



## Paper & Paperboard Interlaboratory Testing Program

### Summary Report #245S - March 2010

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## **The CTS Paper & Paperboard Interlaboratory Fiberboard 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:

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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

### **Emmerson Apparatus**

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

Plainfield, NJ 07060  
Phone: (908) 668-1777  
FAX #: (908) 668-4794

FAX#: (207) 774-5304

TAPPI-CTS Interlaboratory Testing Program  
Analysis 305  
Bursting Strength - Printing Papers

WebCode	Data Flag	Sample SA55			Sample SA56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3WJQG6		32.89	0.71	0.42	35.77	1.67	0.98
62FXJW		31.60	-0.58	-0.35	34.36	0.26	0.15
64947V	*	32.51	0.32	0.19	31.04	-3.06	-1.79
68AAWM		33.87	1.68	1.00	34.28	0.18	0.10
8Y26R2	X	40.20	8.01	4.77	39.00	4.90	2.87
AM7493		28.00	-4.19	-2.49	30.10	-4.00	-2.34
BCKCCC		30.43	-1.76	-1.05	31.59	-2.51	-1.47
CFLAL		34.60	2.41	1.44	34.95	0.85	0.50
DCCJGG		33.20	1.01	0.60	35.30	1.20	0.70
DJUFDV		32.49	0.31	0.18	35.39	1.28	0.75
DL2XBR		32.95	0.76	0.46	36.40	2.30	1.34
DMU6KP		32.25	0.06	0.04	34.54	0.44	0.26
DV8TFH		30.65	-1.54	-0.92	33.30	-0.80	-0.47
EMNAEP		35.13	2.94	1.75	35.87	1.77	1.03
F4WXMN		33.10	0.91	0.54	35.55	1.45	0.85
FCM64M		34.62	2.43	1.45	36.80	2.69	1.58
FM84X4		30.30	-1.89	-1.12	31.40	-2.70	-1.58
FNEQAH		32.65	0.46	0.28	36.05	1.95	1.14
FTTJ73		32.75	0.56	0.33	35.21	1.11	0.65
G9Y4KK		32.46	0.27	0.16	33.33	-0.77	-0.45
JG66VG		31.40	-0.79	-0.47	33.78	-0.33	-0.19
K8EKTB		31.05	-1.14	-0.68	32.10	-2.00	-1.17
KLDXGZ		31.43	-0.76	-0.45	33.36	-0.75	-0.44
KU9DBT		31.23	-0.96	-0.57	33.68	-0.43	-0.25
KWG4DM		31.69	-0.50	-0.30	33.43	-0.68	-0.40
L9N94F		28.10	-4.09	-2.43	31.35	-2.75	-1.61
LCNJYF		32.00	-0.19	-0.11	34.90	0.80	0.47
LH89HJ		33.05	0.86	0.51	34.28	0.18	0.10
LLRQKG		32.88	0.69	0.41	35.22	1.11	0.65
M97HWG		31.64	-0.55	-0.33	35.26	1.16	0.68
PPXTCA		34.84	2.65	1.58	34.61	0.50	0.29
QHVL6Q		34.06	1.87	1.11	36.45	2.34	1.37
TDQWC9		32.67	0.48	0.29	34.74	0.64	0.37
VGPUXK		33.26	1.07	0.64	33.51	-0.59	-0.35
VWJH9J		30.60	-1.59	-0.95	33.60	-0.50	-0.29
W9TGFW		32.97	0.78	0.47	35.07	0.97	0.57
XUM3XT		29.40	-2.79	-1.66	31.20	-2.90	-1.70

TAPPI-CTS Interlaboratory Testing Program  
Analysis 305  
Bursting Strength - Printing Papers

	Sample SA55	Summary Statistics	Sample SA56
Grand Means	32.186 psi		34.104 psi
SD Btwn Labs	1.678 psi		1.709 psi
Statistics based on 36 of 37 reporting participants			

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

8Y26R2 (X) - Systematic error (data for both samples are high).

**Analysis Notes:**

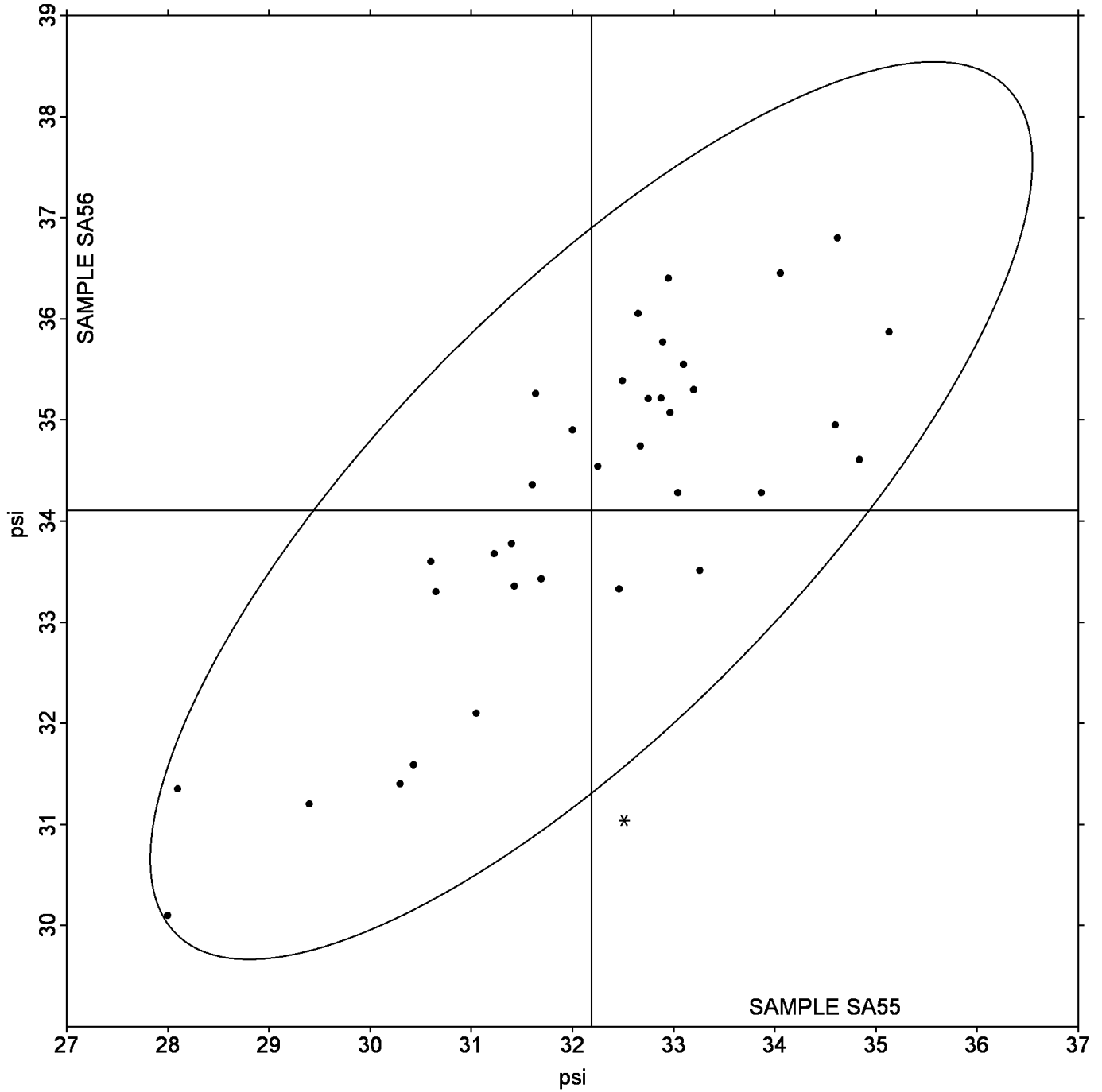
JG66VG - One determination removed from the Lab Mean of Sample SA56 per Grubb's Test at 1% risk (TAPPI 1205).

TAPPI-CTS Interlaboratory Testing Program  
Analysis 305  
Bursting Strength - Printing Papers

Grand Mean Sample SA55 = 32.186 psi

Grand Mean Sample SA56 = 34.104 psi

ANALYSIS 305



**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 310**  
**Bursting Strength - Packaging Papers**

WebCode	Data Flag	Sample SB55			Sample SB56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4YCU43	X	65.00	-3.34	-0.96	70.00	12.89	5.35
7T77YL		69.10	0.76	0.22	55.90	-1.21	-0.50
AZBC4Y		70.20	1.86	0.54	59.81	2.70	1.12
BHNBM3	*	71.10	2.76	0.80	54.30	-2.81	-1.17
CKDTTU		68.82	0.48	0.14	58.96	1.85	0.77
CP62UF		67.50	-0.83	-0.24	57.81	0.69	0.29
ELXG4K		62.10	-6.24	-1.80	52.40	-4.71	-1.96
FVWPQV		72.69	4.35	1.26	59.82	2.71	1.12
HK93RX		71.20	2.86	0.83	58.35	1.24	0.51
JPUKE9		64.64	-3.69	-1.06	55.91	-1.20	-0.50
LQ3BJU		71.80	3.46	1.00	59.67	2.56	1.06
M7FBD6		64.28	-4.06	-1.17	54.03	-3.08	-1.28
MDHKKX		64.90	-3.44	-0.99	56.30	-0.81	-0.34
MPJUVE		67.41	-0.92	-0.27	57.49	0.38	0.16
N872U4	*	60.24	-8.10	-2.33	50.18	-6.93	-2.88
P8W7MW		72.62	4.29	1.24	59.33	2.22	0.92
QTY47		68.30	-0.04	-0.01	57.03	-0.08	-0.03
R634RR	X	65.02	-3.31	-0.95	53.53	-3.59	-1.49
TQ8H6H		68.80	0.46	0.13	58.10	0.99	0.41
U7PG8F		68.78	0.44	0.13	57.73	0.61	0.25
UHNHZ6		70.80	2.46	0.71	57.60	0.49	0.20
V2UERZ	X	87.30	18.96	5.47	82.30	25.19	10.45
VCDZ7U		66.62	-1.72	-0.49	56.06	-1.05	-0.44
VDPLVW		67.46	-0.88	-0.25	57.38	0.26	0.11
VJTK8L		68.11	-0.23	-0.06	58.07	0.96	0.40
X2RFY4		76.40	8.06	2.32	61.30	4.19	1.74
YBPM42		65.54	-2.79	-0.80	57.91	0.80	0.33
Z9C49H		68.26	-0.08	-0.02	56.96	-0.15	-0.06
ZUDQ2D		69.05	0.71	0.21	56.52	-0.59	-0.25

Sample SB55		Summary Statistics	Sample SB56
Grand Means	68.336 psi		57.112 psi
SD Btw Labs	3.469 psi		2.410 psi
Statistics based on 26 of 29 reporting participants			

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

4YCU43 (X) - Extreme data for Sample SB56.

R634RR (X) - Data appears to be transposed between samples. Data switched by CTS.

V2UERZ (X) - Extreme data.

# TAPPI-CTS Interlaboratory Testing Program

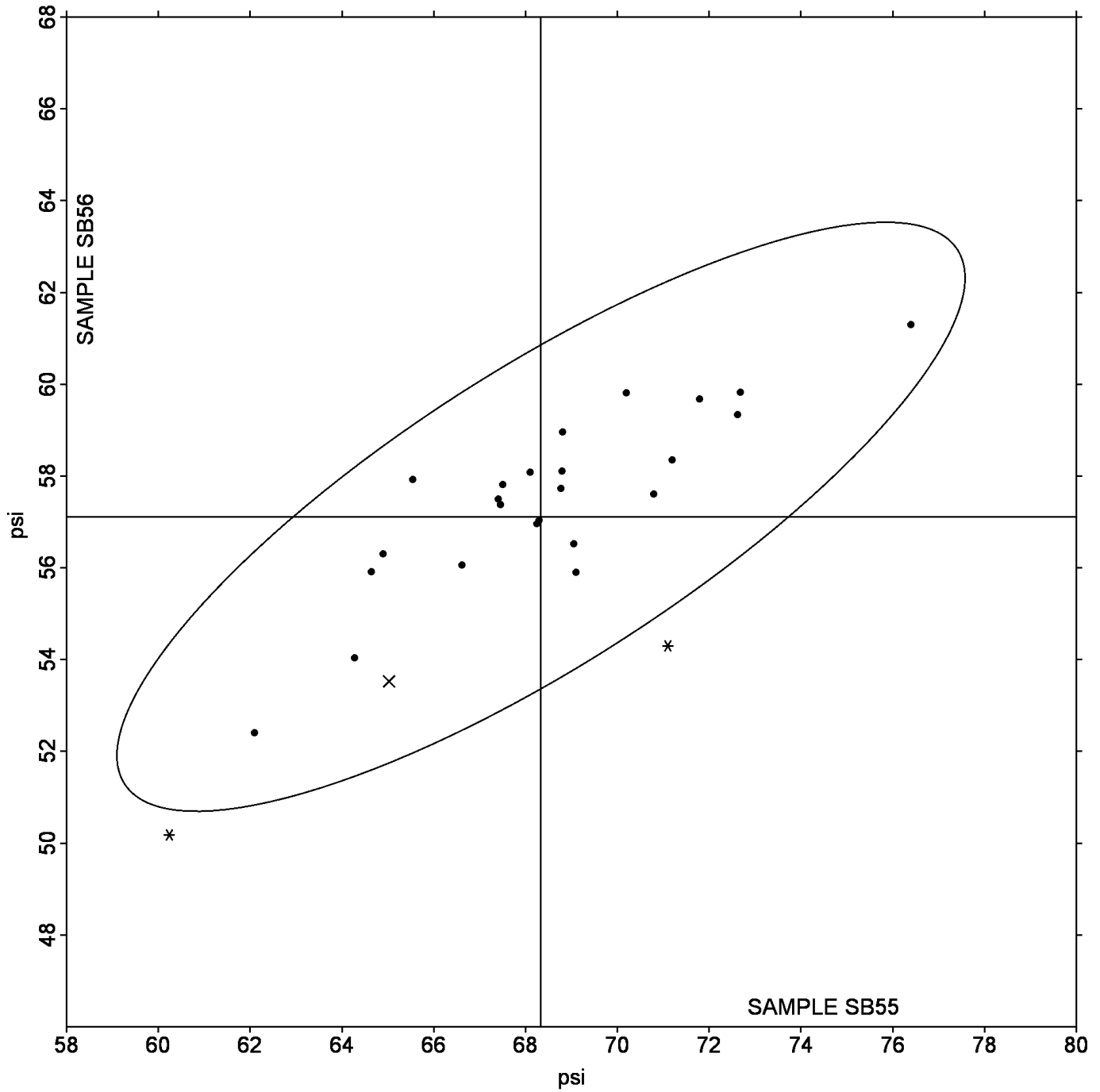
## Analysis 310

### Bursting Strength - Packaging Papers

Grand Mean Sample **SB55** = 68.336 psi

Grand Mean Sample **SB56** = 57.112 psi

#### ANALYSIS 310



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

WebCode	Data Flag	Sample SK55			Sample SK56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
28FT8M		20.32	0.12	0.08	20.34	0.25	0.14
2Z23MG		20.72	0.52	0.34	20.53	0.44	0.25
62ML2G		21.60	1.40	0.91	22.00	1.91	1.07
69GZZQ		19.64	-0.56	-0.36	19.52	-0.57	-0.32
79ZNWW		22.17	1.97	1.27	22.10	2.01	1.13
DVRE7M		21.40	1.20	0.78	20.50	0.41	0.23
KGKTPG		21.39	1.19	0.77	21.27	1.18	0.66
MYX2TN		21.54	1.34	0.87	22.12	2.03	1.14
RRGEN2		18.85	-1.35	-0.87	18.45	-1.64	-0.92
T7DNB8		17.93	-2.27	-1.47	17.82	-2.27	-1.28
UYPF78		17.79	-2.40	-1.55	16.83	-3.26	-1.84
VE4KZZ		21.06	0.86	0.56	21.50	1.41	0.79
X8B2QG		18.16	-2.04	-1.32	18.21	-1.88	-1.06

Sample SK55		Summary Statistics	Sample SK56	
Grand Means	20.198 Grams		20.090 Grams	
SD Btwn Labs	1.548 Grams		1.778 Grams	
Statistics based on 13 of 13 reporting participants				

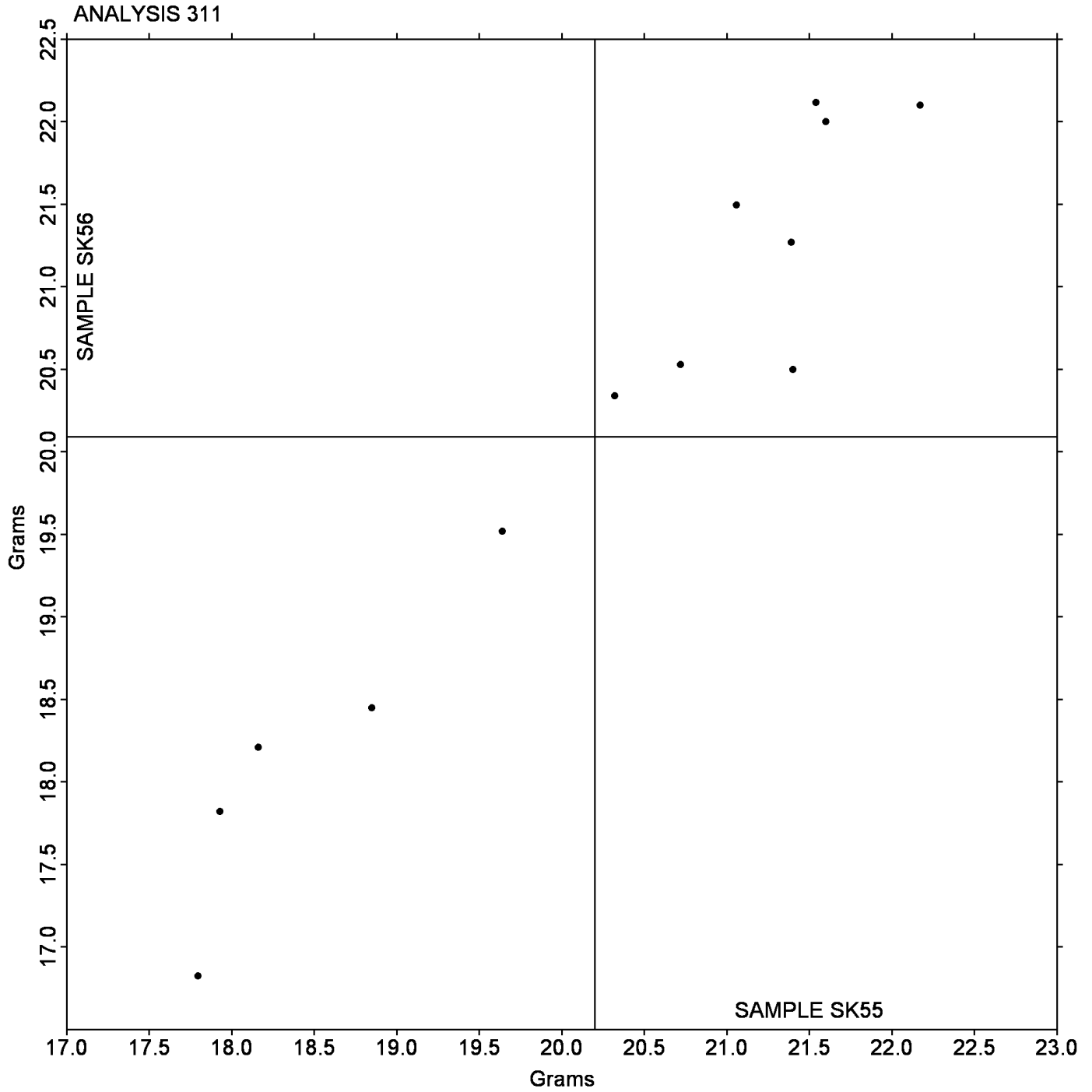
**Notes for Analysis 311**

No Data Flags assigned for this analysis.

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

Grand Mean Sample **SK55** = 20.198 Grams

Grand Mean Sample **SK56** = 20.090 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 SC55			Sample SC56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2EG8WV		57.80	-0.40	-0.14	55.40	-3.24	-0.92
2KKAYA		59.31	1.10	0.38	61.08	2.44	0.69
2NTVTM		54.04	-4.16	-1.45	56.22	-2.42	-0.69
2TFC2L		56.90	-1.30	-0.46	56.94	-1.70	-0.48
2XUANT		55.38	-2.82	-0.99	51.54	-7.10	-2.01
34EPRQ		58.34	0.14	0.05	59.84	1.20	0.34
38D9PJ		61.15	2.95	1.03	61.70	3.06	0.87
3M8QMU		54.96	-3.24	-1.13	57.51	-1.13	-0.32
42MQX8		60.30	2.09	0.73	61.16	2.52	0.72
493DQN		61.59	3.39	1.18	61.47	2.83	0.80
4KUZWJ		58.08	-0.12	-0.04	59.56	0.92	0.26
4NKFQ7		59.00	0.80	0.28	61.10	2.46	0.70
6NDXWZ		62.57	4.37	1.52	61.58	2.94	0.83
6X29D2		54.74	-3.46	-1.21	51.38	-7.26	-2.06
82E7ZZ		61.26	3.06	1.07	61.36	2.72	0.77
8GMBVR		59.44	1.24	0.43	60.14	1.51	0.43
8Z49LH		55.52	-2.68	-0.94	59.59	0.95	0.27
9ZXDFH		55.33	-2.87	-1.00	59.04	0.40	0.11
A3XHDH	X	200.40	142.20	49.63	197.60	138.96	39.44
AHDJA9		60.31	2.10	0.73	60.98	2.34	0.66
AM24DN	*	51.80	-6.40	-2.24	55.40	-3.24	-0.92
B7RNLR		56.76	-1.44	-0.50	57.28	-1.36	-0.39
BAYFXK		58.06	-0.14	-0.05	59.42	0.78	0.22
BZ9Z3N		57.80	-0.40	-0.14	59.60	0.96	0.27
C6VN2L		58.86	0.66	0.23	59.35	0.71	0.20
CZMNXN		60.23	2.03	0.71	62.60	3.96	1.12
D73QFB		59.40	1.20	0.42	60.00	1.36	0.39
DDL7RK	*	58.90	0.70	0.24	64.93	6.29	1.79
DJBV74	X	52.72	-5.48	-1.91	63.22	4.58	1.30
DUA29W		60.62	2.42	0.84	60.39	1.75	0.50
DUAAQA		56.88	-1.33	-0.46	56.69	-1.95	-0.55
DZXLCC		57.00	-1.20	-0.42	55.20	-3.44	-0.98
E36HXL		63.56	5.36	1.87	62.55	3.91	1.11
ED4WLK		61.10	2.90	1.01	63.10	4.46	1.27
EGJKYP		55.50	-2.70	-0.94	55.40	-3.24	-0.92
EMDVDF		58.00	-0.20	-0.07	57.12	-1.52	-0.43
EQMN2E		59.80	1.60	0.56	59.46	0.82	0.23
EYH8GT		55.92	-2.28	-0.80	60.71	2.07	0.59
FQ9V3B		58.42	0.22	0.08	58.92	0.28	0.08
FRJXQV	X	47.36	-10.84	-3.78	48.58	-10.06	-2.85
GQCWX		61.04	2.84	0.99	62.71	4.07	1.16
GYE6ZM		58.25	0.05	0.02	57.32	-1.32	-0.37
GYTQCB		57.40	-0.80	-0.28	57.10	-1.54	-0.44

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 312**  
**Tearing Strength - Printing Papers**

WebCode	Data Flag	Sample SC55			Sample SC56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
HCCVYX	X	61.58	3.38	1.18	57.48	-1.16	-0.33
J8ENZL	*	52.82	-5.38	-1.88	49.50	-9.14	-2.59
K2A847		56.80	-1.40	-0.49	61.50	2.86	0.81
K9Q37P		57.56	-0.64	-0.22	56.02	-2.61	-0.74
KWUQJF		56.82	-1.39	-0.48	56.28	-2.36	-0.67
LBWB4T		53.72	-4.48	-1.57	52.04	-6.60	-1.87
LGFVRQ	*	65.37	7.17	2.50	61.88	3.24	0.92
M4LF7G		62.74	4.54	1.58	62.22	3.58	1.02
MEQN4M	X	50.44	-7.76	-2.71	61.19	2.55	0.72
ML97DN		54.96	-3.24	-1.13	52.82	-5.82	-1.65
MNUMD4	X	49.52	-8.69	-3.03	54.89	-3.75	-1.06
MTPT9E		54.41	-3.79	-1.32	57.19	-1.45	-0.41
NL9FAF		61.96	3.76	1.31	63.87	5.23	1.48
NUG7CH		60.63	2.43	0.85	61.23	2.59	0.74
NXGH9H		62.63	4.43	1.54	61.50	2.86	0.81
P4JNMK	X	47.43	-10.77	-3.76	48.73	-9.91	-2.81
PZX73E		52.97	-5.23	-1.83	52.59	-6.05	-1.72
QEJPLB		61.21	3.00	1.05	62.48	3.85	1.09
QHYHLB		54.48	-3.72	-1.30	53.88	-4.76	-1.35
QK4BDN	X	49.32	-8.88	-3.10	57.92	-0.72	-0.20
RZBBWX		58.80	0.60	0.21	56.00	-2.64	-0.75
TBB6PL		56.14	-2.06	-0.72	59.18	0.54	0.15
TCJUXJ	X	52.44	-5.76	-2.01	61.88	3.24	0.92
TF3GJX		53.40	-4.80	-1.68	52.00	-6.64	-1.88
UBKPTF		59.20	1.00	0.35	58.80	0.16	0.05
UTK7X9		57.34	-0.87	-0.30	56.96	-1.68	-0.48
V68U9X		59.80	1.60	0.56	58.40	-0.24	-0.07
VPGEV7		58.49	0.29	0.10	59.03	0.39	0.11
VTJ23G		57.32	-0.88	-0.31	59.94	1.30	0.37
W9PFC6		58.29	0.09	0.03	58.54	-0.10	-0.03
WVJDYN		60.71	2.51	0.87	61.38	2.74	0.78
XTZTAT		55.59	-2.61	-0.91	52.00	-6.64	-1.88
ZFGFE8		61.00	2.80	0.98	63.50	4.86	1.38
ZXY9LK		61.44	3.24	1.13	63.82	5.18	1.47

Summary Statistics	
Sample SC55	Sample SC56
Grand Means	58.205 Grams
SD Btwn Labs	2.865 Grams
	58.638 Grams
	3.523 Grams
Statistics based on 68 of 77 reporting participants	

TAPPI-CTS Interlaboratory Testing Program  
Analysis 312  
Tearing Strength - Printing Papers

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

A3XHDH (X) - Extreme data.

DJBV74 (X) - Inconsistent in testing between samples.

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

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

MEQN4M (X) - Inconsistent in testing between samples.

MNUMD4 (X) - Inconsistent in testing between samples, data for Sample SC55 are low.

P4JNMK (X) - Systematic error (data for both samples are low).

QK4BDN (X) - Inconsistent in testing between samples, data for Sample SC55 are low.

TCJUXJ (X) - Inconsistent in testing between samples.

**Analysis Notes:**

EYH8GT - One determination removed from the Lab Mean of Sample SC56 per Grubb's Test at 1% risk (TAPPI 1205).

# TAPPI-CTS Interlaboratory Testing Program

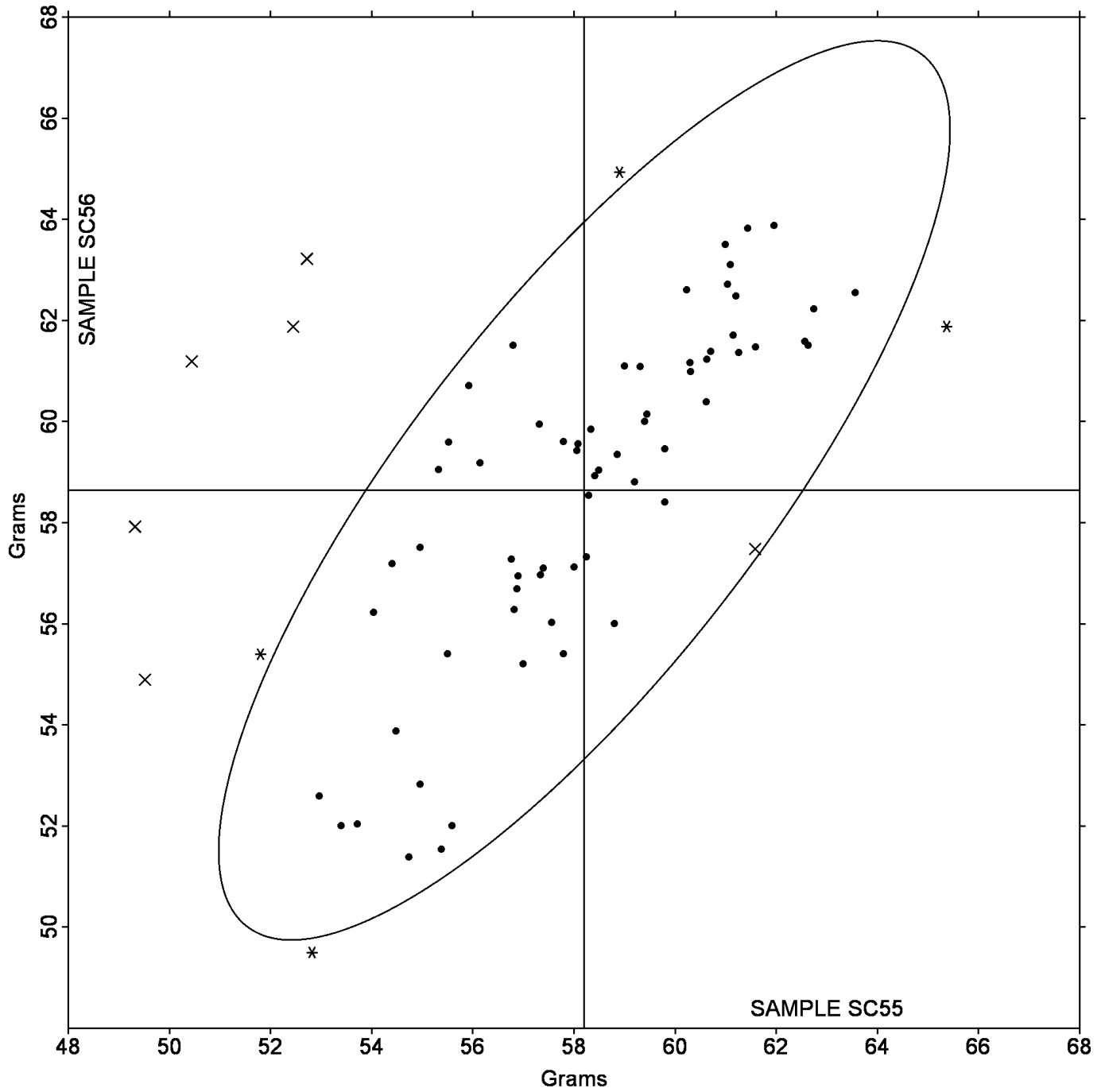
## Analysis 312

### Tearing Strength - Printing Papers

Grand Mean Sample **SC55** = 58.205 Grams

Grand Mean Sample **SC56** = 58.638 Grams

#### ANALYSIS 312



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 314

## Tearing Strength - Packaging Papers

WebCode	Data Flag	Sample SD55			Sample SD56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2MN3QN		154.2	-10.6	-0.99	250.4	-10.8	-0.62
2RKLWT		163.2	-1.6	-0.15	251.6	-9.6	-0.55
3ZUDZV	X	173.5	8.7	0.81	176.0	-85.3	-4.88
4CQ3TV		145.5	-19.3	-1.81	235.8	-25.4	-1.45
4ZRN8N		173.7	8.9	0.83	275.0	13.7	0.79
6CZQ7R		157.5	-7.3	-0.68	232.0	-29.2	-1.67
7MGLV6		170.2	5.4	0.50	251.3	-10.0	-0.57
8R27A6		155.8	-9.0	-0.84	267.3	6.1	0.35
8WE4P6		149.1	-15.7	-1.46	257.1	-4.1	-0.24
973MUK	X	43.1	-121.7	-11.36	49.7	-211.6	-12.10
AERFFL		160.0	-4.8	-0.45	244.8	-16.4	-0.94
D3LT2F		148.3	-16.5	-1.54	249.0	-12.2	-0.70
D7QZGR		168.3	3.5	0.33	264.5	3.2	0.19
DFV2RR		161.0	-3.8	-0.36	253.9	-7.3	-0.42
EKWCZQ		165.2	0.4	0.04	277.2	16.0	0.91
FMLLLH		174.0	9.2	0.86	248.4	-12.8	-0.73
FWQJHX		156.2	-8.6	-0.80	255.3	-5.9	-0.34
GV2DZM		151.8	-13.0	-1.22	239.2	-22.0	-1.26
HG9RVX		173.2	8.4	0.78	283.2	22.0	1.26
JXEB9G		170.0	5.2	0.49	269.9	8.7	0.50
JZPUB4		175.2	10.4	0.97	282.2	21.0	1.20
KRMZJV		178.1	13.3	1.24	282.7	21.5	1.23
LW6HYX		189.8	24.9	2.33	279.4	18.1	1.04
MHQQEH		170.7	5.9	0.55	264.5	3.3	0.19
MM296X		176.5	11.7	1.09	275.7	14.4	0.83
MVVQQG		179.4	14.6	1.36	299.0	37.8	2.16
NB4MHZ		170.8	6.0	0.56	273.6	12.4	0.71
NVN3NT		173.3	8.5	0.79	246.6	-14.7	-0.84
PPH8GJ		164.0	-0.8	-0.08	266.0	4.8	0.27
PTXTY6		141.9	-22.9	-2.14	227.7	-33.5	-1.92
PYJLCP		167.7	2.9	0.27	278.7	17.5	1.00
R24KUZ		150.0	-14.9	-1.39	241.4	-19.8	-1.14
RLUEG2		163.9	-0.9	-0.08	236.7	-24.6	-1.40
TBMJWP		154.8	-10.0	-0.94	246.4	-14.8	-0.85
TBQJZG		159.9	-4.9	-0.46	267.1	5.9	0.34
TGA9HK		169.5	4.6	0.43	269.7	8.5	0.49
UD7298	X	187.5	22.7	2.12	238.9	-22.3	-1.28
UHZJFC	X	8.0	-156.8	-14.64	8.1	-253.1	-14.48
UZ3Y3X	X	174.6	9.8	0.91	263.0	1.8	0.10
XETTW9	X	152.0	-12.8	-1.20	322.0	60.8	3.48
YVRAFC		163.8	-1.1	-0.10	252.1	-9.1	-0.52
YVV3KT		178.3	13.5	1.26	280.7	19.5	1.11
Z2ETER		169.2	4.4	0.41	261.1	-0.1	-0.01

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 314**  
**Tearing Strength - Packaging Papers**

WebCode	Data Flag	Sample SD55			Sample SD56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
ZQW8ZW		169.0	4.2	0.39	289.5	28.3	1.62

		Summary Statistics		
		Sample SD55		Sample SD56
Grand Means		164.82 Grams		261.23 Grams
SD Btwn Labs		10.71 Grams		17.48 Grams
Statistics based on 38 of 44 reporting participants				

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

- 3ZUDZV (X) - Inconsistent in testing between samples, data for Sample SD56 are low.
- 973MUK (X) - Extreme data.
- UD7298 (X) - Inconsistent in testing between samples.
- UHZJFC (X) - Extreme data.
- UZ3Y3X (X) - Data appear to be off by a factor of 1/4; data converted by CTS (x4).
- XETTW9 (X) - Inconsistent in testing between samples and within the determinations for Sample SD56.

**Analysis Notes:**

- 8R27A6 - One determination removed from the Lab Mean of Sample SD56 per Grubb's Test at 1% risk (TAPPI 1205).
- JZPUB4 - One determination removed from the Lab Mean of Sample SD56 per Grubb's Test at 1% risk (TAPPI 1205).

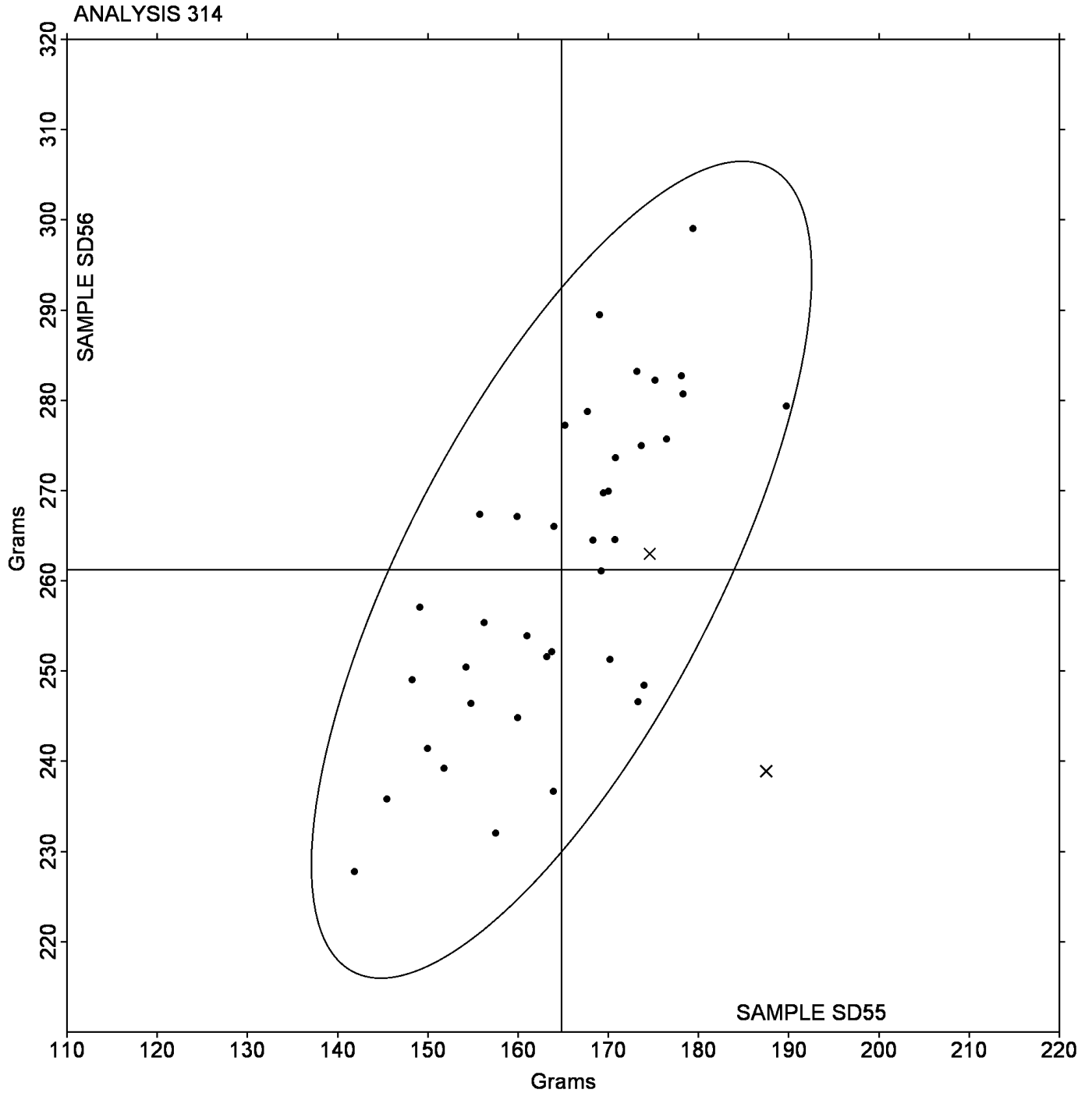
# TAPPI-CTS Interlaboratory Testing Program

## Analysis 314

### Tearing Strength - Packaging Papers

Grand Mean Sample **SD55** = 164.82 Grams

Grand Mean Sample **SD56** = 261.23 Grams



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

WebCode	Data Flag	Sample SR55			Sample SR56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2A98TX		2.101	0.096	0.76	2.021	0.065	0.51
4EVW4K		1.949	-0.055	-0.43	1.906	-0.050	-0.40
7LZRUV		1.893	-0.112	-0.88	1.957	0.000	0.00
8KCJGE		1.895	-0.109	-0.86	1.785	-0.171	-1.35
AU34JN		1.946	-0.058	-0.46	1.940	-0.017	-0.13
BYRGLJ		1.879	-0.125	-0.99	1.848	-0.108	-0.85
FEPLCW		2.024	0.020	0.16	1.933	-0.024	-0.19
FW6GQJ		2.294	0.290	2.28	2.233	0.277	2.18
G3XQL3		2.001	-0.003	-0.02	1.926	-0.030	-0.24
HTNL9C	X	2.634	0.630	4.96	3.512	1.556	12.26
LAZY2X		1.911	-0.093	-0.74	1.806	-0.150	-1.18
LNVJK8		1.912	-0.092	-0.73	1.929	-0.027	-0.21
RYEFXM		2.224	0.220	1.74	2.188	0.232	1.83
T3DHQA		1.974	-0.030	-0.24	1.902	-0.054	-0.43
VB4A4Z		2.055	0.051	0.40	2.014	0.057	0.45
YJK2XU	X	1.655	-0.349	-2.75	1.717	-0.239	-1.89

		Summary Statistics			
		Sample SR55		Sample SR56	
Grand Means		2.0041 kN/m		1.9563 kN/m	
SD Btwn Labs		0.1270 kN/m		0.1269 kN/m	
Statistics based on 14 of 16 reporting participants					

**Comments on assigned Data Flags for Test #320**

HTNL9C (X) - Extreme data.

YJK2XU (X) - Inconsistent in testing between samples and within the determinations for Sample SR55.

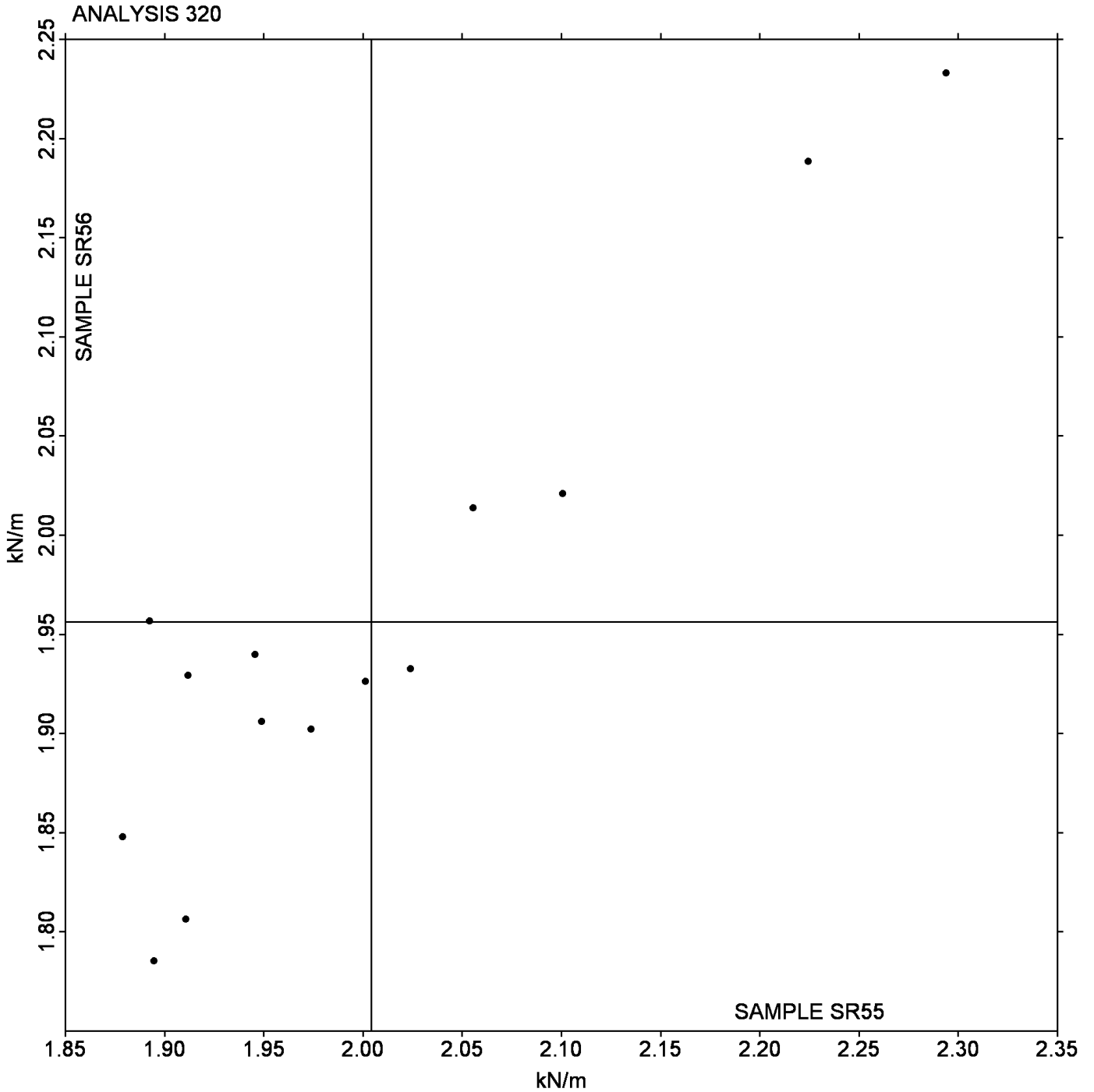
**Analysis Notes:**

T3DHQA - One determination removed from the Lab Mean of Sample SR56 per Grubb's Test at 1% risk (TAPPI 1205).

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

Grand Mean Sample **SR55** = 2.0041 kN/m

Grand Mean Sample **SR56** = 1.9563 kN/m



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 321  
 Tensile Energy Absorption - Newsprint

WebCode	Data Flag	Sample SR55			Sample SR56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
39MU7Q		9.96	-1.28	-0.71	9.46	-1.52	-0.83
4WR4FX		13.08	1.84	1.03	14.58	3.59	1.96
6E8AAN		7.90	-3.35	-1.87	8.67	-2.32	-1.27
7P4VVD		12.97	1.73	0.97	11.62	0.63	0.34
8B2Q27		11.17	-0.08	-0.04	10.00	-0.99	-0.54
9NKDJN		12.85	1.61	0.90	12.25	1.27	0.69
FBQAFW		11.80	0.56	0.31	10.12	-0.86	-0.47
G3TXX9		8.92	-2.32	-1.29	8.67	-2.32	-1.27
NME7QU		10.35	-0.89	-0.50	9.04	-1.95	-1.07
RW9L7A		14.35	3.11	1.74	13.70	2.71	1.48
TJK7V3		10.08	-1.17	-0.65	10.54	-0.45	-0.24
U8MDP4		11.18	-0.06	-0.04	11.03	0.05	0.02
XQYRGZ		12.47	1.23	0.69	12.28	1.30	0.71
Z7TKER		10.30	-0.94	-0.53	11.87	0.88	0.48

		Summary Statistics			
		Sample SR55		Sample SR56	
Grand Means		11.241	Joules/sq m	10.988	Joules/sq m
SD Btwn Labs		1.792	Joules/sq m	1.829	Joules/sq m
Statistics based on 14 of 14 reporting participants					

### TAPPI-CTS Interlaboratory Testing Program

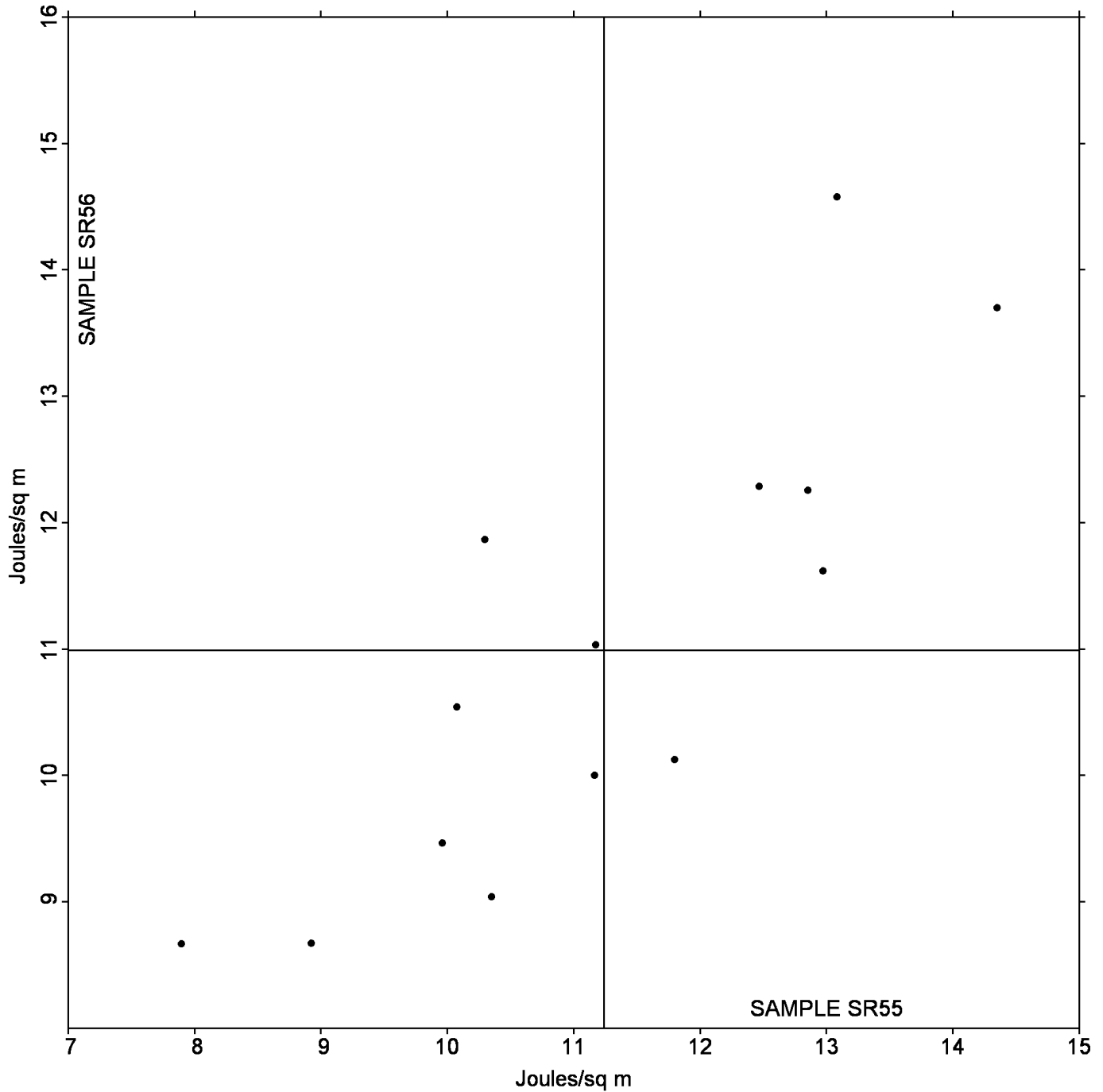
#### Analysis 321

#### Tensile Energy Absorption - Newsprint

Grand Mean Sample **SR55** = 11.241 Joules/sq m

Grand Mean Sample **SR56** = 10.988 Joules/sq m

#### ANALYSIS 321



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 322**  
**Elongation to Break - Newsprint**

WebCode	Data Flag	Sample SR55			Sample SR56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2JCHZM		0.786	-0.225	-1.74	0.779	-0.238	-1.54
2WXYLY		1.165	0.154	1.19	1.252	0.235	1.52
34VHDF		1.048	0.038	0.29	0.977	-0.040	-0.26
9QTBBK		0.950	-0.061	-0.47	1.076	0.059	0.39
CARVCN		1.192	0.181	1.40	1.211	0.194	1.26
DK788X		1.164	0.153	1.19	1.109	0.092	0.60
FGCRKE		1.070	0.059	0.46	1.180	0.163	1.06
G9K6FG		1.018	0.007	0.05	1.011	-0.006	-0.04
JRA3VD		1.157	0.146	1.13	1.147	0.130	0.85
K4V4HX		0.943	-0.068	-0.53	0.880	-0.137	-0.89
P4V2TN		0.883	-0.128	-0.99	0.819	-0.198	-1.28
VTEBR8		1.016	0.005	0.04	1.053	0.036	0.23
XZP9CW		0.900	-0.111	-0.86	0.869	-0.148	-0.96
YHPQWZ		0.861	-0.150	-1.16	0.873	-0.144	-0.93

Sample SR55		Summary Statistics	Sample SR56	
Grand Means	1.0109 Percent		1.0168 Percent	
SD Btwn Labs	0.1290 Percent		0.1541 Percent	
Statistics based on 14 of 14 reporting participants				

**Notes for Analysis 322**

No Data Flags assigned for this analysis.

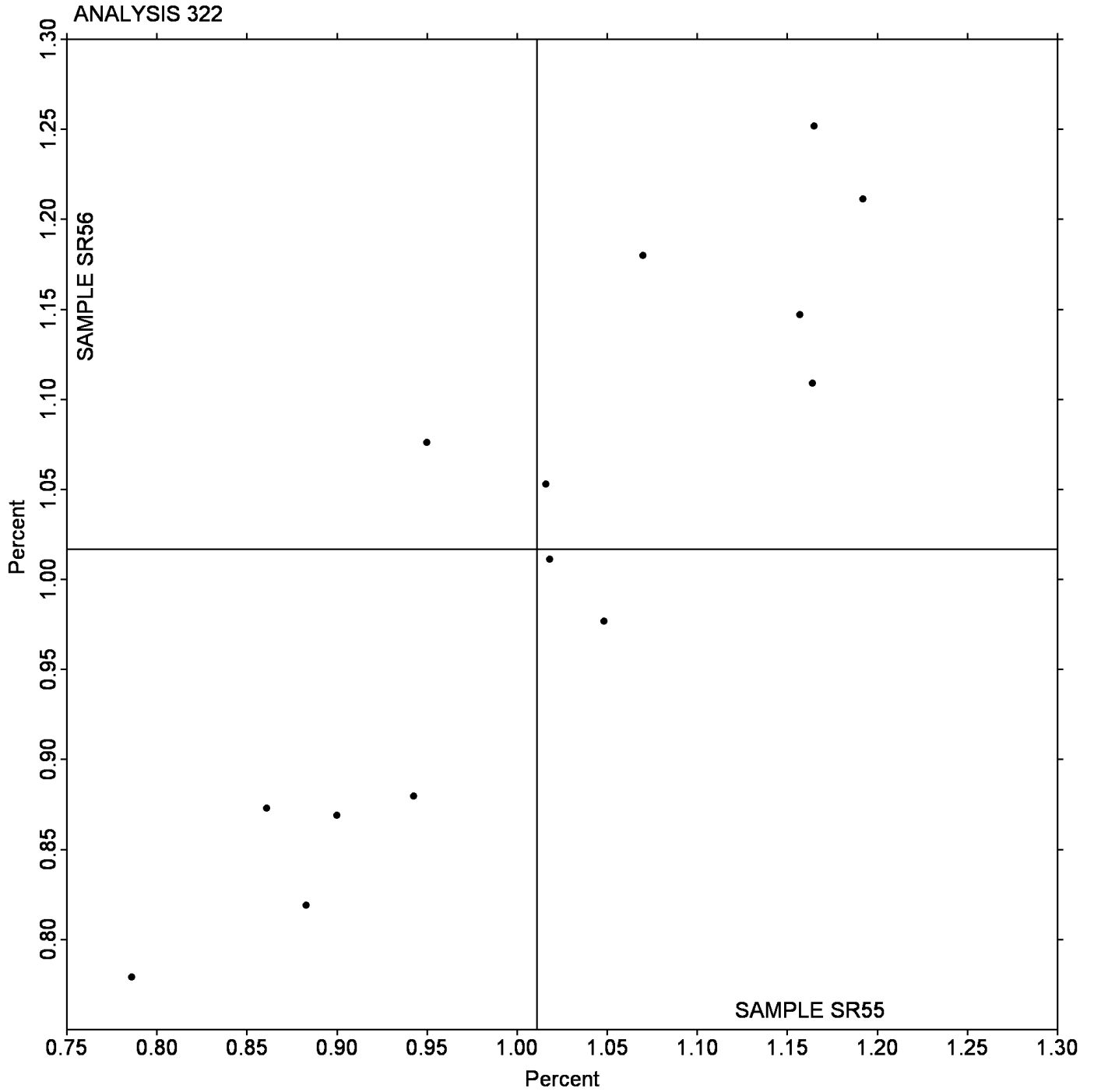
**Analysis Notes:**

CARVCN - One determination removed from the Lab Mean of Sample SR56 per Grubb's Test at 1% risk (TAPPI 1205).

TAPPI-CTS Interlaboratory Testing Program  
Analysis 322  
Elongation to Break - Newsprint

Grand Mean Sample **SR55** = 1.0109 Percent

Grand Mean Sample **SR56** = 1.0168 Percent



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 325  
Tensile Breaking Strength - Printing Papers

WebCode	Data Flag	Sample SF55			Sample SF56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
29RR4G		5.346	-0.219	-0.84	5.584	-0.076	-0.27	TO
2DKWUZ		5.352	-0.213	-0.82	5.364	-0.296	-1.07	XX
2HYTWA	X	6.548	0.983	3.79	6.743	1.083	3.91	TJ
3A2FEL		5.520	-0.045	-0.17	5.758	0.098	0.35	LH
3C9B6Y	*	5.730	0.165	0.64	6.109	0.449	1.62	TB
3EF9B7		5.531	-0.034	-0.13	5.747	0.088	0.32	KA
3KZU3K		5.635	0.070	0.27	5.607	-0.053	-0.19	LH
3WDVYD		5.342	-0.223	-0.86	5.478	-0.182	-0.66	TB
44RQ6D		5.490	-0.075	-0.29	5.736	0.077	0.28	TP
4HCAWL		5.791	0.226	0.87	5.883	0.223	0.80	TI
67TTBM		5.769	0.204	0.79	5.767	0.108	0.39	LH
6Z97J9		5.481	-0.084	-0.32	5.763	0.104	0.37	TJ
7GADAV		5.590	0.025	0.10	5.832	0.172	0.62	TC
8LYQCP		5.192	-0.373	-1.43	5.344	-0.316	-1.14	MN
9G2X8E		5.818	0.253	0.97	5.748	0.088	0.32	LX
9Q88NY		5.472	-0.093	-0.36	5.668	0.008	0.03	TB
A32BHX		5.506	-0.059	-0.23	5.600	-0.060	-0.21	TB
AEGAJK		5.617	0.052	0.20	5.534	-0.126	-0.46	XX
AFG99D		5.767	0.202	0.78	5.900	0.240	0.87	TO
BE6N4A		5.307	-0.258	-0.99	5.387	-0.273	-0.98	IN
BJKLNW		5.168	-0.397	-1.53	5.396	-0.264	-0.95	TO
BRDWZD		5.286	-0.279	-1.07	5.232	-0.428	-1.54	LH
BRVK3M		5.272	-0.293	-1.13	5.115	-0.545	-1.97	LX
C7N44N		5.604	0.039	0.15	5.645	-0.015	-0.05	SP
CEPA9Q		5.481	-0.084	-0.32	5.528	-0.132	-0.48	LH
CH28R8		5.355	-0.210	-0.81	5.331	-0.329	-1.19	ID
DCAJ8K		6.021	0.456	1.76	6.042	0.382	1.38	LH
DUWQUJ		5.451	-0.114	-0.44	5.471	-0.189	-0.68	TJ
E6P9KQ		5.729	0.164	0.63	5.934	0.274	0.99	TO
FBYX9C		5.795	0.230	0.89	5.993	0.333	1.20	TB
FN4BCP		5.965	0.400	1.54	6.207	0.547	1.97	LH
FX7J3M		5.352	-0.213	-0.82	5.446	-0.213	-0.77	IM
G6ZPWV		5.701	0.136	0.52	5.759	0.099	0.36	LH
GVQXCK		5.930	0.365	1.40	5.944	0.284	1.02	LH
GYF7W8		5.123	-0.442	-1.70	5.346	-0.314	-1.13	MR
H3CH9R		5.604	0.039	0.15	5.690	0.030	0.11	LI
HPZEKA		5.711	0.146	0.56	5.785	0.125	0.45	LI
HRUJD2	X	4.345	-1.220	-4.70	4.663	-0.997	-3.59	ID
JALBU9	*	4.892	-0.673	-2.59	5.029	-0.631	-2.28	RE
JTJCKP	X	4.784	-0.781	-3.01	4.623	-1.037	-3.74	TP
JVMXJN	X	5.341	-0.224	-0.86	4.943	-0.717	-2.58	IK
KFQKML		5.614	0.049	0.19	5.585	-0.075	-0.27	LH
KKMRYN		5.857	0.292	1.12	6.080	0.420	1.51	LX

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

WebCode	Data Flag	Sample SF55			Sample SF56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
L2L9HR		5.956	0.391	1.51	6.028	0.368	1.33	TA
L3YZCU		5.394	-0.171	-0.66	5.279	-0.381	-1.37	LH
LBEELQ		5.466	-0.099	-0.38	5.375	-0.285	-1.03	TX
LRYMPL		5.343	-0.222	-0.85	5.451	-0.209	-0.75	LH
LTTVNJ	X	6.290	0.725	2.79	6.075	0.415	1.50	TJ
LZCC3F		5.411	-0.154	-0.59	5.488	-0.172	-0.62	LA
M86VP3		5.703	0.138	0.53	5.712	0.052	0.19	LH
ME69UC		5.434	-0.131	-0.50	5.441	-0.219	-0.79	IM
N7V4GL		6.074	0.509	1.96	6.144	0.484	1.75	IX
NJHQUM		5.426	-0.139	-0.54	5.488	-0.172	-0.62	LH
NMH2PM		5.423	-0.142	-0.55	5.442	-0.218	-0.79	LH
NYWGR8		5.507	-0.059	-0.23	5.515	-0.145	-0.52	TB
P7NGEX		5.566	0.001	0.00	5.698	0.038	0.14	XX
RNF BUT	X	5.809	0.244	0.94	5.712	0.052	0.19	LH
RNYU2L		5.462	-0.103	-0.40	5.373	-0.287	-1.03	TO
RPCLWN		5.676	0.111	0.43	5.768	0.108	0.39	LH
T9KFBU		5.864	0.299	1.15	5.845	0.185	0.67	XX
TJKU2Y		5.820	0.255	0.98	5.740	0.080	0.29	LH
UCVLBE		5.299	-0.266	-1.03	5.426	-0.234	-0.84	DL
W3Y738		5.378	-0.187	-0.72	5.585	-0.075	-0.27	LH
WGL848		5.518	-0.047	-0.18	5.569	-0.091	-0.33	TF
WN4VYF		6.085	0.520	2.00	6.257	0.597	2.15	IA
WNG7ET		5.293	-0.272	-1.05	5.549	-0.111	-0.40	IM
WPXNUY	*	6.253	0.688	2.65	6.363	0.703	2.54	LH
X64ARU		5.759	0.194	0.75	5.856	0.196	0.71	TO
XWRDM		5.771	0.206	0.79	5.961	0.301	1.08	TI
ZJDCB9		5.452	-0.113	-0.43	5.648	-0.011	-0.04	IK
ZW42AE		5.224	-0.341	-1.31	5.529	-0.131	-0.47	VM

	Sample SF55	Summary Statistics	Sample SF56
Grand Means	5.5650 kN/m		5.6599 kN/m
SD Btwn Labs	0.2597 kN/m		0.2773 kN/m
Statistics based on 65 of 71 reporting participants			

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

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

2HYTWA (X) - Systematic error (data for both samples are high). Data appears to be transposed between Analysis 328 (Elongation to Break) and Analysis 325 (Tensile Breaking Strength). Data switched by CTS.

HRUJD2 (X) - Systematic error (data for both samples are low).

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

JVMXJN (X) - Inconsistent in testing between samples.

LTTVNJ (X) - Inconsistent in testing between samples, data for Sample SF55 are high.

RNFBUT (X) - Data appears to be transposed between Analysis 327 (Tensile Energy Absorption) and Analysis 325 (Tensile Breaking Strength). Data switched by CTS.

**Analysis Notes:**

JALBU9 - Data appear to be reported as kN/m, not N/15mm as indicated on datasheet. Unit changed by CTS.

W3Y738 - Data appear to be reported as lb/inch, not kN/m as indicated on datasheet. Unit changed by CTS.

ZW42AE - Data appear to be reported as lb/inch, not kN/m as indicated on datasheet. Unit changed by CTS.

**Instrument Code List**

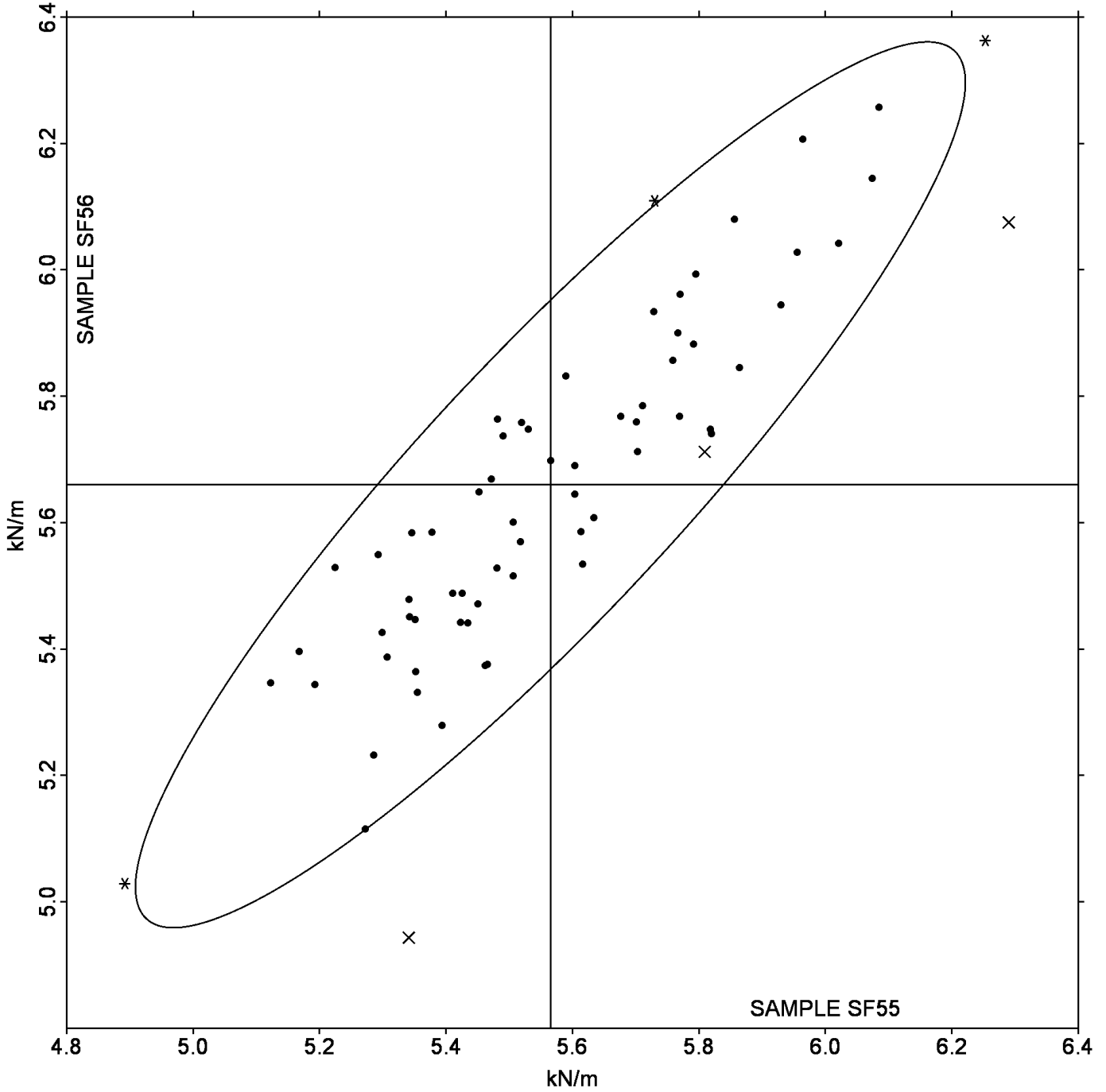
(DL) - EMIC DL500 Universal Testing Machines	(IA) - Instron 1011
(ID) - Instron 4201/4202	(IK) - Instron 4400 Series
(IM) - Instron 5500 Series	(IN) - Instron 3340 series
(IX) - Instron (model not specified)	(KA) - Zwick Model 1425
(LA) - L & W Tensile - Autoline 300	(LH) - L & W Alwetron TH1 (Horizontal) SE 060/065F
(LI) - L & W Tensile Tester SE 062	(LX) - L & W (model not specified)
(MN) - Minebea	(MR) - MTS Alliance RT series
(RE) - Regmed	(SP) - Schopper Type Tensile Tester (TMI)
(TA) - Testometric AX	(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	

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

Grand Mean Sample SF55 = 5.5650 kN/m

Grand Mean Sample SF56 = 5.6599 kN/m

ANALYSIS 325



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 327

## Tensile Energy Absorption - Printing Papers

WebCode	Data Flag	Sample SF55			Sample SF56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3JR7UM		81.05	3.17	0.57	81.32	2.29	0.42	LH
4AXPRJ		77.94	0.06	0.01	77.41	-1.61	-0.29	XX
4QMD2Y		76.46	-1.42	-0.26	79.01	-0.01	0.00	IM
4WAUAX		80.18	2.30	0.41	78.53	-0.49	-0.09	XX
6FFCND		77.14	-0.73	-0.13	80.03	1.01	0.18	ID
8RNMDE		72.76	-5.12	-0.92	76.00	-3.02	-0.55	XX
9EF2UL		86.48	8.60	1.54	87.90	8.87	1.61	TB
9TTJDA		79.44	1.56	0.28	80.54	1.52	0.28	DL
9XRNFU		73.26	-4.62	-0.83	73.63	-5.40	-0.98	LH
ABQXXF		75.44	-2.44	-0.44	87.48	8.45	1.54	IM
B2JYYJ		69.69	-8.19	-1.47	66.64	-12.39	-2.25	LH
C2VXUR		71.19	-6.69	-1.20	78.84	-0.19	-0.03	LH
C3BC4M		87.14	9.26	1.66	91.09	12.07	2.19	IM
CJWACN	X	81.22	3.34	0.60	97.68	18.65	3.39	XX
CKT83N		64.97	-12.91	-2.32	70.23	-8.80	-1.60	LA
D2TMDF		84.16	6.28	1.13	78.24	-0.78	-0.14	LH
DA6RHT		80.22	2.34	0.42	81.28	2.25	0.41	IM
DYM3MU		82.89	5.02	0.90	91.07	12.04	2.19	XX
FWTHUN		75.67	-2.21	-0.40	82.11	3.08	0.56	LX
KCXWA7		77.94	0.06	0.01	83.92	4.89	0.89	TB
L4QBDH		80.52	2.65	0.48	84.25	5.23	0.95	TF
L69Q3X	X	43.68	-34.20	-6.14	54.15	-24.87	-4.52	ID
LQQVL2		72.19	-5.69	-1.02	73.99	-5.03	-0.92	LH
MRBB8U	*	64.74	-13.14	-2.36	65.64	-13.38	-2.43	TP
MUYTDL		77.07	-0.81	-0.15	80.74	1.72	0.31	KA
NGTLWA		80.53	2.65	0.48	79.49	0.47	0.08	LX
NRMYUL		72.72	-5.16	-0.93	75.91	-3.11	-0.57	LI
PJA7JP		81.00	3.12	0.56	84.35	5.33	0.97	VM
QGF4NL		83.26	5.38	0.97	84.44	5.41	0.98	TO
QQN2QN		70.17	-7.71	-1.38	75.22	-3.80	-0.69	LH
T3CXQD	X	83.85	5.97	1.07	64.26	-14.76	-2.68	IK
TCGYEQ	X	78.79	0.91	0.16	79.41	0.39	0.07	LI
TX2MXJ		85.53	7.65	1.37	79.44	0.41	0.08	TA
UZY3MF		75.49	-2.39	-0.43	78.44	-0.58	-0.11	LH
VY3QKK		77.93	0.05	0.01	80.70	1.68	0.31	TB
WAYC7A		74.41	-3.47	-0.62	74.05	-4.97	-0.90	LH
WHEZYQ		75.77	-2.11	-0.38	70.76	-8.26	-1.50	LH
WLDABD		75.00	-2.88	-0.52	77.31	-1.72	-0.31	LH
WQD44U		82.02	4.14	0.74	84.06	5.04	0.92	TI
X2HR8N		81.01	3.13	0.56	78.53	-0.49	-0.09	LX
XKZM7P		75.56	-2.32	-0.42	77.23	-1.80	-0.33	LH
Y38X8T		87.03	9.15	1.64	84.93	5.90	1.07	LH
Y9YKXD		85.96	8.08	1.45	76.98	-2.04	-0.37	TO

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

WebCode	Data Flag	Sample SF55			Sample SF56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
YBKWPB		75.54	-2.34	-0.42	74.72	-4.31	-0.78	LI
YFWUAR	X	54.99	-22.89	-4.11	61.42	-17.61	-3.20	RE
YTAGNP		71.48	-6.40	-1.15	76.58	-2.45	-0.44	MR
ZKAHD2		85.64	7.76	1.39	76.57	-2.45	-0.45	LH
ZLKBGF		82.54	4.66	0.84	75.11	-3.92	-0.71	LH
ZP7G2R		79.52	1.64	0.30	82.37	3.34	0.61	LI

Sample SF55		Summary Statistics	Sample SF56	
Grand Means	77.878	Joules/sq m	79.024	Joules/sq m
SD Btwn Labs	5.567	Joules/sq m	5.501	Joules/sq m
Statistics based on 44 of 49 reporting participants				

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

CJWACN (X) - Inconsistent in testing between samples, data for Sample SF56 are high.

L69Q3X (X) - Extreme data.

T3CXQD (X) - Inconsistent in testing between samples.

TCGYQQ (X) - Data appears to be transposed between Analysis 325 (Tensile Breaking Strength) and Analysis 327 (Tensile Energy Absorption). Data switched by CTS.

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

**Analysis Notes:**

DA6RHT - Data appear to be reported as kg-m/sq m, not J/sq m as indicated on datasheet. Unit changed by CTS

FWTHUN - Data appear to be reported as ft-lb/sq ft, not kg-m/sq m as indicated on datasheet. Unit changed by CTS.

MRBB8U - Data appear to be reported as ft lb/sq ft, not J/sq m as indicated on datasheet. Unit changed by CTS.

VY3QKK - Data appear to be reported as ft-lb/sq ft, not in-lb/sq in as indicated on datasheet. Unit changed by CTS

Y38X8T - Data appear to be reported as ft-lb/sq ft, not in-lb/sq in as indicated on datasheet. Unit changed by CTS

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

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**Instrument Code List**

(DL) - EMIC DL500 Universal Testing Machines	(ID) - Instron 4201
(IK) - Instron 4400 Series	(IM) - Instron 5500 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
(RE) - Regmed	(TA) - Thwing-Albert
(TB) - Thwing-Albert EJA/1000	(TF) - Thwing-Albert EJA Vantage-1
(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

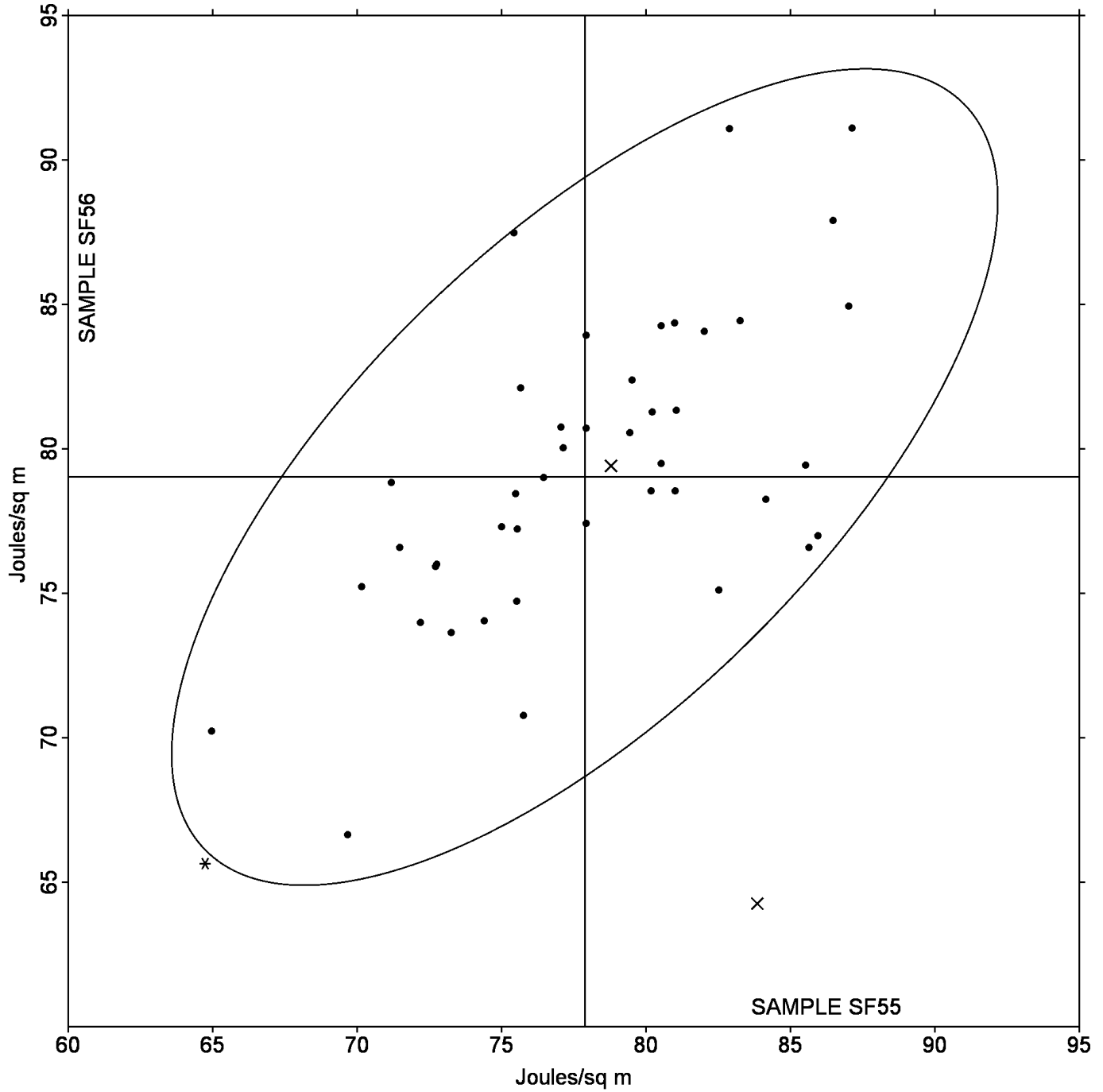
## Analysis 327

### Tensile Energy Absorption - Printing Papers

Grand Mean Sample **SF55** = 77.878 Joules/sq m

Grand Mean Sample **SF56** = 79.024 Joules/sq m

#### ANALYSIS 327



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 328

## Elongation to Break - Printing Papers

WebCode	Data Flag	Sample SF55			Sample SF56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2RPJDB	*	2.404	0.332	1.67	2.197	0.057	0.29	TO
37NNDL		2.082	0.010	0.05	2.201	0.061	0.31	MR
6W6BZ7		2.070	-0.002	-0.01	2.173	0.033	0.17	LH
6YDZ94		2.033	-0.039	-0.20	2.049	-0.091	-0.47	LH
7GNCDY		1.946	-0.126	-0.63	1.983	-0.157	-0.80	LH
8HMX36		2.211	0.139	0.70	2.155	0.015	0.07	TX
8JXVFM		1.950	-0.122	-0.61	1.860	-0.280	-1.43	XX
8NPBGE		1.956	-0.116	-0.58	1.959	-0.181	-0.92	LH
8PXZPC		1.830	-0.242	-1.22	2.022	-0.118	-0.60	IN
976Z9L		2.309	0.236	1.19	2.385	0.244	1.24	TB
9U7B9C	X	4.720	2.648	13.31	4.940	2.800	14.24	TJ
9WC7YN		2.260	0.188	0.94	2.338	0.198	1.01	LX
AG3ZKP		2.424	0.351	1.77	2.558	0.417	2.12	IM
BDV6ER		1.967	-0.105	-0.53	2.012	-0.128	-0.65	LH
BH8Y7H		2.126	0.054	0.27	2.248	0.107	0.54	ID
BYC2TB		1.954	-0.118	-0.59	1.892	-0.248	-1.26	LH
CA7UGT		2.211	0.139	0.70	2.441	0.301	1.53	TO
CFXYFN		2.028	-0.044	-0.22	2.137	-0.003	-0.02	TB
D7HAXM		2.082	0.010	0.05	1.922	-0.218	-1.11	LH
DK6Y3E		2.177	0.105	0.53	2.180	0.040	0.20	LH
F68GC7		2.000	-0.072	-0.36	2.017	-0.123	-0.63	XX
FDTAA2		2.288	0.216	1.09	2.305	0.165	0.84	DL
GP2D96		2.042	-0.030	-0.15	2.059	-0.081	-0.41	LX
GZ2FK9		2.140	0.068	0.34	2.390	0.250	1.27	IM
HA7RAB		2.039	-0.033	-0.17	2.178	0.038	0.19	LX
HHJYUK		2.452	0.380	1.91	2.571	0.431	2.19	TF
KCMGL4		2.105	0.033	0.17	2.150	0.010	0.05	LH
KEU9KR	X	3.424	1.352	6.79	3.346	1.206	6.13	TO
KQLVQM		2.132	0.060	0.30	2.242	0.102	0.52	IK
KZF94L		2.139	0.067	0.34	2.191	0.051	0.26	TB
LX2T2R	*	2.566	0.494	2.48	2.639	0.499	2.54	VM
M6FP8Q		1.748	-0.324	-1.63	1.893	-0.247	-1.26	LH
N4JD7W		1.985	-0.087	-0.44	2.107	-0.033	-0.17	LI
NELUXM	X	2.460	0.388	1.95	2.487	0.347	1.76	TJ
NLPQRK		2.078	0.006	0.03	2.122	-0.018	-0.09	KA
PGNNYJ		1.894	-0.178	-0.90	1.988	-0.152	-0.78	LI
PQTYNE		1.780	-0.292	-1.47	1.923	-0.217	-1.11	LH
QHFHBY		2.142	0.070	0.35	2.190	0.050	0.25	TI
QZDR7P		1.877	-0.195	-0.98	2.027	-0.113	-0.58	TP
RHQNSZ		2.091	0.019	0.09	2.028	-0.112	-0.57	LH
RJLQVX		1.843	-0.229	-1.15	1.964	-0.176	-0.90	RE
RTP4VY		2.029	-0.043	-0.22	2.117	-0.023	-0.12	LI
RZBRYG		2.032	-0.040	-0.20	2.104	-0.036	-0.19	LH

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

WebCode	Data Flag	Sample SF55			Sample SF56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
RZUYDR	*	1.534	-0.538	-2.71	1.768	-0.372	-1.90	ID
T3RGUD		2.090	0.018	0.09	2.190	0.050	0.25	TF
TVXWPH		1.934	-0.138	-0.69	2.125	-0.015	-0.08	XX
TYCMUD	X	2.446	0.374	1.88	2.105	-0.035	-0.18	IK
UFWMD		2.375	0.303	1.52	2.389	0.249	1.26	XX
ULJ4HE		1.991	-0.081	-0.41	2.088	-0.052	-0.27	LH
UMWH43		2.259	0.187	0.94	2.394	0.254	1.29	MN
UUEAQZ	*	1.675	-0.397	-2.00	1.626	-0.514	-2.62	LH
UUKKM8		1.950	-0.122	-0.61	1.975	-0.165	-0.84	IA
VACR47	*	1.794	-0.278	-1.40	2.134	-0.006	-0.03	LA
VBYFDK		2.250	0.178	0.89	2.164	0.024	0.12	LH
XHPU3B	X	2.844	0.772	3.88	2.822	0.682	3.47	XX
Y878KF		2.180	0.108	0.54	2.245	0.105	0.53	TB
YH2HQ3		2.228	0.156	0.78	2.231	0.091	0.46	XX
ZBQR93		2.140	0.068	0.34	2.200	0.060	0.30	IM
ZH9FNP	X	55.063	52.991	266.33	54.815	52.675	268.02	TB

Sample SF55		Summary Statistics	Sample SF56	
Grand Means	2.0721 Percent		2.1405 Percent	
SD Btw Labs	0.1990 Percent		0.1965 Percent	
Statistics based on 53 of 59 reporting participants				

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

9U7B9C (X) - Extreme data.

KEU9KR (X) - Extreme data.

NELUXM (X) - Data appears to be transposed between Analysis 325 (Tensile Breaking Strength) and Analysis 328 (Elongation to Break). Data switched by CTS.

TYCMUD (X) - Inconsistent in testing between samples.

XHPU3B (X) - Systematic error (data for both samples are high).

ZH9FNP (X) - Extreme data.

**Analysis Notes:**

8PXZPC - One determination removed from the Lab Mean of Sample SF56 per Grubb's Test at 1% risk (TAPPI 1205).

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

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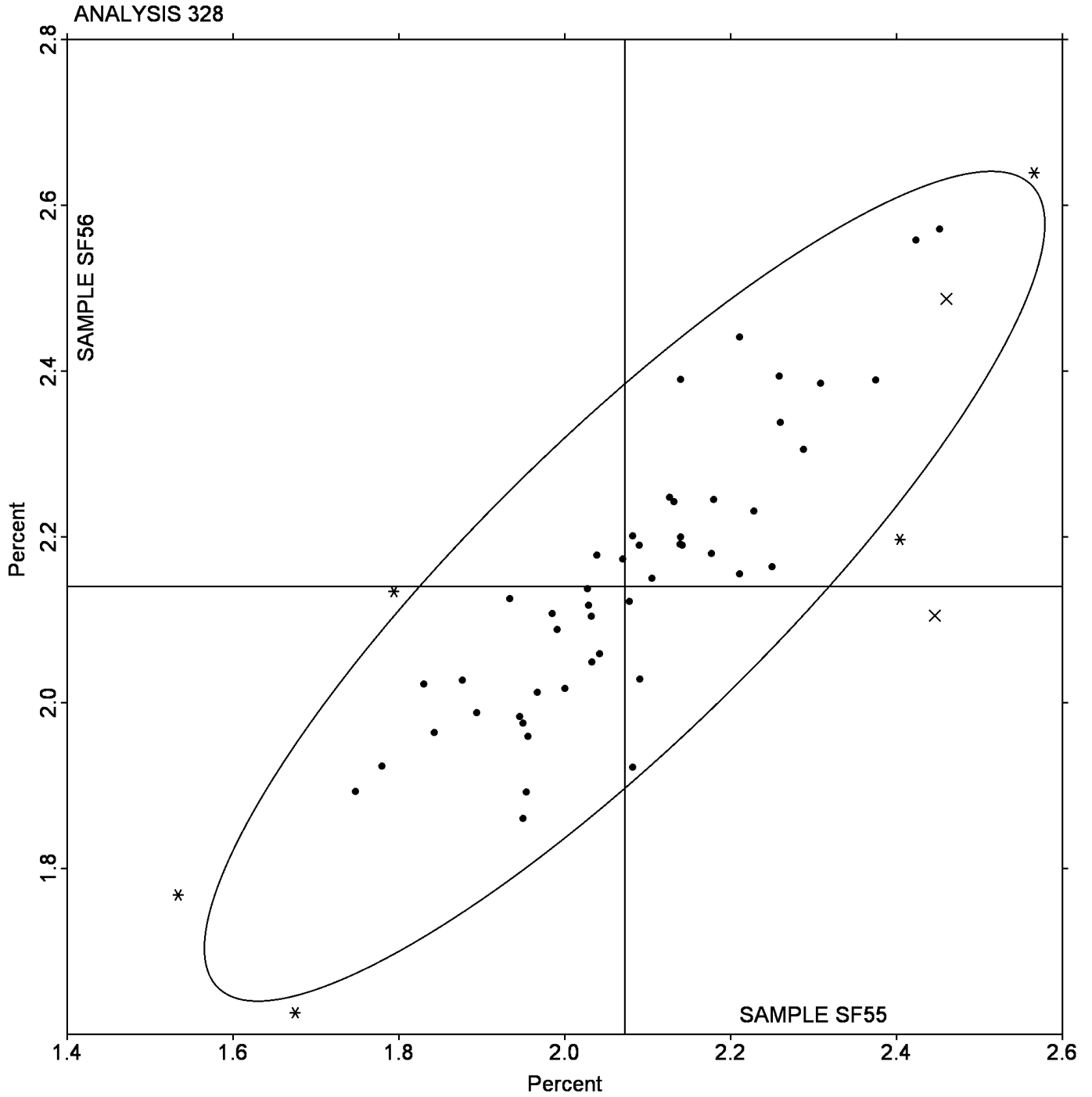
**Instrument Code List**

(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)	(MN) - Minebea
(MR) - MTS Alliance RT series	(RE) - Regmed
(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 **SF55** = 2.0721 Percent

Grand Mean Sample **SF56** = 2.1405 Percent



TAPPI-CTS Interlaboratory Testing Program  
Analysis 330  
Tensile Breaking Strength - Packaging Papers

WebCode	Data Flag	Sample SE55			Sample SE56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2JNXWF		5.824	0.808	2.02	10.641	1.297	2.08	TA
3EUTQA		4.954	-0.061	-0.15	9.135	-0.209	-0.34	IN
4F48ZN		4.358	-0.658	-1.65	8.477	-0.867	-1.39	SA
4V262Z		4.987	-0.028	-0.07	9.285	-0.059	-0.09	TB
64K44P		5.595	0.579	1.45	10.275	0.931	1.50	IK
6RGLMN		4.643	-0.373	-0.93	8.897	-0.447	-0.72	LW
7DNZHY		5.005	-0.010	-0.03	9.274	-0.070	-0.11	LH
7FT4B3		5.051	0.036	0.09	9.323	-0.021	-0.03	LH
8FRZC6		5.016	0.000	0.00	9.512	0.168	0.27	LA
9DZJDG		4.417	-0.599	-1.50	8.768	-0.576	-0.92	IF
9K24TC		4.721	-0.294	-0.74	8.650	-0.693	-1.11	XX
9UCGUF		4.494	-0.521	-1.31	8.514	-0.830	-1.33	LW
9WRCCT		4.890	-0.125	-0.31	9.280	-0.064	-0.10	TP
B7RY3G		5.165	0.149	0.37	10.049	0.706	1.13	IM
B94TLG		4.765	-0.250	-0.63	9.019	-0.325	-0.52	XX
CRE3YL		5.876	0.860	2.15	10.261	0.917	1.47	TK
D38LGJ		5.443	0.427	1.07	10.052	0.708	1.14	TP
DR667G		4.173	-0.843	-2.11	7.931	-1.412	-2.27	IF
EHZYN6		4.758	-0.258	-0.65	8.967	-0.377	-0.61	IM
FMZKQM	*	4.919	-0.097	-0.24	8.383	-0.961	-1.54	ZU
HYVTPL		4.792	-0.224	-0.56	9.304	-0.039	-0.06	XX
J7M8N8		5.418	0.403	1.01	10.099	0.755	1.21	IA
JAMD8J		4.915	-0.101	-0.25	9.294	-0.050	-0.08	TB
K32P62		5.219	0.204	0.51	9.768	0.424	0.68	TO
K6QVMC		4.773	-0.242	-0.61	9.088	-0.256	-0.41	RE
KDGJHE	*	5.517	0.501	1.25	10.683	1.339	2.15	TO
KJTHXE		4.919	-0.097	-0.24	9.398	0.055	0.09	ID
LK379J		5.018	0.003	0.01	9.516	0.173	0.28	LH
LVZNN8		5.139	0.123	0.31	9.466	0.123	0.20	ID
MMNET6		4.767	-0.248	-0.62	8.721	-0.622	-1.00	TO
NA9VHM		4.841	-0.175	-0.44	9.134	-0.210	-0.34	LA
NE326P		5.319	0.303	0.76	9.576	0.232	0.37	TO
REXHX6	*	5.762	0.746	1.87	9.711	0.367	0.59	TK
RHACPV		5.144	0.129	0.32	9.294	-0.050	-0.08	LH
RU4N4U		4.702	-0.313	-0.78	8.939	-0.405	-0.65	TB
THNVU8		5.527	0.512	1.28	9.883	0.539	0.87	TH
U4JLG3		5.052	0.037	0.09	9.749	0.406	0.65	TE
YDWGUE		4.713	-0.302	-0.76	8.748	-0.596	-0.96	IX

TAPPI-CTS Interlaboratory Testing Program  
Analysis 330  
Tensile Breaking Strength - Packaging Papers

	Sample SE55	Summary Statistics	Sample SE56
Grand Means	5.0155 kN/m		9.3438 kN/m
SD Btwn Labs	0.3994 kN/m		0.6228 kN/m
Statistics based on 38 of 38 reporting participants			

**Notes for Analysis 330**

No Data Flags assigned for this analysis.

**Analysis Notes:**

- 2JNXWF - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- 3EUTQA - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- 4F48ZN - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- 64K44P - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- 6RGLMN - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- 7DNZHY - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- 7FT4B3 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- 8FRZC6 - Data appear to be lb/in, not kN/m as indicated on datasheet. One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- CRE3YL - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- FMZKQM - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- HYVTPL - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- J7M8N8 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- K32P62 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- K6QVMC - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- LK379J - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- MMNET6 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- RHACPV - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- THNVU8 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- U4JLG3 - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- YDWGUE - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 330  
Tensile Breaking Strength - Packaging Papers

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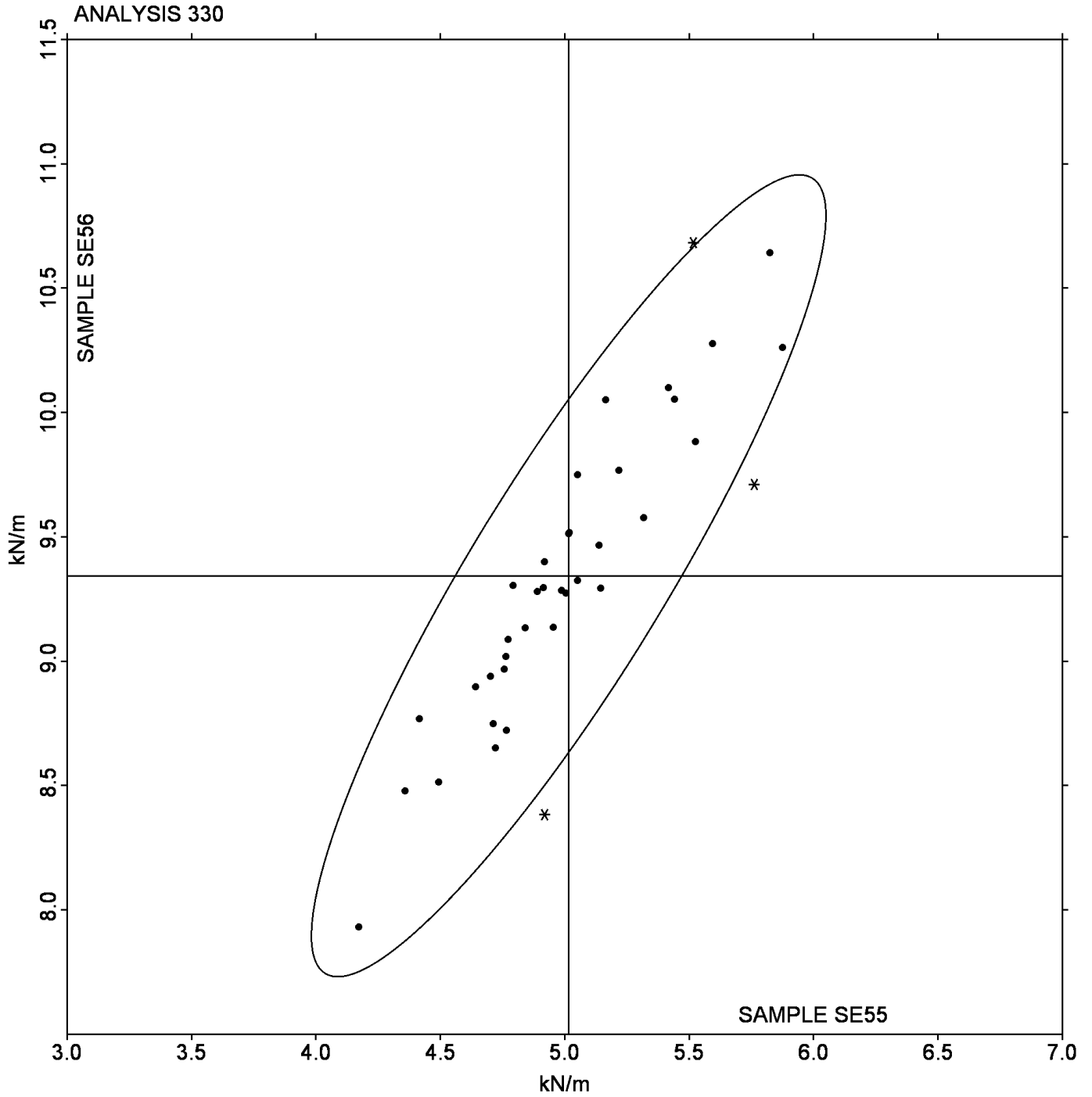
**Instrument Code List**

(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
(LH) - L & W Alwetron TH1 (Horizontal) SE 060	(LW) - L & W Tensile Tester SE062
(RE) - Regmed	(SA) - Shimadzu Autograph AG 2000 A
(TA) - Thwing-Albert Tensile Tester	(TB) - Thwing-Albert EJA/1000
(TE) - Thwing-Albert Intelect II	(TH) - Thwing-Albert QC-3A
(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 **SE55** = 5.0155 kN/m

Grand Mean Sample **SE56** = 9.3438 kN/m



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

WebCode	Data Flag	Sample SE55			Sample SE56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3NJDDV		191.5	3.3	0.21	143.0	17.5	1.40	TE
4M6XA2		188.4	0.1	0.01	114.0	-11.5	-0.92	LH
4VLRNN		183.0	-5.3	-0.33	117.9	-7.6	-0.61	LW
9YGYQ3		211.7	23.5	1.47	133.3	7.8	0.63	LA
A64HPG		177.5	-10.8	-0.67	111.7	-13.7	-1.10	XX
D8JV42		206.1	17.8	1.11	128.1	2.6	0.21	TO
E7JXNK		194.5	6.3	0.39	138.1	12.6	1.00	XX
EMR78E		151.0	-37.2	-2.32	109.1	-16.4	-1.31	SA
F4CELM		169.1	-19.1	-1.19	123.6	-1.9	-0.15	XX
FNTDL6		203.4	15.2	0.95	145.9	20.5	1.63	TO
J36PUG		210.3	22.1	1.38	127.5	2.0	0.16	TH
L66V48		189.6	1.4	0.08	118.3	-7.2	-0.58	IA
MBAGNZ		188.5	0.2	0.02	109.6	-15.9	-1.27	LW
MXEEU8		189.2	0.9	0.06	147.7	22.2	1.77	IK
P7L7Q2		201.4	13.1	0.82	130.7	5.3	0.42	IA
PT2NVD		189.1	0.9	0.06	112.1	-13.4	-1.07	IX
REB2UV		178.8	-9.5	-0.59	112.1	-13.4	-1.07	LH
RRD4Y6		178.7	-9.6	-0.60	128.6	3.1	0.25	RE
TYBNPJ		188.2	0.0	0.00	119.4	-6.1	-0.49	IN
U8Z7N8		172.1	-16.1	-1.01	135.5	10.0	0.80	TP
VNRUJ9		199.9	11.7	0.73	128.6	3.1	0.25	LH
VYM9GK		187.8	-0.5	-0.03	114.3	-11.2	-0.90	TO
WYKE27		225.0	36.8	2.30	148.3	22.8	1.82	TB
XKF7QM		180.9	-7.3	-0.46	124.4	-1.1	-0.09	TB
YXKKQK		180.9	-7.3	-0.46	123.3	-2.2	-0.17	IM
ZMUWW		157.8	-30.4	-1.90	106.6	-18.9	-1.51	IF
ZY9U3R		187.9	-0.3	-0.02	136.4	10.9	0.87	IM

		Summary Statistics	
	Sample SE55		Sample SE56
Grand Means	188.23 Joules/sq m		125.48 Joules/sq m
SD Btwn Labs	16.02 Joules/sq m		12.52 Joules/sq m
Statistics based on 27 of 27 reporting participants			

**Notes for Analysis 331**

No Data Flags assigned for this analysis.

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

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**Analysis Notes:**

- 3NJDDV - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- 4M6XA2 - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- 4VLRNN - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- 9YGYQ3 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- EMR78E - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- F4CELM - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- FNTDL6 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- J36PUG - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- MXEEU8 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- P7L7Q2 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- PT2NVD - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- REB2UV - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- RRD4Y6 - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.
- TYBNPJ - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- VNRUJ9 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.
- VYM9GK - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.

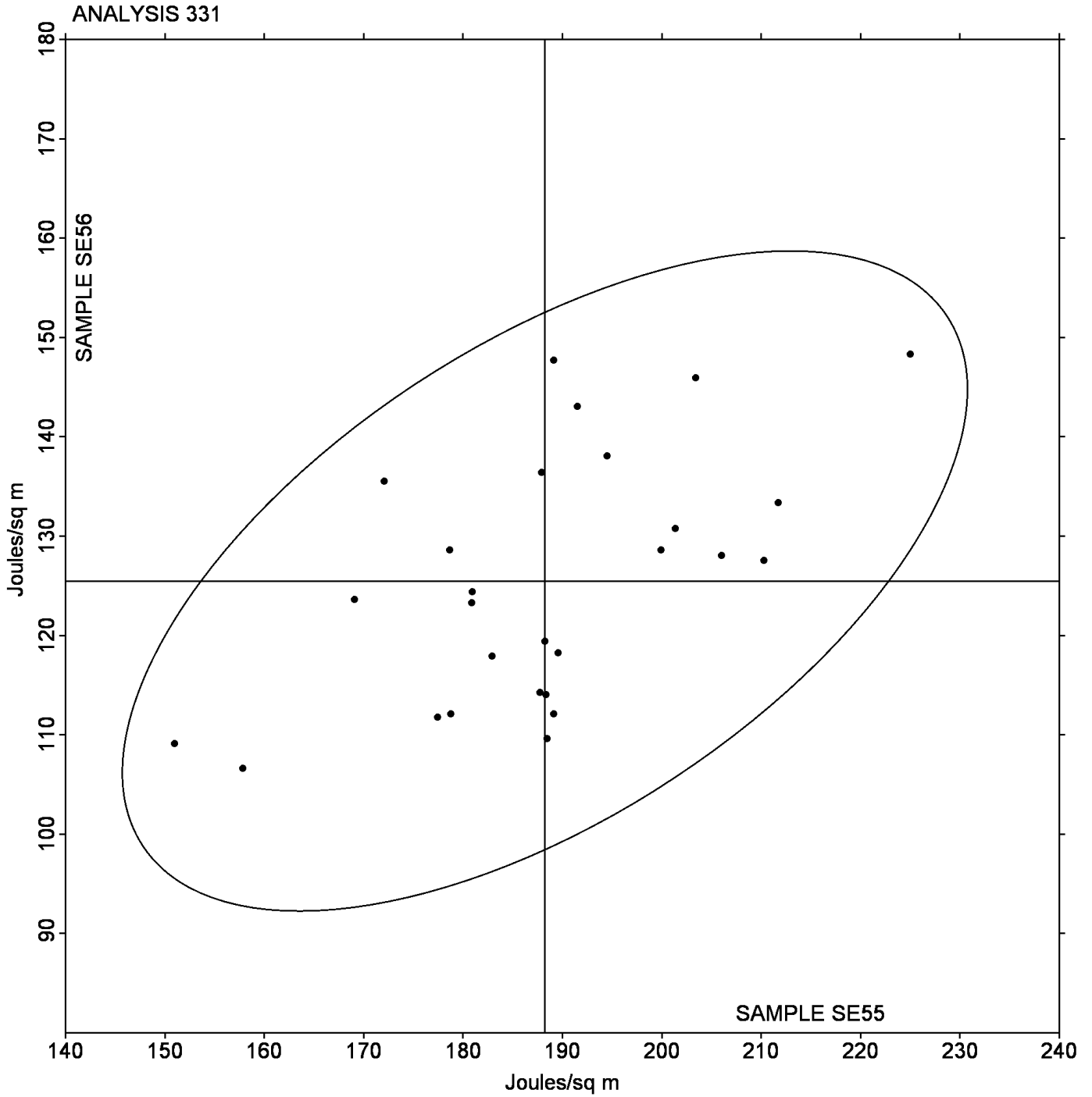
### Instrument Code List

- |   |   |
|---|---|
| (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                             | (LH) - L & W Alwetron TH1 (Horizontal) SE 060 |
| (LW) - L & W Tensile Tester SE062                 | (RE) - Regmed                                 |
| (SA) - Shimadzu Autograph AG 2000 A               | (TB) - Thwing-Albert EJA/1000                 |
| (TE) - Thwing-Albert Intelect II                  | (TH) - Thwing-Albert QC-3A                    |
| (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 **SE55** = 188.23 Joules/sq m

Grand Mean Sample **SE56** = 125.48 Joules/sq m



**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 332**  
**Elongation to Break - Packaging Papers**

WebCode	Data Flag	Sample SE55			Sample SE56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3KJ2GV		5.140	0.063	0.15	2.372	0.274	1.33	TE
68KNXV	*	5.750	0.673	1.64	2.654	0.556	2.70	TP
6DDJ7V		4.979	-0.098	-0.24	2.020	-0.078	-0.38	TH
6DWP6K		4.840	-0.237	-0.58	2.064	-0.034	-0.17	IA
6L9L87		5.360	0.283	0.69	2.024	-0.074	-0.36	LA
7VA3CM		4.663	-0.415	-1.01	1.970	-0.128	-0.62	XX
8XNMEN		4.928	-0.150	-0.37	2.220	0.122	0.59	RE
9EKEGH		4.887	-0.191	-0.47	1.853	-0.245	-1.19	XX
ABAH8T		5.144	0.066	0.16	1.961	-0.137	-0.67	IX
AGHEUK		5.233	0.156	0.38	1.990	-0.108	-0.53	XX
BRBYCH		6.000	0.923	2.26	2.220	0.122	0.59	IA
C9DBTQ		4.894	-0.183	-0.45	1.973	-0.125	-0.61	TB
CMU9RZ		5.239	0.162	0.39	2.319	0.221	1.07	IN
EJTVBE	*	3.961	-1.116	-2.73	2.031	-0.067	-0.33	SA
EU6CTJ		5.144	0.067	0.16	1.997	-0.101	-0.49	LH
GE6Y4K		5.985	0.908	2.22	2.490	0.392	1.91	TB
JHYD4F		5.258	0.181	0.44	2.152	0.054	0.26	XX
KMTCQV		5.181	0.104	0.25	1.937	-0.161	-0.78	TO
PNQXLW		4.613	-0.465	-1.14	1.840	-0.258	-1.26	LH
PUAJAU		5.076	-0.001	0.00	2.068	-0.030	-0.15	TB
QBTLJ4		4.536	-0.541	-1.32	2.319	0.221	1.08	IK
QU8FED	X	6.350	1.273	3.11	1.650	-0.448	-2.18	ZU
RKXJYD		4.874	-0.204	-0.50	1.827	-0.271	-1.32	LH
RN3MMZ		5.135	0.058	0.14	1.968	-0.130	-0.63	LW
TRAMAP		5.327	0.250	0.61	1.978	-0.120	-0.58	XX
UG79T6		4.590	-0.487	-1.19	1.950	-0.148	-0.72	XX
VEXB4U		4.844	-0.234	-0.57	1.899	-0.199	-0.97	IF
VJBBZK		4.892	-0.185	-0.45	2.173	0.075	0.36	IM
VVA9KT		5.486	0.409	1.00	1.910	-0.188	-0.92	LW
WU4WZN		5.137	0.059	0.14	2.386	0.288	1.40	TH
YDFYQD		5.107	0.030	0.07	2.123	0.025	0.12	TO
ZPAH6J		5.198	0.120	0.29	2.354	0.256	1.24	IM

Sample SE55		Summary Statistics	Sample SE56	
Grand Means	5.0774 Percent		2.0981	Percent
SD Btwn Labs	0.4090 Percent		0.2056	Percent
Statistics based on 31 of 32 reporting participants				

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

QU8FED (X) - Inconsistent in testing between samples (SE55 high)and within the determinations for Sample SE56.

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 332**  
**Elongation to Break - Packaging Papers**

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**Analysis Notes:**

3KJ2GV - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.

6DDJ7V - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.

6DWP6K - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.

6L9L87 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.

7VA3CM - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.

8XNMEN - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.

ABAH8T - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.

AGHEUK - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.

CMU9RZ - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.

EJTVBE - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.

KMTCQV - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.

PNQXLW - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.

QBTLJ4 - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.

QU8FED - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.

RKXJYD - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.

RN3MMZ - Two replicates removed from the Lab Mean of SE55 due to incorrectly cut specimens.

VEXB4U - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.

WU4WZN - One replicate removed from the Lab Mean of SE55 due to incorrectly cut specimen.

### Instrument Code List

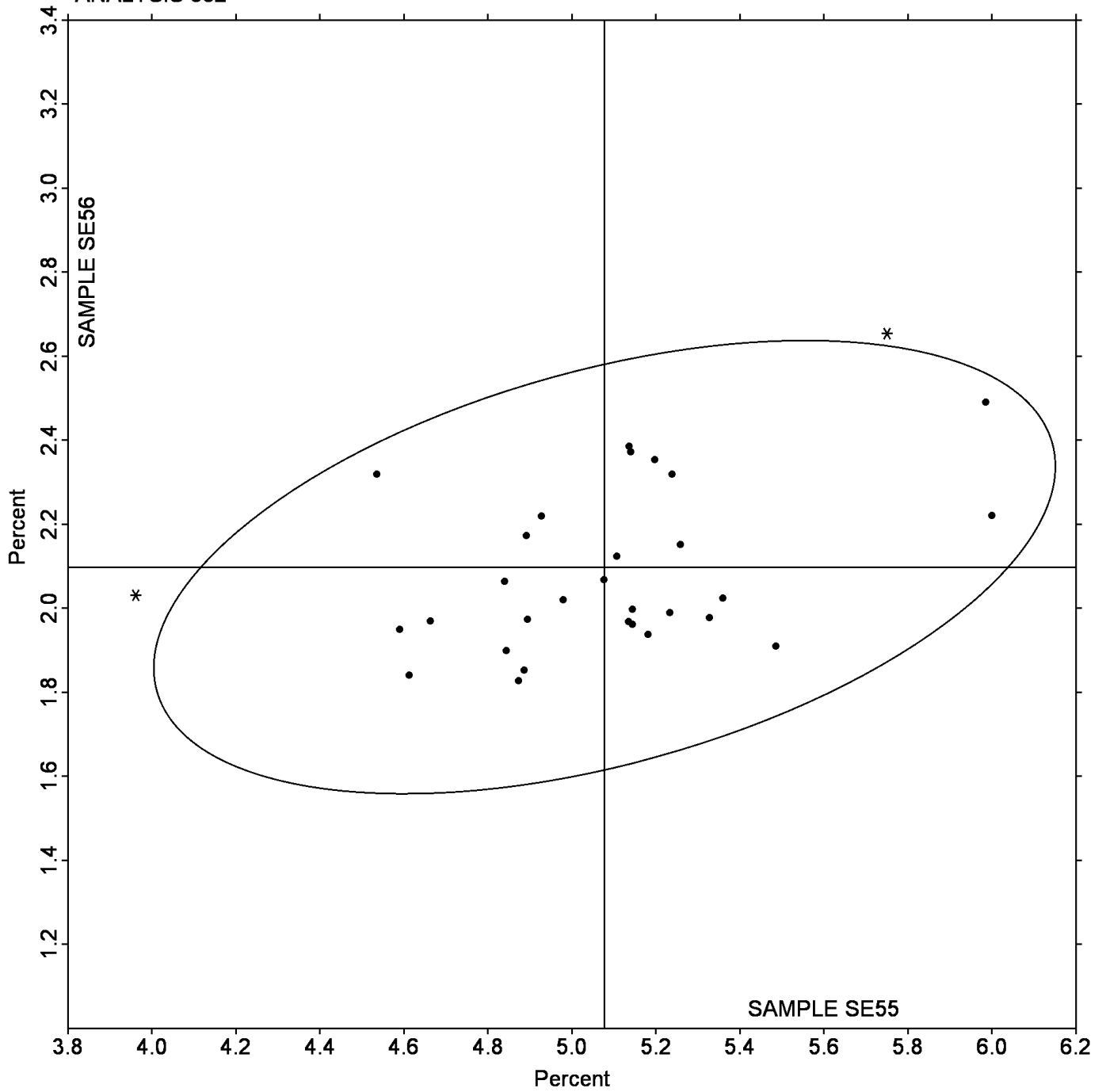
(IA) - Instron 1011	(IF) - Instron 3340 Series
(IK) - Instron 4400 Series	(IM) - Instron 5500 Series
(IN) - Instron 3360 Series	(IX) - Instron (model not specified)
(LA) - L & W Autoline 300	(LH) - L & W Alwetron TH1 (Horizontal) SE 060
(LW) - L & W Tensile Tester SE062	(RE) - Regmed
(SA) - Shimadzu Autograph AG 2000 A	(TB) - Thwing-Albert EJA/1000
(TE) - Thwing-Albert Intelect II	(TH) - Thwing-Albert QC-3A
(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 332  
Elongation to Break - Packaging Papers

Grand Mean Sample **SE55** = 5.0774 Percent

Grand Mean Sample **SE56** = 2.0981 Percent

ANALYSIS 332



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

WebCode	Data Flag	Sample SG55			Sample SG56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2AK4VG		53.20	-10.47	-0.62	54.40	-4.56	-0.28	MT
4F7NAG		66.80	3.14	0.19	77.40	18.45	1.13	MT
6GBNQ8		61.80	-1.87	-0.11	50.00	-8.96	-0.55	MT
9VKJNR		49.30	-14.37	-0.86	41.00	-17.96	-1.10	MT
ANZW4L		77.90	14.24	0.85	42.90	-16.06	-0.98	MT
AWC36J		78.10	14.44	0.86	65.30	6.35	0.39	MT
B4PWGL		53.30	-10.37	-0.62	40.10	-18.86	-1.16	MT
FDX3FJ		49.90	-13.77	-0.82	49.00	-9.96	-0.61	MT
G83RHQ		62.00	-1.67	-0.10	58.90	-0.06	0.00	MT
G8QECM	*	33.40	-30.27	-1.81	69.20	10.25	0.63	MT
GNXF7N		70.20	6.54	0.39	56.20	-2.76	-0.17	MT
HFZ3NZ		64.60	0.94	0.06	74.30	15.35	0.94	MT
JUD3PJ		45.90	-17.77	-1.06	44.90	-14.06	-0.86	XX
M7Z2EC		75.50	11.84	0.71	87.20	28.25	1.73	MT
RTVREJ		74.50	10.84	0.65	68.10	9.15	0.56	XX
XE892A		37.00	-26.67	-1.59	24.50	-34.46	-2.11	MT
XGMV6N		101.10	37.44	2.23	86.20	27.25	1.67	MT
XHBFGL		88.90	25.24	1.51	70.60	11.65	0.71	MT
YQ3R4L		62.70	-0.97	-0.06	54.50	-4.46	-0.27	MT
YX7VN8		67.20	3.54	0.21	64.40	5.45	0.33	MT

Sample SG55		Summary Statistics	Sample SG56	
Grand Means	63.665 Double Folds		58.955 Double Folds	
SD Btwn Labs	16.757 Double Folds		16.315 Double Folds	
Statistics based on 20 of 20 reporting participants				

**Notes for Analysis 334**

No Data Flags assigned for this analysis.

**Instrument Code List**

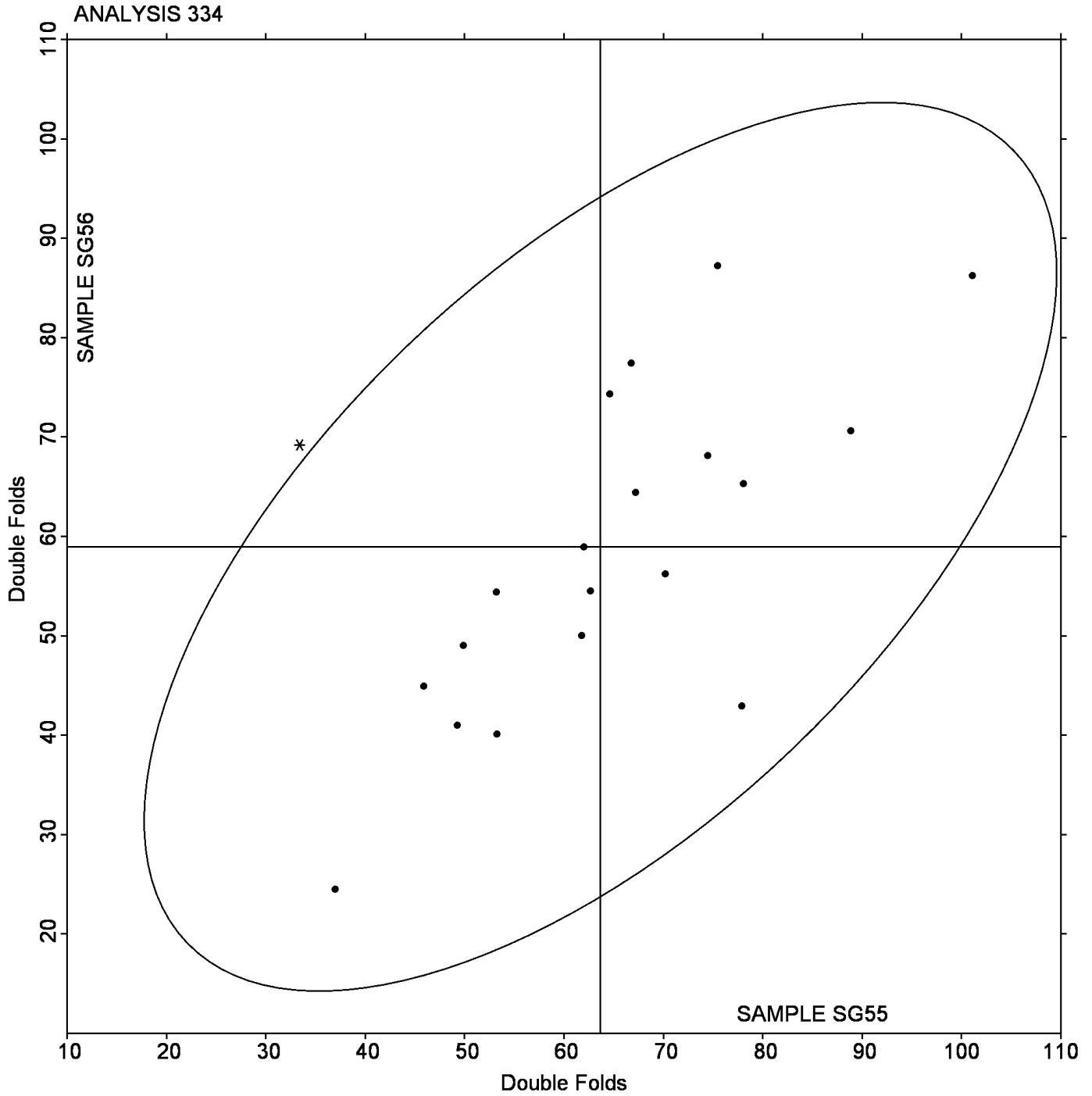
(MT) - MIT - Tinius Olsen

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

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

Grand Mean Sample **SG55** = 63.665 Double Folds

Grand Mean Sample **SG56** = 58.955 Double Folds



**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 336**  
**Bending Resistance, Gurley Type**

WebCode	Data Flag	Sample SH55			Sample SH56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3RKLFK		278.6	7.4	0.40	259.7	-0.4	-0.02
4BUQQZ		284.9	13.7	0.74	276.0	15.9	0.76
7E6F8F		296.4	25.1	1.36	277.3	17.1	0.82
7T3RFJ		256.9	-14.3	-0.78	256.9	-3.2	-0.15
89A7AL		282.7	11.4	0.62	268.5	8.3	0.40
8LJLGQ		265.1	-6.1	-0.33	258.3	-1.9	-0.09
9BWT4F		251.7	-19.5	-1.06	234.4	-25.7	-1.22
9MATZA		288.9	17.7	0.96	276.5	16.3	0.78
ANEV9Q		239.3	-31.9	-1.73	230.2	-29.9	-1.43
CF4MY9		270.7	-0.6	-0.03	247.6	-12.6	-0.60
F7TVKU		290.8	19.5	1.06	288.6	28.4	1.35
FLW2AK	X	191.1	-80.2	-4.35	165.7	-94.5	-4.50
FPPNMZ		281.8	10.5	0.57	280.9	20.8	0.99
H3NZZG		271.2	-0.1	0.00	259.6	-0.6	-0.03
LD23V7		289.7	18.4	1.00	268.6	8.4	0.40
LNGX9K		263.6	-7.7	-0.42	264.1	3.9	0.19
NZJ8MK		269.7	-1.5	-0.08	252.9	-7.3	-0.35
Q9TJME		267.1	-4.1	-0.22	258.0	-2.2	-0.10
VV43YN		279.1	7.9	0.43	262.7	2.5	0.12
W4Z9EB		276.9	5.6	0.31	273.4	13.2	0.63
WDG7UF		247.6	-23.7	-1.29	243.1	-17.0	-0.81
WWDM3J		251.5	-19.7	-1.07	233.3	-26.8	-1.28
XVXH9R		258.1	-13.1	-0.71	246.3	-13.8	-0.66
YM6K6P		232.0	-39.2	-2.13	209.8	-50.4	-2.40
YMYUUE		309.8	38.6	2.09	311.6	51.4	2.45
Z3QF4T		277.1	5.8	0.31	265.5	5.4	0.26

		Summary Statistics	
	Sample SH55		Sample SH56
Grand Means	271.26 Gurley Units		260.15 Gurley Units
SD Btwn Labs	18.42 Gurley Units		21.01 Gurley Units
Statistics based on 25 of 26 reporting participants			

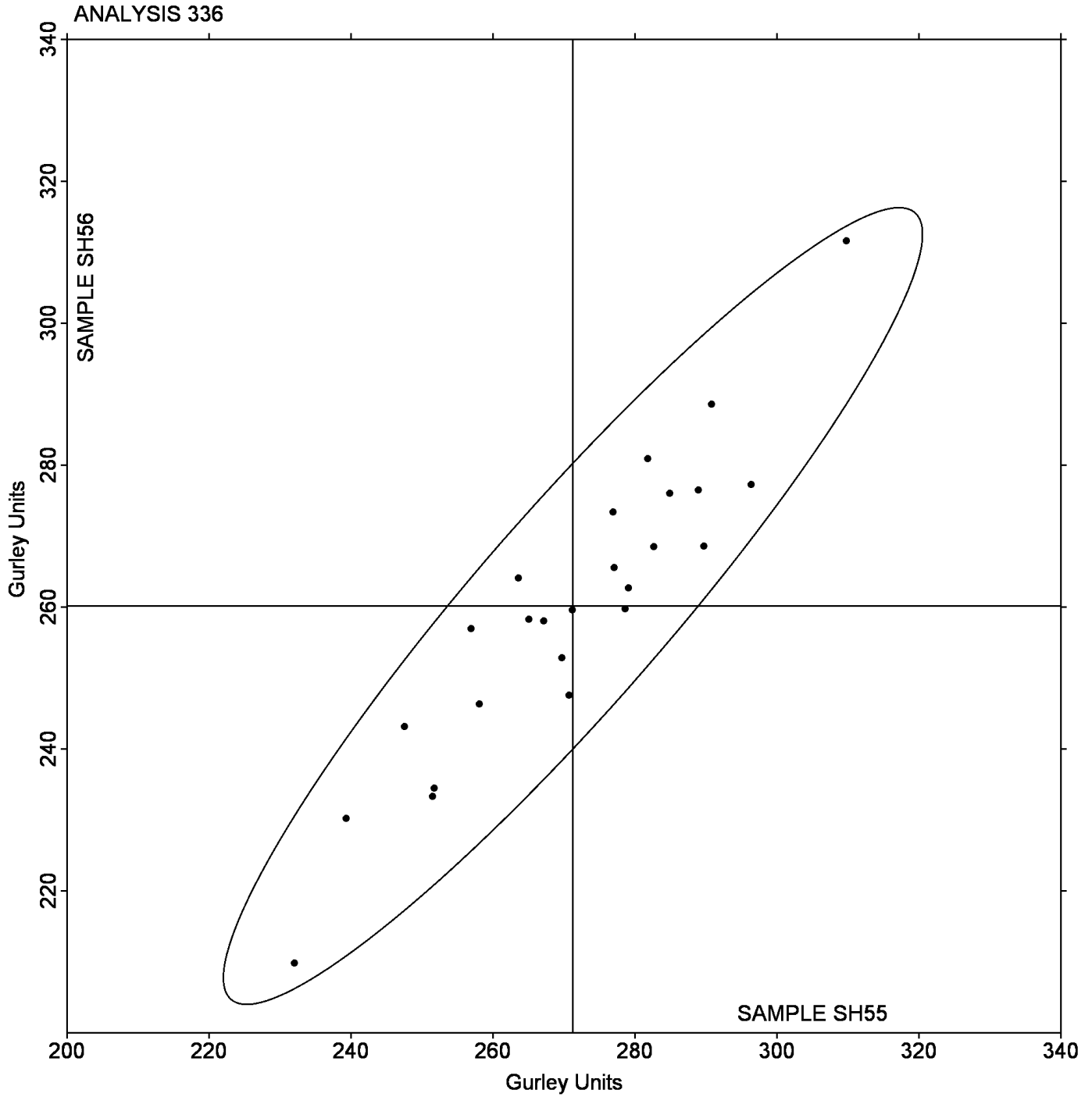
**Comments on assigned Data Flags for Test #336**

FLW2AK (X) - Systematic error (data for both samples are low).

TAPPI-CTS Interlaboratory Testing Program  
Analysis 336  
Bending Resistance, Gurley Type

Grand Mean Sample **SH55** = 271.26 Gurley Units

Grand Mean Sample **SH56** = 260.15 Gurley Units



**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 338**  
**Bending Resistance, Taber Type - 0 to 10 Units**

WebCode	Data Flag	Sample SJ55			Sample SJ56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2BGWZV		3.699	-0.038	-0.06	3.672	-0.051	-0.09
2LFDJP		4.185	0.448	0.74	4.130	0.407	0.70
3X9WYG		3.783	0.045	0.08	3.688	-0.035	-0.06
ED2QCH		3.848	0.111	0.18	3.628	-0.095	-0.16
FFJCFP		3.680	-0.057	-0.09	3.644	-0.079	-0.14
FTYBGD	X	1.833	-1.904	-3.15	3.582	-0.141	-0.24
GRC7BJ		3.770	0.033	0.05	3.480	-0.243	-0.42
JK83AQ		3.677	-0.060	-0.10	3.462	-0.261	-0.45
N2FA82		5.200	1.463	2.42	5.290	1.567	2.70
NQZNBZ		3.535	-0.202	-0.33	3.630	-0.093	-0.16
P3BPEX		3.058	-0.679	-1.12	2.694	-1.029	-1.77
UACYRL		3.240	-0.497	-0.82	3.110	-0.613	-1.06
VQP7VU	X	5.980	2.243	3.71	5.829	2.106	3.63
W2RZAX		3.800	0.062	0.10	3.710	-0.013	-0.02
WEY7YQ		3.400	-0.337	-0.56	3.320	-0.403	-0.69
XPP9TH	*	2.526	-1.211	-2.01	4.047	0.324	0.56
XQLKUC		4.616	0.878	1.45	4.473	0.750	1.29
YPT7ME		3.778	0.041	0.07	3.591	-0.132	-0.23

		Summary Statistics	
	Sample SJ55		Sample SJ56
Grand Means	3.7371 Taber Units		3.7230 Taber Units
SD Btwn Labs	0.6039 Taber Units		0.5807 Taber Units
Statistics based on 16 of 18 reporting participants			

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

FTYBGD (X) - Inconsistent in testing between samples, data for Sample SJ55 are low.

VQP7VU (X) - Systematic error (data for both samples are high).

**Analysis Notes:**

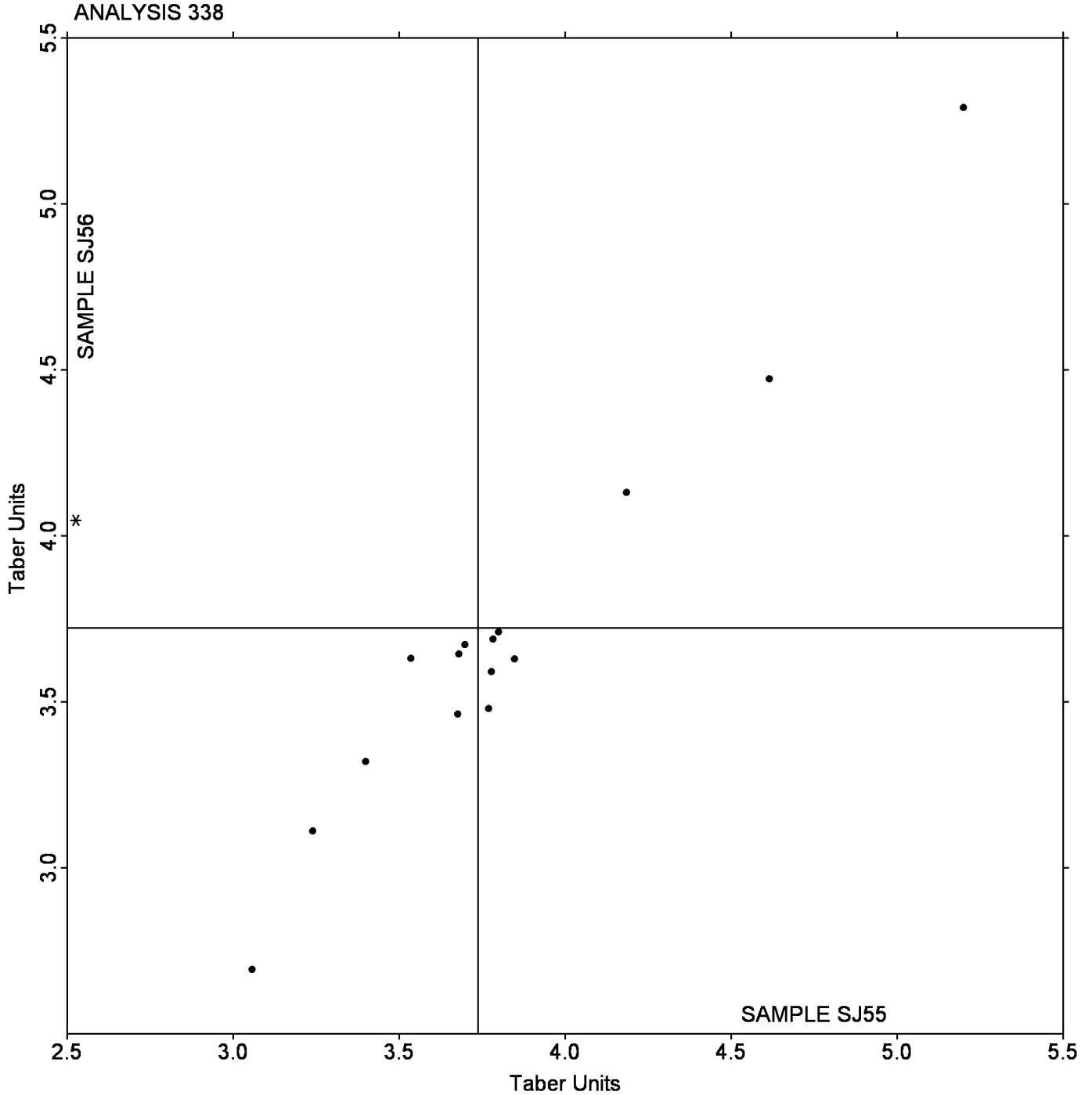
JK83AQ - Data appear to be reported as mN-m, not g-cm as indicated on datasheet. Unit changed by CTS.

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

TAPPI-CTS Interlaboratory Testing Program  
Analysis 338  
Bending Resistance, Taber Type - 0 to 10 Units

Grand Mean Sample **SJ55** = 3.7371 Taber Units

Grand Mean Sample **SJ56** = 3.7230 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 339**  
**Bending Resistance, Taber Type - 10 to 100 Taber Units**

WebCode	Data Flag	Sample SQ55			Sample SQ56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2784YP		14.85	-0.43	-0.41	20.50	0.35	0.31
3QT98Z		15.05	-0.23	-0.22	20.20	0.05	0.04
784EQL		14.79	-0.49	-0.47	18.88	-1.27	-1.14
8C9JVQ		16.75	1.47	1.40	22.13	1.98	1.77
D6GXT9		14.93	-0.35	-0.34	20.21	0.05	0.05
E7L6BR		15.01	-0.27	-0.26	20.09	-0.06	-0.06
HNPVVQ	X	40.10	24.82	23.66	53.70	33.55	30.01
HWH9PY		14.60	-0.68	-0.65	19.48	-0.68	-0.60
LF63PB		14.76	-0.52	-0.50	19.28	-0.87	-0.78
NYQ4NQ		13.92	-1.36	-1.30	18.42	-1.73	-1.55
Q33YVR		17.56	2.28	2.17	21.56	1.41	1.26
TZQUGU		15.90	0.62	0.59	20.95	0.80	0.71

Sample SQ55		Summary Statistics	Sample SQ56	
Grand Means	15.284 Taber Units		20.154 Taber Units	
SD Btwn Labs	1.049 Taber Units		1.118 Taber Units	
Statistics based on 11 of 12 reporting participants				

**Comments on assigned Data Flags for Test #339**

HNPVVQ (X) - Extreme data.

**Analysis Notes:**

784EQL - One determination removed from the Lab Mean of Sample SQ55 per Grubb's Test at 1% risk (TAPPI 1205).

E7L6BR - One determination removed from the Lab Mean of Sample SQ55 per Grubb's Test at 1% risk (TAPPI 1205).

HNPVVQ - Data for Sample SQ55 appear to be machine direction length bending resistance.



TAPPI-CTS Interlaboratory Testing Program  
Analysis 340

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

WebCode	Data Flag	Sample ST55			Sample ST56		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
234DQP	X	210.5	3.6	0.44	253.2	5.2	0.54
34XHKN		203.8	-3.1	-0.38	249.9	1.9	0.20
3BDBZD	X	93.3	-113.6	-13.95	89.5	-158.5	-16.75
43Y8BL		198.8	-8.1	-0.99	250.3	2.3	0.24
67EC7L		211.7	4.8	0.59	253.5	5.5	0.58
BQJL9D		214.8	7.8	0.96	255.5	7.5	0.79
CR9R3F		201.0	-5.9	-0.72	233.4	-14.7	-1.55
EKFL7Q		210.1	3.2	0.39	253.9	5.9	0.62
EKKEVL		199.9	-7.0	-0.86	242.5	-5.6	-0.59
FWQZLH		194.6	-12.3	-1.51	244.4	-3.7	-0.39
H2KZ9X		194.5	-12.5	-1.53	231.2	-16.9	-1.79
HL8NF4		199.5	-7.4	-0.91	230.8	-17.3	-1.83
HXE3DP		204.0	-2.9	-0.35	242.2	-5.8	-0.62
J9QDER		215.5	8.6	1.06	250.7	2.7	0.28
LB9TLJ		206.3	-0.6	-0.08	256.4	8.4	0.88
M8AMVK		207.0	0.1	0.01	252.8	4.8	0.50
NR8J2D		206.3	-0.6	-0.07	246.2	-1.9	-0.20
P6RDVJ	X	206.9	0.0	0.00	213.8	-34.2	-3.62
PMVMJ3		220.7	13.7	1.69	252.4	4.4	0.46
PXUTMV		218.1	11.2	1.37	267.6	19.6	2.07
Q4BN3Q		217.8	10.8	1.33	251.3	3.2	0.34

Sample ST55		Summary Statistics	Sample ST56	
Grand Means	206.90 Taber Units		248.05 Taber Units	
SD Btwn Labs	8.15 Taber Units		9.46 Taber Units	
Statistics based on 18 of 21 reporting participants				

**Comments on assigned Data Flags for Test #340**

234DQP (X) - Data appears to be transposed between samples. Data switched by CTS.

3BDBZD (X) - Extreme data.

P6RDVJ (X) - Inconsistent in testing between samples, data for Sample ST56 are low.

**Analysis Notes:**

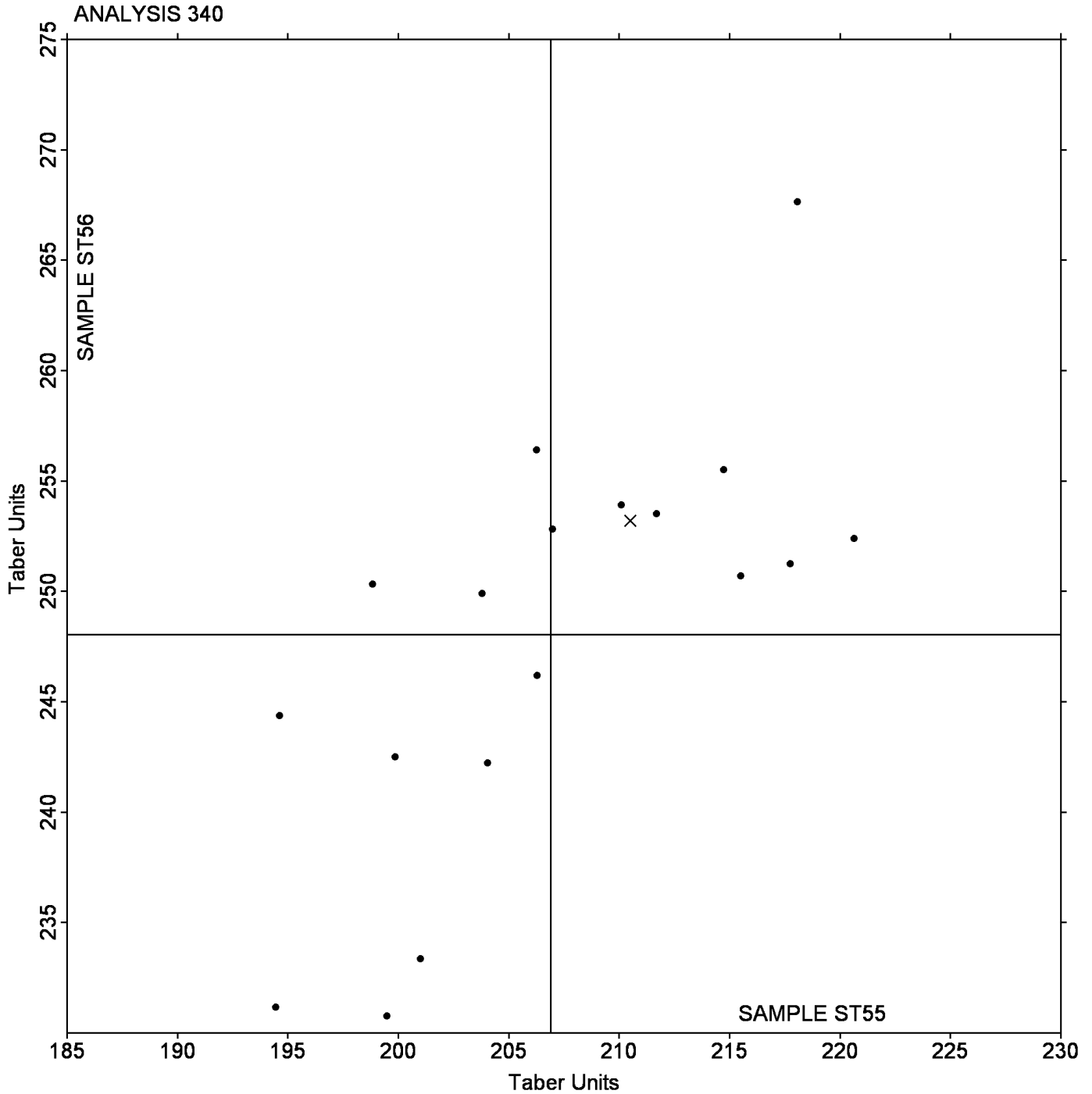
PXUTMV - Data appear to be reported as mN-m, not g-cm as indicated on datasheet. Unit changed by CTS.

### TAPPI-CTS Interlaboratory Testing Program Analysis 340

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

Grand Mean Sample **ST55** = 206.90 Taber Units

Grand Mean Sample **ST56** = 248.05 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 SM55			Sample SM56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6P9TT4		73.74	-7.99	-0.61	50.47	-11.05	-1.17	LW
7FEPXR		78.66	-3.06	-0.23	53.56	-7.96	-0.84	TZ
7XGN7A		99.56	17.83	1.35	75.16	13.64	1.44	CD
AAGCH8		65.91	-15.81	-1.20	52.43	-9.10	-0.96	TZ
C8Y2G6		91.80	10.07	0.76	67.80	6.28	0.66	CA
CB2JKL		92.00	10.27	0.78	66.54	5.02	0.53	LW
F2NY2U		100.52	18.79	1.42	79.80	18.28	1.93	TL
GF7XU2		67.02	-14.71	-1.11	53.64	-7.88	-0.83	CD
J7R2Q7		70.22	-11.51	-0.87	56.86	-4.66	-0.49	TZ
NXU249		87.85	6.12	0.46	62.13	0.60	0.06	TA
Q7ZDHH	X	36.83	-44.89	-3.40	32.60	-28.93	-3.05	XX
QA7WPQ		77.20	-4.53	-0.34	64.00	2.48	0.26	CA
RGD2NZ		93.72	11.99	0.91	68.08	6.56	0.69	DT
T6W9LR		73.84	-7.89	-0.60	53.92	-7.60	-0.80	LW
VC8AX7		69.79	-11.93	-0.90	56.16	-5.37	-0.57	TZ
W2PKLY		100.97	19.25	1.46	73.65	12.12	1.28	TA
ZGT2EV		64.80	-16.93	-1.28	50.20	-11.32	-1.19	CA

Sample SM55		Summary Statistics	Sample SM56	
Grand Means	81.726 psi		61.525 psi	
SD Btw Labs	13.200 psi		9.480 psi	
Statistics based on 16 of 17 reporting participants				

**Comments on assigned Data Flags for Test #343**

Q7ZDHH (X) - Systematic error (data for both samples are low).

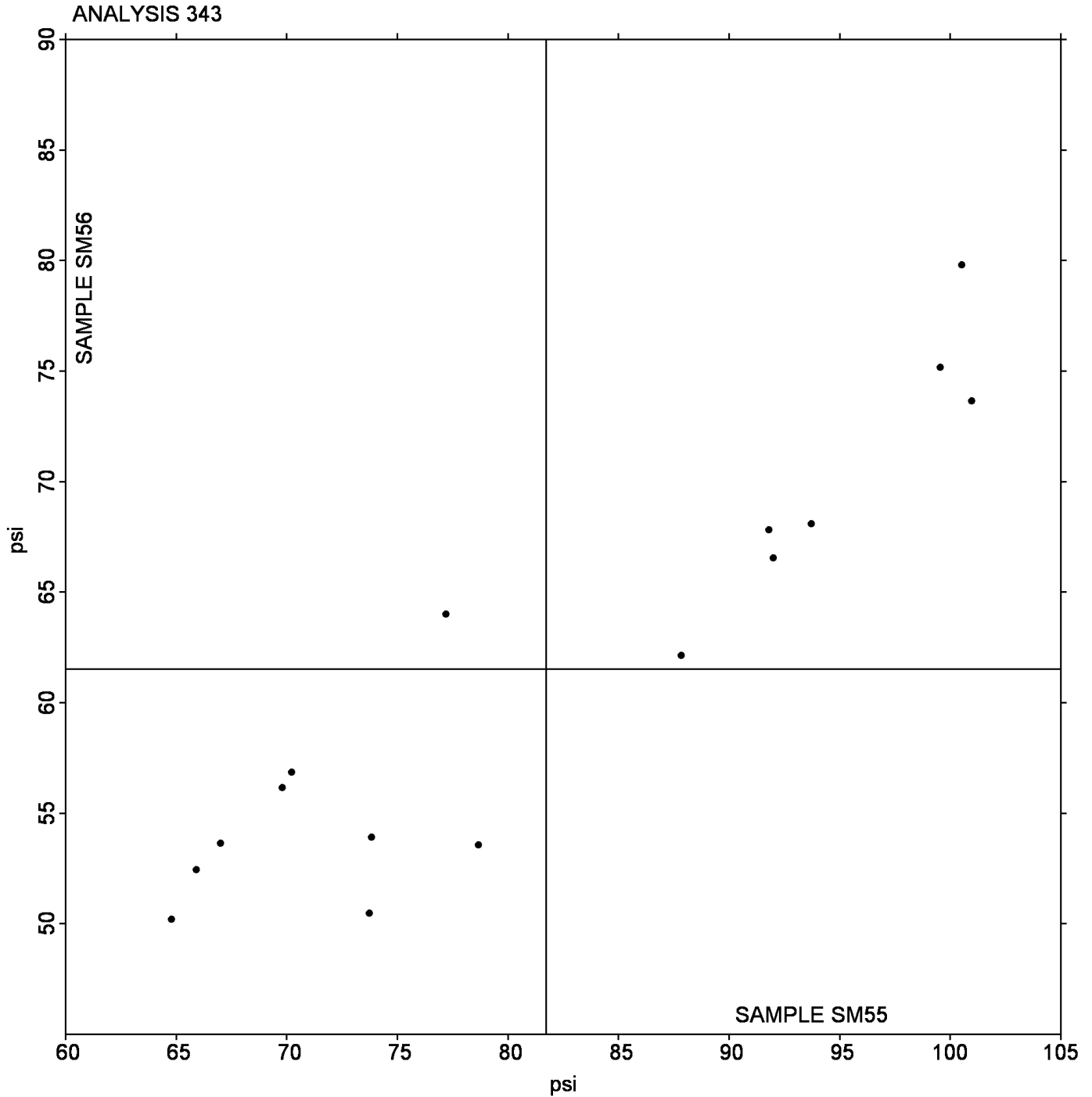
**Instrument Code List**

- |                                     |   |
|-------------------------------------|---|
| (CA) - CSI CS-163                   | (CD) - CSI CS-163D                                |
| (DT) - Dek-Tron DCS-163A ZDT Tester | (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 **SM55** = 81.726 psi

Grand Mean Sample **SM56** = 61.525 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 SZ55			Sample SZ56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2AR9GK		56.17	-0.10	-0.02	39.50	-1.96	-0.64	LW
48QJ4W		52.13	-4.14	-0.78	37.45	-4.01	-1.32	LW
63WD9C		59.92	3.65	0.69	42.42	0.96	0.32	DP
6EBBDF		57.64	1.37	0.26	38.80	-2.66	-0.87	CA
ATAZ7G		54.00	-2.27	-0.43	36.20	-5.26	-1.73	CA
HDLGF6		54.88	-1.39	-0.26	43.80	2.34	0.77	TZ
MLLX67		60.46	4.19	0.79	45.84	4.38	1.44	PG
MY9HQH		59.60	3.33	0.63	42.40	0.94	0.31	CA
PWGBAH	*	45.00	-11.27	-2.11	44.90	3.44	1.13	CD
QY2V2K		56.88	0.61	0.12	41.72	0.26	0.09	CA
TKEWZV		47.94	-8.33	-1.56	39.60	-1.86	-0.61	TZ
UXV86X		62.78	6.51	1.22	42.04	0.58	0.19	TZ
VQH22K		50.40	-5.87	-1.10	37.00	-4.46	-1.46	CA
VU8RWU		57.00	0.73	0.14	45.60	4.14	1.36	CA
WEC48B	X	54.46	-1.81	-0.34	54.34	12.88	4.23	TL
Y2Y797		62.90	6.63	1.25	42.60	1.14	0.38	TL
ZRN4M6		62.56	6.29	1.18	43.44	1.98	0.65	TL

Sample SZ55		Summary Statistics	Sample SZ56
Grand Means	56.266 psi		41.457 psi
SD Btw Labs	5.328 psi		3.045 psi
Statistics based on 16 of 17 reporting participants			

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

WEC48B (X) - Inconsistent in testing between samples, data for Sample SZ56 are high.

**Instrument Code List**

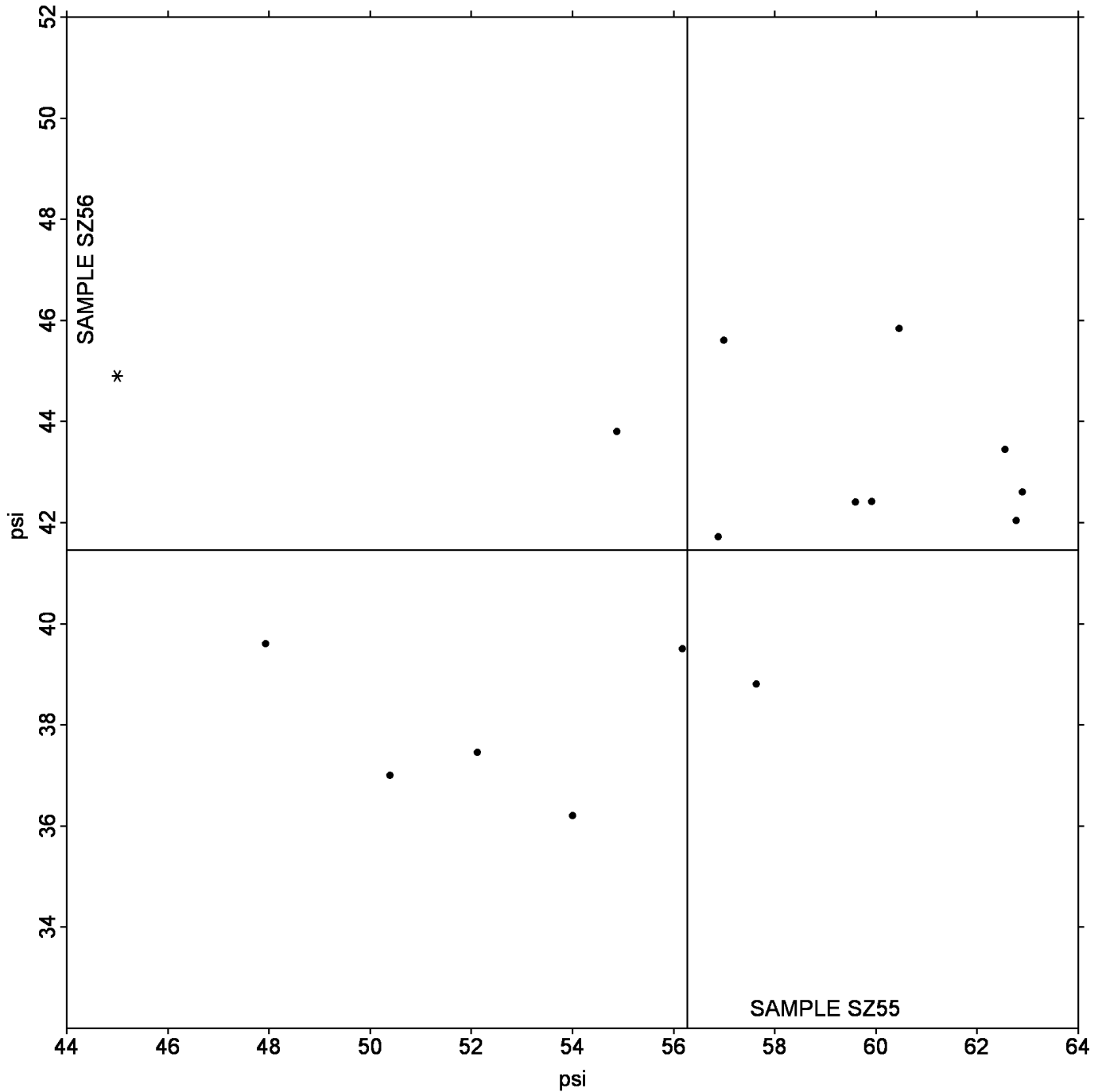
- |                                      |                                |
|--------------------------------------|--------------------------------|
| (CA) - CSI CS-163                    | (CD) - CSI CS-163D             |
| (DP) - Dek-Tron XP Series            | (LW) - L & W ZD Tensile Tester |
| (PG) - Perkins Model A Mullen 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 **SZ55** = 56.266 psi

Grand Mean Sample **SZ56** = 41.457 psi

ANALYSIS 345



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 SN55			Sample SN56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2T3YVH		73.20	-4.34	-0.62	73.60	-3.61	-0.55	XX
33KYNX		78.60	1.06	0.15	78.40	1.19	0.18	HY
4QZ28R		79.20	1.66	0.24	78.60	1.39	0.21	HY
6LMB9X		91.20	13.66	1.94	87.20	9.99	1.53	HY
7CFCA2		73.00	-4.54	-0.64	70.40	-6.81	-1.04	HY
7V9ZYC		70.00	-7.54	-1.07	71.60	-5.61	-0.86	HY
C8PQA2		76.40	-1.14	-0.16	75.60	-1.61	-0.25	HY
EC8Z9P		71.00	-6.54	-0.93	70.80	-6.41	-0.98	HY
F72L4Y		68.20	-9.34	-1.33	68.00	-9.21	-1.41	HY
GRXNBY	*	97.60	20.06	2.85	94.40	17.19	2.62	HY
H7UXHK		75.80	-1.74	-0.25	76.00	-1.21	-0.19	HZ
JKLNLD		86.20	8.66	1.23	84.20	6.99	1.07	HY
L66PY7		77.60	0.06	0.01	74.80	-2.41	-0.37	HZ
P38U2T		79.20	1.66	0.24	79.80	2.59	0.39	XX
QL99F6		74.80	-2.74	-0.39	74.52	-2.70	-0.41	HY
UKBCHR		82.61	5.07	0.72	81.47	4.25	0.65	HY
V9VKW3		74.00	-3.54	-0.50	75.00	-2.21	-0.34	HY
VR7LKA		77.08	-0.46	-0.07	77.28	0.07	0.01	HY
VXT4PR	*	80.60	3.06	0.43	86.00	8.79	1.34	HZ
X98ZZU		74.24	-3.30	-0.47	72.84	-4.37	-0.67	KR
XECYBJ		70.80	-6.74	-0.96	73.20	-4.01	-0.61	HY
XM7GW3		81.20	3.66	0.52	83.40	6.19	0.94	HY
XVW8D3		79.80	2.26	0.32	79.80	2.59	0.39	HZ
Z9YF76		80.80	3.26	0.46	78.80	1.59	0.24	HY
ZV8Q9K		65.36	-12.18	-1.73	64.64	-12.57	-1.92	HZ

Sample SN55		Summary Statistics	Sample SN56	
Grand Means	77.540 1000th ft-lbs		77.214 1000th ft-lbs	
SD Btwn Labs	7.043 1000th ft-lbs		6.548 1000th ft-lbs	
Statistics based on 25 of 25 reporting participants				

**Notes for Analysis 348**

No Data Flags assigned for this analysis.

**Instrument Code List**

(HY) - Huygen Digitized Scott Internal Bond Tester  
 (KR) - Kumagai Riki Kogyo Internal Bond Tester

(HZ) - Huygen Internal Bond Tester with AccuPress  
 (XX) - Instrument make/model not specified by lab

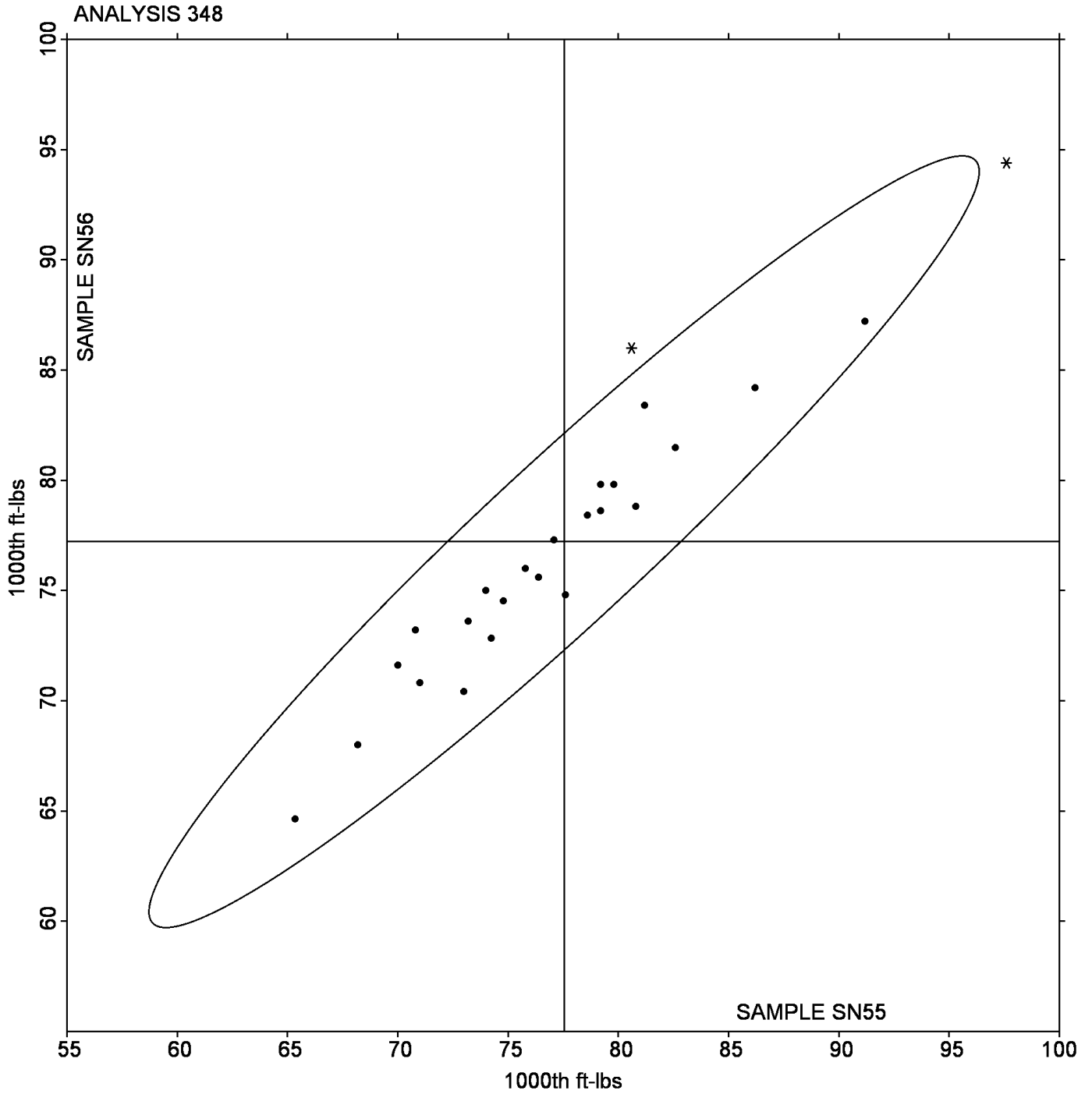
# TAPPI-CTS Interlaboratory Testing Program

## Analysis 348

### Internal Bond Strength - Modified Scott Mechanics

Grand Mean Sample **SN55** = 77.540 1000th ft-lbs

Grand Mean Sample **SN56** = 77.214 1000th ft-lbs



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

WebCode	Data Flag	Sample SP55			Sample SP56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6GUPGG		75.80	9.37	0.97	85.80	11.17	1.25	SC
7H2RHZ		84.80	18.37	1.90	71.60	-3.03	-0.34	XX
86URGL		60.40	-6.03	-0.62	72.00	-2.63	-0.30	TM
8VQGLH		60.47	-5.96	-0.62	68.80	-5.83	-0.65	SC
DV6DBR		56.82	-9.61	-0.99	64.79	-9.85	-1.10	TM
E76Q2W		59.48	-6.95	-0.72	69.66	-4.97	-0.56	XX
HJCRP4		82.40	15.97	1.65	93.00	18.37	2.06	SC
LX6T9Z		65.20	-1.23	-0.13	70.80	-3.83	-0.43	TM
NGA2LP		63.80	-2.63	-0.27	85.20	10.57	1.18	TM
NTJBWF		63.40	-3.03	-0.31	73.20	-1.43	-0.16	SC
QDHQGG		68.80	2.37	0.25	76.60	1.97	0.22	SC
ZLH8LY		55.77	-10.66	-1.10	64.14	-10.49	-1.18	TM

Summary Statistics				
	Sample SP55		Sample SP56	
Grand Means	66.428	1000th ft-lbs	74.633	1000th ft-lbs
SD Btwn Labs	9.675	1000th ft-lbs	8.924	1000th ft-lbs
Statistics based on 12 of 12 reporting participants				

**Notes for Analysis 349**

No Data Flags assigned for this analysis.

**Instrument Code List**

(SC) - Scott Internal Bond Tester (Manual)

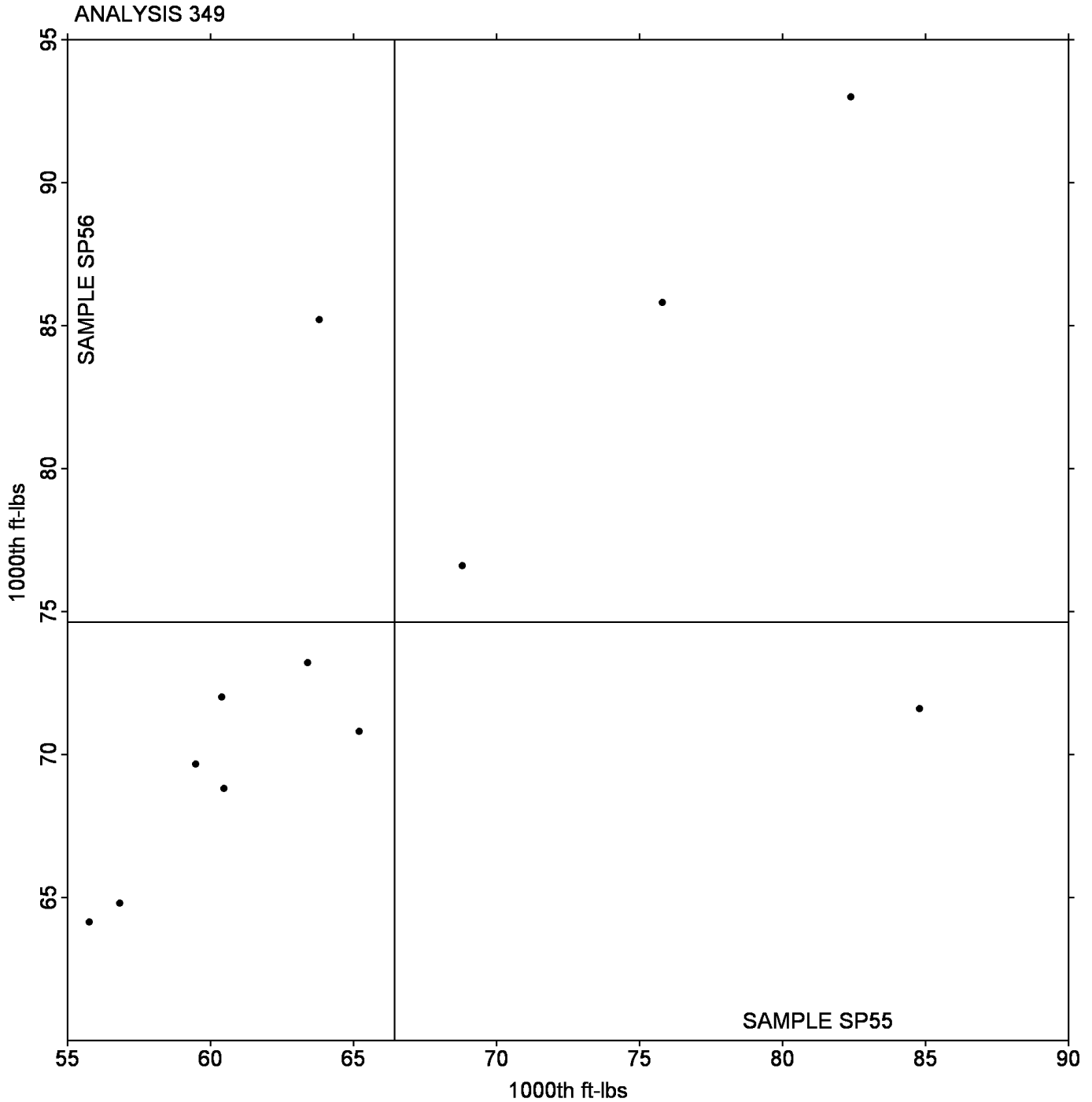
(TM) - TMI Monitor/Internal Bond Tester

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

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

Grand Mean Sample **SP55** = 66.428 1000th ft-lbs

Grand Mean Sample **SP56** = 74.633 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.