



CCC-06072008-0238

Invoice No.: INV/PT-LB/20

رقم الممثل: 631

Date: 30 June 2008

Participant Name:

Fax No. :

Attention: Laboratory Manager

Subject: **Invoice For Participation in Inter-Laboratory Proficiency Testing Program (PTP)**

You are hereby requested to pay to Dubai Accreditation Department, Dubai Municipality the participation fee for the Inter-laboratory Proficiency Testing Program having the following details:

| | |
|---------|---|
| PTP No. | 162 |
| Details | Determination of Liquid Limit, Plastic Limit and Plasticity Index |
| Amount | 850 |

How to Pay:

EFT

Electronic Funds Transfer

Bank Name: Emirates Bank International PJSC
Branch: Dubai Main Branch, P.O. Box 2923 UAE
Account Name: Dubai Municipality – Revenue A/C
Account Number: 0022 – 107445 – 001
SWIFT Code: EBILAEAD

Credit Card

By visiting Dubai Central Laboratory
Department
Administration Building- DCLD counter –
ground floor

Cheque

Please address the cheque to Dubai Municipality
and submit it by hand to DCLD counter.

Note:

- You are kindly requested to pay the amount within one month from the date in which the result is posted on our website.
- All sending and receiving bank charges must be included in the payment to ensure the full invoice amount is received.
- Please make sure that the payment is referring to DAC Accreditation Fees Alies No. 631 regardless of the payment method used.
- After payment please submit a copy of the receipt to Dubai Accreditation Department (Aisha Al Ali in DCLD administration building- 2nd floor- DAC Director Secretary and Technical Support Office.

Best Regard.


AMINA A. MOHAMMED
DIRECTOR OF DUBAI ACCREDITATION DEPARTMENT

Cc:

- Planning and Development Office- DAC

DUBAI ACCREDITATION DEPARTMENT

REPORT ON 162nd LABORATORY PROFICIENCY TESTING DETERMINATION OF LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX

30 June 2008

1. INTRODUCTION

This document presents the results of the 162nd inter-laboratory proficiency-testing program conducted during the month of June involving the **Liquid Limit Plastic Limit and Plasticity Index** with twenty one 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:

Eighteen private laboratories and three governmental laboratories (thirteen of them are accredited by DAC for construction materials testing) participated in this program.

2.3 Samples Tested:

One (1) Sample of Clayey Soil 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. For this particular program participating Laboratories are requested to contact Dr. Yaser Saleh Rahag (Tel No.: 302 7074) to know their code number.

DUBAI ACCREDITATION DEPARTMENT

4. TEST METHOD

Instructions were given to the participants to test the samples as per:

- 4.1 **Determination of Liquid Limit** in accordance with BS 1377:1990 Part 2 Cl. 4.5/4.3, Amd 9027:1996, Sample Preparation shall be as per Cl. 4.2.4.
- 4.2 **Determination of Plastic Limit and Plasticity Index** as per BS 1377: 1990 Part 2 Cl.5 , 5.3,5.4 Amd .9027:1996
- 4.3 Use 80 Degree oven Temperatures

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 |
|---------------|-----------------------------------|
| Liquid Limit | Lab No. 12 & 18 |
| Plastic Limit | Lab No. 12 & 18 |

7. CONCLUSION AND RECOMMENDATIONS

The test results provided by the above mentioned laboratories are outside the Z - score limits of ± 3 .

8. APPENDICES

8.1 Appendix A: Raw Data

8.2 Appendix B: Calculation of z-scores and other statistics

8.3 Appendix C: Charts

رؤيتنا: بناء مدينة متميزة تتوفر فيها رفاهية العيش ومقومات النجاح
Our Vision : To create an excellent city that provides the essence of success and comfort of living.

**Determination of Liquid Limit, Plastic Limit,
And Plasticity Index**

Appendix A: Raw Data

Liquid Limit %

| Lab # | Results |
|--------|---------|
| Lab 1 | 46 |
| Lab 2 | 49 |
| Lab 3 | 49 |
| Lab 4 | 46 |
| Lab 5 | 49 |
| Lab 6 | 49 |
| Lab 7 | 50 |
| Lab 8 | 48 |
| Lab 9 | 47 |
| Lab 10 | 48 |
| Lab 11 | 49 |
| Lab 12 | 43 |
| Lab 13 | 49 |
| Lab 14 | 49 |
| Lab 15 | 49 |
| Lab 16 | 47 |
| Lab 17 | 48 |
| Lab 18 | 41 |
| Lab 19 | 49 |
| Lab 20 | 49 |
| Lab 21 | 49 |

Plastic Limit %

| Lab # | Results |
|--------|---------|
| Lab 1 | 23 |
| Lab 2 | 24 |
| Lab 3 | 25 |
| Lab 4 | 22 |
| Lab 5 | 24 |
| Lab 6 | 25 |
| Lab 7 | 23 |
| Lab 8 | 25 |
| Lab 9 | 25 |
| Lab 10 | 24 |
| Lab 11 | 24 |
| Lab 12 | 20 |
| Lab 13 | 23 |
| Lab 14 | 23 |
| Lab 15 | 23 |
| Lab 16 | 24.1 |
| Lab 17 | 24 |
| Lab 18 | 14 |
| Lab 19 | 23 |
| Lab 20 | 24 |
| Lab 21 | 23 |

Plasticity Index

| Lab # | Results |
|--------|---------|
| Lab 1 | 23 |
| Lab 2 | 25 |
| Lab 3 | 24 |
| Lab 4 | 24 |
| Lab 5 | 25 |
| Lab 6 | 24 |
| Lab 7 | 27 |
| Lab 8 | 23 |
| Lab 9 | 22 |
| Lab 10 | 24 |
| Lab 11 | 25 |
| Lab 12 | 23 |
| Lab 13 | 26 |
| Lab 14 | 26 |
| Lab 15 | 26 |
| Lab 16 | 22.9 |
| Lab 17 | 24 |
| Lab 18 | 27 |
| Lab 19 | 26 |
| Lab 20 | 25 |
| Lab 21 | 26 |

**Determination of Liquid Limit, Plastic Limit,
And Plasticity Index**

Appendix B: Calculation of z-scores and other statistics

Liquid Limit %

| Iteration | 0 | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | Z Score | | | | | |
|------------------|-------|-------|--------|--------------|--------|--------------|--------|--------------|--------|--------------|-------|--------------|-------|--------------|---------|-------|-------|-------|-------|--|
| $\delta = 1.5 s$ | --- | xi-x* | 0.00 | $(xi-x^*)^2$ | 0.00 | $(xi-x^*)^2$ | 0.00 | $(xi-x^*)^2$ | 0.00 | $(xi-x^*)^2$ | 0.00 | $(xi-x^*)^2$ | 0.00 | $(xi-x^*)^2$ | | | | | | |
| $x^* - \delta$ | --- | | 49.00 | | 49.00 | | 49.00 | | 49.00 | | 49.00 | | 49.00 | | 49.00 | 49.00 | 49.00 | 49.00 | 49.00 | |
| $x^* + \delta$ | --- | | 49.00 | | 49.00 | | 49.00 | | 49.00 | | 49.00 | | 49.00 | | 49.00 | 49.00 | 49.00 | 49.00 | 49.00 | |
| LAB 1 | 46 | 3.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | -3.00 | | | | | |
| LAB 2 | 49 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 0.00 | | | | | |
| LAB 3 | 49 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 0.00 | | | | | |
| LAB 4 | 46 | 3.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | -3.00 | | | | | |
| LAB 5 | 49 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 0.00 | | | | | |
| LAB 6 | 49 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 0.00 | | | | | |
| LAB 7 | 50 | 1.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 1.00 | | | | | |
| LAB 8 | 48 | 1.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | -1.00 | | | | | |
| LAB 9 | 47 | 2.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | -2.00 | | | | | |
| LAB 10 | 48 | 1.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | -1.00 | | | | | |
| LAB 11 | 49 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 0.00 | | | | | |
| LAB 12 | 43 | 6.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | -6.00 | | | | | |
| LAB 13 | 49 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 0.00 | | | | | |
| LAB 14 | 49 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 0.00 | | | | | |
| LAB 15 | 49 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 0.00 | | | | | |
| LAB 16 | 47 | 2.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | -2.00 | | | | | |
| LAB 17 | 48 | 1.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | -1.00 | | | | | |
| LAB 18 | 41 | 8.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | -8.00 | | | | | |
| LAB 19 | 49 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 0.00 | | | | | |
| LAB 20 | 49 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 0.00 | | | | | |
| LAB 21 | 49 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 0.00 | | | | | |
| Average | 47.76 | | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | | | | | | |
| SD | 2.21 | | 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* | 49 | 0.00 | 49.000 | 0.00 | 49.000 | 0.00 | 49.000 | 0.00 | 49.000 | 0.00 | 49.00 | 0.00 | 49.00 | 0.00 | | | | | | |
| New s* | 0.00 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.00 | | 0.00 | | | | | | | |

N 21

| | |
|------------------|-------|
| Target value | 49 |
| Low Acceptable | 46 |
| High Acceptable | 52 |
| Acceptable Range | 46-52 |

**Determination of Liquid Limit, Plastic Limit,
And Plasticity Index**

Appendix B: Calculation of z-scores and other statistics

Plastic Limit %

| Iteration | 0 | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | Z Score |
|------------------|-------|-------|--------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------|-------|----------------------|-------|----------------------|---------|
| $\delta = 1.5 s$ | --- | xi-x* | 2.22 | (xi-x*) ² | 1.78 | (xi-x*) ² | 1.78 | (xi-x*) ² | 1.78 | (xi-x*) ² | 1.77 | (xi-x*) ² | 1.77 | (xi-x*) ² | |
| x* - δ | --- | | 21.78 | | 21.78 | | 21.78 | | 21.78 | | 21.78 | | 21.78 | | |
| x* + δ | --- | | 26.22 | | 25.33 | | 25.33 | | 25.33 | | 25.33 | | 25.33 | | |
| LAB 1 | 23 | 1.00 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | -0.47 |
| LAB 2 | 24 | 0.00 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 0.38 |
| LAB 3 | 25 | 1.00 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 1.22 |
| LAB 4 | 22 | 2.00 | 22.00 | 2.42 | 22.00 | 2.42 | 22.00 | 2.42 | 22.00 | 2.42 | 22.00 | 2.42 | 22.00 | 2.42 | -1.31 |
| LAB 5 | 24 | 0.00 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 0.38 |
| LAB 6 | 25 | 1.00 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 1.22 |
| LAB 7 | 23 | 1.00 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | -0.47 |
| LAB 8 | 25 | 1.00 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 1.22 |
| LAB 9 | 25 | 1.00 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 25.00 | 2.09 | 1.22 |
| LAB 10 | 24 | 0.00 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 0.38 |
| LAB 11 | 24 | 0.00 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 0.38 |
| LAB 12 | 20 | 4.00 | 21.78 | 3.17 | 21.78 | 3.16 | 21.78 | 3.15 | 21.78 | 3.15 | 21.78 | 3.15 | 21.78 | 3.15 | -3.01 |
| LAB 13 | 23 | 1.00 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | -0.47 |
| LAB 14 | 23 | 1.00 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | -0.47 |
| LAB 15 | 23 | 1.00 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | -0.47 |
| LAB 16 | 24.1 | 0.10 | 24.10 | 0.30 | 24.10 | 0.30 | 24.10 | 0.30 | 24.10 | 0.30 | 24.10 | 0.30 | 24.10 | 0.30 | 0.46 |
| LAB 17 | 24 | 0.00 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 0.38 |
| LAB 18 | 14 | 10.00 | 21.78 | 3.17 | 21.78 | 3.16 | 21.78 | 3.15 | 21.78 | 3.15 | 21.78 | 3.15 | 21.78 | 3.15 | -8.08 |
| LAB 19 | 23 | 1.00 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | -0.47 |
| LAB 20 | 24 | 0.00 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 24.00 | 0.20 | 0.38 |
| LAB 21 | 23 | 1.00 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | 23.00 | 0.31 | -0.47 |
| Average | 23.10 | | 23.55 | 20.74 | 23.56 | 20.73 | 23.56 | 20.72 | 23.56 | 20.71 | 23.56 | 20.71 | 23.56 | 20.71 | |
| SD | 2.39 | | 1.02 | 1.09 | 1.02 | 1.09 | 1.02 | 1.09 | 1.02 | 1.09 | 1.02 | 1.09 | 1.02 | 1.09 | |
| New x* | 24 | 1.00 | 23.555 | 1.04 | 23.555 | 1.04 | 23.555 | 1.04 | 23.555 | 1.04 | 23.56 | 1.04 | 23.56 | 1.04 | |
| New s* | 1.48 | | 1.185 | | 1.184 | | 1.184 | | 1.183 | | 1.18 | | 1.18 | | |

N 21

| | |
|------------------|---------|
| Target value | 24 |
| Low Acceptable | 20 |
| High Acceptable | 27 |
| Acceptable Range | 20 - 27 |

**Determination of Liquid Limit, Plastic Limit,
And Plasticity Index**

Appendix B: Calculation of z-scores and other statistics

Plasticity Index

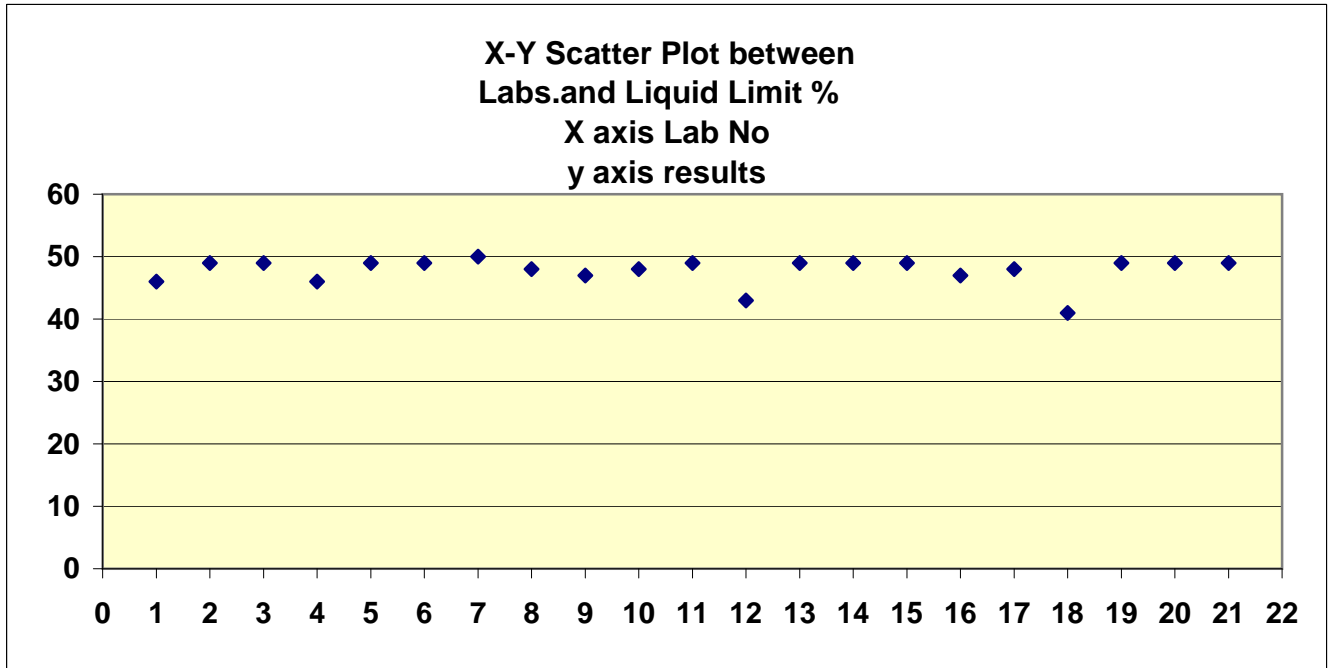
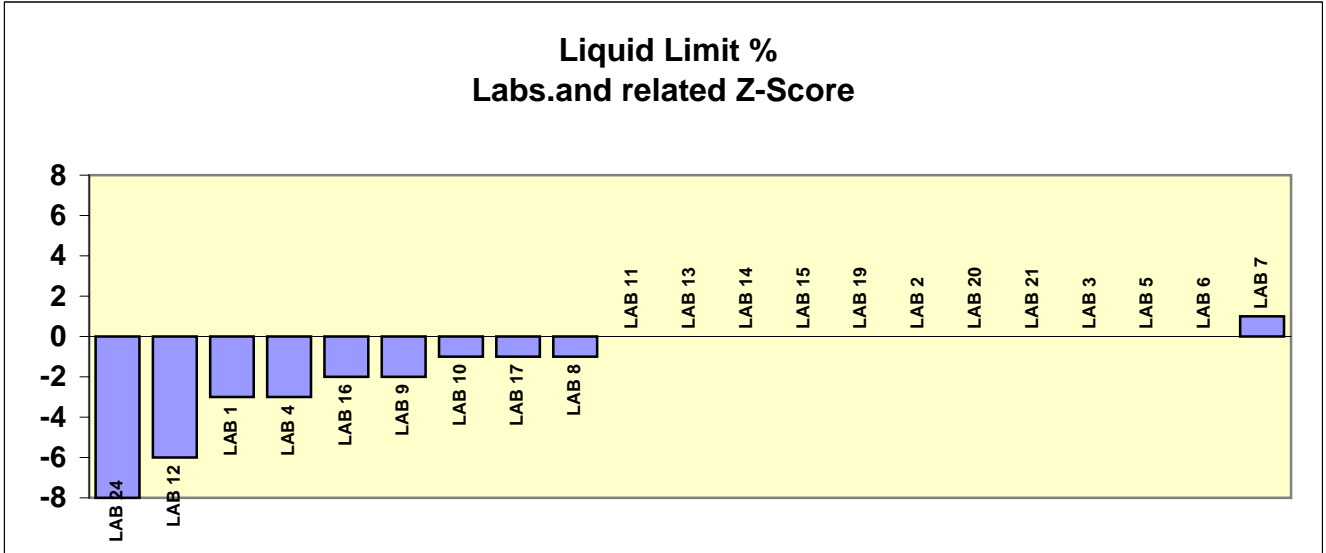
| Iteration | 0 | | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | Z Score |
|------------------|-------|-------|--------|----------------------|--------|----------------------|--------|----------------------|--------|----------------------|-------|----------------------|-------|----------------------|---------|
| $\delta = 1.5 s$ | --- | xi-x* | 2.22 | (xi-x*) ² | 2.18 | (xi-x*) ² | 2.11 | (xi-x*) ² | 2.06 | (xi-x*) ² | 2.03 | (xi-x*) ² | 2.01 | (xi-x*) ² | |
| x* - δ | --- | | 22.78 | | 22.52 | | 22.58 | | 22.62 | | 22.65 | | 22.66 | | |
| x* + δ | --- | | 27.22 | | 26.88 | | 26.79 | | 26.74 | | 26.70 | | 26.68 | | |
| LAB 1 | 23 | 2.00 | 23.00 | 2.89 | 23.00 | 2.85 | 23.00 | 2.82 | 23.00 | 2.80 | 23.00 | 2.79 | 23.00 | 2.78 | -1.25 |
| LAB 2 | 25 | 0.00 | 25.00 | 0.09 | 25.00 | 0.10 | 25.00 | 0.10 | 25.00 | 0.11 | 25.00 | 0.11 | 25.00 | 0.11 | 0.25 |
| LAB 3 | 24 | 1.00 | 24.00 | 0.49 | 24.00 | 0.47 | 24.00 | 0.46 | 24.00 | 0.45 | 24.00 | 0.45 | 24.00 | 0.45 | -0.50 |
| LAB 4 | 24 | 1.00 | 24.00 | 0.49 | 24.00 | 0.47 | 24.00 | 0.46 | 24.00 | 0.45 | 24.00 | 0.45 | 24.00 | 0.45 | -0.50 |
| LAB 5 | 25 | 0.00 | 25.00 | 0.09 | 25.00 | 0.10 | 25.00 | 0.10 | 25.00 | 0.11 | 25.00 | 0.11 | 25.00 | 0.11 | 0.25 |
| LAB 6 | 24 | 1.00 | 24.00 | 0.49 | 24.00 | 0.47 | 24.00 | 0.46 | 24.00 | 0.45 | 24.00 | 0.45 | 24.00 | 0.45 | -0.50 |
| LAB 7 | 27 | 2.00 | 27.00 | 5.30 | 26.88 | 4.80 | 26.79 | 4.47 | 26.74 | 4.26 | 26.70 | 4.12 | 26.68 | 4.04 | 1.75 |
| LAB 8 | 23 | 2.00 | 23.00 | 2.89 | 23.00 | 2.85 | 23.00 | 2.82 | 23.00 | 2.80 | 23.00 | 2.79 | 23.00 | 2.78 | -1.25 |
| LAB 9 | 22 | 3.00 | 22.78 | 3.70 | 22.78 | 3.66 | 22.78 | 3.62 | 22.78 | 3.60 | 22.78 | 3.59 | 22.78 | 3.58 | -2.00 |
| LAB 10 | 24 | 1.00 | 24.00 | 0.49 | 24.00 | 0.47 | 24.00 | 0.46 | 24.00 | 0.45 | 24.00 | 0.45 | 24.00 | 0.45 | -0.50 |
| LAB 11 | 25 | 0.00 | 25.00 | 0.09 | 25.00 | 0.10 | 25.00 | 0.10 | 25.00 | 0.11 | 25.00 | 0.11 | 25.00 | 0.11 | 0.25 |
| LAB 12 | 23 | 2.00 | 23.00 | 2.89 | 23.00 | 2.85 | 23.00 | 2.82 | 23.00 | 2.80 | 23.00 | 2.79 | 23.00 | 2.78 | -1.25 |
| LAB 13 | 26 | 1.00 | 26.00 | 1.69 | 26.00 | 1.72 | 26.00 | 1.74 | 26.00 | 1.76 | 26.00 | 1.77 | 26.00 | 1.77 | 1.00 |
| LAB 14 | 26 | 1.00 | 26.00 | 1.69 | 26.00 | 1.72 | 26.00 | 1.74 | 26.00 | 1.76 | 26.00 | 1.77 | 26.00 | 1.77 | 1.00 |
| LAB 15 | 26 | 1.00 | 26.00 | 1.69 | 26.00 | 1.72 | 26.00 | 1.74 | 26.00 | 1.76 | 26.00 | 1.77 | 26.00 | 1.77 | 1.00 |
| LAB 16 | 22.9 | 2.10 | 22.90 | 3.24 | 22.90 | 3.19 | 22.90 | 3.17 | 22.90 | 3.15 | 22.90 | 3.13 | 22.90 | 3.13 | -1.33 |
| LAB 17 | 24 | 1.00 | 24.00 | 0.49 | 24.00 | 0.47 | 24.00 | 0.46 | 24.00 | 0.45 | 24.00 | 0.45 | 24.00 | 0.45 | -0.50 |
| LAB 18 | 27 | 2.00 | 27.00 | 5.30 | 26.88 | 4.80 | 26.79 | 4.47 | 26.74 | 4.26 | 26.70 | 4.12 | 26.68 | 4.04 | 1.75 |
| LAB 19 | 26 | 1.00 | 26.00 | 1.69 | 26.00 | 1.72 | 26.00 | 1.74 | 26.00 | 1.76 | 26.00 | 1.77 | 26.00 | 1.77 | 1.00 |
| LAB 20 | 25 | 0.00 | 25.00 | 0.09 | 25.00 | 0.10 | 25.00 | 0.10 | 25.00 | 0.11 | 25.00 | 0.11 | 25.00 | 0.11 | 0.25 |
| LAB 21 | 26 | 1.00 | 26.00 | 1.69 | 26.00 | 1.72 | 26.00 | 1.74 | 26.00 | 1.76 | 26.00 | 1.77 | 26.00 | 1.77 | 1.00 |
| Average | 24.66 | | 24.70 | 37.45 | 24.69 | 36.37 | 24.68 | 35.63 | 24.67 | 35.16 | 24.67 | 34.87 | 24.67 | 34.69 | |
| SD | 1.43 | | 1.37 | 1.64 | 1.35 | 1.53 | 1.33 | 1.46 | 1.33 | 1.42 | 1.32 | 1.39 | 1.32 | 1.38 | |
| New x* | 25 | 1.00 | 24.699 | 1.28 | 24.687 | 1.24 | 24.679 | 1.21 | 24.674 | 1.19 | 24.67 | 1.18 | 24.67 | 1.17 | |
| New s* | 1.48 | | 1.454 | | 1.404 | | 1.372 | | 1.352 | | 1.34 | | 1.33 | | |

N 21

| | |
|------------------|--------|
| Target value | 25 |
| Low Acceptable | 21 |
| High Acceptable | 29 |
| Acceptable Range | 21- 29 |

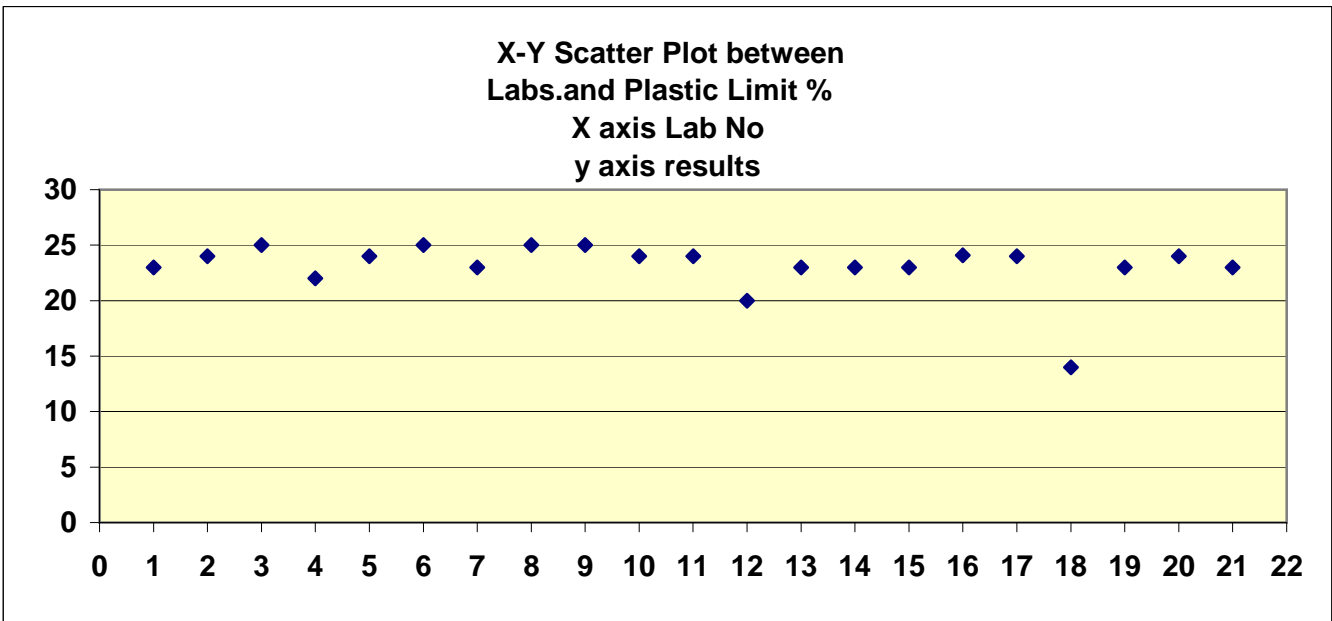
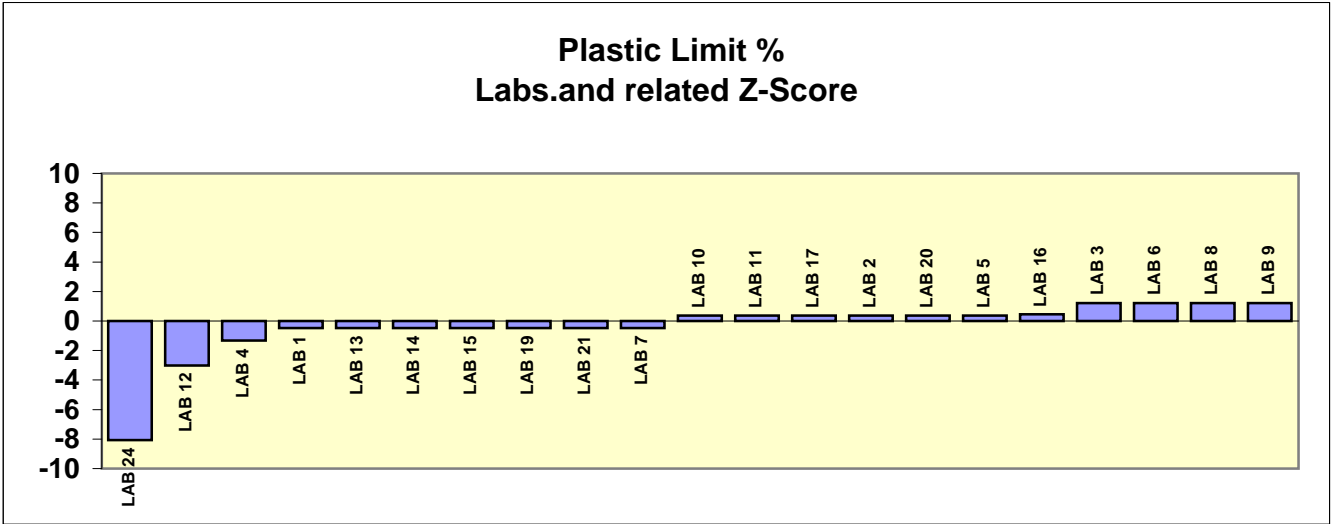
**Determination of Liquid Limit, Plastic Limit,
And Plasticity Index**

Appendix C:Charts



**Determination of Liquid Limit, Plastic Limit,
And Plasticity Index**

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**Determination of Liquid Limit, Plastic Limit,
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Appendix C:Charts

