.00; (7.813 µm)	0.5253	4.3394
7.00 to 7.50; (5.524 µm)	0.5185	4.2835
7.50 to 8.00; (3.906 µm)	0.5270	4.3540
8.00 to 8.50; (2.762 µm)	0.3734	3.0847
8.50 to 9.00; (1.953 µm)	0.2876	2.3757
9.00 to 9.50; (1.381 µm)	0.2936	2.4254
9.50 to 10.00; (0.977 µm)	0.2407	1.9885
10.00 to 10.50; (0.691 µm)	0.1623	1.3409
10.50 to 11.00; (0.488 µm)	0.1330	1.0986
11.00 to 11.50; (0.345 µm)	0.1380	1.1399
11.50 to 12.00; (0.244 µm)	0.1319	1.0900
12.00 to 12.50; (0.173 µm)	0.0962	0.7950
12.50 to 13.00; (0.122 µm)	0.0597	0.4935
13.00 to 13.50; (0.086 µm)	0.0295	0.2439
Total	100.00	826.11

COMMENTS:

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

Exercise Code:	**PS62**
LabCode:	**BM REP 3**
Sample Code:	**PS62_ 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	0.0000	0
-3.50 to -3.00; 8 mm	9.9851	80.87
-3.00 to -2.50; 5.6 mm	11.0901	89.82
-2.50 to -2.00; 4 mm	11.1889	90.62
-2.00 to -1.50; 2.8 mm	8.4083	68.1
-1.50 to -1.00; 2 mm	4.5042	36.48
-1.00 to -0.50; 1.4 mm	4.5672	36.9900
-0.50 to 0.00; 1 mm	2.7040	21.9000
0.00 to 0.50; (707 µm)	4.0112	32.4872
0.50 to 1.00; (500 µm)	8.8618	71.7725
1.00 to 1.50; (353.6 µm)	12.3898	100.3465
1.50 to 2.00; (250 µm)	9.5084	77.0099
2.00 to 2.50; (176.8 µm)	4.4583	36.1080
2.50 to 3.00; (125 µm)	1.5858	12.8438
3.00 to 3.50; (88.39 µm)	0.6339	5.1343
3.50 to 4.00; (62.5 µm)	0.3612	2.9253
4.00 to 4.50; (44.19 µm)	0.3173	2.5697
4.50 to 5.00; (31.25 µm)	0.4724	3.8261
5.00 to 5.50; (22.097 µm)	0.4587	3.7154
5.50 to 6.00; (15.625 µm)	0.5624	4.5546
6.00 to 6.50; (11.049 µm)	0.5864	4.7490
6.50 to 7.00; (7.813 µm)	0.5389	4.3646
7.00 to 7.50; (5.524 µm)	0.5275	4.2721
7.50 to 8.00; (3.906 µm)	0.5180	4.1953
8.00 to 8.50; (2.762 µm)	0.3670	2.9726
8.50 to 9.00; (1.953 µm)	0.2680	2.1707
9.00 to 9.50; (1.381 µm)	0.2568	2.0800
9.50 to 10.00; (0.977 µm)	0.2124	1.7199
10.00 to 10.50; (0.691 µm)	0.1469	1.1900
10.50 to 11.00; (0.488 µm)	0.1156	0.9364
11.00 to 11.50; (0.345 µm)	0.1123	0.9094
11.50 to 12.00; (0.244 µm)	0.1067	0.8645
12.00 to 12.50; (0.173 µm)	0.0830	0.6726
12.50 to 13.00; (0.122 µm)	0.0578	0.4680
13.00 to 13.50; (0.086 µm)	0.0335	0.2716
Total	100.00	809.91

COMMENTS:

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

Exercise Code:	**PS62**
LabCode:	**BM REP 4**
Sample Code:	**PS62_ 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	0.4958	4.07
-3.50 to -3.00; 8 mm	10.1812	83.57
-3.00 to -2.50; 5.6 mm	12.3412	101.3
-2.50 to -2.00; 4 mm	9.9814	81.93
-2.00 to -1.50; 2.8 mm	7.6739	62.99
-1.50 to -1.00; 2 mm	4.5235	37.13
-1.00 to -0.50; 1.4 mm	4.4260	36.3300
-0.50 to 0.00; 1 mm	2.8264	23.2000
0.00 to 0.50; (707 µm)	3.5982	29.5350
0.50 to 1.00; (500 µm)	8.4978	69.7522
1.00 to 1.50; (353.6 µm)	12.6856	104.1271
1.50 to 2.00; (250 µm)	9.8174	80.5842
2.00 to 2.50; (176.8 µm)	4.5300	37.1838
2.50 to 3.00; (125 µm)	1.5634	12.8332
3.00 to 3.50; (88.39 µm)	0.6318	5.1859
3.50 to 4.00; (62.5 µm)	0.3437	2.8215
4.00 to 4.50; (44.19 µm)	0.3296	2.7054
4.50 to 5.00; (31.25 µm)	0.4559	3.7425
5.00 to 5.50; (22.097 µm)	0.4601	3.7766
5.50 to 6.00; (15.625 µm)	0.5653	4.6397
6.00 to 6.50; (11.049 µm)	0.5910	4.8508
6.50 to 7.00; (7.813 µm)	0.5465	4.4862
7.00 to 7.50; (5.524 µm)	0.5370	4.4080
7.50 to 8.00; (3.906 µm)	0.5368	4.4065
8.00 to 8.50; (2.762 µm)	0.3763	3.0886
8.50 to 9.00; (1.953 µm)	0.2808	2.3049
9.00 to 9.50; (1.381 µm)	0.2784	2.2850
9.50 to 10.00; (0.977 µm)	0.2246	1.8435
10.00 to 10.50; (0.691 µm)	0.1492	1.2243
10.50 to 11.00; (0.488 µm)	0.1217	0.9990
11.00 to 11.50; (0.345 µm)	0.1277	1.0484
11.50 to 12.00; (0.244 µm)	0.1237	1.0156
12.00 to 12.50; (0.173 µm)	0.0915	0.7508
12.50 to 13.00; (0.122 µm)	0.0576	0.4729
13.00 to 13.50; (0.086 µm)	0.0290	0.2382
Total	100.00	820.83

COMMENTS:

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

Exercise Code:	**PS62**
LabCode:	**BM REP 5**
Sample Code:	**PS62_ 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	0.0000	0
-3.50 to -3.00; 8 mm	9.7198	80.04
-3.00 to -2.50; 5.6 mm	13.1237	108.07
-2.50 to -2.00; 4 mm	10.0927	83.11
-2.00 to -1.50; 2.8 mm	7.6591	63.07
-1.50 to -1.00; 2 mm	4.5405	37.39
-1.00 to -0.50; 1.4 mm	4.4167	36.3700
-0.50 to 0.00; 1 mm	2.8586	23.5400
0.00 to 0.50; (707 µm)	3.5324	29.0882
0.50 to 1.00; (500 µm)	8.3056	68.3945
1.00 to 1.50; (353.6 µm)	12.3572	101.7580
1.50 to 2.00; (250 µm)	9.9660	82.0669
2.00 to 2.50; (176.8 µm)	4.8677	40.0842
2.50 to 3.00; (125 µm)	1.7417	14.3428
3.00 to 3.50; (88.39 µm)	0.6832	5.6263
3.50 to 4.00; (62.5 µm)	0.3551	2.9238
4.00 to 4.50; (44.19 µm)	0.3648	3.0037
4.50 to 5.00; (31.25 µm)	0.4726	3.8917
5.00 to 5.50; (22.097 µm)	0.4518	3.7208
5.50 to 6.00; (15.625 µm)	0.5553	4.5724
6.00 to 6.50; (11.049 µm)	0.5660	4.6610
6.50 to 7.00; (7.813 µm)	0.5183	4.2682
7.00 to 7.50; (5.524 µm)	0.5145	4.2366
7.50 to 8.00; (3.906 µm)	0.5059	4.1658
8.00 to 8.50; (2.762 µm)	0.3587	2.9534
8.50 to 9.00; (1.953 µm)	0.2716	2.2364
9.00 to 9.50; (1.381 µm)	0.2698	2.2221
9.50 to 10.00; (0.977 µm)	0.2241	1.8455
10.00 to 10.50; (0.691 µm)	0.1546	1.2728
10.50 to 11.00; (0.488 µm)	0.1247	1.0267
11.00 to 11.50; (0.345 µm)	0.1252	1.0313
11.50 to 12.00; (0.244 µm)	0.1195	0.9844
12.00 to 12.50; (0.173 µm)	0.0903	0.7433
12.50 to 13.00; (0.122 µm)	0.0597	0.4918
13.00 to 13.50; (0.086 µm)	0.0325	0.2674
Total	100.00	823.47

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	0.30	0.00	0.00	0.00	0.00	0.00	0.00
% MEDIUM GRAVEL:	10.23	8.57	8.59	9.40	10.24	10.34	8.59	9.50	9.37	9.54	9.39	8.00	8.98	9.26	8.52
% FINE GRAVEL:	22.64	23.12	23.34	23.44	22.18	23.17	22.97	23.25	23.38	23.73	22.76	21.67	22.41	23.19	24.80
% V FINE GRAVEL:	12.46	12.60	12.01	12.33	12.67	11.93	12.52	12.23	13.12	11.90	14.01	12.88	12.56	12.84	12.69
% V COARSE SAND:	7.22	7.38	8.15	7.50	7.61	7.38	8.06	7.28	7.65	7.22	7.43	7.44	7.12	7.24	7.57
% COARSE SAND:	12.16	12.12	11.36	9.84	2.68	2.64	11.44	9.17	6.37	11.35	11.64	18.19	13.38	11.89	8.48
% MEDIUM SAND:	22.22	20.41	19.85	18.06	28.42	24.95	19.76	21.51	13.75	14.45	17.63	16.89	23.79	22.23	18.03
% FINE SAND:	6.27	7.62	7.33	7.15	11.99	15.07	6.99	8.61	6.36	4.99	6.65	4.69	8.18	6.21	8.58
% V FINE SAND:	1.00	0.78	0.91	1.78	0.98	1.33	0.80	0.83	1.95	2.03	0.73	1.06	0.64	0.96	3.15
% V COARSE SILT:	0.81	1.29	1.29	1.42	3.23	0.26	1.32	1.20	2.93	2.84	1.37	1.58	0.61	0.83	2.62
% COARSE SILT:	1.00	1.49	1.56	1.85	0.00	0.26	1.57	1.45	4.45	3.33	1.94	2.01	0.55	1.12	1.85
% MEDIUM SILT:	1.10	1.65	1.81	2.15	0.00	0.29	1.92	1.69	5.07	3.46	2.26	2.32	0.69	1.23	1.43
% FINE SILT:	1.04	1.52	1.78	1.88	0.00	0.15	1.92	1.55	4.08	5.17	2.03	1.84	0.68	1.15	1.06
% V FINE SILT:	0.64	0.94	1.26	1.30	0.00	0.17	1.35	0.94	1.23	0.00	1.23	0.94	0.39	0.67	0.69
% CLAY:	1.21	0.50	0.76	1.92	0.00	2.05	0.79	0.81	0.00	0.00	0.93	0.50	0.01	1.18	0.50
% GRAVEL	45.33	44.29	43.94	45.17	45.09	45.44	44.08	44.97	46.16	45.17	46.15	42.55	43.95	45.28	46.01
% SAND	48.87	48.31	47.60	44.31	51.68	51.38	47.05	47.39	36.08	40.03	44.08	48.27	53.11	48.53	45.82
% SILT	4.60	6.89	7.71	8.60	3.23	1.13	8.09	6.83	17.75	14.79	8.83	8.68	2.93	5.01	7.67
% CLAY	1.21	0.50	0.76	1.92	0.00	2.05	0.79	0.81	0.00	0.00	0.93	0.50	0.01	1.18	0.50
% MUD	5.80	7.40	8.47	10.51	3.23	3.18	8.88	7.64	17.76	14.79	9.77	9.18	2.94	6.19	8.17

APPENDIX 3 - Data used to create Figures 5 - 8.

Sieve Data - percentage in each half phi interval used for Figure 5.

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
-6.5 to -6.0	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
-6.0 to -5.5	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
-5.5 to -5.0	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
-5.0 to -4.5	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
-4.5 to -4.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.00	0.00
-4.0 to -3.5	0.31	0.00	0.00	0.41	0.83	0.00	0.00	0.97	1.08	1.49	0.00	0.33	2.43	1.24	0.00
-3.5 to -3.0	19.15	16.59	16.48	17.43	18.60	19.57	16.48	17.21	16.32	16.71	17.52	15.67	15.15	16.38	15.91
-3.0 to -2.5	23.58	25.00	25.56	24.50	24.31	24.96	22.42	24.50	21.91	27.02	24.28	25.93	25.40	25.51	27.78
-2.5 to -2.0	19.51	19.73	19.25	20.01	17.78	18.91	21.64	19.99	21.54	18.28	18.19	17.41	18.49	18.65	18.51
-2.0 to -1.5	15.02	15.09	14.75	14.34	15.01	13.67	15.20	14.74	15.47	14.03	17.12	16.60	14.94	15.67	14.01
-1.5 to -1.0	8.70	9.29	8.31	9.07	9.04	8.91	8.81	8.66	8.91	8.69	9.02	9.17	9.65	8.77	9.67
-1.0 to -0.5	8.35	7.81	8.98	8.10	7.92	7.66	8.74	7.78	7.91	7.56	7.82	8.41	7.64	8.23	7.66
-0.5 to 0.0	5.38	6.48	6.67	6.14	6.52	6.32	6.72	6.15	6.31	6.21	6.05	6.47	6.30	5.55	6.46

Sieve Data -cumulative percentage in each half phi interval used for Figure 6.

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	99.44	100.00	100.00	100.00	100.00	100.00	100.00
8000	99.69	100.00	100.00	99.59	99.17	100.00	100.00	99.03	98.36	98.51	100.00	99.67	97.57	98.76	100.00
5600	80.54	83.41	83.52	82.16	80.57	80.43	83.52	81.82	82.04	81.79	82.48	84.00	82.42	82.38	84.09
4000	56.95	58.41	57.95	57.65	56.26	55.46	61.10	57.32	60.13	54.77	58.20	58.07	57.02	56.87	56.32
2800	37.45	38.67	38.70	37.65	38.49	36.55	39.47	37.33	38.59	36.49	40.01	40.65	38.54	38.23	37.81
2000	22.43	23.58	23.96	23.31	23.48	22.89	24.26	22.59	23.13	22.47	22.89	24.05	23.60	22.55	23.80
1400	13.74	14.29	15.65	14.24	14.44	13.98	15.46	13.93	14.22	13.77	13.86	14.88	13.94	13.79	14.13
1000	5.38	6.48	6.67	6.14	6.52	6.32	6.72	6.15	6.31	6.21	6.05	6.47	6.30	5.55	6.46

APPENDIX 3 - Data used to create Figures 5 - 8.

Laser Data - percentage in each phi interval used for Figure 7.

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
0.0 to 1.0	25.62	25.07	23.72	20.78	-	-	23.99	19.20	18.98	23.38	25.07	36.37	27.34	25.04	18.27
1.0 to 2.0	46.82	42.24	41.42	38.15	-	-	41.30	45.04	31.87	29.76	37.98	33.78	48.62	46.84	38.85
2.0 to 3.0	13.21	15.76	15.30	15.10	-	-	14.50	18.02	12.00	10.28	14.32	9.37	16.72	13.07	18.49
3.0 to 4.0	2.12	1.62	1.89	3.75	-	-	1.66	1.73	3.68	4.19	1.58	2.12	1.30	2.02	6.78
4.0 to 5.0	1.70	2.68	2.70	3.00	-	-	2.74	2.51	5.52	5.85	2.95	3.16	1.25	1.76	5.65
5.0 to 6.0	2.12	3.09	3.26	3.91	-	-	3.28	3.03	8.38	6.85	4.17	4.01	1.12	2.36	3.99
6.0 to 7.0	2.32	3.42	3.78	4.54	-	-	4.02	3.54	9.55	7.13	4.88	4.63	1.42	2.60	3.09
7.0 to 8.0	2.19	3.15	3.71	3.97	-	-	4.02	3.26	7.70	10.65	4.37	3.69	1.40	2.42	2.29
8.0 to 9.0	1.36	1.93	2.64	2.75	-	-	2.84	1.96	2.31	0.00	2.66	1.87	0.80	1.41	1.50
>9.0	2.54	1.04	1.59	4.05	-	-	1.66	1.71	0.00	0.00	2.01	1.00	0.03	2.49	1.08

- Laser analysis not undertaken.

APPENDIX 3 - Data used to create Figures 5 - 8.

Laser Data -cumulative percentage in each half phi interval used for Figure 8.

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
707	100.00	100.00	100.00	100.00	-	-	100.00	100.00	100.00	98.09	100.00	100.00	100.00	100.00	100.00
500	92.29	91.88	93.01	93.15	-	-	92.95	95.82	94.15	89.62	91.26	84.29	91.85	92.63	96.03
353.6	74.38	74.93	76.28	79.22	-	-	76.01	80.80	81.02	74.70	74.93	63.63	72.66	74.96	81.73
250	48.17	52.51	54.17	58.80	-	-	53.80	57.67	63.97	57.43	54.89	43.82	46.64	48.85	61.44
176.8	27.56	32.68	34.87	41.07	-	-	34.71	35.76	49.15	44.94	36.95	29.85	24.04	28.12	42.88
125	17.78	21.08	23.68	30.68	-	-	23.94	22.63	40.96	37.52	26.84	22.89	11.53	18.38	30.73
88.39	14.35	16.92	19.56	25.97	-	-	20.22	17.74	37.15	34.66	22.62	20.48	7.32	15.05	24.38
62.5	12.99	16.01	18.50	23.73	-	-	19.35	16.71	35.46	32.65	21.76	19.50	6.53	13.76	20.72
44.19	12.23	15.31	17.67	22.21	-	-	18.55	16.01	33.47	30.47	21.04	18.36	6.02	13.04	17.60
31.25	11.52	14.08	16.43	20.76	-	-	17.28	14.86	31.16	27.84	19.71	16.88	5.35	12.32	14.58
22.097	10.53	12.63	14.97	19.22	-	-	15.81	13.50	27.95	24.62	18.09	15.20	4.77	11.28	11.95
15.625	9.58	11.13	13.42	17.44	-	-	14.26	12.06	24.10	21.29	16.10	13.33	4.25	10.22	9.79
11.049	8.42	9.55	11.72	15.31	-	-	12.53	10.47	19.57	17.77	13.92	11.19	3.65	8.92	7.95
7.813	7.21	7.86	9.87	13.00	-	-	10.59	8.73	14.74	14.10	11.49	8.87	2.99	7.57	6.32
5.524	6.09	6.12	7.93	10.77	-	-	8.52	6.93	10.01	10.65	9.05	6.56	2.23	6.32	4.86
3.906	4.99	4.45	6.02	8.67	-	-	6.44	5.19	5.72	7.42	6.69	4.50	1.49	5.09	3.62
2.762	3.90	2.98	4.23	6.80	-	-	4.50	3.67	2.32	0.00	4.67	2.87	0.84	3.90	2.58
1.953	3.13	1.82	2.71	5.26	-	-	2.86	2.47	0.42	0.00	3.12	1.72	0.31	3.08	1.72
1.381	2.54	1.04	1.59	4.05	-	-	1.66	1.71	0.00	0.00	2.01	1.00	0.03	2.49	1.08
0.977	1.97	0.58	0.88	3.13	-	-	0.91	1.38	0.00	0.00	1.29	0.60	0.00	1.92	0.66
0.691	1.49	0.30	0.47	2.43	-	-	0.47	1.27	0.00	0.00	0.84	0.34	0.00	1.45	0.38
0.488	1.16	0.09	0.18	1.89	-	-	0.17	0.97	0.00	0.00	0.41	0.14	0.00	1.14	0.15
0.345	0.90	0.00	0.00	1.43	-	-	0.00	0.53	0.00	0.00	0.09	0.00	0.00	0.89	0.00
0.244	0.64	0.00	0.00	1.04	-	-	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.63	0.00
0.173	0.38	0.00	0.00	0.69	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00
0.122	0.19	0.00	0.00	0.42	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00
0.086	0.07	0.00	0.00	0.20	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00