

## DUBAI ACCREDITATION DEPARTMENT

### REPORT ON 188<sup>TH</sup> LABORATORY PROFICIENCY TESTING DETERMINATION OF SAND EQUIVALENT VALUE

4 April 2010

#### 1. INTRODUCTION

This document presents the results of the 188<sup>th</sup> inter-laboratory proficiency-testing program conducted during the month of 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 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:

Eighteen laboratories were participated in this program, the participants are registered and accredited laboratories who are operating in the emirate of Dubai. In addition to one governmental laboratory and three laboratories participated from Abu Dhabi and 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.

#### 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.

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### 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 $\pm 3$
Sand Equivalent value	Lab EX9

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.

Also other participating laboratories have showed Z-score values higher than **two** which is **not outlier** but, this is consider as 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 ----

## Determination of Sand Equivalent Value in fine aggregate

### Appendix A: Raw Data

Lab #	Results
Lab 9	72
Lab 74	72
Lab 3	73
Lab EX9	64
Lab 4	74
Lab 76	73
Lab 58	73
Lab G01	72
Lab 89	73
Lab 21	73
Lab 72	74
Lab EX6	74
Lab 23	73
Lab EX10	76
Lab 79	72
Lab7	71
Lab 28	72
Lab 82	72

## Determination of Sand Equivalent Value in fine aggregate

### 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*) <sup>2</sup>	1.91	(xi-x*) <sup>2</sup>	1.79	(xi-x*) <sup>2</sup>	1.74	(xi-x*) <sup>2</sup>	1.73	(xi-x*) <sup>2</sup>	1.72	(xi-x*) <sup>2</sup>	
$x^* - \delta$	---		70.78		70.81		70.90		70.95		70.96		70.97		
$x^* + \delta$	---		75.22		74.64		74.48		74.43		74.41		74.41		
Lab EX9	64	9.00	70.78	3.79	70.81	3.54	70.90	3.18	70.95	3.03	70.96	2.98	70.97	2.96	-7.58
Lab7	71	2.00	71.00	2.97	71.00	2.86	71.00	2.85	71.00	2.85	71.00	2.85	71.00	2.85	-1.47
Lab 28	72	1.00	72.00	0.52	72.00	0.48	72.00	0.47	72.00	0.47	72.00	0.47	72.00	0.47	-0.60
Lab 74	72	1.00	72.00	0.52	72.00	0.48	72.00	0.47	72.00	0.47	72.00	0.47	72.00	0.47	-0.60
Lab 79	72	1.00	72.00	0.52	72.00	0.48	72.00	0.47	72.00	0.47	72.00	0.47	72.00	0.47	-0.60
Lab 82	72	1.00	72.00	0.52	72.00	0.48	72.00	0.47	72.00	0.47	72.00	0.47	72.00	0.47	-0.60
Lab 9	72	1.00	72.00	0.52	72.00	0.48	72.00	0.47	72.00	0.47	72.00	0.47	72.00	0.47	-0.60
Lab G01	72	1.00	72.00	0.52	72.00	0.48	72.00	0.47	72.00	0.47	72.00	0.47	72.00	0.47	-0.60
Lab 21	73	0.00	73.00	0.08	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	0.27
Lab 23	73	0.00	73.00	0.08	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	0.27
Lab 3	73	0.00	73.00	0.08	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	0.27
Lab 58	73	0.00	73.00	0.08	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	0.27
Lab 76	73	0.00	73.00	0.08	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	0.27
Lab 89	73	0.00	73.00	0.08	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	73.00	0.10	0.27
Lab 4	74	1.00	74.00	1.63	74.00	1.71	74.00	1.72	74.00	1.72	74.00	1.72	74.00	1.72	1.15
Lab 72	74	1.00	74.00	1.63	74.00	1.71	74.00	1.72	74.00	1.72	74.00	1.72	74.00	1.72	1.15
Lab EX6	74	1.00	74.00	1.63	74.00	1.71	74.00	1.72	74.00	1.72	74.00	1.72	74.00	1.72	1.15
Lab EX10	76	3.00	75.22	6.26	74.64	3.78	74.48	3.21	74.43	3.03	74.41	2.98	74.41	2.96	2.89
Average	72.39		72.72	21.51	72.69	18.76	72.69	17.82	72.69	17.50	72.69	17.40	72.69	17.36	
SD	2.38		1.12	1.27	1.05	1.10	1.02	1.05	1.01	1.03	1.01	1.02	1.01	1.02	
New x*	73	1.00	72.72	1.12	72.69	1.05	72.69	1.02	72.69	1.01	72.69	1.01	72.69	1.01	
New s*	1.48		1.28		1.19		1.16		1.15		1.15		1.15		

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Target value	72.69
Low Acceptable	69.25
High Acceptable	76.13
Acceptable Range	69.25 - 76.13

# Determination of Sand Equivalent Value in fine aggregate

## Appendix C:Charts

