

## DUBAI ACCREDITATION DEPARTMENT

### REPORT ON 161<sup>ST</sup> LABORATORY PROFICIENCY TESTING DETERMINATION OF SAND EQUIVALENT VALUE

3 June 2008

#### 1. INTRODUCTION

This document presents the results of the 161<sup>st</sup> inter-laboratory proficiency-testing program conducted during the month of May involving the **Determination of Sand Equivalent** 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:

Sixteen private laboratories and two governmental laboratories (ten 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. For this particular program participating Laboratories are requested to contact Dr. Yaser Saleh Rahag (Tel No.: 302 7074) to know their 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 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 No. 8, Lab No. 14, and Lab No. 18

### 7. CONCLUSION AND RECOMMENDATIONS

The test results provided by the above mentioned laboratories are outside the Z - score limits of  $\pm 3$ , the abovementioned laboratories are requested to investigate the root cause of the outlier results, implement corrective action and email a report within 2 weeks to Accreditation Decisions Section of the Dubai Accreditation Department to the following e-mail address: [msrassol@dm.gov.ae](mailto:msrassol@dm.gov.ae)

### 8. APPENDICES

#### 8.1 Appendix A: Raw Data

#### 8.2 Appendix B: Calculation of z-scores and other statistics

#### 8.3 Appendix C: Charts

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## Appendix A: Raw Data

### Sand Equivalent Value %

Lab #	Results
Lab 1	77
Lab 2	76
Lab 3	75
Lab 4	74
Lab 5	75
Lab 6	75
Lab 7	75
Lab 8	80.5
Lab 9	75
Lab 10	75
Lab 11	76
Lab 12	75
Lab 13	75
Lab 14	69
Lab 15	75
Lab 16	75
Lab 17	75
Lab 18	27

Appendix B: Calculation of z-scores and other statistics

Iteration	0		1		2		3		4		5		6		Z Score
$\delta = 1.5 s$	---		0.00		0.00		0.00		0.00		0.00		0.00		
$x^* - \delta$	---	$xi-x^*$	75.00	$(xi-x^*)^2$	75.00	$(xi-x^*)^2$	75.00	$(xi-x^*)^2$	75.00	$(xi-x^*)^2$	75.00	$(xi-x^*)^2$	75.00	$(xi-x^*)^2$	
$x^* + \delta$	---		75.00		75.00		75.00		75.00		75.00		75.00		
LAB 1	77	2.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	2.00
LAB 2	76	1.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	1.00
LAB 3	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	0.00
LAB 4	74	1.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	-1.00
LAB 5	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	0.00
LAB 6	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	0.00
LAB 7	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	0.00
LAB 8	80.5	5.50	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	5.50
LAB 9	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	0.00
LAB 10	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	0.00
LAB 11	76	1.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	1.00
LAB 12	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	0.00
LAB 13	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	0.00
LAB 14	69	6.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	-6.00
LAB 15	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	0.00
LAB 16	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	0.00
LAB 17	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	0.00
LAB 18	27	48.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	-48.00
Average	72.47		75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	
SD	11.54		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
New $x^*$	75	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	75.00	0.00	
New $s^*$	0.00		0.00		0.00		0.00		0.00		0.00		0.00		

N 18

Target value	75
Low Acceptable	72
High Acceptable	78
Acceptable Range	72 - 78

Appendix C:Charts



