

DUBAI ACCREDITATION DEPARTMENT

REPORT ON 174TH LABORATORY PROFICIENCY TESTING DETERMINATION OF SAND EQUIVALENT VALUE

30 March 2009

1. INTRODUCTION

This document presents the results of the 174th inter-laboratory proficiency-testing program conducted during the month of March involving the **Determination of Sand Equivalent Value** with nineteen laboratories participating.

This program is part of the Inter-laboratory Comparison Programs organized by Dubai Accreditation Department (DAC) of Dubai Municipality (DM) for monitoring the validity of test results of laboratories operating in Dubai as a requirement of the Local Order 52/1990 and ISO/IEC 17011: 2004.

2. EXPERIMENTAL DESIGN

2.1 Homogeneity:

DAC had ensured the homogeneity of the samples prior to their distribution to the participating laboratories by conducting homogeneity test on six samples (randomly selected). Based on the test results the homogeneity is statistically evaluated as per *ISO 13528:2005 as explained in DAC-G3-03*.

2.2 Participants:

Seventeen private laboratories and two governmental laboratories (eleven of them are accredited by DAC for construction materials testing) participated in this program.

2.3 Samples Tested:

One Crushed Rock Sand sample approximately 5 Kg was distributed to all participating laboratories.

3. CONFIDENTIALITY

Each laboratory is given a code number to maintain confidentiality of results and to protect their identities. Only the concerned laboratory knows its code number.

If you have doubt about your code number please don't hesitate to contact Dr. Yaser Saleh Rahag (Tel : 302 7074) to know your code number.

4. TEST METHOD

Instructions were given to the participants to test the samples as per (ASTM D 2419:2002).

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5. TEST RESULTS

The test results submitted by the participating laboratories are presented in Appendix A. In order to protect the identity of the participating laboratories, each one was assigned a code number. The numbers in the column headings, Lab #, of the tables represents the code numbers for the participating laboratories.

6. EVALUATION OF RESULTS

6.1 Method of Analysis

The analysis of the participant's results is based on *ISO 13528:2005 (Statistical Methods for the Use in Proficiency Testing by Inter-laboratory Comparisons)*

6.2 Calculations of Z- scores

Appendix B gives the details of the calculation of the laboratories results and their Z-Scores which are obtained from the raw data. Also Z- Score and participant's results are represented in a bar chart and X-Y scattered plots C. The Z-Score analysis is based on an international Standard (*ISO 13528:2005*).

6.3 Outlier Results

Test	Labs outside the z-scores ± 3
Sand Equivalent value	Lab No. FQ

After evaluating the Z-Score the test results provided by the above mentioned laboratory is outside the Z - score limits of ± 3 , the above mentioned laboratory is requested to investigate the root cause of the outlier results and implement a corrective action.

Also other participating laboratories have showed Z-score values higher than **two** which representing **not outlier** but a warning limit, these laboratories are advised to investigate the potential root cause of such results.

7. APPENDICES

7.1 Appendix A: Raw Data

7.2 Appendix B: Calculation of z-scores and other statistics

7.3 Appendix C: Charts

---- End of Report ----

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Determination of Sand Equivalent Value

Appendix A: Raw Data

Sand Equivalent Value %

Lab #	Results
Lab 1	73
Lab 3S	72
Lab 76	76
Lab FQ	68
Lab 124	75
Lab 58	75
Lab 7	75
Lab 95	78.3
Lab 147	75
Lab 3	76
Lab 4	77
Lab 21	76
Lab 9	76
Lab28	75
Lab 23	75
Lab 57	76
Lab 66	75
Lab 74	75
Lab 79	74

Determination of Sand Equivalent Value

Appendix B: Calculation of z-scores and other statistics

Iteration	0		1		2		3		4		5		6		Z Score
$\delta = 1.5 s^*$	---	xi-x*	2.22	(xi-x*) ²	2.15	(xi-x*) ²	2.09	(xi-x*) ²	2.06	(xi-x*) ²	2.03	(xi-x*) ²	2.01	(xi-x*) ²	
$x^* - \delta$	---		72.78		72.95		73.02		73.06		73.09		73.11		
$x^* + \delta$	---		77.22		77.24		77.20		77.18		77.16		77.14		
Lab 1	73	2.00	73.00	4.38	73.00	4.46	73.02	4.40	73.06	4.25	73.09	4.14	73.11	4.07	-1.60
Lab 3S	72	3.00	72.78	5.37	72.95	4.69	73.02	4.40	73.06	4.25	73.09	4.14	73.11	4.07	-2.34
Lab 76	76	1.00	76.00	0.82	76.00	0.79	76.00	0.78	76.00	0.77	76.00	0.76	76.00	0.76	0.65
Lab FQ	68	7.00	72.78	5.37	72.95	4.69	73.02	4.40	73.06	4.25	73.09	4.14	73.11	4.07	-5.34
Lab 124	75	0.00	75.00	0.01	75.00	0.01	75.00	0.01	75.00	0.02	75.00	0.02	75.00	0.02	-0.10
Lab 58	75	0.00	75.00	0.01	75.00	0.01	75.00	0.01	75.00	0.02	75.00	0.02	75.00	0.02	-0.10
Lab 7	75	0.00	75.00	0.01	75.00	0.01	75.00	0.01	75.00	0.02	75.00	0.02	75.00	0.02	-0.10
Lab 95	78.3	3.30	77.22	4.54	77.22	4.47	77.20	4.33	77.18	4.21	77.16	4.12	77.14	4.05	2.37
Lab 147	75	0.00	75.00	0.01	75.00	0.01	75.00	0.01	75.00	0.02	75.00	0.02	75.00	0.02	-0.10
Lab 3	76	1.00	76.00	0.82	76.00	0.79	76.00	0.78	76.00	0.77	76.00	0.76	76.00	0.76	0.65
Lab 4	77	2.00	77.00	3.63	77.00	3.57	77.00	3.54	77.00	3.52	77.00	3.50	77.00	3.49	1.40
Lab 21	76	1.00	76.00	0.82	76.00	0.79	76.00	0.78	76.00	0.77	76.00	0.76	76.00	0.76	0.65
Lab 9	76	1.00	76.00	0.82	76.00	0.79	76.00	0.78	76.00	0.77	76.00	0.76	76.00	0.76	0.65
Lab28	75	0.00	75.00	0.01	75.00	0.01	75.00	0.01	75.00	0.02	75.00	0.02	75.00	0.02	-0.10
Lab 23	75	0.00	75.00	0.01	75.00	0.01	75.00	0.01	75.00	0.02	75.00	0.02	75.00	0.02	-0.10
Lab 57	76	1.00	76.00	0.82	76.00	0.79	76.00	0.78	76.00	0.77	76.00	0.76	76.00	0.76	0.65
Lab 66	75	0.00	75.00	0.01	75.00	0.01	75.00	0.01	75.00	0.02	75.00	0.02	75.00	0.02	-0.10
Lab 74	75	0.00	75.00	0.01	75.00	0.01	75.00	0.01	75.00	0.02	75.00	0.02	75.00	0.02	-0.10
Lab 79	74	1.00	74.00	1.20	74.00	1.24	74.00	1.25	74.00	1.26	74.00	1.27	74.00	1.28	-0.85
Average	74.86		75.09	28.68	75.11	27.15	75.12	26.30	75.12	25.69	75.13	25.26	75.13	24.95	
SD	2.14		1.26	1.59	1.23	1.51	1.21	1.46	1.19	1.43	1.18	1.40	1.18	1.39	
New x*	75	1.00	75.09	1.26	75.11	1.23	75.12	1.21	75.12	1.19	75.13	1.18	75.13	1.18	
New s*	1.48		1.43		1.39		1.37		1.35		1.34		1.34		

N 19

Target value	75.13
Low Acceptable	71.13
High Acceptable	79.14
Acceptable Range	71 - 79

Determination of Sand Equivalent Value

Appendix C:Charts

