The National Marine Biological
Analytical Quality Control Scheme
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Particle Size Analysis Results for PS50

2013/2014 (Year 20)

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Contents

Table 1. Summary of the replicate benchmark analysis and particle size information received from participating laboratories for exercise PS50.

Benchmark Data

Sample	Method	% Gravel	% Sand	% Mud	Median ϕ	Mean ϕ	Sediment Description (Post analysis)
PS50 TUM01	NMBAQC	0	97.35	2.65	1.56	1.58	Sand
PS50 TUM02	NMBAQC	0	97.32	2.68	1.54	1.56	Sand
PS50 TUM03	NMBAQC	0	98.10	1.90	1.51	1.52	Sand
PS50 TUM04	NMBAQC	0	97.62	2.38	1.51	1.53	Sand
PS50 TUM05	NMBAQC	0	97.23	2.77	1.57	1.59	Sand
PS50 TUM06	NMBAQC	0	97.43	2.57	1.57	1.58	Sand
PS50 TUM07	NMBAQC	0	97.33	2.67	1.54	1.56	Sand
PS50 TUM08	NMBAQC	0	97.31	2.69	1.52	1.55	Sand
PS50 TUM09	NMBAQC	0	97.42	2.58	1.46	1.46	Sand
PS50 TUM10	NMBAQC	0	97.30	2.70	1.47	1.48	Sand
TUM AVERAGE	NMBAQC	0	97.44	2.56	1.54	1.52	Sand

Participant Data

Lab	Method	% Gravel	% Sand	% Mud	Sediment Description (Post analysis)
LB2003	NMBAQC	0	98.72	1.28	Sand
LB2007	NMBAQC & OTHER	0	97.50	2.50	Sand
LB2015	NMBAQC	0	98.00	2.00	Medium Sand
LB2020	NMBAQC	0	98.01	1.99	Medium Sand
LB2021	NMBAQC	0	98.32	1.68	Sand
LB2022	NMBAQC	0	97.46	2.54	Medium Sand
LB2027	NMBAQC	0	92.11	7.89	Sand
LB2029	NMBAQC	0	98.25	1.75	Medium Sand
LB2031	OTHER	0	97.93	2.07	Medium sand
LB2032	NMBAQC	0	95.95	4.05	Sand
LB2054	NMBAQC	0	97.42	2.58	Sand
LB2056	OTHER	0	96.82	3.18	Sand
LB2057	NMBAQC	0	94.45	5.55	Sand
LB2060_A	NMBAQC & OTHER	0	98.23	1.77	Sand
LB2060_B	NMBAQC & OTHER	0	98.58	1.42	Sand

Key to methods

NMBAQC - States following NMBAQC PSA SOP for supporting biological data

OTHER - Following a different SOP.

Figure 1. Particle size distribution curves resulting from analysis of ten replicate samples of sediment distributed as PS50 (Benchmark Data).

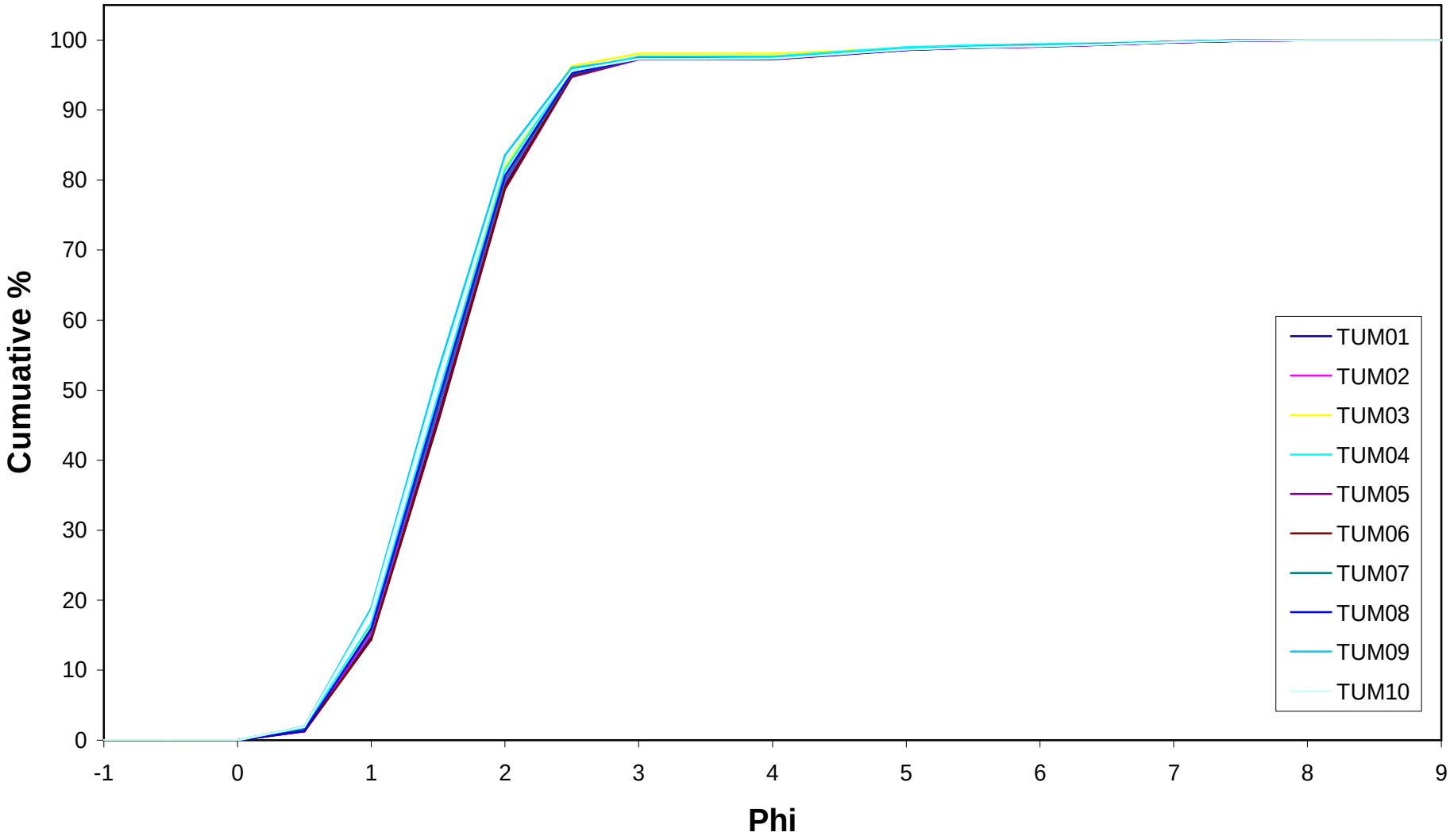


Figure 2. Particle size distribution curves from all participating laboratories for sediment samples from PS50.

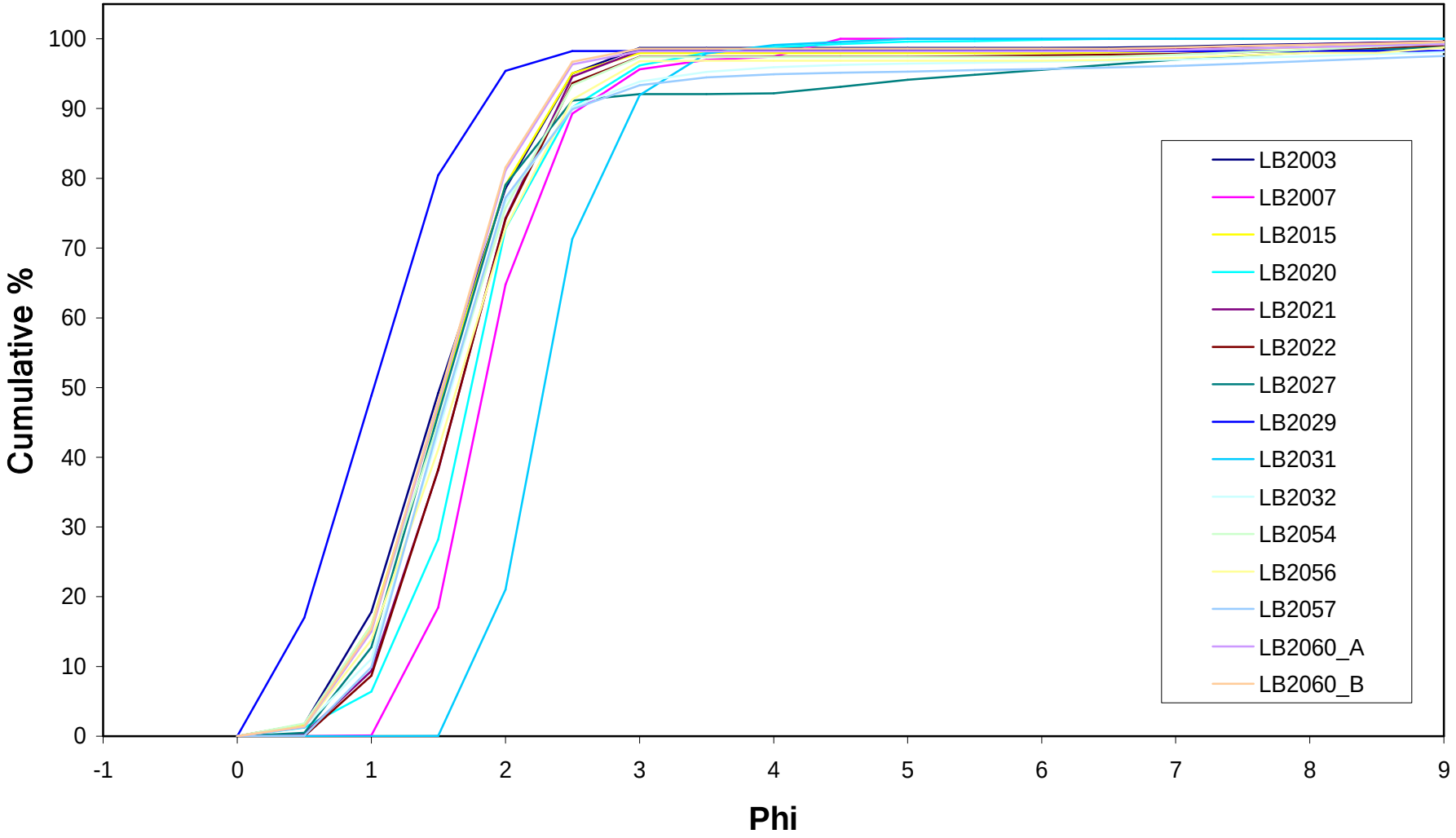


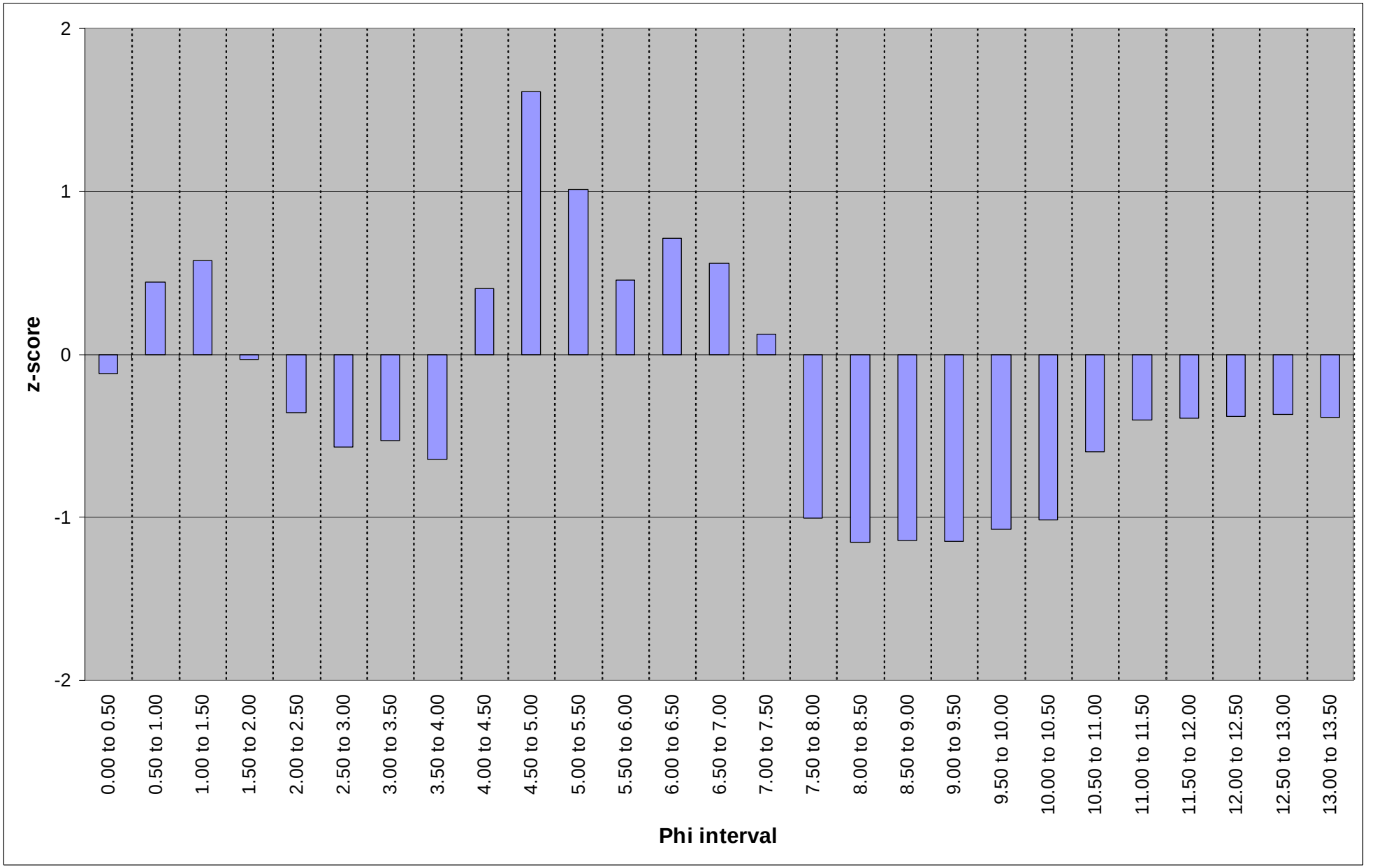
Table 2. Summary of z-scores for each half-phi interval for PS50; data from all participating laboratories included in mean and standard deviation calculations.

	-0.50 to 0.00	0.00 to 0.50	0.50 to 1.00	1.00 to 1.50	1.50 to 2.00	2.00 to 2.50	2.50 to 3.00	3.00 to 3.50	3.50 to 4.00	4.00 to 4.50	4.50 to 5.00	5.00 to 5.50	5.50 to 6.00	6.00 to 6.50
TUM AVERAGE	0.000	-0.116	0.441	0.573	-0.033	-0.356	-0.572	-0.531	-0.641	0.401	1.612	1.009	0.454	0.715
LB2003	0.000	-0.075	0.649	0.471	-0.413	-0.189	-0.228	-0.513	-0.694	-0.527	-0.503	-0.446	-0.495	-0.404
LB2007	0.000	-0.483	-1.479	-1.020	1.801	0.613	0.333	0.310	0.639	3.296	-0.503	-0.446	-0.495	-0.647
LB2015	0.000	-0.076	0.398	0.447	-0.074	-0.235	-0.381	-0.531	-0.694	-0.527	-0.503	-0.446	-0.495	-0.264
LB2020	0.000	-0.194	-0.804	-0.623	1.579	-0.097	0.268	0.596	1.457	0.110	0.562	0.123	0.438	0.025
LB2021	0.000	-0.408	-0.293	0.173	0.476	0.192	-0.218	-0.531	-0.694	-0.527	-0.503	-0.446	-0.495	-0.224
LB2022	0.000	-0.483	-0.337	0.254	0.451	0.110	-0.202	-0.512	-0.694	-0.527	-0.503	-0.119	-0.031	-0.085
LB2027	0.000	-0.366	0.134	0.702	0.051	-0.621	-0.798	-0.531	-0.426	0.854	2.830	3.290	3.338	3.377
LB2029	0.000	3.556	2.755	0.494	-2.300	-1.533	-0.997	-0.531	-0.694	-0.527	-0.503	-0.446	-0.495	-0.647
LB2031	0.000	-0.484	-1.498	-3.099	-1.511	3.160	3.326	3.270	2.406	0.106	0.978	-0.446	-0.495	-0.647
LB2032	0.000	-0.145	-0.209	0.587	0.079	-0.472	-0.227	0.346	1.034	-0.035	0.129	0.081	0.261	0.138
LB2054	0.000	-0.043	0.374	0.191	-0.217	-0.068	-0.147	-0.529	-0.694	-0.527	-0.503	-0.446	-0.494	-0.333
LB2056	0.000	-0.163	0.166	0.005	-0.101	0.007	0.152	-0.477	-0.694	-0.527	-0.503	-0.446	-0.495	-0.078
LB2057	0.000	-0.463	-0.187	0.814	0.050	-0.561	-0.278	0.165	0.439	-0.116	0.024	0.636	0.449	0.351
LB2060_A	0.000	-0.174	0.330	0.604	0.131	-0.307	-0.602	-0.531	-0.694	-0.527	-0.503	-0.446	-0.495	-0.562
LB2060_B	0.000	-0.141	0.363	0.616	0.122	-0.314	-0.605	-0.531	-0.694	-0.527	-0.503	-0.446	-0.495	-0.567
Mean	0.000	2.033	11.227	27.273	32.527	18.344	4.759	0.840	0.271	0.345	0.152	0.089	0.089	0.120
St. Dev	0.000	4.203	7.497	8.783	7.652	10.103	4.772	1.581	0.390	0.655	0.302	0.200	0.179	0.186

	6.50 to 7.00	7.00 to 7.50	7.50 to 8.00	8.00 to 8.50	8.50 to 9.00	9.00 to 9.50	9.50 to 10.00	10.00 to 10.50	10.50 to 11.00	11.00 to 11.50	11.50 to 12.00	12.00 to 12.50	12.50 to 13.00	13.00 to 13.50
TUM AVERAGE	0.558	0.123	-1.007	-1.151	-1.142	-1.148	-1.071	-1.015	-0.598	-0.403	-0.393	-0.381	-0.371	-0.388
LB2003	-0.175	-0.227	-0.300	-0.178	-0.387	-0.153	-0.394	-0.522	-0.282	-0.403	-0.393	-0.381	-0.371	-0.388
LB2007	-1.060	-1.299	-1.335	-1.151	-1.142	-1.148	-1.071	-1.015	-0.598	-0.403	-0.393	-0.381	-0.371	-0.388
LB2015	0.117	0.288	0.369	0.685	0.080	0.116	-0.306	0.648	-0.598	-0.403	-0.393	-0.381	-0.371	-0.388
LB2020	-1.046	-1.299	-1.335	-1.151	-1.142	-1.148	-1.071	-1.015	-0.598	-0.403	-0.393	-0.381	-0.371	-0.388
LB2021	0.434	0.420	0.177	0.180	-0.174	0.028	-0.381	-0.663	-0.598	-0.403	-0.393	-0.381	-0.371	-0.388
LB2022	-0.253	0.060	0.424	0.732	0.476	1.394	0.866	0.096	-0.588	-0.403	-0.393	-0.381	-0.371	-0.388
LB2027	2.896	2.216	1.502	1.290	0.544	0.831	0.481	0.885	1.742	-0.403	-0.393	-0.381	-0.371	-0.388
LB2029	-1.060	-1.299	-1.335	-1.151	-1.142	-1.148	-1.071	-1.015	-0.598	-0.403	-0.393	-0.381	-0.371	-0.388
LB2031	-1.060	-1.299	-1.335	-1.151	-1.142	-1.148	-1.071	-1.015	-0.598	-0.403	-0.393	-0.381	-0.371	-0.388
LB2032	-0.001	0.155	0.281	0.418	0.181	0.873	0.647	0.914	1.894	2.087	1.696	1.371	1.147	1.554
LB2054	0.332	0.821	1.147	1.441	0.812	1.020	0.171	-0.515	-0.563	-0.403	-0.393	-0.381	-0.371	-0.388
LB2056	0.550	0.918	1.039	-1.151	2.387	-1.148	2.480	2.319	-0.598	-0.403	-0.393	-0.381	-0.371	-0.388
LB2057	0.383	0.672	0.857	1.064	0.684	1.250	0.598	0.694	1.948	2.747	3.021	3.200	3.302	3.104
LB2060_A	-0.059	-0.125	-0.156	0.125	-0.037	0.381	0.120	0.204	0.037	-0.403	-0.393	-0.381	-0.371	-0.388
LB2060_B	-0.044	-0.081	-0.138	0.075	-0.154	0.109	-0.198	-0.781	-0.598	-0.403	-0.393	-0.381	-0.371	-0.388
Mean	0.191	0.216	0.216	0.188	0.243	0.186	0.210	0.161	0.063	0.037	0.033	0.027	0.020	0.015
St. Dev	0.180	0.166	0.162	0.163	0.213	0.162	0.196	0.159	0.105	0.091	0.084	0.070	0.055	0.039

z-score >1.96 or <-1.96
All values equal 0

Figure 3. Summary of z-scores for the benchmark data (TUM Average); data from all participating laboratories included in mean and standard deviation calculations.



Results of SIMPROF testing on PSA Ring test PS50 data

Data was entered into PRIMER v. 6.1.13 in half-phi intervals; any missing data was entered as zero. The data did not need to be transformed as all data was on a similar percentage scale. A Euclidean distance matrix was created from the data; The Euclidean distance between two samples (labs) *j* and *k,* is defined algebraically as $d_{jk} = \sqrt{\sum_{i=1}^{p}(y_{ij} - y_{ik})^2}$. From this distance matrix cluster analysis was carried out including a SIMPROF test at a 5% significance level. The red SIMPROF lines on the dendrogram indicate labs that cannot be distinguished from each other at the 5% significance level; the black lines indicate labs that can be distinguished from each other. The results are presented as a cluster dendrogram (Figure 4) and non-metric Multi-Dimensional Scaling (MDS) diagrams (Figures 5) below. It is important to note that, although the MDS plot is bounded by a box, the box does not represent either axes or scale. Two samples with a high similarity index will appear close together while those less similar will appear further apart. The 'correct' configuration of sample points will be multidimensional and the plot represents the best 2-dimensional solution to the problem. The technique should be viewed as complementary to cluster analysis, offering a different perspective of the same information.

Figure 4. Cluster dendrogram of PS50 including all laboratories, with the benchmark replicates (TUM average).

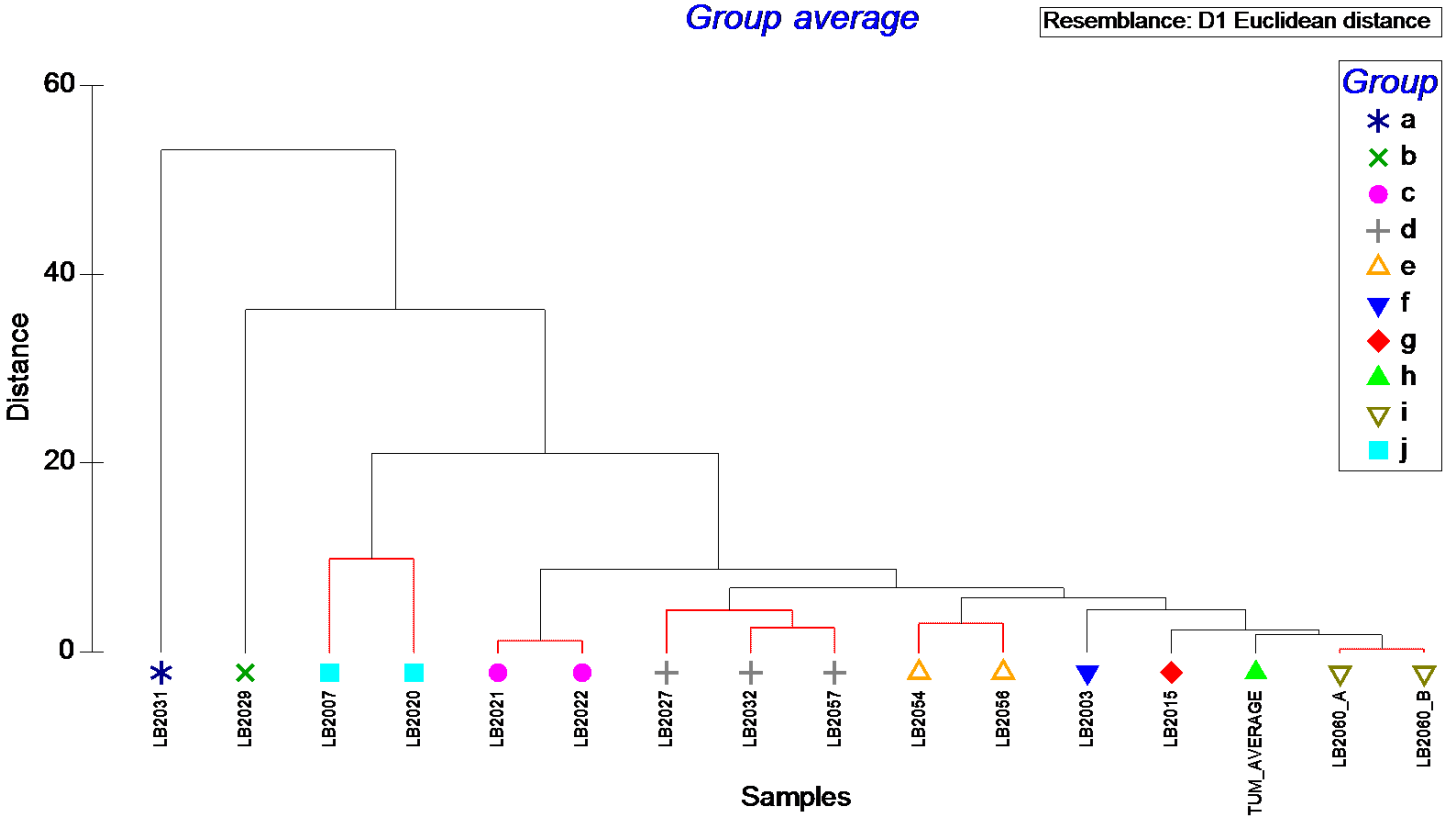
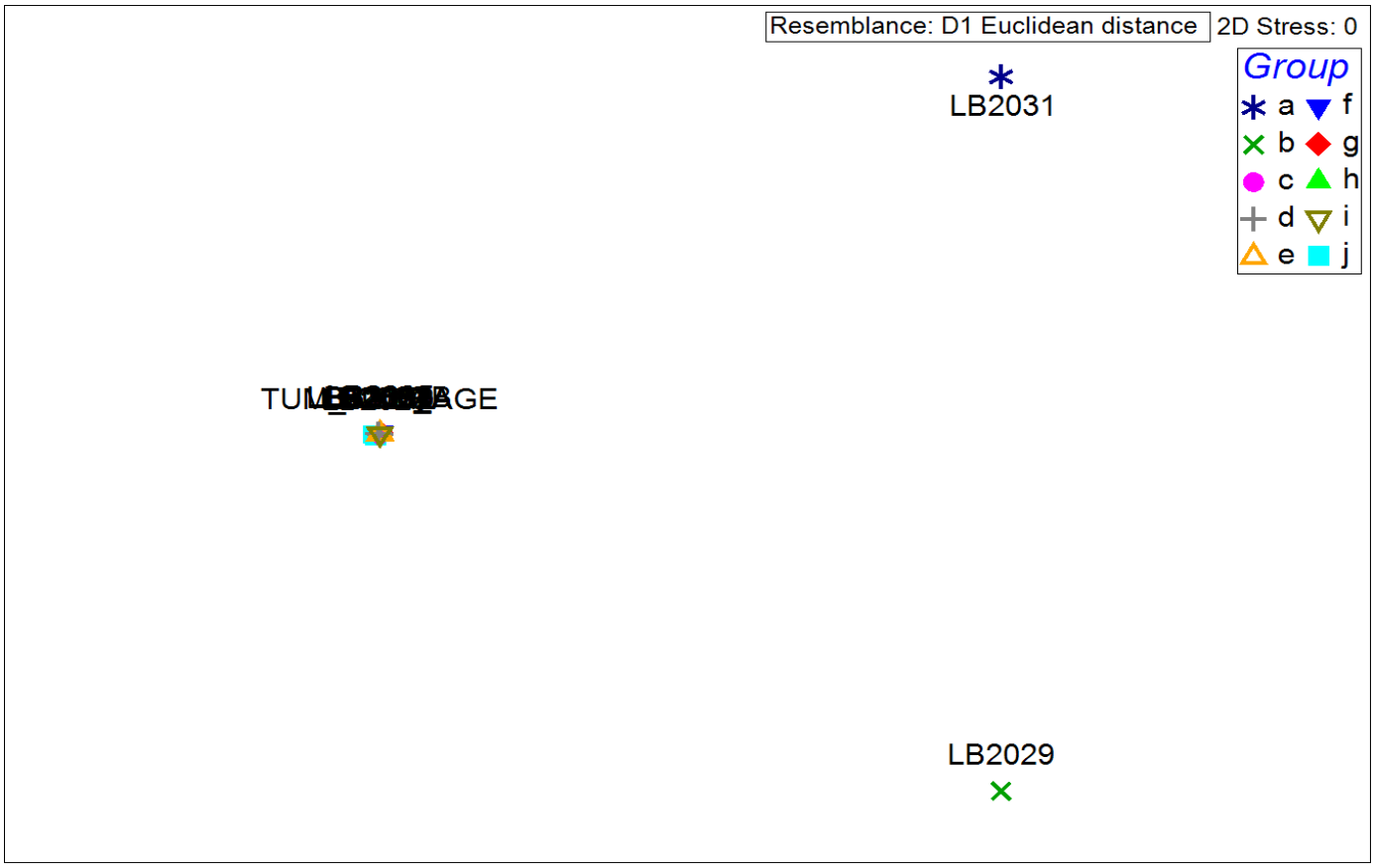
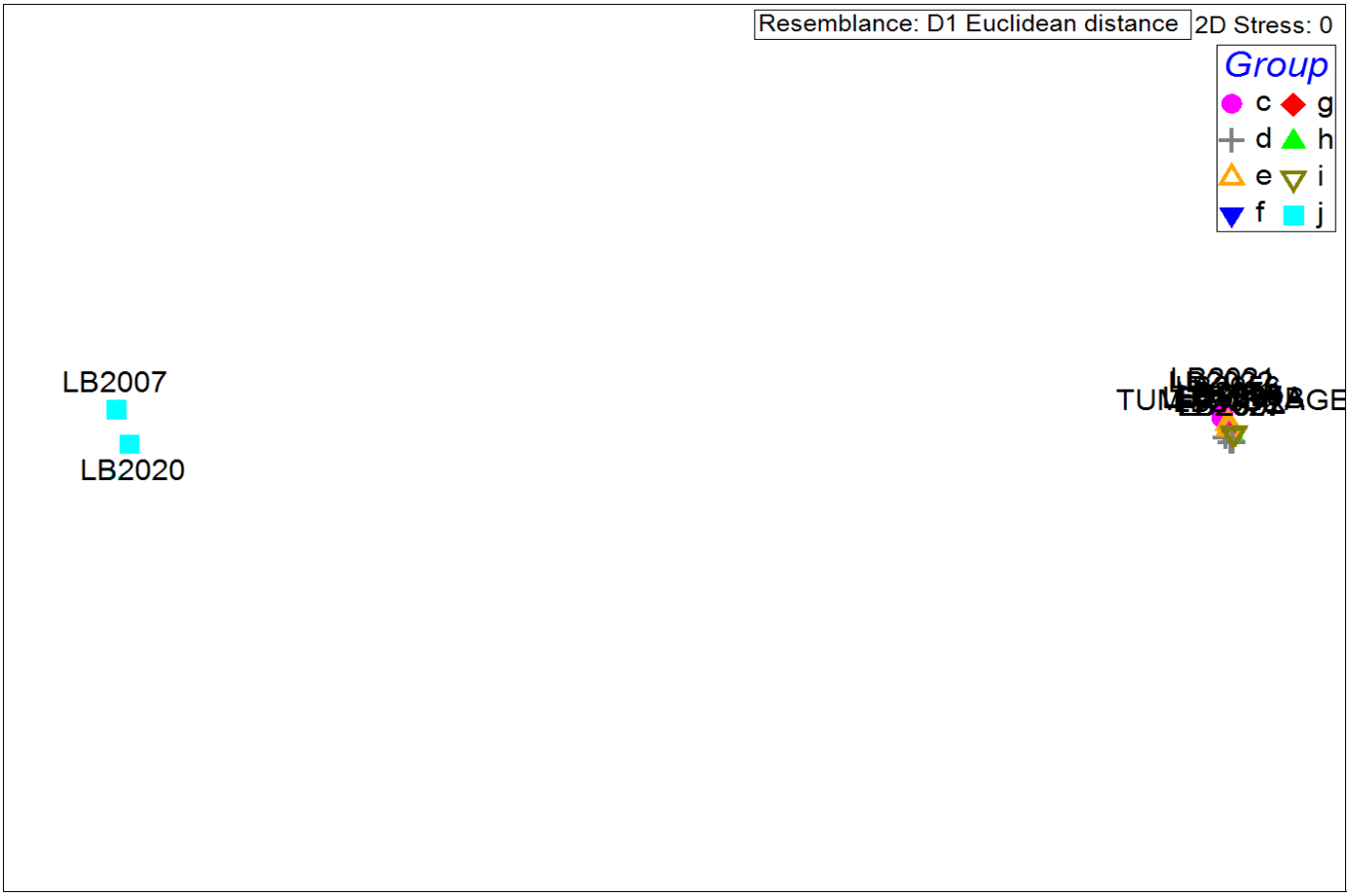


Figure 5. a) MDS plot of PS50 with the benchmark replicates (TUM AVERAGE) averaged; b) a subset of cluster groups c through j; and c) a subset of cluster groups c through f.

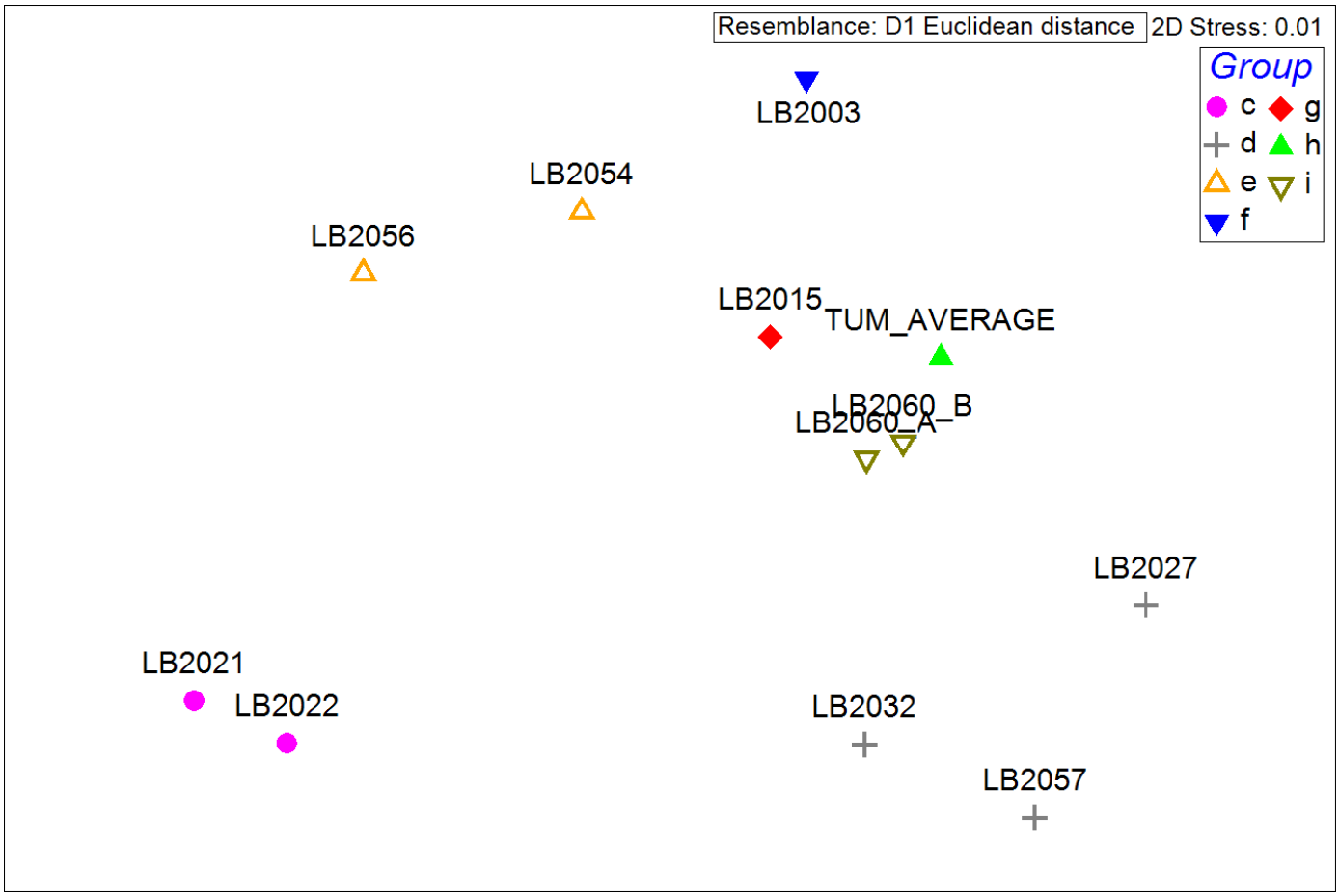
a)



b)



c)



Due to a problem with the distributed workbook formulas, the data received was merged independently before further analyses were performed. Statistical analysis is based on the results presented in Appendix 2.

The cluster analysis separates the laboratories in to 10 SIMPROF cluster groups; 5 of these groups each comprise a single laboratory.

Cluster group a is formed of a single laboratory (LB2031). Figure 2 shows that LB2031 starts recording at phi level 1.5 with a subsequent sharp rise in the percentage of particles present between 1.5 and 3.5. This is supported by the z-score results in Table 2 where the phi intervals between 1 to 1.5 and 2 to 4 differ from other laboratories.

Cluster group b is formed of a single laboratory (LB2029). Figure 2 shows that LB2029 recorded a higher cumulative proportion of particles between phi intervals 0 and 3. This is supported by the z-score results in Table 2 where the phi intervals between 0 and 1, and 1.5 to 2 differ from other laboratories.

Cluster groups c (LB2021 and LB2022), d (LB2027, LB2032, and LB2057), e (LB2054 and LB2056), f (LB2003), g (LB2015), h (TUM_AVERAGE) and i (LB2060_A and LB2060_B) show a euclidean distance between samples of below 10. Therefore these groups show an increasingly higher degree of similarity. The percentage proportions of both laboratories in group c shows that they recorded less sediment between phi intervals 1 and 1.5 but more between 2 and 2.5. Table 2 shows that all laboratories from group d had z-scores that differed significantly (LB2027 with phi intervals between 4.5 and 7.5; LB2032 at phi interval 11.5; and LB2057 with phi intervals between 11.5 and 13.5) from other laboratories. Differentiation between the remainder of the groups is almost indistinguishable due to

the euclidean distance between the remaining samples being so low. This can also be viewed in figure 5c, which presents the degree of relatedness of the laboratories in cluster groups from c through to i in a MDS plot. The figure depicts that the laboratories with results that are most correlated with the Thomson Unicomarine average are LB2060 and LB2015, as these data points are situated closest to the TUM_AVERAGE point.

Cluster group j comprises two laboratories (LB2007 and LB2020)**.** Both LB2007 and LB2020 account for all of their sediment proportions by phi level 4.5 and 7 respectively. Omitting LB2031, these laboratories reach 100% before any other laboratories. For LB2007, this was due to the methodology used to analyse the sediment.

Appendices

Appendix 1. Final Summary Data sheets as supplied by participating laboratories (arranged by Lab Code).

NMBAQCS - PS Exercise Data Workbook (Page 2 - Final Merged Data Submission)

Return to Thomson Unicomarine Ltd. by 04-04-14

Exercise Code:	**PS50**
LabCode:	**LB2003**
Sample Code:	**PS502003**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume percentage (should equal 100) (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)	**1.7186**
0.50 to 1.00; (500 µm)	**16.0936**
1.00 to 1.50; (353.6 µm)	**31.4120**
1.50 to 2.00; (250 µm)	**29.3640**
2.00 to 2.50; (176.8 µm)	**16.4373**
2.50 to 3.00; (125 µm)	**3.6711**
3.00 to 3.50; (88.39 µm)	**0.0281**
3.50 to 4.00; (62.5 µm)	**0.0000**
4.00 to 4.50; (44.19 µm)	**0.0000**
4.50 to 5.00; (31.25 µm)	**0.0000**
5.00 to 5.50; (22.097 µm)	**0.0000**
5.50 to 6.00; (15.625 µm)	**0.0000**
6.00 to 6.50; (11.049 µm)	**0.0450**
6.50 to 7.00; (7.813 µm)	**0.1596**
7.00 to 7.50; (5.524 µm)	**0.1780**
7.50 to 8.00; (3.906 µm)	**0.1673**
8.00 to 8.50; (2.762 µm)	**0.1591**
8.50 to 9.00; (1.953 µm)	**0.1606**
9.00 to 9.50; (1.381 µm)	**0.1609**
9.50 to 10.00; (0.977 µm)	**0.1327**
10.00 to 10.50; (0.691 µm)	**0.0784**
10.50 to 11.00; (0.488 µm)	**0.0332**
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**

NMBAQCS - PS Exercise Data Workbook (Page 2 - Final Merged Data Submission)	Return to Thomson Unicomarine Ltd. by 04-04-14
Exercise Code:	**PS50**
LabCode:	**LB2007**
Sample Code:	**PS502007**
Phi interval (explicit)	**Total volume percentage (should equal 100)**
+ sieve mesh (theoretical sieves shown in brackets)	**(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)	**0.0010**
0.50 to 1.00; (500 µm)	**0.1270**
1.00 to 1.50; (353.6 µm)	**16.4550**
1.50 to 2.00; (250 µm)	**41.6090**
2.00 to 2.50; (176.8 µm)	**22.0470**
2.50 to 3.00; (125 µm)	**5.7060**
3.00 to 3.50; (88.39 µm)	**1.1960**
3.50 to 4.00; (62.5 µm)	**0.4670**
4.00 to 4.50; (44.19 µm)	**2.2500**
4.50 to 5.00; (31.25 µm)	**0.0000**
5.00 to 5.50; (22.097 µm)	**0.0000**
5.50 to 6.00; (15.625 µm)	**0.0000**
6.00 to 6.50; (11.049 µm)	**0.0000**
6.50 to 7.00; (7.813 µm)	**0.0000**
7.00 to 7.50; (5.524 µm)	**0.0000**
7.50 to 8.00; (3.906 µm)	**0.0000**
8.00 to 8.50; (2.762 µm)	**0.0000**
8.50 to 9.00; (1.953 µm)	**0.0000**
9.00 to 9.50; (1.381 µm)	**0.0000**
9.50 to 10.00; (0.977 µm)	**0.0000**
10.00 to 10.50; (0.691 µm)	**0.0000**
10.50 to 11.00; (0.488 µm)	**0.0000**
11.00 to 11.50; (0.345 µm)	**0.0000**
11.50 to 12.00; (0.244 µm)	**0.0000**
12.00 to 12.50; (0.173 µm)	**0.0000**
12.50 to 13.00; (0.122 µm)	**0.0000**
13.00 to 13.50; (0.086 µm)	**0.0000**

NMBAQCS - PS Exercise Data Workbook (Page 2 - Final Merged Data Submission)

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Exercise Code:	**PS50**
LabCode:	**LB2015**
Sample Code:	**PS502015**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume percentage (should equal 100) (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)	*1.7144*
0.50 to 1.00; (500 µm)	*14.2122*
1.00 to 1.50; (353.6 µm)	*31.1967*
1.50 to 2.00; (250 µm)	*31.9589*
2.00 to 2.50; (176.8 µm)	*15.9744*
2.50 to 3.00; (125 µm)	*2.9389*
3.00 to 3.50; (88.39 µm)	*0.0000*
3.50 to 4.00; (62.5 µm)	*0.0000*
4.00 to 4.50; (44.19 µm)	*0.0000*
4.50 to 5.00; (31.25 µm)	*0.0000*
5.00 to 5.50; (22.097 µm)	*0.0000*
5.50 to 6.00; (15.625 µm)	*0.0000*
6.00 to 6.50; (11.049 µm)	*0.0711*
6.50 to 7.00; (7.813 µm)	*0.2122*
7.00 to 7.50; (5.524 µm)	*0.2633*
7.50 to 8.00; (3.906 µm)	*0.2756*
8.00 to 8.50; (2.762 µm)	*0.3000*
8.50 to 9.00; (1.953 µm)	*0.2600*
9.00 to 9.50; (1.381 µm)	*0.2044*
9.50 to 10.00; (0.977 µm)	*0.1500*
10.00 to 10.50; (0.691 µm)	*0.2644*
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**

NMBAQCS - PS Exercise Data Workbook
(Page 2 - Final Merged Data Submission)

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Exercise Code:	**PS50**
LabCode:	**LB2020**
Sample Code:	**PS502020**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume percentage (should equal 100) (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)	**1.8100**
0.50 to 1.00; (500 µm)	**7.7680**
1.00 to 1.50; (353.6 µm)	**32.1510**
1.50 to 2.00; (250 µm)	**36.3583**
2.00 to 2.50; (176.8 µm)	**15.6135**
2.50 to 3.00; (125 µm)	**4.1899**
3.00 to 3.50; (88.39 µm)	**1.0049**
3.50 to 4.00; (62.5 µm)	**0.3402**
4.00 to 4.50; (44.19 µm)	**0.1439**
4.50 to 5.00; (31.25 µm)	**0.1513**
5.00 to 5.50; (22.097 µm)	**0.0254**
5.50 to 6.00; (15.625 µm)	**0.0000**
6.00 to 6.50; (11.049 µm)	**0.0000**
6.50 to 7.00; (7.813 µm)	**0.0000**
7.00 to 7.50; (5.524 µm)	**0.0000**
7.50 to 8.00; (3.906 µm)	**0.0000**
8.00 to 8.50; (2.762 µm)	**0.0000**
8.50 to 9.00; (1.953 µm)	**0.0000**
9.00 to 9.50; (1.381 µm)	**0.0000**
9.50 to 10.00; (0.977 µm)	**0.0000**
10.00 to 10.50; (0.691 µm)	**0.0000**
10.50 to 11.00; (0.488 µm)	**0.0000**
11.00 to 11.50; (0.345 µm)	**0.0000**
11.50 to 12.00; (0.244 µm)	**0.0000**
12.00 to 12.50; (0.173 µm)	**0.0000**
12.50 to 13.00; (0.122 µm)	**0.0000**
13.00 to 13.50; (0.086 µm)	**0.0000**

NMBAQCS - PS Exercise Data Workbook (Page 2 - Final Merged Data Submission)

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Exercise Code:	**PS50**
LabCode:	**LB2021**
Sample Code:	**PS502021**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume percentage (should equal 100) (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)	**0.3203**
0.50 to 1.00; (500 µm)	**9.0306**
1.00 to 1.50; (353.6 µm)	**28.7919**
1.50 to 2.00; (250 µm)	**36.1708**
2.00 to 2.50; (176.8 µm)	**20.2828**
2.50 to 3.00; (125 µm)	**3.7206**
3.00 to 3.50; (88.39 µm)	**0.0008**
3.50 to 4.00; (62.5 µm)	**0.0000**
4.00 to 4.50; (44.19 µm)	**0.0000**
4.50 to 5.00; (31.25 µm)	**0.0000**
5.00 to 5.50; (22.097 µm)	**0.0000**
5.50 to 6.00; (15.625 µm)	**0.0000**
6.00 to 6.50; (11.049 µm)	**0.0784**
6.50 to 7.00; (7.813 µm)	**0.2694**
7.00 to 7.50; (5.524 µm)	**0.2852**
7.50 to 8.00; (3.906 µm)	**0.2446**
8.00 to 8.50; (2.762 µm)	**0.2176**
8.50 to 9.00; (1.953 µm)	**0.2061**
9.00 to 9.50; (1.381 µm)	**0.1902**
9.50 to 10.00; (0.977 µm)	**0.1353**
10.00 to 10.50; (0.691 µm)	**0.0559**
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**

NMBAQCS - PS Exercise Data Workbook (Page 2 - Final Merged Data Submission)

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Exercise Code:	**PS50**
LabCode:	**LB2022**
Sample Code:	**PS502022**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume percentage (should equal 100) (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)	**0.0044**
0.50 to 1.00; (500 µm)	**8.7033**
1.00 to 1.50; (353.6 µm)	**29.5022**
1.50 to 2.00; (250 µm)	**35.9744**
2.00 to 2.50; (176.8 µm)	**19.4522**
2.50 to 3.00; (125 µm)	**3.7944**
3.00 to 3.50; (88.39 µm)	**0.0300**
3.50 to 4.00; (62.5 µm)	**0.0000**
4.00 to 4.50; (44.19 µm)	**0.0000**
4.50 to 5.00; (31.25 µm)	**0.0000**
5.00 to 5.50; (22.097 µm)	**0.0656**
5.50 to 6.00; (15.625 µm)	**0.0833**
6.00 to 6.50; (11.049 µm)	**0.1044**
6.50 to 7.00; (7.813 µm)	**0.1456**
7.00 to 7.50; (5.524 µm)	**0.2256**
7.50 to 8.00; (3.906 µm)	**0.2844**
8.00 to 8.50; (2.762 µm)	**0.3078**
8.50 to 9.00; (1.953 µm)	**0.3444**
9.00 to 9.50; (1.381 µm)	**0.4111**
9.50 to 10.00; (0.977 µm)	**0.3800**
10.00 to 10.50; (0.691 µm)	**0.1767**
10.50 to 11.00; (0.488 µm)	**0.0011**
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**

NMBAQCS - PS Exercise Data Workbook
(Page 2 - Final Merged Data Submission)

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Exercise Code:	**PS50**
LabCode:	**LB2027**
Sample Code:	**PS502027**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume % (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)	0.4944
0.50 to 1.00; (500 µm)	12.2289
1.00 to 1.50; (353.6 µm)	33.4422
1.50 to 2.00; (250 µm)	32.9167
2.00 to 2.50; (176.8 µm)	12.0744
2.50 to 3.00; (125 µm)	0.9522
3.00 to 3.50; (88.39 µm)	0.0000
3.50 to 4.00; (62.5 µm)	0.1044
4.00 to 4.50; (44.19 µm)	0.9044
4.50 to 5.00; (31.25 µm)	1.0078
5.00 to 5.50; (22.097 µm)	0.7489
5.50 to 6.00; (15.625 µm)	0.6878
6.00 to 6.50; (11.049 µm)	0.7478
6.50 to 7.00; (7.813 µm)	0.7133
7.00 to 7.50; (5.524 µm)	0.5833
7.50 to 8.00; (3.906 µm)	0.4589
8.00 to 8.50; (2.762 µm)	0.3989
8.50 to 9.00; (1.953 µm)	0.3589
9.00 to 9.50; (1.381 µm)	0.3200
9.50 to 10.00; (0.977 µm)	0.3044
10.00 to 10.50; (0.691 µm)	0.3022
10.50 to 11.00; (0.488 µm)	0.2456
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

NMBAQCS - PS Exercise Data Workbook (Page 2 - Final Merged Data Submission)

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Exercise Code:	**PS50**
LabCode:	**LB2029**
Sample Code:	**PS502029**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume percentage (should equal 100) (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)	**29.6033**
0.50 to 1.00; (500 µm)	**55.5949**
1.00 to 1.50; (353.6 µm)	**55.1151**
1.50 to 2.00; (250 µm)	**26.0294**
2.00 to 2.50; (176.8 µm)	**4.9816**
2.50 to 3.00; (125 µm)	**0.0000**
3.00 to 3.50; (88.39 µm)	**0.0000**
3.50 to 4.00; (62.5 µm)	**0.0000**
4.00 to 4.50; (44.19 µm)	**0.0000**
4.50 to 5.00; (31.25 µm)	**0.0000**
5.00 to 5.50; (22.097 µm)	**0.0000**
5.50 to 6.00; (15.625 µm)	**0.0000**
6.00 to 6.50; (11.049 µm)	**0.0000**
6.50 to 7.00; (7.813 µm)	**0.0000**
7.00 to 7.50; (5.524 µm)	**0.0000**
7.50 to 8.00; (3.906 µm)	**0.0000**
8.00 to 8.50; (2.762 µm)	**0.0000**
8.50 to 9.00; (1.953 µm)	**0.0000**
9.00 to 9.50; (1.381 µm)	**0.0000**
9.50 to 10.00; (0.977 µm)	**0.0000**
10.00 to 10.50; (0.691 µm)	**0.0000**
10.50 to 11.00; (0.488 µm)	**0.0000**
11.00 to 11.50; (0.345 µm)	**0.0000**
11.50 to 12.00; (0.244 µm)	**0.0000**
12.00 to 12.50; (0.173 µm)	**0.0000**
12.50 to 13.00; (0.122 µm)	**0.0000**
13.00 to 13.50; (0.086 µm)	**0.0000**

NMBAQCS - PS Exercise Data Workbook
(Page 2 - Final Merged Data Submission)

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Exercise Code:	**PS50**
LabCode:	**LB2031**
Sample Code:	**PS502031**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume percentage (should equal 100) (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)	*0.0500*
1.50 to 2.00; (250 µm)	*18.7300*
2.00 to 2.50; (176.8 µm)	*44.9100*
2.50 to 3.00; (125 µm)	*18.4300*
3.00 to 3.50; (88.39 µm)	*5.3700*
3.50 to 4.00; (62.5 µm)	*1.0800*
4.00 to 4.50; (44.19 µm)	*0.3700*
4.50 to 5.00; (31.25 µm)	*0.4000*
5.00 to 5.50; (22.097 µm)	**0.0000**
5.50 to 6.00; (15.625 µm)	**0.0000**
6.00 to 6.50; (11.049 µm)	**0.0000**
6.50 to 7.00; (7.813 µm)	**0.0000**
7.00 to 7.50; (5.524 µm)	**0.0000**
7.50 to 8.00; (3.906 µm)	**0.0000**
8.00 to 8.50; (2.762 µm)	**0.0000**
8.50 to 9.00; (1.953 µm)	**0.0000**
9.00 to 9.50; (1.381 µm)	**0.0000**
9.50 to 10.00; (0.977 µm)	**0.0000**
10.00 to 10.50; (0.691 µm)	**0.0000**
10.50 to 11.00; (0.488 µm)	**0.0000**
11.00 to 11.50; (0.345 µm)	**0.0000**
11.50 to 12.00; (0.244 µm)	**0.0000**
12.00 to 12.50; (0.173 µm)	**0.0000**
12.50 to 13.00; (0.122 µm)	**0.0000**
13.00 to 13.50; (0.086 µm)	**0.0000**

NMBAQCS - PS Exercise Data Workbook
(Page 2 - Final Merged Data Submission)

Return to Thomson Unicomarine Ltd. by 04-04-14

Exercise Code:	**PS50**
LabCode:	**LB2032**
Sample Code:	**PS502032**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume percentage (should equal 100) (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)	**1.42**
0.50 to 1.00; (500 µm)	**9.66**
1.00 to 1.50; (353.6 µm)	**32.43**
1.50 to 2.00; (250 µm)	**33.13**
2.00 to 2.50; (176.8 µm)	**13.57**
2.50 to 3.00; (125 µm)	**3.68**
3.00 to 3.50; (88.39 µm)	**1.39**
3.50 to 4.00; (62.5 µm)	**0.67**
4.00 to 4.50; (44.19 µm)	**0.32**
4.50 to 5.00; (31.25 µm)	**0.19**
5.00 to 5.50; (22.097 µm)	**0.11**
5.50 to 6.00; (15.625 µm)	**0.14**
6.00 to 6.50; (11.049 µm)	**0.15**
6.50 to 7.00; (7.813 µm)	**0.19**
7.00 to 7.50; (5.524 µm)	**0.24**
7.50 to 8.00; (3.906 µm)	**0.26**
8.00 to 8.50; (2.762 µm)	**0.26**
8.50 to 9.00; (1.953 µm)	**0.28**
9.00 to 9.50; (1.381 µm)	**0.33**
9.50 to 10.00; (0.977 µm)	**0.34**
10.00 to 10.50; (0.691 µm)	**0.31**
10.50 to 11.00; (0.488 µm)	**0.26**
11.00 to 11.50; (0.345 µm)	**0.23**
11.50 to 12.00; (0.244 µm)	**0.18**
12.00 to 12.50; (0.173 µm)	**0.12**
12.50 to 13.00; (0.122 µm)	**0.08**
>13	**0.08**

NMBAQCS - PS Exercise Data Workbook
(Page 2 - Final Merged Data Submission)

Return to Thomson Unicomarine Ltd. by 04-04-14

Exercise Code:	**PS50**
LabCode:	**LB2054**
Sample Code:	**PS502054**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume percentage (should equal 100) (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)	**1.8534**
0.50 to 1.00; (500 µm)	**14.0328**
1.00 to 1.50; (353.6 µm)	**28.9542**
1.50 to 2.00; (250 µm)	**30.8639**
2.00 to 2.50; (176.8 µm)	**17.6536**
2.50 to 3.00; (125 µm)	**4.0592**
3.00 to 3.50; (88.39 µm)	**0.0033**
3.50 to 4.00; (62.5 µm)	**0.0000**
4.00 to 4.50; (44.19 µm)	**0.0000**
4.50 to 5.00; (31.25 µm)	**0.0000**
5.00 to 5.50; (22.097 µm)	**0.0000**
5.50 to 6.00; (15.625 µm)	**0.0002**
6.00 to 6.50; (11.049 µm)	**0.0582**
6.50 to 7.00; (7.813 µm)	**0.2510**
7.00 to 7.50; (5.524 µm)	**0.3518**
7.50 to 8.00; (3.906 µm)	**0.4015**
8.00 to 8.50; (2.762 µm)	**0.4236**
8.50 to 9.00; (1.953 µm)	**0.4159**
9.00 to 9.50; (1.381 µm)	**0.3506**
9.50 to 10.00; (0.977 µm)	**0.2437**
10.00 to 10.50; (0.691 µm)	**0.0795**
10.50 to 11.00; (0.488 µm)	**0.0037**
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**

NMBAQCS - PS Exercise Data Workbook
(Page 2 - Final Merged Data Submission)

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Exercise Code:	**PS50**
LabCode:	**LB2056**
Sample Code:	**PS502056**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume percentage (should equal 100) (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)	**1.3493**
0.50 to 1.00; (500 µm)	**12.4737**
1.00 to 1.50; (353.6 µm)	**27.3197**
1.50 to 2.00; (250 µm)	**31.7503**
2.00 to 2.50; (176.8 µm)	**18.4123**
2.50 to 3.00; (125 µm)	**5.4823**
3.00 to 3.50; (88.39 µm)	**0.0850**
3.50 to 4.00; (62.5 µm)	**0.0000**
4.00 to 4.50; (44.19 µm)	**0.0000**
4.50 to 5.00; (31.25 µm)	**0.0000**
5.00 to 5.50; (22.097 µm)	**0.0000**
5.50 to 6.00; (15.625 µm)	**0.0000**
6.00 to 6.50; (11.049 µm)	**0.1057**
6.50 to 7.00; (7.813 µm)	**0.2903**
7.00 to 7.50; (5.524 µm)	**0.3680**
7.50 to 8.00; (3.906 µm)	**0.3840**
8.00 to 8.50; (2.762 µm)	**0.0000**
8.50 to 9.00; (1.953 µm)	**0.7513**
9.00 to 9.50; (1.381 µm)	**0.0000**
9.50 to 10.00; (0.977 µm)	**0.6967**
10.00 to 10.50; (0.691 µm)	**0.5303**
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**

NMBAQCS - PS Exercise Data Workbook
(Page 2 - Final Merged Data Submission)

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Exercise Code:	**PS50**
LabCode:	**LB2057**
Sample Code:	**PS502057**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	**Total volume percentage (should equal 100) (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)	**0.0890**
0.50 to 1.00; (500 µm)	**9.8219**
1.00 to 1.50; (353.6 µm)	**34.4226**
1.50 to 2.00; (250 µm)	**32.9077**
2.00 to 2.50; (176.8 µm)	**12.6769**
2.50 to 3.00; (125 µm)	**3.4318**
3.00 to 3.50; (88.39 µm)	**1.1013**
3.50 to 4.00; (62.5 µm)	**0.4418**
4.00 to 4.50; (44.19 µm)	**0.2689**
4.50 to 5.00; (31.25 µm)	**0.1591**
5.00 to 5.50; (22.097 µm)	**0.2168**
5.50 to 6.00; (15.625 µm)	**0.1694**
6.00 to 6.50; (11.049 µm)	**0.1853**
6.50 to 7.00; (7.813 µm)	**0.2602**
7.00 to 7.50; (5.524 µm)	**0.3270**
7.50 to 8.00; (3.906 µm)	**0.3546**
8.00 to 8.50; (2.762 µm)	**0.3620**
8.50 to 9.00; (1.953 µm)	**0.3888**
9.00 to 9.50; (1.381 µm)	**0.3877**
9.50 to 10.00; (0.977 µm)	**0.3274**
10.00 to 10.50; (0.691 µm)	**0.2718**
10.50 to 11.00; (0.488 µm)	**0.2672**
11.00 to 11.50; (0.345 µm)	**0.2863**
11.50 to 12.00; (0.244 µm)	**0.2877**
12.00 to 12.50; (0.173 µm)	**0.2498**
12.50 to 13.00; (0.122 µm)	**0.2008**
13.00 to 13.50; (0.086 µm)	**0.1362**

NMBAQCS - PS Exercise Data Workbook (Page 2 - Final Merged Data Submission)

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Exercise Code:	**PS50_A**
LabCode:	**LB2060**
Sample Code:	**PS50_A2060**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Total volume percentage (should equal 100) (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)	**1.3006**
0.50 to 1.00; (500 µm)	**13.6984**
1.00 to 1.50; (353.6 µm)	**32.5768**
1.50 to 2.00; (250 µm)	**33.5259**
2.00 to 2.50; (176.8 µm)	**15.2448**
2.50 to 3.00; (125 µm)	**1.8869**
3.00 to 3.50; (88.39 µm)	**0.0000**
3.50 to 4.00; (62.5 µm)	**0.0000**
4.00 to 4.50; (44.19 µm)	**0.0000**
4.50 to 5.00; (31.25 µm)	**0.0000**
5.00 to 5.50; (22.097 µm)	**0.0000**
5.50 to 6.00; (15.625 µm)	**0.0000**
6.00 to 6.50; (11.049 µm)	**0.0156**
6.50 to 7.00; (7.813 µm)	**0.1806**
7.00 to 7.50; (5.524 µm)	**0.1948**
7.50 to 8.00; (3.906 µm)	**0.1907**
8.00 to 8.50; (2.762 µm)	**0.2085**
8.50 to 9.00; (1.953 µm)	**0.2351**
9.00 to 9.50; (1.381 µm)	**0.2472**
9.50 to 10.00; (0.977 µm)	**0.2336**
10.00 to 10.50; (0.691 µm)	**0.1939**
10.50 to 11.00; (0.488 µm)	**0.0667**
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**

NMBAQCS - PS Exercise Data Workbook (Page 2 - Final Merged Data Submission)

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Exercise Code:	**PS50_B**
LabCode:	**LB2060**
Sample Code:	**PS50_B2060**

Phi interval (explicit) + sieve mesh (theoretical sieves shown in brackets)	Total volume percentage (should equal 100) (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)	**1.4402**
0.50 to 1.00; (500 µm)	**13.9478**
1.00 to 1.50; (353.6 µm)	**32.6868**
1.50 to 2.00; (250 µm)	**33.4633**
2.00 to 2.50; (176.8 µm)	**15.1748**
2.50 to 3.00; (125 µm)	**1.8712**
3.00 to 3.50; (88.39 µm)	**0.0000**
3.50 to 4.00; (62.5 µm)	**0.0000**
4.00 to 4.50; (44.19 µm)	**0.0000**
4.50 to 5.00; (31.25 µm)	**0.0000**
5.00 to 5.50; (22.097 µm)	**0.0000**
5.50 to 6.00; (15.625 µm)	**0.0000**
6.00 to 6.50; (11.049 µm)	**0.0147**
6.50 to 7.00; (7.813 µm)	**0.1831**
7.00 to 7.50; (5.524 µm)	**0.2021**
7.50 to 8.00; (3.906 µm)	**0.1937**
8.00 to 8.50; (2.762 µm)	**0.2004**
8.50 to 9.00; (1.953 µm)	**0.2103**
9.00 to 9.50; (1.381 µm)	**0.2033**
9.50 to 10.00; (0.977 µm)	**0.1712**
10.00 to 10.50; (0.691 µm)	**0.0371**
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 2. Percentage proportion of participant phi-intervals using independently merged data.

Laboratory	LB2003	LB2007	LB2015	LB2020	LB2021	LB2022	LB2027	LB2029	LB2031	LB2032	LB2054	LB2056	LB2057	LB2060_A	LB2060_B
Phi-interval															
-6.50 to -6.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-6.00 to -5.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-5.50 to -5.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-5.00 to -4.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-4.50 to -4.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-4.00 to -3.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-3.50 to -3.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-3.00 to -2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-2.50 to -2.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-2.00 to -1.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1.50 to -1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1.00 to -0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-0.50 to 0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.00 to 0.50	1.718556	0.001113	1.714444	1.216327	0.320333	0.004444	0.494444	16.97751	0	1.422987	1.853382	1.349333	0.088993	1.3005689	1.4401801
0.50 to 1.00	16.09356	0.141334	14.21222	5.201574	9.030556	8.703333	12.22889	31.8837	0	9.657892	14.03282	12.47367	9.821882	13.698421	13.947787
1.00 to 1.50	31.412	18.31223	31.19667	21.80012	28.79189	29.50222	33.44222	31.60852	0.055966	32.42908	28.95416	27.31967	34.42258	32.576825	32.686802
1.50 to 2.00	29.364	46.30528	31.95889	44.60875	36.17078	35.97444	32.91667	14.92785	20.96485	33.13185	30.86393	31.75033	32.90766	33.525948	33.463349
2.00 to 2.50	16.43733	24.53538	15.97444	17.36663	20.28278	19.45222	12.07444	2.856972	50.26864	13.57416	17.65358	18.41233	12.67688	15.244761	15.174801
2.50 to 3.00	3.671111	6.350019	2.938889	6.037368	3.720556	3.794444	0.952222	0	20.62906	3.675314	4.059153	5.482333	3.431802	1.8868679	1.8712359
3.00 to 3.50	0.028111	1.330989	0	1.782726	0.000778	0.03	0	0	6.010745	1.387649	0.003267	0.085	1.101282	0	0
3.50 to 4.00	0	0.519709	0	0.838645	0	0	0.104444	0	1.208865	0.673758	0	0	0.441843	0	0
4.00 to 4.50	0	2.503951	0	0.41734	0	0	0.904444	0	0.414148	0.321796	0	0	0.268895	0	0
4.50 to 5.00	0	0	0	0.32184	0	0	1.007778	0	0.447728	0.191075	0	0	0.15911	0	0
5.00 to 5.50	0	0	0	0.113913	0	0.065556	0.748889	0	0	0.105593	0	0	0.216809	0	0
5.50 to 6.00	0	0	0	0.167458	0	0.083333	0.687778	0	0	0.135759	0.000212	0	0.169422	0	0
6.00 to 6.50	0.045	0	0.071111	0.124883	0.078444	0.104444	0.747778	0	0	0.145793	0.058223	0.105667	0.185344	0.0156243	0.0147064
6.50 to 7.00	0.159556	0	0.212222	0.002421	0.269444	0.145556	0.713333	0	0	0.191031	0.251049	0.290333	0.260231	0.1805624	0.1831089
7.00 to 7.50	0.178	0	0.263333	0	0.285222	0.225556	0.583333	0	0	0.241308	0.351806	0.368	0.327038	0.1948018	0.2021162
7.50 to 8.00	0.167333	0	0.275556	0	0.244556	0.284444	0.458889	0	0	0.261441	0.401481	0.384	0.354572	0.190681	0.1936663
8.00 to 8.50	0.159111	0	0.3	0	0.217556	0.307778	0.398889	0	0	0.256424	0.423554	0	0.36201	0.2084923	0.2003642
8.50 to 9.00	0.160556	0	0.26	0	0.206111	0.344444	0.358889	0	0	0.281596	0.415945	0.751333	0.388786	0.2350833	0.2102772
9.00 to 9.50	0.160889	0	0.204444	0	0.190222	0.411111	0.32	0	0	0.326879	0.350557	0	0.387741	0.247248	0.2033323
9.50 to 10.00	0.132667	0	0.15	0	0.135333	0.38	0.304444	0	0	0.336935	0.243689	0.696667	0.327427	0.2335608	0.1711543
10.00 to 10.50	0.078444	0	0.264444	0	0.055889	0.176667	0.302222	0	0	0.306768	0.0795	0.530333	0.271774	0.193869	0.0371184
10.50 to 11.00	0.033222	0	0	0	0	0.001111	0.245556	0	0	0.26153	0.003689	0	0.267191	0.0666851	0
11.00 to 11.50	0	0	0	0	0	0	0	0	0	0.226347	0	0	0.286273	0	0
11.50 to 12.00	0	0	0	0	0	0	0	0	0	0.17607	0	0	0.287652	0	0
12.00 to 12.50	0	0	0	0	0	0	0	0	0	0.122237	0	0	0.249815	0	0
12.50 to 13.00	0	0	0	0	0	0	0	0	0	0.082996	0	0	0.20082	0	0
13.00 to 13.50	0	0	0	0	0	0	0	0	0	0.075729	0	0	0.136168	0	0

Appendix 3. Z-score calculations when data from all participating laboratories are included in mean and standard deviation calculations.

	0.00 to 0.50	z-score	0.50 to 1.00	z-score	1.00 to 1.50	z-score	1.50 to 2.00	z-score	2.00 to 2.50	z-score
TUM AVERAGE	1.548	-0.116	14.533	0.441	32.309	0.573	32.273	-0.033	14.744	-0.356
LB2003	1.719	-0.075	16.094	0.649	31.412	0.471	29.364	-0.413	16.437	-0.189
LB2007	0.001	-0.483	0.141	-1.479	18.312	-1.020	46.305	1.801	24.535	0.613
LB2015	1.714	-0.076	14.212	0.398	31.197	0.447	31.959	-0.074	15.974	-0.235
LB2020	1.216	-0.194	5.202	-0.804	21.800	-0.623	44.609	1.579	17.367	-0.097
LB2021	0.320	-0.408	9.031	-0.293	28.792	0.173	36.171	0.476	20.283	0.192
LB2022	0.004	-0.483	8.703	-0.337	29.502	0.254	35.974	0.451	19.452	0.110
LB2027	0.494	-0.366	12.229	0.134	33.442	0.702	32.917	0.051	12.074	-0.621
LB2029	16.978	3.556	31.884	2.755	31.609	0.494	14.928	-2.300	2.857	-1.533
LB2031	0.000	-0.484	0.000	-1.498	0.056	-3.099	20.965	-1.511	50.269	3.160
LB2032	1.423	-0.145	9.658	-0.209	32.429	0.587	33.132	0.079	13.574	-0.472
LB2054	1.853	-0.043	14.033	0.374	28.954	0.191	30.864	-0.217	17.654	-0.068
LB2056	1.349	-0.163	12.474	0.166	27.320	0.005	31.750	-0.101	18.412	0.007
LB2057	0.089	-0.463	9.822	-0.187	34.423	0.814	32.908	0.050	12.677	-0.561
LB2060_A	1.301	-0.174	13.698	0.330	32.577	0.604	33.526	0.131	15.245	-0.307
LB2060_B	1.44018	-0.14106	13.94779	0.362891	32.6868	0.61637	33.46335	0.122425	15.1748	-0.31366
Mean	2.033		11.227		27.273		32.527		18.34361	
St. Dev	4.203		7.497		8.783		7.652		10.10273	

	2.50 to 3.00	z-score	3.00 to 3.50	z-score	3.50 to 4.00	z-score	4.00 to 4.50	z-score	4.50 to 5.00	z-score
TUM AVERAGE	2.030	-0.572	0.000	-0.531	0.020	-0.641	0.608	0.401	0.639434	1.612177
LB2003	3.671	-0.228	0.028	-0.513	0.000	-0.694	0.000	-0.527	0	-0.50259
LB2007	6.350	0.333	1.331	0.310	0.520	0.639	2.504	3.296	0	-0.50259
LB2015	2.939	-0.381	0.000	-0.531	0.000	-0.694	0.000	-0.527	0	-0.50259
LB2020	6.037	0.268	1.783	0.596	0.839	1.457	0.417	0.110	0.32184	0.561814
LB2021	3.721	-0.218	0.001	-0.531	0.000	-0.694	0.000	-0.527	0	-0.50259
LB2022	3.794	-0.202	0.030	-0.512	0.000	-0.694	0.000	-0.527	0	-0.50259
LB2027	0.952	-0.798	0.000	-0.531	0.104	-0.426	0.904	0.854	1.007778	2.830382
LB2029	0.000	-0.997	0.000	-0.531	0.000	-0.694	0.000	-0.527	0	-0.50259
LB2031	20.629	3.326	6.011	3.270	1.209	2.406	0.414	0.106	0.447728	0.978157
LB2032	3.675	-0.227	1.388	0.346	0.674	1.034	0.322	-0.035	0.191075	0.129343
LB2054	4.059	-0.147	0.003	-0.529	0.000	-0.694	0.000	-0.527	0	-0.50259
LB2056	5.482	0.152	0.085	-0.477	0.000	-0.694	0.000	-0.527	0	-0.50259
LB2057	3.432	-0.278	1.101	0.165	0.442	0.439	0.269	-0.116	0.15911	0.023624
LB2060_A	1.887	-0.602	0.000	-0.531	0.000	-0.694	0.000	-0.527	0	-0.50259
LB2060_B	1.871236	-0.60519	0	-0.53125	0	-0.69375	0	-0.52675	0	-0.50259
Mean	4.759224		0.840039		0.270519		0.345041		0.151966	
St. Dev	4.77207		1.581259		0.389937		0.655032		0.302366	

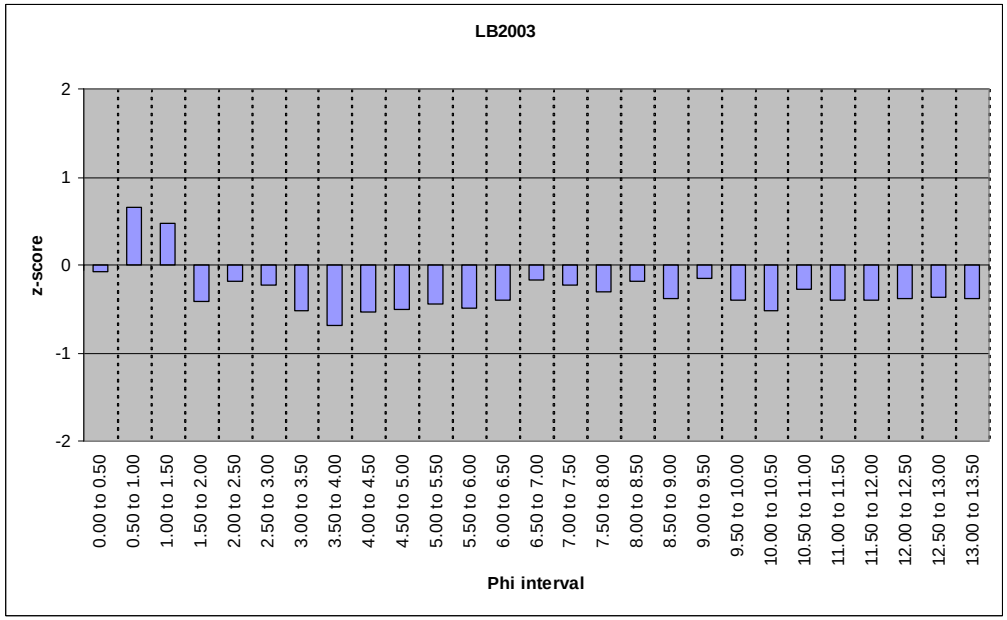
	5.00 to 5.50	z-score	5.50 to 6.00	z-score	6.00 to 6.50	z-score	6.50 to 7.00	z-score	7.00 to 7.50	z-score
TUM AVERAGE	0.291711	1.009386	0.170311	0.453931	0.252989	0.714634	0.291845	0.558489	0.236067	0.123343
LB2003	0	-0.44561	0	-0.49516	0.045	-0.40441	0.159556	-0.17505	0.178	-0.22659
LB2007	0	-0.44561	0	-0.49516	0	-0.64653	0	-1.05977	0	-1.29931
LB2015	0	-0.44561	0	-0.49516	0.071111	-0.26393	0.212222	0.116988	0.263333	0.287664
LB2020	0.113913	0.122566	0.167458	0.438029	0.124883	0.025386	0.002421	-1.04635	0	-1.29931
LB2021	0	-0.44561	0	-0.49516	0.078444	-0.22447	0.269444	0.434282	0.285222	0.419577
LB2022	0.065556	-0.11863	0.083333	-0.03077	0.104444	-0.08458	0.145556	-0.25268	0.225556	0.059998
LB2027	0.748889	3.289691	0.687778	3.337593	0.747778	3.376753	0.713333	2.895621	0.583333	2.216134
LB2029	0	-0.44561	0	-0.49516	0	-0.64653	0	-1.05977	0	-1.29931
LB2031	0	-0.44561	0	-0.49516	0	-0.64653	0	-1.05977	0	-1.29931
LB2032	0.105593	0.081067	0.135759	0.261385	0.145793	0.137883	0.191031	-0.00052	0.241308	0.154929
LB2054	0	-0.44561	0.000212	-0.49397	0.058223	-0.33327	0.251049	0.332278	0.351806	0.82084
LB2056	0	-0.44561	0	-0.49516	0.105667	-0.07801	0.290333	0.550109	0.368	0.918435
LB2057	0.216809	0.635788	0.169422	0.448974	0.185344	0.350683	0.260231	0.383192	0.327038	0.671578
LB2060_A	0	-0.44561	0	-0.49516	0.015624	-0.56246	0.180562	-0.05856	0.194802	-0.12534
LB2060_B	0	-0.44561	0	-0.49516	0.014706	-0.5674	0.183109	-0.04444	0.202116	-0.08126
Mean	0.08934		0.088854		0.120165		0.191124		0.2156	
St. Dev	0.20049		0.179448		0.185863		0.180344		0.165935	

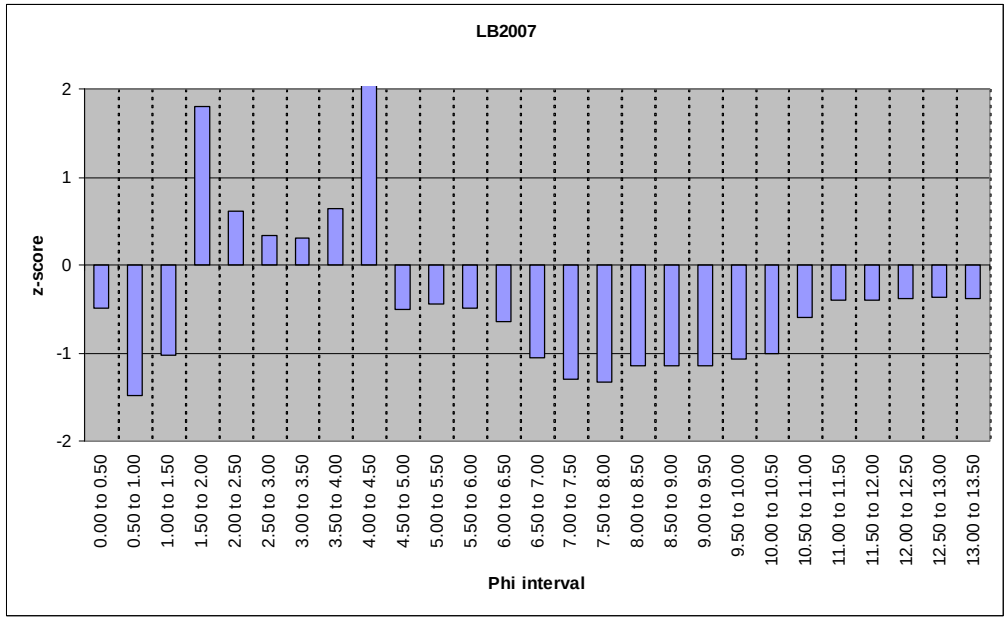
	7.50 to 8.00	z-score	8.00 to 8.50	z-score	8.50 to 9.00	z-score	9.00 to 9.50	z-score	9.50 to 10.00	z-score
TUM AVERAGE	0.053067	-1.0068	0	-1.1515	0	-1.14159	0	-1.14798	0	-1.07053
LB2003	0.167333	-0.3004	0.159111	-0.17762	0.160556	-0.38748	0.160889	-0.15311	0.132667	-0.39439
LB2007	0	-1.33486	0	-1.1515	0	-1.14159	0	-1.14798	0	-1.07053
LB2015	0.275556	0.368637	0.3	0.684733	0.26	0.079597	0.204444	0.11622	0.15	-0.30605
LB2020	0	-1.33486	0	-1.1515	0	-1.14159	0	-1.14798	0	-1.07053
LB2021	0.244556	0.176994	0.217556	0.18011	0.206111	-0.17351	0.190222	0.028276	0.135333	-0.3808
LB2022	0.284444	0.423588	0.307778	0.73234	0.344444	0.47622	0.411111	1.394157	0.38	0.866144
LB2027	0.458889	1.502009	0.398889	1.29001	0.358889	0.544064	0.32	0.830765	0.304444	0.481074
LB2029	0	-1.33486	0	-1.1515	0	-1.14159	0	-1.14798	0	-1.07053
LB2031	0	-1.33486	0	-1.1515	0	-1.14159	0	-1.14798	0	-1.07053
LB2032	0.261441	0.28138	0.256424	0.418018	0.281596	0.181032	0.326879	0.873303	0.336935	0.646661
LB2054	0.401481	1.147114	0.423554	1.440982	0.415945	0.812049	0.350557	1.019717	0.243689	0.171432
LB2056	0.384	1.039043	0	-1.1515	0.751333	2.387319	0	-1.14798	0.696667	2.480039
LB2057	0.354572	0.857117	0.36201	1.064283	0.388786	0.684488	0.387741	1.249647	0.327427	0.598206
LB2060_A	0.190681	-0.15606	0.208492	0.124636	0.235083	-0.03743	0.247248	0.380899	0.233561	0.119815
LB2060_B	0.193666	-0.13761	0.200364	0.074885	0.210277	-0.15394	0.203332	0.109343	0.171154	-0.19824
Mean	0.215925		0.18813		0.243053		0.185649		0.210052	
St. Dev	0.161759		0.163378		0.212908		0.161719		0.196213	

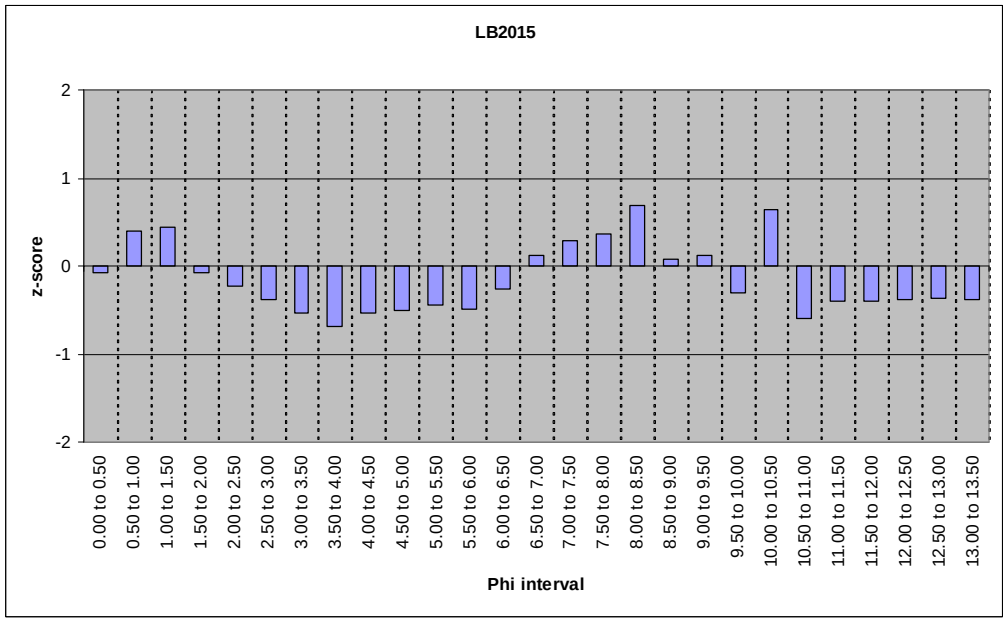
	10.00 to 10.50	z-score	10.50 to 11.00	z-score	11.00 to 11.50	z-score	11.50 to 12.00	z-score	12.00 to 12.50	z-score
TUM AVERAGE	0	-1.01456	0	-0.59835	0	-0.40284	0	-0.39308	0	-0.38098
LB2003	0.078444	-0.52153	0.033222	-0.28173	0	-0.40284	0	-0.39308	0	-0.38098
LB2007	0	-1.01456	0	-0.59835	0	-0.40284	0	-0.39308	0	-0.38098
LB2015	0.264444	0.647509	0	-0.59835	0	-0.40284	0	-0.39308	0	-0.38098
LB2020	0	-1.01456	0	-0.59835	0	-0.40284	0	-0.39308	0	-0.38098
LB2021	0.055889	-0.66329	0	-0.59835	0	-0.40284	0	-0.39308	0	-0.38098
LB2022	0.176667	0.095813	0.001111	-0.58776	0	-0.40284	0	-0.39308	0	-0.38098
LB2027	0.302222	0.884947	0.245556	1.741836	0	-0.40284	0	-0.39308	0	-0.38098
LB2029	0	-1.01456	0	-0.59835	0	-0.40284	0	-0.39308	0	-0.38098
LB2031	0	-1.01456	0	-0.59835	0	-0.40284	0	-0.39308	0	-0.38098
LB2032	0.306768	0.91352	0.26153	1.894075	0.226347	2.087368	0.17607	1.696397	0.122237	1.371389
LB2054	0.0795	-0.51489	0.003689	-0.56319	0	-0.40284	0	-0.39308	0	-0.38098
LB2056	0.530333	2.318656	0	-0.59835	0	-0.40284	0	-0.39308	0	-0.38098
LB2057	0.271774	0.693575	0.267191	1.948026	0.286273	2.746656	0.287652	3.020575	0.249815	3.200329
LB2060_A	0.193869	0.203932	0.066685	0.037172	0	-0.40284	0	-0.39308	0	-0.38098
LB2060_B	0.037118	-0.78127	0	-0.59835	0	-0.40284	0	-0.39308	0	-0.38098
Mean	0.161422		0.062785		0.036616		0.033123		0.026575	
St. Dev	0.159106		0.10493		0.090895		0.084265		0.069755	

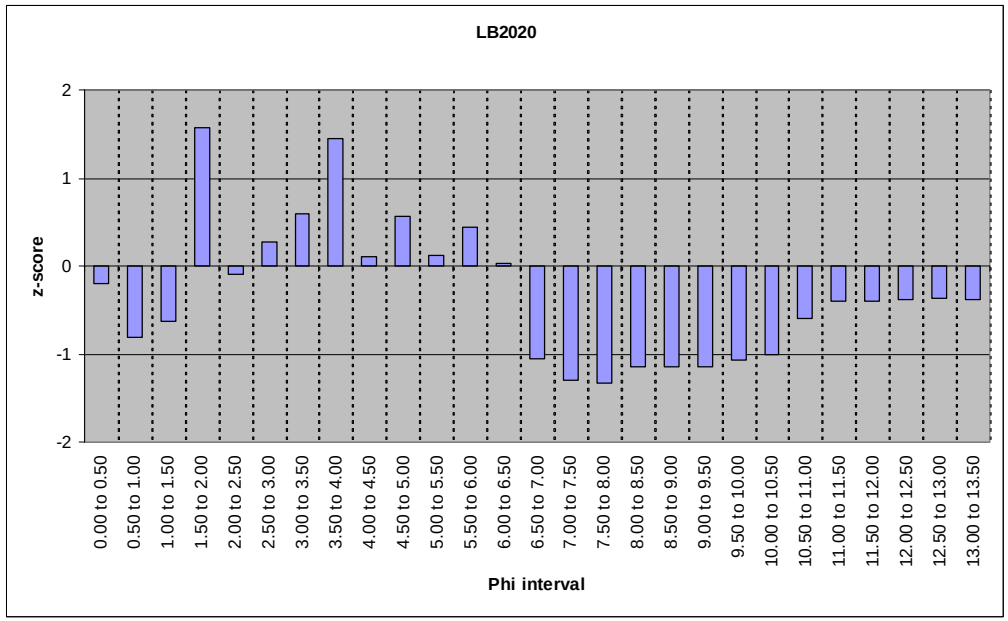
	12.50 to 13.00	z-score	13.00 to 13.50	z-score
TUM AVERAGE	0	-0.3708	0	-0.38819
LB2003	0	-0.3708	0	-0.38819
LB2007	0	-0.3708	0	-0.38819
LB2015	0	-0.3708	0	-0.38819
LB2020	0	-0.3708	0	-0.38819
LB2021	0	-0.3708	0	-0.38819
LB2022	0	-0.3708	0	-0.38819
LB2027	0	-0.3708	0	-0.38819
LB2029	0	-0.3708	0	-0.38819
LB2031	0	-0.3708	0	-0.38819
LB2032	0.082996	1.147265	0.075729	1.554061
LB2054	0	-0.3708	0	-0.38819
LB2056	0	-0.3708	0	-0.38819
LB2057	0.20082	3.302352	0.136168	3.104187
LB2060_A	0	-0.3708	0	-0.38819
LB2060_B	0	-0.3708	0	-0.38819
Mean	0.020273		0.015135	
St. Dev	0.054672		0.03899	

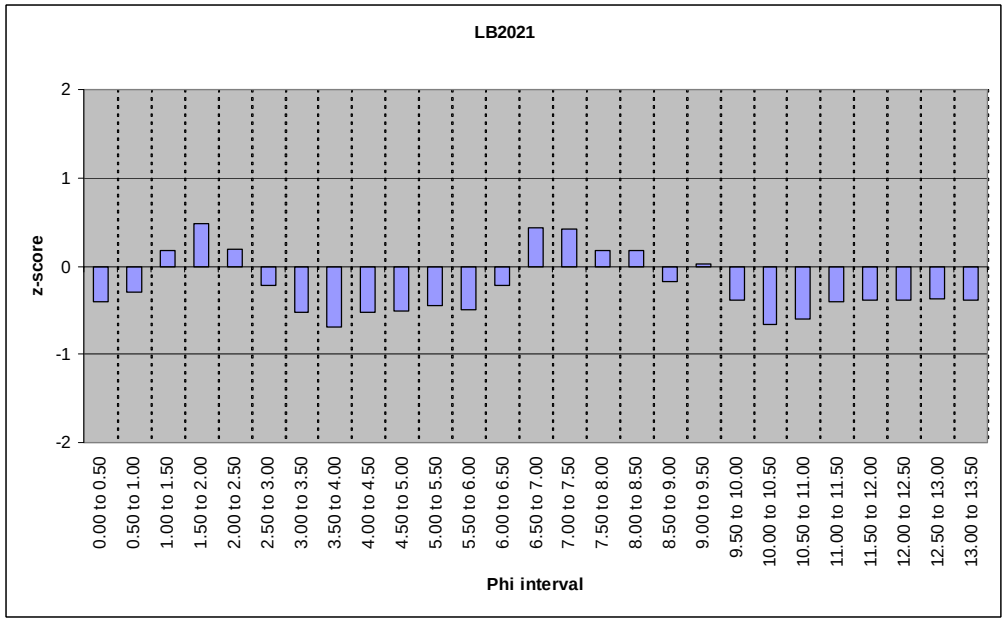
Appendix 4. Summary of z-scores for each half-phi interval for PS50; when data from all participating laboratories included in the mean and standard deviation calculations.










LB2021
z-score
2
1
0
-1
-2
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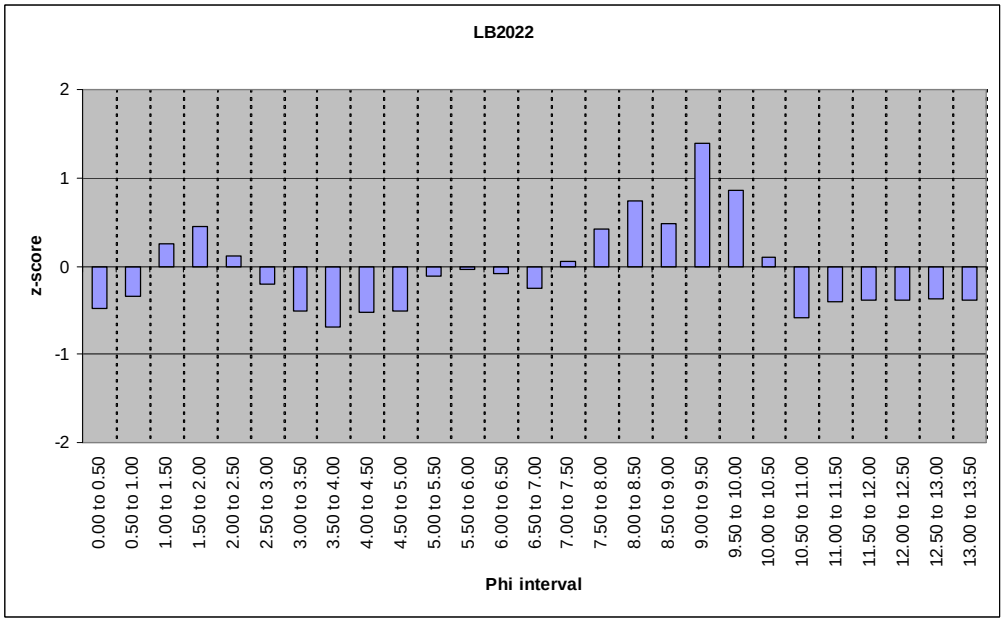
0.50 to 1.00
1.00 to 1.50
1.50 to 2.00
2.00 to 2.50
2.50 to 3.00
3.00 to 3.50
3.50 to 4.00
4.00 to 4.50
4.50 to 5.00
5.00 to 5.50
5.50 to 6.00
6.00 to 6.50
6.50 to 7.00
7.00 to 7.50
7.50 to 8.00
8.00 to 8.50
8.50 to 9.00
9.00 to 9.50
9.50 to 10.00
10.00 to 10.50
10.50 to 11.00
11.00 to 11.50
11.50 to 12.00
12.00 to 12.50
12.50 to 13.00
13.00 to 13.50
Phi interval


LB2022
z-score
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0
-1
-2
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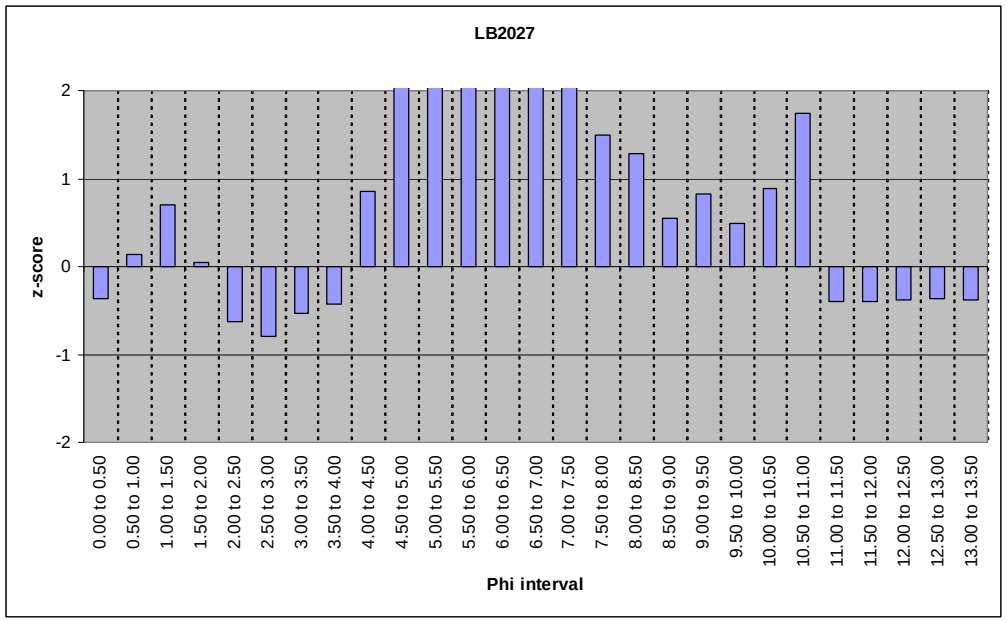
0.50 to 1.00
1.00 to 1.50
1.50 to 2.00
2.00 to 2.50
2.50 to 3.00
3.00 to 3.50
3.50 to 4.00
4.00 to 4.50
4.50 to 5.00
5.00 to 5.50
5.50 to 6.00
6.00 to 6.50
6.50 to 7.00
7.00 to 7.50
7.50 to 8.00
8.00 to 8.50
8.50 to 9.00
9.00 to 9.50
9.50 to 10.00
10.00 to 10.50
10.50 to 11.00
11.00 to 11.50
11.50 to 12.00
12.00 to 12.50
12.50 to 13.00
13.00 to 13.50
Phi interval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z-score
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-2
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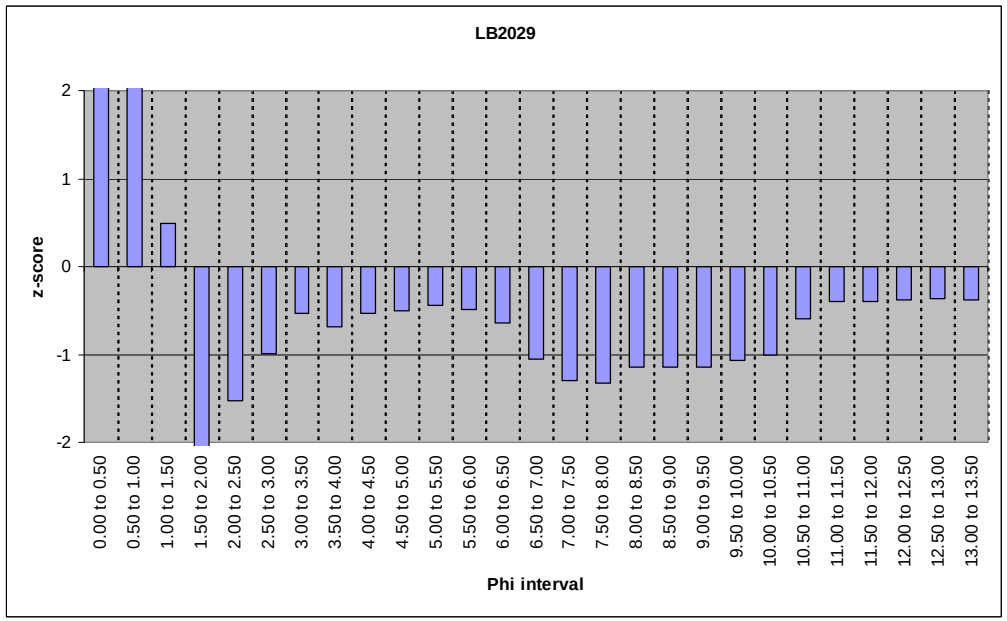
2.00 to 2.50
2.50 to 3.00
3.00 to 3.50
3.50 to 4.00
4.00 to 4.50
4.50 to 5.00
5.00 to 5.50
5.50 to 6.00
6.00 to 6.50
6.50 to 7.00
7.00 to 7.50
7.50 to 8.00
8.00 to 8.50
8.50 to 9.00
9.00 to 9.50
9.50 to 10.00
10.00 to 10.50
10.50 to 11.00
11.00 to 11.50
11.50 to 12.00
12.00 to 12.50
12.50 to 13.00
13.00 to 13.50
Phi interval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z-score
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-1
-2
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2.00 to 2.50
2.50 to 3.00
3.00 to 3.50
3.50 to 4.00
4.00 to 4.50
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5.00 to 5.50
5.50 to 6.00
6.00 to 6.50
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7.00 to 7.50
7.50 to 8.00
8.00 to 8.50
8.50 to 9.00
9.00 to 9.50
9.50 to 10.00
10.00 to 10.50
10.50 to 11.00
11.00 to 11.50
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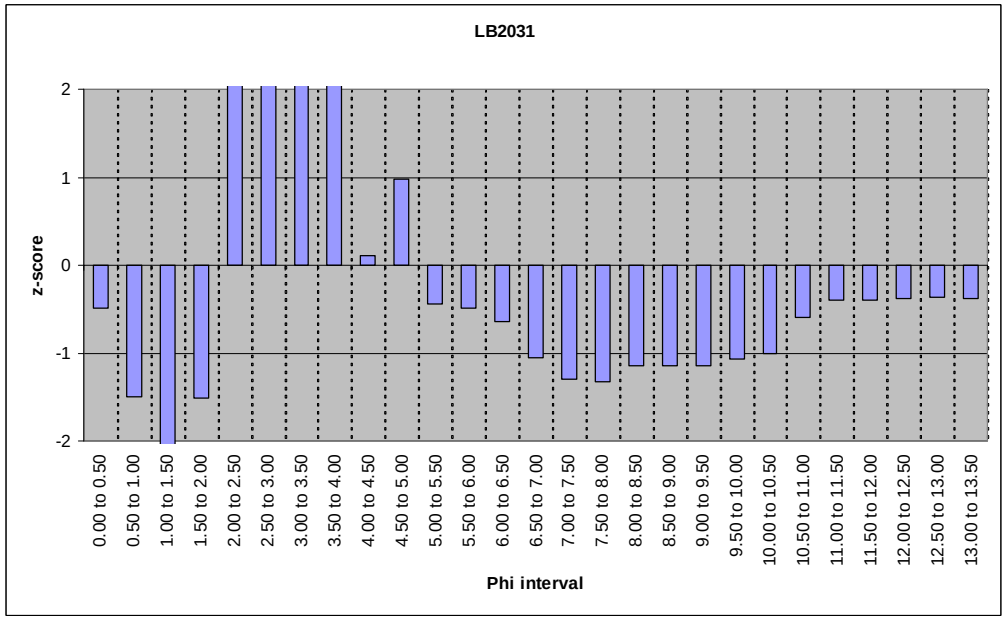
12.00 to 12.50
12.50 to 13.00
13.00 to 13.50
Phi interval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z-score
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-1
-2
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1.50 to 2.00
2.00 to 2.50
2.50 to 3.00
3.00 to 3.50
3.50 to 4.00
4.00 to 4.50
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7.00 to 7.50
7.50 to 8.00
8.00 to 8.50
8.50 to 9.00
9.00 to 9.50
9.50 to 10.00
10.00 to 10.50
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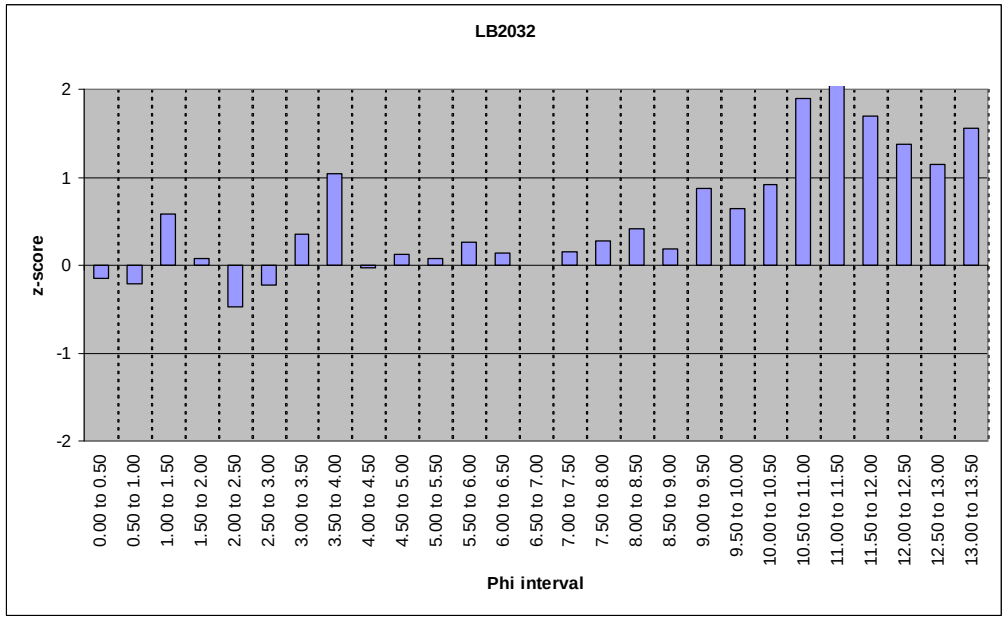
13.00 to 13.50
Phi interval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z-score
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-2
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1.50 to 2.00
2.00 to 2.50
2.50 to 3.00
3.00 to 3.50
3.50 to 4.00
4.00 to 4.50
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7.00 to 7.50
7.50 to 8.00
8.00 to 8.50
8.50 to 9.00
9.00 to 9.50
9.50 to 10.00
10.00 to 10.50
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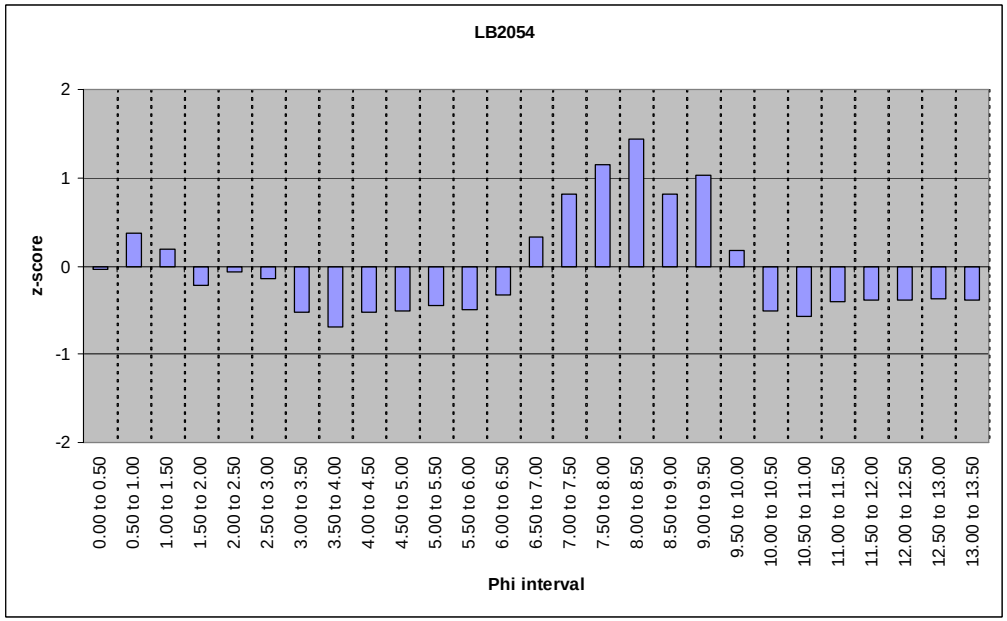
13.00 to 13.50
Phi interval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-2
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1.50 to 2.00
2.00 to 2.50
2.50 to 3.00
3.00 to 3.50
3.50 to 4.00
4.00 to 4.50
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7.00 to 7.50
7.50 to 8.00
8.00 to 8.50
8.50 to 9.00
9.00 to 9.50
9.50 to 10.00
10.00 to 10.50
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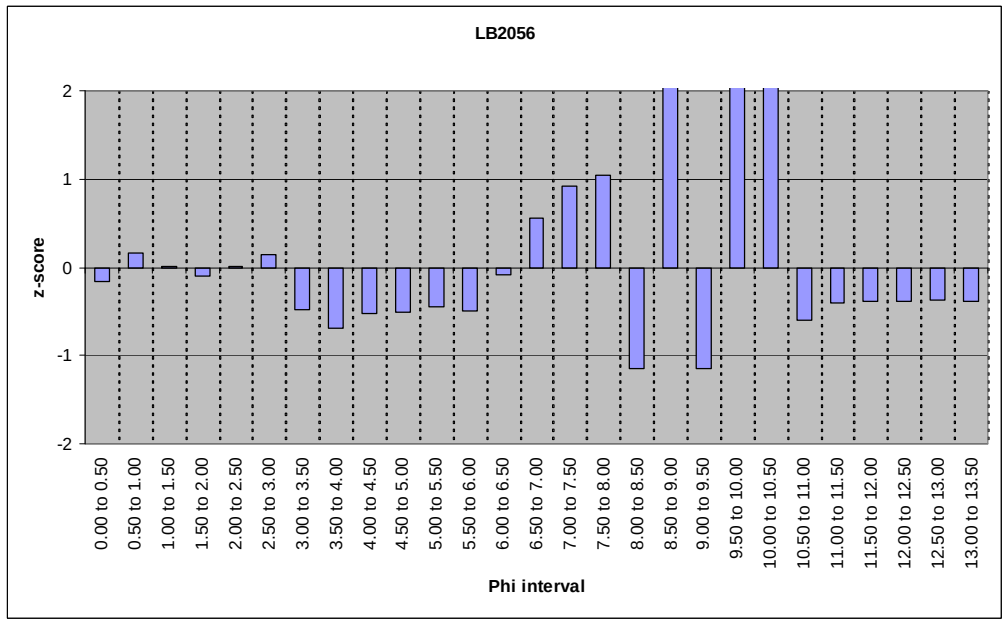
11.00 to 11.50
11.50 to 12.00
12.00 to 12.50
12.50 to 13.00
13.00 to 13.50
Phi interval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-2
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2.50 to 3.00
3.00 to 3.50
3.50 to 4.00
4.00 to 4.50
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7.00 to 7.50
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8.00 to 8.50
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9.00 to 9.50
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10.00 to 10.50
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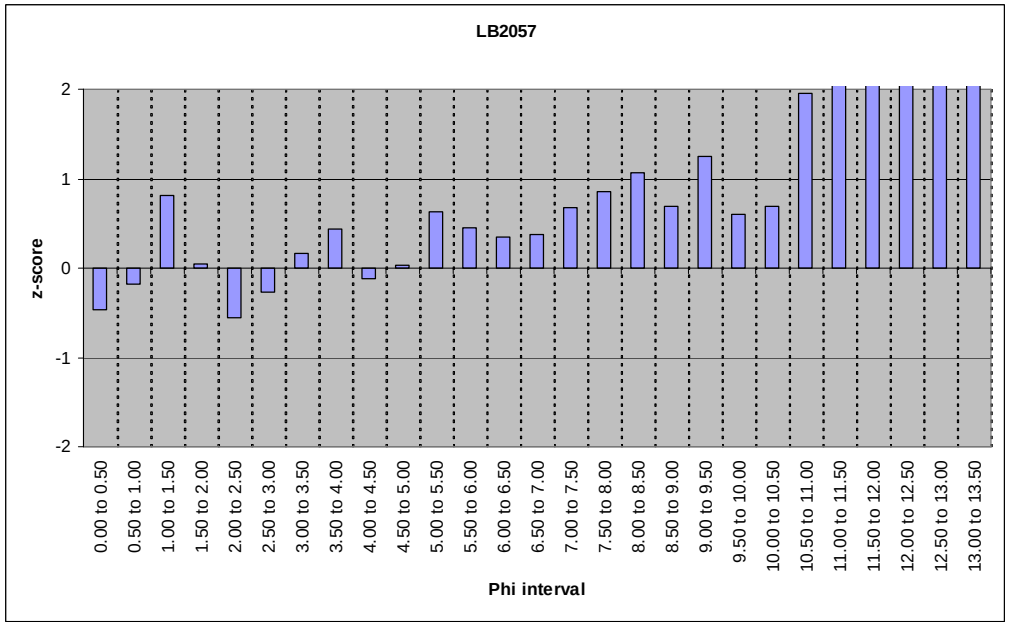
Phi interval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2.00 to 2.50
2.50 to 3.00
3.00 to 3.50
3.50 to 4.00
4.00 to 4.50
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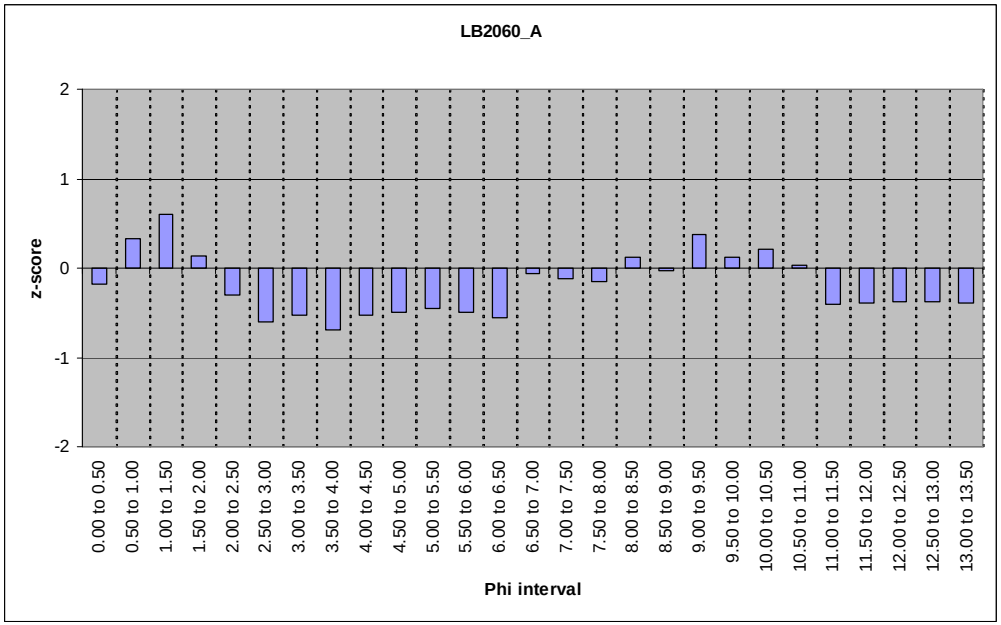
7.00 to 7.50
7.50 to 8.00
8.00 to 8.50
8.50 to 9.00
9.00 to 9.50
9.50 to 10.00
10.00 to 10.50
10.50 to 11.00
11.00 to 11.50
11.50 to 12.00
12.00 to 12.50
12.50 to 13.00
13.00 to 13.50
Phi interval


LB2060_A
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-1
-2
0.00 to 0.50
0.50 to 1.00
1.00 to 1.50
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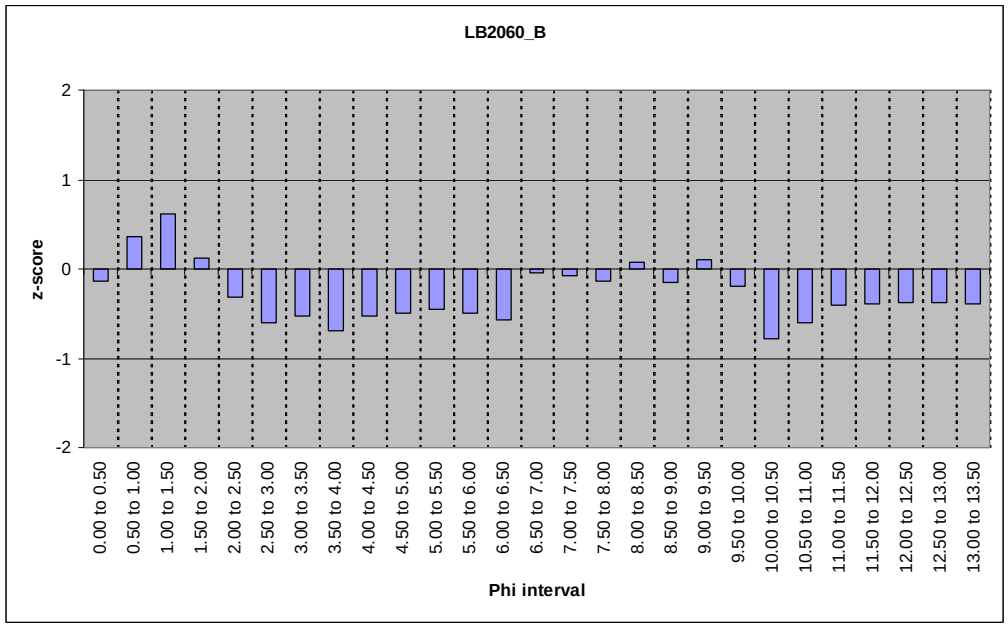
Phi interval


LB2060_B
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-2
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Phi interval