NMBAQC

The National Marine Biological Analytical Quality Control Scheme

Particle Size Report - PS56

Particle Size Component 2015/16

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APEM

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APPENDICES

Appendix 1. Final Merged Data sheets as supplied by participating laboratories (arranged by Lab Code) and the benchmark replicates.

Appendix 2. A comparison of Final Laser and Final Merged data for each participant where laser data was supplied and no sieve analysis was undertaken.

PS56

Sample produced from natural mud collected from Barry Island. The sample was pre-sieved at 0.5mm to remove any larger particles.

Where participants only used laser analysis, the Final Laser Data should be the same as the Final Merged Data; some discrepancies were found, these are outlined in Appendix 2.

BENCHMARK DATA

Table 1. Summary data for the benchmark replicates distributed as PS56.

	Method	% Gravel	% Sand	% Silt/Clay	Sediment Description (Post analysis)
REPLICATE 1	NMBAQC	0.0	1.2	98.8	Mud
REPLICATE 2	NMBAQC	0.0	0.6	98.2	Mud
REPLICATE 3	NMBAQC	0.0	1.1	98.9	Mud
REPLICATE 4	NMBAQC	0.0	1.4	98.6	Mud
REPLICATE 5	NMBAQC	0.0	1.5	98.5	Mud
REP AVERAGE	NMBAQC	0.0	1.1	98.6	Mud

Table 2. Summary of equipment used and sieve data for the benchmark replicates distributed as PS56.

	Sieves used	Phi; sieve mesh		Total Weight (g)	Laser used
		Weight (g) < 0.00; >1 mm	Weight (g) > 0.00; <1 mm		
REPLICATE 1	☒	-	-	-	☑
REPLICATE 2	☒	-	-	-	☑
REPLICATE 3	☒	-	-	-	☑
REPLICATE 4	☒	-	-	-	☑
REPLICATE 5	☒	-	-	-	☑
BM AVERAGE	☒	-	-	-	☑

Table 3. Summary of final laser data for the benchmark replicates distributed as PS56.

	% Sand				
	Coarse 0 - 1 phi	Medium 1 - 2 phi	Fine 2 - 3 phi	Very Fine 3 - 4 phi	
REPLICATE 1	0.00	0.00	0.00	1.16	
REPLICATE 2	0.00	0.00	0.00	0.58	
REPLICATE 3	0.00	0.00	0.00	1.06	
REPLICATE 4	0.00	0.00	0.00	1.41	
REPLICATE 5	0.00	0.00	0.00	1.52	
BM AVERAGE	0.00	0.00	0.00	1.15	
	% Silt				% Clay
	Coarse 4 - 5 phi	Medium 5 - 6 phi	Fine 6 - 7 phi	Very Fine 7 - 8 phi	8 - 13 phi
REPLICATE 1	9.58	16.24	19.30	18.49	35.23
REPLICATE 2	9.49	16.35	19.80	19.20	34.58
REPLICATE 3	9.21	16.00	19.29	18.54	35.90
REPLICATE 4	9.55	16.34	19.47	18.62	34.60
REPLICATE 5	9.83	16.50	19.47	18.28	34.39
BM AVERAGE	9.53	16.29	19.47	18.63	34.94

- no data

BENCHMARK DATA

Table 4. Summary of descriptive statistics and coefficient of variance for the benchmark replicates distributed as PS56.

	D10 (mm)		D50 (mm)		D90 (mm)		Mean (µm)	
	Result	d	Result	d	Result	d	Result	d
BENCHMARK REPLICATE 1	0.51	0.01	6.84	0.05	32.68	0.12	12.52	0.01
BENCHMARK REPLICATE 2	0.54	0.02	6.86	0.03	31.38	1.18	12.11	0.41
BENCHMARK REPLICATE 3	0.50	0.02	6.67	0.22	31.79	0.77	12.23	0.29
BENCHMARK REPLICATE 4	0.53	0.01	6.97	0.08	33.10	0.53	12.74	0.23
BENCHMARK REPLICATE 5	0.52	0.00	7.10	0.21	33.87	1.30	12.97	0.46
Grand Robust Mean	0.52		6.86		32.68		12.52	
Mean	0.52		6.88		32.56		12.52	
Robust Standard Deviation	0.01		0.08		0.77		0.29	
Standard Deviation	0.01		0.16		1.00		0.36	
Median Absolute Deviations	0.01		0.12		1.15		0.43	
Coefficient of Variance (COV)	2.73		2.31		3.07		2.86	

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

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

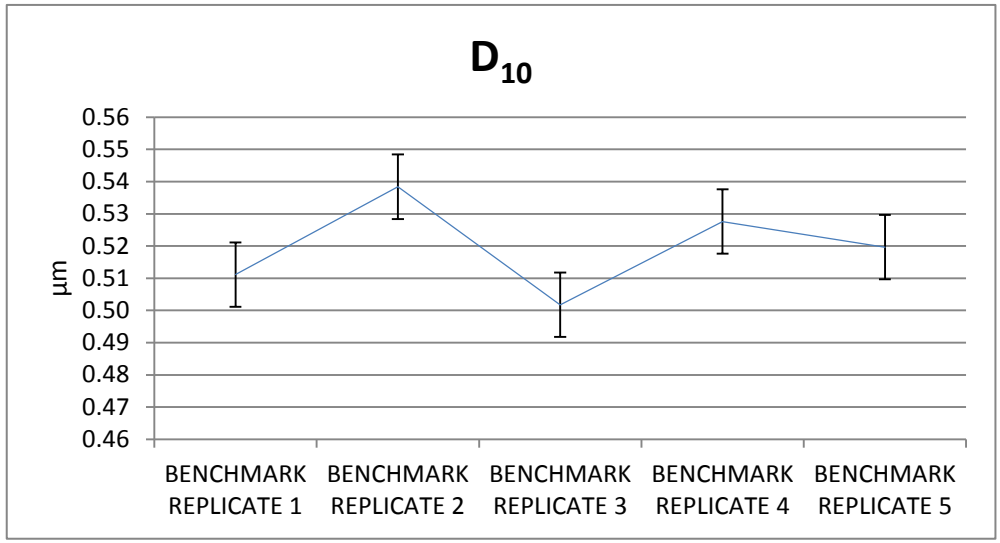
All limits double when the D50 < 10 µm.

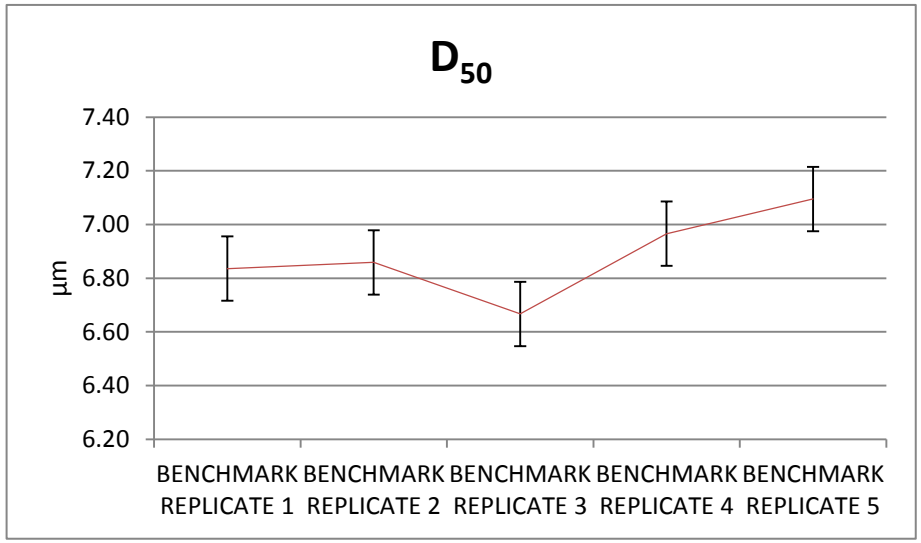
Benchmark replicates distributed as PS56 show a COV <3% for the D50 and <5% for the D10 and D90.

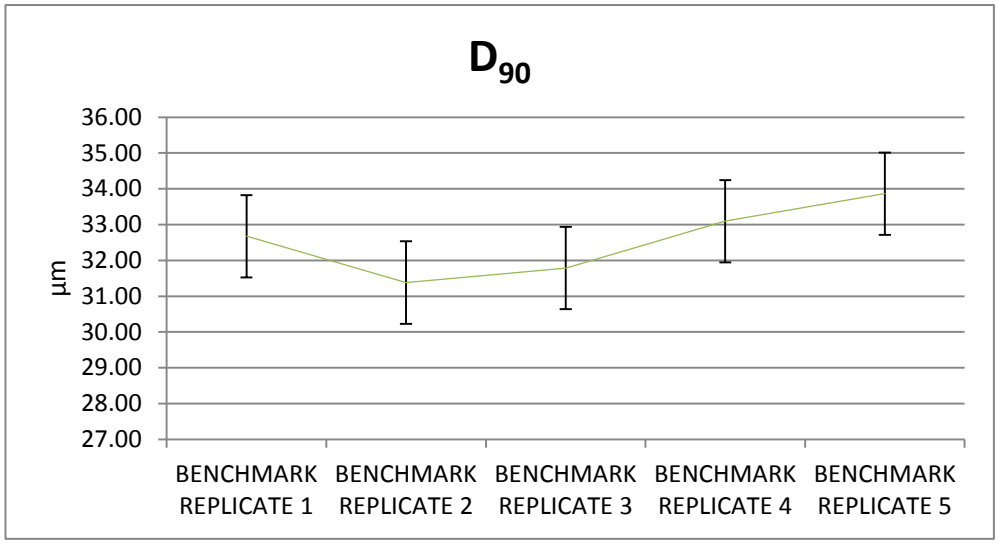
The replicates show good reproducibility.

BENCHMARK DATA

Figure 1. Scatterplot of Benchmark Data for PS56 with error bars showing ± 1 MAD_E.







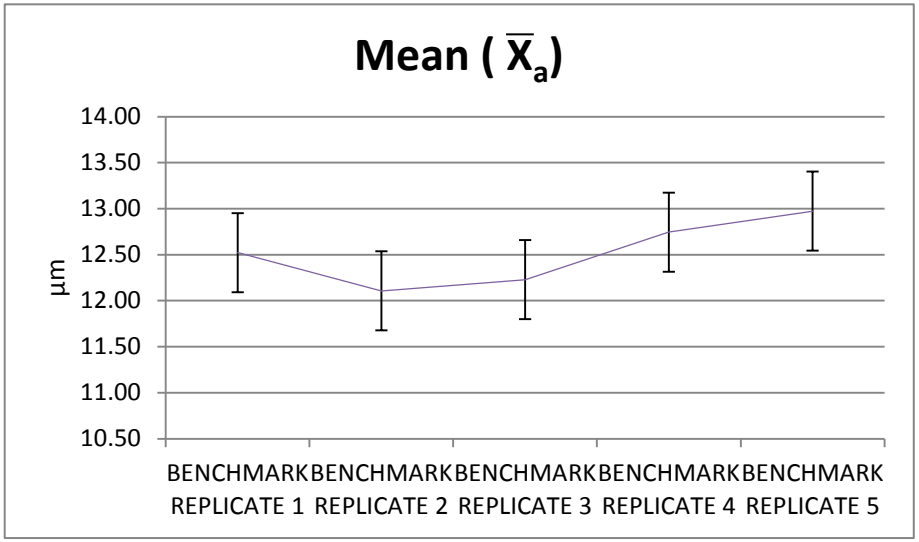
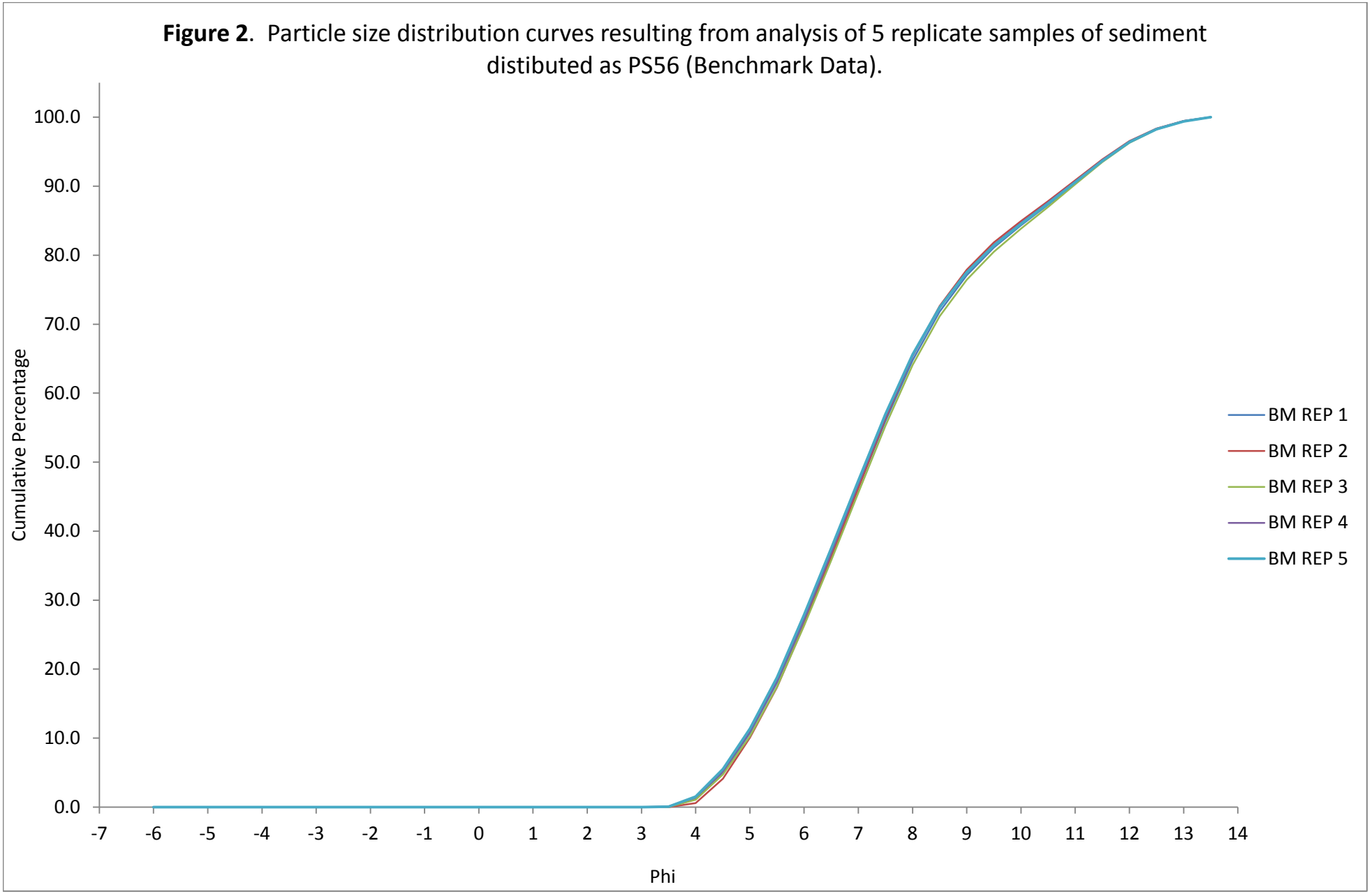


Figure 2. Particle size distribution curves resulting from analysis of 5 replicate samples of sediment distibuted as PS56 (Benchmark Data).



PARTICIPANT DATA

Table 5. Summary data and verification for the participants for sediment distributed as PS56.

Lab	% Gravel	% Sand	% Silt/Clay	Sediment Description (Post analysis)	Summary Data APEM verification							
					% Gravel		% Sand		% Silt/Clay		Sediment Description (Post analysis)	
Benchmark Average	0.0	1.1	98.6	Mud	-		-		-		-	
PSA_2201	0.0	38.6	61.3	Very Coarse Silt	0.04	☒	38.52	☒	61.44	☒	Slightly Gravelly Sandy Mud	☒
PSA_2202	0.0	5.0	95.0	Mud	0.00	☑	5.00	☑	95.00	☑	Mud	☑
PSA_2203	0.0	1.2	98.8	Mud	0.00	☑	1.16	☑	98.84	☑	Mud	☑
PSA_2204	0.00	12.1	87.9	Sandy Mud	0.00	☑	12.03	☒	87.97	☒	Sandy Mud	☑
PSA_2205	0.00	10.2	89.8	Medium Silt	0.00	☑	9.35	☒	90.65	☒	Mud	☒
PSA_2208	0.00	9.29	90.72	Mud	0.00	☑	11.56	☒	88.44	☒	Sandy Mud	☒
PSA_2209	0	6	94	Mud	0.00	☑	5.94	☑	94.06	☑	Mud	☑
PSA_2210	0.0	9.4	90.6	Mud	0.00	☑	13.07	☒	86.93	☒	Sandy Mud	☒
PSA_2211	0.0	13.5	86.5	Sandy Mud	0.00	☑	13.23	☒	86.77	☒	Sandy Mud	☑
PSA_2212	0	7	93	Mud	0.00	☑	7.02	☑	92.98	☑	Mud	☑
PSA_2213	0.00	7.76	92.24	Mud	0.00	☑	7.76	☑	92.24	☑	Mud	☑
PSA_2214_A	0.00	7.59	92.41	Mud	0.00	☑	7.59	☑	92.41	☑	Mud	☑
PSA_2214_B	0.00	6.23	93.77	Mud	0.00	☑	6.23	☑	93.77	☑	Mud	☑
PSA_2215	0.0	3.7	96.3	Mud	0.00	☑	3.68	☑	96.32	☑	Mud	☑
PSA_2216	0.00	14.77	85.23	Sandy Mud	0.00	☑	14.63	☒	85.37	☒	Sandy Mud	☑
PSA_2217	-	-	-	-	0.00	☒	8.17	☒	91.83	☒	Mud	☒
PSA_2218	0.0	3.2	96.8	Mud	0.00	☑	3.01	☒	96.99	☒	Mud	☑

- data not provided

PARTICIPANT DATA

Table 6. Summary of equipment used and sieve data for the participants for sediment distributed as PS56.

Participant	Method	Sieves used	Phi; sieve mesh		Total Weight (g)	Laser used
			Weight (g) < 0.00ϕ; >1 mm	Weight (g) > 0.00ϕ; <1 mm		
Benchmark Average	NMBAQC	☒	-	-	-	☑
PSA_2201	NMBAQC	☑	0.05	112.00	112.05	☑
PSA_2202	NMBAQC	☒	0.00	105.80	105.80	☑
PSA_2203	NMBAQC	☒	-	-	-	☑
PSA_2204	NMBAQC	☒	-	-	-	☑
PSA_2205	NMBAQC	☒	-	-	-	☑
PSA_2208	NMBAQC	☒	0.00	96.51	96.51	☑
PSA_2209	OTHER[1]	☒	-	-	-	☑
PSA_2210	NMBAQC	☒	-	88.81	88.81	☑
PSA_2211	NMBAQC	☒	0.00	108.87	108.87	☑
PSA_2212	NMBAQC	☒	-	-	-	☑
PSA_2213	NMBAQC	☒	-	-	-	☑
PSA_2214_A	NMBAQC*	☒	-	-	-	☑
PSA_2214_B	NMBAQC*	☒	-	-	-	☑
PSA_2215	NMBAQC	☒	-	-	-	☑
PSA_2216	NMBAQC	☒	-	-	-	☑
PSA_2217	NMBAQC	☒	-	-	-	☑
PSA_2218	OTHER[2]	☑	-	-	-	☒

OTHER[1] In-house methodology

OTHER[2] British Standard Pipette method.

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

PARTICIPANT DATA

Table 7. Summary of final laser data for the participants for sediment distributed as PS56.

	% Sand				% Silt				% Clay	Total	Laser Data Re-proportioned?
Participant	Coarse 0 - 1 phi	Medium 1 - 2 phi	Fine 2 - 3 phi	Very Fine 3 - 4 phi	Coarse 4 - 5 phi	Medium 5 - 6 phi	Fine 6 - 7 phi	Very Fine 7 - 8 phi	8 - 13 phi		
Benchmark Average	0.00	0.00	0.00	1.15	9.53	16.29	19.47	18.63	34.94	100.00	☑
PSA_2201	7.67	10.28	9.86	10.72	13.62	15.36	13.87	10.49	8.13	100.00	☑
PSA_2202	0.00	0.41	1.28	3.31	7.49	14.61	22.54	24.89	25.47	100.00	☑
PSA_2203	0.00	0.00	0.00	1.16	9.58	16.24	19.30	18.49	35.23	100.00	☑
PSA_2204	-	-	-	-	-	-	-	-	-	-	-
PSA_2205	0.01	0.87	3.21	5.26	8.85	15.06	23.10	26.95	16.69	100.00	☑
PSA_2208	0.00	0.19	0.75	4.73	8.25	15.07	20.42	23.44	27.15	100.00	☑
PSA_2209	0.07	0.32	1.49	4.05	9.05	14.78	18.96	21.67	29.50	99.89	☒
PSA_2210	0.16	0.80	1.55	4.52	8.53	13.61	18.41	22.42	29.99	100.00	☑
PSA_2211	0.00	0.20	2.16	10.87	22.79	22.18	15.81	11.27	14.72	100.00	☑
PSA_2212	0.46	0.64	1.68	4.24	9.47	16.35	22.75	24.57	19.84	100.00	☑
PSA_2213	0.46	0.64	1.68	4.24	9.47	16.35	22.75	24.57	19.84	100.00	☑
PSA_2214_A	0.54	1.03	1.61	4.41	9.19	14.74	19.10	20.91	28.47	100.00	☑
PSA_2215	0.00	0.00	0.61	3.07	6.87	15.48	21.02	21.99	31.07	100.11	☒[1]
PSA_2216	0.28	1.98	3.95	8.43	13.53	18.26	21.67	18.21	13.69	100.00	☑
PSA_2217	0.18	1.06	1.98	4.95	8.94	14.27	19.81	22.76	26.05	100.00	☑
PSA_2218	*-	*-	*-	*-	*-	*-	*-	*-	*-	*-	*-

- Laser data not supplied.

*- Participant does not own a laser.

[1] - Percentage should not go over 100.

Figure 3. Particle size distribution curves from all participating laboratories and the Benchmark Average for sediment distributed as PS56.

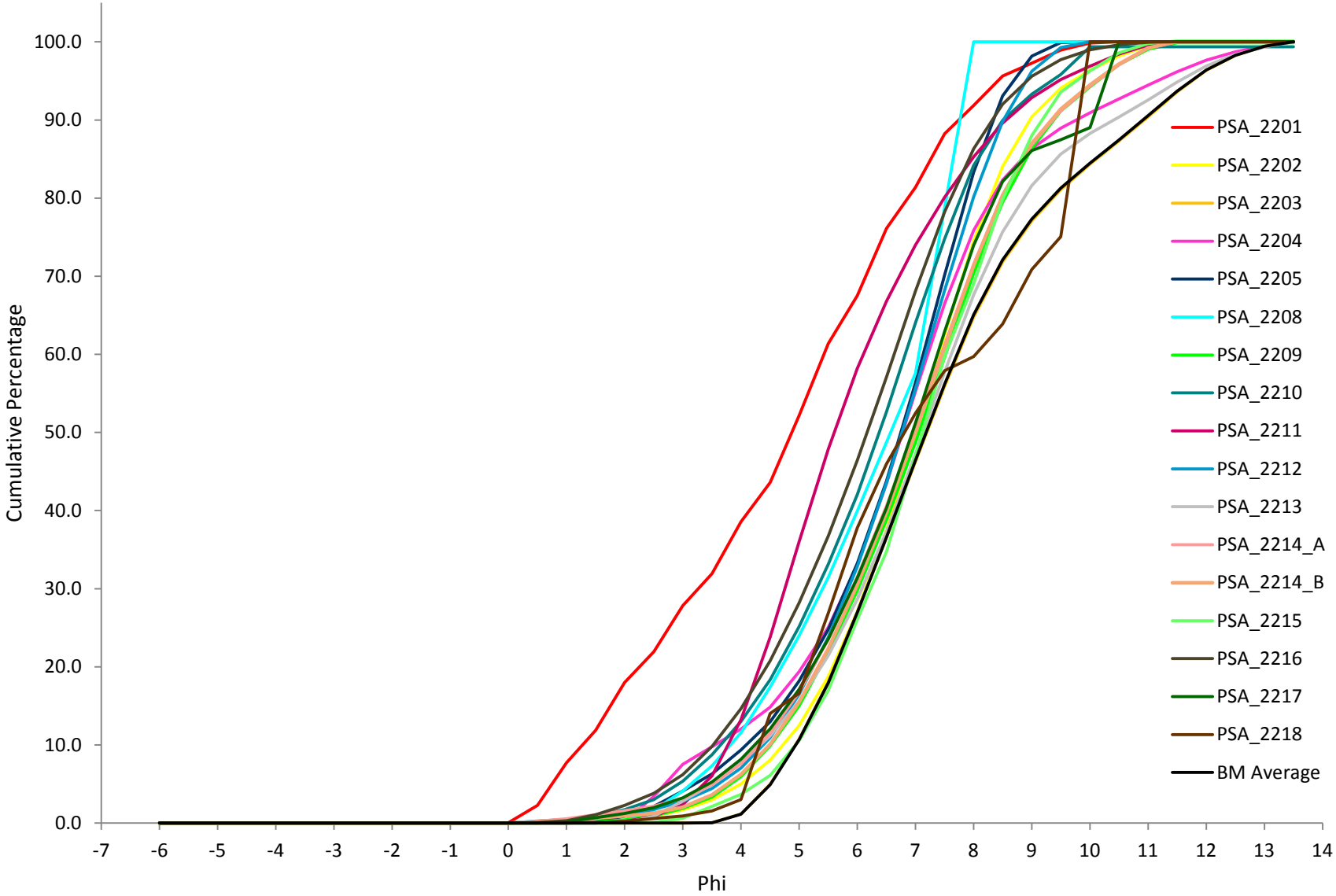
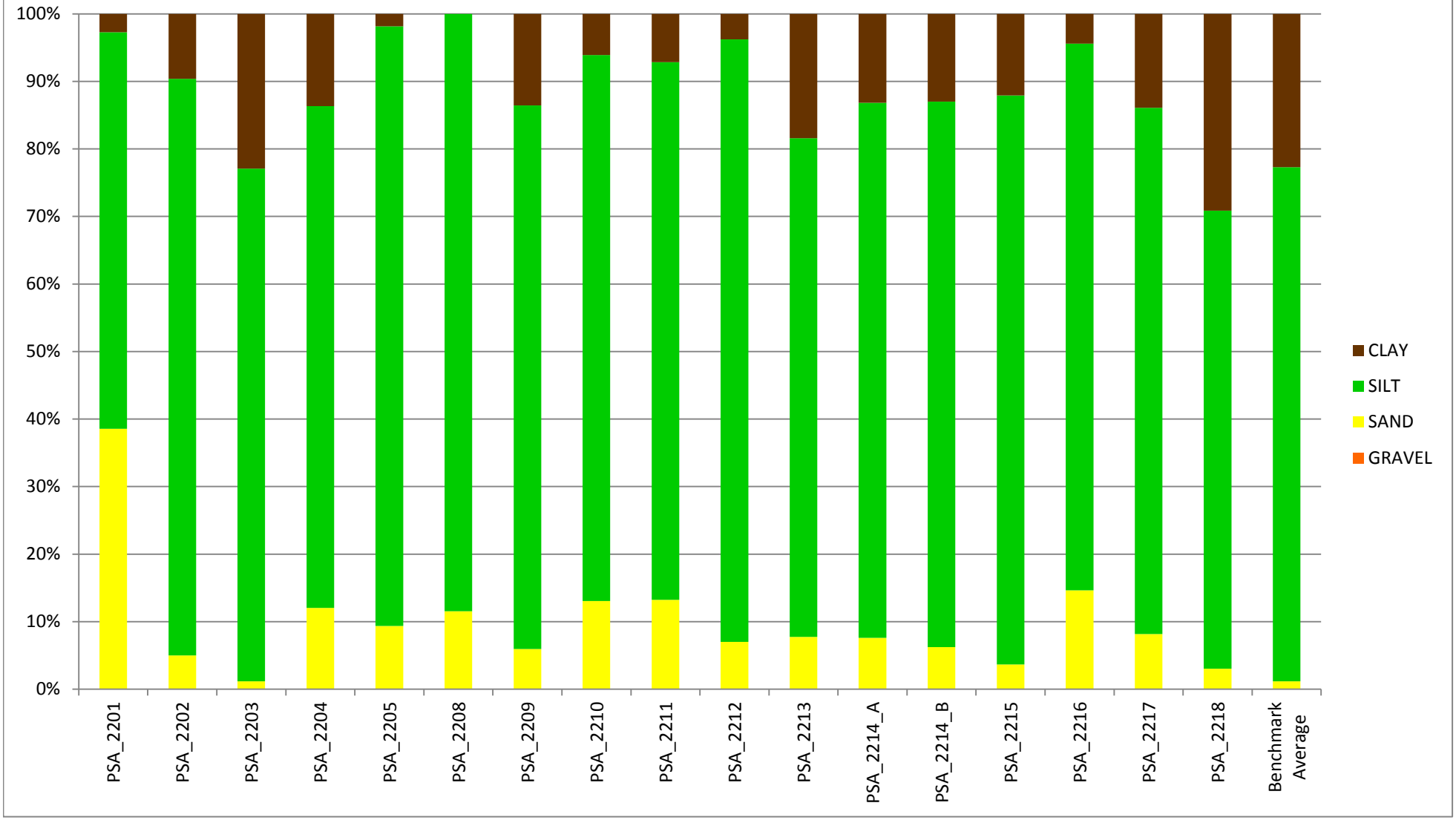


Figure 4. Bar chart showing the percentage gravel, sand, silt and clay recorded by each participating laboratory and the benchmark average for PS56.



Z-SCORES

Table 8. Calculations of Robust Mean and SDPA for PS56.

	D_{10} (mm)		D_{50} (mm)		D_{90} (mm)		Mean (µm)	
Laboratory	result	d	result	d	result	d	result	d
PSA_2201	4.67	2.96	34.12	25.21	413.34	362.92	128.22	103.56
PSA_2202	2.00	0.28	7.74	1.17	37.95	12.46	17.59	7.07
PSA_2203	0.51	1.20	6.84	2.07	32.68	17.74	12.52	12.14
PSA_2204	1.15	0.56	9.11	0.20	85.44	35.03	28.12	3.46
PSA_2205	3.08	1.37	9.31	0.40	58.73	8.32	25.06	0.40
PSA_2208	4.60	2.88	10.52	1.61	70.99	20.58	27.82	3.16
PSA_2209	1.51	0.20	7.51	1.39	43.96	6.45	19.08	5.58
PSA_2210	2.85	1.13	12.17	3.26	80.17	29.76	33.70	9.04
PSA_2211	2.64	0.93	20.57	11.67	73.00	22.59	31.77	7.11
PSA_2212	2.74	1.02	9.17	0.27	48.04	2.38	24.66	0.00
PSA_2213	0.74	0.98	7.13	1.77	49.72	0.70	19.44	5.22
PSA_2214_A	1.52	0.20	7.98	0.92	50.41	0.00	25.60	0.94
PSA_2214_B	1.54	0.17	7.81	1.09	44.63	5.79	21.43	3.23
PSA_2215	1.71	0.00	7.20	1.71	32.60	17.82	14.47	10.19
PSA_2216	3.12	1.41	13.91	5.01	87.12	36.70	37.23	12.57
PSA_2217	0.95	0.77	8.12	0.79	53.14	2.73	23.93	0.73
PSA_2218	1.12	0.59	8.91	0.00	50.17	0.24	18.28	6.38
Original Statistics								
Median	1.71		8.91		50.41		24.66	
Mean	2.14		11.07		77.18		29.94	
Robust SD	0.93		1.39		12.46		5.58	
Std Dev	1.25		6.83		88.34		26.19	
MADe	1.38		2.06		18.48		8.28	
median + (5*MADe)	8.60		19.23		142.83		66.06	
median - (5*MADe)	-5.17		-1.41		-42.01		-16.74	
Outliers removed								
Robust Mean	1.71		8.12		50.29		24.66	
Mean	2.14		8.90		57.39		24.21	
Robust SD	0.93		0.98		17.62		5.22	
Std Dev	1.25		1.98		17.84		6.92	
MADe	1.38		1.46		26.12		7.74	

	Data falls outside the range of: Median ± 5xMADe. Therefore removed from Robust mean and MADe calculations.
	Data not used for any Median/Mean or Std Dev calculations due to reporting errors.

MAD - Median of Absolute Deviations
MADe - Normalised Median of Absolute Deviations
SDPA - Standard Deviation for Proficiency Assessment

Z-SCORES

Table 9. z-score results for each participating laboratory for PS56 when using robust statistics with outliers removed.

	D_{10} (mm)		D_{50} (mm)		D_{90} (mm)		Mean(µm)	
Laboratory	Result	z	result	z	result	z	result	z
PSA_2201	4.67	2.15	34.12	17.83	413.34	13.90	128.22	13.37
PSA_2202	2.00	0.20	7.74	-0.26	37.95	-0.47	17.59	-0.91
PSA_2203	0.51	-0.87	6.84	-0.88	32.68	-0.67	12.52	-1.57
PSA_2204	1.15	-0.41	9.11	0.68	85.44	1.35	28.12	0.45
PSA_2205	3.08	0.99	9.31	0.82	58.73	0.32	25.06	0.05
PSA_2208	4.60	2.10	10.52	1.64	70.99	0.79	27.82	0.41
PSA_2209	1.51	-0.15	7.51	-0.41	43.96	-0.24	19.08	-0.72
PSA_2210	2.85	0.82	12.17	2.78	80.17	1.14	33.70	1.17
PSA_2211	2.64	0.67	20.57	8.54	73.00	0.87	31.77	0.92
PSA_2212	2.74	0.74	9.17	0.73	48.04	-0.09	24.66	0.00
PSA_2213	0.74	-0.71	7.13	-0.67	49.72	-0.02	19.44	-0.67
PSA_2214_A	1.52	-0.14	7.98	-0.09	50.41	0.00	25.60	0.12
PSA_2214_B	1.54	-0.13	7.81	-0.21	44.63	-0.22	21.43	-0.42
PSA_2215	1.71	0.00	7.20	-0.63	32.60	-0.68	14.47	-1.32
PSA_2216	3.12	1.02	13.91	3.97	87.12	1.41	37.23	1.62
PSA_2217	0.95	-0.56	8.12	0.00	53.14	0.11	23.93	-0.09
PSA_2218	1.12	-0.43	8.91	0.54	50.17	0.00	18.28	-0.82

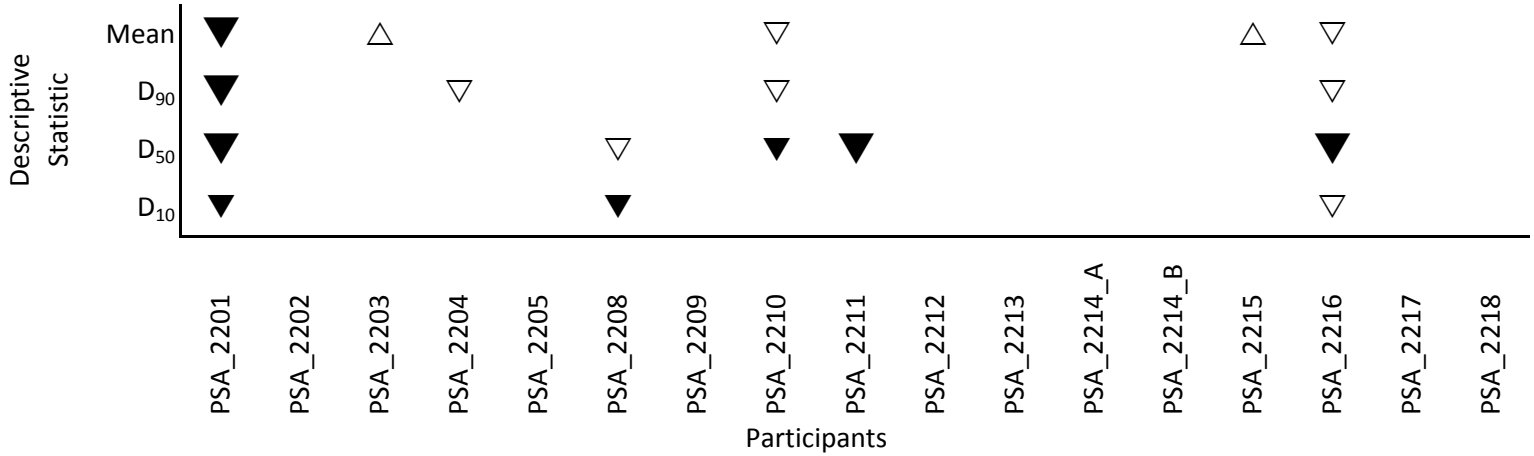
Robust Mean	1.71	8.12	50.29	24.66
MADe	1.38	1.46	26.12	7.74

$$z = \frac{x - X}{SDPA}$$

where; x = participant data
X = Robust Mean
SDPA = MADe

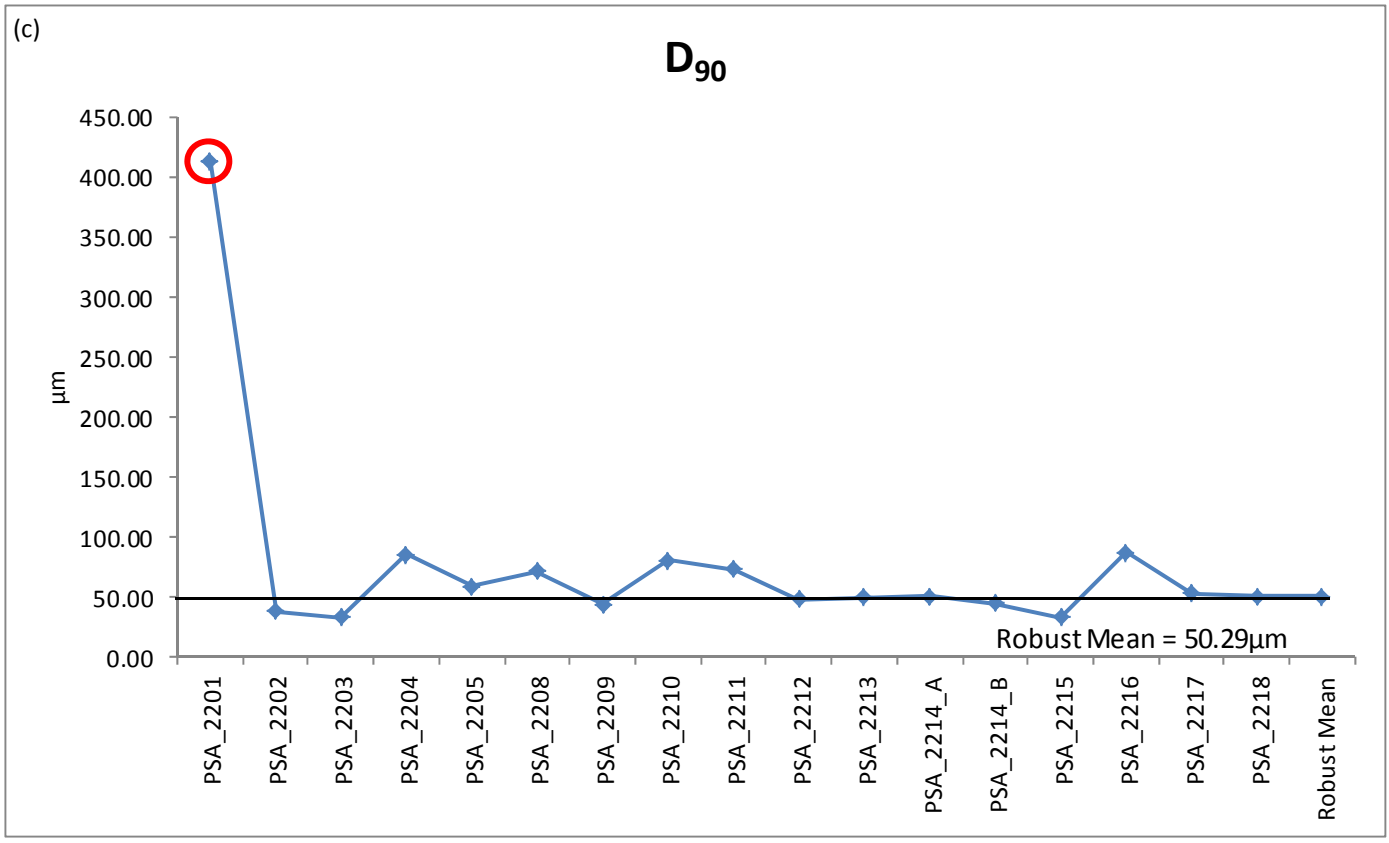
Z-SCORES

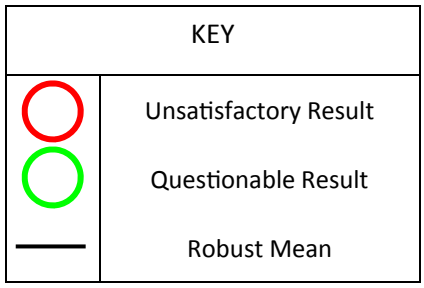
Figure 5. Summary plots of z-scores achieved by participating laboratories for PS56 when using robust statistics.



▼	z-score ≥ 3.00	Unsatisfactory result
▼	2.00 ≤ z-score < 3.00	Questionable result
▽	1.00 ≤ z-score < 2.00	Satisfactory result
	-1.00 < z-score < 1.00	
△	-2.00 < z-score ≤ -1.00	
▲	-3.00 < z-score ≤ -2.00	Questionable result
▲	z-score ≤ -3.00	Unsatisfactory result

Figure 6. Line plot of participant descriptive statistics for PS56 for (a) D10, (b) D50, (c) D90 and (d) Mean.





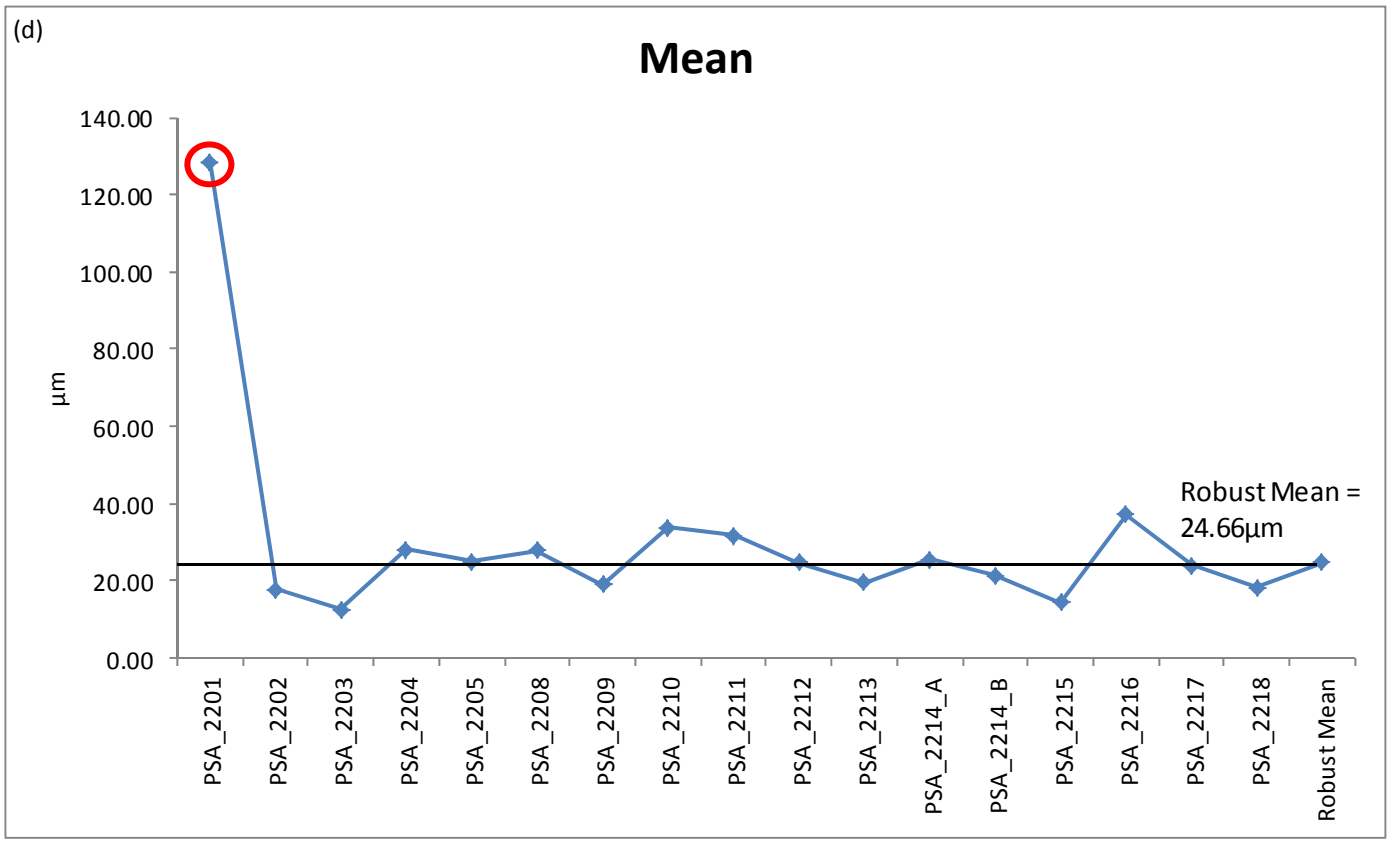
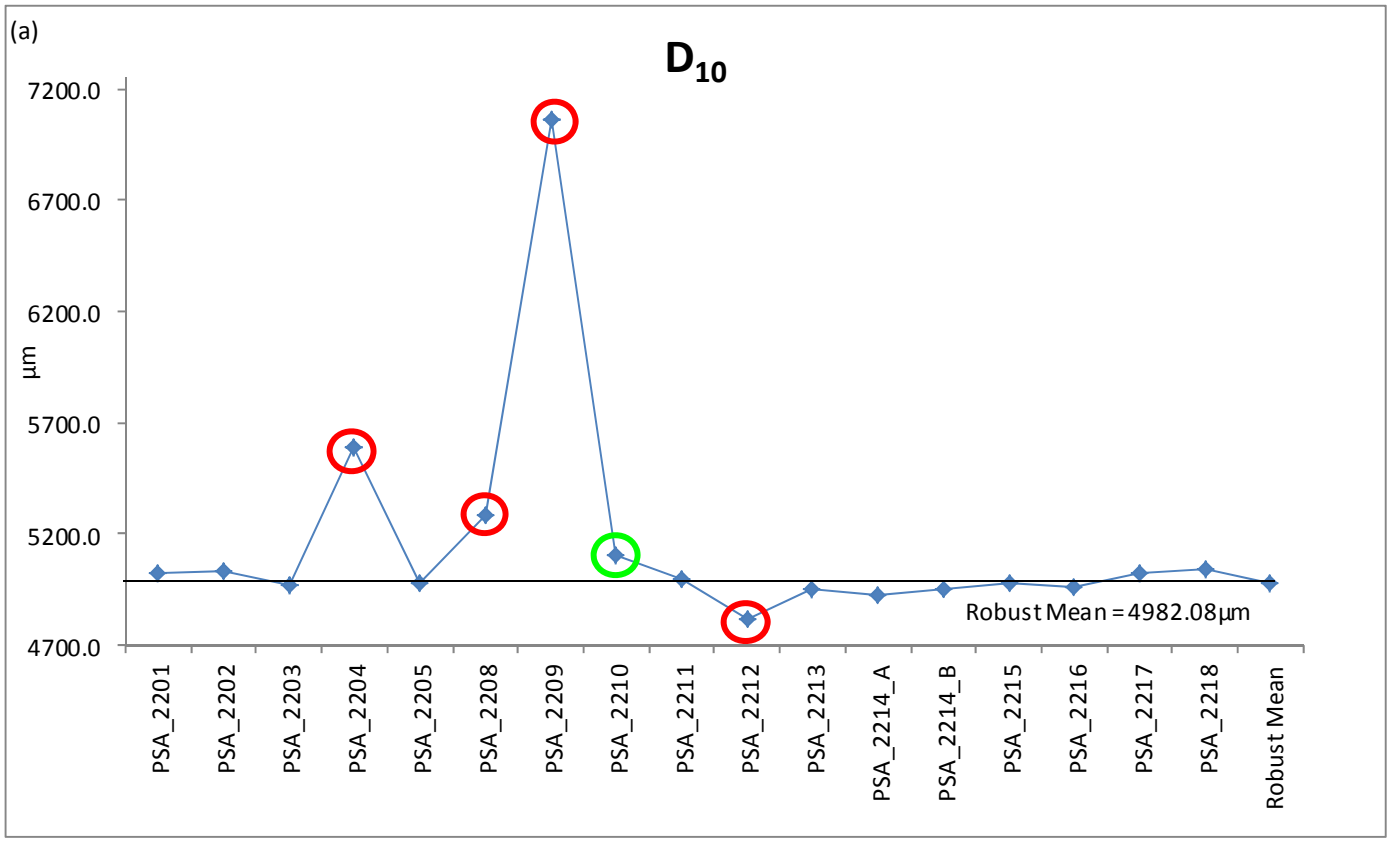
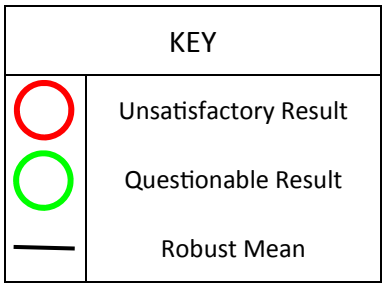
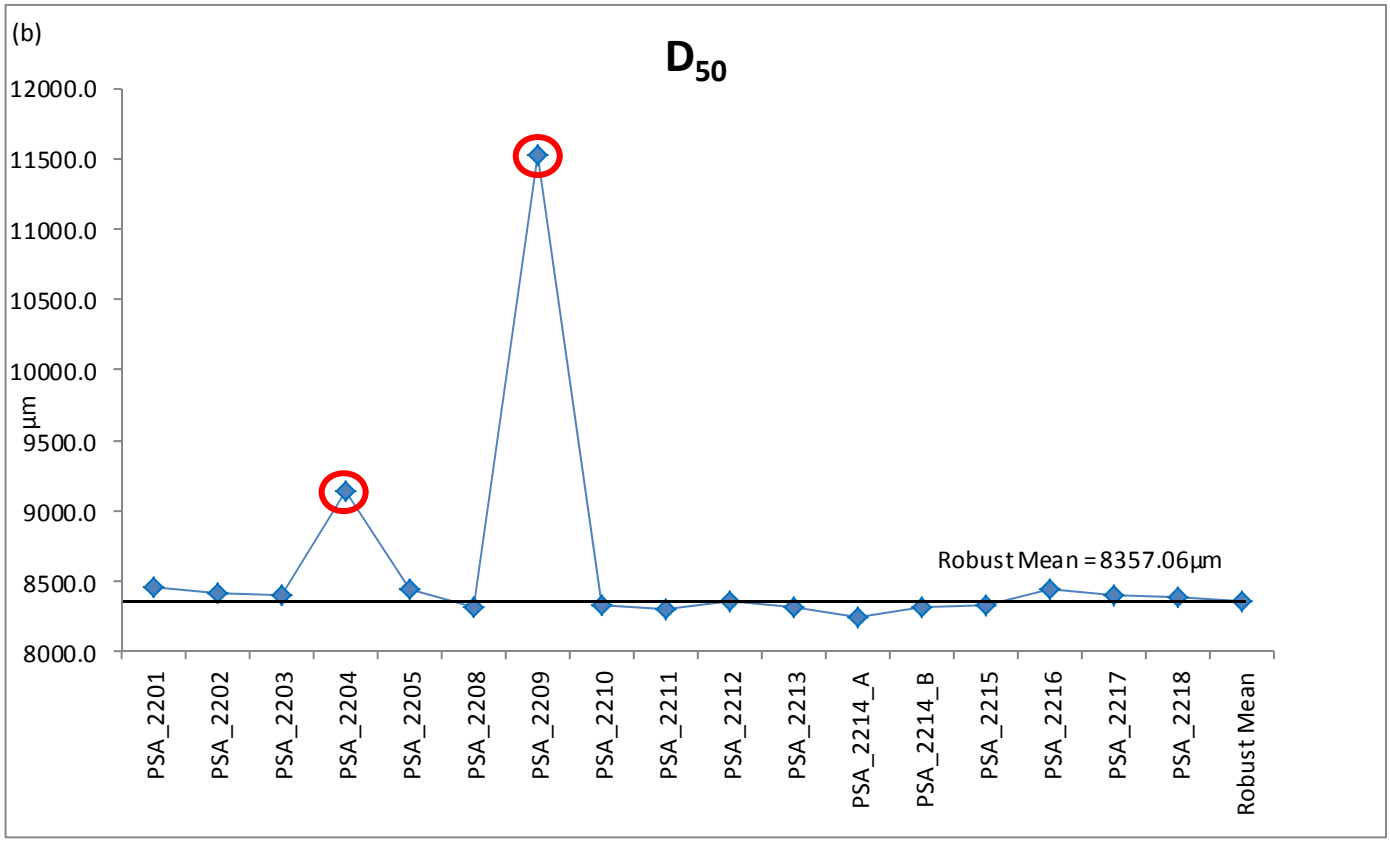


Figure 6. Line plot of participant descriptive statistics for PS57 for (a) D_{10}, (b) D_{50}, (c) D_{90} and (d) Mean.







PERFORMANCE

Table 10. Summary of Results for PS56.

	D_{10}	D_{50}	D_{90}	Mean (µm)	Satisfactory	Questionable	Unsatisfactory	Score	%	Pass/Fail	
PSA_2201	Questionable	Unsatisfactory	Unsatisfactory	Unsatisfactory	0	1	**3**	2	10	**FAIL - BAD**	PSA_2201
PSA_2202	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2202
PSA_2203	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2203
PSA_2204	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2204
PSA_2205	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2205
PSA_2208	Questionable	Satisfactory	Satisfactory	Satisfactory	3	1	0	17	85	PASS - GOOD	PSA_2208
PSA_2209	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2209
PSA_2210	Satisfactory	Questionable	Satisfactory	Satisfactory	3	1	0	17	85	PASS - GOOD	PSA_2210
PSA_2211	Satisfactory	Unsatisfactory	Satisfactory	Satisfactory	3	0	**1**	15	75	PASS - GOOD	PSA_2211
PSA_2212	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2212
PSA_2213	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2213
PSA_2214_A	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2214_A
PSA_2214_B	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2214_B
PSA_2215	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2215
PSA_2216	Satisfactory	Unsatisfactory	Satisfactory	Satisfactory	3	0	**1**	15	75	PASS - GOOD	PSA_2216
PSA_2217	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2217
PSA_2218	Satisfactory	Satisfactory	Satisfactory	Satisfactory	4	0	0	20	100	PASS - EXCELLENT	PSA_2218

Score	
5	Satisfactory
2	Questionable
0	Unsatisactory

Score	%	Pass/ Fail	Level
20	86 - 100	PASS	EXCELLENT
15 - 19	71 - 85	PASS	GOOD
12 - 14	60 - 70	PASS	ACCEPTABLE
6 - 11	26 - 59	FAIL	POOR
0-5	0 - 15	FAIL	BAD

Appendices

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2201**
Sample Code:	**PS562201**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0446**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	2.2074
0.50 to 1.00; (500 µm)	5.4583
1.00 to 1.50; (353.6 µm)	4.1674
1.50 to 2.00; (250 µm)	6.1075
2.00 to 2.50; (176.8 µm)	3.9308
2.50 to 3.00; (125 µm)	5.9265
3.00 to 3.50; (88.39 µm)	4.0810
3.50 to 4.00; (62.5 µm)	6.6369
4.00 to 4.50; (44.19 µm)	5.0423
4.50 to 5.00; (31.25 µm)	8.5683
5.00 to 5.50; (22.097 µm)	9.2340
5.50 to 6.00; (15.625 µm)	6.1166
6.00 to 6.50; (11.049 µm)	8.6124
6.50 to 7.00; (7.813 µm)	5.2519
7.00 to 7.50; (5.524 µm)	6.8701
7.50 to 8.00; (3.906 µm)	3.6148
8.00 to 8.50; (2.762 µm)	3.7607
8.50 to 9.00; (1.953 µm)	1.6370
9.00 to 9.50; (1.381 µm)	1.6789
9.50 to 10.00; (0.977 µm)	0.8985
10.00 to 10.50; (0.691 µm)	0.1541
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

APPENDIX 1.

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2202**
Sample Code:	**PS562202**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0018
1.00 to 1.50; (353.6 µm)	0.1041
1.50 to 2.00; (250 µm)	0.3051
2.00 to 2.50; (176.8 µm)	0.4903
2.50 to 3.00; (125 µm)	0.7876
3.00 to 3.50; (88.39 µm)	1.2718
3.50 to 4.00; (62.5 µm)	2.0391
4.00 to 4.50; (44.19 µm)	3.0499
4.50 to 5.00; (31.25 µm)	4.4388
5.00 to 5.50; (22.097 µm)	6.2786
5.50 to 6.00; (15.625 µm)	8.3347
6.00 to 6.50; (11.049 µm)	10.4060
6.50 to 7.00; (7.813 µm)	12.1329
7.00 to 7.50; (5.524 µm)	12.8840
7.50 to 8.00; (3.906 µm)	12.0020
8.00 to 8.50; (2.762 µm)	9.5221
8.50 to 9.00; (1.953 µm)	6.3452
9.00 to 9.50; (1.381 µm)	3.6824
9.50 to 10.00; (0.977 µm)	2.2830
10.00 to 10.50; (0.691 µm)	1.8261
10.50 to 11.00; (0.488 µm)	1.3674
11.00 to 11.50; (0.345 µm)	0.4472
11.50 to 12.00; (0.244 µm)	0.0000
12.00 to 12.50; (0.173 µm)	0.0000
12.50 to 13.00; (0.122 µm)	0.0000
13.00 to 13.50; (0.086 µm)	0.0000

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2203**
Sample Code:	**PS562203**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0000
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)	0.0451
3.50 to 4.00; (62.5 µm)	1.1166
4.00 to 4.50; (44.19 µm)	3.8087
4.50 to 5.00; (31.25 µm)	5.7736
5.00 to 5.50; (22.097 µm)	7.2925
5.50 to 6.00; (15.625 µm)	8.9480
6.00 to 6.50; (11.049 µm)	9.5722
6.50 to 7.00; (7.813 µm)	9.7230
7.00 to 7.50; (5.524 µm)	9.6523
7.50 to 8.00; (3.906 µm)	8.8370
8.00 to 8.50; (2.762 µm)	7.0521
8.50 to 9.00; (1.953 µm)	5.2610
9.00 to 9.50; (1.381 µm)	4.0194
9.50 to 10.00; (0.977 µm)	3.2327
10.00 to 10.50; (0.691 µm)	2.9718
10.50 to 11.00; (0.488 µm)	3.1080
11.00 to 11.50; (0.345 µm)	3.1727
11.50 to 12.00; (0.244 µm)	2.7701
12.00 to 12.50; (0.173 µm)	1.9086
12.50 to 13.00; (0.122 µm)	1.1601
13.00 to 13.50; (0.086 µm)	0.5745

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2204**
Sample Code:	**PS562204**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0000
1.00 to 1.50; (353.6 µm)	0.0000
1.50 to 2.00; (250 µm)	0.2100
2.00 to 2.50; (176.8 µm)	3.2100
2.50 to 3.00; (125 µm)	4.1000
3.00 to 3.50; (88.39 µm)	2.2600
3.50 to 4.00; (62.5 µm)	2.2500
4.00 to 4.50; (44.19 µm)	2.7900
4.50 to 5.00; (31.25 µm)	4.5600
5.00 to 5.50; (22.097 µm)	5.6800
5.50 to 6.00; (15.625 µm)	7.9600
6.00 to 6.50; (11.049 µm)	10.4300
6.50 to 7.00; (7.813 µm)	11.7700
7.00 to 7.50; (5.524 µm)	11.3100
7.50 to 8.00; (3.906 µm)	9.3200
8.00 to 8.50; (2.762 µm)	6.4600
8.50 to 9.00; (1.953 µm)	4.0300
9.00 to 9.50; (1.381 µm)	2.6200
9.50 to 10.00; (0.977 µm)	1.9700
10.00 to 10.50; (0.691 µm)	1.7700
10.50 to 11.00; (0.488 µm)	1.7600
11.00 to 11.50; (0.345 µm)	1.7200
11.50 to 12.00; (0.244 µm)	1.4800
12.00 to 12.50; (0.173 µm)	1.0700
12.50 to 13.00; (0.122 µm)	0.7100
13.00 to 13.50; (0.086 µm)	0.5600

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2205**
Sample Code:	**PS562205**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0104
1.00 to 1.50; (353.6 µm)	0.1810
1.50 to 2.00; (250 µm)	0.6889
2.00 to 2.50; (176.8 µm)	1.2592
2.50 to 3.00; (125 µm)	1.9508
3.00 to 3.50; (88.39 µm)	2.1963
3.50 to 4.00; (62.5 µm)	3.0660
4.00 to 4.50; (44.19 µm)	3.6087
4.50 to 5.00; (31.25 µm)	5.2378
5.00 to 5.50; (22.097 µm)	6.5853
5.50 to 6.00; (15.625 µm)	8.4740
6.00 to 6.50; (11.049 µm)	10.5156
6.50 to 7.00; (7.813 µm)	12.5833
7.00 to 7.50; (5.524 µm)	13.8344
7.50 to 8.00; (3.906 µm)	13.1190
8.00 to 8.50; (2.762 µm)	9.7723
8.50 to 9.00; (1.953 µm)	5.0893
9.00 to 9.50; (1.381 µm)	1.7399
9.50 to 10.00; (0.977 µm)	0.0878
10.00 to 10.50; (0.691 µm)	0.0000
10.50 to 11.00; (0.488 µm)	0.0000
11.00 to 11.50; (0.345 µm)	0.0000
11.50 to 12.00; (0.244 µm)	0.0000
12.00 to 12.50; (0.173 µm)	0.0000
12.50 to 13.00; (0.122 µm)	0.0000
13.00 to 13.50; (0.086 µm)	0.0000

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2208**
Sample Code:	**PS562208**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0000
1.00 to 1.50; (353.6 µm)	0.0000
1.50 to 2.00; (250 µm)	0.5000
2.00 to 2.50; (176.8 µm)	1.6000
2.50 to 3.00; (125 µm)	3.0900
3.00 to 3.50; (88.39 µm)	4.1000
3.50 to 4.00; (62.5 µm)	5.3800
4.00 to 4.50; (44.19 µm)	7.4200
4.50 to 5.00; (31.25 µm)	8.3800
5.00 to 5.50; (22.097 µm)	9.4700
5.50 to 6.00; (15.625 µm)	10.7600
6.00 to 6.50; (11.049 µm)	11.1600
6.50 to 7.00; (7.813 µm)	11.2300
7.00 to 7.50; (5.524 µm)	26.9200
7.50 to 8.00; (3.906 µm)	26.9200
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

APEM comment:
Data sums to 126.93. Assumed to be in grams and converted back to percentage for comparison analysis. Final Laser Data and Final Merged Data do not match.

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2209**
Sample Code:	**PS562209**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0383
0.50 to 1.00; (500 µm)	0.0361
1.00 to 1.50; (353.6 µm)	0.0806
1.50 to 2.00; (250 µm)	0.2399
2.00 to 2.50; (176.8 µm)	0.5232
2.50 to 3.00; (125 µm)	0.9627
3.00 to 3.50; (88.39 µm)	1.4599
3.50 to 4.00; (62.5 µm)	2.5946
4.00 to 4.50; (44.19 µm)	3.9780
4.50 to 5.00; (31.25 µm)	5.0700
5.00 to 5.50; (22.097 µm)	6.9101
5.50 to 6.00; (15.625 µm)	7.8711
6.00 to 6.50; (11.049 µm)	9.0499
6.50 to 7.00; (7.813 µm)	9.9060
7.00 to 7.50; (5.524 µm)	10.9204
7.50 to 8.00; (3.906 µm)	10.7533
8.00 to 8.50; (2.762 µm)	9.0750
8.50 to 9.00; (1.953 µm)	6.9024
9.00 to 9.50; (1.381 µm)	4.7758
9.50 to 10.00; (0.977 µm)	3.1019
10.00 to 10.50; (0.691 µm)	2.8264
10.50 to 11.00; (0.488 µm)	1.9808
11.00 to 11.50; (0.345 µm)	0.8369
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

APPENDIX 1.

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2210**
Sample Code:	**PS562210**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0300
0.50 to 1.00; (500 µm)	0.3400
1.00 to 1.50; (353.6 µm)	0.6100
1.50 to 2.00; (250 µm)	0.7300
2.00 to 2.50; (176.8 µm)	1.3000
2.50 to 3.00; (125 µm)	2.3500
3.00 to 3.50; (88.39 µm)	3.3800
3.50 to 4.00; (62.5 µm)	4.2500
4.00 to 4.50; (44.19 µm)	5.3500
4.50 to 5.00; (31.25 µm)	6.8200
5.00 to 5.50; (22.097 µm)	7.9900
5.50 to 6.00; (15.625 µm)	8.8800
6.00 to 6.50; (11.049 µm)	10.6100
6.50 to 7.00; (7.813 µm)	11.3900
7.00 to 7.50; (5.524 µm)	10.7700
7.50 to 8.00; (3.906 µm)	9.3700
8.00 to 8.50; (2.762 µm)	5.7700
8.50 to 9.00; (1.953 µm)	3.3800
9.00 to 9.50; (1.381 µm)	2.4900
9.50 to 10.00; (0.977 µm)	3.5600
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

APEM comment:
Final Laser and Final Merged data do not match up.

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2211**
Sample Code:	**PS562211**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0000
1.00 to 1.50; (353.6 µm)	0.0044
1.50 to 2.00; (250 µm)	0.1922
2.00 to 2.50; (176.8 µm)	0.6711
2.50 to 3.00; (125 µm)	1.4911
3.00 to 3.50; (88.39 µm)	3.6678
3.50 to 4.00; (62.5 µm)	7.2011
4.00 to 4.50; (44.19 µm)	10.5800
4.50 to 5.00; (31.25 µm)	12.2111
5.00 to 5.50; (22.097 µm)	11.8533
5.50 to 6.00; (15.625 µm)	10.3256
6.00 to 6.50; (11.049 µm)	8.6178
6.50 to 7.00; (7.813 µm)	7.1922
7.00 to 7.50; (5.524 µm)	6.1067
7.50 to 8.00; (3.906 µm)	5.1678
8.00 to 8.50; (2.762 µm)	4.3011
8.50 to 9.00; (1.953 µm)	3.2767
9.00 to 9.50; (1.381 µm)	2.3011
9.50 to 10.00; (0.977 µm)	1.7167
10.00 to 10.50; (0.691 µm)	1.5511
10.50 to 11.00; (0.488 µm)	1.1667
11.00 to 11.50; (0.345 µm)	0.4056
11.50 to 12.00; (0.244 µm)	0.0000
12.00 to 12.50; (0.173 µm)	0.0000
12.50 to 13.00; (0.122 µm)	0.0000
13.00 to 13.50; (0.086 µm)	0.0000

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2212**
Sample Code:	**PS562212**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.2513
0.50 to 1.00; (500 µm)	0.2132
1.00 to 1.50; (353.6 µm)	0.2464
1.50 to 2.00; (250 µm)	0.3937
2.00 to 2.50; (176.8 µm)	0.6453
2.50 to 3.00; (125 µm)	1.0340
3.00 to 3.50; (88.39 µm)	1.6443
3.50 to 4.00; (62.5 µm)	2.5919
4.00 to 4.50; (44.19 µm)	3.9244
4.50 to 5.00; (31.25 µm)	5.5484
5.00 to 5.50; (22.097 µm)	7.3018
5.50 to 6.00; (15.625 µm)	9.0449
6.00 to 6.50; (11.049 µm)	10.6937
6.50 to 7.00; (7.813 µm)	12.0537
7.00 to 7.50; (5.524 µm)	12.6498
7.50 to 8.00; (3.906 µm)	11.9200
8.00 to 8.50; (2.762 µm)	9.6820
8.50 to 9.00; (1.953 µm)	6.3909
9.00 to 9.50; (1.381 µm)	3.0488
9.50 to 10.00; (0.977 µm)	0.7215
10.00 to 10.50; (0.691 µm)	0.0000
10.50 to 11.00; (0.488 µm)	0.0000
11.00 to 11.50; (0.345 µm)	0.0000
11.50 to 12.00; (0.244 µm)	0.0000
12.00 to 12.50; (0.173 µm)	0.0000
12.50 to 13.00; (0.122 µm)	0.0000
13.00 to 13.50; (0.086 µm)	0.0000

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2213**
Sample Code:	**PS562213**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.00**
-6.00 to -5.50; 45 mm	**0.00**
-5.50 to -5.00; 31.5 mm	**0.00**
-5.00 to -4.50; 22.4 mm	**0.00**
-4.50 to -4.00; 16 mm	**0.00**
-4.00 to -3.50; 11.2 mm	**0.00**
-3.50 to -3.00; 8 mm	**0.00**
-3.00 to -2.50; 5.6 mm	**0.00**
-2.50 to -2.00; 4 mm	**0.00**
-2.00 to -1.50; 2.8 mm	**0.00**
-1.50 to -1.00; 2 mm	**0.00**
-1.00 to -0.50; 1.4 mm	**0.00**
-0.50 to 0.00; 1 mm	**0.00**
0.00 to 0.50; (707 µm)	0.00
0.50 to 1.00; (500 µm)	0.00
1.00 to 1.50; (353.6 µm)	0.00
1.50 to 2.00; (250 µm)	0.02
2.00 to 2.50; (176.8 µm)	0.86
2.50 to 3.00; (125 µm)	1.93
3.00 to 3.50; (88.39 µm)	2.14
3.50 to 4.00; (62.5 µm)	2.80
4.00 to 4.50; (44.19 µm)	3.40
4.50 to 5.00; (31.25 µm)	4.44
5.00 to 5.50; (22.097 µm)	5.84
5.50 to 6.00; (15.625 µm)	7.19
6.00 to 6.50; (11.049 µm)	8.66
6.50 to 7.00; (7.813 µm)	9.95
7.00 to 7.50; (5.524 µm)	10.50
7.50 to 8.00; (3.906 µm)	9.87
8.00 to 8.50; (2.762 µm)	8.06
8.50 to 9.00; (1.953 µm)	5.93
9.00 to 9.50; (1.381 µm)	4.02
9.50 to 10.00; (0.977 µm)	2.65
10.00 to 10.50; (0.691 µm)	2.11
10.50 to 11.00; (0.488 µm)	2.17
11.00 to 11.50; (0.345 µm)	2.29
11.50 to 12.00; (0.244 µm)	2.08
12.00 to 12.50; (0.173 µm)	1.48
12.50 to 13.00; (0.122 µm)	0.93
13.00 to 13.50; (0.086 µm)	0.66

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2214_A**
Sample Code:	**PS562214**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.2280
0.50 to 1.00; (500 µm)	0.3160
1.00 to 1.50; (353.6 µm)	0.5250
1.50 to 2.00; (250 µm)	0.5040
2.00 to 2.50; (176.8 µm)	0.5959
2.50 to 3.00; (125 µm)	1.0104
3.00 to 3.50; (88.39 µm)	1.7278
3.50 to 4.00; (62.5 µm)	2.6832
4.00 to 4.50; (44.19 µm)	3.8871
4.50 to 5.00; (31.25 µm)	5.2997
5.00 to 5.50; (22.097 µm)	6.7370
5.50 to 6.00; (15.625 µm)	8.0021
6.00 to 6.50; (11.049 µm)	9.0796
6.50 to 7.00; (7.813 µm)	10.0252
7.00 to 7.50; (5.524 µm)	10.6051
7.50 to 8.00; (3.906 µm)	10.3010
8.00 to 8.50; (2.762 µm)	8.8009
8.50 to 9.00; (1.953 µm)	6.5042
9.00 to 9.50; (1.381 µm)	4.3481
9.50 to 10.00; (0.977 µm)	3.1441
10.00 to 10.50; (0.691 µm)	2.7206
10.50 to 11.00; (0.488 µm)	2.1277
11.00 to 11.50; (0.345 µm)	0.8273
11.50 to 12.00; (0.244 µm)	0.0000
12.00 to 12.50; (0.173 µm)	0.0000
12.50 to 13.00; (0.122 µm)	0.0000
13.00 to 13.50; (0.086 µm)	0.0000

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2214_B**
Sample Code:	**PS562214**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.1173
0.50 to 1.00; (500 µm)	0.2093
1.00 to 1.50; (353.6 µm)	0.2896
1.50 to 2.00; (250 µm)	0.2849
2.00 to 2.50; (176.8 µm)	0.3485
2.50 to 3.00; (125 µm)	0.7717
3.00 to 3.50; (88.39 µm)	1.5849
3.50 to 4.00; (62.5 µm)	2.6194
4.00 to 4.50; (44.19 µm)	3.8847
4.50 to 5.00; (31.25 µm)	5.3627
5.00 to 5.50; (22.097 µm)	6.8661
5.50 to 6.00; (15.625 µm)	8.1733
6.00 to 6.50; (11.049 µm)	9.2628
6.50 to 7.00; (7.813 µm)	10.2204
7.00 to 7.50; (5.524 µm)	10.8326
7.50 to 8.00; (3.906 µm)	10.5493
8.00 to 8.50; (2.762 µm)	9.0123
8.50 to 9.00; (1.953 µm)	6.6250
9.00 to 9.50; (1.381 µm)	4.3757
9.50 to 10.00; (0.977 µm)	3.1162
10.00 to 10.50; (0.691 µm)	2.6682
10.50 to 11.00; (0.488 µm)	2.0604
11.00 to 11.50; (0.345 µm)	0.7644
11.50 to 12.00; (0.244 µm)	0.0000
12.00 to 12.50; (0.173 µm)	0.0000
12.50 to 13.00; (0.122 µm)	0.0000
13.00 to 13.50; (0.086 µm)	0.0000

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2215**
Sample Code:	**PS562215**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0000
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)	0.0988
2.50 to 3.00; (125 µm)	0.5140
3.00 to 3.50; (88.39 µm)	1.5200
3.50 to 4.00; (62.5 µm)	1.5500
4.00 to 4.50; (44.19 µm)	2.4200
4.50 to 5.00; (31.25 µm)	4.4500
5.00 to 5.50; (22.097 µm)	6.4300
5.50 to 6.00; (15.625 µm)	9.0500
6.00 to 6.50; (11.049 µm)	8.7300
6.50 to 7.00; (7.813 µm)	12.2900
7.00 to 7.50; (5.524 µm)	12.7400
7.50 to 8.00; (3.906 µm)	9.2500
8.00 to 8.50; (2.762 µm)	10.7800
8.50 to 9.00; (1.953 µm)	8.2000
9.00 to 9.50; (1.381 µm)	5.5300
9.50 to 10.00; (0.977 µm)	2.7200
10.00 to 10.50; (0.691 µm)	2.3100
10.50 to 11.00; (0.488 µm)	1.2200
11.00 to 11.50; (0.345 µm)	0.3070
11.50 to 12.00; (0.244 µm)	0.0000
12.00 to 12.50; (0.173 µm)	0.0000
12.50 to 13.00; (0.122 µm)	0.0000
13.00 to 13.50; (0.086 µm)	0.0000

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2216**
Sample Code:	**PS562216**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.5571
0.50 to 1.00; (500 µm)	2.2022
1.00 to 1.50; (353.6 µm)	7.9384
1.50 to 2.00; (250 µm)	11.6054
2.00 to 2.50; (176.8 µm)	15.3097
2.50 to 3.00; (125 µm)	23.7602
3.00 to 3.50; (88.39 µm)	35.5249
3.50 to 4.00; (62.5 µm)	47.8391
4.00 to 4.50; (44.19 µm)	60.4906
4.50 to 5.00; (31.25 µm)	73.3542
5.00 to 5.50; (22.097 µm)	84.9409
5.50 to 6.00; (15.625 µm)	95.6727
6.00 to 6.50; (11.049 µm)	105.4154
6.50 to 7.00; (7.813 µm)	108.9286
7.00 to 7.50; (5.524 µm)	100.2451
7.50 to 8.00; (3.906 µm)	79.8036
8.00 to 8.50; (2.762 µm)	56.3093
8.50 to 9.00; (1.953 µm)	35.5799
9.00 to 9.50; (1.381 µm)	21.0273
9.50 to 10.00; (0.977 µm)	12.3262
10.00 to 10.50; (0.691 µm)	6.5516
10.50 to 11.00; (0.488 µm)	3.1000
11.00 to 11.50; (0.345 µm)	0.5176
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

APEM comment:
Final Merged Data sums to 989.00. Assumed to be in grams and converted to percentage for comparison analyssis. Sample was sent in a 200ml pot so not possible to weigh this much. Looks as though the laser data has been mulipled by 9.89.

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2217**
Sample Code:	**PS562217**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.1800
1.00 to 1.50; (353.6 µm)	0.5078
1.50 to 2.00; (250 µm)	0.5556
2.00 to 2.50; (176.8 µm)	0.7211
2.50 to 3.00; (125 µm)	1.2567
3.00 to 3.50; (88.39 µm)	2.0333
3.50 to 4.00; (62.5 µm)	2.9200
4.00 to 4.50; (44.19 µm)	3.9000
4.50 to 5.00; (31.25 µm)	5.0378
5.00 to 5.50; (22.097 µm)	6.4589
5.50 to 6.00; (15.625 µm)	7.8078
6.00 to 6.50; (11.049 µm)	8.9678
6.50 to 7.00; (7.813 µm)	10.8444
7.00 to 7.50; (5.524 µm)	11.7300
7.50 to 8.00; (3.906 µm)	11.0300
8.00 to 8.50; (2.762 µm)	8.1822
8.50 to 9.00; (1.953 µm)	3.9422
9.00 to 9.50; (1.381 µm)	1.3967
9.50 to 10.00; (0.977 µm)	1.5600
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)	10.9644
12.00 to 12.50; (0.173 µm)	
12.50 to 13.00; (0.122 µm)	
13.00 to 13.50; (0.086 µm)	

APPENDIX 1.

NMBAQCS - PS Exercise Data Workbook
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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_2218**
Sample Code:	**PS562218**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0150
1.00 to 1.50; (353.6 µm)	0.0490
1.50 to 2.00; (250 µm)	0.2070
2.00 to 2.50; (176.8 µm)	0.3790
2.50 to 3.00; (125 µm)	0.3880
3.00 to 3.50; (88.39 µm)	0.7250
3.50 to 4.00; (62.5 µm)	1.6840
4.00 to 4.50; (44.19 µm)	12.6100
4.50 to 5.00; (31.25 µm)	2.9250
5.00 to 5.50; (22.097 µm)	11.7650
5.50 to 6.00; (15.625 µm)	12.4800
6.00 to 6.50; (11.049 µm)	9.3600
6.50 to 7.00; (7.813 µm)	7.4100
7.00 to 7.50; (5.524 µm)	6.2400
7.50 to 8.00; (3.906 µm)	2.0800
8.00 to 8.50; (2.762 µm)	4.7450
8.50 to 9.00; (1.953 µm)	7.9950
9.00 to 9.50; (1.381 µm)	4.8100
9.50 to 10.00; (0.977 µm)	28.5260
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

APEM Comment:
Final Merged Data in grams. Converted to pecentages for comparison analysis.

APPENDIX 1.

NMBAQCS - PS Exercise Data Workbook
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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_BM REP 1**
Sample Code:	**PS56BMREP1**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0000
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)	0.0451
3.50 to 4.00; (62.5 µm)	1.1166
4.00 to 4.50; (44.19 µm)	3.8087
4.50 to 5.00; (31.25 µm)	5.7736
5.00 to 5.50; (22.097 µm)	7.2925
5.50 to 6.00; (15.625 µm)	8.9480
6.00 to 6.50; (11.049 µm)	9.5722
6.50 to 7.00; (7.813 µm)	9.7230
7.00 to 7.50; (5.524 µm)	9.6523
7.50 to 8.00; (3.906 µm)	8.8370
8.00 to 8.50; (2.762 µm)	7.0521
8.50 to 9.00; (1.953 µm)	5.2610
9.00 to 9.50; (1.381 µm)	4.0194
9.50 to 10.00; (0.977 µm)	3.2327
10.00 to 10.50; (0.691 µm)	2.9718
10.50 to 11.00; (0.488 µm)	3.1080
11.00 to 11.50; (0.345 µm)	3.1727
11.50 to 12.00; (0.244 µm)	2.7701
12.00 to 12.50; (0.173 µm)	1.9086
12.50 to 13.00; (0.122 µm)	1.1601
13.00 to 13.50; (0.086 µm)	0.5745

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_BM REP 2**
Sample Code:	**PS56BMREP2**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0000
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)	0.0075
3.50 to 4.00; (62.5 µm)	0.5695
4.00 to 4.50; (44.19 µm)	3.5240
4.50 to 5.00; (31.25 µm)	5.9710
5.00 to 5.50; (22.097 µm)	7.2796
5.50 to 6.00; (15.625 µm)	9.0741
6.00 to 6.50; (11.049 µm)	9.7341
6.50 to 7.00; (7.813 µm)	10.0647
7.00 to 7.50; (5.524 µm)	10.0492
7.50 to 8.00; (3.906 µm)	9.1499
8.00 to 8.50; (2.762 µm)	7.2069
8.50 to 9.00; (1.953 µm)	5.2628
9.00 to 9.50; (1.381 µm)	3.9376
9.50 to 10.00; (0.977 µm)	3.1383
10.00 to 10.50; (0.691 µm)	2.8793
10.50 to 11.00; (0.488 µm)	2.9986
11.00 to 11.50; (0.345 µm)	3.0436
11.50 to 12.00; (0.244 µm)	2.6450
12.00 to 12.50; (0.173 µm)	1.8164
12.50 to 13.00; (0.122 µm)	1.1024
13.00 to 13.50; (0.086 µm)	0.5455

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_BM REP 3**
Sample Code:	**PS56BMREP3**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0000
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)	0.0219
3.50 to 4.00; (62.5 µm)	1.0370
4.00 to 4.50; (44.19 µm)	3.6817
4.50 to 5.00; (31.25 µm)	5.5321
5.00 to 5.50; (22.097 µm)	7.1473
5.50 to 6.00; (15.625 µm)	8.8532
6.00 to 6.50; (11.049 µm)	9.5288
6.50 to 7.00; (7.813 µm)	9.7634
7.00 to 7.50; (5.524 µm)	9.6912
7.50 to 8.00; (3.906 µm)	8.8469
8.00 to 8.50; (2.762 µm)	7.0640
8.50 to 9.00; (1.953 µm)	5.2652
9.00 to 9.50; (1.381 µm)	4.0499
9.50 to 10.00; (0.977 µm)	3.3591
10.00 to 10.50; (0.691 µm)	3.1578
10.50 to 11.00; (0.488 µm)	3.2613
11.00 to 11.50; (0.345 µm)	3.2490
11.50 to 12.00; (0.244 µm)	2.7938
12.00 to 12.50; (0.173 µm)	1.9169
12.50 to 13.00; (0.122 µm)	1.1812
13.00 to 13.50; (0.086 µm)	0.5983

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Return to APEM Ltd.

Exercise Code:	**PS56**
LabCode:	**PSA_BM REP 4**
Sample Code:	**PS56BMREP4**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0000
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)	0.0845
3.50 to 4.00; (62.5 µm)	1.3242
4.00 to 4.50; (44.19 µm)	3.7714
4.50 to 5.00; (31.25 µm)	5.7766
5.00 to 5.50; (22.097 µm)	7.3174
5.50 to 6.00; (15.625 µm)	9.0250
6.00 to 6.50; (11.049 µm)	9.6481
6.50 to 7.00; (7.813 µm)	9.8266
7.00 to 7.50; (5.524 µm)	9.7465
7.50 to 8.00; (3.906 µm)	8.8774
8.00 to 8.50; (2.762 µm)	7.0181
8.50 to 9.00; (1.953 µm)	5.1796
9.00 to 9.50; (1.381 µm)	3.9366
9.50 to 10.00; (0.977 µm)	3.1722
10.00 to 10.50; (0.691 µm)	2.9248
10.50 to 11.00; (0.488 µm)	3.0568
11.00 to 11.50; (0.345 µm)	3.1105
11.50 to 12.00; (0.244 µm)	2.7023
12.00 to 12.50; (0.173 µm)	1.8461
12.50 to 13.00; (0.122 µm)	1.1116
13.00 to 13.50; (0.086 µm)	0.5438

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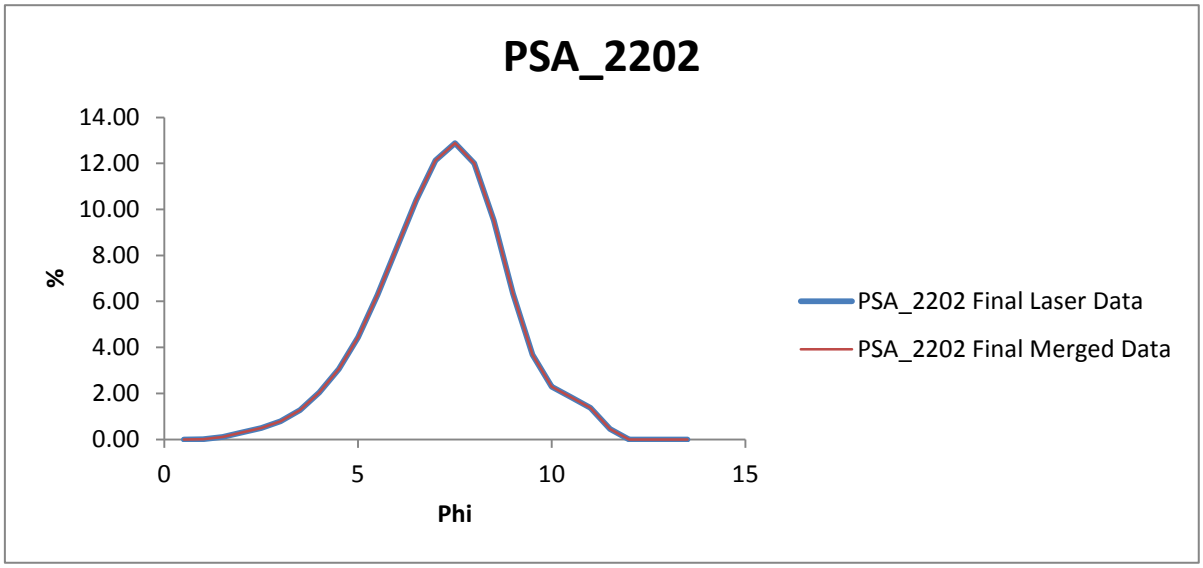
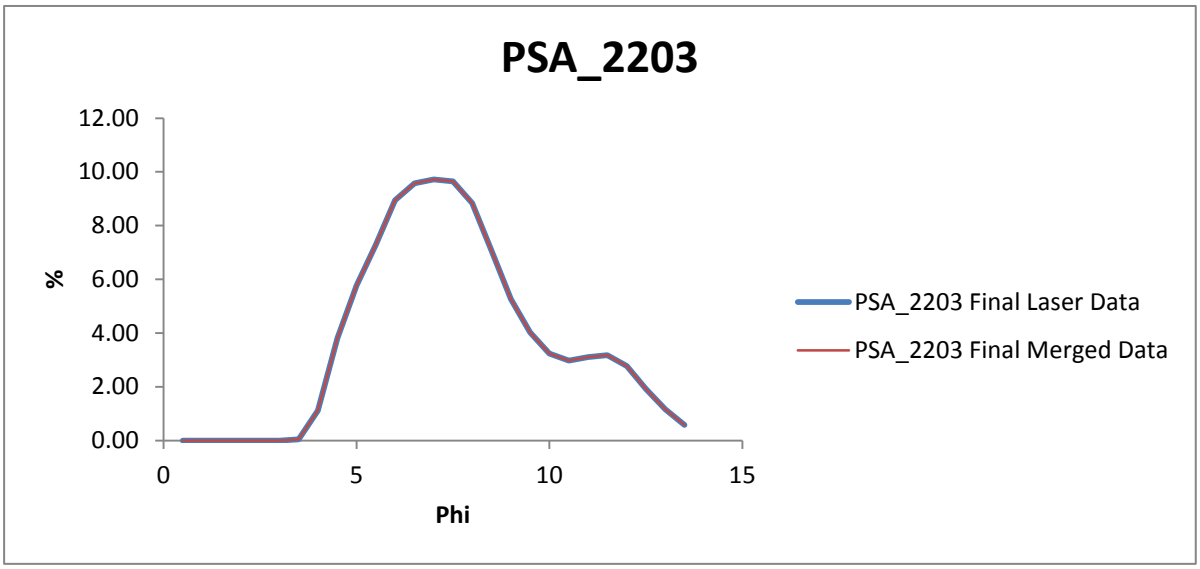
Return to APEM Ltd.

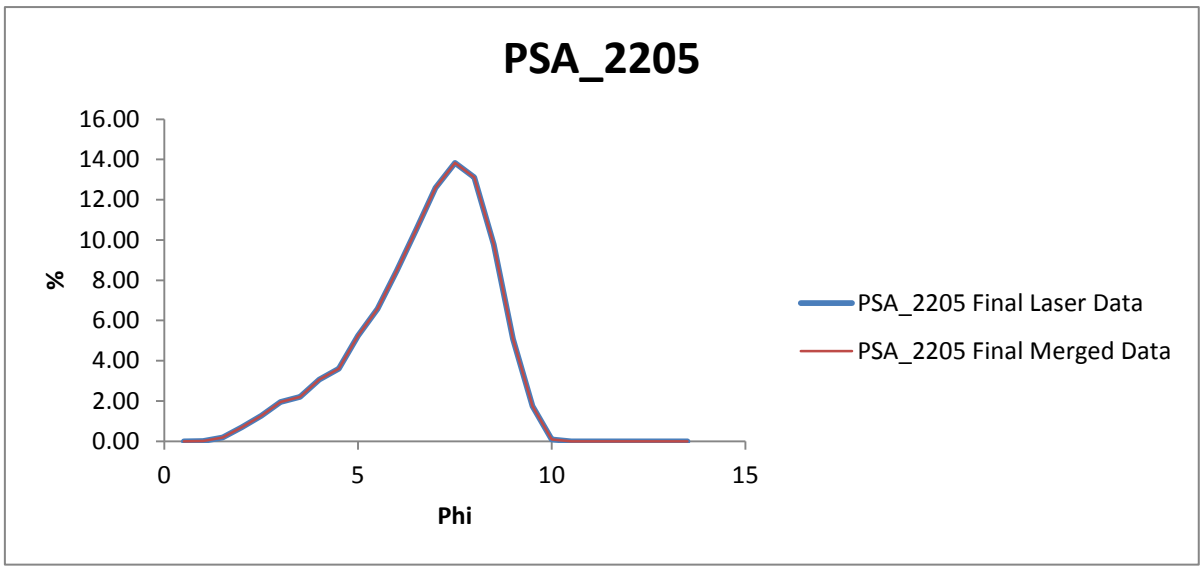
Exercise Code:	**PS56**
LabCode:	**PSA_BM REP 5**
Sample Code:	**PS56BMREP5**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Volume/Weight (mark as "0" for not analysed or no material)
-6.50 to -6.00; 63 mm	**0.0000**
-6.00 to -5.50; 45 mm	**0.0000**
-5.50 to -5.00; 31.5 mm	**0.0000**
-5.00 to -4.50; 22.4 mm	**0.0000**
-4.50 to -4.00; 16 mm	**0.0000**
-4.00 to -3.50; 11.2 mm	**0.0000**
-3.50 to -3.00; 8 mm	**0.0000**
-3.00 to -2.50; 5.6 mm	**0.0000**
-2.50 to -2.00; 4 mm	**0.0000**
-2.00 to -1.50; 2.8 mm	**0.0000**
-1.50 to -1.00; 2 mm	**0.0000**
-1.00 to -0.50; 1.4 mm	**0.0000**
-0.50 to 0.00; 1 mm	**0.0000**
0.00 to 0.50; (707 µm)	0.0000
0.50 to 1.00; (500 µm)	0.0000
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)	0.0482
3.50 to 4.00; (62.5 µm)	1.4761
4.00 to 4.50; (44.19 µm)	3.9922
4.50 to 5.00; (31.25 µm)	5.8385
5.00 to 5.50; (22.097 µm)	7.4435
5.50 to 6.00; (15.625 µm)	9.0548
6.00 to 6.50; (11.049 µm)	9.6720
6.50 to 7.00; (7.813 µm)	9.8020
7.00 to 7.50; (5.524 µm)	9.6129
7.50 to 8.00; (3.906 µm)	8.6696
8.00 to 8.50; (2.762 µm)	6.8434
8.50 to 9.00; (1.953 µm)	5.0675
9.00 to 9.50; (1.381 µm)	3.8706
9.50 to 10.00; (0.977 µm)	3.1555
10.00 to 10.50; (0.691 µm)	2.9387
10.50 to 11.00; (0.488 µm)	3.0688
11.00 to 11.50; (0.345 µm)	3.1109
11.50 to 12.00; (0.244 µm)	2.7103
12.00 to 12.50; (0.173 µm)	1.8781
12.50 to 13.00; (0.122 µm)	1.1594
13.00 to 13.50; (0.086 µm)	0.5872

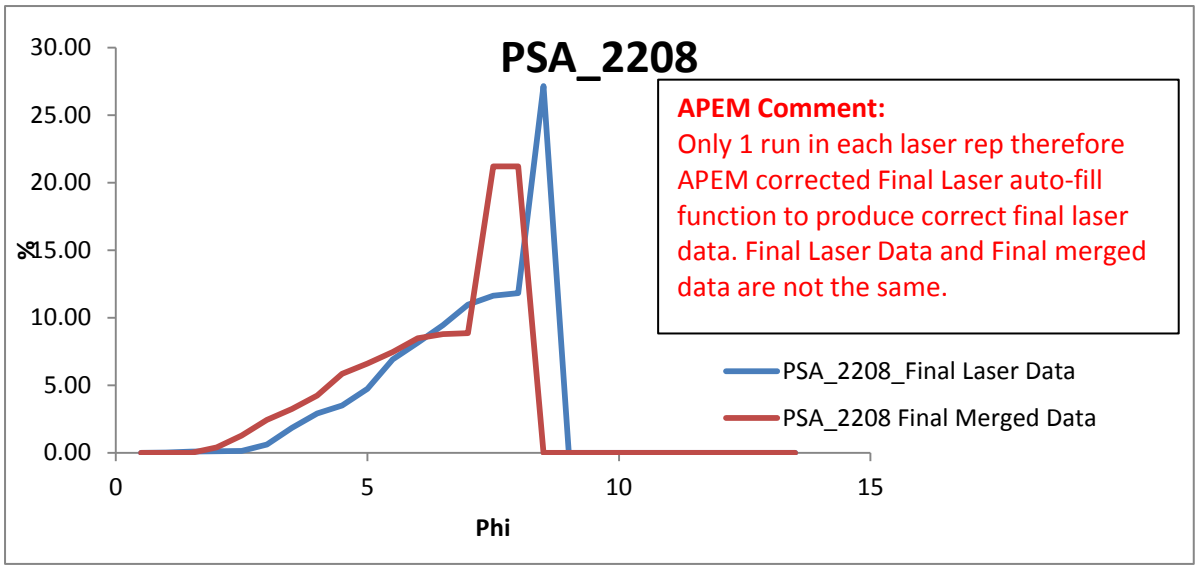
APPENDIX 2.

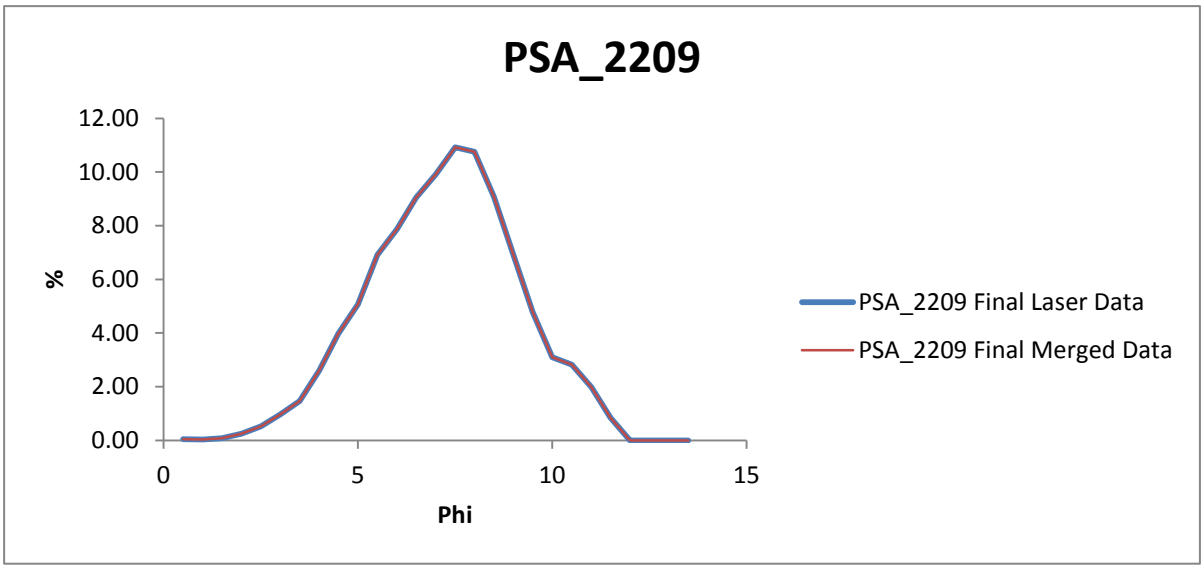

PSA_2202
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
%
0
5
10
15
Phi
PSA_2202 Final Laser Data
PSA_2202 Final Merged Data

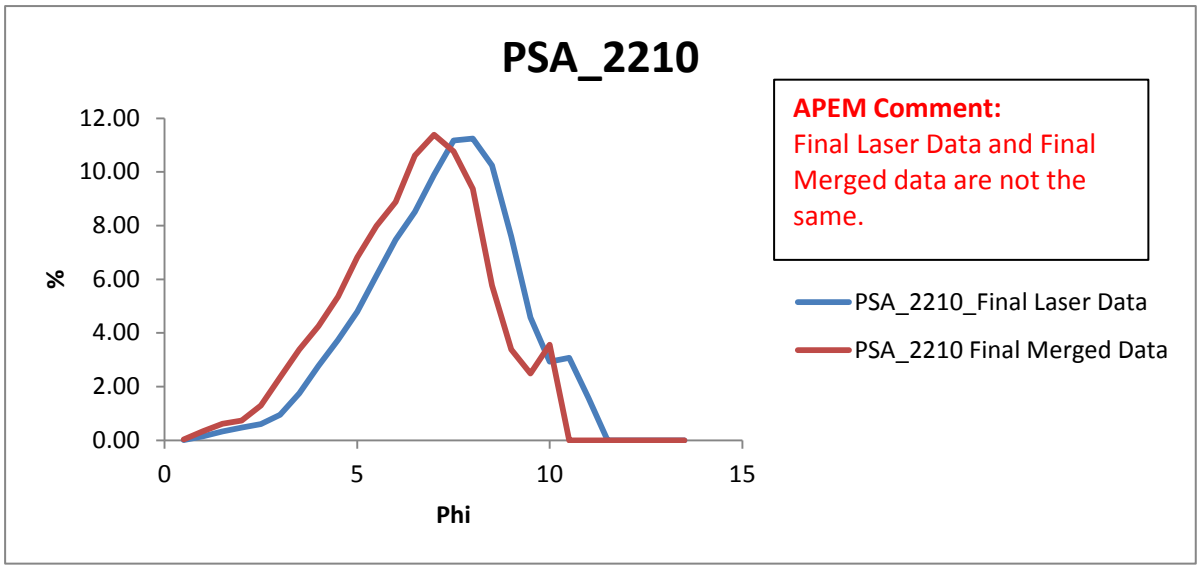

PSA_2203
12.00
10.00
8.00
6.00
4.00
2.00
0.00
%
0
5
10
15
Phi
PSA_2203 Final Laser Data
PSA_2203 Final Merged Data


PSA_2205
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
%
0
5
10
15
Phi
PSA_2205 Final Laser Data
PSA_2205 Final Merged Data

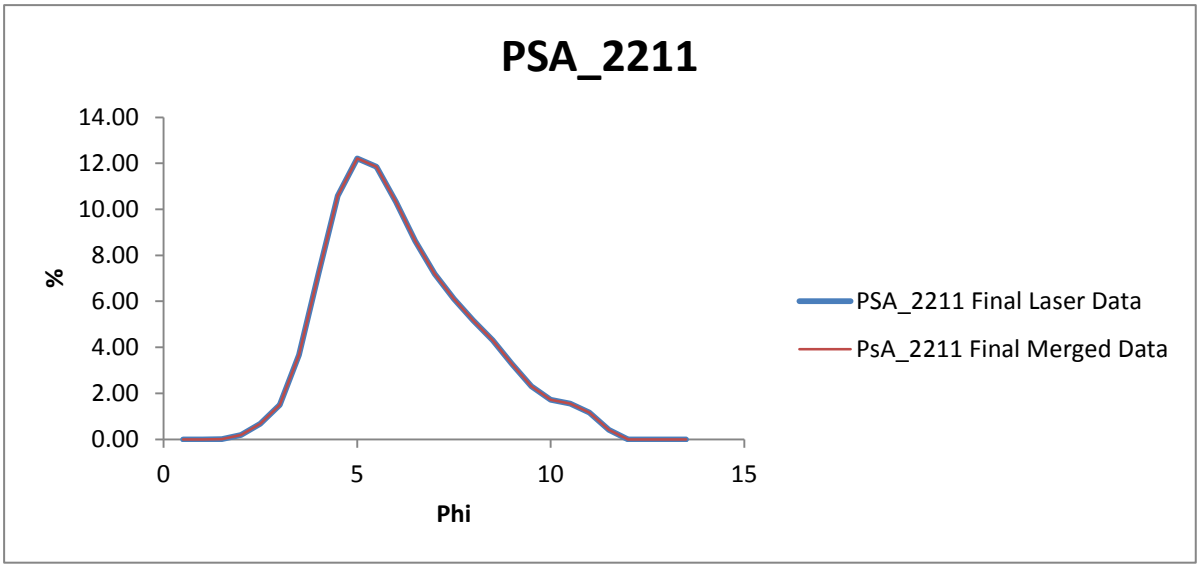
APPENDIX 2.

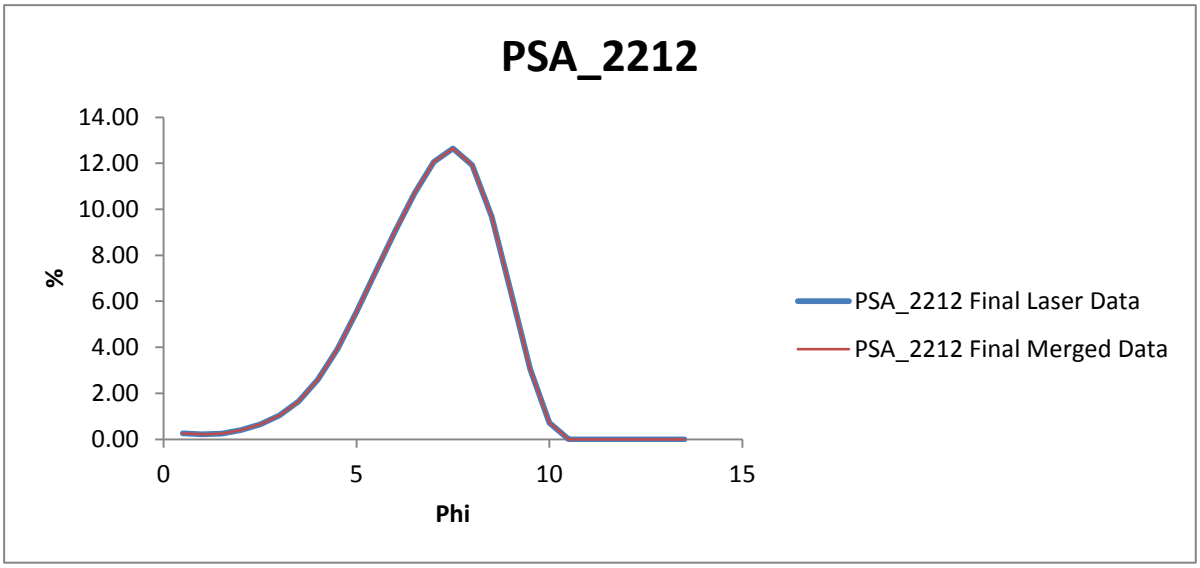

PSA_2208
30.00
25.00
20.00
15.00
10.00
5.00
0.00
%
0
5
10
15
Phi
APEM Comment:
Only 1 run in each laser rep therefore APEM corrected Final Laser auto-fill function to produce correct final laser data. Final Laser Data and Final merged data are not the same.
PSA_2208_Final Laser Data
PSA_2208 Final Merged Data

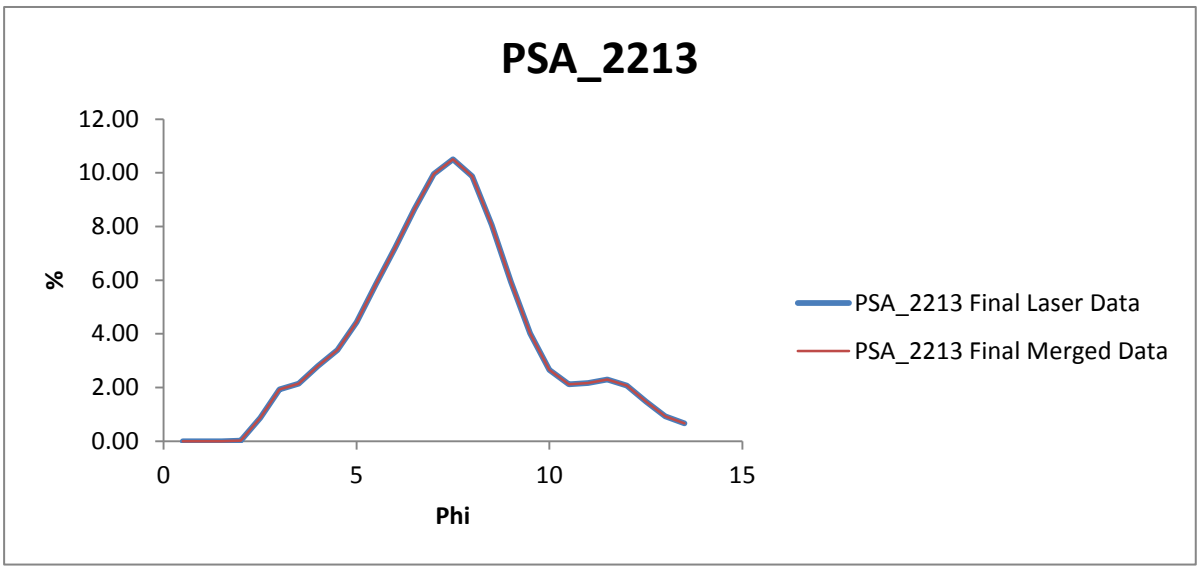

PSA_2209
12.00
10.00
8.00
6.00
4.00
2.00
0.00
%
0
5
10
15
Phi
PSA_2209 Final Laser Data
PSA_2209 Final Merged Data


PSA_2210
12.00
10.00
8.00
6.00
4.00
2.00
0.00
%
0
5
10
15
Phi
APEM Comment:
Final Laser Data and Final Merged data are not the same.
PSA_2210_Final Laser Data
PSA_2210 Final Merged Data

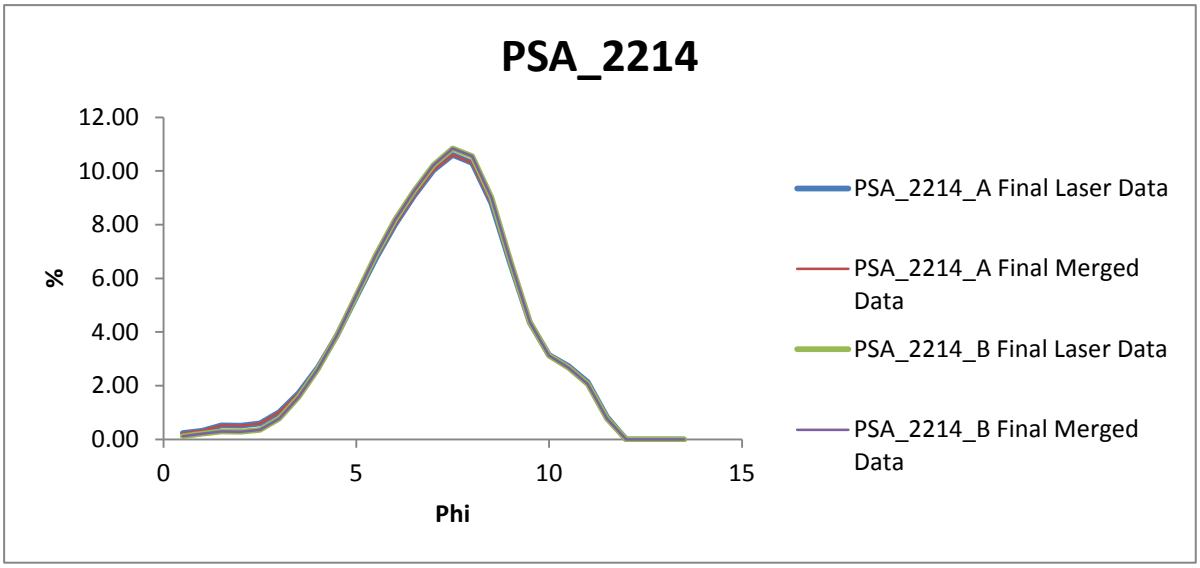
APPENDIX 2.

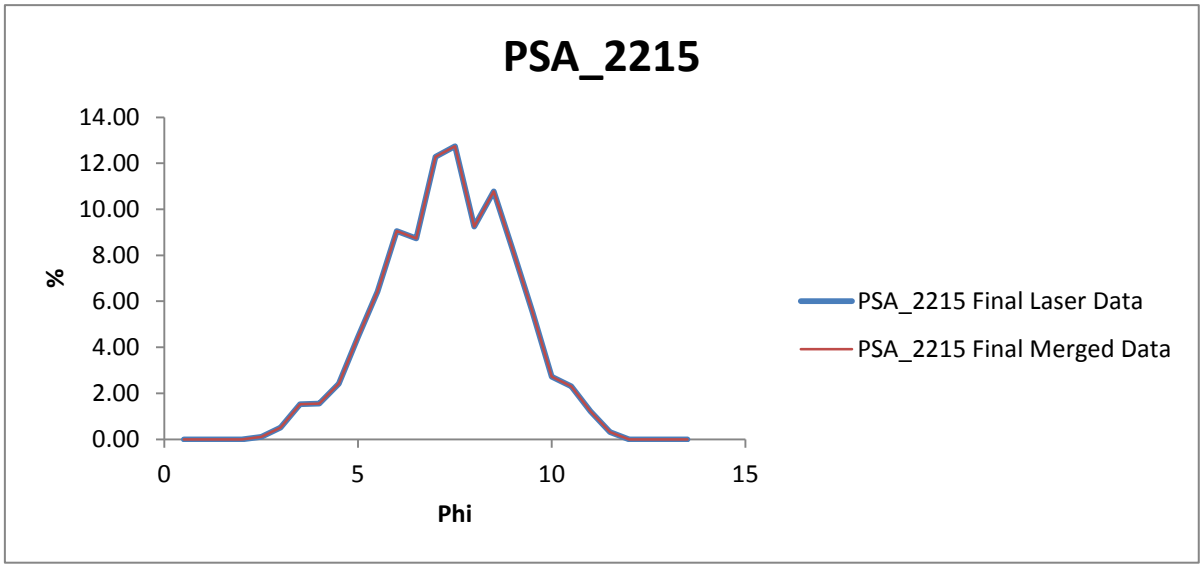

PSA_2211
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
%
0
5
10
15
Phi
PSA_2211 Final Laser Data
PsA_2211 Final Merged Data

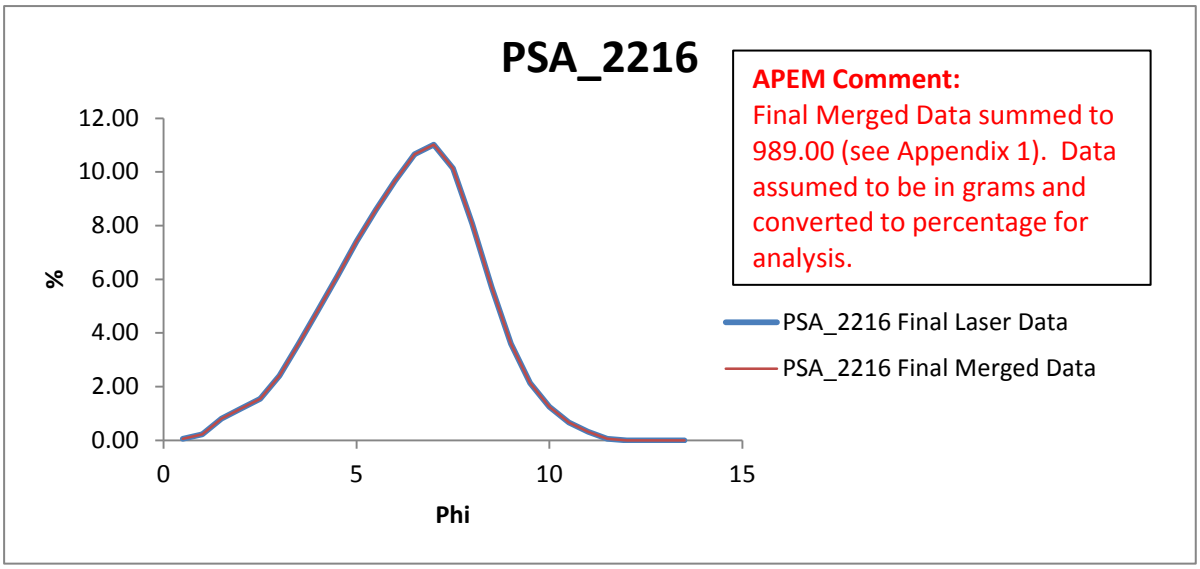

PSA_2212
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
%
0
5
10
15
Phi
PSA_2212 Final Laser Data
PSA_2212 Final Merged Data


PSA_2213
12.00
10.00
8.00
6.00
4.00
2.00
0.00
%
0
5
10
15
Phi
PSA_2213 Final Laser Data
PSA_2213 Final Merged Data

APPENDIX 2.

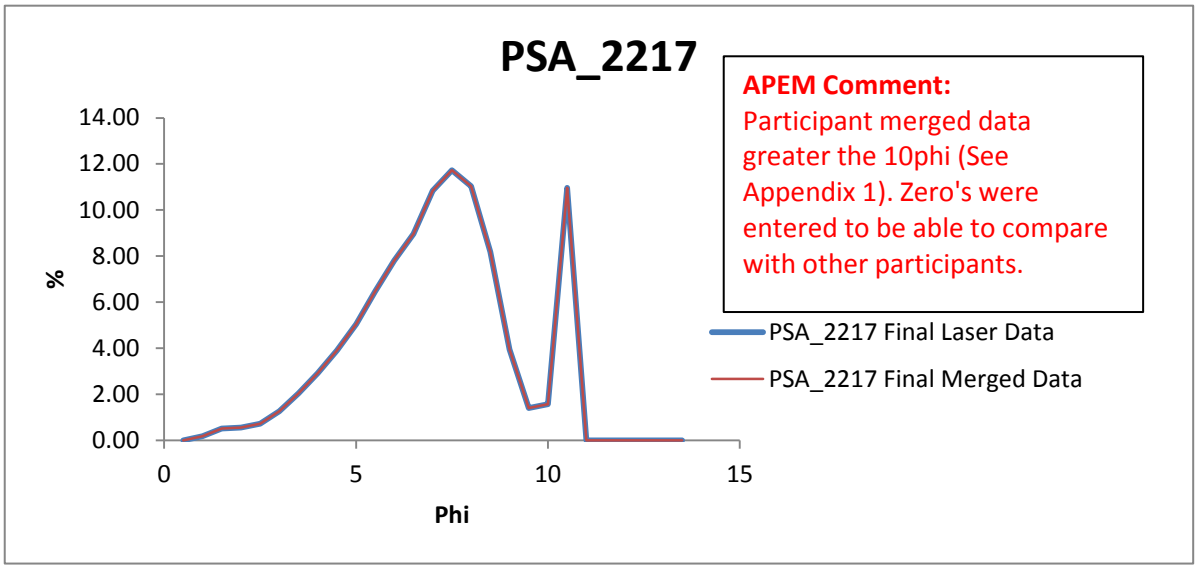






APEM Comment:
Final Merged Data summed to 989.00 (see Appendix 1). Data assumed to be in grams and converted to percentage for analysis.

APPENDIX 2.



Not included:

PSA_2201 - Recorded a small amount of >1mm, therefore final laser and final merged data are not comparible.

PSA_2204 - Did not provide final laser data.