

## Paper & Paperboard Interlaboratory Program

### Summary Report #239S - March 2009

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## **The CTS Paper & Paperboard Program**

In 1969, the National Bureau of Standards (now designated the National Institute for Standards and Technology) and the Technical Association of the Pulp and Paper Industry (TAPPI) developed an interlaboratory program for paper and paperboard testing. Since 1971, Collaborative Testing Services has operated the Collaborative Reference Program for Paper and Paperboard. With hundreds of organizations from around the world participating in these tests, this program has become one of the largest of its kind. The program allows laboratories to compare the performance of their testing with that of other participating laboratories, and provides a realistic picture of the state of paper testing.

### **About CTS**

Founded in 1971, Collaborative Testing Services, Inc. (CTS) is a privately - owned company that specializes in interlaboratory tests for a variety of industrial sectors: rubber, plastics, fasteners and metals, CKPG, paper, color, and wine as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality assurance objectives.

If there are any questions on the report or testing program, please contact:

Collaborative Testing Services, Inc.  
21331 Gentry Drive  
Sterling, Virginia 20166 USA  
+1-571-434-1925  
FAX #: +1-571-434-1937  
paper@cts-interlab.com

(Toll-free fax within the U.S.: 1-866-fax-2cts)  
Office Hours: 8:00 a.m. - 4:30 p.m. ET

## Key for Web Summary Reports (Page 1 of 2)

|                                       |   |
|---------------------------------------|---|
| <b>WebCode</b>                        | Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Paper Report published on the CTS web site. The WebCode for each analysis can be found in the Performance Analysis Report mailed to each participant. In addition, the WebCodes can be found on the data sheets.  |
| <b>Lab Mean</b>                       | The average of the values obtained for each sample by the participant.  |
| <b>Grand Mean</b>                     | The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.   |
| <b>Difference from Grand Mean</b>     | The difference of the LAB MEAN from the GRAND MEAN.   |
| <b>Between-Lab Standard Deviation</b> | An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).   |
| <b>Comparative Performance Value</b>  | An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa). The critical value for each CPV will vary depending on the number of labs participating in a test. |
| <b>Inst Code</b>                      | A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section), if instruments are tracked.  |
| <b>Data Flag</b>                      | DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:  |

| DATA FLAG | STATISTICALLY INCLUDED/EXCLUDED | ACTION REQUIRED  |
|-----------|---------------------------------|--|
| *         | INCLUDED                        | <b>CAUTION</b> - review testing procedure and monitor future results. Results fall outside 95% ellipse but within a 99% ellipse that is calculated but not drawn.  |
| X         | EXCLUDED                        | <b>STOP</b> - immediate review of data and/or testing procedure is required. Results fall outside the 99% ellipse. See specific notes following each table for more information on why the data is excluded. |
| M         | EXCLUDED                        | <b>PROCEED</b> - lab was unable to report data for at least one sample.  |

**Graph** - For each laboratory, the LAB MEAN for the first sample (x-axis) is plotted against the LAB MEAN for the second sample (y-axis) with each point representing a laboratory. The horizontal and vertical cross-hairs are the GRAND MEANS for each sample. When 20 or more laboratories are in the statistics, an ellipse is also drawn so that 95% of the time a randomly selected laboratory will be included inside the ellipse. Plotted data flags are explained on the previous page.

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### Common Problems Highlighted in Footnotes

1. **Extreme data** - The laboratory's results for one or both samples are so inconsistent with those of the other participants that the lab mean(s) fall outside the plot. The participant is advised to immediately review his data and/or testing procedure.
2. **Systematic bias** - The laboratory's results are either consistently high or low for both samples when compared to the other participants (the plotted point falls near the top or bottom of the ellipse). This indicates that the participant is performing the test with a constant bias. Causes of systematic errors include improper calibration, the particular make/model of equipment or a modification to the testing procedure.
3. **Inconsistency in testing between samples/sample sets** - The laboratory's results indicate that there are differences in the way the two samples tested (the plotted point falls to the side of the ellipse). This type of error may be attributed to the analyst deviating from the procedure when testing one of the samples or a material interaction occurrence with the instrument or room conditions. The inconsistency is reflected in the CPVs for the two samples, such as a +1.5 CPV for sample A and a -2.2 CPV for sample B. CTS also will specify if the laboratory's data for one sample are high/low compared to the other participants. If this inconsistency is slight, the lab's plotted point will be an \* that falls on the edge of the ellipse.
4. **Inconsistency in testing within a sample** - The laboratory's within-lab standard deviation for a specified sample is high when compared to the other participants, often causing the lab's plotted point to fall outside of the ellipse.

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Labs flagged with an \* are not typically included in the footnotes of a data table. These labs may locate their position in the control ellipse and use the definitions above to help identify the type of testing error. An \* should serve as a caution flag, a "yellow light", to a lab. If this error is repeated in future rounds, a lab may need to stop and review its testing procedures. The initial data flag is not cause for alarm. Interlaboratory tests conducted at regular intervals permit a lab to recognize trends in testing.

## Instrument Manufacturer Contacts

If your results have been flagged with an "X" and you suspect that the problem is with your instrument (and not your testing procedure), CTS urges you to contact the appropriate instrument manufacturer. CTS has asked manufacturers to supply a contact person who is familiar with the Paper, Paperboard & Corrugated Fiberboard Interlaboratory Program. The listed service contact should be able to work with you on evaluating your results and determining possible causes of the problem.

### **Technidyne Corp., Hagerty Div.**

George Hagerty  
287 Dix Ave. P.O. Box 4741  
Queensbury, NY 12804  
Phone: (518) 793-2834  
FAX #: (518) 792-1796

### **Technidyne Corporation**

Jeff Hobbs / Mike Lankins  
100 Quality Avenue  
New Albany, IN 47150-2272 USA  
Phone: (812) 948-2884  
FAX #: (812) 945-6847

### **Thwing Albert Instrument Co.**

Raymond McCart, Service Contact  
David Zarrilli, Sales Contact  
10960 Dutton Road  
Philadelphia, PA 19154  
Phone: (215) 637-0100  
FAX #: (215) 632-8370

### **Testing Machines Inc.**

Michael Foran, Technical Support Engineer  
2910 Expressway Drive South  
Islandia, NY 11722  
Phone: (631) 439-5400  
FAX #: (631) 439-5420

### **Huygen Corporation**

Richard Wade  
P.O. Box 316  
Waconda, IL 60084  
Phone: (815) 455-2200  
FAX #: (815) 455-2300

### **Gurley Precision Instruments**

Martin Gordinier, Product Manager  
P.O. Box 88  
Troy, NY 12181-0088  
Phone: (800) 759-1844  
FAX #: (518) 274-0336

### **Lorentzen & Wettre USA Inc.**

Bill Crai, Technical Manager  
1055 Windward Ridge Pkwy  
Suite 160  
Alpharetta, GA 30005  
Phone: (770) 442-8015  
FAX #: (770) 442-6792

### **Valmet Inc.**

Eeva Nettamo, Product Mgr Paper Testing  
3100 Medlock Bridge Road - Suite 260  
Norcross, GA 30071  
Phone: (404) 448-0849  
FAX #: (404) 242-8386

### **Custom Scientific Instruments**

DEK-TRON Scientific  
Segundo Vargas, Chief Design Engineer  
244 East Third Street  
Plainfield, NJ 07060  
Phone: (908) 668-1777  
FAX #: (908) 668-4794

### **Emmerson Apparatus**

170 Anderson Street  
Portland, ME 04101  
Phone: (207) 774-5254  
FAX#: (207) 774-5304

## TAPPI-CTS Interlaboratory Testing Program

## Analysis 305

## Bursting Strength - Printing Papers

| WebCode | Data Flag | Sample SA43 |                      |       | Sample SA44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| 1C756Y  |           | 27.20       | -0.27                | -0.23 | 26.30       | -0.23                | -0.19 |
| 27BV75  | X         | 29.00       | 1.53                 | 1.32  | 27.60       | 1.07                 | 0.90  |
| 2MLXUE  |           | 26.96       | -0.51                | -0.44 | 24.99       | -1.54                | -1.29 |
| 3BKU3Q  |           | 27.68       | 0.21                 | 0.18  | 27.75       | 1.22                 | 1.02  |
| 58MUUW  |           | 27.71       | 0.24                 | 0.21  | 25.94       | -0.58                | -0.49 |
| 5SM9FN  |           | 25.65       | -1.83                | -1.58 | 24.80       | -1.72                | -1.45 |
| 5Z7MW9  | *         | 27.90       | 0.43                 | 0.37  | 25.10       | -1.43                | -1.20 |
| 7QLQ36  |           | 27.75       | 0.28                 | 0.24  | 26.40       | -0.13                | -0.11 |
| 9R6S1Z  |           | 26.30       | -1.17                | -1.01 | 25.40       | -1.13                | -0.94 |
| 9X1HX9  |           | 26.53       | -0.94                | -0.82 | 25.79       | -0.74                | -0.62 |
| A3VTAE  |           | 29.20       | 1.73                 | 1.50  | 28.02       | 1.49                 | 1.25  |
| AJYNHY  |           | 25.60       | -1.87                | -1.62 | 24.30       | -2.23                | -1.87 |
| CYCH8U  |           | 28.22       | 0.75                 | 0.65  | 27.24       | 0.71                 | 0.60  |
| E7EY12  |           | 25.40       | -2.07                | -1.79 | 25.60       | -0.93                | -0.78 |
| G6H3QD  |           | 26.84       | -0.63                | -0.55 | 25.37       | -1.16                | -0.97 |
| GVVK78  |           | 28.63       | 1.16                 | 1.00  | 27.84       | 1.31                 | 1.10  |
| HVKJ5Q  |           | 27.95       | 0.48                 | 0.42  | 27.46       | 0.93                 | 0.78  |
| J26R9G  | X         | 34.90       | 7.43                 | 6.43  | 36.45       | 9.92                 | 8.32  |
| LVY172  |           | 28.28       | 0.81                 | 0.70  | 26.29       | -0.24                | -0.20 |
| MTGA6G  |           | 28.50       | 1.03                 | 0.89  | 27.60       | 1.07                 | 0.90  |
| N9JZFE  |           | 26.41       | -1.06                | -0.92 | 25.66       | -0.87                | -0.73 |
| NB9FXU  |           | 28.80       | 1.33                 | 1.15  | 26.70       | 0.17                 | 0.15  |
| NNQB7S  |           | 28.75       | 1.28                 | 1.11  | 27.87       | 1.34                 | 1.13  |
| PARCYF  |           | 26.79       | -0.68                | -0.59 | 26.32       | -0.20                | -0.17 |
| PCV2ZR  |           | 29.12       | 1.65                 | 1.43  | 27.34       | 0.81                 | 0.68  |
| Q4YYZM  |           | 29.55       | 2.08                 | 1.80  | 28.20       | 1.67                 | 1.40  |
| QEGSKL  |           | 25.56       | -1.91                | -1.65 | 24.80       | -1.73                | -1.45 |
| QX89MP  |           | 26.40       | -1.07                | -0.93 | 26.20       | -0.33                | -0.27 |
| RUZL3R  |           | 25.76       | -1.71                | -1.48 | 24.47       | -2.06                | -1.72 |
| S667R2  |           | 28.65       | 1.18                 | 1.02  | 27.27       | 0.74                 | 0.62  |
| T2MDCN  | X         | 27.95       | 0.48                 | 0.42  | 24.95       | -1.58                | -1.32 |
| T8AMRZ  |           | 26.71       | -0.76                | -0.66 | 25.89       | -0.63                | -0.53 |
| TLM8PT  |           | 28.18       | 0.71                 | 0.61  | 27.88       | 1.35                 | 1.14  |
| TUPT41  |           | 28.37       | 0.90                 | 0.78  | 28.66       | 2.13                 | 1.79  |
| U9M197  |           | 27.80       | 0.32                 | 0.28  | 27.75       | 1.22                 | 1.02  |
| UP5MTT  |           | 28.07       | 0.60                 | 0.52  | 27.23       | 0.70                 | 0.59  |
| VLTSCK  |           | 27.17       | -0.30                | -0.26 | 27.36       | 0.83                 | 0.70  |
| VRXM3N  |           | 28.32       | 0.85                 | 0.73  | 27.16       | 0.64                 | 0.53  |
| X48XYT  |           | 28.33       | 0.86                 | 0.74  | 27.79       | 1.26                 | 1.06  |
| Y1PDTZ  | X         | 23.90       | -3.57                | -3.09 | 21.85       | -4.68                | -3.92 |
| YBCS22  |           | 25.80       | -1.67                | -1.45 | 25.00       | -1.53                | -1.28 |
| Z5X6DW  |           | 27.06       | -0.41                | -0.36 | 26.23       | -0.29                | -0.25 |

**Bursting Strength - Printing Papers**

|   | <b>Sample SA43</b> | <b>Summary Statistics</b> | <b>Sample SA44</b> |
|---|--------------------|---------------------------|--------------------|
| Grand Means   | 27.471 psi         |                           | 26.526 psi         |
| SD Btwn Labs  | 1.155 psi          |                           | 1.193 psi          |
| Statistics based on 38 of 42 reporting participants |                    |                           |                    |

**Comments on assigned Data Flags for Test #305**

27BV75 (X) - Data appears to be transposed between samples. Data switched by CTS.

J26R9G (X) - Extreme data.

T2MDCN (X) - Data appears to be transposed between samples. Data switched by CTS.

Y1PDTZ (X) - Systematic error (data for both samples are low).

**Analysis Notes:**

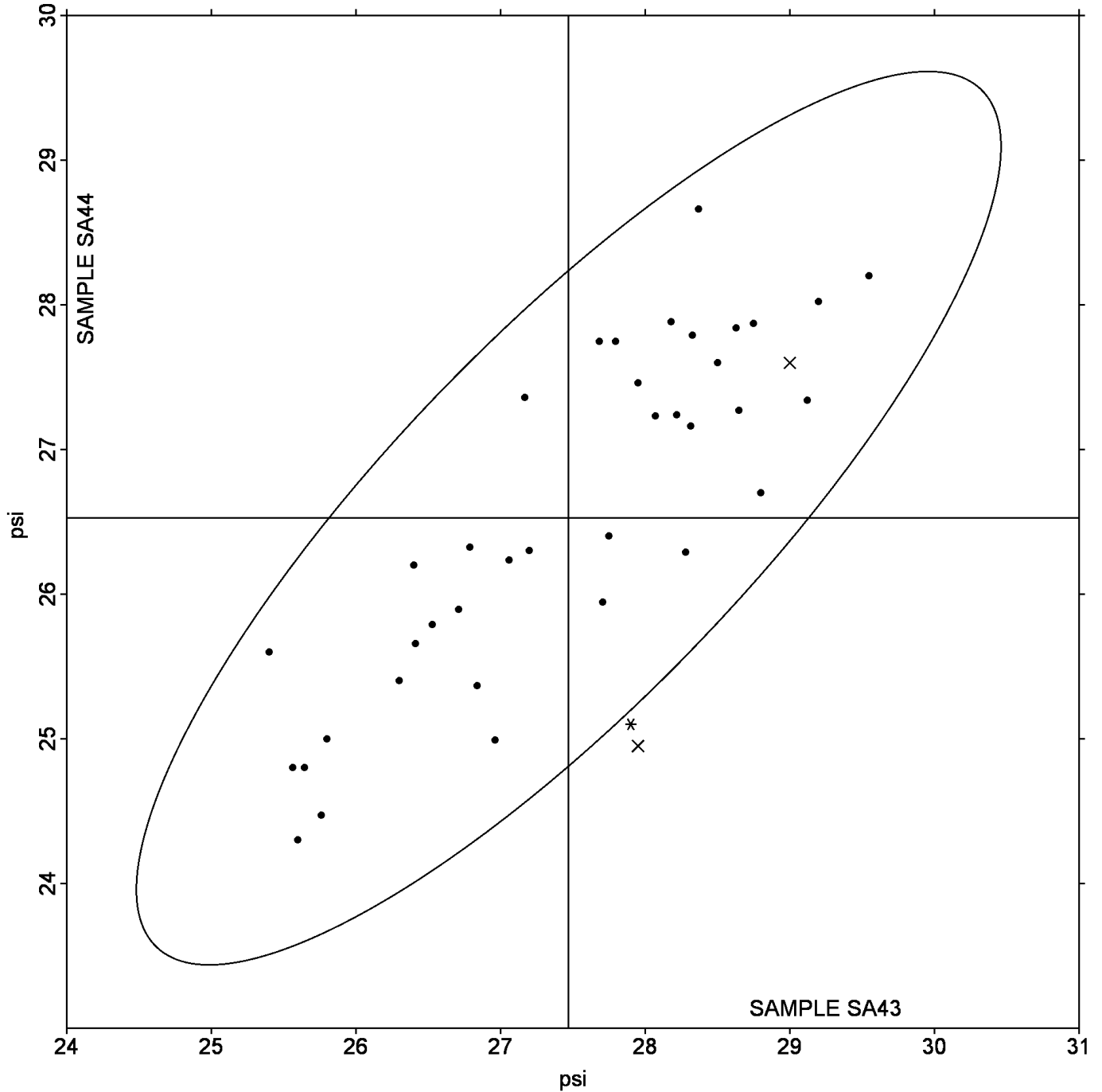
QEGSKL - Two determinations removed from the Lab Mean of Sample SA43 per Grubb's Test at 5% risk (TAPPI 1205).

**Bursting Strength - Printing Papers**

Grand Mean Sample SA43 = 27.471 psi

Grand Mean Sample SA44 = 26.526 psi

**ANALYSIS 305**



TAPPI-CTS Interlaboratory Testing Program

Analysis 310

Bursting Strength - Packaging Papers

| WebCode | Data Flag | Sample SB43 |                      |       | Sample SB44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| 2B2RVQ  |           | 64.11       | 5.02                 | 1.34  | 55.39       | 5.57                 | 1.66  |
| 4V828C  |           | 61.94       | 2.85                 | 0.76  | 51.19       | 1.37                 | 0.41  |
| 5H8FT9  |           | 57.80       | -1.29                | -0.34 | 48.59       | -1.23                | -0.37 |
| 5RL2UF  |           | 61.60       | 2.51                 | 0.67  | 53.50       | 3.68                 | 1.10  |
| 6A6AG9  | X         | 68.10       | 9.01                 | 2.40  | 63.40       | 13.58                | 4.06  |
| 6TQGUD  |           | 57.62       | -1.47                | -0.39 | 49.47       | -0.35                | -0.10 |
| 7CEMWQ  |           | 57.41       | -1.68                | -0.45 | 49.18       | -0.64                | -0.19 |
| 7UAVN3  |           | 60.34       | 1.25                 | 0.33  | 47.45       | -2.37                | -0.71 |
| 8FYTA5  |           | 56.40       | -2.69                | -0.72 | 46.80       | -3.02                | -0.90 |
| 8QVPHG  | *         | 69.04       | 9.95                 | 2.65  | 60.63       | 10.81                | 3.23  |
| 98FEUZ  |           | 56.90       | -2.19                | -0.58 | 49.80       | -0.02                | -0.01 |
| D5XCV9  | *         | 61.10       | 2.01                 | 0.54  | 45.80       | -4.02                | -1.20 |
| E1VVUZ  |           | 57.70       | -1.39                | -0.37 | 50.90       | 1.08                 | 0.32  |
| EXPVLG  |           | 56.40       | -2.69                | -0.72 | 48.00       | -1.82                | -0.54 |
| EYYVN3  |           | 59.58       | 0.49                 | 0.13  | 49.42       | -0.40                | -0.12 |
| GF4B7E  |           | 59.23       | 0.14                 | 0.04  | 49.04       | -0.78                | -0.23 |
| J38UG5  |           | 57.00       | -2.09                | -0.56 | 46.30       | -3.52                | -1.05 |
| M1WYYX  |           | 58.27       | -0.82                | -0.22 | 49.64       | -0.18                | -0.05 |
| R6M56U  |           | 54.56       | -4.53                | -1.21 | 45.38       | -4.44                | -1.33 |
| S7J1Q5  |           | 59.10       | 0.01                 | 0.00  | 49.10       | -0.72                | -0.22 |
| T4LFQC  |           | 61.12       | 2.03                 | 0.54  | 51.45       | 1.63                 | 0.49  |
| TDQF35  |           | 56.04       | -3.05                | -0.81 | 48.12       | -1.69                | -0.51 |
| VCXFXC  |           | 57.93       | -1.16                | -0.31 | 50.64       | 0.82                 | 0.25  |
| VN24T3  |           | 62.60       | 3.51                 | 0.93  | 53.20       | 3.38                 | 1.01  |
| XN3G17  | *         | 48.11       | -10.98               | -2.92 | 44.49       | -5.33                | -1.59 |
| Y68UXG  |           | 59.76       | 0.67                 | 0.18  | 49.59       | -0.23                | -0.07 |
| ZGTSSY  |           | 60.27       | 1.18                 | 0.31  | 49.01       | -0.81                | -0.24 |
| ZM8U1W  |           | 63.50       | 4.41                 | 1.17  | 53.02       | 3.20                 | 0.96  |

| Summary Statistics                                  |             |             |
|---|-------------|-------------|
|   | Sample SB43 | Sample SB44 |
| Grand Means   | 59.090 psi  | 49.818 psi  |
| SD Btwn Labs  | 3.756 psi   | 3.346 psi   |
| Statistics based on 27 of 28 reporting participants |             |             |

**Comments on assigned Data Flags for Test #310**

6A6AG9 (X) - Systematic error (data for both samples are high).

TAPPI-CTS Interlaboratory Testing Program

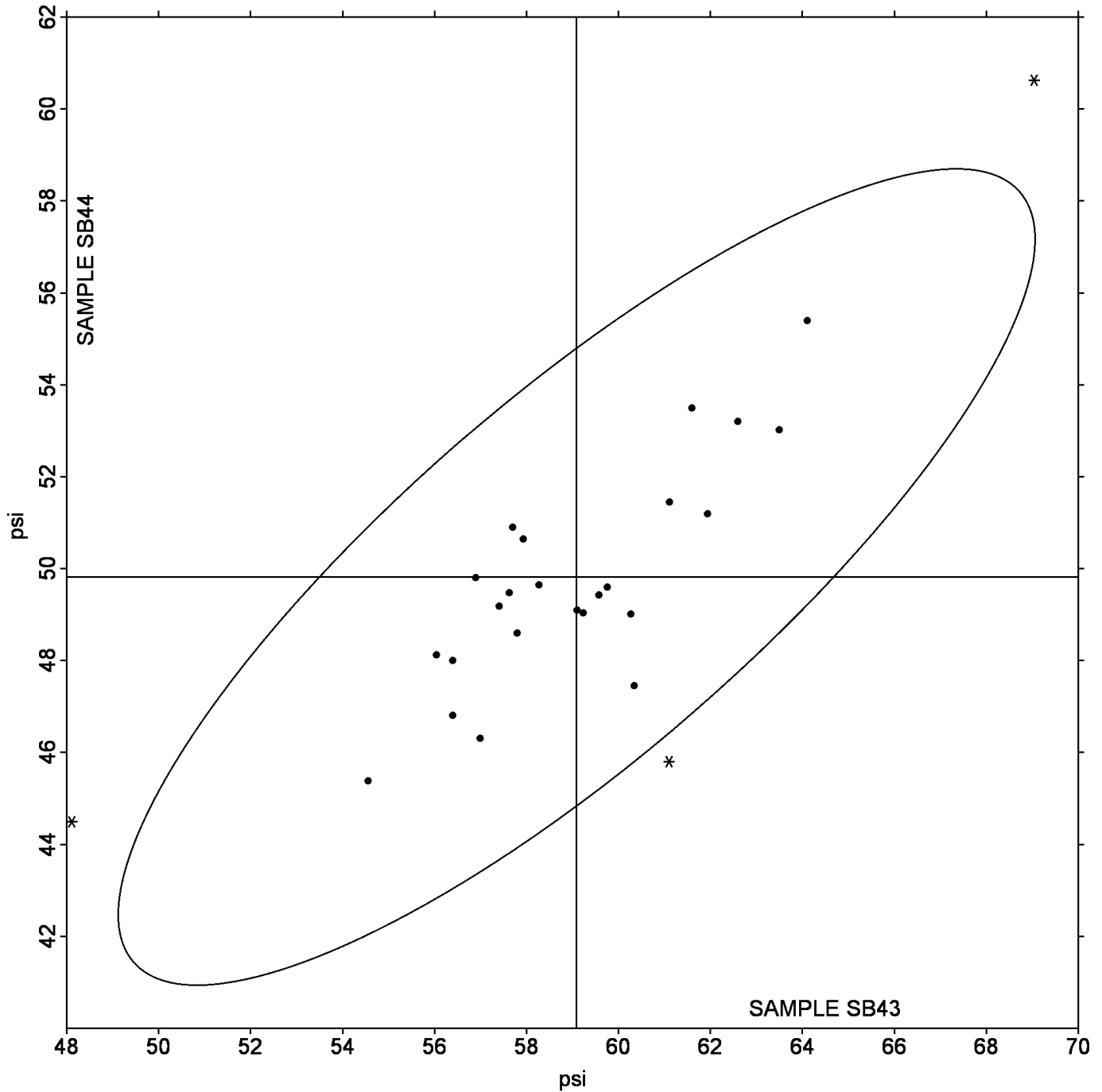
Analysis 310

Bursting Strength - Packaging Papers

Grand Mean Sample **SB43** = 59.090 psi

Grand Mean Sample **SB44** = 49.818 psi

ANALYSIS 310



TAPPI-CTS Interlaboratory Testing Program  
Analysis 311

**Tearing Strength - Newsprint**

| WebCode | Data Flag | Sample SK43 |                      |       | Sample SK44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| 6JY1Z5  |           | 20.50       | 0.36                 | 0.17  | 20.32       | 0.48                 | 0.25  |
| 6YN63C  |           | 17.12       | -3.01                | -1.37 | 17.29       | -2.55                | -1.33 |
| 955SJ2  |           | 20.82       | 0.69                 | 0.31  | 20.71       | 0.87                 | 0.45  |
| BRS2VJ  |           | 19.05       | -1.08                | -0.49 | 19.05       | -0.79                | -0.41 |
| BZSZUE  |           | 18.10       | -2.03                | -0.92 | 18.74       | -1.10                | -0.57 |
| ECQZB8  |           | 21.50       | 1.37                 | 0.62  | 21.00       | 1.16                 | 0.60  |
| GVNW1Z  |           | 21.20       | 1.07                 | 0.49  | 20.36       | 0.52                 | 0.27  |
| HTFVNE  | X         | 30.50       | 10.37                | 4.71  | 30.30       | 10.46                | 5.45  |
| KLJ6M1  |           | 19.48       | -0.65                | -0.30 | 19.08       | -0.76                | -0.40 |
| LTGZPT  | X         | 36.29       | 16.16                | 7.34  | 35.71       | 15.87                | 8.27  |
| M5UG3G  |           | 19.95       | -0.18                | -0.08 | 19.88       | 0.04                 | 0.02  |
| NA315W  |           | 17.15       | -2.98                | -1.35 | 17.06       | -2.78                | -1.45 |
| PGVVFJ8 |           | 20.38       | 0.25                 | 0.11  | 20.64       | 0.80                 | 0.42  |
| TTJQP3  |           | 23.00       | 2.87                 | 1.30  | 22.00       | 2.16                 | 1.12  |
| UJYN7L  |           | 18.49       | -1.64                | -0.75 | 17.56       | -2.28                | -1.19 |
| YRCLS3  |           | 25.10       | 4.97                 | 2.26  | 24.10       | 4.26                 | 2.22  |

| Summary Statistics                                  |              |              |
|---|--------------|--------------|
|   | Sample SK43  | Sample SK44  |
| Grand Means   | 20.131 Grams | 19.842 Grams |
| SD Btwn Labs  | 2.202 Grams  | 1.919 Grams  |
| Statistics based on 14 of 16 reporting participants |              |              |

**Comments on assigned Data Flags for Test #311**

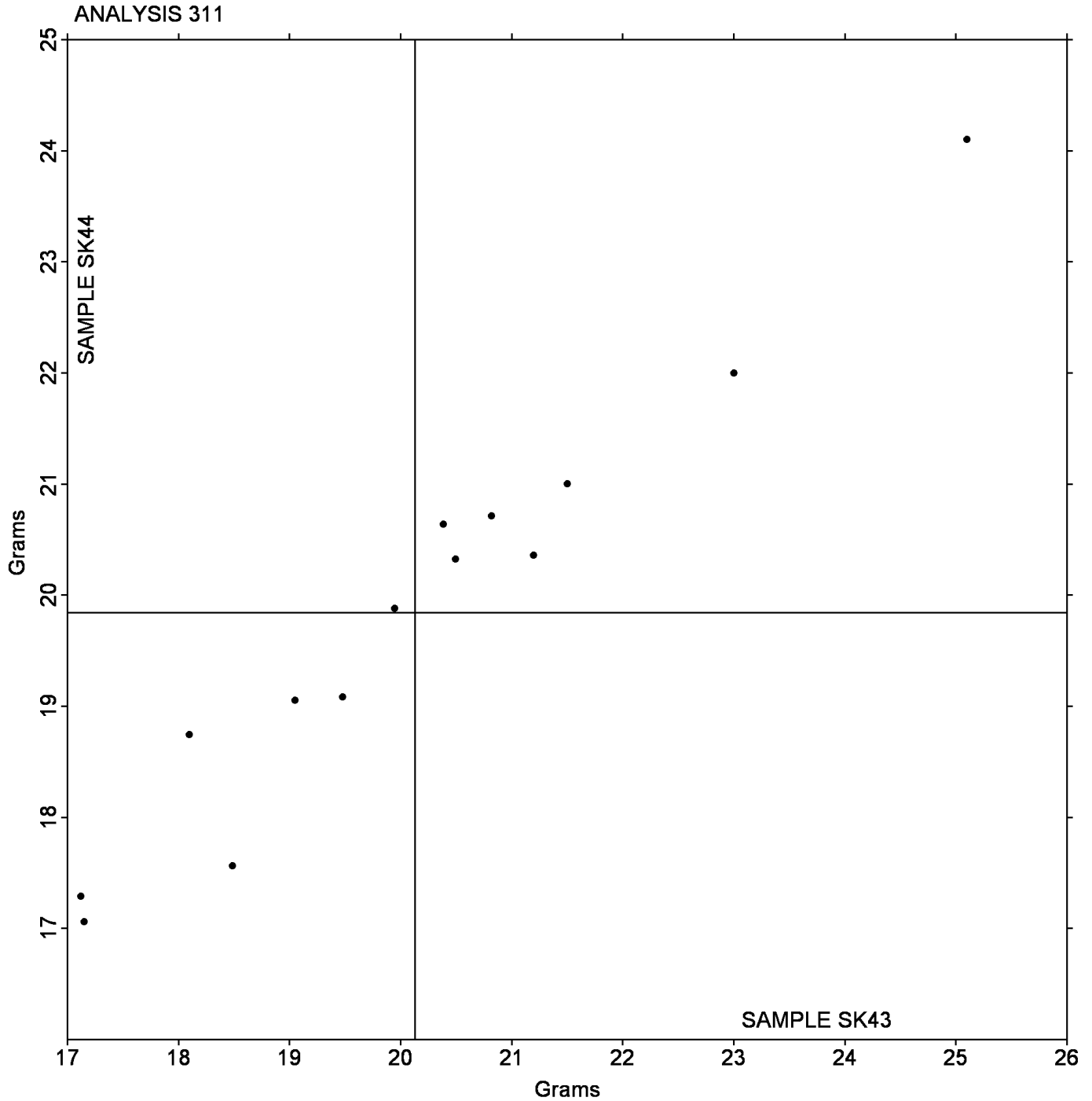
HTFVNE (X) - Extreme data.

LTGZPT (X) - Extreme data.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 311  
Tearing Strength - Newsprint

Grand Mean Sample **SK43** = 20.131 Grams

Grand Mean Sample **SK44** = 19.842 Grams



If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

## TAPPI-CTS Interlaboratory Testing Program

## Analysis 312

## Tearing Strength - Printing Papers

| WebCode | Data Flag | Sample SC43 |                      |       | Sample SC44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| 168HGK  |           | 47.10       | -1.07                | -0.29 | 49.80       | -0.67                | -0.18 |
| 181CKT  |           | 47.80       | -0.37                | -0.10 | 49.20       | -1.27                | -0.34 |
| 1XRZX5  | *         | 58.21       | 10.04                | 2.68  | 58.15       | 7.68                 | 2.08  |
| 23NE7J  | *         | 45.37       | -2.80                | -0.75 | 51.10       | 0.63                 | 0.17  |
| 32YPAQ  | X         | 56.40       | 8.23                 | 2.20  | 71.28       | 20.81                | 5.64  |
| 347B1B  |           | 52.40       | 4.23                 | 1.13  | 56.66       | 6.19                 | 1.68  |
| 3RU5Q4  |           | 49.46       | 1.29                 | 0.34  | 52.46       | 1.99                 | 0.54  |
| 3TXKQP  | X         | 56.59       | 8.42                 | 2.25  | 61.78       | 11.31                | 3.07  |
| 46U882  |           | 48.72       | 0.55                 | 0.15  | 51.89       | 1.42                 | 0.39  |
| 47JAFH  |           | 46.04       | -2.13                | -0.57 | 49.31       | -1.16                | -0.31 |
| 4ELL2V  |           | 44.53       | -3.64                | -0.97 | 47.66       | -2.81                | -0.76 |
| 4MWNRN  | X         | 47.00       | -1.17                | -0.31 | 44.86       | -5.61                | -1.52 |
| 5356NZ  |           | 54.61       | 6.44                 | 1.72  | 56.33       | 5.86                 | 1.59  |
| 54RN53  |           | 40.80       | -7.37                | -1.97 | 44.80       | -5.67                | -1.54 |
| 5AGVXM  |           | 45.60       | -2.57                | -0.69 | 45.40       | -5.07                | -1.38 |
| 5CH6JB  |           | 51.03       | 2.86                 | 0.76  | 54.17       | 3.70                 | 1.00  |
| 5G478N  |           | 48.68       | 0.51                 | 0.14  | 52.06       | 1.59                 | 0.43  |
| 5M547V  |           | 42.20       | -5.97                | -1.59 | 45.70       | -4.77                | -1.29 |
| 5Z8DXA  |           | 48.49       | 0.32                 | 0.08  | 51.09       | 0.62                 | 0.17  |
| 6TYPRM  |           | 42.15       | -6.02                | -1.61 | 44.86       | -5.61                | -1.52 |
| 7AVKCQ  |           | 50.24       | 2.07                 | 0.55  | 51.24       | 0.77                 | 0.21  |
| 7SU7P4  | X         | 59.77       | 11.60                | 3.10  | 59.35       | 8.88                 | 2.41  |
| 7YHBK5  |           | 46.80       | -1.37                | -0.37 | 50.00       | -0.47                | -0.13 |
| 84Y12M  |           | 44.22       | -3.95                | -1.05 | 44.53       | -5.94                | -1.61 |
| 8AQZ92  |           | 49.53       | 1.36                 | 0.36  | 50.53       | 0.06                 | 0.02  |
| 9Z9WVV  |           | 47.90       | -0.27                | -0.07 | 51.26       | 0.79                 | 0.21  |
| B4SR4K  |           | 50.08       | 1.91                 | 0.51  | 52.25       | 1.78                 | 0.48  |
| B9S3TB  | X         | 49.30       | 1.13                 | 0.30  | 52.20       | 1.73                 | 0.47  |
| BGSHC4  |           | 44.24       | -3.93                | -1.05 | 46.32       | -4.15                | -1.13 |
| BXJDWM  |           | 46.84       | -1.33                | -0.35 | 47.90       | -2.57                | -0.70 |
| CAYUCB  |           | 45.54       | -2.63                | -0.70 | 47.62       | -2.85                | -0.77 |
| CUVALF  |           | 44.53       | -3.64                | -0.97 | 44.67       | -5.80                | -1.57 |
| CXM8QS  |           | 49.16       | 0.99                 | 0.26  | 50.32       | -0.15                | -0.04 |
| D5AG52  |           | 43.08       | -5.09                | -1.36 | 46.18       | -4.29                | -1.16 |
| D997N1  |           | 50.00       | 1.83                 | 0.49  | 52.70       | 2.23                 | 0.60  |
| DBMQA5  |           | 47.60       | -0.57                | -0.15 | 50.50       | 0.03                 | 0.01  |
| DBPWJ6  |           | 54.10       | 5.93                 | 1.58  | 56.60       | 6.13                 | 1.66  |
| DGLGXE  |           | 50.37       | 2.20                 | 0.59  | 52.88       | 2.41                 | 0.65  |
| G7EZFF  |           | 49.41       | 1.24                 | 0.33  | 51.91       | 1.44                 | 0.39  |
| GEQEJW  |           | 46.64       | -1.53                | -0.41 | 48.77       | -1.70                | -0.46 |
| GM5Y1A  |           | 48.21       | 0.04                 | 0.01  | 51.24       | 0.77                 | 0.21  |
| GMFK75  |           | 45.38       | -2.79                | -0.74 | 47.27       | -3.20                | -0.87 |
| H3MEHW  |           | 44.16       | -4.01                | -1.07 | 46.60       | -3.87                | -1.05 |

TAPPI-CTS Interlaboratory Testing Program

Analysis 312

Tearing Strength - Printing Papers

| WebCode | Data Flag | Sample SC43 |                      |       | Sample SC44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| J77PHZ  |           | 50.00       | 1.83                 | 0.49  | 52.40       | 1.93                 | 0.52  |
| J7LP9V  |           | 56.98       | 8.81                 | 2.35  | 58.43       | 7.96                 | 2.16  |
| J8RYR1  |           | 42.03       | -6.14                | -1.64 | 45.31       | -5.16                | -1.40 |
| JCZC6Z  |           | 42.08       | -6.09                | -1.62 | 44.40       | -6.07                | -1.65 |
| JNZUTV  |           | 45.46       | -2.71                | -0.72 | 46.45       | -4.02                | -1.09 |
| JUDPN4  |           | 50.30       | 2.13                 | 0.57  | 53.50       | 3.03                 | 0.82  |
| L5MRTU  |           | 48.65       | 0.48                 | 0.13  | 50.83       | 0.36                 | 0.10  |
| L714X4  |           | 52.80       | 4.63                 | 1.24  | 54.39       | 3.92                 | 1.06  |
| L9GNAT  |           | 47.24       | -0.93                | -0.25 | 51.32       | 0.85                 | 0.23  |
| MKT6J3  |           | 40.94       | -7.23                | -1.93 | 44.98       | -5.49                | -1.49 |
| MNSTUR  |           | 41.92       | -6.25                | -1.67 | 44.34       | -6.13                | -1.66 |
| N4B2WT  | *         | 49.18       | 1.01                 | 0.27  | 54.80       | 4.33                 | 1.17  |
| N4K9QL  |           | 53.83       | 5.66                 | 1.51  | 55.28       | 4.81                 | 1.30  |
| NBYMLT  |           | 52.81       | 4.64                 | 1.24  | 53.84       | 3.37                 | 0.91  |
| NQUGSM  |           | 52.46       | 4.29                 | 1.14  | 52.52       | 2.05                 | 0.56  |
| NVY4Y9  | *         | 51.30       | 3.13                 | 0.84  | 50.30       | -0.17                | -0.05 |
| PC4GWJ  |           | 50.11       | 1.94                 | 0.52  | 51.98       | 1.51                 | 0.41  |
| QEXTK2  |           | 52.46       | 4.29                 | 1.14  | 56.46       | 5.99                 | 1.62  |
| QNAWU9  |           | 49.92       | 1.75                 | 0.47  | 53.08       | 2.61                 | 0.71  |
| QNZ2G8  |           | 45.21       | -2.96                | -0.79 | 47.01       | -3.46                | -0.94 |
| QVBAGW  |           | 47.90       | -0.27                | -0.07 | 49.80       | -0.67                | -0.18 |
| RYQVW4  |           | 48.75       | 0.58                 | 0.16  | 51.19       | 0.72                 | 0.19  |
| S4XWUY  |           | 46.22       | -1.95                | -0.52 | 48.24       | -2.23                | -0.61 |
| T25AR9  |           | 52.90       | 4.73                 | 1.26  | 54.54       | 4.07                 | 1.10  |
| T4MQQE  |           | 51.60       | 3.43                 | 0.91  | 54.05       | 3.57                 | 0.97  |
| TL4BXD  |           | 50.48       | 2.31                 | 0.62  | 54.17       | 3.70                 | 1.00  |
| UKTUKE  |           | 49.80       | 1.63                 | 0.44  | 53.10       | 2.63                 | 0.71  |
| UP2KST  |           | 46.18       | -1.99                | -0.53 | 47.54       | -2.93                | -0.79 |
| W5Q3X1  | X         | 43.00       | -5.17                | -1.38 | 43.80       | -6.67                | -1.81 |
| WDTHCT  |           | 43.80       | -4.37                | -1.17 | 44.60       | -5.87                | -1.59 |
| XDGQKR  |           | 47.84       | -0.33                | -0.09 | 49.28       | -1.19                | -0.32 |
| YB2XPZ  |           | 48.47       | 0.30                 | 0.08  | 50.84       | 0.37                 | 0.10  |
| YP3LMV  | X         | 44.00       | -4.17                | -1.11 | 52.00       | 1.53                 | 0.41  |
| YWZFME  |           | 51.02       | 2.85                 | 0.76  | 52.07       | 1.60                 | 0.43  |

| Sample SC43   |              | Summary Statistics | Sample SC44  |  |
|---|--------------|--------------------|--------------|--|
| Grand Means   | 48.169 Grams |                    | 50.471 Grams |  |
| SD Btwn Labs  | 3.748 Grams  |                    | 3.688 Grams  |  |
| Statistics based on 70 of 77 reporting participants |              |                    |              |  |

**Tearing Strength - Printing Papers**

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**Comments on assigned Data Flags for Test #312**

32YPAQ (X) - Extreme data for Sample SC44 and inconsistent within the replicate measurements for Sample SC43.

3TXKQP (X) - Systematic error (data for both samples are high) and inconsistent within the replicate measurements for Sample SC44.

4MWNRN (X) - Inconsistent in testing between samples.

7SU7P4 (X) - Systematic error (data for both samples are high).

B9S3TB (X) - Data appear to be off by a factor of 1/2, data converted by CTS (x2).

W5Q3X1 (X) - Data appear to be off by a factor of 1/2, data converted by CTS (x2).

YP3LMV (X) - Inconsistent in testing between samples.

TAPPI-CTS Interlaboratory Testing Program

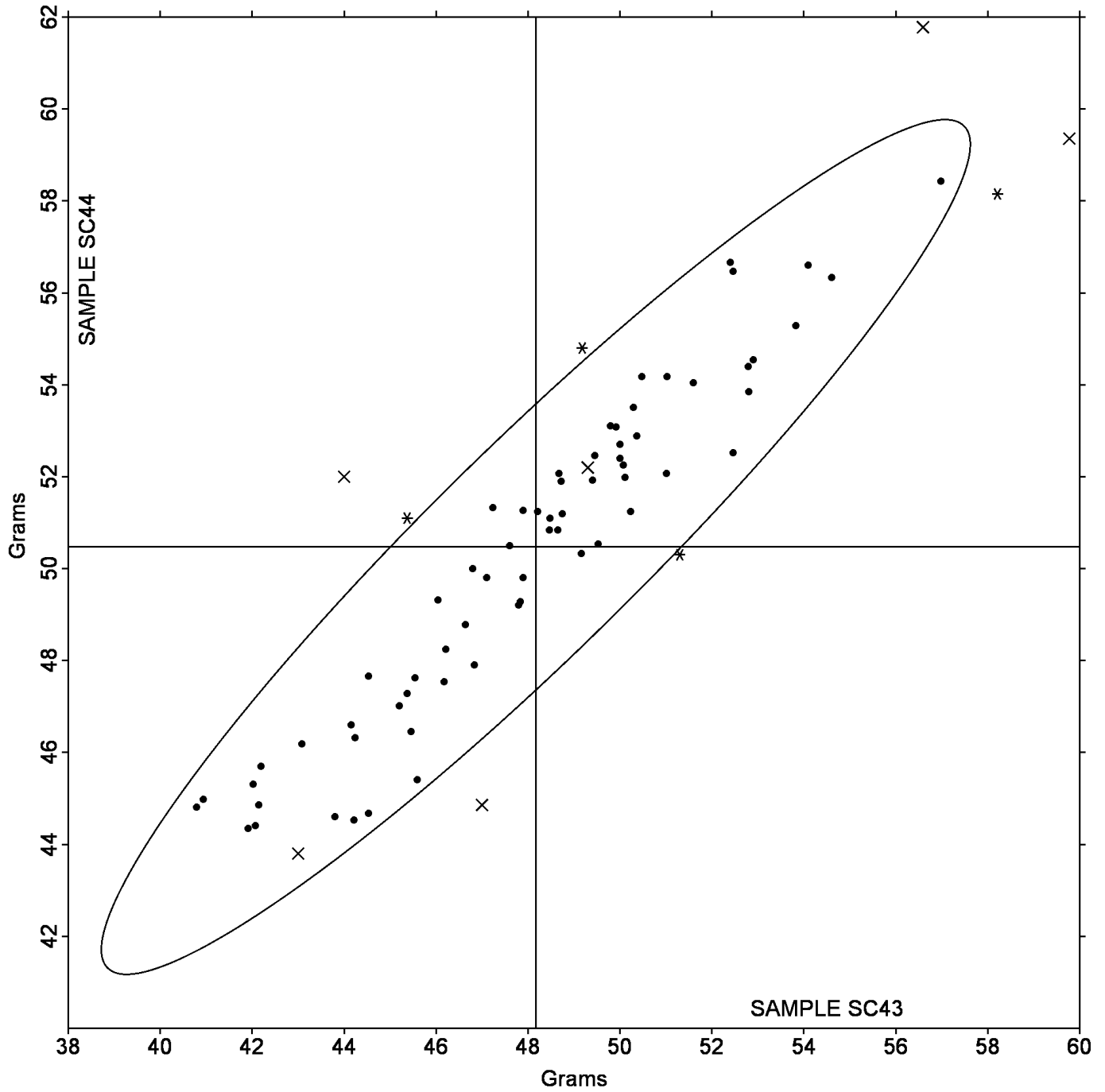
Analysis 312

Tearing Strength - Printing Papers

Grand Mean Sample **SC43** = 48.169 Grams

Grand Mean Sample **SC44** = 50.471 Grams

ANALYSIS 312



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 314

## Tearing Strength - Packaging Papers

| WebCode | Data Flag | Sample SD43 |                      |       | Sample SD44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| 1F19AX  |           | 111.4       | -0.5                 | -0.08 | 144.2       | -3.4                 | -0.32 |
| 2529DS  |           | 109.2       | -2.7                 | -0.41 | 146.0       | -1.6                 | -0.15 |
| 2CWD7T  |           | 106.8       | -5.1                 | -0.77 | 136.3       | -11.3                | -1.05 |
| 49RVEW  | X         | 108.6       | -3.3                 | -0.50 | 146.3       | -1.3                 | -0.12 |
| 5WAJ66  |           | 104.7       | -7.2                 | -1.10 | 136.0       | -11.6                | -1.09 |
| 6N1V97  | *         | 125.3       | 13.4                 | 2.05  | 156.2       | 8.6                  | 0.80  |
| 6QZFM5  |           | 113.7       | 1.8                  | 0.28  | 149.9       | 2.3                  | 0.21  |
| 6YJGAV  |           | 111.4       | -0.5                 | -0.08 | 147.1       | -0.5                 | -0.05 |
| 79X8FW  |           | 119.1       | 7.2                  | 1.10  | 150.5       | 2.9                  | 0.27  |
| 7KXWG6  |           | 109.6       | -2.3                 | -0.35 | 149.2       | 1.6                  | 0.15  |
| 7Q1UXX  |           | 104.4       | -7.5                 | -1.14 | 138.3       | -9.3                 | -0.87 |
| 83QM36  |           | 106.1       | -5.8                 | -0.89 | 136.7       | -10.9                | -1.02 |
| 8HE1RZ  |           | 120.2       | 8.3                  | 1.26  | 168.1       | 20.5                 | 1.92  |
| 8KCYL   |           | 118.6       | 6.7                  | 1.02  | 148.9       | 1.3                  | 0.12  |
| 9SQSNT  |           | 107.5       | -4.4                 | -0.68 | 144.2       | -3.4                 | -0.32 |
| A2J3ZP  |           | 115.3       | 3.4                  | 0.52  | 159.5       | 11.9                 | 1.11  |
| BLN5AY  |           | 118.1       | 6.2                  | 0.95  | 166.2       | 18.6                 | 1.74  |
| CAT7AJ  |           | 110.8       | -1.1                 | -0.16 | 149.6       | 2.0                  | 0.19  |
| CQMCLD  |           | 110.8       | -1.1                 | -0.17 | 144.0       | -3.6                 | -0.34 |
| DHKXDS  |           | 111.6       | -0.3                 | -0.05 | 147.1       | -0.5                 | -0.04 |
| DN664B  |           | 119.6       | 7.7                  | 1.18  | 170.0       | 22.4                 | 2.09  |
| DNFA98  |           | 114.4       | 2.5                  | 0.39  | 144.6       | -3.0                 | -0.28 |
| FNQBFL  |           | 114.2       | 2.3                  | 0.36  | 149.7       | 2.1                  | 0.20  |
| G2KKSL  |           | 115.2       | 3.3                  | 0.51  | 153.7       | 6.1                  | 0.57  |
| J47HX3  |           | 103.4       | -8.5                 | -1.30 | 130.2       | -17.4                | -1.63 |
| LEL8Z5  | X         | 120.8       | 8.9                  | 1.36  | 155.2       | 7.6                  | 0.71  |
| LZDXX3  | X         | 122.8       | 10.9                 | 1.67  | 136.8       | -10.8                | -1.01 |
| M4EN9F  |           | 120.8       | 8.9                  | 1.36  | 158.0       | 10.4                 | 0.97  |
| MEQTW   |           | 113.0       | 1.1                  | 0.17  | 151.6       | 4.0                  | 0.38  |
| N8TPS7  |           | 101.6       | -10.3                | -1.57 | 138.6       | -9.0                 | -0.84 |
| NTBFN9  |           | 112.4       | 0.5                  | 0.07  | 143.2       | -4.4                 | -0.41 |
| P58DU7  | X         | 102.0       | -9.9                 | -1.51 | 128.8       | -18.8                | -1.76 |
| P7S77G  |           | 119.7       | 7.8                  | 1.19  | 148.8       | 1.2                  | 0.12  |
| PA3VCY  |           | 105.0       | -6.9                 | -1.06 | 139.9       | -7.7                 | -0.72 |
| PCY5X2  |           | 118.6       | 6.7                  | 1.02  | 155.3       | 7.7                  | 0.72  |
| SJAVUB  |           | 109.5       | -2.4                 | -0.37 | 152.6       | 5.0                  | 0.46  |
| TF2JKG  |           | 101.3       | -10.6                | -1.62 | 132.8       | -14.8                | -1.38 |
| U2WGXZ  |           | 125.5       | 13.6                 | 2.08  | 175.0       | 27.4                 | 2.56  |
| VPR1VU  |           | 110.3       | -1.6                 | -0.24 | 144.2       | -3.4                 | -0.32 |
| W2BYFQ  |           | 115.4       | 3.5                  | 0.54  | 151.1       | 3.5                  | 0.33  |
| W99CGQ  |           | 104.8       | -7.1                 | -1.09 | 128.8       | -18.8                | -1.76 |
| WEGBR5  |           | 99.2        | -12.7                | -1.94 | 128.8       | -18.8                | -1.76 |
| WXE6DU  |           | 116.2       | 4.3                  | 0.65  | 151.4       | 3.9                  | 0.36  |

## TAPPI-CTS Interlaboratory Testing Program

## Analysis 314

## Tearing Strength - Packaging Papers

| WebCode | Data Flag | Sample SD43 |                      |       | Sample SD44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| XQWLUP  | X         | 122.2       | 10.3                 | 1.57  | 164.0       | 16.4                 | 1.53  |
| YNGQJG  |           | 109.0       | -2.9                 | -0.44 | 149.0       | 1.4                  | 0.13  |
| ZBAGWA  |           | 104.2       | -7.7                 | -1.18 | 136.2       | -11.4                | -1.06 |

| Summary Statistics                                  |              |  |              |
|---|--------------|--|--------------|
|   | Sample SD43  |  | Sample SD44  |
| Grand Means   | 111.90 Grams |  | 147.60 Grams |
| SD Btwn Labs  | 6.54 Grams   |  | 10.70 Grams  |
| Statistics based on 41 of 46 reporting participants |              |  |              |

**Comments on assigned Data Flags for Test #314**

49RVEW (X) - Data appear to be reported as mN, not gf as indicated on datasheet, units changed by CTS.

LEL8Z5 (X) - Data appear to be off by a factor of 1/4, data converted by CTS (x4).

LZDXX3 (X) - Inconsistent in testing between samples.

P58DU7 (X) - Data appear to be off by a factor of 1/4, data converted by CTS (x4).

XQWLUP (X) - Data appear to be off by a factor of 1/4, data converted by CTS (x4).

### TAPPI-CTS Interlaboratory Testing Program

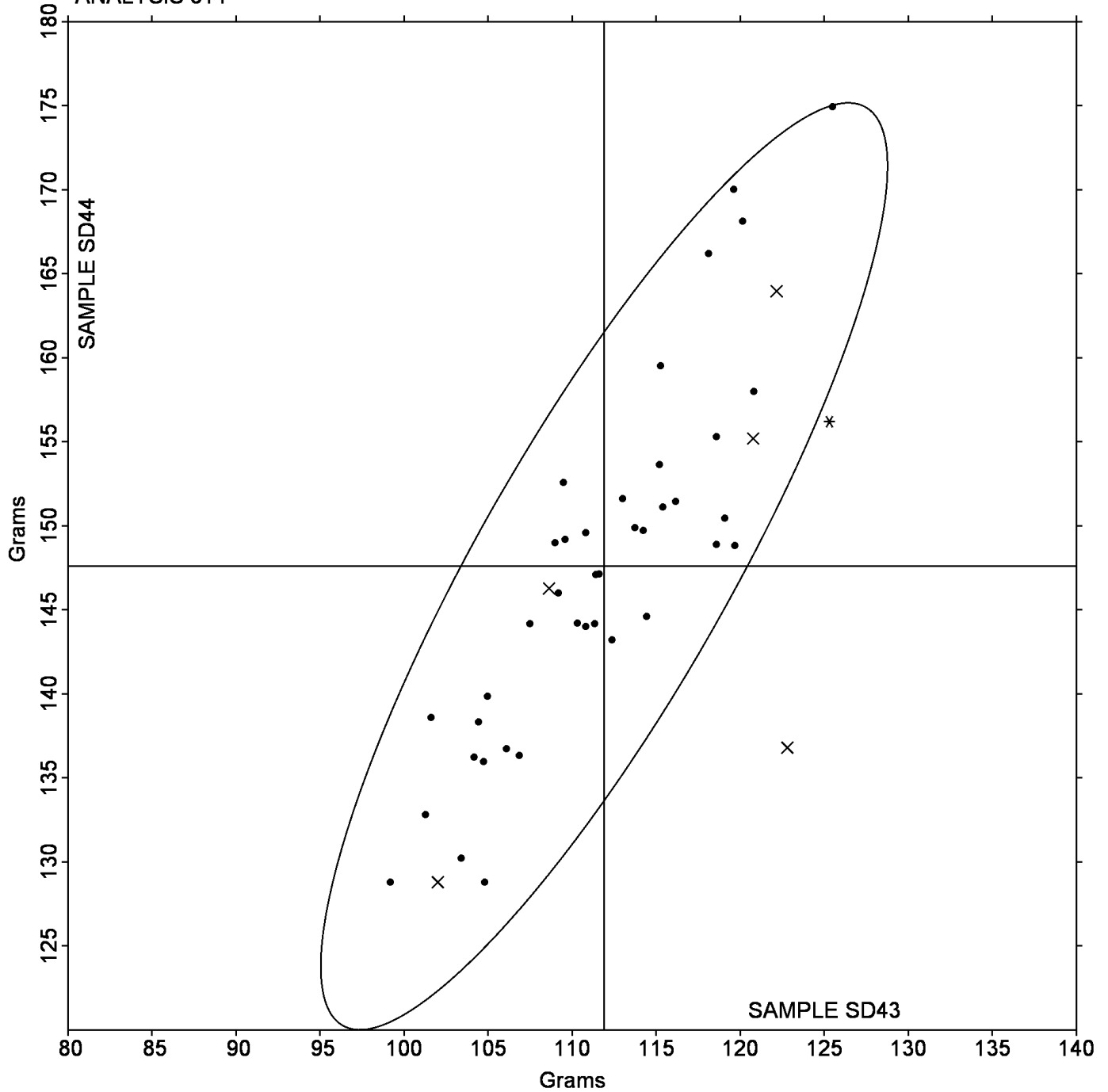
#### Analysis 314

### Tearing Strength - Packaging Papers

Grand Mean Sample **SD43** = 111.90 Grams

Grand Mean Sample **SD44** = 147.60 Grams

ANALYSIS 314



**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 320**  
**Tensile Breaking Strength - Newsprint**

| WebCode | Data Flag | Sample SR43 |                      |       | Sample SR44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| 1Y9H2G  |           | 1.926       | -0.043               | -0.43 | 1.947       | -0.022               | -0.24 |
| 5SR59E  |           | 1.907       | -0.062               | -0.62 | 1.893       | -0.075               | -0.83 |
| 7Y64W9  |           | 1.931       | -0.038               | -0.38 | 1.966       | -0.003               | -0.03 |
| 976XWM  |           | 1.942       | -0.027               | -0.27 | 1.784       | -0.184               | -2.03 |
| AQGZ8L  |           | 1.875       | -0.094               | -0.94 | 1.916       | -0.053               | -0.58 |
| BS46ZV  |           | 2.060       | 0.091                | 0.91  | 2.037       | 0.068                | 0.75  |
| CM7J4L  |           | 1.980       | 0.011                | 0.11  | 1.986       | 0.018                | 0.19  |
| D32EAQ  |           | 1.901       | -0.068               | -0.68 | 1.942       | -0.026               | -0.29 |
| J4R7EX  |           | 1.983       | 0.014                | 0.14  | 2.015       | 0.046                | 0.51  |
| JQJVQ3  |           | 2.195       | 0.226                | 2.25  | 2.194       | 0.226                | 2.49  |
| KA32UJ  |           | 1.979       | 0.010                | 0.10  | 1.928       | -0.040               | -0.44 |
| KP9KXC  |           | 1.975       | 0.006                | 0.06  | 1.962       | -0.006               | -0.07 |
| MMV7DT  |           | 1.968       | -0.001               | -0.01 | 2.028       | 0.060                | 0.66  |
| PPRFUG  |           | 2.144       | 0.175                | 1.75  | 2.094       | 0.125                | 1.38  |
| QCK4RY  |           | 1.876       | -0.093               | -0.93 | 1.919       | -0.050               | -0.55 |
| T8G7VN  |           | 2.108       | 0.139                | 1.38  | 1.923       | -0.045               | -0.50 |
| TTLXUP  |           | 1.765       | -0.204               | -2.04 | 1.932       | -0.036               | -0.40 |
| TWTFLB  |           | 1.997       | 0.028                | 0.28  | 2.018       | 0.050                | 0.55  |
| VADE3Q  |           | 1.864       | -0.105               | -1.05 | 1.906       | -0.062               | -0.68 |
| XYWWD   |           | 1.928       | -0.041               | -0.41 | 1.852       | -0.116               | -1.28 |
| ZQ1Z4M  |           | 2.046       | 0.077                | 0.77  | 2.095       | 0.127                | 1.40  |

|   |             | Summary Statistics |             |
|---|-------------|--------------------|-------------|
|   | Sample SR43 |                    | Sample SR44 |
| Grand Means   | 1.9690 kN/m |                    | 1.9685 kN/m |
| SD Btwn Labs  | 0.1001 kN/m |                    | 0.0906 kN/m |
| Statistics based on 21 of 21 reporting participants |             |                    |             |

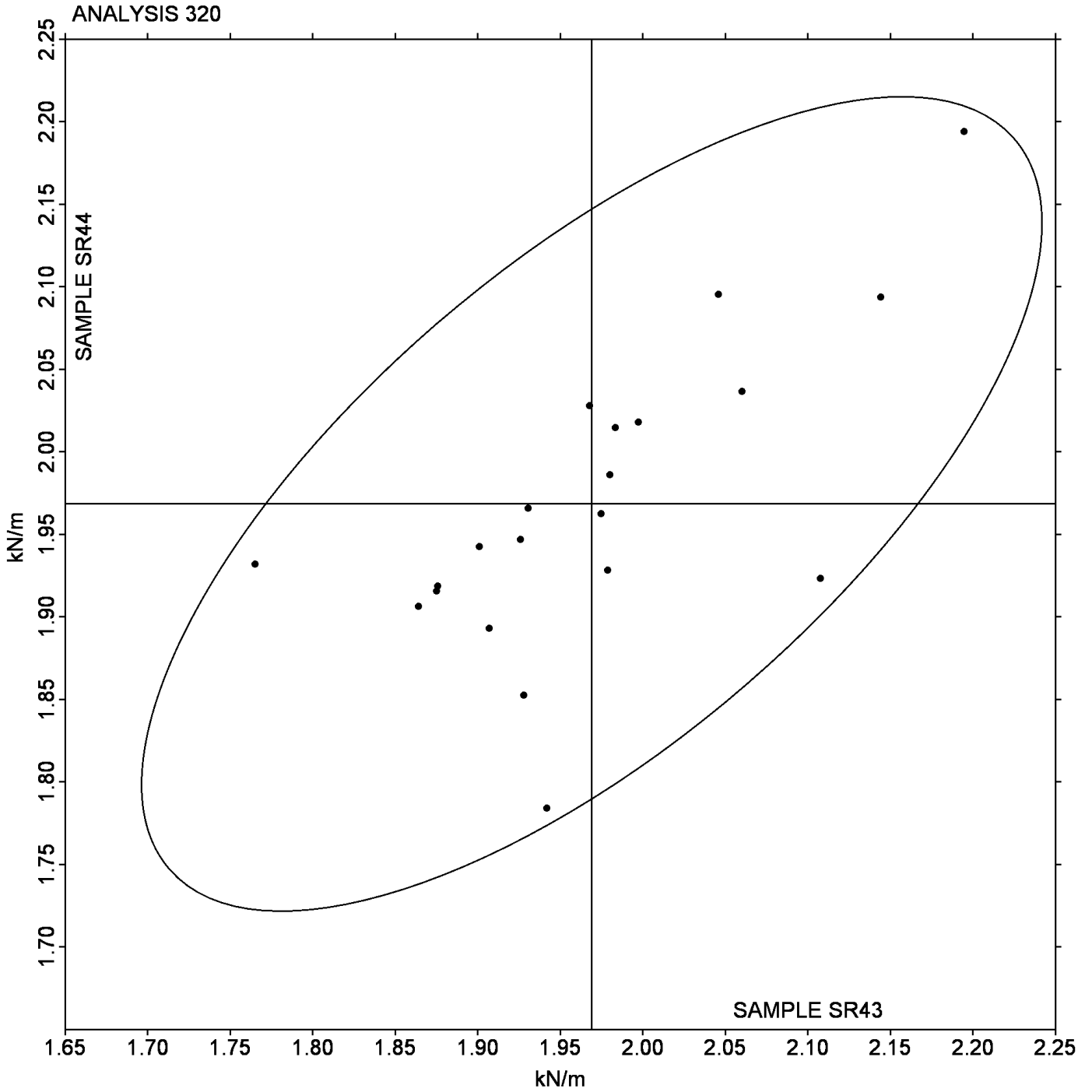
**Analysis Notes:**

BS46ZV - Data appear to be off by a factor of 10; data converted by CTS (/10).

TAPPI-CTS Interlaboratory Testing Program  
Analysis 320  
Tensile Breaking Strength - Newsprint

Grand Mean Sample **SR43** = 1.9690 kN/m

Grand Mean Sample **SR44** = 1.9685 kN/m



TAPPI-CTS Interlaboratory Testing Program

Analysis 321

Tensile Energy Absorption - Newsprint

| WebCode | Data Flag | Sample SR43 |                      |       | Sample SR44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| 1PKU5U  |           | 12.44       | 1.55                 | 1.13  | 12.62       | 1.94                 | 1.04  |
| 4NTK9B  |           | 10.40       | -0.49                | -0.36 | 10.40       | -0.28                | -0.15 |
| 5VWHB2  |           | 9.79        | -1.09                | -0.80 | 8.45        | -2.23                | -1.19 |
| 6LVTF2  |           | 11.13       | 0.24                 | 0.17  | 10.24       | -0.44                | -0.24 |
| 7BR5ZP  |           | 11.95       | 1.06                 | 0.77  | 11.82       | 1.14                 | 0.61  |
| AKTAU3  |           | 13.54       | 2.65                 | 1.93  | 14.18       | 3.50                 | 1.87  |
| GLM993  |           | 12.57       | 1.68                 | 1.23  | 14.23       | 3.55                 | 1.90  |
| HAU924  |           | 9.43        | -1.46                | -1.06 | 10.07       | -0.61                | -0.32 |
| HD8ALN  |           | 10.09       | -0.80                | -0.58 | 10.07       | -0.60                | -0.32 |
| HKQ815  |           | 10.07       | -0.81                | -0.59 | 10.45       | -0.22                | -0.12 |
| LDVCSW  |           | 11.22       | 0.33                 | 0.24  | 8.46        | -2.22                | -1.19 |
| MCMFBX  |           | 9.49        | -1.39                | -1.02 | 9.99        | -0.68                | -0.37 |
| MULF1Y  |           | 10.28       | -0.60                | -0.44 | 9.83        | -0.85                | -0.45 |
| SGMYCQ  |           | 11.51       | 0.62                 | 0.45  | 11.65       | 0.97                 | 0.52  |
| T6EMCN  |           | 11.24       | 0.35                 | 0.26  | 11.55       | 0.87                 | 0.47  |
| UCZE59  |           | 9.67        | -1.22                | -0.89 | 9.73        | -0.95                | -0.51 |
| VPXK5Z  |           | 9.23        | -1.66                | -1.21 | 8.88        | -1.80                | -0.96 |
| WAES9Y  |           | 10.03       | -0.86                | -0.63 | 7.90        | -2.78                | -1.49 |
| WG8VYN  |           | 13.80       | 2.92                 | 2.12  | 13.68       | 3.00                 | 1.61  |
| XRQ3R9  |           | 9.87        | -1.02                | -0.74 | 9.35        | -1.32                | -0.71 |

| Sample SR43   |                    | Summary Statistics | Sample SR44        |  |
|---|--------------------|--------------------|--------------------|--|
| Grand Means   | 10.887 Joules/sq m |                    | 10.677 Joules/sq m |  |
| SD Btwn Labs  | 1.372 Joules/sq m  |                    | 1.870 Joules/sq m  |  |
| Statistics based on 20 of 20 reporting participants |                    |                    |                    |  |

**Notes for Analysis 321**

No Data Flags assigned for this analysis.

**Analysis Notes:**

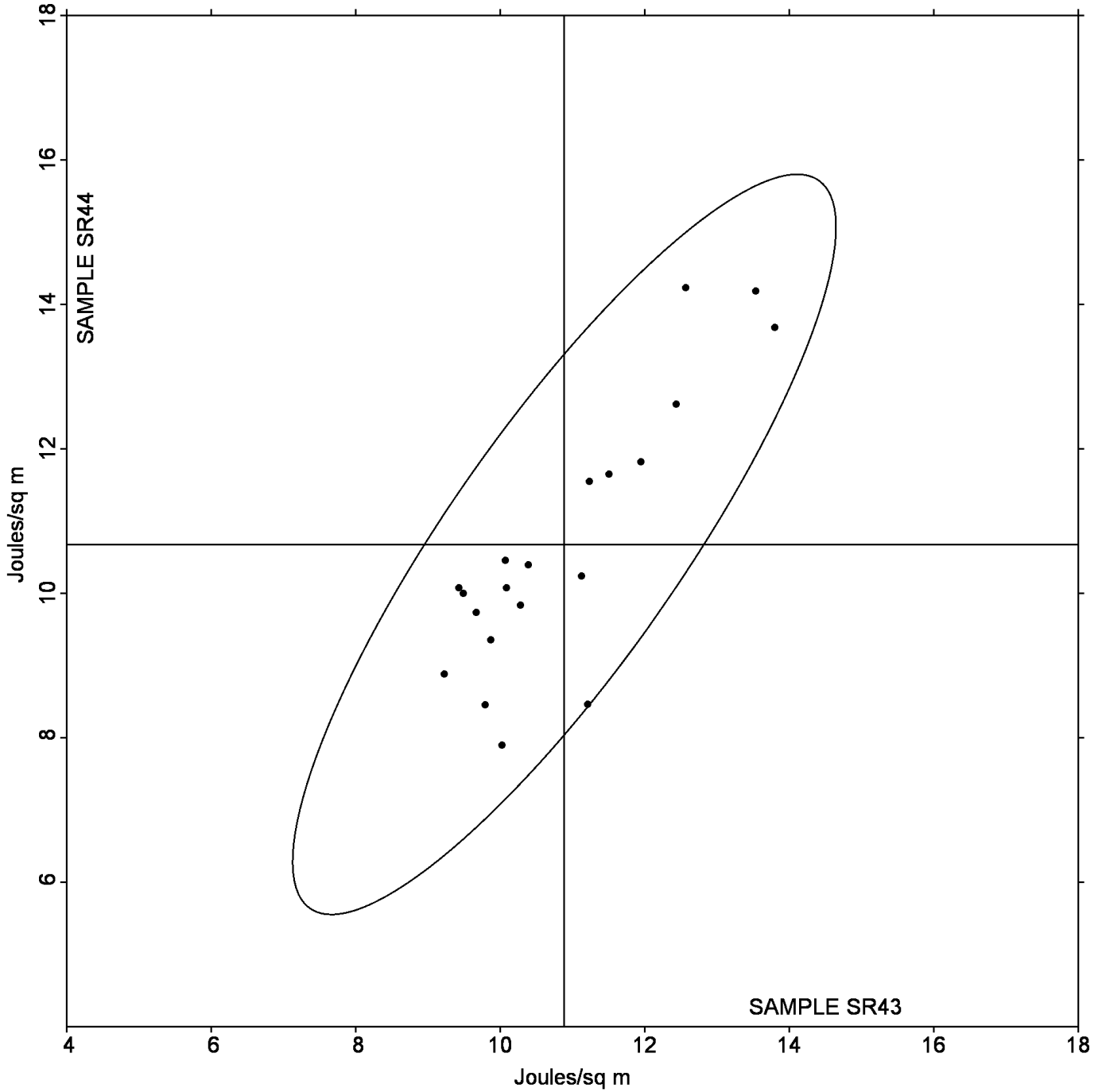
HKQ815 - Data appear to be reported as ft-lb/sq ft, not in-lb/sq in as indicated on datasheet. Units changed by CTS.

Tensile Energy Absorption - Newsprint

Grand Mean Sample **SR43** = 10.887 Joules/sq m

Grand Mean Sample **SR44** = 10.677 Joules/sq m

ANALYSIS 321



**Elongation to Break - Newsprint**

| WebCode | Data Flag | Sample SR43 |                      |       | Sample SR44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| 1N9SJV  |           | 1.0220      | 0.0734               | 0.69  | 1.0440      | 0.1141               | 0.88  |
| 2AEFB5  |           | 0.9140      | -0.0346              | -0.33 | 0.8590      | -0.0709              | -0.55 |
| 4GCXQ7  |           | 1.1230      | 0.1744               | 1.64  | 1.1920      | 0.2621               | 2.02  |
| 4P8R6D  |           | 0.9100      | -0.0386              | -0.36 | 0.8860      | -0.0439              | -0.34 |
| 8YHHP6  |           | 0.9690      | 0.0204               | 0.19  | 0.9520      | 0.0221               | 0.17  |
| D9M11E  |           | 1.1260      | 0.1774               | 1.67  | 1.1340      | 0.2041               | 1.57  |
| FCS3L3  |           | 0.9950      | 0.0464               | 0.44  | 1.0100      | 0.0801               | 0.62  |
| HN1GM2  |           | 1.1168      | 0.1682               | 1.58  | 1.1058      | 0.1759               | 1.36  |
| HPEE4D  |           | 0.8036      | -0.1450              | -1.37 | 0.7828      | -0.1471              | -1.13 |
| JYZF41  |           | 0.8170      | -0.1316              | -1.24 | 0.8240      | -0.1059              | -0.82 |
| KJD4UX  |           | 0.8407      | -0.1079              | -1.02 | 0.8505      | -0.0793              | -0.61 |
| MWPF6B  |           | 0.9400      | -0.0086              | -0.08 | 0.8500      | -0.0799              | -0.62 |
| NZACD3  |           | 0.9080      | -0.0406              | -0.38 | 0.7650      | -0.1649              | -1.27 |
| SRHVMM  |           | 0.9774      | 0.0287               | 0.27  | 0.9846      | 0.0547               | 0.42  |
| UH4EHK  |           | 0.9400      | -0.0086              | -0.08 | 0.8250      | -0.1049              | -0.81 |
| V4M87A  |           | 0.8640      | -0.0846              | -0.80 | 0.8620      | -0.0679              | -0.52 |
| WLR3LF  |           | 1.1226      | 0.1740               | 1.64  | 1.1281      | 0.1982               | 1.53  |
| XHVXY8  |           | 0.8630      | -0.0856              | -0.81 | 0.8270      | -0.1029              | -0.79 |
| YFMNG5  |           | 0.8520      | -0.0966              | -0.91 | 0.8500      | -0.0799              | -0.62 |
| YLF2LX  |           | 0.8680      | -0.0806              | -0.76 | 0.8660      | -0.0639              | -0.49 |

| Sample SR43   |                 | Summary Statistics | Sample SR44     |  |
|---|-----------------|--------------------|-----------------|--|
| Grand Means   | 0.94860 Percent |                    | 0.92989 Percent |  |
| SD Btwn Labs  | 0.10613 Percent |                    | 0.12974 Percent |  |
| Statistics based on 20 of 20 reporting participants |                 |                    |                 |  |

**Notes for Analysis 322**

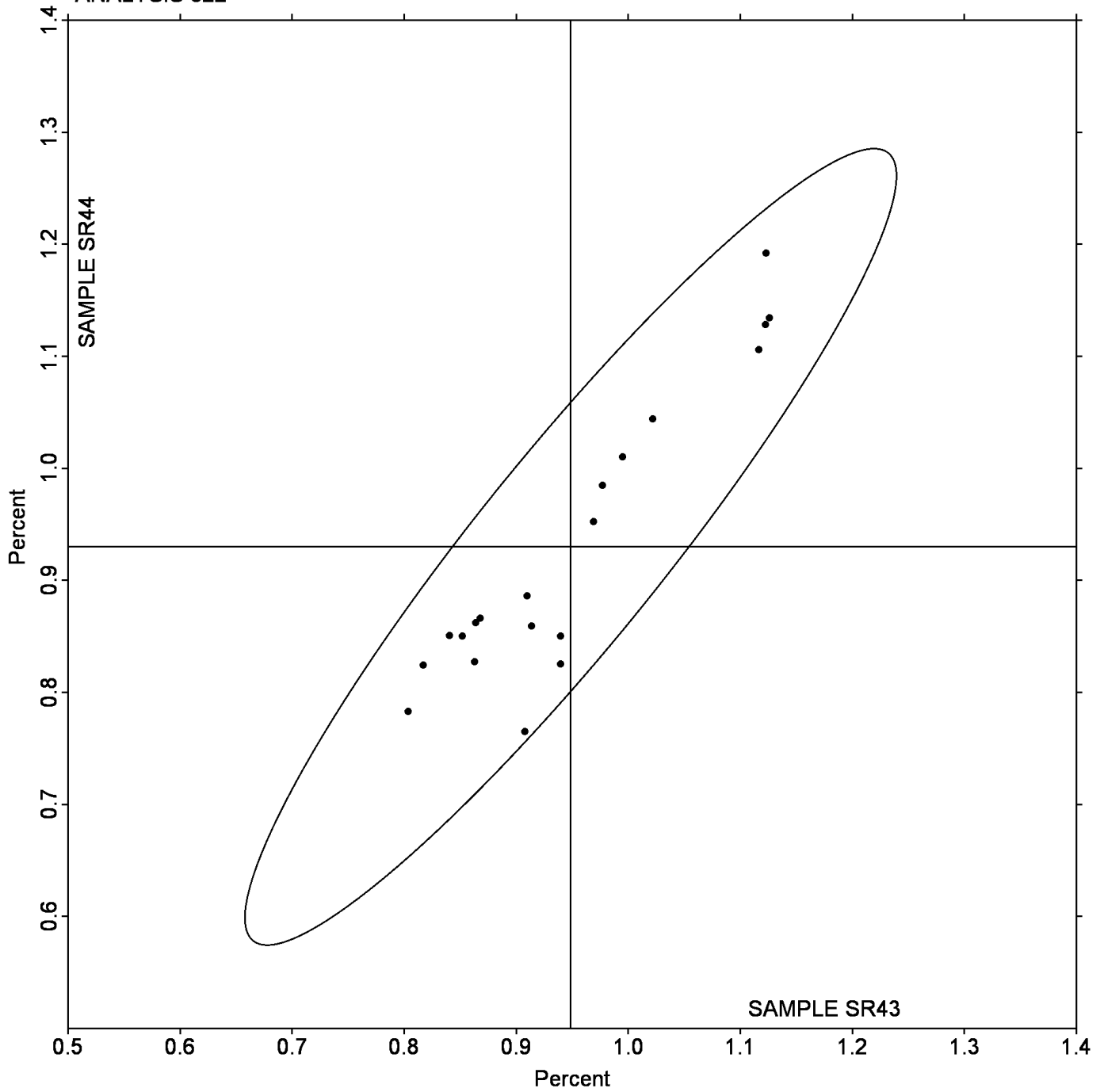
No Data Flags assigned for this analysis.

**Elongation to Break - Newsprint**

Grand Mean Sample **SR43** = 0.94860 Percent

Grand Mean Sample **SR44** = 0.92989 Percent

**ANALYSIS 322**



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 325

## Tensile Breaking Strength - Printing Papers

| WebCode | Data Flag | Sample SF43 |                      |        | Sample SF44 |                      |        | Instr Code |
|---------|-----------|-------------|----------------------|--------|-------------|----------------------|--------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV    | Lab Mean    | Diff from Grand Mean | CPV    |            |
| 1APR3Y  |           | 5.357       | 0.408                | 1.26   | 5.230       | 0.397                | 1.33   | LH         |
| 1YPE9G  |           | 5.450       | 0.501                | 1.55   | 5.214       | 0.380                | 1.28   | TP         |
| 1YQ77Q  | *         | 5.493       | 0.544                | 1.68   | 5.517       | 0.683                | 2.29   | LH         |
| 26WD6K  |           | 5.194       | 0.245                | 0.76   | 4.936       | 0.102                | 0.34   | TO         |
| 27HNU8  |           | 4.682       | -0.267               | -0.82  | 4.808       | -0.026               | -0.09  | XX         |
| 2BV5TU  |           | 5.180       | 0.231                | 0.72   | 5.151       | 0.318                | 1.07   | LH         |
| 2C2MKM  |           | 4.539       | -0.410               | -1.27  | 4.487       | -0.347               | -1.16  | ID         |
| 2UPGCH  |           | 4.516       | -0.433               | -1.34  | 4.641       | -0.193               | -0.65  | IM         |
| 3GE5EU  |           | 4.857       | -0.091               | -0.28  | 4.816       | -0.018               | -0.06  | TJ         |
| 3X4UCP  |           | 4.657       | -0.292               | -0.90  | 4.548       | -0.285               | -0.96  | LA         |
| 5EZG7E  | X         | 0.641       | -4.308               | -13.31 | 0.664       | -4.170               | -14.00 | TO         |
| 5JX2ZQ  |           | 5.467       | 0.518                | 1.60   | 5.282       | 0.448                | 1.51   | LX         |
| 5V1ZGQ  |           | 4.982       | 0.033                | 0.10   | 4.798       | -0.035               | -0.12  | LH         |
| 6F7L53  |           | 5.201       | 0.252                | 0.78   | 5.113       | 0.280                | 0.94   | LH         |
| 6NY7K3  |           | 5.609       | 0.660                | 2.04   | 5.408       | 0.574                | 1.93   | VM         |
| 6WT6J2  |           | 4.812       | -0.137               | -0.42  | 4.733       | -0.100               | -0.34  | TF         |
| 763BA4  |           | 4.843       | -0.106               | -0.33  | 4.708       | -0.125               | -0.42  | LH         |
| 776VR6  |           | 5.145       | 0.196                | 0.61   | 4.890       | 0.057                | 0.19   | XX         |
| 77S45G  |           | 4.655       | -0.294               | -0.91  | 4.647       | -0.187               | -0.63  | TO         |
| 79QTVQ  |           | 4.688       | -0.261               | -0.81  | 4.577       | -0.256               | -0.86  | IM         |
| 7FJRTS  |           | 4.911       | -0.038               | -0.12  | 4.731       | -0.102               | -0.34  | LH         |
| 7TLXP3  |           | 4.626       | -0.323               | -1.00  | 4.426       | -0.407               | -1.37  | TX         |
| 883Z5K  |           | 4.902       | -0.047               | -0.15  | 4.848       | 0.015                | 0.05   | LH         |
| 8F8JS4  |           | 4.577       | -0.372               | -1.15  | 4.411       | -0.423               | -1.42  | TO         |
| 8Z35L8  |           | 5.630       | 0.682                | 2.11   | 5.372       | 0.539                | 1.81   | TB         |
| BSPKYL  |           | 4.962       | 0.013                | 0.04   | 4.903       | 0.070                | 0.23   | TB         |
| CQMVLH  |           | 4.979       | 0.030                | 0.09   | 4.738       | -0.095               | -0.32  | LH         |
| CVGFZZ  |           | 4.576       | -0.372               | -1.15  | 4.333       | -0.500               | -1.68  | SP         |
| DV125F  |           | 4.478       | -0.471               | -1.45  | 4.498       | -0.335               | -1.13  | TP         |
| ERF8B7  |           | 5.314       | 0.365                | 1.13   | 5.122       | 0.288                | 0.97   | LX         |
| FRF3MH  |           | 5.021       | 0.072                | 0.22   | 4.868       | 0.035                | 0.12   | PP         |
| FSH8CJ  |           | 4.628       | -0.321               | -0.99  | 4.333       | -0.500               | -1.68  | ID         |
| FVWB8X  |           | 4.795       | -0.154               | -0.48  | 4.665       | -0.168               | -0.56  | TO         |
| G2EZBR  |           | 4.925       | -0.024               | -0.08  | 4.876       | 0.042                | 0.14   | TJ         |
| G8KN8D  |           | 5.115       | 0.166                | 0.51   | 4.909       | 0.076                | 0.25   | LI         |
| GPND3A  |           | 5.233       | 0.284                | 0.88   | 5.103       | 0.269                | 0.90   | LX         |
| HDEAWQ  |           | 5.236       | 0.287                | 0.89   | 5.141       | 0.308                | 1.03   | TB         |
| J1YYM1  |           | 5.054       | 0.105                | 0.32   | 5.034       | 0.201                | 0.67   | TC         |
| K4PMF1  |           | 4.656       | -0.293               | -0.91  | 4.599       | -0.234               | -0.79  | DL         |
| KPVMQS  |           | 4.585       | -0.364               | -1.13  | 4.476       | -0.357               | -1.20  | LH         |
| KULZD8  |           | 4.879       | -0.070               | -0.22  | 4.884       | 0.051                | 0.17   | LH         |
| KUXHVE  |           | 4.848       | -0.101               | -0.31  | 4.881       | 0.048                | 0.16   | LH         |
| L72A74  |           | 4.868       | -0.081               | -0.25  | 4.803       | -0.030               | -0.10  | KA         |

## TAPPI-CTS Interlaboratory Testing Program

## Analysis 325

## Tensile Breaking Strength - Printing Papers

| WebCode | Data Flag | Sample SF43 |                      |       | Sample SF44 |                      |       | Instr Code |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |            |
| LC1STP  |           | 5.057       | 0.108                | 0.33  | 4.765       | -0.068               | -0.23 | XX         |
| LPKFL9  |           | 4.619       | -0.330               | -1.02 | 4.388       | -0.446               | -1.50 | TP         |
| MR21SW  | *         | 5.879       | 0.930                | 2.87  | 5.576       | 0.743                | 2.49  | LH         |
| N36BAX  |           | 5.180       | 0.231                | 0.71  | 4.816       | -0.018               | -0.06 | IA         |
| NWYY2D  |           | 5.273       | 0.324                | 1.00  | 5.345       | 0.511                | 1.72  | LH         |
| P6E5D8  |           | 4.564       | -0.385               | -1.19 | 4.668       | -0.166               | -0.56 | TI         |
| PBAN11  | *         | 5.182       | 0.233                | 0.72  | 4.707       | -0.126               | -0.42 | TB         |
| PLETXN  |           | 4.412       | -0.537               | -1.66 | 4.475       | -0.358               | -1.20 | LH         |
| RL6G9Q  |           | 4.999       | 0.050                | 0.15  | 4.719       | -0.114               | -0.38 | TB         |
| S1VFMP  | X         | 4.005       | -0.944               | -2.92 | 3.608       | -1.226               | -4.12 | IN         |
| S9SUJP  |           | 5.518       | 0.569                | 1.76  | 5.328       | 0.495                | 1.66  | TJ         |
| SABGFR  | X         | 6.283       | 1.334                | 4.12  | 5.578       | 0.745                | 2.50  | XX         |
| SRE16M  |           | 5.416       | 0.467                | 1.44  | 5.212       | 0.379                | 1.27  | TJ         |
| SSG8MS  |           | 4.760       | -0.189               | -0.58 | 4.815       | -0.019               | -0.06 | IM         |
| TVH5V7  |           | 5.008       | 0.059                | 0.18  | 4.828       | -0.006               | -0.02 | TP         |
| TWRAWB  |           | 4.982       | 0.033                | 0.10  | 4.962       | 0.129                | 0.43  | LI         |
| UWX7CK  |           | 4.962       | 0.013                | 0.04  | 4.845       | 0.011                | 0.04  | LH         |
| V8L8C4  |           | 4.814       | -0.134               | -0.42 | 4.760       | -0.073               | -0.25 | MR         |
| VLP1VX  |           | 4.706       | -0.243               | -0.75 | 4.572       | -0.262               | -0.88 | IK         |
| WA49S6  |           | 4.832       | -0.117               | -0.36 | 4.877       | 0.044                | 0.15  | TI         |
| X8TDX1  |           | 4.871       | -0.078               | -0.24 | 4.951       | 0.118                | 0.40  | TI         |
| XPDSSD  |           | 4.713       | -0.236               | -0.73 | 4.551       | -0.282               | -0.95 | LH         |
| YZK56S  |           | 4.828       | -0.121               | -0.37 | 4.721       | -0.112               | -0.38 | TO         |
| Z7PAYG  |           | 4.735       | -0.214               | -0.66 | 4.772       | -0.061               | -0.21 | XX         |
| ZC4JU6  |           | 4.525       | -0.424               | -1.31 | 4.332       | -0.501               | -1.68 | VM         |
| ZNT2CR  |           | 4.671       | -0.278               | -0.86 | 4.563       | -0.270               | -0.91 | IX         |

## Summary Statistics

## Sample SF43

Grand Means 4.9489 kN/m  
SD Btwn Labs 0.3236 kN/m

## Sample SF44

4.8335 kN/m  
0.2978 kN/m

Statistics based on 66 of 69 reporting participants

**Comments on assigned Data Flags for Test #325**

5EZG7E (X) - Extreme data.

S1VFMP (X) - Systematic error (data for both samples are low).

SABGFR (X) - Systematic error (data for both samples are high).

TAPPI-CTS Interlaboratory Testing Program  
Analysis 325  
**Tensile Breaking Strength - Printing Papers**

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**Analysis Notes:**

DV125F - Data appear to be reported as kg/15mm, not kg/inch as indicated on datasheet. Units changed by CTS.

X8TDX1 - Data appear to be off by a factor of 1000; data converted by CTS (/1000).

**Instrument Code List**

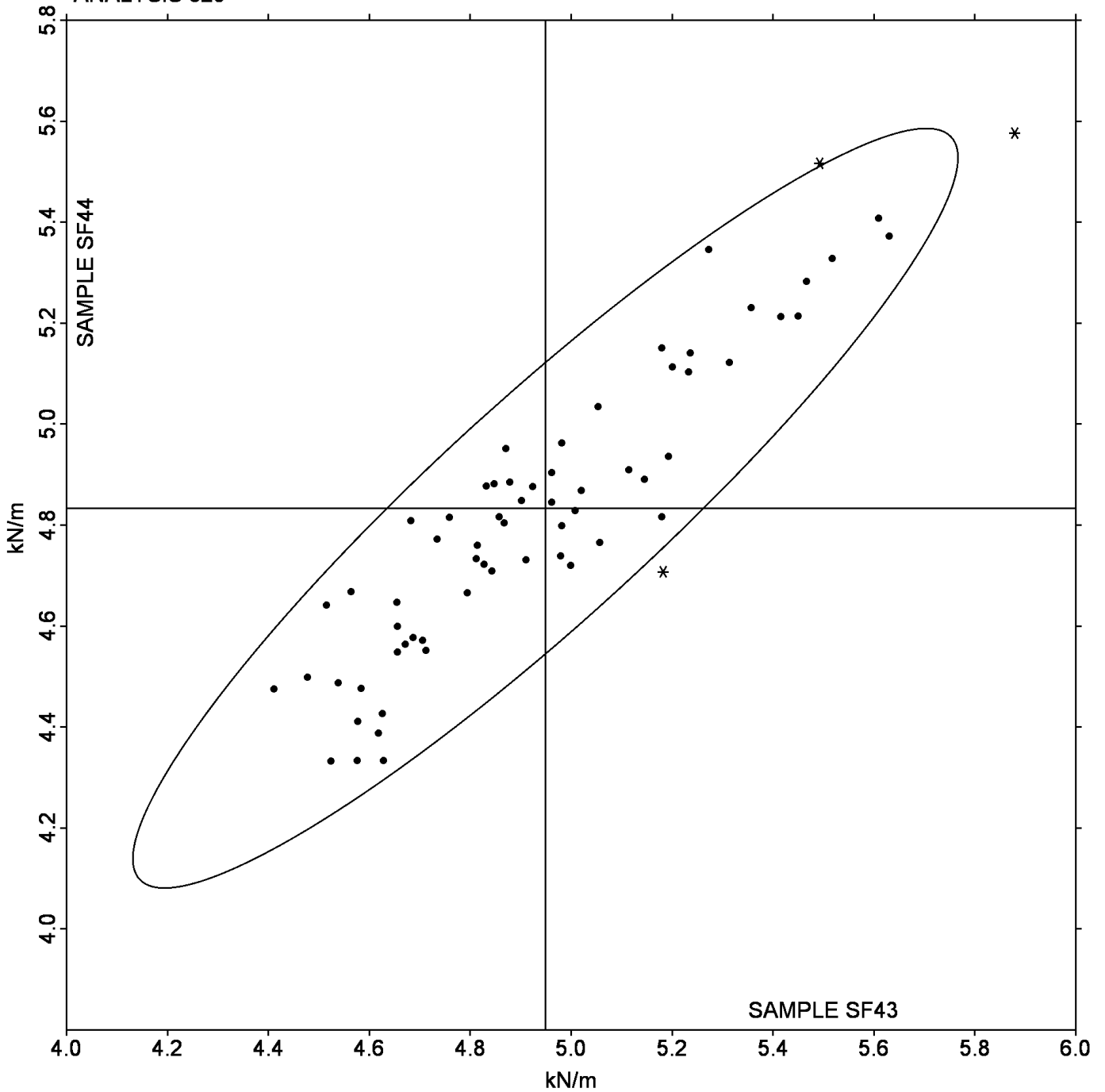
|  |  |
|--|--|
| (DL) - EMIC DL500 Universal Testing Machines       | (IA) - Instron 1011                                |
| (ID) - Instron 4201/4202                           | (IK) - Instron 4400 Series                         |
| (IM) - Instron 5500 Series                         | (IN) - Instron 3340 series                         |
| (IX) - Instron (model not specified)               | (KA) - Zwick Model 1425                            |
| (LA) - L & W Tensile - Autoline 300                | (LH) - L & W Alwetron TH1 (Horizontal) SE 060/065F |
| (LI) - L & W Tensile Tester SE 062                 | (LX) - L & W (model not specified)                 |
| (MR) - MTS Alliance RT series                      | (PP) - Technidyne Profile Plus                     |
| (SP) - Schopper Type Tensile Tester (TMI)          | (TB) - Thwing-Albert EJA/1000                      |
| (TC) - Thwing-Albert Electro-Hydraulic, Model 30LT | (TF) - Thwing-Albert EJA Vantage-1                 |
| (TI) - Thwing-Albert QC II                         | (TJ) - Thwing-Albert QC II-XS                      |
| (TO) - Thwing-Albert QC-1000                       | (TP) - TMI Monitor/Tensile 100 (84-21-01)          |
| (TX) - Thwing-Albert (model not specified)         | (VM) - Valmet PaperLab (was Kajaani/Robotest)      |
| (XX) - Instrument make/model not specified by lab  |  |

**Tensile Breaking Strength - Printing Papers**

Grand Mean Sample **SF43** = 4.9489 kN/m

Grand Mean Sample **SF44** = 4.8335 kN/m

ANALYSIS 325



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 327

## Tensile Energy Absorption - Printing Papers

| WebCode | Data Flag | Sample SF43 |                      |        | Sample SF44 |                      |        | Instr Code |
|---------|-----------|-------------|----------------------|--------|-------------|----------------------|--------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV    | Lab Mean    | Diff from Grand Mean | CPV    |            |
| 1JCUQC  |           | 59.81       | -1.94                | -0.49  | 67.82       | 3.50                 | 0.77   | LH         |
| 1V5D5H  |           | 58.93       | -2.82                | -0.71  | 69.88       | 5.56                 | 1.22   | IM         |
| 2Z2TEV  |           | 63.15       | 1.40                 | 0.35   | 58.83       | -5.49                | -1.21  | ID         |
| 4YK9TP  |           | 64.75       | 3.00                 | 0.76   | 69.92       | 5.60                 | 1.23   | IK         |
| 51QE3D  |           | 66.80       | 5.05                 | 1.28   | 69.43       | 5.11                 | 1.12   | XX         |
| 5C8KAT  | X         | 1.22        | -60.53               | -15.33 | 1.43        | -62.89               | -13.81 | TP         |
| 6RDVW7  |           | 59.15       | -2.60                | -0.66  | 60.87       | -3.45                | -0.76  | LH         |
| 72T1MV  | *         | 51.46       | -10.29               | -2.61  | 51.62       | -12.70               | -2.79  | LH         |
| 782H39  | X         | 37.77       | -23.98               | -6.07  | 30.12       | -34.20               | -7.51  | IN         |
| 7NTAMC  |           | 64.10       | 2.35                 | 0.59   | 70.84       | 6.52                 | 1.43   | LH         |
| 7XLJGE  |           | 62.35       | 0.59                 | 0.15   | 67.35       | 3.03                 | 0.67   | TO         |
| 982BFT  |           | 60.32       | -1.43                | -0.36  | 64.27       | -0.05                | -0.01  | LH         |
| 9DYT5L  |           | 65.70       | 3.95                 | 1.00   | 67.89       | 3.57                 | 0.78   | LI         |
| 9E9T77  |           | 62.20       | 0.45                 | 0.11   | 62.36       | -1.96                | -0.43  | XX         |
| 9TAF7P  |           | 60.37       | -1.38                | -0.35  | 63.37       | -0.95                | -0.21  | PP         |
| A6Y4DZ  |           | 61.00       | -0.75                | -0.19  | 63.19       | -1.13                | -0.25  | TA         |
| CEAD4C  |           | 61.12       | -0.63                | -0.16  | 63.96       | -0.36                | -0.08  | ID         |
| D68CS4  |           | 60.90       | -0.85                | -0.22  | 63.45       | -0.87                | -0.19  | KA         |
| DVHAVV  |           | 63.13       | 1.38                 | 0.35   | 61.72       | -2.60                | -0.57  | LH         |
| ERF9B5  |           | 55.52       | -6.24                | -1.58  | 58.32       | -6.00                | -1.32  | LA         |
| F42QXJ  | X         | 1.13        | -60.62               | -15.35 | 1.23        | -63.09               | -13.85 | TP         |
| FGANN5  |           | 64.69       | 2.94                 | 0.74   | 65.71       | 1.39                 | 0.30   | LX         |
| FVBQHS  |           | 61.70       | -0.05                | -0.01  | 65.20       | 0.88                 | 0.19   | LI         |
| FX9DBE  |           | 65.25       | 3.50                 | 0.89   | 68.49       | 4.17                 | 0.91   | LH         |
| GEV7PQ  |           | 68.19       | 6.44                 | 1.63   | 68.03       | 3.71                 | 0.81   | TB         |
| GKX8W6  |           | 59.52       | -2.23                | -0.56  | 55.45       | -8.87                | -1.95  | LH         |
| H9JXCU  |           | 63.94       | 2.19                 | 0.55   | 69.99       | 5.67                 | 1.24   | LH         |
| HBT3QF  |           | 60.23       | -1.52                | -0.39  | 63.84       | -0.48                | -0.10  | MR         |
| JLVAZT  |           | 58.92       | -2.83                | -0.72  | 60.17       | -4.15                | -0.91  | LH         |
| K6CRV6  |           | 69.03       | 7.28                 | 1.84   | 71.07       | 6.75                 | 1.48   | XX         |
| KTMF9F  |           | 56.42       | -5.33                | -1.35  | 62.82       | -1.50                | -0.33  | LH         |
| KXRG45  | X         | 45.65       | -16.10               | -4.08  | 46.50       | -17.82               | -3.91  | IM         |
| KXVDJ1  |           | 55.16       | -6.59                | -1.67  | 62.27       | -2.05                | -0.45  | IM         |
| LJW5HL  | X         | 43.93       | -17.82               | -4.51  | 55.02       | -9.30                | -2.04  | VM         |
| NDZ5CP  |           | 63.13       | 1.38                 | 0.35   | 63.28       | -1.04                | -0.23  | LH         |
| NMPTAB  |           | 62.03       | 0.28                 | 0.07   | 62.00       | -2.32                | -0.51  | LI         |
| P4R3FU  |           | 65.11       | 3.36                 | 0.85   | 69.05       | 4.73                 | 1.04   | DL         |
| QCXMCB  |           | 59.25       | -2.50                | -0.63  | 66.55       | 2.23                 | 0.49   | TI         |
| QJ7TFM  |           | 58.22       | -3.53                | -0.89  | 58.97       | -5.35                | -1.17  | LH         |
| RDN8KT  |           | 69.42       | 7.67                 | 1.94   | 69.72       | 5.40                 | 1.19   | TB         |
| RLNFE1  |           | 54.51       | -7.24                | -1.83  | 62.29       | -2.03                | -0.45  | LH         |
| RY2KYH  |           | 61.88       | 0.13                 | 0.03   | 57.79       | -6.53                | -1.43  | VM         |
| SMS9A5  |           | 61.73       | -0.02                | 0.00   | 62.53       | -1.79                | -0.39  | LH         |

TAPPI-CTS Interlaboratory Testing Program  
Analysis 327

**Tensile Energy Absorption - Printing Papers**

| WebCode | Data Flag | Sample SF43 |                      |      | Sample SF44 |                      |       | Instr Code |
|---------|-----------|-------------|----------------------|------|-------------|----------------------|-------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV  | Lab Mean    | Diff from Grand Mean | CPV   |            |
| TEXWBW  |           | 66.26       | 4.51                 | 1.14 | 70.01       | 5.69                 | 1.25  | IM         |
| WBS5Z1  |           | 64.66       | 2.91                 | 0.74 | 62.50       | -1.82                | -0.40 | XX         |

| Summary Statistics                                  |                    |  |                    |
|---|--------------------|--|--------------------|
|   | Sample SF43        |  | Sample SF44        |
| Grand Means   | 61.750 Joules/sq m |  | 64.320 Joules/sq m |
| SD Btwn Labs  | 3.949 Joules/sq m  |  | 4.555 Joules/sq m  |
| Statistics based on 40 of 45 reporting participants |                    |  |                    |

**Comments on assigned Data Flags for Test #327**

5C8KAT (X) - Extreme data.

782H39 (X) - Extreme data.

F42QXJ (X) - Extreme data.

KXRG45 (X) - Systematic error (data for both samples are low) and inconsistent within the replicate measurements for Sample SF44.

LJW5HL (X) - Systematic error (data for both samples are low) and inconsistent within the replicate measurements for both samples.

**Instrument Code List**

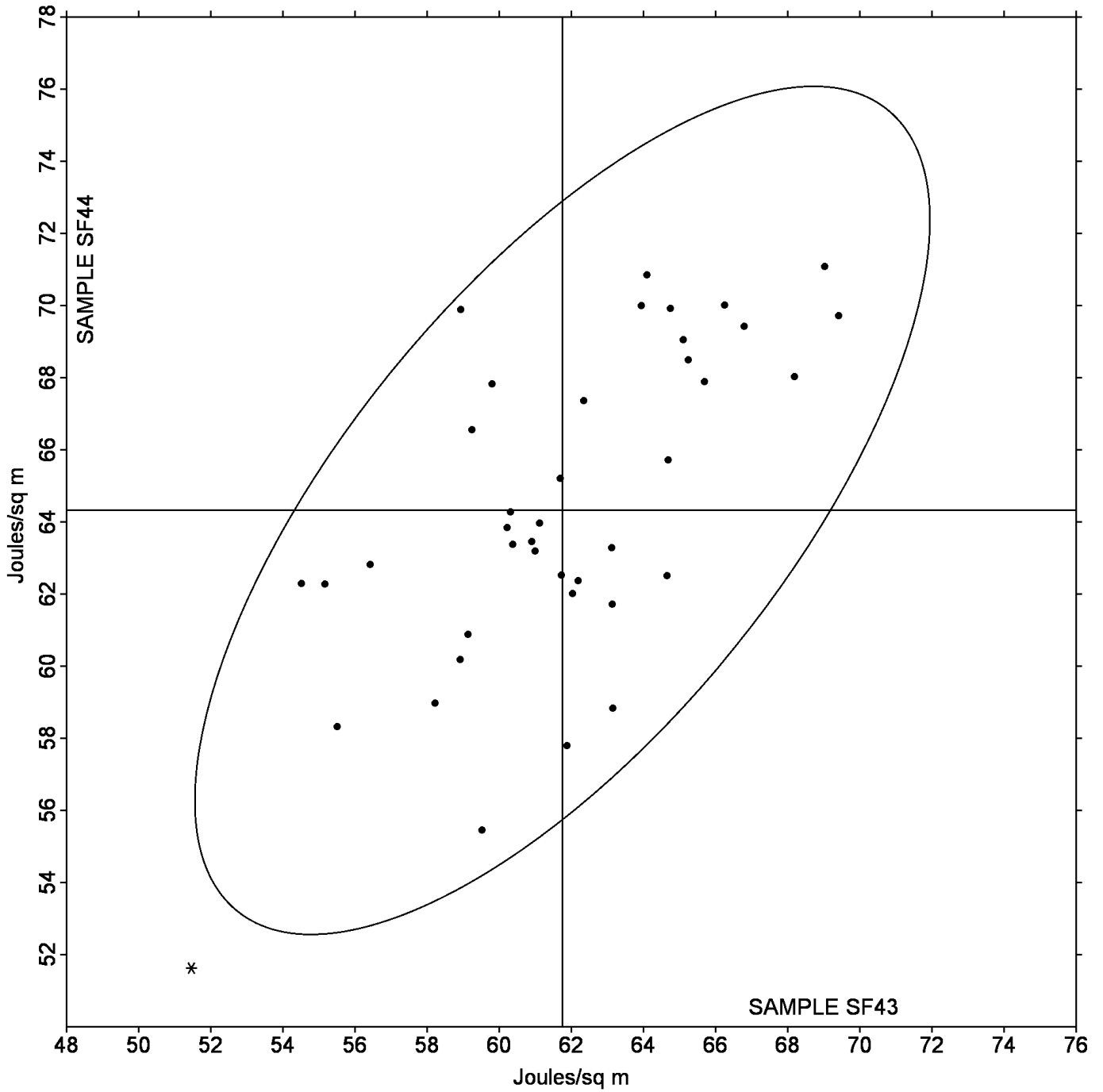
- |   |   |
|---|---|
| (DL) - EMIC DL500 Universal Testing Machines      | (ID) - Instron 4201                           |
| (IK) - Instron 4400 Series                        | (IM) - Instron 5500 Series                    |
| (IN) - Instron 3340 series                        | (KA) - Zwick Model 1425                       |
| (LA) - L & W Tensile - Autoline 300               | (LH) - L & W Alwetron TH1 (Horizontal) SE 060 |
| (LI) - L & W Tensile Tester SE 062                | (LX) - L & W (model not specified)            |
| (MR) - MTS Alliance RT series                     | (PP) - Technidyne Profile Plus                |
| (TA) - Thwing-Albert                              | (TB) - Thwing-Albert EJA/1000                 |
| (TI) - Thwing-Albert QC II                        | (TO) - Thwing-Albert QC-1000                  |
| (TP) - TMI Monitor/Tensile 100 (84-21-01)         | (VM) - Valmet PaperLab (was Kajaani/Robotest) |
| (XX) - Instrument make/model not specified by lab |   |

TAPPI-CTS Interlaboratory Testing Program  
Analysis 327  
Tensile Energy Absorption - Printing Papers

Grand Mean Sample SF43 = 61.750 Joules/sq m

Grand Mean Sample SF44 = 64.320 Joules/sq m

ANALYSIS 327



TAPPI-CTS Interlaboratory Testing Program  
Analysis 328

**Elongation to Break - Printing Papers**

| WebCode | Data Flag | Sample SF43 |                      |        | Sample SF44 |                      |        | Instr Code |
|---------|-----------|-------------|----------------------|--------|-------------|----------------------|--------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV    | Lab Mean    | Diff from Grand Mean | CPV    |            |
| 13RB2X  |           | 1.928       | -0.020               | -0.11  | 1.965       | -0.087               | -0.37  | LH         |
| 1638CL  |           | 2.001       | 0.053                | 0.27   | 2.158       | 0.106                | 0.46   | XX         |
| 1G4G8A  |           | 2.037       | 0.089                | 0.46   | 2.241       | 0.189                | 0.81   | LH         |
| 27Q7RH  |           | 1.935       | -0.013               | -0.07  | 2.015       | -0.037               | -0.16  | KA         |
| 2UA25N  |           | 1.540       | -0.408               | -2.12  | 1.560       | -0.492               | -2.11  | IM         |
| 2ZD1FY  |           | 1.977       | 0.029                | 0.15   | 1.985       | -0.067               | -0.29  | XX         |
| 385VTM  |           | 2.100       | 0.152                | 0.79   | 2.050       | -0.002               | -0.01  | IA         |
| 3NCBYF  |           | 1.825       | -0.123               | -0.64  | 2.082       | 0.030                | 0.13   | LA         |
| 3PWJEE  | X         | 1.137       | -0.811               | -4.21  | 1.237       | -0.815               | -3.50  | TJ         |
| 3TB9T2  |           | 1.845       | -0.103               | -0.54  | 1.909       | -0.143               | -0.61  | LH         |
| 3YQ9AS  |           | 1.888       | -0.060               | -0.31  | 1.977       | -0.075               | -0.32  | LH         |
| 6FSVXQ  |           | 1.891       | -0.057               | -0.30  | 1.952       | -0.100               | -0.43  | LH         |
| 7EZ5TB  |           | 1.803       | -0.145               | -0.76  | 1.947       | -0.105               | -0.45  | LH         |
| 7LFPMA  |           | 1.837       | -0.111               | -0.58  | 1.888       | -0.164               | -0.70  | LH         |
| 87GW5E  |           | 1.756       | -0.192               | -1.00  | 1.840       | -0.212               | -0.91  | XX         |
| 8TU5PJ  | X         | 4.453       | 2.505                | 13.01  | 4.950       | 2.898                | 12.45  | TB         |
| 97GT47  |           | 1.957       | 0.009                | 0.05   | 2.069       | 0.017                | 0.07   | TX         |
| 9JSR23  |           | 1.884       | -0.064               | -0.33  | 1.955       | -0.097               | -0.42  | LH         |
| 9XY3SG  |           | 2.424       | 0.476                | 2.47   | 2.562       | 0.510                | 2.19   | XX         |
| BH3KZ3  |           | 2.050       | 0.102                | 0.53   | 2.130       | 0.078                | 0.34   | TF         |
| BQU35J  | *         | 2.414       | 0.466                | 2.42   | 2.429       | 0.377                | 1.62   | TJ         |
| BXD5N7  |           | 2.026       | 0.077                | 0.40   | 2.287       | 0.235                | 1.01   | IM         |
| CX7RRS  |           | 1.889       | -0.059               | -0.31  | 2.158       | 0.106                | 0.46   | VM         |
| ESKURU  |           | 2.161       | 0.213                | 1.10   | 2.313       | 0.261                | 1.12   | XX         |
| EUT7D1  | X         | 1.569       | -0.380               | -1.97  | 1.248       | -0.804               | -3.45  | IN         |
| G9CJVM  |           | 1.476       | -0.472               | -2.45  | 1.522       | -0.530               | -2.28  | LH         |
| GBEKNR  |           | 1.962       | 0.014                | 0.07   | 2.207       | 0.155                | 0.66   | TB         |
| GCPQQU  | X         | 57.427      | 55.479               | 288.13 | 55.650      | 53.598               | 230.33 | TB         |
| GFURTH  |           | 1.929       | -0.019               | -0.10  | 2.031       | -0.021               | -0.09  | MR         |
| GHNWW   |           | 1.910       | -0.038               | -0.20  | 1.820       | -0.232               | -1.00  | VM         |
| H4H2U1  |           | 1.975       | 0.027                | 0.14   | 1.963       | -0.089               | -0.38  | LH         |
| H89SZ6  |           | 2.242       | 0.294                | 1.52   | 2.321       | 0.269                | 1.16   | DL         |
| HKYHB9  |           | 2.190       | 0.241                | 1.25   | 2.388       | 0.336                | 1.44   | IK         |
| HZ5AHT  | X         | 17.920      | 15.972               | 82.95  | 17.230      | 15.178               | 65.22  | XX         |
| J7D61D  |           | 1.936       | -0.012               | -0.06  | 2.001       | -0.051               | -0.22  | LH         |
| K5APJP  |           | 1.878       | -0.070               | -0.37  | 1.916       | -0.136               | -0.58  | LI         |
| KLRVL7  |           | 1.669       | -0.279               | -1.45  | 1.859       | -0.193               | -0.83  | LH         |
| KS1ZSE  |           | 1.911       | -0.038               | -0.20  | 1.936       | -0.116               | -0.50  | TB         |
| MAJ4QA  | X         | 3.374       | 1.426                | 7.40   | 3.949       | 1.897                | 8.15   | TP         |
| MHC8MS  | *         | 2.306       | 0.358                | 1.86   | 2.704       | 0.652                | 2.80   | IM         |
| NC1PWX  |           | 1.595       | -0.353               | -1.84  | 1.545       | -0.507               | -2.18  | LH         |
| NVBBZR  |           | 2.008       | 0.060                | 0.31   | 1.924       | -0.128               | -0.55  | XX         |
| PC3XY3  |           | 2.056       | 0.108                | 0.56   | 2.137       | 0.084                | 0.36   | ID         |

TAPPI-CTS Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

| WebCode | Data Flag | Sample SF43 |                      |       | Sample SF44 |                      |       | Instr Code |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |            |
| PQRMTU  |           | 2.187       | 0.238                | 1.24  | 2.284       | 0.232                | 1.00  | TB         |
| RB9CK3  |           | 1.912       | -0.036               | -0.19 | 2.050       | -0.002               | -0.01 | LI         |
| SL8EDY  |           | 1.880       | -0.068               | -0.36 | 2.120       | 0.068                | 0.29  | PP         |
| T5ABXL  |           | 1.866       | -0.082               | -0.43 | 1.954       | -0.098               | -0.42 | LX         |
| U3D56T  |           | 2.067       | 0.119                | 0.62  | 2.252       | 0.200                | 0.86  | TO         |
| UGGTZ8  | X         | 3.443       | 1.495                | 7.76  | 3.758       | 1.706                | 7.33  | TP         |
| UKF7LC  |           | 2.090       | 0.142                | 0.74  | 2.280       | 0.228                | 0.98  | TF         |
| VSBBF3  |           | 1.747       | -0.201               | -1.05 | 1.906       | -0.146               | -0.63 | LH         |
| YRR676  |           | 1.912       | -0.036               | -0.19 | 2.079       | 0.027                | 0.12  | TI         |
| Z9D88Y  |           | 2.046       | 0.097                | 0.50  | 1.991       | -0.061               | -0.26 | ID         |
| ZBE83D  |           | 1.851       | -0.097               | -0.51 | 2.016       | -0.036               | -0.15 | LH         |
| ZSNND2  |           | 1.755       | -0.193               | -1.00 | 1.821       | -0.231               | -0.99 | LH         |

| Sample SF43   |                | Summary Statistics | Sample SF44    |  |
|---|----------------|--------------------|----------------|--|
| Grand Means   | 1.9484 Percent |                    | 2.0520 Percent |  |
| SD Btw Labs   | 0.1925 Percent |                    | 0.2327 Percent |  |
| Statistics based on 48 of 55 reporting participants |                |                    |                |  |

**Comments on assigned Data Flags for Test #328**

3PWJEE (X) - Systematic error (data for both samples are low).

8TU5PJ (X) - Extreme data.

EUT7D1 (X) - Inconsistent in testing between samples, data for Sample SF44 are low.

GCPQQU (X) - Extreme data.

HZ5AHT (X) - Extreme data.

MAJ4QA (X) - Extreme data.

UGGTZ8 (X) - Extreme data.

**Elongation to Break - Printing Papers**

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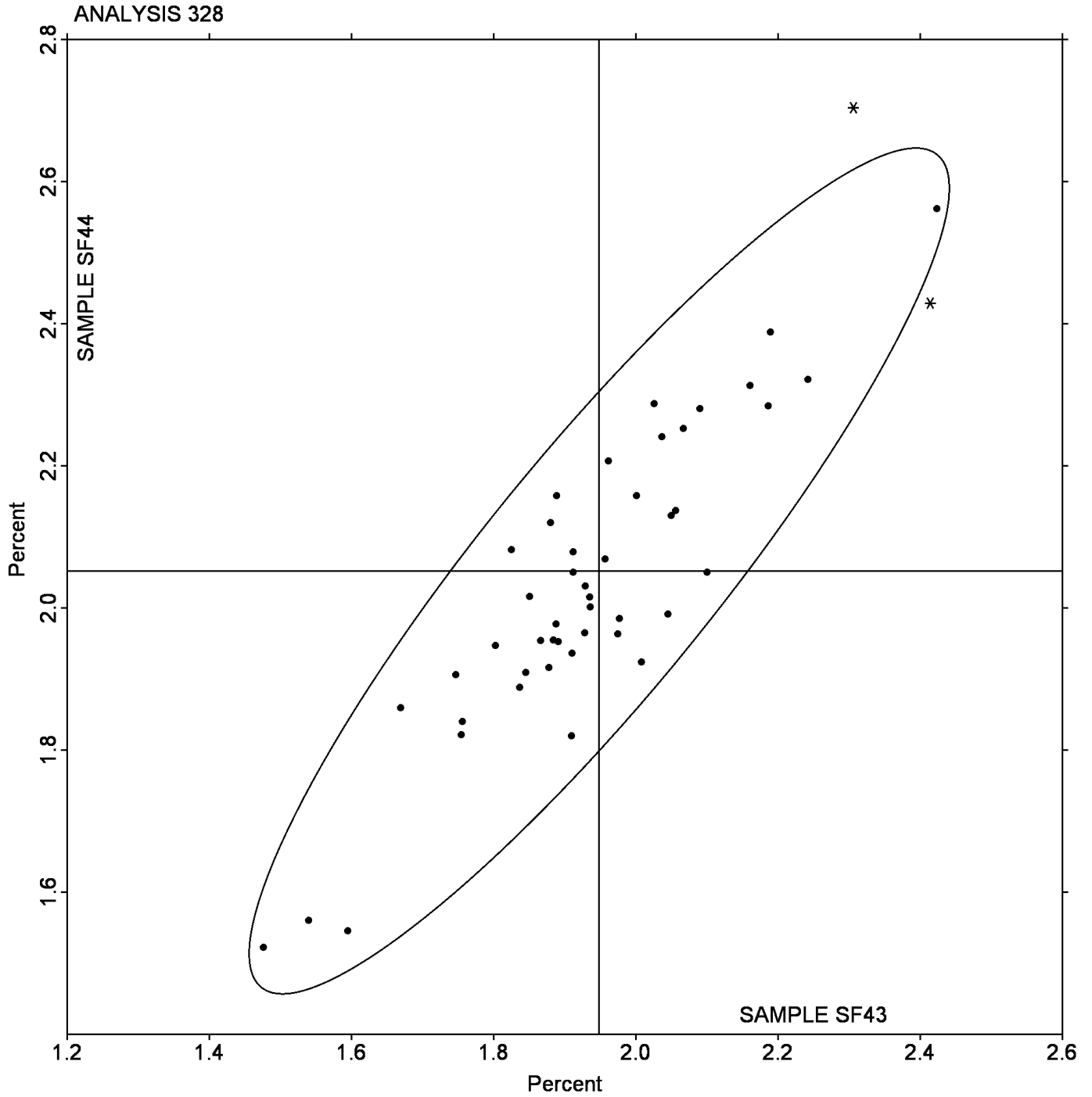
**Instrument Code List**

|   |   |
|---|---|
| (DL) - EMIC DL500 Universal Testing Machines  | (IA) - Instron 1011                               |
| (ID) - Instron 4201                           | (IK) - Instron 4400 Series                        |
| (IM) - Instron 5500                           | (IN) - Instron 3340 Series                        |
| (KA) - Zwick Model 1425                       | (LA) - L & W Tensile - Autoline 300               |
| (LH) - L & W Alwetron TH1 (Horizontal) SE 060 | (LI) - L & W Tensile Tester SE 062                |
| (LX) - L & W (model not specified)            | (MR) - MTS Alliance RT series                     |
| (PP) - Technidyne Profile Plus                | (TB) - Thwing-Albert EJA/1000                     |
| (TF) - Thwing-Albert EJA Vantage-1            | (TI) - Thwing-Albert QC II                        |
| (TJ) - Thwing-Albert QC II-XS                 | (TO) - Thwing-Albert QC-1000                      |
| (TP) - TMI Monitor/Tensile 100 (84-21-01)     | (TX) - Thwing-Albert (model not specified)        |
| (VM) - Valmet PaperLab (was Kajaani/Robotest) | (XX) - Instrument make/model not specified by lab |

TAPPI-CTS Interlaboratory Testing Program  
Analysis 328  
Elongation to Break - Printing Papers

Grand Mean Sample SF43 = 1.9484 Percent

Grand Mean Sample SF44 = 2.0520 Percent



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 330

## Tensile Breaking Strength - Packaging Papers

| WebCode | Data Flag | Sample SE43 |                      |       | Sample SE44 |                      |       | Instr Code |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |            |
| 38C5FZ  |           | 7.341       | -0.299               | -0.59 | 12.82       | -0.02                | -0.03 | lw         |
| 3LAWMR  |           | 7.816       | 0.176                | 0.35  | 13.14       | 0.30                 | 0.42  | TE         |
| 3QFX4M  |           | 8.006       | 0.367                | 0.73  | 13.08       | 0.24                 | 0.34  | LH         |
| 59MYG6  |           | 7.277       | -0.363               | -0.72 | 12.55       | -0.29                | -0.40 | IN         |
| 5CXKT6  |           | 8.143       | 0.504                | 1.00  | 13.41       | 0.58                 | 0.81  | TO         |
| 69D58W  |           | 6.863       | -0.777               | -1.54 | 11.94       | -0.90                | -1.27 | SA         |
| 6DMZU1  |           | 8.732       | 1.092                | 2.16  | 14.16       | 1.32                 | 1.86  | TA         |
| 6HNCKZ  |           | 6.921       | -0.719               | -1.42 | 12.15       | -0.69                | -0.96 | IA         |
| 6JMVU7  |           | 6.932       | -0.708               | -1.40 | 11.97       | -0.87                | -1.22 | LW         |
| 6SXPYV  |           | 8.470       | 0.830                | 1.64  | 13.85       | 1.01                 | 1.43  | TB         |
| 77RB78  |           | 7.223       | -0.417               | -0.82 | 11.79       | -1.05                | -1.48 | IF         |
| 7DFE75  |           | 7.427       | -0.213               | -0.42 | 12.87       | 0.03                 | 0.05  | IK         |
| 85G8UP  |           | 7.102       | -0.537               | -1.06 | 12.39       | -0.45                | -0.64 | TE         |
| 8PLL2B  |           | 8.154       | 0.514                | 1.02  | 13.43       | 0.59                 | 0.83  | ID         |
| 8W4S69  |           | 8.320       | 0.681                | 1.35  | 12.97       | 0.13                 | 0.19  | TO         |
| 8WV1EY  |           | 7.717       | 0.077                | 0.15  | 13.16       | 0.33                 | 0.46  | TB         |
| AGHD4D  |           | 7.846       | 0.207                | 0.41  | 13.38       | 0.54                 | 0.76  | XX         |
| BGTD32  |           | 7.354       | -0.286               | -0.57 | 12.87       | 0.03                 | 0.04  | LA         |
| EA6T5Y  |           | 8.208       | 0.569                | 1.12  | 13.94       | 1.10                 | 1.54  | TO         |
| FES724  |           | 7.416       | -0.223               | -0.44 | 12.88       | 0.04                 | 0.06  | XX         |
| GFHZ87  | X         | 7.889       | 0.250                | 0.49  | 11.51       | -1.32                | -1.86 | TK         |
| J1ZRK8  | X         | 7.972       | 0.332                | 0.66  | 10.34       | -2.50                | -3.51 | TP         |
| JQ6PK8  |           | 7.725       | 0.085                | 0.17  | 13.14       | 0.30                 | 0.42  | LH         |
| KQBMYA  | X         | 11.486      | 3.846                | 7.60  | 19.47       | 6.63                 | 9.31  | ZU         |
| LDTKU9  |           | 7.881       | 0.241                | 0.48  | 13.06       | 0.23                 | 0.32  | LH         |
| LF5XQN  |           | 8.321       | 0.681                | 1.35  | 13.71       | 0.87                 | 1.22  | TK         |
| LMB813  |           | 7.401       | -0.239               | -0.47 | 12.81       | -0.02                | -0.03 | TB         |
| M33TQA  |           | 7.839       | 0.199                | 0.39  | 12.20       | -0.64                | -0.90 | SP         |
| MFQ7KX  |           | 8.219       | 0.580                | 1.15  | 13.51       | 0.68                 | 0.95  | IM         |
| MJHCL3  |           | 8.194       | 0.554                | 1.10  | 13.79       | 0.95                 | 1.33  | LH         |
| NUU691  |           | 7.289       | -0.350               | -0.69 | 12.24       | -0.59                | -0.83 | XX         |
| PZ5CZK  |           | 7.264       | -0.375               | -0.74 | 12.49       | -0.35                | -0.49 | SB         |
| R8BTMA  |           | 7.482       | -0.158               | -0.31 | 13.23       | 0.39                 | 0.55  | ID         |
| RK4C32  |           | 7.860       | 0.220                | 0.43  | 13.34       | 0.50                 | 0.70  | TP         |
| TZRGG8  | *         | 7.252       | -0.387               | -0.77 | 11.24       | -1.60                | -2.24 | TO         |
| VE59TJ  |           | 6.751       | -0.888               | -1.76 | 11.84       | -1.00                | -1.40 | IK         |
| VEF8A8  |           | 7.273       | -0.366               | -0.72 | 12.21       | -0.63                | -0.89 | IX         |
| WT9UV8  |           | 7.923       | 0.283                | 0.56  | 13.03       | 0.19                 | 0.27  | LH         |
| Z3WMRF  |           | 7.080       | -0.559               | -1.11 | 11.60       | -1.24                | -1.74 | IM         |

TAPPI-CTS Interlaboratory Testing Program  
Analysis 330

**Tensile Breaking Strength - Packaging Papers**

|   | Summary Statistics |             |
|---|--------------------|-------------|
|   | Sample SE43        | Sample SE44 |
| Grand Means   | 7.6395 kN/m        | 12.839 kN/m |
| SD Btwn Labs  | 0.5058 kN/m        | 0.712 kN/m  |
| Statistics based on 36 of 39 reporting participants |                    |             |

**Comments on assigned Data Flags for Test #330**

GFHZ87 (X) - Inconsistent in testing between samples.

J1ZRK8 (X) - Inconsistent in testing between samples, data for Sample SE44 are low.

KQBMYA (X) - Extreme data.

**Analysis Notes:**

BGTD32 - Data appear to be reported as lb/inch, not kN/m as indicated on datasheet. Units changed by CTS.

**Instrument Code List**

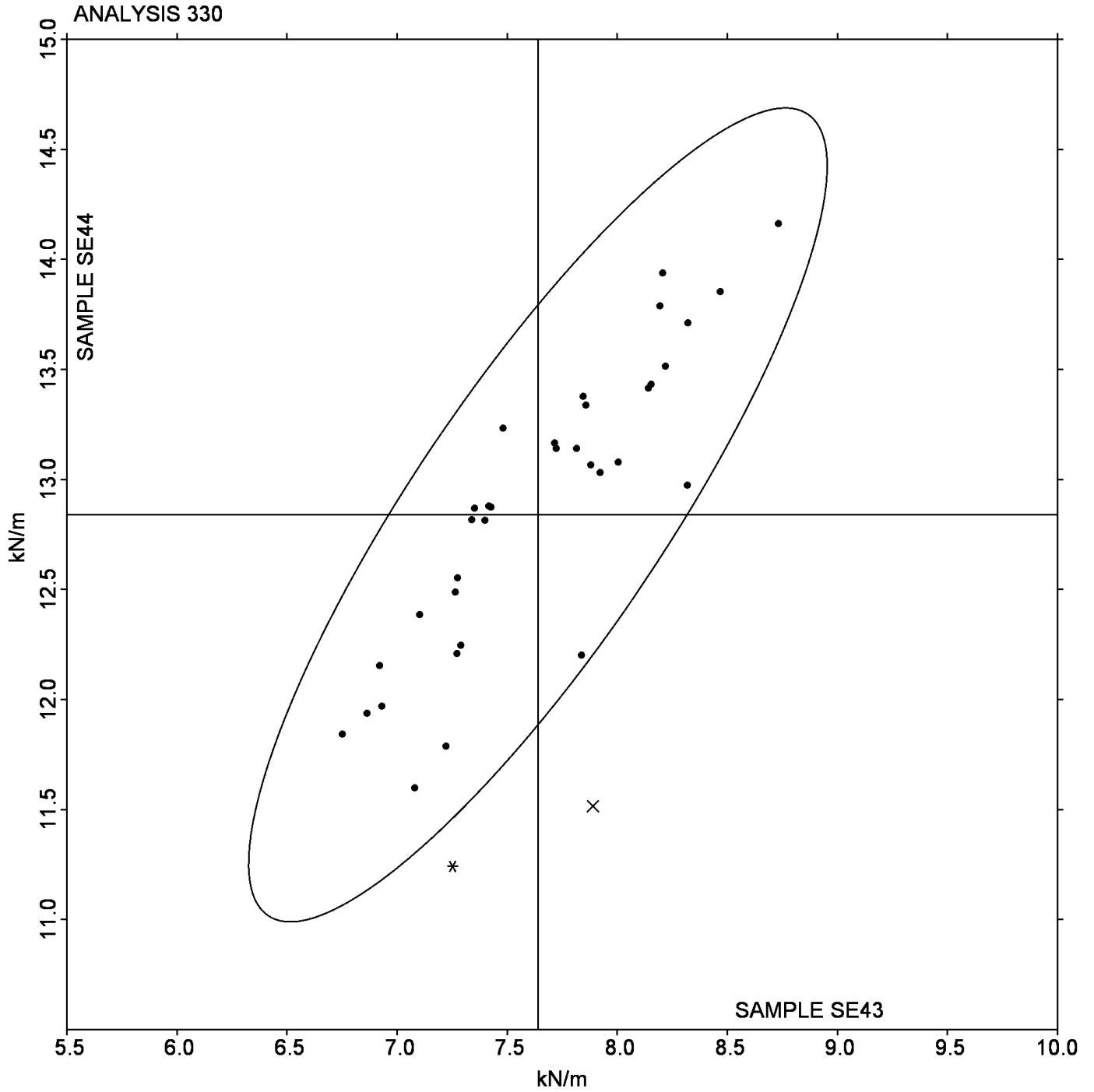
|   |   |
|---|---|
| (IA) - Instron 1011                           | (ID) - Instron 4201                               |
| (IF) - Instron 3340 Series                    | (IK) - Instron 4400 Series                        |
| (IM) - Instron 5500 Series                    | (IN) - Instron 3360 Series                        |
| (IX) - Instron (model not specified)          | (LA) - L & W Autoline 300                         |
| (LH) - L & W Alwetron TH1 (Horizontal) SE 060 | (LW) - L & W Tensile Tester SE062                 |
| (SA) - Shimadzu Autograph AG 2000 A           | (SB) - Shimadzu Autograph DSS 500                 |
| (SP) - Schopper Type Tensile Tester (TMI)     | (TA) - Thwing-Albert Tensile Tester               |
| (TB) - Thwing-Albert EJA/1000                 | (TE) - Thwing-Albert Intellect II                 |
| (TK) - Thwing-Albert Model 37-4               | (TO) - Thwing-Albert QC-1000                      |
| (TP) - TMI Monitor/Tensile 100 (84-21-01)     | (XX) - Instrument make/model not specified by lab |
| (ZU) - Zwick Universal Tensile Tester         |   |

TAPPI-CTS Interlaboratory Testing Program  
Analysis 330

Tensile Breaking Strength - Packaging Papers

Grand Mean Sample SE43 = 7.6395 kN/m

Grand Mean Sample SE44 = 12.839 kN/m



TAPPI-CTS Interlaboratory Testing Program  
Analysis 331

Tensile Energy Absorption - Packaging Papers

| WebCode | Data Flag | Sample SE43 |                      |       | Sample SE44 |                      |       | Instr Code |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |            |
| 25G5R5  |           | 94.0        | -9.6                 | -0.90 | 181.5       | -18.4                | -0.84 | LW         |
| 2YY91G  |           | 88.9        | -14.7                | -1.37 | 165.9       | -34.0                | -1.55 | IF         |
| 3GLSAL  |           | 107.9       | 4.4                  | 0.41  | 186.8       | -13.1                | -0.60 | LH         |
| 6HE1C9  |           | 110.3       | 6.8                  | 0.64  | 235.5       | 35.6                 | 1.63  | IK         |
| 6VXE42  |           | 101.3       | -2.2                 | -0.21 | 185.5       | -14.4                | -0.66 | XX         |
| 7UXJBJ  | X         | 91.0        | -12.6                | -1.18 | 104.8       | -95.1                | -4.34 | TP         |
| 89DSY8  |           | 106.0       | 2.4                  | 0.23  | 217.5       | 17.6                 | 0.80  | TO         |
| 8UWWLX  |           | 88.0        | -15.5                | -1.46 | 211.1       | 11.2                 | 0.51  | SA         |
| A9MKN7  |           | 98.8        | -4.8                 | -0.45 | 195.6       | -4.3                 | -0.20 | XX         |
| AFKT42  |           | 114.0       | 10.4                 | 0.98  | 211.5       | 11.5                 | 0.53  | XX         |
| B2PEHX  |           | 100.6       | -2.9                 | -0.27 | 197.1       | -2.8                 | -0.13 | IN         |
| BM6QAU  |           | 97.3        | -6.3                 | -0.59 | 192.7       | -7.2                 | -0.33 | LW         |
| BUEJE5  |           | 104.8       | 1.2                  | 0.12  | 162.7       | -37.2                | -1.70 | TO         |
| BULUFF  |           | 102.5       | -1.0                 | -0.09 | 202.5       | 2.6                  | 0.12  | LH         |
| JHT9XB  |           | 104.8       | 1.2                  | 0.12  | 193.1       | -6.8                 | -0.31 | LH         |
| JRCX55  |           | 100.2       | -3.3                 | -0.31 | 203.8       | 3.9                  | 0.18  | TB         |
| KFQUER  |           | 101.2       | -2.4                 | -0.22 | 217.3       | 17.4                 | 0.79  | SB         |
| MFGDAQ  |           | 119.3       | 15.7                 | 1.48  | 217.1       | 17.2                 | 0.78  | LA         |
| MGY11A  |           | 96.7        | -6.9                 | -0.64 | 194.3       | -5.6                 | -0.26 | TE         |
| PR65QY  |           | 103.6       | 0.1                  | 0.01  | 217.4       | 17.5                 | 0.80  | TE         |
| UXRZBK  |           | 86.7        | -16.9                | -1.58 | 150.7       | -49.2                | -2.25 | IM         |
| VM5HB5  | *         | 134.4       | 30.9                 | 2.89  | 242.6       | 42.7                 | 1.95  | TB         |
| XH3JSR  |           | 115.6       | 12.1                 | 1.13  | 208.2       | 8.3                  | 0.38  | IM         |
| YQTFU6  |           | 104.8       | 1.2                  | 0.11  | 207.7       | 7.8                  | 0.35  | IA         |
| YRYXY3  | X         | 251.7       | 148.1                | 13.89 | 472.1       | 272.2                | 12.43 | IX         |

| Summary Statistics                                  |                    |                    |
|---|--------------------|--------------------|
|   | Sample SE43        | Sample SE44        |
| Grand Means   | 103.54 Joules/sq m | 199.92 Joules/sq m |
| SD Btwn Labs  | 10.66 Joules/sq m  | 21.91 Joules/sq m  |
| Statistics based on 23 of 25 reporting participants |                    |                    |

**Comments on assigned Data Flags for Test #331**

7UXJBJ (X) - Inconsistent in testing between samples, data for Sample SE44 are low.

YRYXY3 (X) - Extreme data.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 331**Tensile Energy Absorption - Packaging Papers**

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**Instrument Code List**

|   |   |
|---|---|
| (IA) - Instron 1011                       | (IF) - Instron 3340 Series                        |
| (IK) - Instron 4400 Series                | (IM) - Instron 5500 Series                        |
| (IN) - Instron 3360 Series                | (IX) - Instron (model not specified)              |
| (LA) - L & W Autoline 300                 | (LH) - L & W Alwetron TH1 (Horizontal) SE 060     |
| (LW) - L & W Tensile Tester SE062         | (SA) - Shimadzu Autograph AG 2000 A               |
| (SB) - Shimadzu Autograph DSS 500         | (TB) - Thwing-Albert EJA/1000                     |
| (TE) - Thwing-Albert Intelect II          | (TO) - Thwing-Albert QC-1000                      |
| (TP) - TMI Monitor/Tensile 100 (84-21-01) | (XX) - Instrument make/model not specified by lab |

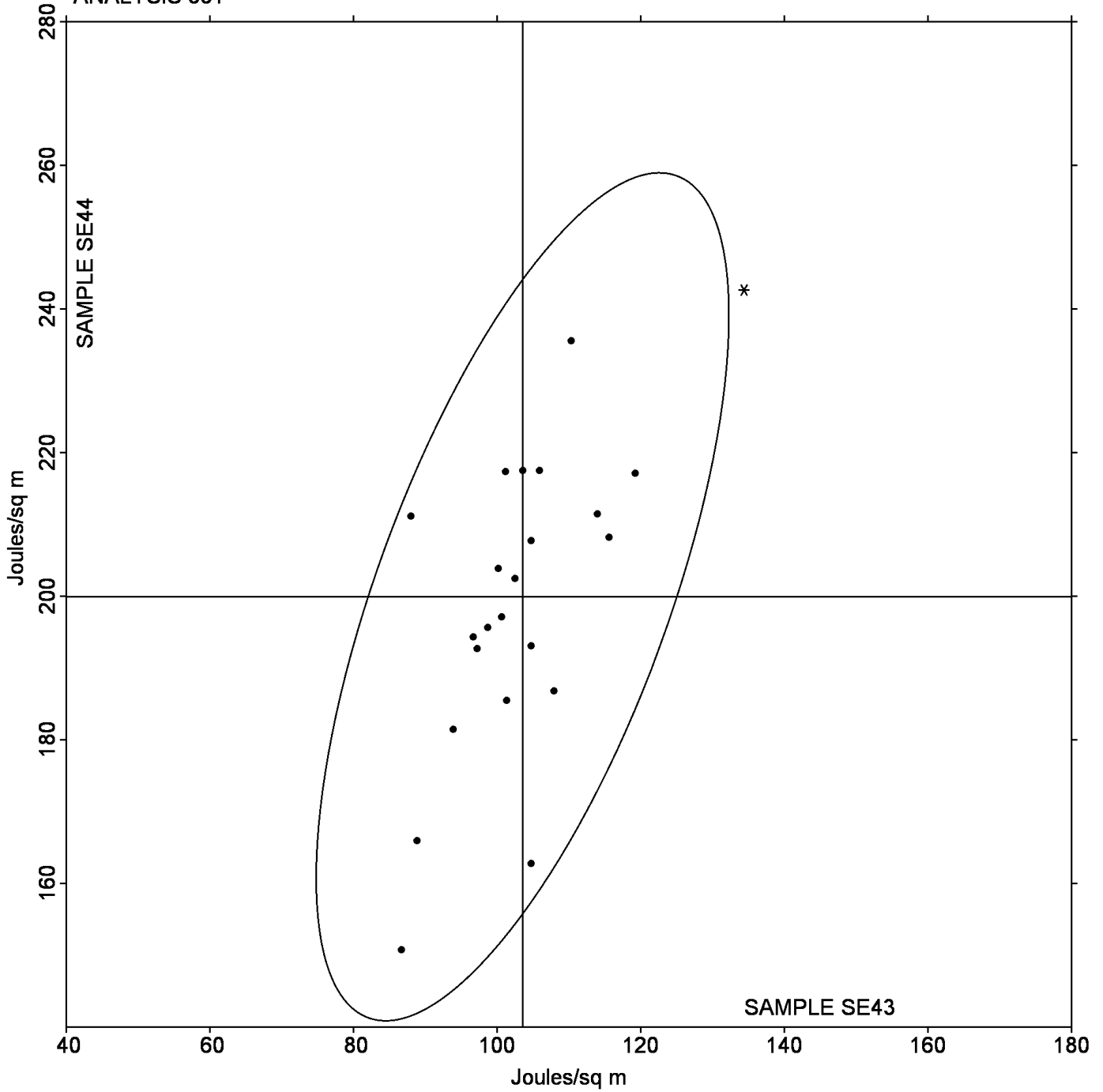
TAPPI-CTS Interlaboratory Testing Program  
Analysis 331

Tensile Energy Absorption - Packaging Papers

Grand Mean Sample SE43 = 103.54 Joules/sq m

Grand Mean Sample SE44 = 199.92 Joules/sq m

ANALYSIS 331



TAPPI-CTS Interlaboratory Testing Program

Analysis 332

Elongation to Break - Packaging Papers

| WebCode | Data Flag | Sample SE43 |                      |        | Sample SE44 |                      |        | Instr Code |
|---------|-----------|-------------|----------------------|--------|-------------|----------------------|--------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV    | Lab Mean    | Diff from Grand Mean | CPV    |            |
| 231HXY  |           | 2.074       | 0.004                | 0.02   | 2.525       | 0.060                | 0.27   | XX         |
| 2UC43Y  |           | 2.001       | -0.069               | -0.40  | 2.425       | -0.040               | -0.18  | TE         |
| 4SLN4A  |           | 2.031       | -0.039               | -0.23  | 2.545       | 0.080                | 0.36   | TO         |
| 51STP4  |           | 2.151       | 0.081                | 0.47   | 2.583       | 0.118                | 0.53   | IN         |
| 53DKDN  |           | 1.963       | -0.108               | -0.63  | 2.427       | -0.038               | -0.17  | TB         |
| 5P9WZ8  |           | 2.366       | 0.296                | 1.73   | 2.360       | -0.105               | -0.47  | TO         |
| 5RTRSN  |           | 1.950       | -0.120               | -0.70  | 2.258       | -0.207               | -0.93  | XX         |
| 5SEZZ2  |           | 1.884       | -0.186               | -1.09  | 2.155       | -0.310               | -1.39  | XX         |
| 6ZSP94  |           | 2.200       | 0.130                | 0.76   | 2.600       | 0.135                | 0.60   | XX         |
| 9CB2SU  |           | 2.056       | -0.014               | -0.08  | 2.506       | 0.041                | 0.18   | LH         |
| 9GY883  |           | 2.232       | 0.162                | 0.94   | 2.500       | 0.035                | 0.16   | LA         |
| BGB686  |           | 2.044       | -0.026               | -0.15  | 2.544       | 0.079                | 0.35   | IA         |
| BR1LR8  | *         | 2.359       | 0.289                | 1.68   | 2.150       | -0.315               | -1.41  | TP         |
| HQ198U  |           | 1.983       | -0.087               | -0.51  | 2.606       | 0.140                | 0.63   | SB         |
| HR9JW6  |           | 2.010       | -0.060               | -0.35  | 2.630       | 0.165                | 0.74   | TE         |
| HZKQQN  |           | 2.056       | -0.014               | -0.08  | 2.501       | 0.036                | 0.16   | TB         |
| JGHG59  | X         | 3.000       | 0.930                | 5.42   | 3.540       | 1.075                | 4.80   | ZU         |
| KXRJMH  | X         | 5.265       | 3.195                | 18.63  | 6.218       | 3.753                | 16.77  | IX         |
| LUQ8JL  |           | 1.918       | -0.152               | -0.89  | 2.319       | -0.146               | -0.65  | LW         |
| MBW1A2  | X         | 0.160       | -1.910               | -11.14 | 0.177       | -2.288               | -10.23 | XX         |
| PSSDZ   |           | 2.190       | 0.120                | 0.70   | 2.556       | 0.091                | 0.41   | IM         |
| RAHWDR  | X         | 1.932       | -0.138               | -0.81  | 13.404      | 10.939               | 48.88  | XX         |
| SWGX58  |           | 2.426       | 0.356                | 2.08   | 2.816       | 0.351                | 1.57   | TB         |
| UMTZVZ  |           | 1.950       | -0.120               | -0.70  | 2.250       | -0.215               | -0.96  | LH         |
| UZSNLM  |           | 1.859       | -0.211               | -1.23  | 2.280       | -0.185               | -0.83  | IF         |
| V7B4ZH  | *         | 2.461       | 0.391                | 2.28   | 3.194       | 0.729                | 3.26   | IK         |
| VEKM6U  |           | 1.909       | -0.161               | -0.94  | 2.309       | -0.156               | -0.70  | LH         |
| VX5QX9  |           | 1.911       | -0.159               | -0.93  | 2.691       | 0.226                | 1.01   | SA         |
| XAY1EB  |           | 1.953       | -0.117               | -0.68  | 2.224       | -0.241               | -1.08  | XX         |
| YK4B98  |           | 1.921       | -0.149               | -0.87  | 2.296       | -0.169               | -0.76  | LW         |
| ZT7XTS  |           | 2.035       | -0.035               | -0.20  | 2.312       | -0.153               | -0.68  | IM         |

| Sample SE43   |                | Summary Statistics | Sample SE44 |         |
|---|----------------|--------------------|-------------|---------|
| Grand Means   | 2.0701 Percent |                    | 2.4652      | Percent |
| SD Btwn Labs  | 0.1715 Percent |                    | 0.2238      | Percent |
| Statistics based on 27 of 31 reporting participants |                |                    |             |         |

**Elongation to Break - Packaging Papers**

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**Comments on assigned Data Flags for Test #332**

JGHG59 (X) - Extreme data.

KXRJMH (X) - Extreme data.

MBW1A2 (X) - Extreme data.

RAHWDR (X) - Extreme data for Sample SE44.

**Instrument Code List**

|   |   |
|---|---|
| (IA) - Instron 1011                       | (IF) - Instron 3340 Series                        |
| (IK) - Instron 4400 Series                | (IM) - Instron 5500 Series                        |
| (IN) - Instron 3360 Series                | (IX) - Instron (model not specified)              |
| (LA) - L & W Autoline 300                 | (LH) - L & W Alwetron TH1 (Horizontal) SE 060     |
| (LW) - L & W Tensile Tester SE062         | (SA) - Shimadzu Autograph AG 2000 A               |
| (SB) - Shimadzu Autograph DSS 500         | (TB) - Thwing-Albert EJA/1000                     |
| (TE) - Thwing-Albert Intellect II         | (TO) - Thwing-Albert QC-1000                      |
| (TP) - TMI Monitor/Tensile 100 (84-21-01) | (XX) - Instrument make/model not specified by lab |
| (ZU) - Zwick Universal Tensile Tester     |   |



TAPPI-CTS Interlaboratory Testing Program

Analysis 334

Folding Endurance (MIT) - Double Folds

| WebCode | Data Flag | Sample SG43 |                      |       | Sample SG44 |                      |       | Instr Code |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |            |
| 1G7BSW  |           | 48.80       | 1.89                 | 0.21  | 44.90       | -14.18               | -1.22 | MT         |
| 2M29BH  |           | 40.80       | -6.11                | -0.67 | 45.90       | -13.18               | -1.14 | MT         |
| 2MLNTM  |           | 45.40       | -1.51                | -0.17 | 52.70       | -6.38                | -0.55 | MT         |
| 3GX1YG  |           | 40.50       | -6.41                | -0.71 | 43.40       | -15.68               | -1.35 | XX         |
| 3L7JRH  |           | 46.30       | -0.61                | -0.07 | 60.60       | 1.52                 | 0.13  | MT         |
| 5W5URH  |           | 49.30       | 2.39                 | 0.26  | 58.70       | -0.38                | -0.03 | MT         |
| CJHHJ6  |           | 58.10       | 11.19                | 1.23  | 65.40       | 6.32                 | 0.55  | MT         |
| H52CXX  |           | 50.60       | 3.69                 | 0.41  | 68.20       | 9.12                 | 0.79  | MT         |
| HC7ZA8  |           | 52.60       | 5.69                 | 0.63  | 70.00       | 10.92                | 0.94  | MT         |
| JLYS4J  |           | 64.60       | 17.69                | 1.95  | 77.90       | 18.82                | 1.63  | MT         |
| MZ347V  |           | 41.10       | -5.81                | -0.64 | 50.70       | -8.38                | -0.72 | XX         |
| NU7837  |           | 36.70       | -10.21               | -1.12 | 65.50       | 6.42                 | 0.55  | MT         |
| UBWWR5  |           | 48.80       | 1.89                 | 0.21  | 80.20       | 21.12                | 1.82  | MT         |
| V5EYSQ  |           | 42.20       | -4.71                | -0.52 | 58.80       | -0.28                | -0.02 | MT         |
| W5YV6N  |           | 36.30       | -10.61               | -1.17 | 46.10       | -12.98               | -1.12 | MT         |
| W7SYE4  |           | 63.00       | 16.09                | 1.77  | 66.40       | 7.32                 | 0.63  | MT         |
| WN2MQJ  |           | 32.40       | -14.51               | -1.60 | 48.90       | -10.18               | -0.88 | MT         |

| Summary Statistics                                  |                     |                     |
|---|---------------------|---------------------|
|   | Sample SG43         | Sample SG44         |
| Grand Means   | 46.912 Double Folds | 59.076 Double Folds |
| SD Btwn Labs  | 9.084 Double Folds  | 11.575 Double Folds |
| Statistics based on 17 of 17 reporting participants |                     |                     |

**Notes for Analysis 334**

No Data Flags assigned for this analysis.

**Instrument Code List**

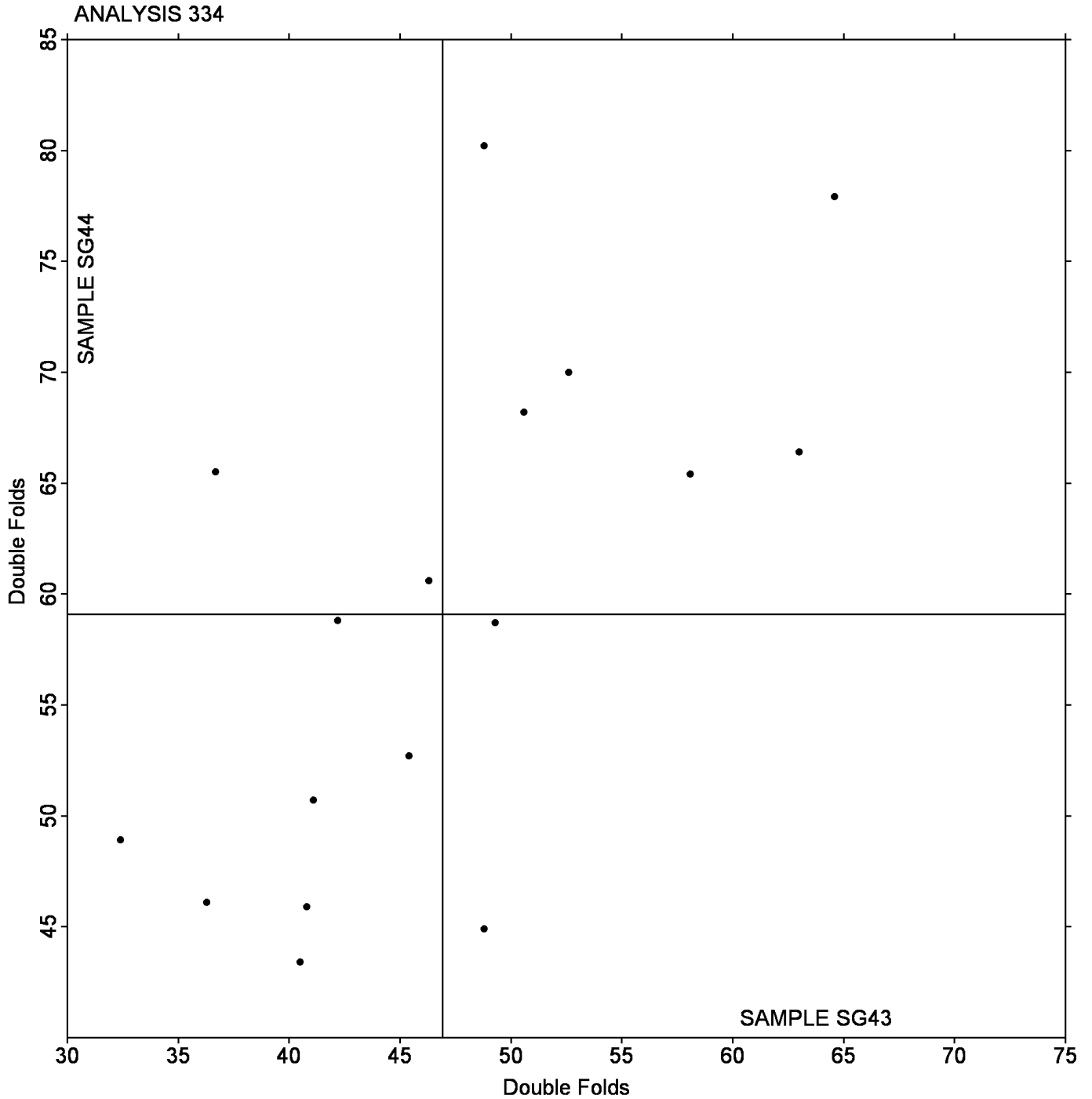
(MT) - MIT - Tinius Olsen

(XX) - Instrument make/model not specified by lab

TAPPI-CTS Interlaboratory Testing Program  
Analysis 334  
Folding Endurance (MIT) - Double Folds

Grand Mean Sample **SG43** = 46.912 Double Folds

Grand Mean Sample **SG44** = 59.076 Double Folds



If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

TAPPI-CTS Interlaboratory Testing Program

Analysis 336

Bending Resistance, Gurley Type

| WebCode | Data Flag | Sample SH43 |                      |        | Sample SH44 |                      |       |
|---------|-----------|-------------|----------------------|--------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV    | Lab Mean    | Diff from Grand Mean | CPV   |
| 2HQUVL  |           | 217.8       | 5.2                  | 0.35   | 145.8       | -0.1                 | -0.01 |
| 2SVD31  |           | 201.4       | -11.2                | -0.74  | 130.7       | -15.2                | -0.97 |
| 3F3DL D |           | 209.8       | -2.7                 | -0.18  | 142.3       | -3.6                 | -0.23 |
| 3UUCTE  |           | 215.9       | 3.4                  | 0.22   | 143.7       | -2.2                 | -0.14 |
| 3XK1QV  |           | 205.6       | -6.9                 | -0.46  | 154.3       | 8.4                  | 0.54  |
| 4S2YMF  |           | 223.3       | 10.8                 | 0.72   | 152.1       | 6.2                  | 0.39  |
| 5LEDAN  |           | 220.4       | 7.9                  | 0.53   | 134.3       | -11.6                | -0.74 |
| 713BJL  |           | 196.7       | -15.8                | -1.06  | 127.0       | -18.9                | -1.20 |
| 9FBRX2  |           | 207.9       | -4.6                 | -0.31  | 142.9       | -3.0                 | -0.19 |
| A9NU26  |           | 225.1       | 12.6                 | 0.84   | 145.4       | -0.5                 | -0.03 |
| B94X2W  |           | 226.3       | 13.7                 | 0.91   | 155.9       | 10.1                 | 0.64  |
| DDV2S6  | X         | 221.9       | 9.4                  | 0.62   | 289.8       | 143.9                | 9.17  |
| EUCFBN  |           | 222.3       | 9.7                  | 0.65   | 166.2       | 20.4                 | 1.30  |
| KLE7FE  |           | 191.1       | -21.4                | -1.43  | 109.8       | -36.1                | -2.30 |
| LKLLK3  | X         | 4.1         | -208.4               | -13.88 | 4.8         | -141.1               | -8.99 |
| M5R9ZJ  |           | 238.9       | 26.3                 | 1.75   | 182.3       | 36.4                 | 2.32  |
| N5MDL5  |           | 230.8       | 18.3                 | 1.22   | 149.4       | 3.5                  | 0.22  |
| NPFK6V  |           | 198.9       | -13.6                | -0.91  | 143.2       | -2.7                 | -0.17 |
| PK184C  |           | 198.7       | -13.9                | -0.92  | 141.0       | -4.9                 | -0.31 |
| RP9QE6  | X         | 94.2        | -118.3               | -7.88  | 60.4        | -85.4                | -5.45 |
| RUQYCW  |           | 240.0       | 27.4                 | 1.83   | 149.4       | 3.5                  | 0.22  |
| S5G63L  | X         | 103.7       | -108.8               | -7.25  | 72.8        | -73.1                | -4.66 |
| SENB6G  |           | 215.6       | 3.0                  | 0.20   | 142.2       | -3.6                 | -0.23 |
| WYNTR8  |           | 195.4       | -17.2                | -1.14  | 131.2       | -14.7                | -0.94 |
| X8YGGP  |           | 207.6       | -5.0                 | -0.33  | 144.9       | -1.0                 | -0.06 |
| ZFTFMB  | *         | 186.5       | -26.1                | -1.74  | 175.6       | 29.7                 | 1.89  |

| Summary Statistics                                  |                     |                     |
|---|---------------------|---------------------|
|   | Sample SH43         | Sample SH44         |
| Grand Means   | 212.54 Gurley Units | 145.89 Gurley Units |
| SD Btwn Labs  | 15.02 Gurley Units  | 15.69 Gurley Units  |
| Statistics based on 22 of 26 reporting participants |                     |                     |

**Comments on assigned Data Flags for Test #336**

DDV2S6 (X) - Extreme data for Sample SH44.

LKLLK3 (X) - Extreme data.

RP9QE6 (X) - Extreme data.

S5G63L (X) - Extreme data.

TAPPI-CTS Interlaboratory Testing Program

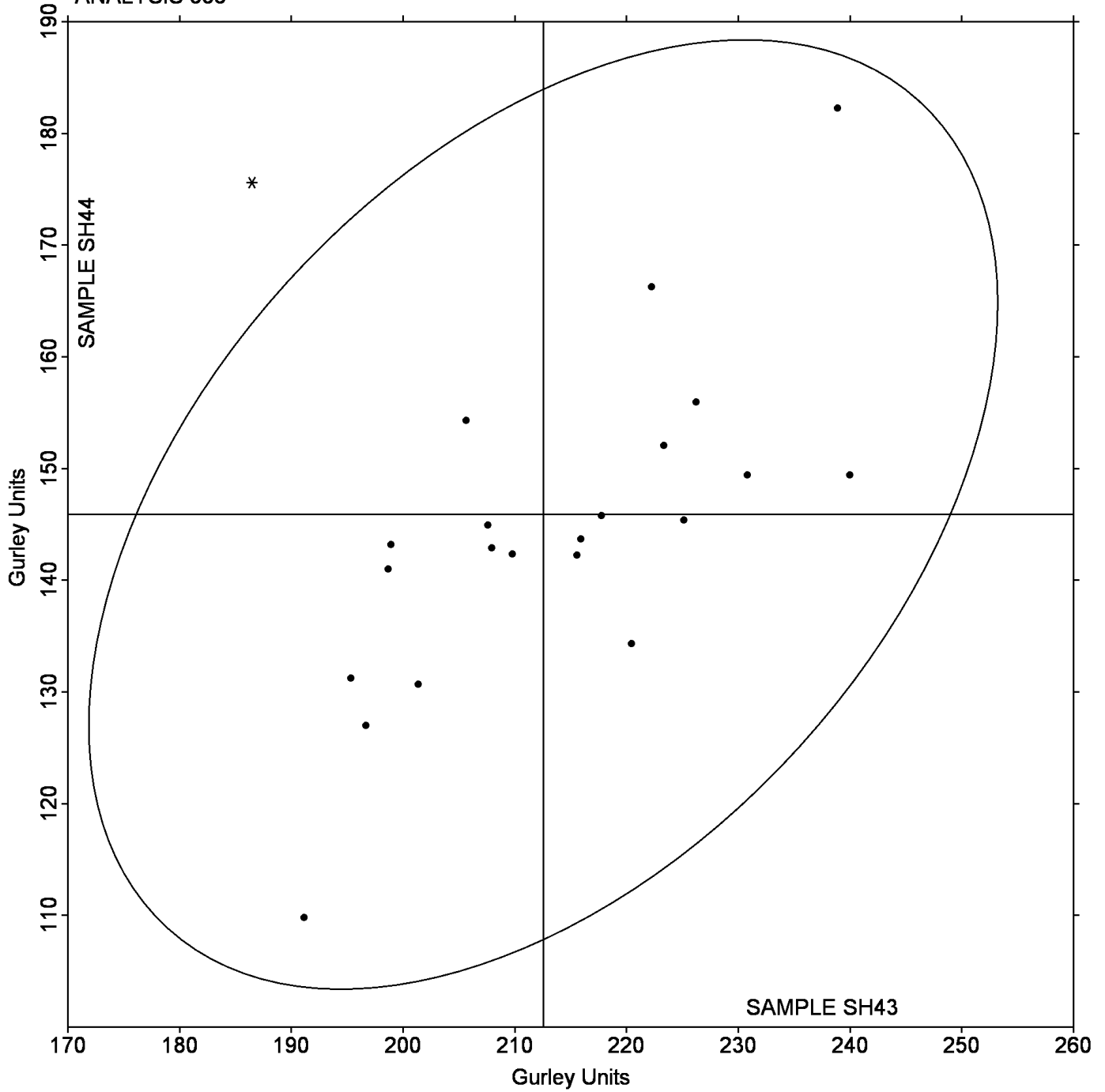
Analysis 336

Bending Resistance, Gurley Type

Grand Mean Sample SH43 = 212.54 Gurley Units

Grand Mean Sample SH44 = 145.89 Gurley Units

ANALYSIS 336



TAPPI-CTS Interlaboratory Testing Program  
Analysis 338

**Bending Resistance, Taber Type - 0 to 10 Units**

| WebCode | Data Flag | Sample SJ43 |                      |       | Sample SJ44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| 1X16M1  |           | 2.865       | -0.088               | -0.17 | 2.062       | -0.040               | -0.17 |
| 2L3P8J  |           | 3.280       | 0.327                | 0.64  | 2.380       | 0.278                | 1.17  |
| 4RSAMX  |           | 3.116       | 0.163                | 0.32  | 2.032       | -0.070               | -0.29 |
| 5SA1TG  |           | 3.149       | 0.196                | 0.38  | 2.232       | 0.130                | 0.55  |
| AUDPN7  |           | 3.144       | 0.191                | 0.37  | 2.281       | 0.179                | 0.75  |
| AYR2CD  |           | 2.621       | -0.332               | -0.65 | 1.859       | -0.243               | -1.02 |
| DLGSMT  |           | 4.106       | 1.153                | 2.25  | 2.443       | 0.341                | 1.44  |
| HWV4E7  |           | 3.199       | 0.246                | 0.48  | 2.208       | 0.106                | 0.45  |
| J8ZZG1  |           | 2.546       | -0.407               | -0.80 | 1.948       | -0.154               | -0.65 |
| K8GDHJ  |           | 2.834       | -0.119               | -0.23 | 2.132       | 0.030                | 0.13  |
| L3QB4B  | *         | 1.434       | -1.519               | -2.97 | 1.784       | -0.318               | -1.34 |
| MBCQLM  |           | 2.716       | -0.238               | -0.46 | 1.998       | -0.104               | -0.44 |
| RTJGD1  |           | 3.405       | 0.452                | 0.88  | 2.600       | 0.498                | 2.10  |
| VTQSN6  |           | 2.758       | -0.195               | -0.38 | 1.968       | -0.134               | -0.56 |
| VYTNX9  |           | 3.370       | 0.417                | 0.82  | 2.140       | 0.038                | 0.16  |
| WGE46F  |           | 2.889       | -0.065               | -0.13 | 1.976       | -0.126               | -0.53 |
| X2Z8DR  | X         | 7.260       | 4.307                | 8.42  | 2.010       | -0.092               | -0.39 |
| XLL828  |           | 2.530       | -0.423               | -0.83 | 1.580       | -0.522               | -2.20 |
| XX6PS1  |           | 2.799       | -0.154               | -0.30 | 2.007       | -0.095               | -0.40 |
| XZVFLC  |           | 3.196       | 0.243                | 0.47  | 2.324       | 0.222                | 0.94  |
| Z8NEXW  |           | 3.108       | 0.155                | 0.30  | 2.084       | -0.018               | -0.08 |

|   |                    | Summary Statistics |                    |
|---|--------------------|--------------------|--------------------|
|   | Sample SJ43        |                    | Sample SJ44        |
| Grand Means   | 2.9532 Taber Units |                    | 2.1019 Taber Units |
| SD Btwn Labs  | 0.5112 Taber Units |                    | 0.2374 Taber Units |
| Statistics based on 20 of 21 reporting participants |                    |                    |                    |

**Comments on assigned Data Flags for Test #338**

X2Z8DR (X) - Extreme data for Sample SJ43.

**Analysis Notes:**

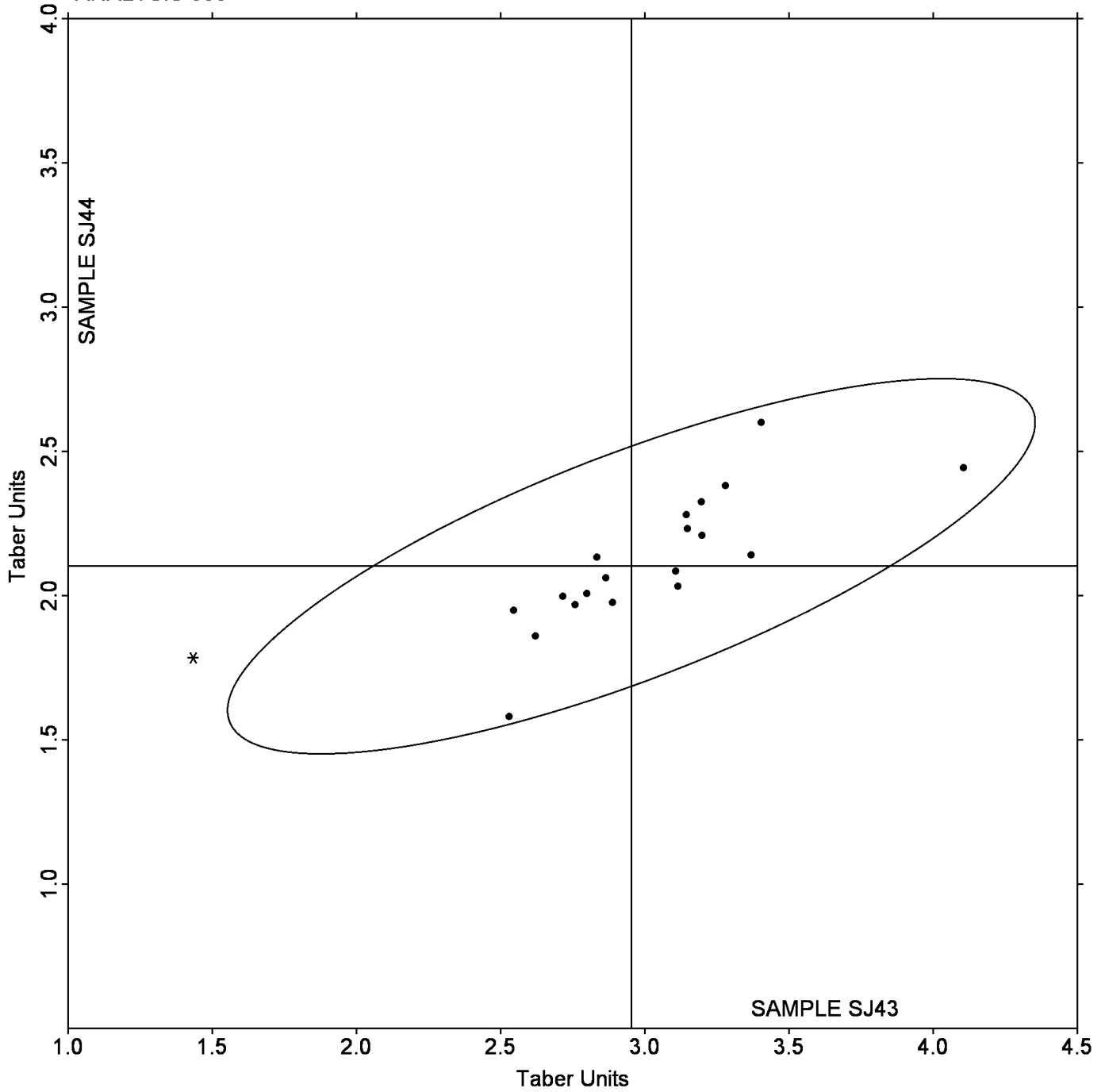
XZVFLC - Data appear to be off by a factor of 10; data converted by CTS (/10).

**Bending Resistance, Taber Type - 0 to 10 Units**

Grand Mean Sample **SJ43** = 2.9532 Taber Units

Grand Mean Sample **SJ44** = 2.1019 Taber Units

ANALYSIS 338



TAPPI-CTS Interlaboratory Testing Program  
 Analysis 339

**Bending Resistance, Taber Type - 10 to 100 Taber Units**

| WebCode | Data Flag | Sample SQ43 |                      |       | Sample SQ44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| 3HP66U  |           | 13.13       | -3.66                | -1.94 | 17.63       | -3.30                | -1.88 |
| 7ADM3Y  |           | 17.92       | 1.14                 | 0.60  | 22.01       | 1.08                 | 0.62  |
| 9LK2Z4  |           | 18.00       | 1.22                 | 0.65  | 21.95       | 1.02                 | 0.58  |
| A35JUW  |           | 16.39       | -0.39                | -0.21 | 21.58       | 0.65                 | 0.37  |
| CWTEU8  |           | 15.43       | -1.35                | -0.72 | 19.14       | -1.79                | -1.02 |
| JTPFTU  |           | 16.55       | -0.23                | -0.12 | 20.75       | -0.18                | -0.10 |
| P83HZ7  |           | 17.13       | 0.35                 | 0.18  | 21.37       | 0.44                 | 0.25  |
| U89H1A  |           | 19.87       | 3.09                 | 1.64  | 23.31       | 2.38                 | 1.36  |
| XJEQ4C  |           | 15.25       | -1.53                | -0.81 | 19.35       | -1.58                | -0.90 |
| Z7CCBX  |           | 18.95       | 2.17                 | 1.15  | 23.13       | 2.20                 | 1.25  |
| Z98DC1  |           | 16.00       | -0.78                | -0.42 | 20.00       | -0.93                | -0.53 |

|   |                    | Summary Statistics |                    |
|---|--------------------|--------------------|--------------------|
|   | Sample SQ43        |                    | Sample SQ44        |
| Grand Means   | 16.783 Taber Units |                    | 20.929 Taber Units |
| SD Btwn Labs  | 1.884 Taber Units  |                    | 1.756 Taber Units  |
| Statistics based on 11 of 11 reporting participants |                    |                    |                    |

**Notes for Analysis 339**

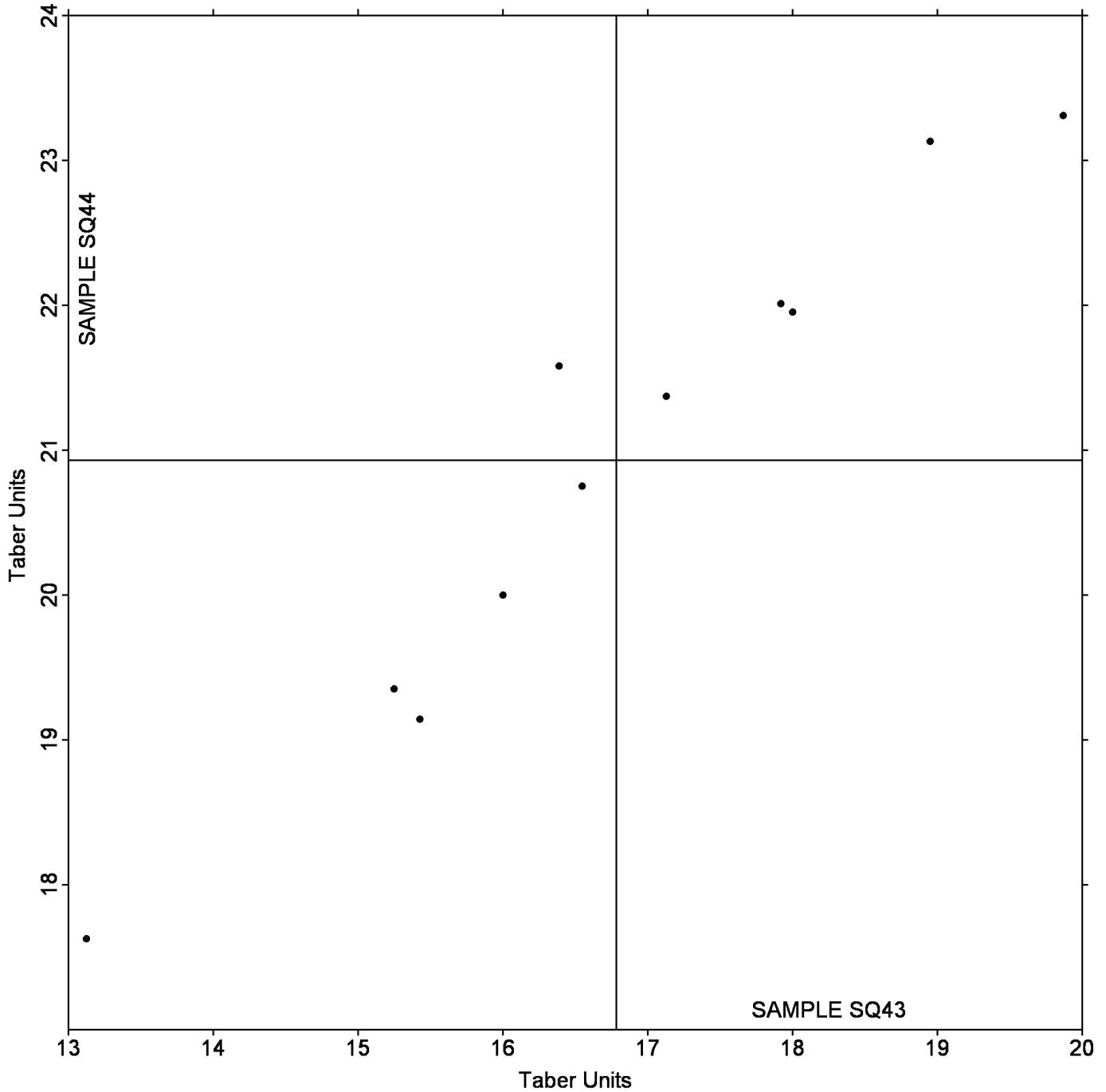
No Data Flags assigned for this analysis.

**Bending Resistance, Taber Type - 10 to 100 Taber Units**

Grand Mean Sample **SQ43** = 16.783 Taber Units

Grand Mean Sample **SQ44** = 20.929 Taber Units

**ANALYSIS 339**



If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 340

**Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard**

| WebCode | Data Flag | Sample ST43 |                      |       | Sample ST44 |                      |       |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |
| 1417HV  |           | 207.3       | -3.2                 | -0.26 | 208.4       | -4.2                 | -0.33 |
| 2PLFHV  |           | 209.0       | -1.5                 | -0.12 | 204.4       | -8.1                 | -0.64 |
| 4XCB39  |           | 193.9       | -16.6                | -1.34 | 198.4       | -14.1                | -1.11 |
| 8BVRS4  |           | 211.1       | 0.6                  | 0.05  | 217.3       | 4.8                  | 0.37  |
| A8KK89  |           | 209.0       | -1.5                 | -0.12 | 211.3       | -1.3                 | -0.10 |
| CWB7M6  |           | 206.6       | -3.9                 | -0.31 | 215.3       | 2.8                  | 0.22  |
| DZRNPN  |           | 217.7       | 7.2                  | 0.59  | 224.5       | 12.0                 | 0.94  |
| FNUV4P  |           | 208.1       | -2.4                 | -0.19 | 208.7       | -3.8                 | -0.30 |
| JGQ53G  |           | 218.7       | 8.2                  | 0.67  | 217.8       | 5.3                  | 0.41  |
| M8BTRL  |           | 195.5       | -15.0                | -1.21 | 198.5       | -14.0                | -1.10 |
| MQ57RS  |           | 224.6       | 14.1                 | 1.15  | 226.0       | 13.4                 | 1.05  |
| QY99L4  |           | 218.0       | 7.5                  | 0.61  | 217.5       | 5.0                  | 0.39  |
| T25E2B  |           | 185.0       | -25.4                | -2.06 | 185.6       | -26.9                | -2.12 |
| T5U5QH  |           | 220.1       | 9.6                  | 0.78  | 216.9       | 4.4                  | 0.34  |
| ZW3DRP  |           | 232.4       | 21.9                 | 1.77  | 237.5       | 25.0                 | 1.96  |

| Summary Statistics                                  |                    |                    |
|---|--------------------|--------------------|
|   | Sample ST43        | Sample ST44        |
| Grand Means   | 210.46 Taber Units | 212.53 Taber Units |
| SD Btwn Labs  | 12.33 Taber Units  | 12.74 Taber Units  |
| Statistics based on 15 of 15 reporting participants |                    |                    |

**Notes for Analysis 340**

No Data Flags assigned for this analysis.

**Analysis Notes:**

DZRNPN - Data appear to be reported as g-cm, not mN-m as indicated on datasheet. Units changed by CTS.

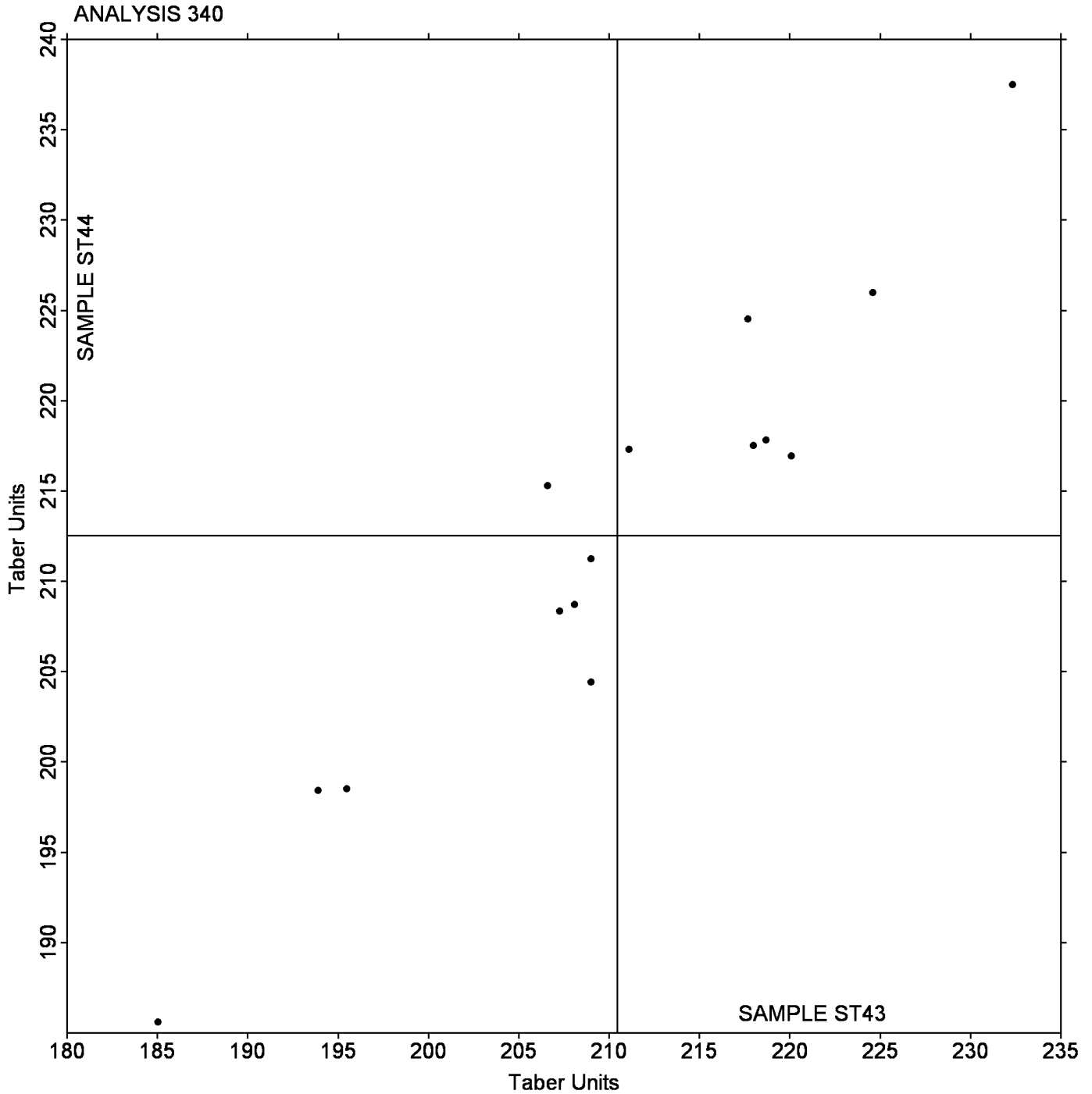
MQ57RS - Data appear to be reported as mN-m, not g-cm as indicated on datasheet. Units changed by CTS.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 340

**Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard**

Grand Mean Sample **ST43** = 210.46 Taber Units

Grand Mean Sample **ST44** = 212.53 Taber Units



If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 343  
**Z-Direction Tensile**

| WebCode | Data Flag | Sample SM43 |                      |       | Sample SM44 |                      |       | Instr Code |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |            |
| 62LSD3  |           | 79.72       | -6.15                | -0.46 | 82.34       | -3.84                | -0.28 | TZ         |
| 66CJCT  |           | 76.46       | -9.40                | -0.70 | 74.84       | -11.34               | -0.84 | LW         |
| 66D2EN  |           | 69.20       | -16.67               | -1.25 | 68.00       | -18.18               | -1.35 | CA         |
| 8PTLBR  |           | 100.03      | 14.16                | 1.06  | 102.83      | 16.65                | 1.23  | TA         |
| AE5FDK  |           | 61.84       | -24.02               | -1.79 | 61.96       | -24.22               | -1.79 | TZ         |
| B29S8V  |           | 80.96       | -4.91                | -0.37 | 83.24       | -2.94                | -0.22 | TL         |
| ETSD83  |           | 76.82       | -9.05                | -0.68 | 78.46       | -7.72                | -0.57 | LW         |
| GC4335  |           | 95.92       | 10.05                | 0.75  | 94.94       | 8.76                 | 0.65  | XX         |
| HVAUJC  |           | 104.04      | 18.17                | 1.36  | 106.90      | 20.72                | 1.53  | CD         |
| J7FSUZ  |           | 106.20      | 20.33                | 1.52  | 102.20      | 16.02                | 1.19  | CD         |
| MDNMW   |           | 93.60       | 7.73                 | 0.58  | 92.60       | 6.42                 | 0.47  | CA         |
| MG4M35  |           | 95.78       | 9.91                 | 0.74  | 95.70       | 9.52                 | 0.70  | XX         |
| QFMC1H  |           | 90.46       | 4.59                 | 0.34  | 92.28       | 6.10                 | 0.45  | TA         |
| UG68SC  |           | 74.44       | -11.43               | -0.85 | 76.12       | -10.07               | -0.74 | TZ         |
| WUJ5ZK  |           | 65.13       | -20.74               | -1.55 | 65.26       | -20.92               | -1.55 | TZ         |
| Y46T5C  |           | 86.11       | 0.25                 | 0.02  | 82.48       | -3.71                | -0.27 | TZ         |
| YRLYUC  |           | 98.00       | 12.13                | 0.91  | 100.00      | 13.82                | 1.02  | CD         |
| Z8TMAR  |           | 90.88       | 5.01                 | 0.37  | 91.12       | 4.94                 | 0.37  | XX         |

| Summary Statistics                                  |             |
|---|-------------|
| Sample SM43   | Sample SM44 |
| Grand Means   | 85.866 psi  |
| SD Btwn Labs  | 13.383 psi  |
|   | 86.181 psi  |
|   | 13.516 psi  |
| Statistics based on 18 of 18 reporting participants |             |

**Notes for Analysis 343**

No Data Flags assigned for this analysis.

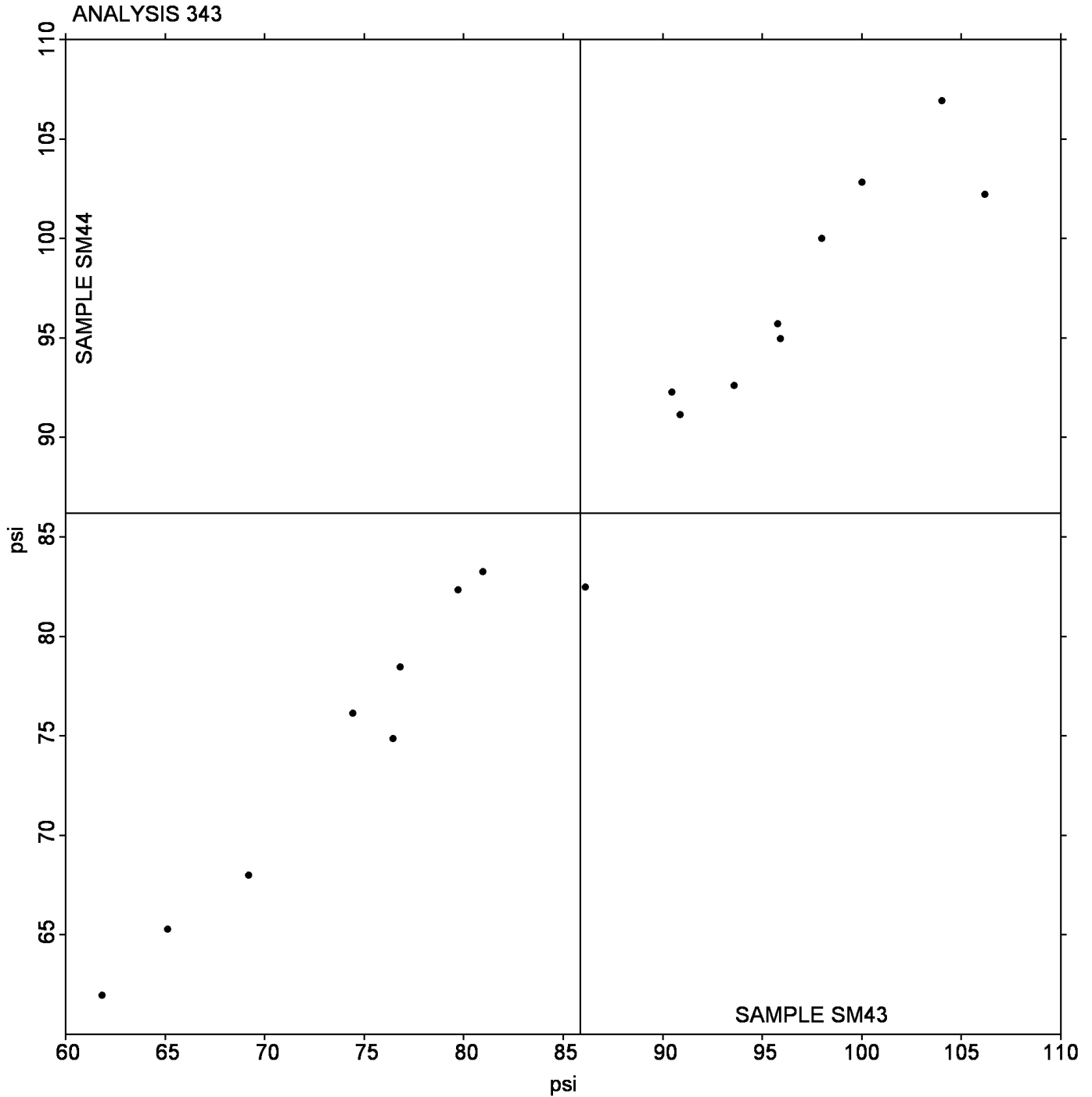
**Instrument Code List**

- |   |                                     |
|---|-------------------------------------|
| (CA) - CSI CS-163                                 | (CD) - CSI CS-163D                  |
| (LW) - L & W ZD Tensile Tester                    | (TA) - Thwing-Albert Tensile Tester |
| (TL) - TMI Lab Master                             | (TZ) - TMI Monitor/ZDT Tester       |
| (XX) - Instrument make/model not specified by lab |                                     |

TAPPI-CTS Interlaboratory Testing Program  
Analysis 343  
Z-Direction Tensile

Grand Mean Sample **SM43** = 85.866 psi

Grand Mean Sample **SM44** = 86.181 psi



If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 345**  
**Z-Direction Tensile, Recycled Paperboard**

| WebCode | Data Flag | Sample SZ43                      |                      |       | Sample SZ44 |                      |       | Instr Code |
|---------|-----------|----------------------------------|----------------------|-------|-------------|----------------------|-------|------------|
|         |           | Lab Mean                         | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |            |
| 4THG58  |           | 52.40                            | -4.60                | -0.96 | 49.20       | -8.13                | -1.61 | CA         |
| 64XDDQ  | M         | No data reported for this sample |                      |       | 63.60       | 6.27                 | 1.24  | TL         |
| BZPJ51  |           | 49.30                            | -7.70                | -1.60 | 50.05       | -7.29                | -1.44 | TZ         |
| CNT8HF  |           | 55.93                            | -1.07                | -0.22 | 57.14       | -0.20                | -0.04 | TZ         |
| KYW28R  |           | 62.80                            | 5.80                 | 1.21  | 62.60       | 5.27                 | 1.04  | CA         |
| LCBHVN  |           | 55.71                            | -1.29                | -0.27 | 54.92       | -2.41                | -0.48 | LW         |
| PJ1T8N  |           | 56.68                            | -0.32                | -0.07 | 58.27       | 0.93                 | 0.18  | TZ         |
| PNQK5J  |           | 56.04                            | -0.96                | -0.20 | 55.48       | -1.85                | -0.37 | LW         |
| T8RA51  |           | 62.50                            | 5.50                 | 1.14  | 63.40       | 6.07                 | 1.20  | DP         |
| UUZKD3  |           | 64.50                            | 7.50                 | 1.56  | 63.50       | 6.17                 | 1.22  | CD         |
| V1PLVZ  |           | 56.98                            | -0.02                | 0.00  | 54.58       | -2.75                | -0.54 | TL         |
| XPP7V8  |           | 50.80                            | -6.20                | -1.29 | 55.40       | -1.93                | -0.38 | CA         |
| ZQ8EXL  |           | 60.36                            | 3.36                 | 0.70  | 63.48       | 6.15                 | 1.22  | LW         |

| Summary Statistics                                  |             |  |             |
|---|-------------|--|-------------|
|   | Sample SZ43 |  | Sample SZ44 |
| Grand Means   | 57.000 psi  |  | 57.335 psi  |
| SD Btwn Labs  | 4.806 psi   |  | 5.055 psi   |
| Statistics based on 12 of 13 reporting participants |             |  |             |

**Comments on assigned Data Flags for Test #345**

64XDDQ (M) - No data for Sample SZ43.

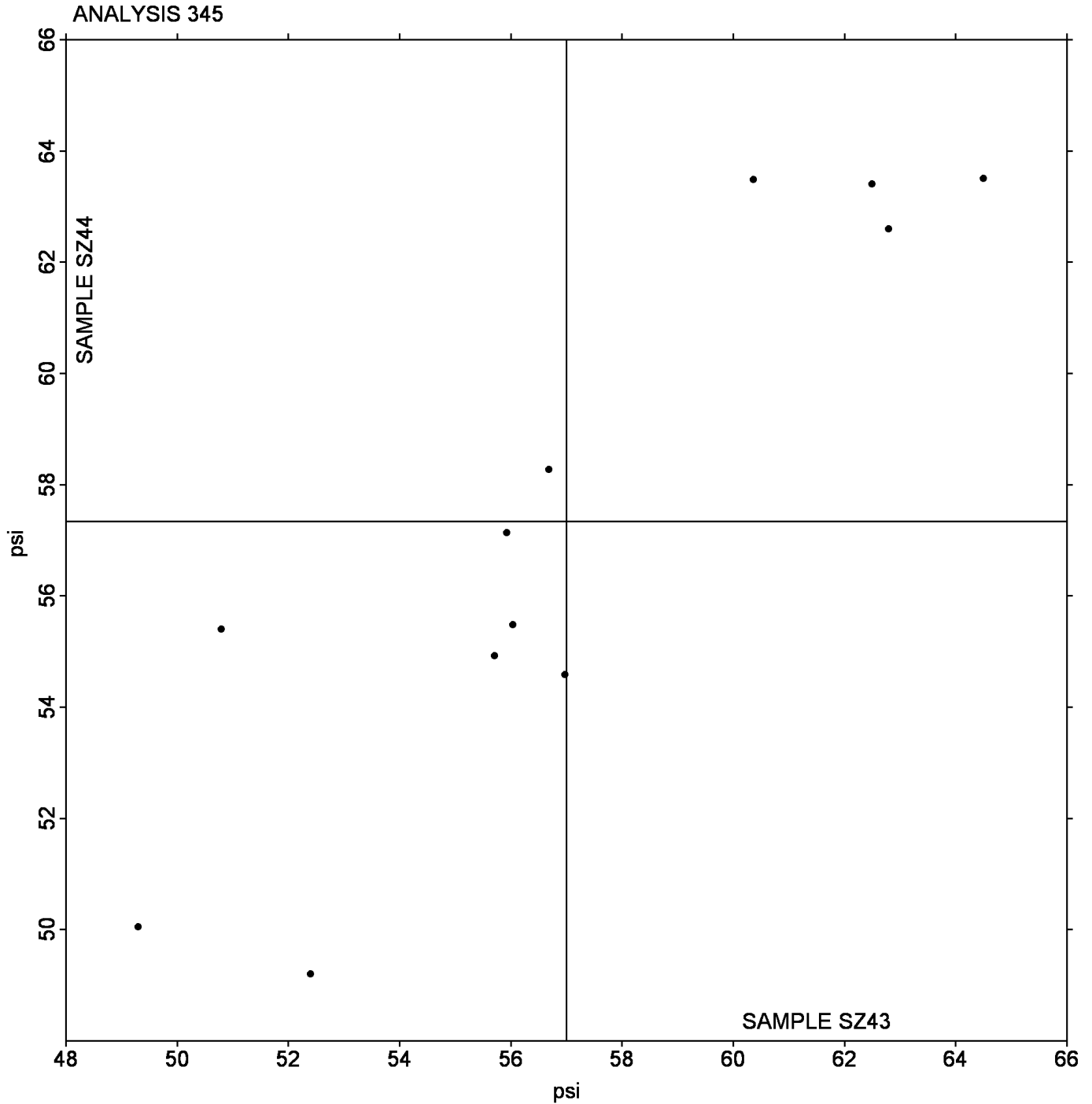
**Instrument Code List**

- |                           |                                |
|---------------------------|--------------------------------|
| (CA) - CSI CS-163         | (CD) - CSI CS-163D             |
| (DP) - Dek-Tron XP Series | (LW) - L & W ZD Tensile Tester |
| (TL) - TMI Lab Master     | (TZ) - TMI Monitor/ZDT Tester  |

TAPPI-CTS Interlaboratory Testing Program  
Analysis 345  
Z-Direction Tensile, Recycled Paperboard

Grand Mean Sample **SZ43** = 57.000 psi

Grand Mean Sample **SZ44** = 57.335 psi



If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 348

**Internal Bond Strength - Modified Scott Mechanics**

| WebCode | Data Flag | Sample SN43 |                      |       | Sample SN44 |                      |       | Instr Code |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |            |
| 3ZW4NY  |           | 134.0       | 0.3                  | 0.04  | 94.40       | -2.14                | -0.36 | HY         |
| 436TF6  |           | 125.7       | -7.9                 | -0.90 | 92.70       | -3.84                | -0.65 | HY         |
| 4BVKJ1  |           | 146.6       | 12.9                 | 1.47  | 110.40      | 13.86                | 2.33  | HY         |
| 63T7K8  |           | 132.4       | -1.3                 | -0.15 | 95.40       | -1.14                | -0.19 | XX         |
| 6YNFMW  |           | 137.0       | 3.3                  | 0.38  | 99.80       | 3.26                 | 0.55  | XX         |
| 8FN1TP  |           | 146.8       | 13.1                 | 1.49  | 100.80      | 4.26                 | 0.72  | HY         |
| 9X3R3T  |           | 117.0       | -16.7                | -1.90 | 84.00       | -12.54               | -2.11 | HY         |
| AEMP4Z  | X         | 109.1       | -24.6                | -2.79 | 73.68       | -22.86               | -3.84 | HZ         |
| CDUB5R  |           | 131.2       | -2.5                 | -0.28 | 95.80       | -0.74                | -0.13 | HZ         |
| D9USRC  |           | 125.6       | -8.1                 | -0.92 | 89.60       | -6.94                | -1.17 | HY         |
| DN7Y2J  |           | 139.8       | 6.1                  | 0.70  | 99.80       | 3.26                 | 0.55  | HZ         |
| DVSARC  |           | 122.5       | -11.2                | -1.27 | 92.56       | -3.98                | -0.67 | KR         |
| E3VK5A  |           | 135.4       | 1.7                  | 0.20  | 98.40       | 1.86                 | 0.31  | HY         |
| FS5918  |           | 129.0       | -4.7                 | -0.53 | 95.60       | -0.94                | -0.16 | HY         |
| K7VPLQ  |           | 133.8       | 0.1                  | 0.01  | 92.60       | -3.94                | -0.66 | HY         |
| LTJL9M  |           | 132.4       | -1.3                 | -0.15 | 96.40       | -0.14                | -0.02 | HY         |
| LU6DU4  |           | 137.6       | 3.9                  | 0.45  | 98.98       | 2.43                 | 0.41  | HY         |
| MTJGFJ  |           | 148.0       | 14.3                 | 1.63  | 105.80      | 9.26                 | 1.56  | HY         |
| NQ2KT5  | *         | 125.4       | -8.3                 | -0.94 | 100.40      | 3.86                 | 0.65  | HY         |
| QFH2YK  |           | 147.0       | 13.3                 | 1.51  | 103.60      | 7.06                 | 1.19  | HZ         |
| QFMVZJ  |           | 122.8       | -10.9                | -1.24 | 86.60       | -9.94                | -1.67 | HY         |
| QWFEU1  | X         | 131.0       | -2.7                 | -0.30 | 122.60      | 26.06                | 4.38  | HY         |
| RKEVG7  |           | 151.4       | 17.7                 | 2.01  | 105.20      | 8.66                 | 1.45  | HY         |
| U9M5KA  |           | 128.5       | -5.2                 | -0.59 | 91.52       | -5.02                | -0.84 | HY         |
| UDF2WU  |           | 132.4       | -1.3                 | -0.15 | 95.00       | -1.54                | -0.26 | XX         |
| VTBQSE  |           | 127.0       | -6.7                 | -0.76 | 90.80       | -5.74                | -0.97 | HY         |
| YYA8QU  |           | 130.8       | -2.9                 | -0.33 | 96.60       | 0.06                 | 0.01  | HY         |
| ZXFUXA  |           | 135.4       | 1.7                  | 0.20  | 97.40       | 0.86                 | 0.14  | HY         |

|   |             | Summary Statistics |             |
|---|-------------|--------------------|-------------|
|   | Sample SN43 |                    | Sample SN44 |
| Grand Means   | 133.68      | 1000th ft-lbs      | 96.544      |
| SD Btwn Labs  | 8.80        | 1000th ft-lbs      | 5.951       |
| Statistics based on 26 of 28 reporting participants |             |                    |             |

**Comments on assigned Data Flags for Test #348**

AEMP4Z (X) - Systematic error (data for both samples are low) and inconsistent within the replicate measurements for Sample SN43.

QWFEU1 (X) - Inconsistent in testing between samples, data for Sample SN44 are high.

**Internal Bond Strength - Modified Scott Mechanics**

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**Instrument Code List**

(HY) - Huygen Digitized Scott Internal Bond Tester

(HZ) - Huygen Internal Bond Tester with AccuPress

(KR) - Kumagai Riki Kogyo Internal Bond Tester

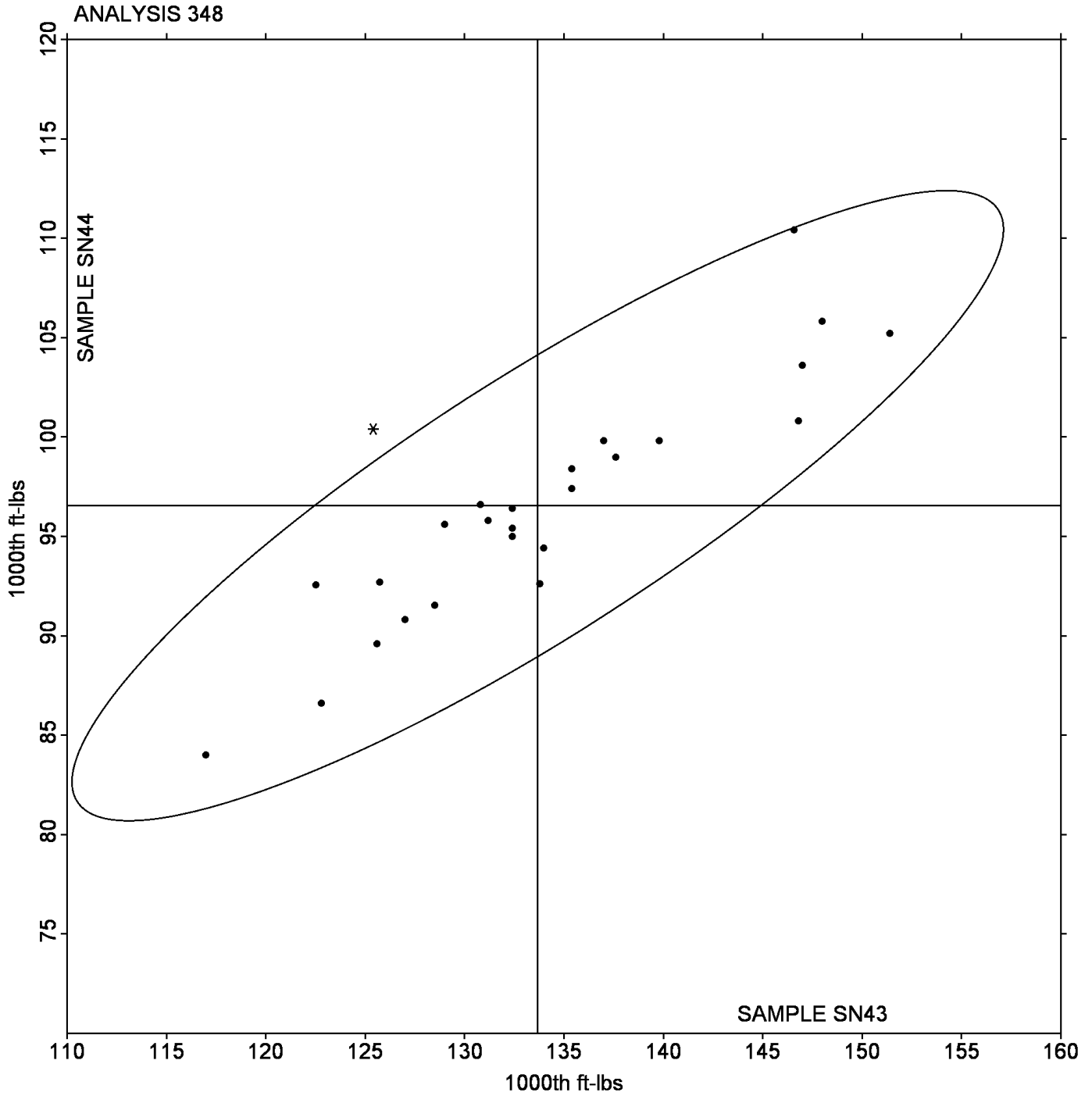
(XX) - Instrument make/model not specified by lab

TAPPI-CTS Interlaboratory Testing Program  
Analysis 348

**Internal Bond Strength - Modified Scott Mechanics**

Grand Mean Sample **SN43** = 133.68 1000th ft-lbs

Grand Mean Sample **SN44** = 96.544 1000th ft-lbs



TAPPI-CTS Interlaboratory Testing Program  
Analysis 349

Internal Bond Strength - Scott Bond Models

| WebCode | Data Flag | Sample SP43 |                      |       | Sample SP44 |                      |       | Instr Code |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|------------|
|         |           | Lab Mean    | Diff from Grand Mean | CPV   | Lab Mean    | Diff from Grand Mean | CPV   |            |
| 42QT3J  |           | 132.0       | 13.2                 | 1.16  | 90.40       | 7.10                 | 1.06  | SC         |
| 87F377  |           | 122.4       | 3.6                  | 0.32  | 93.80       | 10.50                | 1.56  | SC         |
| B8XJPP  |           | 104.4       | -14.4                | -1.26 | 73.47       | -9.83                | -1.46 | XX         |
| BMRPME  |           | 125.1       | 6.3                  | 0.55  | 88.68       | 5.38                 | 0.80  | TM         |
| DCNNTS  |           | 121.6       | 2.8                  | 0.25  | 88.20       | 4.90                 | 0.73  | XX         |
| FGCTD8  |           | 138.6       | 19.8                 | 1.74  | 86.95       | 3.65                 | 0.54  | TM         |
| FVUPFA  |           | 123.0       | 4.2                  | 0.37  | 80.80       | -2.50                | -0.37 | SC         |
| LSPYXJ  |           | 121.6       | 2.8                  | 0.25  | 86.80       | 3.50                 | 0.52  | TM         |
| RB3ZEL  |           | 100.6       | -18.2                | -1.59 | 71.40       | -11.90               | -1.77 | TM         |
| SNE3GF  |           | 115.6       | -3.2                 | -0.28 | 81.80       | -1.50                | -0.22 | TM         |
| TE1DGM  |           | 114.6       | -4.2                 | -0.37 | 77.60       | -5.70                | -0.85 | TM         |
| UNLNZT  |           | 102.0       | -16.8                | -1.47 | 76.32       | -6.98                | -1.04 | SC         |
| V3T11Z  |           | 111.2       | -7.6                 | -0.66 | 82.40       | -0.90                | -0.13 | SC         |
| VQE2N6  |           | 130.2       | 11.4                 | 1.00  | 87.60       | 4.30                 | 0.64  | SC         |

| Summary Statistics                                  |             |               |                      |
|---|-------------|---------------|----------------------|
|   | Sample SP43 |               | Sample SP44          |
| Grand Means   | 118.78      | 1000th ft-lbs | 83.302 1000th ft-lbs |
| SD Btwn Labs  | 11.40       | 1000th ft-lbs | 6.717 1000th ft-lbs  |
| Statistics based on 14 of 14 reporting participants |             |               |                      |

**Notes for Analysis 349**

No Data Flags assigned for this analysis.

**Analysis Notes:**

UNLNZT - One determination removed from the Lab Mean of Sample SP43 per Grubb's Test at 1% risk (TAPPI 1205).

**Instrument Code List**

(SC) - Scott Internal Bond Tester (Manual)

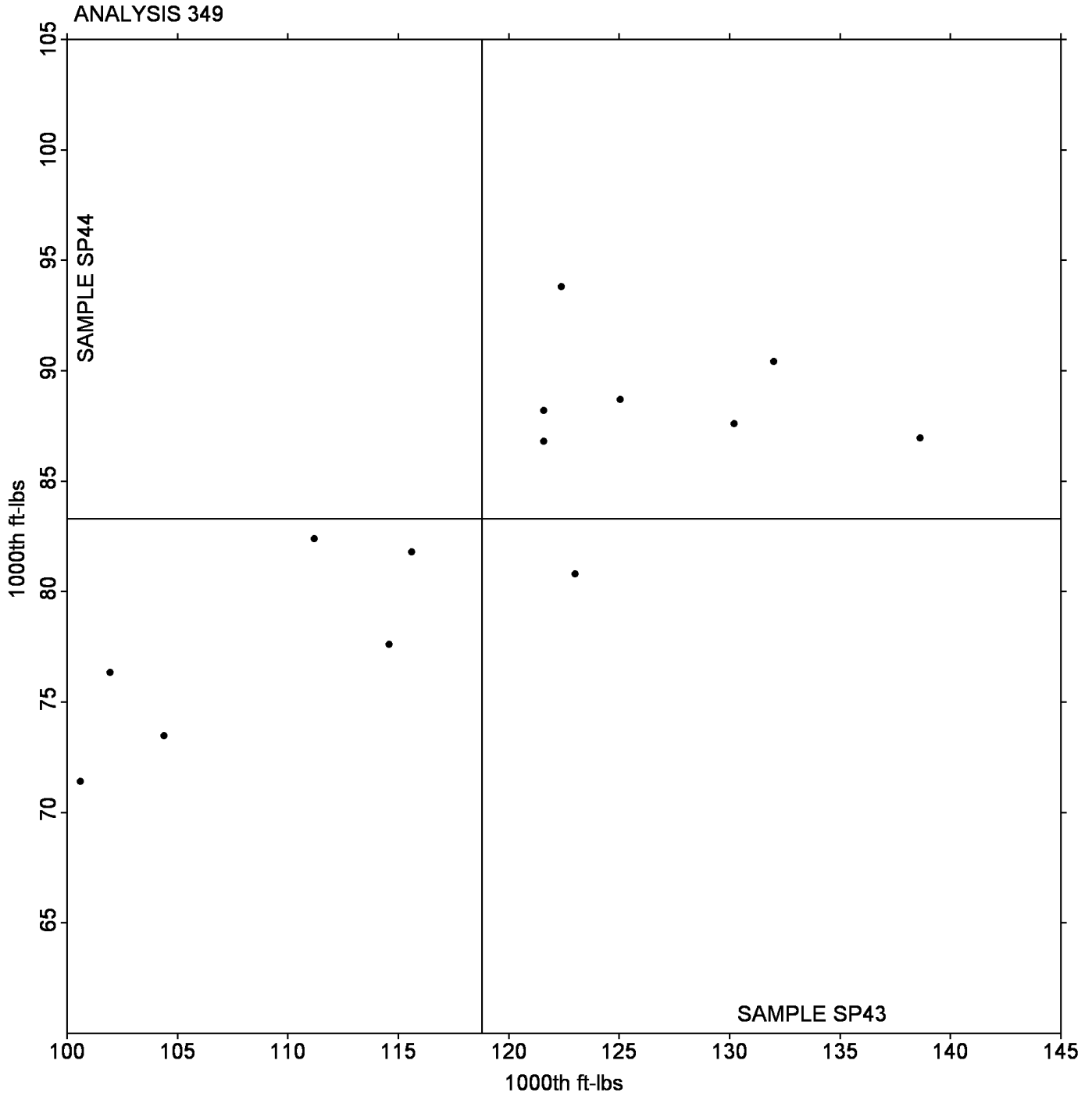
(TM) - TMI Monitor/Internal Bond Tester

(XX) - Instrument make/model not specified by lab

TAPPI-CTS Interlaboratory Testing Program  
Analysis 349  
Internal Bond Strength - Scott Bond Models

Grand Mean Sample **SP43** = 118.78 1000th ft-lbs

Grand Mean Sample **SP44** = 83.302 1000th ft-lbs



If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.