DUBAI ACCREDITATION DEPARTMENT

REPORT ON PTP 166th INTER-LABORATORY PROFICIENCY TESTING PROGRAM DETERMINATION OF CLHORIDE AND SULPHATE CONTENT IN CONCRETE BLOCK

Date: 31 October 2008

1. INTRODUCTION

This document presents the results of the 166th inter-laboratory proficiency-testing program conducted during the month of October involving the determination 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 private laboratories and three governmental laboratories (twelve 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 had 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 was 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 for Determination of Chloride & Sulphate Content in Blocks as per (BS 1881: 1988 - P124AD06– 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

After evaluating the Z-Score, the results from all participating laboratories are found within the Z-score limits of ± 3, therefore, all the results are acceptable, however only few laboratories have showed Z-score values higher than **two** which representing not outlier but a warring 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 ---

Acid Soluble Chloride/ Sulphate Content in Concrete Blocks

Acid Soluble Chloride Content in Concrete Blocks

Lab #	Results
Lab 1	0.08
Lab 2	0.09
Lab 3	0.08
Lab 4	0.09
Lab 5	0.10
Lab 6	0.09
Lab 7	0.11
Lab 8	0.09
Lab 9	0.10
Lab 10	0.10
Lab 11	0.09
Lab 12	0.10
Lab 13	0.10
Lab 14	0.09
Lab 15	0.09
Lab 16	0.09
Lab 17	0.10
Lab 18	0.09
Lab 19	0.09
Lab 20	0.09
Lab 21	0.11
Lab 22	0.11
Lab 23	0.09

Acid Soluble Sulphate Content in Concrete Blocks

Lab #	Results
Lab 1	0.30
Lab 2	0.50
Lab 3	0.38
Lab 4	0.38
Lab 5	0.41
Lab 6	0.39
Lab 7	0.54
Lab 8	0.38
Lab 9	0.46
Lab 11	0.46
Lab 12	0.42
Lab 13	0.43
Lab 14	0.45
Lab 15	0.40
Lab 16	0.38
Lab 17	0.52
Lab 18	0.38
Lab 19	0.43
Lab 20	0.38
Lab 21	0.45
Lab 22	0.45
Lab 23	0.39

Appendix B: **Acid Soluble Chloride/ Sulphate**
Calculation of z-scores and other statistics **Content in Concrete Blocks**

Acid Soluble Chloride 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
δ = 1.5 s*	---		0.00		0.00		0.00		0.00		0.00		0.00		
x* - δ	---		0.09		0.09		0.09		0.09		0.09		0.09		
x* + δ	---		0.09		0.09		0.09		0.09		0.09		0.09		
Lab 1	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	-1.19
Lab 3	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	-1.19
Lab 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	0.09	0.00	0.00
Lab 14	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 15	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 16	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 18	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 19	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 2	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 20	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 4	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 6	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 8	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 10	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	1.19
Lab 12	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	1.19
Lab 13	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	1.19
Lab 17	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	1.19
Lab 5	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	1.19
Lab 9	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	1.19
Lab 21	0.11	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	2.37
Lab 22	0.11	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	2.37
Lab 7	0.11	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	2.37
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	0.01		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	0.06
High Acceptable	0.12
Acceptable Range	0.06-0.12

Appendix B: **Acid Soluble Chloride/ Sulphate**
Calculation of z-scores and other statistics **Content in Concrete Blocks**

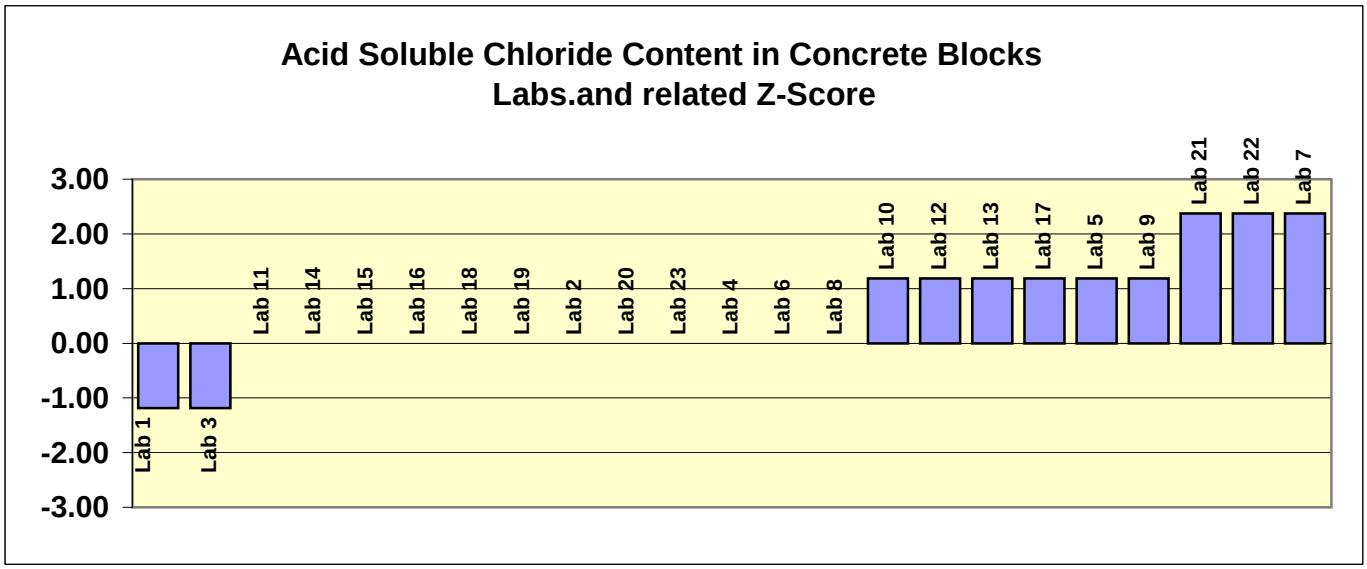
Acid Soluble Sulphate Content in Concrete Blocks

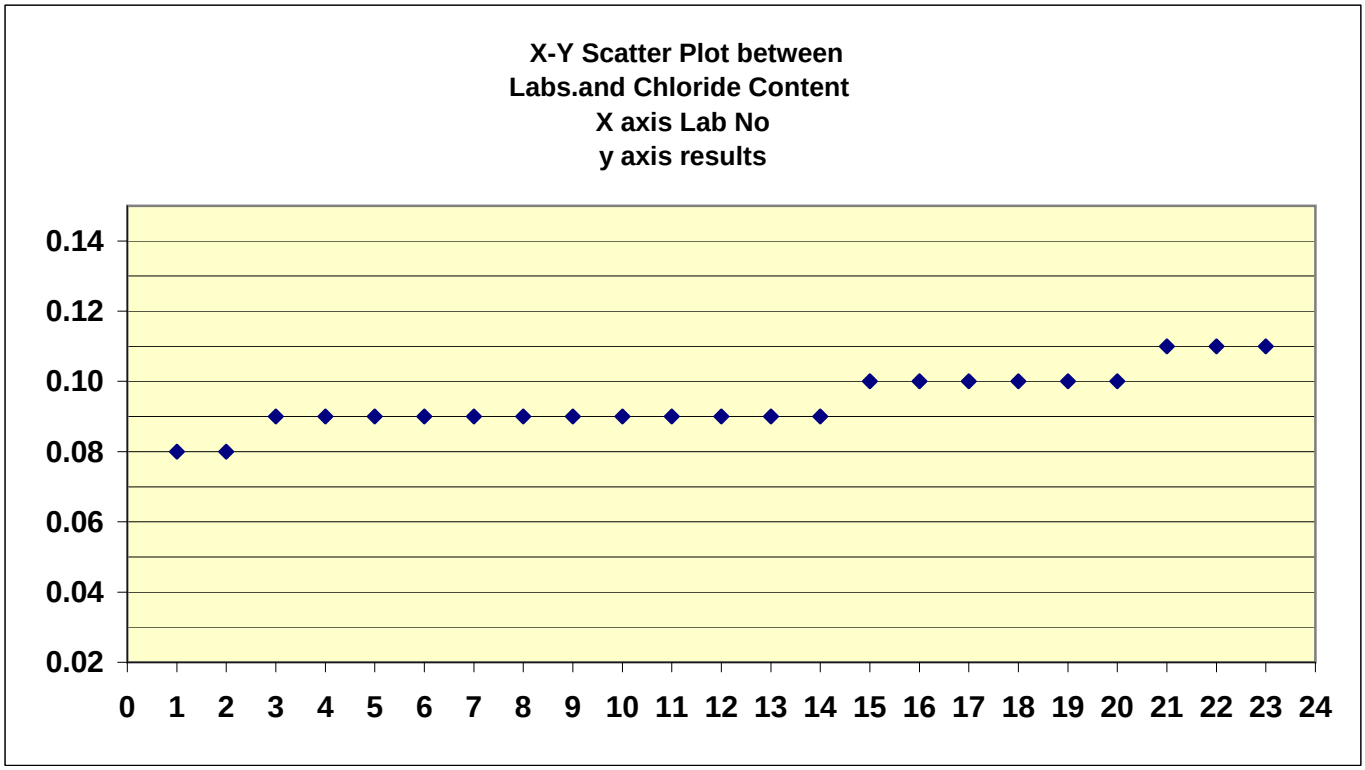
Iteration	0	xi-x*	1	$(xi-x^*)^2$	2	$(xi-x^*)^2$	3	$(xi-x^*)^2$	4	$(xi-x^*)^2$	5	$(xi-x^*)^2$	6	$(xi-x^*)^2$	Z Score
δ = 1.5 s*	---		0.09		0.08		0.08		0.07		0.07		0.07		
x* - δ	---		0.33		0.34		0.35		0.35		0.35		0.35		
x* + δ	---		0.51		0.50		0.50		0.49		0.49		0.49		
Lab 1	0.30	0.12	0.33	0.01	0.34	0.01	0.35	0.01	0.35	0.01	0.35	0.01	0.35	0.01	**-2.53**
Lab 16	0.38	0.04	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	**-0.85**
Lab 18	0.38	0.04	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	**-0.85**
Lab 20	0.38	0.04	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	**-0.85**
Lab 3	0.38	0.04	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	**-0.85**
Lab 4	0.38	0.04	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	**-0.85**
Lab 8	0.38	0.04	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	0.38	0.00	**-0.85**
Lab 23	0.39	0.03	0.39	0.00	0.39	0.00	0.39	0.00	0.39	0.00	0.39	0.00	0.39	0.00	**-0.64**
Lab 6	0.39	0.03	0.39	0.00	0.39	0.00	0.39	0.00	0.39	0.00	0.39	0.00	0.39	0.00	**-0.64**
Lab 15	0.40	0.02	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	**-0.42**
Lab 5	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	**-0.21**
Lab 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	0.42	0.00	**0.00**
Lab 12	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	0.42	0.00	**0.00**
Lab 13	0.43	0.01	0.43	0.00	0.43	0.00	0.43	0.00	0.43	0.00	0.43	0.00	0.43	0.00	**0.21**
Lab 19	0.43	0.01	0.43	0.00	0.43	0.00	0.43	0.00	0.43	0.00	0.43	0.00	0.43	0.00	**0.21**
Lab 14	0.45	0.03	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	**0.63**
Lab 21	0.45	0.03	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	**0.63**
Lab 22	0.45	0.03	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	0.45	0.00	**0.63**
Lab 11	0.46	0.04	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	**0.84**
Lab 9	0.46	0.04	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	0.46	0.00	**0.84**
Lab 2	0.50	0.08	0.50	0.01	0.50	0.01	0.50	0.01	0.49	0.01	0.49	0.01	0.49	0.01	**1.68**
Lab 17	0.52	0.10	0.51	0.01	0.50	0.01	0.50	0.01	0.49	0.01	0.49	0.01	0.49	0.01	**2.10**
Lab 7	0.54	0.12	0.51	0.01	0.50	0.01	0.50	0.01	0.49	0.01	0.49	0.01	0.49	0.01	**2.52**
Average	0.42		0.42	0.05	0.42	0.04	0.42	0.04	0.42	0.04	0.42	0.04	0.42	0.04	
SD	0.05		0.05	0.00	0.04	0.00	0.04	0.00	0.04	0.00	0.04	0.00	0.04	0.00	
New x*	**0.42**	**0.04**	**0.42**	**0.05**	**0.42**	**0.04**	**0.42**	**0.04**	**0.42**	**0.04**	**0.42**	**0.04**	**0.42**	**0.04**	
New s*	**0.06**		**0.05**		**0.05**		**0.05**		**0.05**		**0.05**		**0.05**		

N **23**

Target value	**0.42**
Low Acceptable	**0.28**
High Acceptable	**0.56**
Acceptable Range	**0.28 - 0.56**

Acid Soluble Chloride/ Sulphate Content in Concrete Blocks





Acid Soluble Chloride/ Sulphate Content in Concrete Blocks