

DUBAI ACCREDITATION DEPARTMENT

REPORT ON 193RD LABORATORY PROFICIENCY TESTING DETERMINATION OF ACID SOLUBLE SULPHATE AND CHLORIDE IN SOIL

8 July 2010

1. INTRODUCTION

This document presents the results of the 193rd inter-laboratory proficiency-testing program conducted during the month of June involving the determination of **Acid soluble Sulphate and Chloride in Soil** with thirty 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, also five laboratories from outside UAE were are 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:

Thirty laboratories were participated in this program; one is governmental laboratory and twenty are private laboratories operating in the emirate of Dubai which are registered and/or accredited by DAC for construction materials testing, in addition, four participants from other emirates, three participants from Qatar; one from Oman and one participant from Bahrain.

2.3 Samples Tested:

One soil sample of approximately 1 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: **(BS 1377:1990 Part 3 Amd 9028.1996 Clause 5)**.

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 calculation is based on an international Standard (**ISO 13528:2005**).

6.3 Outlier Results

Test	Labs outside the z-scores ± 3
Acid soluble Sulphate in Soil	Lab EX16
Acid soluble Chloride in Soil	Lab EX10 & Lab EX16

After evaluating the Z-Score the test results provided by the above mentioned laboratories are outside the Z - score limits of ± 3 , the above mentioned laboratories are 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 one participating laboratory has showed Z-score values higher than **two** which representing **not outlier** but a warning limit, this laboratory is 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 ----

Acid Soluble Sulphate Content in Soil

Appendix A: Raw Data

Acide Soluble Sulphate in Soil

Lab #	Results
Lab G01	1.14
Lab EX11	1.11
Lab 39	1.17
Lab 4	1.12
Lab 56	1.20
Lab 21	1.17
Lab EX1	1.17
Lab 7	1.16
Lab EX5	1.17
Lab 9	1.17
Lab 28	1.16
Lab 23	1.14
Lab EX6	1.12
Lab 2	1.14
Lab 58	1.14
Lab EX14	1.16
Lab 64	1.18
Lab 68	1.08
Lab 72	1.15
Lab 67	1.11
Lab 74	1.14
Lab 79	1.17
Lab 82	1.16
Lab EX3	1.10
Lab EX4	1.17
Lab 57	1.18
Lab 76	1.21
Lab 66	1.18
Lab EX16	1.41
Lab EX10	1.20

Acide Soluble Chloride in Soil

Lab #	Results
Lab G01	0.02
Lab EX11	0.02
Lab 39	0.01
Lab 4	0.02
Lab 56	0.01
Lab 21	0.01
Lab EX1	0.01
Lab 7	0.01
Lab EX5	0.01
Lab 9	0.01
Lab 28	0.01
Lab 23	0.01
Lab EX6	0.01
Lab 2	0.02
Lab 58	0.01
Lab EX14	0.02
Lab 64	0.01
Lab 68	0.01
Lab 72	0.01
Lab 67	0.01
Lab 74	0.01
Lab 79	0.01
Lab 82	0.01
Lab EX3	0.01
Lab EX4	0.02
Lab 57	0.01
Lab 76	0.01
Lab 66	0.01
Lab EX16	0.056
Lab EX10	0.04

Appendix B: Calculation of z-scores and other statistics Acid Soluble Sulphate Content in Soil

Acide Soluble Sulphate in Soil

Iteration	0		1		2		3		4		5		6		Z Score
$\delta = 1.5 s^*$	---	xi-x*	0.04	(xi-x*) ²	0.05	(xi-x*) ²	0.05	(xi-x*) ²	0.05	(xi-x*) ²	0.05	(xi-x*) ²	0.05	(xi-x*) ²	
$x^* - \delta$	---		1.12		1.11		1.11		1.11		1.11		1.11		1.11
$x^* + \delta$	---		1.20		1.21		1.21		1.21		1.21		1.21		1.21
Lab 68	1.08	0.08	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	-2.45
Lab EX3	1.10	0.06	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	-1.82
Lab 67	1.11	0.05	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	-1.50
Lab EX11	1.11	0.05	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	-1.50
Lab 4	1.12	0.04	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	-1.19
Lab EX6	1.12	0.04	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	1.12	0.00	-1.19
Lab 2	1.14	0.02	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	-0.56
Lab 23	1.14	0.02	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	-0.56
Lab 58	1.14	0.02	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	-0.56
Lab 74	1.14	0.02	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	-0.56
Lab G01	1.14	0.02	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	1.14	0.00	-0.56
Lab 72	1.15	0.01	1.15	0.00	1.15	0.00	1.15	0.00	1.15	0.00	1.15	0.00	1.15	0.00	-0.24
Lab 28	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	0.07
Lab 7	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	0.07
Lab 82	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	0.07
Lab EX14	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	1.16	0.00	0.07
Lab 21	1.17	0.01	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	0.39
Lab 39	1.17	0.01	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	0.39
Lab 79	1.17	0.01	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	0.39
Lab 9	1.17	0.01	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	0.39
Lab EX1	1.17	0.01	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	0.39
Lab EX4	1.17	0.01	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	0.39
Lab EX5	1.17	0.01	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	1.17	0.00	0.39
Lab 57	1.18	0.02	1.18	0.00	1.18	0.00	1.18	0.00	1.18	0.00	1.18	0.00	1.18	0.00	0.70
Lab 64	1.18	0.02	1.18	0.00	1.18	0.00	1.18	0.00	1.18	0.00	1.18	0.00	1.18	0.00	0.70
Lab 66	1.18	0.02	1.18	0.00	1.18	0.00	1.18	0.00	1.18	0.00	1.18	0.00	1.18	0.00	0.70
Lab 56	1.20	0.04	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.33
Lab EX10	1.20	0.04	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.33
Lab 76	1.21	0.05	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.65
Lab EX16	1.41	0.25	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	1.20	0.00	7.95
Average	1.16		1.16	0.02	1.16	0.02	1.16	0.02	1.16	0.02	1.16	0.02	1.16	0.02	
SD	0.06		0.03	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03	0.00	
New x*	1.16	0.02	1.16	0.03	1.16	0.03	1.16	0.03	1.16	0.03	1.16	0.03	1.16	0.03	
New s*	0.03		0.03		0.03		0.03		0.03		0.03		0.03		

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Target value	1.16
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Low Acceptable	1.06
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High Acceptable	1.25
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Acceptable Range	1.06 - 1.25
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Appendix B: Calculation of z-scores and other statistics Acid Soluble Sulphate Content in Soil

Acide Soluble Chloride in Soil

Iteration	0	xi-x*	1	(xi-x*) ²	2	(xi-x*) ²	3	(xi-x*) ²	4	(xi-x*) ²	5	(xi-x*) ²	6	(xi-x*) ²	Z Score
$\delta = 1.5 s^*$	---		0.02		0.01		0.01		0.01		0.01		0.01		
$x^* - \delta$	---		-0.01		0.00		0.00		0.00		0.00		0.00		
$x^* + \delta$	---		0.03		0.02		0.02		0.02		0.02		0.02		
Lab 21	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 23	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 28	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 39	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 56	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 57	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 58	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 64	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 66	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 67	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 68	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 7	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 72	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 74	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 76	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 79	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 82	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 9	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab EX1	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab EX3	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab EX5	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab EX6	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	-0.51
Lab 2	0.02	0.01	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	1.37
Lab 4	0.02	0.01	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	1.37
Lab EX11	0.02	0.01	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	1.37
Lab EX14	0.02	0.01	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	1.37
Lab EX4	0.02	0.01	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	1.37
Lab G01	0.02	0.01	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	1.37
Lab EX10	0.04	0.03	0.03	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	5.13
Lab EX16	0.06	0.05	0.03	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	8.14
Average	0.01		0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	
SD	0.01		0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
New x*	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	
New s*	0.01		0.01		0.01		0.01		0.01		0.01		0.01		

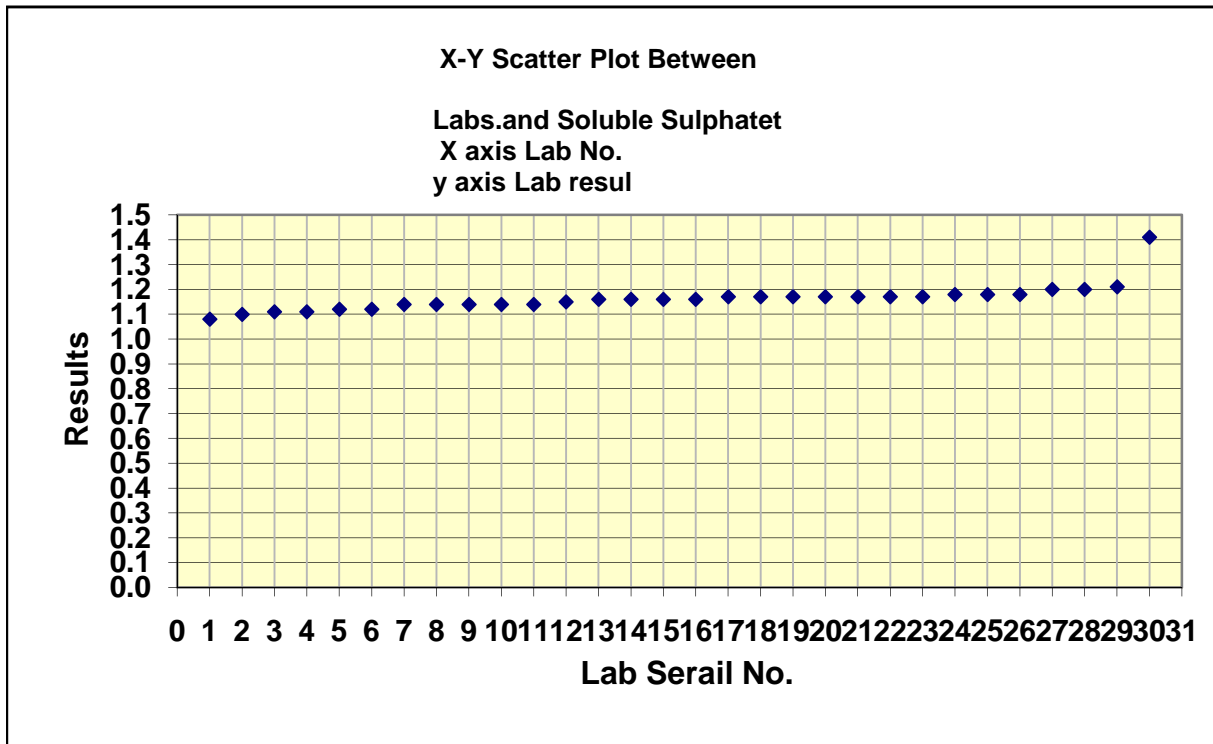
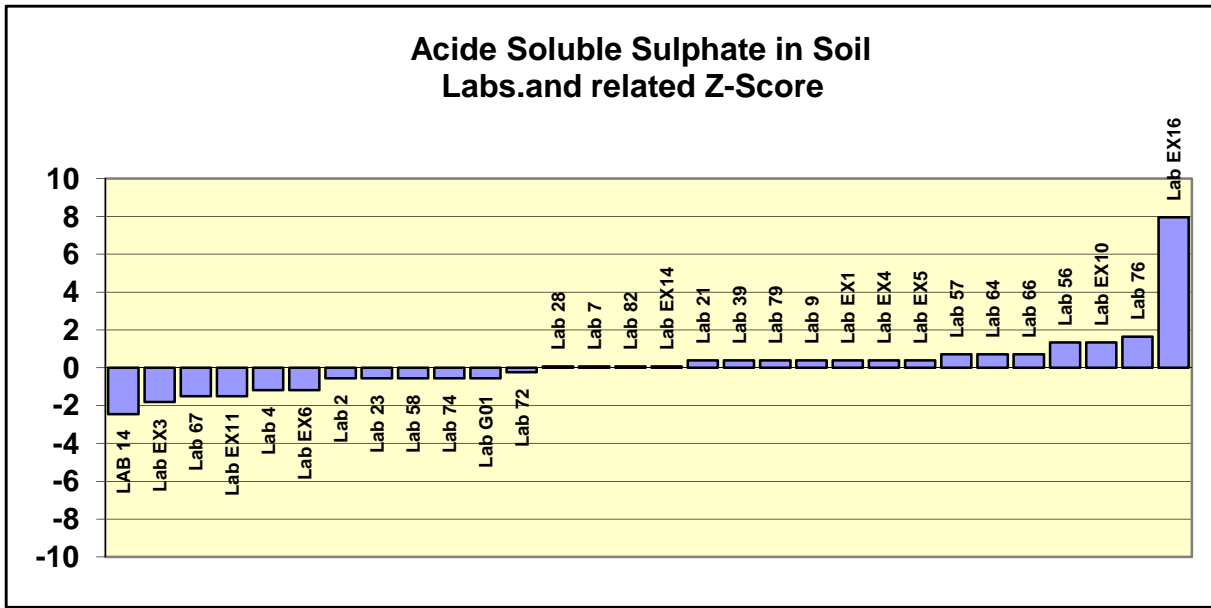
N 30

Target value	0.01	Low Acceptable	0.00	High Acceptable	0.03
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Acceptable Range	0.00 - 0.03
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Acid Soluble Sulphate Content in Soil

Appendix C:Charts



Acid Soluble Sulphate Content in Soil

Appendix C:Charts

