

## DUBAI ACCREDITATION DEPARTMENT

### REPORT ON 203 LABORATORY PROFICIENCY TESTING DETERMINATION OF SAND EQUIVALENT VALUE

29 March 2011

#### 1. INTRODUCTION

This document presents the results of the 203 inter-laboratory proficiency-testing program conducted during the month of February- March involving the Determination of Sand Equivalent Value with eighteen 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 and to ensure the competent of accredited and registered laboratories operating in Dubai as a requirement of the law no. 2/2010 and ISO/IEC 17011: 2004. Also laboratories from other emirates and from outside UAE were participated in this scheme.

#### 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:

Eighteen laboratories were participated in this PTP including:

- Two governmental laboratories.
- Nine are private laboratories operating in Dubai including accredited and registered laboratories.
- Two private laboratories are from other Emirates.
- Two laboratories are from Qatar.
- Two laboratories are from Oman

##### 2.3 Samples Tested:

One Crushed Rock Sand sample approximately 1.5 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.

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### 4. TEST METHOD

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

### 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 the participant's results are plotted as 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 $\pm 3$
Sand Equivalent value	Lab EX17

After evaluating the Z-Score values the test results provided by the above mentioned laboratory are outside the Z - score limits of  $\pm 3$ , the above mentioned laboratory is requested to investigate the root cause of the outlier results, implement corrective action and a report shall be available for checking by assessment team during the nearest assessment visit.

### 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 in fine aggregate

### Appendix A: Raw Data

Lab #	Results
Lab 74	87
Lab 3	83
Lab EX9	83
Lab 4	83
Lab EX10	88
Lab 58	82
Lab EX14	82
Lab G01	85
Lab 89	83
Lab 21	84
Lab EX18	86
Lab EX1	85
Lab EX4	86
Lab 23	83
Lab EX11	82
Lab EX17	93
Lab7	86
Lab 82	85

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### 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*	3.34	(xi-x*) <sup>2</sup>	3.36	(xi-x*) <sup>2</sup>	3.36	(xi-x*) <sup>2</sup>	3.36	(xi-x*) <sup>2</sup>	3.36	(xi-x*) <sup>2</sup>	3.36	(xi-x*) <sup>2</sup>	
$x^* - \delta$	---		81.16		81.12		81.12		81.12		81.12		81.12		81.12
$x^* + \delta$	---		87.84		87.84		87.84		87.84		87.84		87.84		87.84
Lab 58	82	2.50	82.00	6.16	82.00	6.16	82.00	6.16	82.00	6.16	82.00	6.16	82.00	6.16	-1.11
LabEX11	82	2.50	82.00	6.16	82.00	6.16	82.00	6.16	82.00	6.16	82.00	6.16	82.00	6.16	-1.11
LabEX14	82	2.50	82.00	6.16	82.00	6.16	82.00	6.16	82.00	6.16	82.00	6.16	82.00	6.16	-1.11
Lab 23	83	1.50	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	-0.66
Lab 3	83	1.50	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	-0.66
Lab 4	83	1.50	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	-0.66
Lab 89	83	1.50	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	-0.66
Lab EX9	83	1.50	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	83.00	2.20	-0.66
Lab 21	84	0.50	84.00	0.23	84.00	0.23	84.00	0.23	84.00	0.23	84.00	0.23	84.00	0.23	-0.22
Lab 82	85	0.50	85.00	0.27	85.00	0.27	85.00	0.27	85.00	0.27	85.00	0.27	85.00	0.27	0.23
Lab EX1	85	0.50	85.00	0.27	85.00	0.27	85.00	0.27	85.00	0.27	85.00	0.27	85.00	0.27	0.23
Lab G01	85	0.50	85.00	0.27	85.00	0.27	85.00	0.27	85.00	0.27	85.00	0.27	85.00	0.27	0.23
LabEX18	86	1.50	86.00	2.30	86.00	2.30	86.00	2.30	86.00	2.30	86.00	2.30	86.00	2.30	0.68
Lab EX4	86	1.50	86.00	2.30	86.00	2.30	86.00	2.30	86.00	2.30	86.00	2.30	86.00	2.30	0.68
Lab7	86	1.50	86.00	2.30	86.00	2.30	86.00	2.30	86.00	2.30	86.00	2.30	86.00	2.30	0.68
Lab 74	87	2.50	87.00	6.34	87.00	6.34	87.00	6.34	87.00	6.34	87.00	6.34	87.00	6.34	1.12
Lab EX10	88	3.50	87.84	11.26	87.84	11.26	87.84	11.26	87.84	11.26	87.84	11.26	87.84	11.26	1.57
LabEX17	93	8.50	87.84	11.26	87.84	11.26	87.84	11.26	87.84	11.26	87.84	11.26	87.84	11.26	3.80
Average	84.78		84.48	66.26	84.48	66.26	84.48	66.26	84.48	66.26	84.48	66.26	84.48	66.26	
SD	2.73		1.97	3.90	1.97	3.90	1.97	3.90	1.97	3.90	1.97	3.90	1.97	3.90	
New x*	84.5	1.50	84.48	1.97	84.48	1.97	84.48	1.97	84.48	1.97	84.48	1.97	84.48	1.97	
New s*	2.22		2.24		2.24		2.24		2.24		2.24		2.24		

N 18

Target value	84
Low Acceptable	78
High Acceptable	91
Acceptable Range	78 - 91

# Determination of Sand Equivalent Value in fine aggregate

## Appendix C:Charts

