

DUBAI ACCREDITATION DEPARTMENT

REPORT ON PTP 179TH INTER-LABORATORY PROFICIENCY TESTING PROGRAM DETERMINATION OF CHLORIDE AND SULPHATE CONTENT IN CONCRETE BLOCK

Date: 23 July 2009

1. INTRODUCTION

This document presents the results of the 179th inter-laboratory proficiency-testing program conducted during the month of July involving the determination of **chloride and sulphate content in concrete block** with twenty three 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:

Twenty two private laboratories and one governmental laboratory (eighteen of them are accredited by DAC for construction materials testing) participated in this program. A total of twenty three laboratories participated in this program.

2.3 Samples Tested:

One (1) sample of Masonry Hollow 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.

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.

DUBAI ACCREDITATION DEPARTMENT

4. TEST METHOD

Instructions were given to the participants to test the samples for Determination of Chloride & Sulphate Content in Blocks as per (**BS 1881: Part 124: 1988 AD 06 – 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 ± 3
Acid Soluble Chloride Content	Lab 68
Acid Soluble Sulphate Content	Labs: Lab 4, Lab 89, Lab EX2, Lab 68

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 corrective action and a report shall be available for checking by the assessment team during the nearest assessment visit.



DUBAI ACCREDITATION DEPARTMENT

Also other participating laboratories have showed Z-score values 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 Chloride and Sulphate Content in Concrete Block

Appendix A: Raw Data

Acid Soluble Chloride Content in Concrete Blocks

Lab #	Results
Lab 39	0.05
Lab 64	0.07
Lab 72	0.07
Lab 03	0.08
Lab EX1	0.08
Lab G01	0.08
Lab 56	0.08
Lab 76	0.08
Lab 78	0.08
Lab 89	0.09
Lab 04	0.09
Lab 09	0.09
Lab EX2	0.09
Lab 21	0.09
Lab 23	0.09
Lab 28	0.09
Lab 57	0.09
Lab 58	0.09
Lab 66	0.09
Lab 74	0.09
Lab 79	0.09
Lab 07	0.1
Lab 68	0.20

Determination of Chloride and Sulphate Content in Concrete Block

Appendix A: Raw Data

Acid Soluble Sulphate Content in Concrete Blocks

Lab #	Results
Lab G01	0.50
Lab 76	0.51
Lab 39	0.52
Lab 74	0.56
Lab 79	0.57
Lab 56	0.58
Lab 3	0.58
Lab 78	0.58
Lab 9	0.59
Lab 57	0.59
Lab 23	0.60
Lab 64	0.60
Lab EX1	0.60
Lab 28	0.6
Lab 58	0.61
Lab 66	0.61
Lab 21	0.61
Lab 72	0.63
Lab 7	0.67
Lab 4	0.72
Lab 89	0.85
Lab EX2	0.90
Lab 68	1.70

Determination of Chloride and Sulphate Content in Concrete Block

Acid Soluble Chloride Content in Concrete Blocks

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		
$x^* - \delta$	---		0.09		0.09		0.09		0.09		0.09		0.09		
$x^* + \delta$	---		0.09		0.09		0.09		0.09		0.09		0.09		
Lab 39	0.05	0.04	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	-1.52
Lab 64	0.07	0.02	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	-0.76
Lab 72	0.07	0.02	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	-0.76
Lab 03	0.08	0.01	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	-0.38
Lab EX1	0.08	0.01	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	-0.38
Lab G01	0.08	0.01	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	-0.38
Lab 56	0.08	0.01	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	-0.38
Lab 76	0.08	0.01	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	-0.38
Lab 78	0.08	0.01	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	-0.38
Lab 89	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab 04	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab 09	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab EX2	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab 21	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab 23	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab 28	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab 57	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab 58	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab 66	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab 74	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab 79	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.00
Lab 07	0.10	0.01	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.38
Lab 68	0.20	0.11	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	4.19

Average	0.09		0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00
SD	0.03		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^*	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00	0.09	0.00
New s^*	0.00		0.00		0.00		0.00		0.00		0.00		0.00	

N 23

Target value	0.09
Low Acceptable	0.01
High Acceptable	0.17
Acceptable Range	0.01-0.17

Determination of Chloride and Sulphate Content in Concrete Block

Acid Soluble Sulphate Content in Concrete Blocks

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	
$x^* - \delta$	---		0.56		0.55		0.55		0.55		0.55		0.55		
$x^* + \delta$	---		0.64		0.65		0.65		0.65		0.65		0.65		
Lab G01	0.50	0.10	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	-2.86
Lab 76	0.51	0.09	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	-2.57
Lab 39	0.52	0.08	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	-2.29
Lab 74	0.56	0.04	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	0.56	0.00	-1.14
Lab 79	0.57	0.03	0.57	0.00	0.57	0.00	0.57	0.00	0.57	0.00	0.57	0.00	0.57	0.00	-0.86
Lab 56	0.58	0.02	0.58	0.00	0.58	0.00	0.58	0.00	0.58	0.00	0.58	0.00	0.58	0.00	-0.57
Lab 3	0.58	0.02	0.58	0.00	0.58	0.00	0.58	0.00	0.58	0.00	0.58	0.00	0.58	0.00	-0.57
Lab 78	0.58	0.02	0.58	0.00	0.58	0.00	0.58	0.00	0.58	0.00	0.58	0.00	0.58	0.00	-0.57
Lab 9	0.59	0.01	0.59	0.00	0.59	0.00	0.59	0.00	0.59	0.00	0.59	0.00	0.59	0.00	-0.28
Lab 57	0.59	0.01	0.59	0.00	0.59	0.00	0.59	0.00	0.59	0.00	0.59	0.00	0.59	0.00	-0.28
Lab 23	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.00
Lab 64	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.00
Lab EX1	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.00
Lab 28	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.60	0.00	0.00
Lab 58	0.61	0.01	0.61	0.00	0.61	0.00	0.61	0.00	0.61	0.00	0.61	0.00	0.61	0.00	0.29
Lab 66	0.61	0.01	0.61	0.00	0.61	0.00	0.61	0.00	0.61	0.00	0.61	0.00	0.61	0.00	0.29
Lab 21	0.61	0.01	0.61	0.00	0.61	0.00	0.61	0.00	0.61	0.00	0.61	0.00	0.61	0.00	0.29
Lab 72	0.63	0.03	0.63	0.00	0.63	0.00	0.63	0.00	0.63	0.00	0.63	0.00	0.63	0.00	0.86
Lab 7	0.67	0.07	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	2.00
Lab 4	0.72	0.12	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	3.43
Lab 89	0.85	0.25	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	7.15
Lab EX2	0.90	0.30	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	8.58
Lab 68	1.70	1.10	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	0.64	0.00	31.45

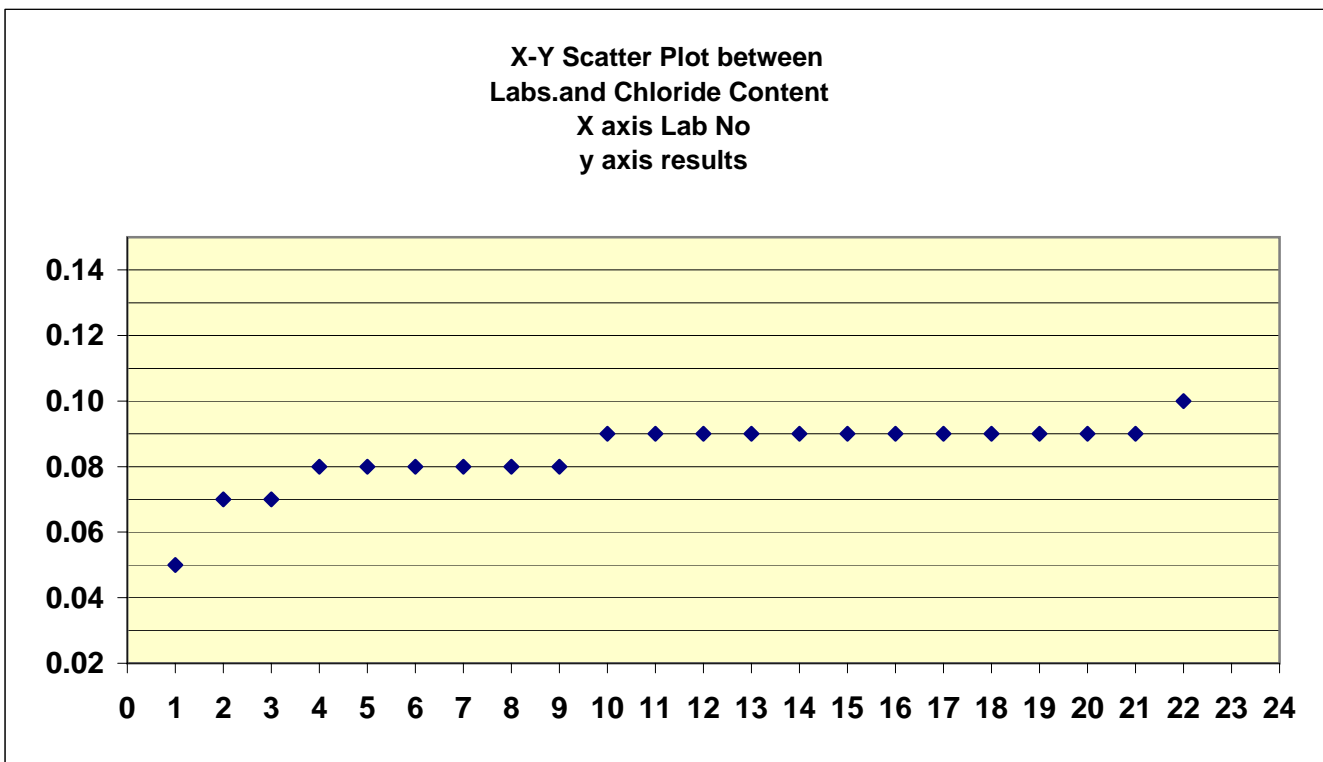
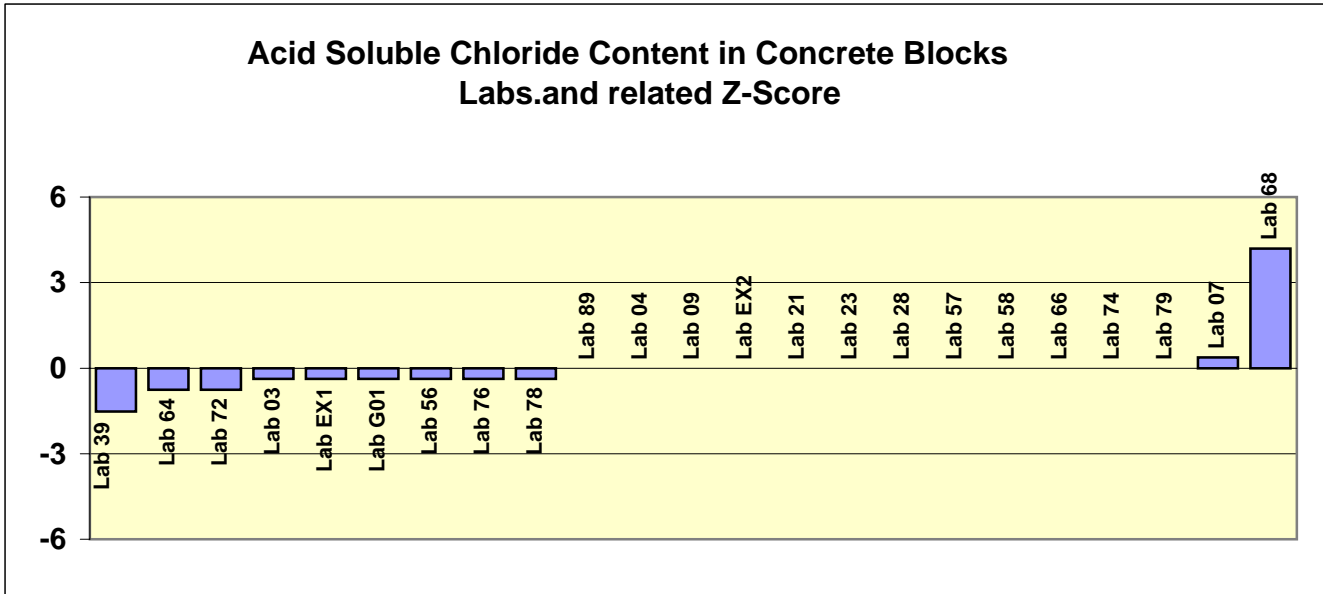
Average	0.66		0.60	0.02	0.60	0.02	0.60	0.02	0.60	0.02	0.60	0.02	0.60	0.02
SD	0.24		0.03	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03	0.00
New x*	0.60	0.02	0.60	0.03	0.60	0.03	0.60	0.03	0.60	0.03	0.60	0.03	0.60	0.03
New s*	0.03		0.03		0.03		0.03		0.03		0.03		0.03	

N 23

Target value	0.60
Low Acceptable	0.50
High Acceptable	0.70
Acceptable Range	0.5 - 0.7

Determination of Chloride and Sulphate Content in Concrete Block

Appendix C:Charts



Determination of Chloride and Sulphate Content in Concrete Block

Appendix C:Charts

