

DUBAI ACCREDITATION DEPARTMENT

REPORT ON 207TH INTER-LABORATORY PROFICIENCY TESTING DETERMINATION OF ACID SOLUBLE SULPHATE AND CHLORIDE IN SOIL

2 June 2011

1. INTRODUCTION

This document presents the results of the 207th inter-laboratory proficiency testing program conducted during the month of April- May; involving the determination of **Acid soluble Sulphate and Chloride in Soil** with twenty eight 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 GCC 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) and two portions A & B from each sample were tested. Based on the test results the homogeneity is statistically evaluated as per *ISO 13528:2005* as explained in DAC-G3-03.

2.2 Participants:

Twenty eight laboratories were participated in this scheme including:

- Two governmental laboratories.
- Eighteen are private laboratories operating in Dubai including accredited and registered laboratories.
- Three private laboratories are from other Emirates.
- Two laboratories are from Qatar.
- Two laboratories are from Oman.
- One laboratory is from Bahrain

2.3 Samples Tested:

One soil sample of approximately 1 Kg was distributed to all participating laboratories.

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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: **(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 EX11; Lab G01; Lab EX4
Acid soluble Chloride in Soil	Lab EX4

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 warring 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 ----

Determination of Acid soluble Sulphate and Chloride in Soil

Appendix A: Raw Data

Acide Soluble Sulphate in Soil

Lab #	Results
Lab G01	0.45
Lab EX11	0.34
Lab 39	0.41
Lab 4	0.38
Lab 56	0.40
Lab 21	0.41
Lab EX1	0.43
Lab EX17	0.40
Lab 89	0.40
Lab 9	0.41
Lab 28	0.40
Lab 23	0.41
Lab EX6	0.42
Lab EX18	0.40
Lab 58	0.40
Lab EX14	0.40
Lab 64	0.44
Lab 72	0.40
Lab 67	0.39
Lab 74	0.40
Lab 79	0.41
Lab 82	0.40
Lab EX4	0.5
Lab 57	0.40
Lab 76	0.41
Lab 66	0.40
Lab EX16	0.41
Lab EX10	0.40

Acide Soluble Chloride in Soil

Lab #	Results
Lab G01	0.06
Lab EX11	0.05
Lab 39	0.06
Lab 4	0.05
Lab 56	0.06
Lab 21	0.06
Lab EX1	0.05
Lab EX17	0.05
Lab 89	0.05
Lab 9	0.06
Lab 28	0.05
Lab 23	0.06
Lab EX6	0.06
Lab EX18	0.05
Lab 58	0.06
Lab EX14	0.06
Lab 64	0.06
Lab 72	0.06
Lab 67	0.05
Lab 74	0.05
Lab 79	0.06
Lab 82	0.05
Lab EX4	0.02
Lab 57	0.05
Lab 76	0.05
Lab 66	0.06
Lab EX16	0.07
Lab EX10	0.05

Determination of Acid soluble Sulphate and Chloride in Soil

Appendix B: Calculation of z-scores and other statistics

Acide Soluble Sulphate in Soil

Iteration	0		1		2		3		4		5		6		Z Score					
$\delta = 1.5 s^*$	---	xi-x*	0.02	$(xi-x^*)^2$	0.02	$(xi-x^*)^2$	0.02	$(xi-x^*)^2$	0.02	$(xi-x^*)^2$	0.02	$(xi-x^*)^2$	0.02	$(xi-x^*)^2$						
$x^* - \delta$	---		0.38		0.38		0.38		0.38		0.38		0.38			0.38	0.38	0.38	0.38	0.38
$x^* + \delta$	---		0.42		0.43		0.43		0.43		0.43		0.43			0.43	0.43	0.43	0.43	0.43
Lab EX11	0.34	0.06	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.39	0.00	-4.99					
Lab 4	0.38	0.02	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.39	0.00	-1.92					
Lab 67	0.39	0.01	0.39	0.00	0.39	0.00	0.39	0.00	0.39	0.00	0.39	0.00	0.39	0.00	-1.15					
Lab 28	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab 56	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab 57	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab 58	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab 66	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab 72	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab 74	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab 82	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab 89	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab EX10	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab EX14	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab EX17	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab EX18	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	-0.38					
Lab 21	0.41	0.01	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.39					
Lab 23	0.41	0.01	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.39					
Lab 39	0.41	0.01	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.39					
Lab 76	0.41	0.01	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.39					
Lab 79	0.41	0.01	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.39					
Lab 9	0.41	0.01	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.39					
Lab EX16	0.41	0.01	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.41	0.00	0.39					
Lab EX6	0.42	0.02	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	1.15					
Lab EX1	0.43	0.03	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	1.92					
Lab 64	0.44	0.04	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	2.69					
Lab G01	0.45	0.05	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	3.46					
Lab EX4	0.50	0.10	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	7.30					
Average	0.41		0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00						
SD	0.03		0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00						
New x*	0.40	0.01	0.40	0.01	0.40	0.01	0.40	0.01	0.40	0.01	0.40	0.01	0.40	0.01						
New s*	0.01		0.02		0.01		0.01		0.01		0.01		0.01							

N 28

Target value 0.40

Low Acceptable 0.37

High Acceptable 0.44

Determination of Acid soluble Sulphate and Chloride in Soil

Appendix B: Calculation of z-scores and other statistics

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
$\delta = 1.5 s^*$	---		0.01		0.01		0.01		0.00		0.00		0.00		
$x^* - \delta$	---		0.04		0.05		0.05		0.05		0.05		0.05		
$x^* + \delta$	---		0.07		0.06		0.06		0.06		0.06		0.06		
Lab EX4	0.02	0.04	0.04	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-3.98
Lab 28	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab 4	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab 57	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab 67	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab 74	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab 76	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab 82	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab 89	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab EX1	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab EX10	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab EX11	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab EX17	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab EX18	0.05	0.01	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.05	0.00	-0.57
Lab 21	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab 23	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab 39	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab 56	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab 58	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab 64	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab 66	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab 72	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab 79	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab 9	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab EX14	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab EX6	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab G01	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.57
Lab EX16	0.07	0.02	0.07	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	1.71
Average	0.05		0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	
SD	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	
New x*	0.06	0.01	0.06	0.01	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	0.06	0.00	
New s*	0.007		0.006		0.004		0.002		0.000		0.000		0.000		

N 28

Target value	0.06
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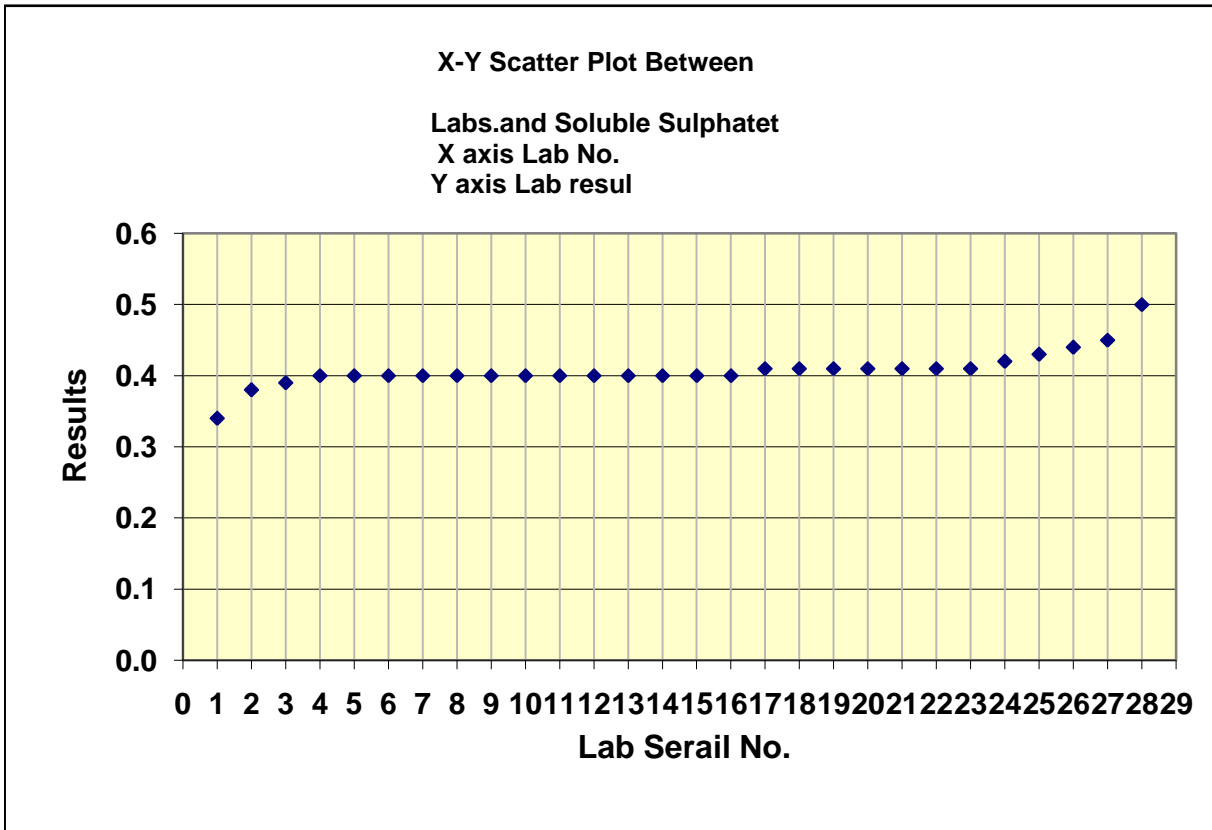
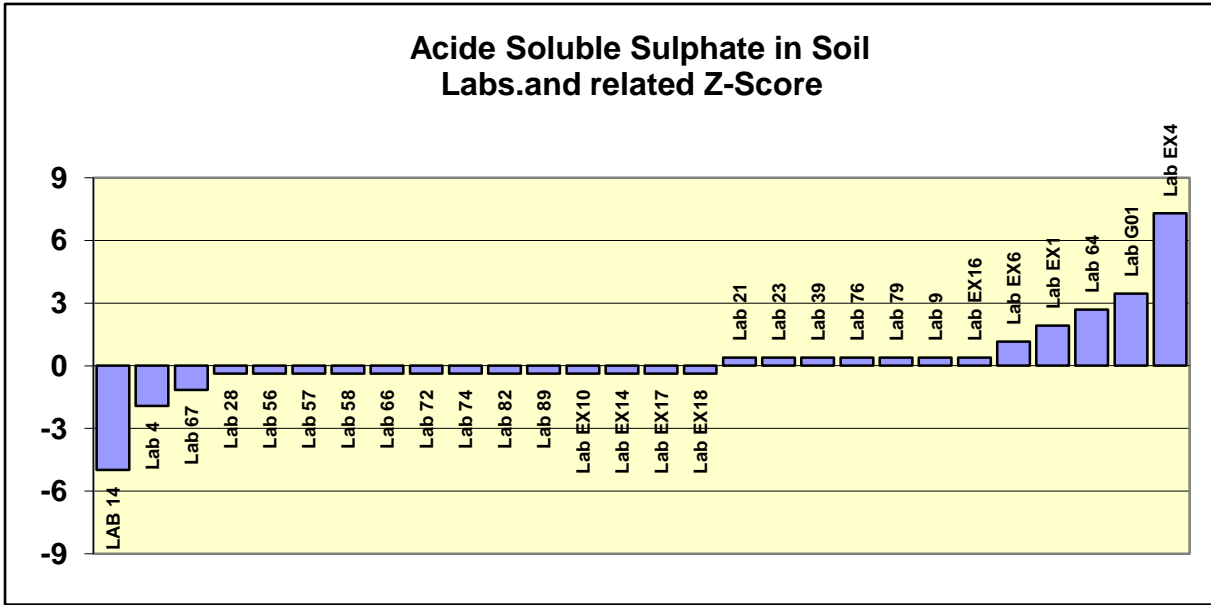
Low Acceptable	0.03
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High Acceptable	0.08
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Acceptable Range	0.03 - 0.08
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Determination of Acid soluble Sulphate and Chloride in Soil

Appendix C:Charts



Determination of Acid soluble Sulphate and Chloride in Soil

Appendix C:Charts

