

DUBAI ACCREDITATION DEPARTMENT

REPORT ON PTP 208th INTER-LABORATORY PROFICIENCY TESTING PROGRAM DETERMINATION OF CHLORIDE AND SULPHATE CONTENT IN MASONRY CONCRETE BLOCK

Date: 16 June 2011

1. INTRODUCTION

This document presents the results of the 208th inter-laboratory proficiency-testing program conducted during the month of May involving the determination of **Chloride and Sulphate content in masonry concrete block** 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 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). 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 scheme including:

- One is a governmental laboratory
- Thirteen are private laboratories operating in the Emirate of Dubai which are registered and/or accredited by DAC for construction materials testing.
- Two participants are from other emirates.
- One participant is from Qatar.
- One participant from Bahrain.

2.3 Samples Tested:

Since the block factory commonly produces blocks with low Chloride and Sulphate content, the factory was requested to prepare a bundle of the same type of block with higher value of Chloride & Sulphate by adding certain weights of Sodium Chloride and white gypsum to the raw materials inside the batching bin before preparing the block, and adequate mixing was ensured before preparing the blocks.

One (1) sample of Masonry Concrete Block Grey in color 400*200*200 mm size consists of 1 specimen has been distributed to all participating laboratories. With each participant being given one sample with a unique identification number provided during the time of collection.

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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 for Determination of Chloride & Sulphate Content in Masonry Concrete Blocks as per **(BS 1881, Part 124: 1988)**

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 above mentioned international Standard (*ISO 13528:2005*).

6.3 Outlier Results

Test	Labs outside the z-scores ± 3
Acid Soluble Sulphate Content in Masonry Concrete Block	Lab G01; Lab 2; Lab 4; Lab EX4; Lab EX9;; Lab EX16

After evaluating the Z-Score, the test results provided by the abovementioned laboratories are outside the Z – score limits ± 3 , the abovementioned laboratories are requested to investigate the root cause of the outlier results, implement a appropriate corrective action and a report shall be available for checking by the assessment team during the nearest assessment visit.

Also other participating laboratories have showed Z-score values two or higher than two which representing not outlier but 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 Sulphate and Chloride Content in Concrete Block

Appendix A: Raw Data

Acid Soluble Sulphate Content in Concrete Blocks

Lab #	Results
Lab G01	0.30
Lab 39	0.46
Lab 79	0.46
Lab 56	0.46
Lab 9	0.46
Lab 23	0.45
Lab 57	0.46
Lab 2	0.48
Lab 58	0.45
Lab EX14	0.45
Lab 21	0.45
Lab EX9	0.62
Lab 89	0.45
Lab 4	0.49
Lab EX4	0.53
Lab 72	0.45
Lab 82	0.45
Lab EX16	0.23

Acid Soluble Chloride Content in Concrete Blocks

Lab #	Results
Lab G01	0.10
Lab 39	0.11
Lab 79	0.11
Lab 56	0.11
Lab 9	0.11
Lab 23	0.12
Lab 57	0.11
Lab 2	0.11
Lab 58	0.11
Lab EX14	0.12
Lab 21	0.11
Lab EX9	0.13
Lab 89	0.11
Lab 4	0.12
Lab EX4	0.11
Lab 72	0.11
Lab 82	0.10
Lab EX16	0.10

Determination of Chloride and Sulphate Content in Concrete Block

Acid Soluble Sulphate Content in Concrete Blocks

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		0.01		0.01		0.01			0.01	0.01	0.01
$x^* - \delta$	---		0.44		0.44		0.44		0.44		0.44		0.44			0.44	0.44	0.44
$x^* + \delta$	---	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47								
Lab EX16	0.23	0.23	0.44	0.00	0.44	0.00	0.44	0.00	0.44	0.00	0.44	0.00	0.44	0.00	-30.57			
Lab G01	0.30	0.16	0.44	0.00	0.44	0.00	0.44	0.00	0.44	0.00	0.44	0.00	0.44	0.00	-21.09			
Lab 21	0.45	0.01	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	-0.78			
Lab 23	0.45	0.01	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	-0.78			
Lab 58	0.45	0.01	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	-0.78			
Lab 72	0.45	0.01	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	-0.78			
Lab 82	0.45	0.01	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	-0.78			
Lab 89	0.45	0.01	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	-0.78			
Lab EX14	0.45	0.01	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	-0.78			
Lab 39	0.46	0.01	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.57			
Lab 56	0.46	0.01	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.57			
Lab 57	0.46	0.01	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.57			
Lab 79	0.46	0.01	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.57			
Lab 9	0.46	0.01	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.57			
Lab 2	0.48	0.03	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	3.28			
Lab 4	0.49	0.04	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	4.64			
Lab EX4	0.53	0.08	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	10.05			
Lab EX9	0.62	0.17	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	0.47	0.00	22.24			
Average	0.45		0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00				
SD	0.08		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*	0.46	0.01	0.46	0.01	0.46	0.01	0.46	0.01	0.46	0.01	0.46	0.01	0.46	0.01				
New s*	0.01		0.01		0.01		0.01		0.01		0.01		0.01					

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Target value	0.46
Low Acceptable	0.434
High Acceptable	0.478
Acceptable Range	0.434 - 0.478

Acid Soluble Chloride Content in Concrete Blocks

Determination of Chloride and Sulphate Content in Concrete Block

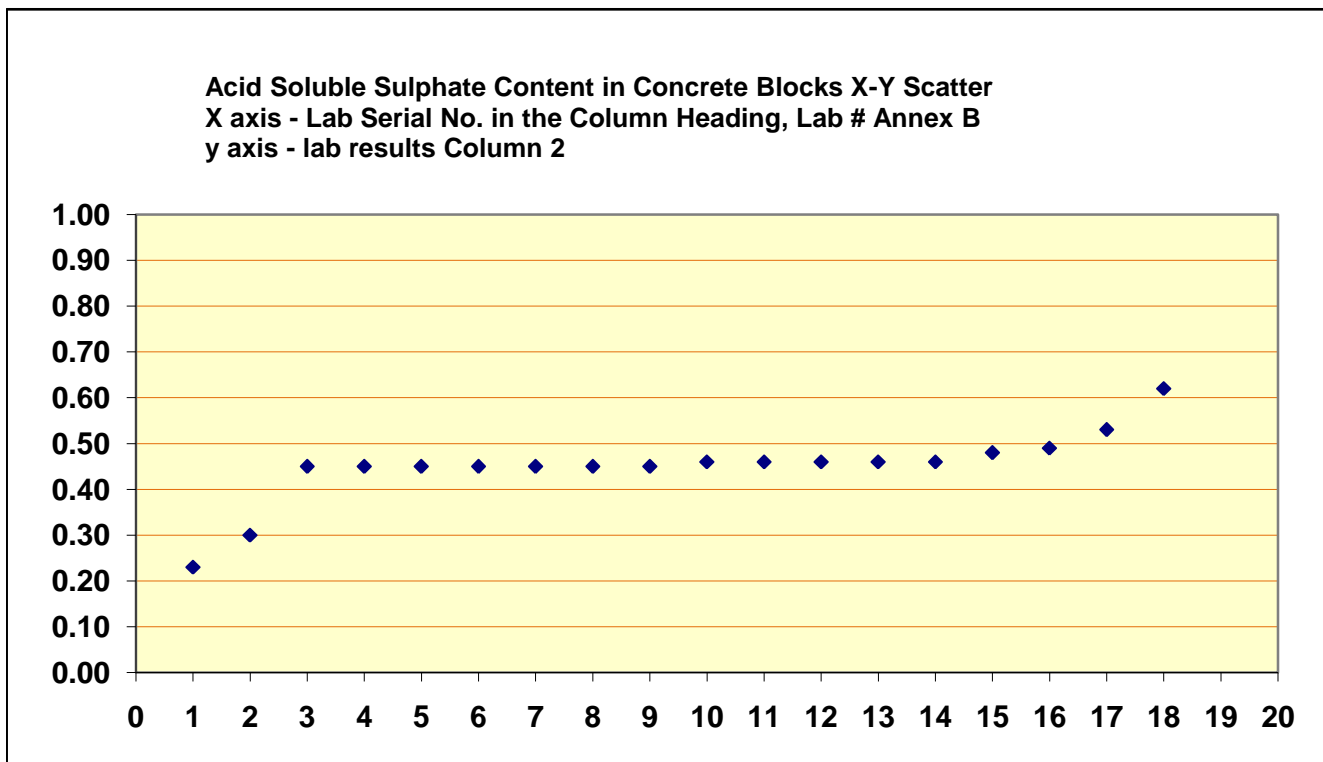
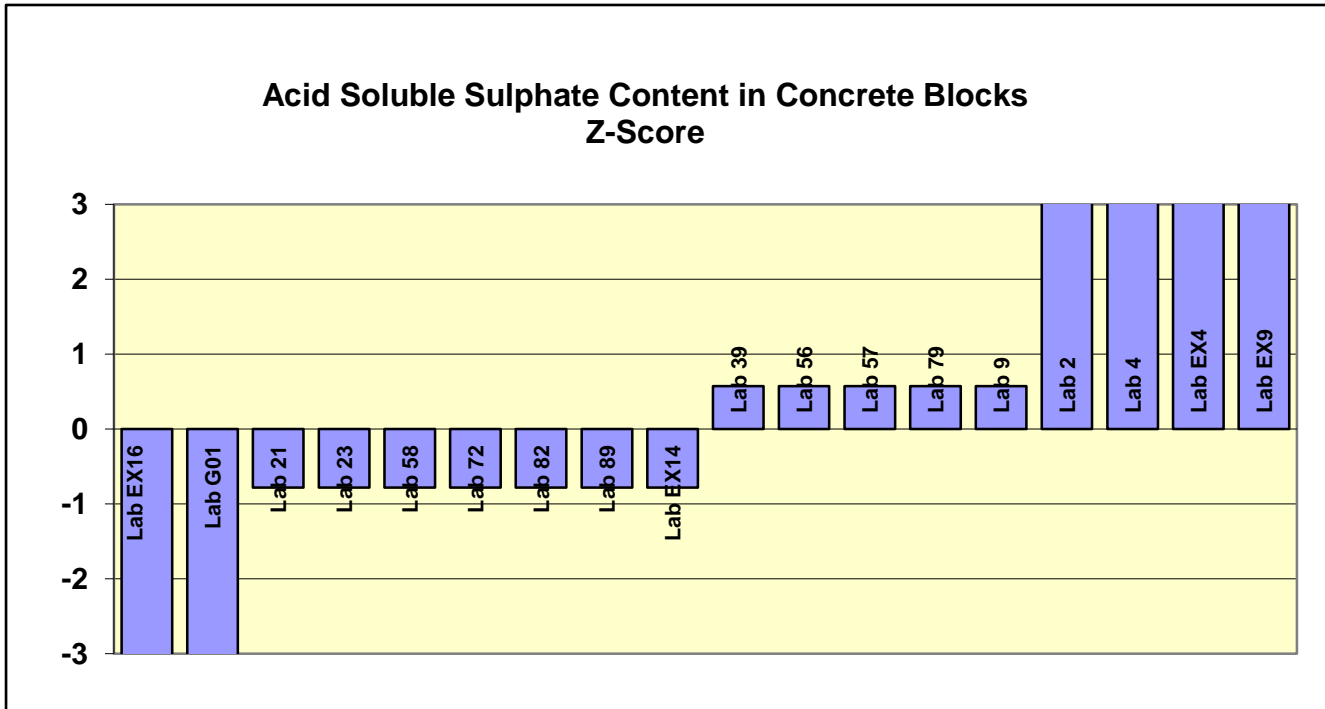
Iteration	0		1		2		3		4		5		6		Z Score
$\delta = 1.5 s^*$	---	$xi-x^*$	0.02	$(xi-x^*)^2$	0.01	$(xi-x^*)^2$	0.01	$(xi-x^*)^2$	0.01	$(xi-x^*)^2$	0.01	$(xi-x^*)^2$	0.01	$(xi-x^*)^2$	
$x^* - \delta$	---		0.10		0.10		0.10		0.10						
$x^* + \delta$	---		0.13		0.12		0.12		0.12						
Lab 82	0.10	0.01	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	-1.43
Lab EX16	0.10	0.01	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	-1.43
Lab G01	0.10	0.01	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	0.10	0.00	-1.43
Lab 2	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	-0.09
Lab 21	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	-0.09
Lab 39	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	-0.09
Lab 56	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	-0.09
Lab 57	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	-0.09
Lab 58	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	-0.09
Lab 72	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	-0.09
Lab 79	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	-0.09
Lab 89	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	-0.09
Lab 9	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	-0.09
Lab EX4	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	-0.09
Lab 23	0.12	0.01	0.12	0.00	0.12	0.00	0.12	0.00	0.12	0.00	0.12	0.00	0.12	0.00	1.26
Lab 4	0.12	0.01	0.12	0.00	0.12	0.00	0.12	0.00	0.12	0.00	0.12	0.00	0.12	0.00	1.26
Lab EX14	0.12	0.01	0.12	0.00	0.12	0.00	0.12	0.00	0.12	0.00	0.12	0.00	0.12	0.00	1.26
Lab EX9	0.13	0.02	0.13	0.00	0.12	0.00	0.12	0.00	0.12	0.00	0.12	0.00	0.12	0.00	2.60
Average	0.11		0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	0.00	0.11	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^*	0.11	0.00	0.11	0.01	0.11	0.01	0.11	0.01	0.11	0.01	0.11	0.01	0.11	0.01	
New s^*	0.01		0.01		0.01		0.01		0.01		0.01		0.01		

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Target value	0.11
Low Acceptable	0.09
High Acceptable	0.13
Acceptable Range	0.09 - 0.13

Determination of Chloride and Sulphate Content in Concrete Block

Appendix C:Charts



Determination of Chloride and Sulphate Content in Concrete Block

Appendix C:Charts

