



## Paper & Paperboard Interlaboratory Testing Program

Summary Report #272S - September 2014

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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.

Labs from the U.S., as well as more than 80 countries, currently participate in CTS programs.

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

<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 Corporation**

James Bruner/Nicholas Riggs  
100 Quality Avenue  
New Albany, IN 47150-2272 USA  
Phone: (812) 948-2884  
FAX #: (812) 945-6847

### **Emmerson Apparatus**

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

### **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

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

WebCode	Data Flag	Sample SA11			Sample SA12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3DL2VV		22.03	1.28	0.50	29.98	0.79	0.24
6CFDKU		24.50	3.75	1.47	33.90	4.71	1.43
6NGFX Y		21.52	0.77	0.30	29.07	-0.12	-0.04
7RCE3W		16.96	-3.79	-1.48	25.66	-3.53	-1.07
8HHNVU		18.32	-2.43	-0.95	25.86	-3.33	-1.01
AFMYBP		21.51	0.76	0.30	30.55	1.36	0.41
ALVZWT	X	26.10	5.35	2.09	31.20	2.01	0.61
CUX X4L		20.12	-0.63	-0.25	26.69	-2.50	-0.76
GVYNNR		19.50	-1.25	-0.49	27.15	-2.04	-0.62
HRUV6J		22.22	1.47	0.58	31.46	2.27	0.69
HWYYKJ		25.38	4.63	1.81	36.55	7.36	2.23
L49HFE		20.68	-0.07	-0.03	29.35	0.16	0.05
N8Y2GA		22.80	2.06	0.80	31.17	1.98	0.60
PZZRUH		20.90	0.15	0.06	29.77	0.58	0.18
Q38ATD		21.11	0.36	0.14	27.19	-2.00	-0.61
Q6CX7H		21.20	0.46	0.18	29.62	0.43	0.13
R4WXNE		18.50	-2.25	-0.88	27.30	-1.89	-0.57
RF4JL4		20.30	-0.45	-0.17	28.40	-0.79	-0.24
TKDQGA		19.72	-1.03	-0.40	27.39	-1.80	-0.55
TPB3M9		22.20	1.45	0.57	30.80	1.61	0.49
UXHY86		19.83	-0.92	-0.36	27.43	-1.76	-0.53
WYGRNY		17.07	-3.68	-1.44	25.35	-3.84	-1.16
XDK3XZ		18.39	-2.36	-0.92	26.70	-2.49	-0.75
XF9C82		22.91	2.16	0.84	32.20	3.01	0.91
XH96Q6		15.20	-5.55	-2.17	23.40	-5.79	-1.76
Y3G8FV		25.83	5.08	1.99	36.78	7.60	2.30

		Summary Statistics	
	Sample SA11		Sample SA12
Grand Means	20.747 psi		29.188 psi
SD Btwn Labs	2.557 psi		3.296 psi
Statistics based on 25 of 26 reporting participants			

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

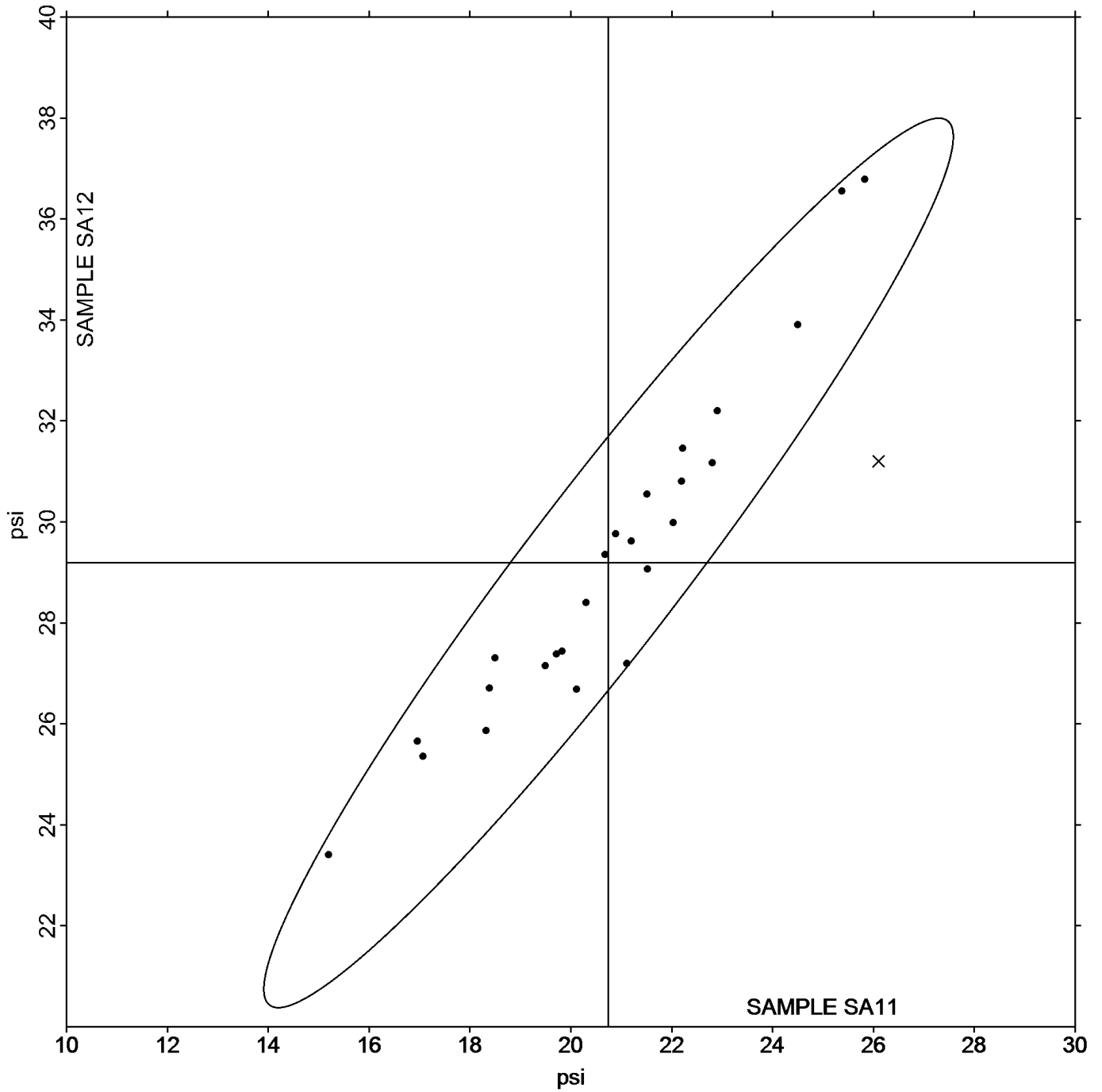
ALVZWT (X) - Inconsistent in testing between samples and within the determinations for Sample SA12.

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

Grand Mean Sample SA11 = 20.747 psi

Grand Mean Sample SA12 = 29.188 psi

ANALYSIS 305



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

WebCode	Data Flag	Sample SB11			Sample SB12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2VQKC2		51.30	3.73	1.09	76.60	2.99	0.60
4YY2UU		43.75	-3.82	-1.12	70.90	-2.71	-0.54
6HLA6U		49.90	2.33	0.68	74.20	0.59	0.12
6W724W		47.28	-0.30	-0.09	74.02	0.40	0.08
873YWP		48.30	0.73	0.21	72.30	-1.31	-0.26
8GPDUQ		47.30	-0.27	-0.08	71.05	-2.56	-0.51
8JVD4Y		40.50	-7.07	-2.06	64.40	-9.21	-1.84
9GJA4L		44.97	-2.60	-0.76	78.47	4.86	0.97
BEL3BJ		42.53	-5.05	-1.47	67.78	-5.84	-1.17
BYDKJU		47.30	-0.27	-0.08	71.20	-2.41	-0.48
DJBP2J	*	40.95	-6.62	-1.93	81.30	7.69	1.54
DPGEMX		53.02	5.45	1.59	79.97	6.36	1.27
DZMYCL		51.80	4.23	1.23	75.30	1.69	0.34
GX2ZHC		46.40	-1.18	-0.34	73.10	-0.51	-0.10
JFUR7G		50.10	2.53	0.74	76.80	3.19	0.64
MRC63A		50.43	2.86	0.83	75.10	1.49	0.30
N8Y2GA		51.22	3.65	1.07	76.74	3.13	0.63
Q6CX7H		43.35	-4.22	-1.23	71.66	-1.95	-0.39
QCREB3		48.93	1.36	0.40	77.73	4.12	0.82
RKYXC9		48.46	0.88	0.26	77.03	3.42	0.68
TAU88C		48.33	0.76	0.22	70.03	-3.58	-0.72
TKDQGA		51.13	3.56	1.04	79.70	6.09	1.22
TPBZX4	*	47.41	-0.16	-0.05	59.14	-14.47	-2.89
V37BBZ		44.15	-3.42	-1.00	68.26	-5.36	-1.07
ZB6KRZ		50.80	3.23	0.94	75.30	1.69	0.34
ZBXVET		47.29	-0.28	-0.08	75.86	2.25	0.45

	Sample SB11	Summary Statistics	Sample SB12
Grand Means	47.573 psi		73.613 psi
SD Btw Labs	3.427 psi		5.007 psi
Statistics based on 26 of 26 reporting participants			

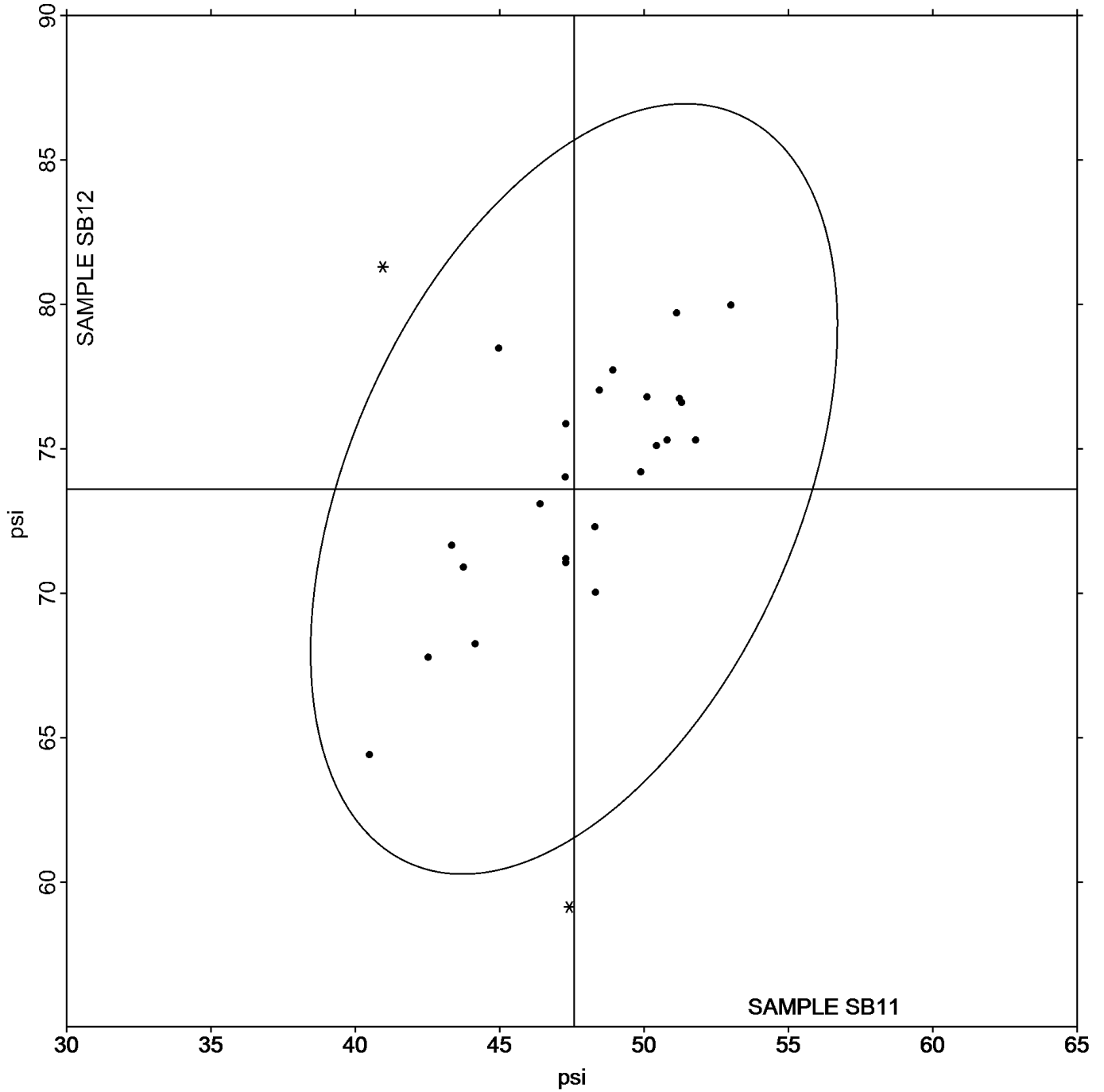


TAPPI-CTS Interlaboratory Testing Program  
Analysis 310  
Bursting Strength - Packaging Papers

Grand Mean Sample **SB11** = 47.573 psi

Grand Mean Sample **SB12** = 73.613 psi

**ANALYSIS 310**



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

WebCode	Data Flag	Sample SK11			Sample SK12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6NGFX		23.05	-1.90	-1.03	22.40	-1.16	-0.97
96MWMV		23.99	-0.96	-0.52	22.81	-0.75	-0.63
C2XJKV	X	35.19	10.24	5.57	30.79	7.22	6.04
G7G873		26.46	1.51	0.82	25.08	1.52	1.27
GQ7LMD		24.91	-0.04	-0.02	23.60	0.04	0.03
N8Y2GA		23.50	-1.44	-0.78	22.55	-1.02	-0.85
U3RH4C	X	36.44	11.50	6.25	31.64	8.08	6.76
ZBXVET		27.78	2.83	1.54	24.94	1.38	1.15

		Summary Statistics	
	Sample SK11		Sample SK12
Grand Means	24.948 Grams		23.563 Grams
SD Btwn Labs	1.840 Grams		1.196 Grams
Statistics based on 6 of 8 reporting participants			

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

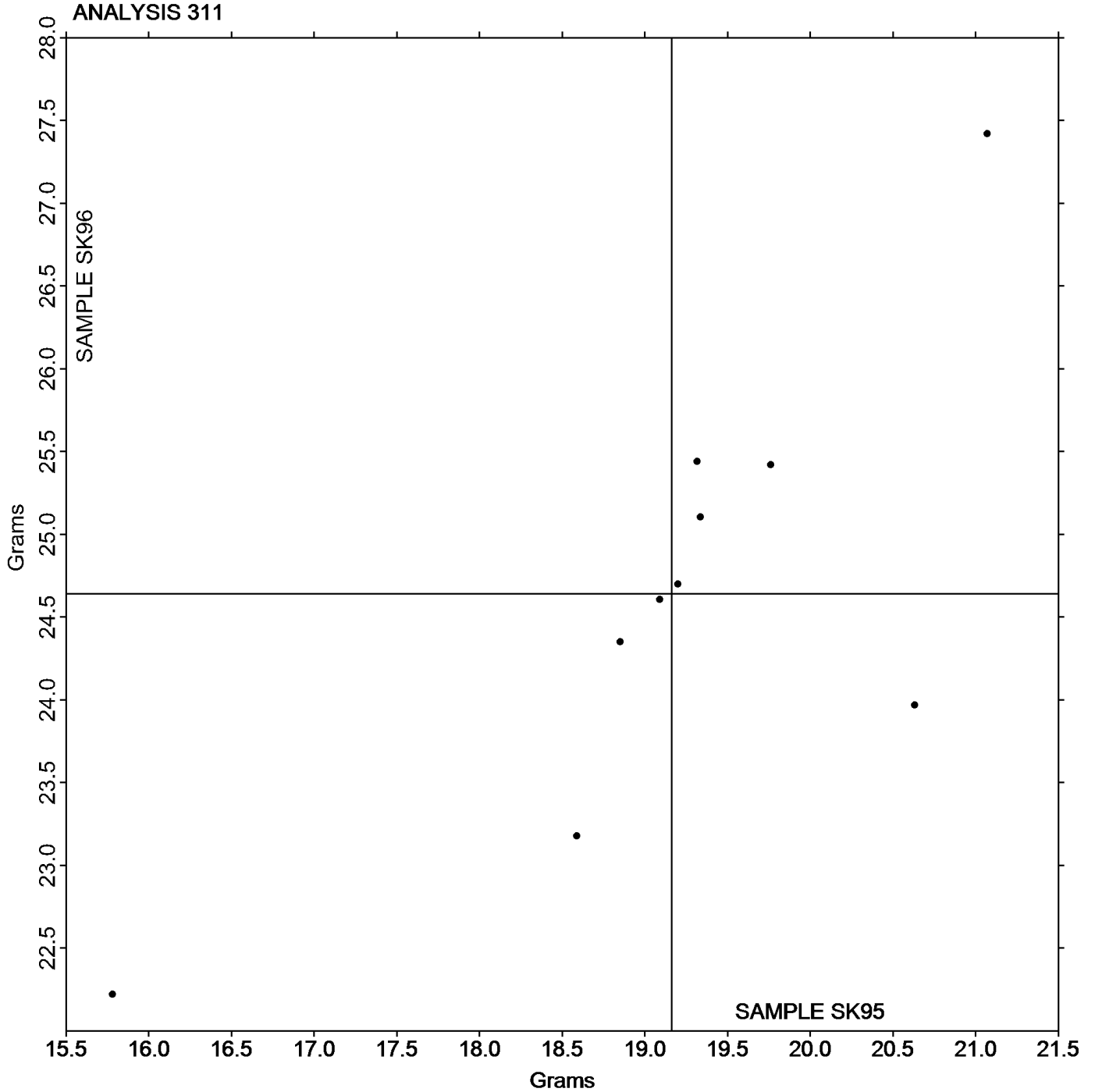
C2XJKV (X) - Data for both samples are high.

U3RH4C (X) - Data for both samples are high.

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

Grand Mean Sample **SK11** = 24.948 Grams

Grand Mean Sample **SK12** = 23.563 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 SC11			Sample SC12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3A6YDZ		69.60	4.22	1.32	54.20	4.93	1.98
3DL2VV		67.27	1.89	0.59	50.39	1.12	0.45
4949AU		59.22	-6.16	-1.93	45.10	-4.17	-1.68
4TBZGW		66.84	1.46	0.46	51.40	2.13	0.86
4YY2UU		66.68	1.30	0.41	50.39	1.12	0.45
64RZWQ	*	63.45	-1.93	-0.60	52.41	3.14	1.26
6CFDKU		61.48	-3.90	-1.22	45.80	-3.47	-1.40
6RZBY7		61.40	-3.98	-1.25	45.60	-3.67	-1.48
6W724W	X	67.76	2.38	0.75	101.73	52.45	21.12
7LNUWV		68.48	3.10	0.97	50.05	0.78	0.31
7RCE3W		61.10	-4.28	-1.34	47.10	-2.17	-0.87
8GPDUQ		69.55	4.17	1.31	49.52	0.25	0.10
8HHNVU		67.73	2.35	0.74	50.70	1.43	0.58
9FM3CT	X	87.82	22.44	7.03	66.75	17.48	7.04
9LVEEL		64.05	-1.33	-0.42	47.23	-2.04	-0.82
AFMYBP		65.91	0.53	0.17	48.46	-0.81	-0.33
ALVZWT		65.42	0.04	0.01	48.20	-1.07	-0.43
AX98NM	X	99.20	33.82	10.59	57.60	8.33	3.35
BRV288		66.00	0.62	0.19	49.10	-0.17	-0.07
BT8NZU		62.66	-2.72	-0.85	46.29	-2.98	-1.20
BWALBM	*	64.13	-1.25	-0.39	53.88	4.61	1.85
BYDKJU	X	68.80	3.42	1.07	52.80	3.53	1.42
CUXX4L		67.50	2.12	0.66	50.12	0.85	0.34
DA4GEH	*	55.60	-9.78	-3.06	44.70	-4.57	-1.84
DEHJQN		61.00	-4.38	-1.37	46.67	-2.60	-1.05
DY7G3E		65.16	-0.22	-0.07	50.24	0.97	0.39
FLUEJM		65.72	0.34	0.11	52.58	3.31	1.33
FTQEWU		66.14	0.76	0.24	48.88	-0.39	-0.16
GVYNNR		69.82	4.44	1.39	53.04	3.77	1.52
GX2ZHC		68.29	2.91	0.91	51.40	2.13	0.86
HRUV6J		63.33	-2.04	-0.64	45.90	-3.38	-1.36
J42U9J	X	99.57	34.19	10.70	95.72	46.45	18.70
JQXYF		69.20	3.82	1.20	50.40	1.13	0.45
L3YWWE		65.76	0.38	0.12	49.36	0.09	0.03
L49HFE	X	68.30	2.92	0.91	66.80	17.53	7.06
LAKUMM		65.90	0.52	0.16	50.50	1.23	0.49
LNFCDL		62.34	-3.04	-0.95	44.65	-4.62	-1.86
MRC63A		67.44	2.06	0.65	51.04	1.77	0.71
N8Y2GA		63.02	-2.36	-0.74	46.78	-2.49	-1.00
P9EE68		66.05	0.67	0.21	48.74	-0.53	-0.21
PZZRUH		70.24	4.86	1.52	49.89	0.62	0.25
Q6CX7H		62.44	-2.94	-0.92	48.47	-0.81	-0.32
RKYXC9		63.20	-2.18	-0.68	46.81	-2.47	-0.99

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

WebCode	Data Flag	Sample SC11			Sample SC12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
TKDQGA		66.10	0.72	0.23	49.60	0.33	0.13
TPB3M9		68.59	3.21	1.01	51.52	2.25	0.90
TPBZX4		66.13	0.75	0.24	47.83	-1.44	-0.58
U9XR76		63.32	-2.06	-0.64	47.88	-1.39	-0.56
UXHY86		70.43	5.05	1.58	52.95	3.68	1.48
V37BBZ		64.86	-0.51	-0.16	50.34	1.07	0.43
VH2NU3		64.99	-0.39	-0.12	47.47	-1.80	-0.72
WYGRNY		66.12	0.74	0.23	49.90	0.63	0.25
XDK3XZ		68.57	3.19	1.00	50.14	0.86	0.35
XF4WWL		67.14	1.76	0.55	48.66	-0.61	-0.25
XF9C82		70.04	4.66	1.46	54.96	5.69	2.29
Y3G8FV	X	66.23	0.85	0.27	56.42	7.15	2.88
YZ8794		59.26	-6.12	-1.91	48.42	-0.85	-0.34
ZY9EX3		64.20	-1.18	-0.37	48.00	-1.27	-0.51

Summary Statistics		
	Sample SC11	Sample SC12
Grand Means	65.377 Grams	49.273 Grams
SD Btwn Labs	3.194 Grams	2.484 Grams
Statistics based on 50 of 57 reporting participants		

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

6W724W (X) - Extreme data for Sample SC12.

9FM3CT (X) - Extreme data.

AX98NM (X) - Extreme data.

J42U9J (X) - Extreme data.

L49HFE (X) - Extreme data for Sample SC12.

Y3G8FV (X) - Data for Sample SC12 are high. Inconsistent in testing within the determinations for both samples.

**Analysis Notes:**

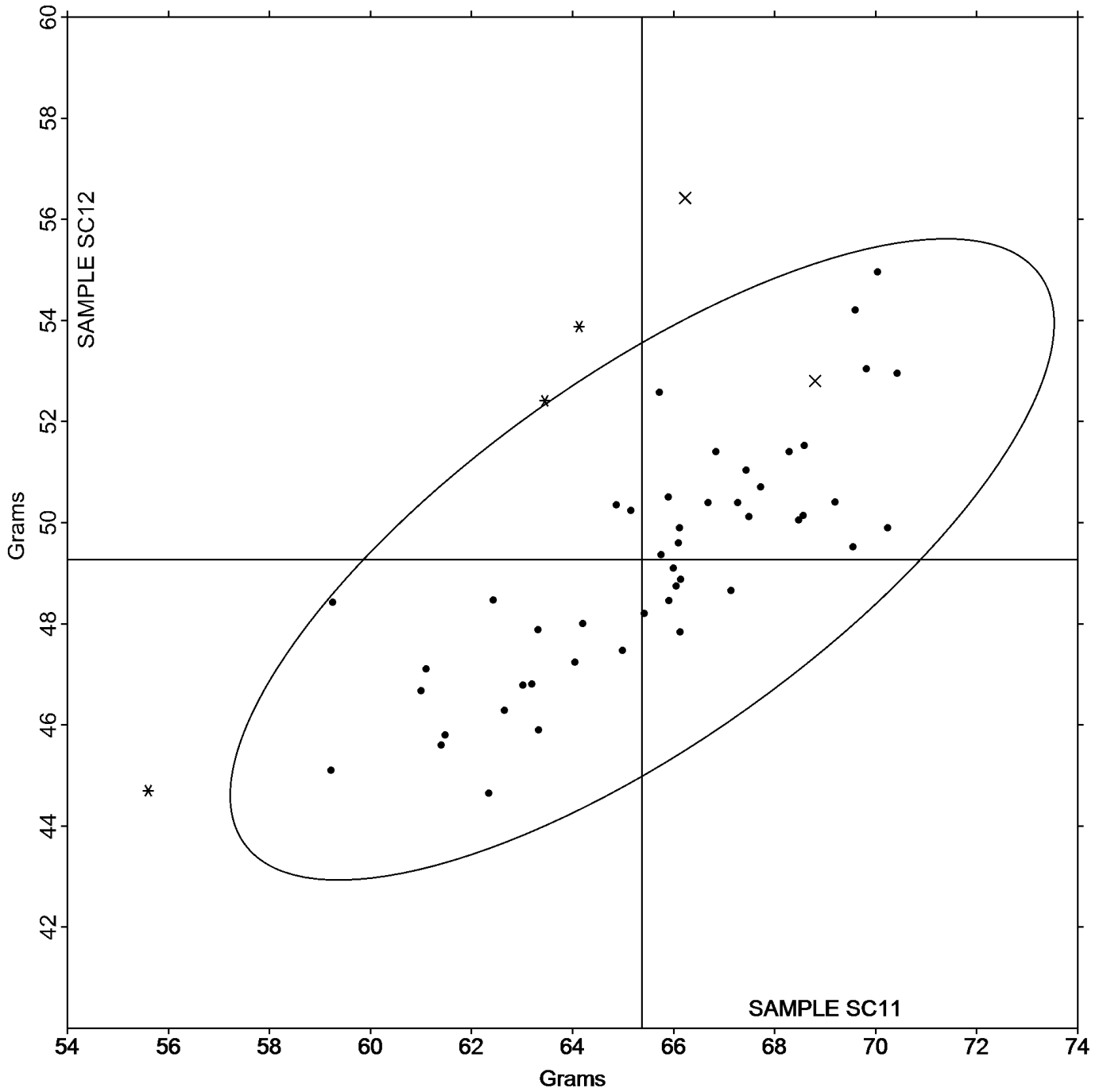
BYDKJU - Data appear to be off by a factor of .5; data converted by CTS (x2).

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

Grand Mean Sample **SC11** = 65.377 Grams

Grand Mean Sample **SC12** = 49.273 Grams

**ANALYSIS 312**



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 314

## Tearing Strength - Packaging Papers

WebCode	Data Flag	Sample SD11			Sample SD12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2VQKC2		194.0	11.5	1.04	153.5	0.8	0.09
3C8YCB		193.9	11.5	1.03	163.6	10.9	1.28
3JNJC3		178.8	-3.7	-0.33	146.8	-5.9	-0.70
3K7JFR		178.0	-4.5	-0.40	160.8	8.1	0.95
3PW6ZY	X	172.9	-9.6	-0.86	147.4	-5.3	-0.63
4DDHKW		176.4	-6.1	-0.55	157.8	5.0	0.59
6HLA6U		170.0	-12.5	-1.12	136.0	-16.7	-1.96
6J69XU		202.4	19.9	1.79	159.7	7.0	0.83
8GNXV8		198.8	16.3	1.47	161.2	8.5	1.00
8JVD4Y		187.0	4.6	0.41	154.6	1.8	0.22
96MWMV		168.6	-13.8	-1.25	144.7	-8.0	-0.94
9GJA4L	X	163.6	-18.8	-1.69	192.2	39.5	4.64
9JT3LZ		177.6	-4.9	-0.44	146.4	-6.3	-0.74
9LVG6P		185.9	3.5	0.31	160.2	7.5	0.88
A4UFUY		186.0	3.6	0.32	146.9	-5.8	-0.69
ALVZWT		178.0	-4.5	-0.40	151.0	-1.8	-0.21
BEL3BJ	X	228.1	45.6	4.11	188.0	35.3	4.15
BYDKJU	X	188.4	5.9	0.54	162.0	9.3	1.09
DJBP2J		188.0	5.5	0.50	156.8	4.1	0.48
DPGEMX		174.9	-7.6	-0.68	146.4	-6.3	-0.74
DZMYCL		180.1	-2.3	-0.21	152.7	-0.1	-0.01
EHXD6Z		179.7	-2.8	-0.25	154.5	1.8	0.21
ETYCPK		204.9	22.4	2.02	168.5	15.8	1.85
GBKDFE		183.9	1.5	0.13	158.4	5.7	0.67
HQK8UU		172.2	-10.3	-0.92	145.4	-7.3	-0.86
HWYYKJ		165.2	-17.3	-1.55	139.6	-13.1	-1.54
JFBKWD		173.4	-9.1	-0.82	154.2	1.5	0.17
KUCGTK		172.5	-10.0	-0.90	149.4	-3.3	-0.39
LT9RYD		177.2	-5.3	-0.48	140.1	-12.6	-1.49
N8Y2GA		175.7	-6.8	-0.61	148.3	-4.4	-0.52
NKDVFH		183.1	0.7	0.06	150.2	-2.5	-0.30
R4WXNE	*	210.8	28.3	2.55	167.2	14.5	1.70
TAU88C		174.1	-8.4	-0.75	150.3	-2.4	-0.28
VJE63A		201.6	19.1	1.72	167.0	14.3	1.68
WX884D		170.4	-12.1	-1.09	144.0	-8.7	-1.02
XH96Q6		175.2	-7.3	-0.65	141.2	-11.5	-1.35
YFFNZT		187.1	4.7	0.42	155.0	2.2	0.26
ZB6KRZ		176.8	-5.7	-0.51	146.8	-5.9	-0.70
ZBXVET		183.8	1.3	0.12	166.1	13.4	1.57

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

	Sample SD11	Summary Statistics	Sample SD12
Grand Means	182.45 Grams		152.72 Grams
SD Btwn Labs	11.11 Grams		8.51 Grams
Statistics based on 35 of 39 reporting participants			

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

9GJA4L (X) - Data for Sample SD12 are high.

BEL3BJ (X) - Data for both samples are high. Inconsistent within the determinations for Sample SD11.

**Analysis Notes:**

3PW6ZY - Data appear to be off by a factor of .25; data converted by CTS (x4).

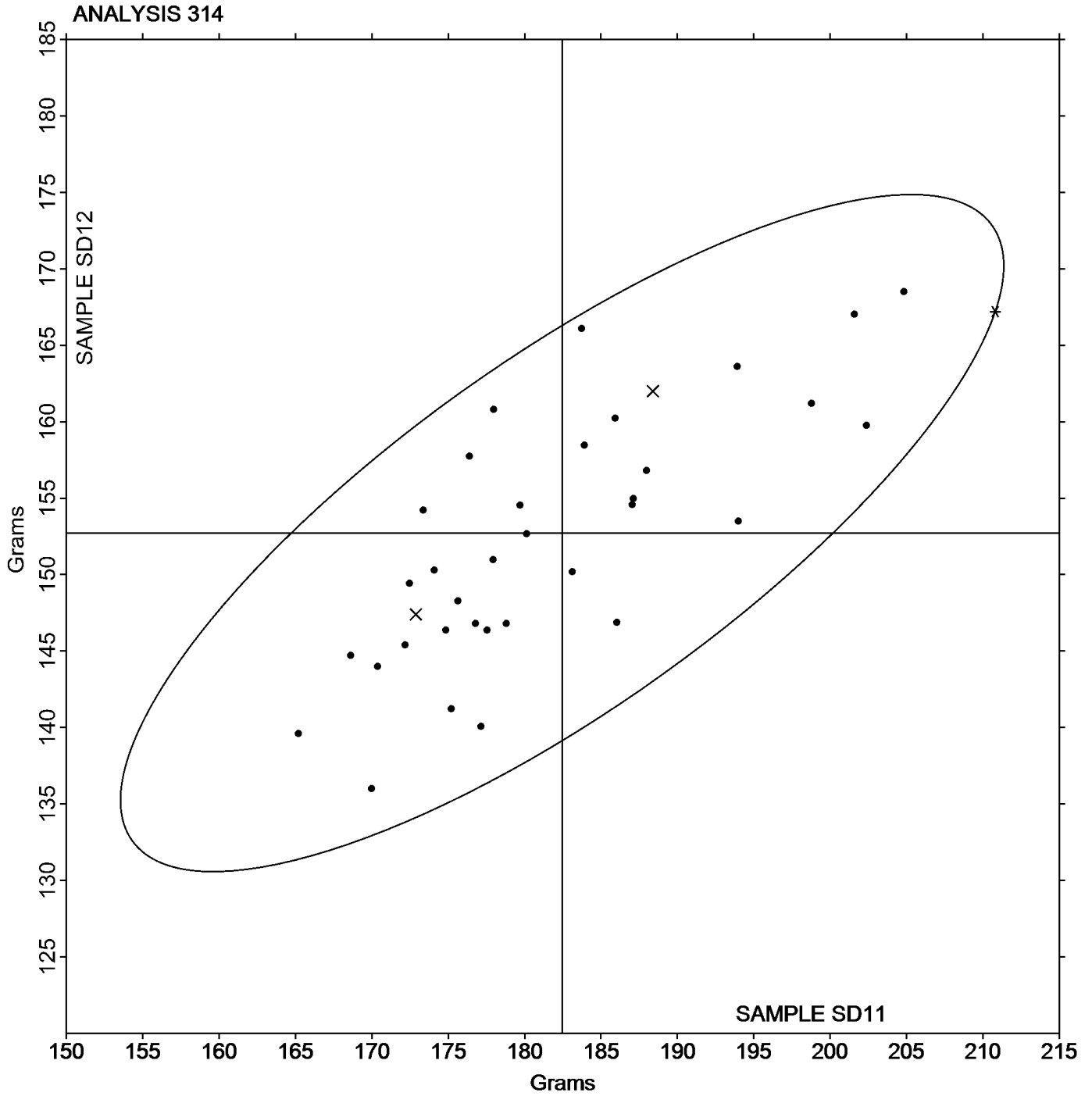
BYDKJU - Data appear to be off by a factor of .25; data converted by CTS (x4).



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

Grand Mean Sample **SD11** = 182.45 Grams

Grand Mean Sample **SD12** = 152.72 Grams



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

WebCode	Data Flag	Sample SR11			Sample SR12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3A3WDY		2.735	-0.180	-0.82	2.379	0.073	0.51
4TBZGW		2.672	-0.243	-1.11	2.228	-0.078	-0.55
6NGFX Y		3.039	0.125	0.57	2.225	-0.081	-0.57
873YWP		2.946	0.031	0.14	2.266	-0.041	-0.29
96MWMV		3.074	0.160	0.73	2.346	0.040	0.28
C2XJKV		2.686	-0.228	-1.04	2.225	-0.081	-0.57
GQ7LMD		2.933	0.018	0.08	2.350	0.044	0.31
JMC3JH		2.686	-0.229	-1.05	2.091	-0.216	-1.53
L49HFE		2.986	0.071	0.33	2.370	0.064	0.45
PY8DF7		3.481	0.566	2.59	2.690	0.384	2.72
Q6CX7H		2.882	-0.033	-0.15	2.197	-0.109	-0.77
U3RH4C		2.825	-0.089	-0.41	2.313	0.007	0.05
ZBXVET		2.944	0.030	0.14	2.300	-0.006	-0.04

Summary Statistics

**Sample SR11**

**Sample SR12**

Grand Means            2.9146 kN/m  
SD Btwn Labs         0.2187 kN/m

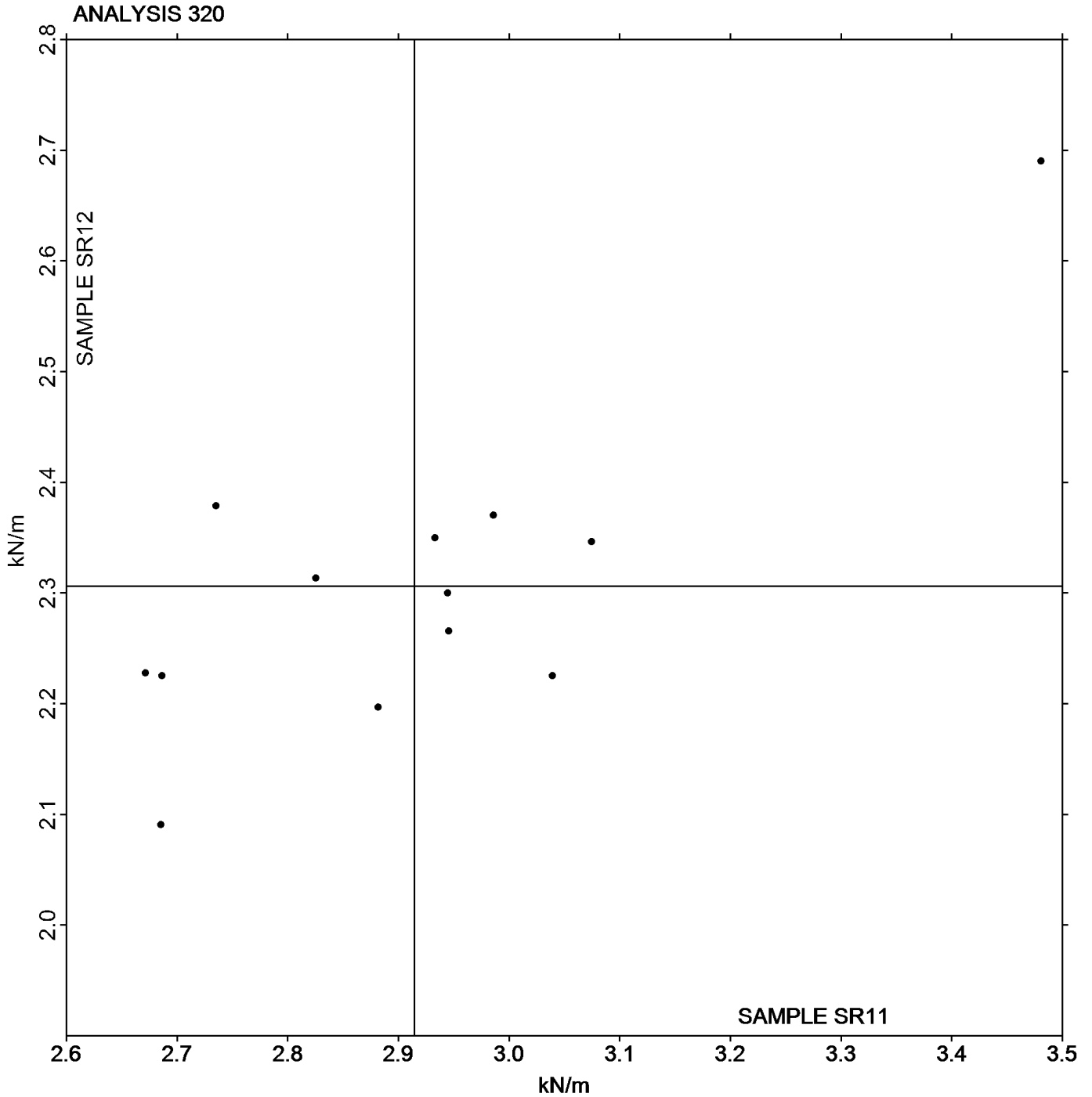
2.3062 kN/m  
0.1413 kN/m

Statistics based on 13 of 13 reporting participants

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

Grand Mean Sample **SR11** = 2.9146 kN/m

Grand Mean Sample **SR12** = 2.3062 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 SR11			Sample SR12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3A3WDY		20.40	-2.59	-0.80	17.28	1.79	0.95
4TBZGW		21.28	-1.71	-0.53	15.87	0.37	0.20
6NGFX Y		26.81	3.82	1.19	15.77	0.27	0.15
873YWP		21.46	-1.53	-0.47	12.77	-2.72	-1.45
96MWMV		22.87	-0.12	-0.04	14.47	-1.02	-0.55
C2XJKV		17.39	-5.60	-1.74	12.94	-2.55	-1.36
GQ7LMD		24.69	1.69	0.53	16.34	0.84	0.45
JMC3JH		24.27	1.28	0.40	15.94	0.44	0.24
L49HFE		25.85	2.86	0.89	17.48	1.99	1.06
PY8DF7		29.47	6.48	2.01	19.04	3.55	1.89
Q6CX7H		21.73	-1.26	-0.39	13.48	-2.01	-1.07
U3RH4C		19.79	-3.20	-0.99	14.08	-1.42	-0.76
ZBXVET		22.88	-0.11	-0.03	15.97	0.47	0.25

		Summary Statistics	
	Sample SR11		Sample SR12
Grand Means	22.991 Joules/sq m		15.495 Joules/sq m
SD Btwn Labs	3.219 Joules/sq m		1.874 Joules/sq m
Statistics based on 13 of 13 reporting participants			

# TAPPI-CTS Interlaboratory Testing Program

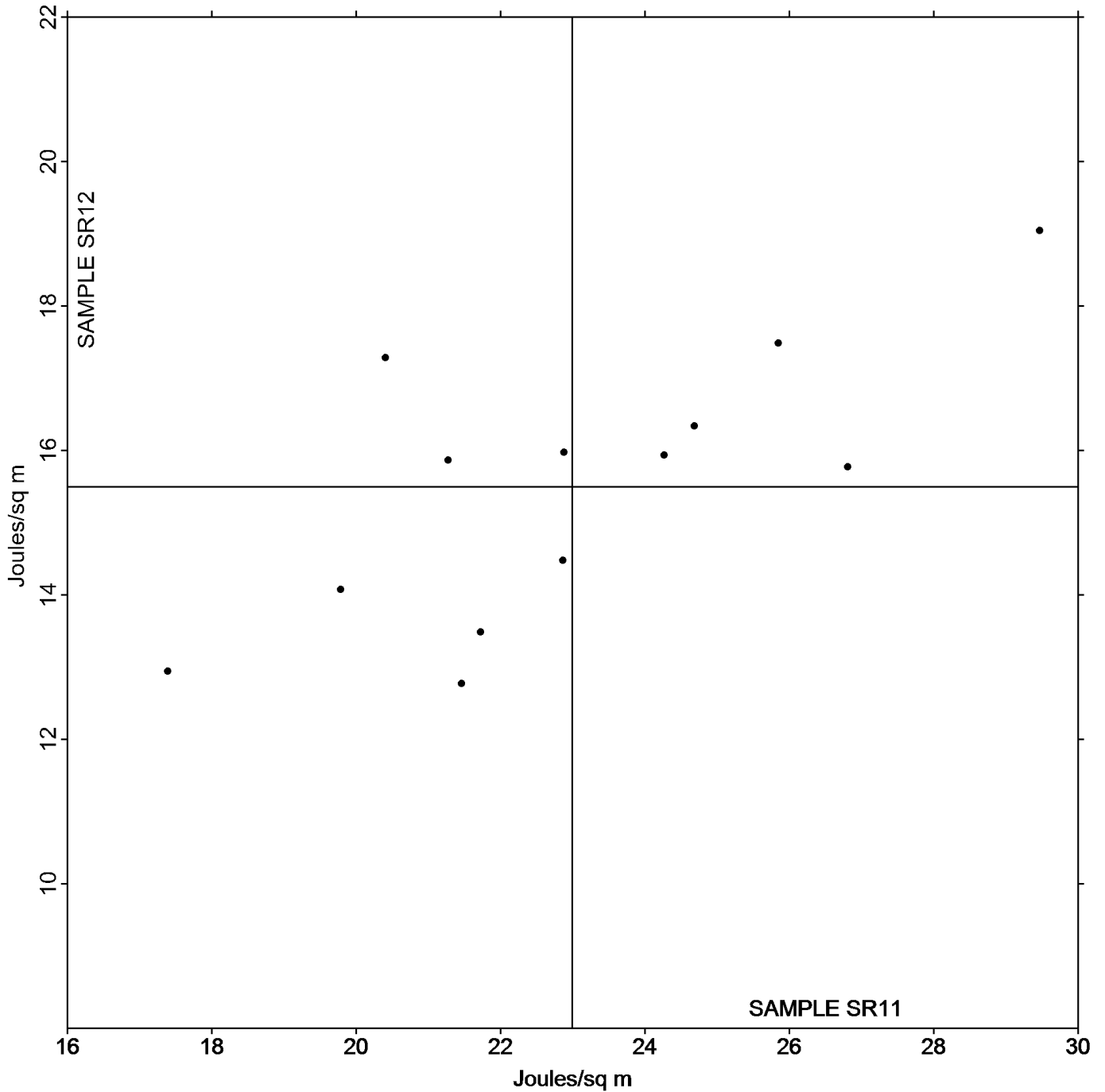
## Analysis 321

### Tensile Energy Absorption - Newsprint

Grand Mean Sample **SR11** = 22.991 Joules/sq m

Grand Mean Sample **SR12** = 15.495 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

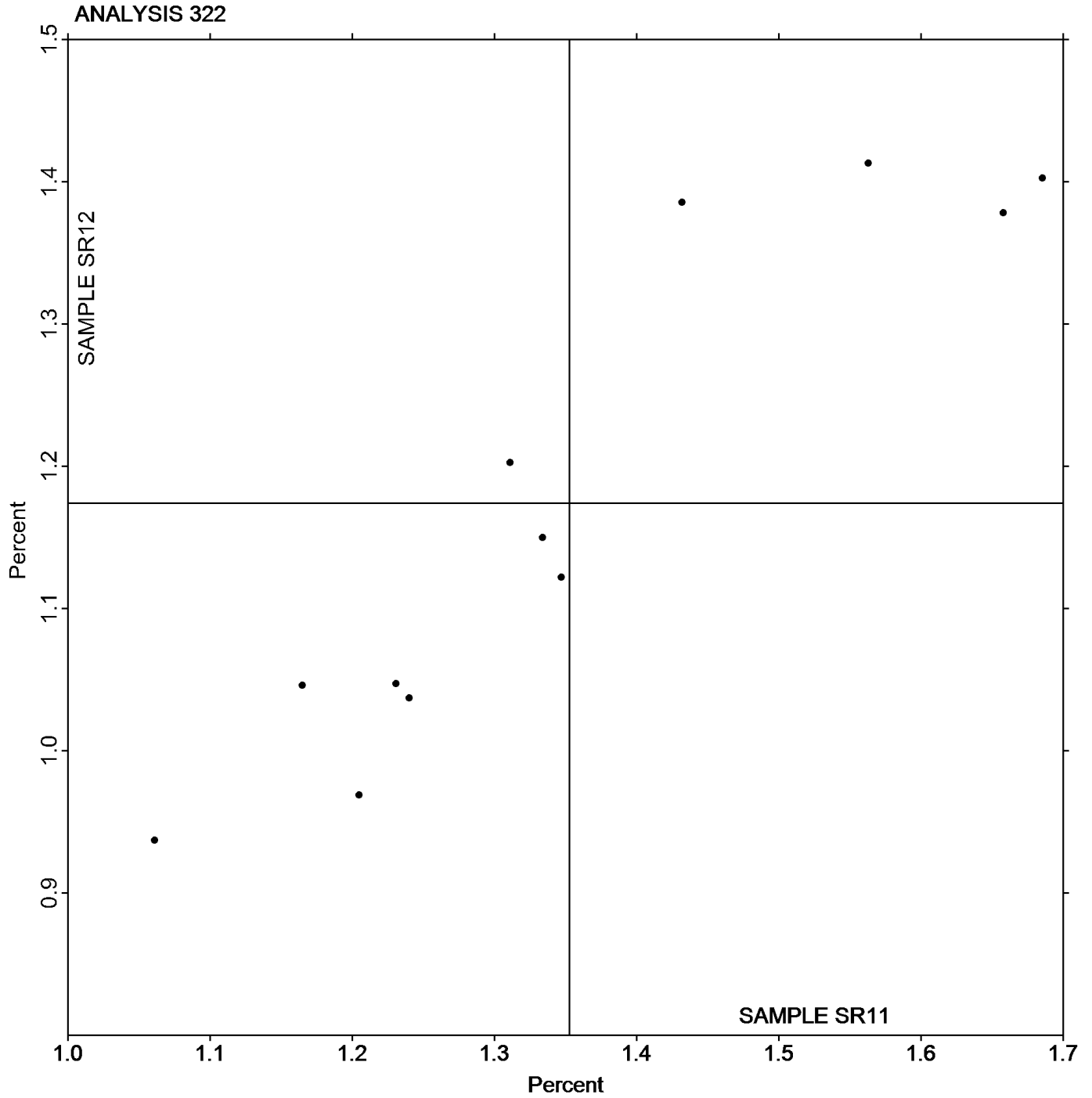
WebCode	Data Flag	Sample SR11			Sample SR12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3A3WDY		1.432	0.079	0.40	1.385	0.211	1.19
4TBZGW		1.311	-0.042	-0.21	1.203	0.029	0.16
6NGFX Y		1.685	0.333	1.69	1.402	0.228	1.28
873YWP		1.205	-0.148	-0.75	0.969	-0.205	-1.15
96MWMV		1.231	-0.122	-0.62	1.047	-0.127	-0.71
GQ7LMD		1.334	-0.019	-0.09	1.150	-0.024	-0.14
JMC3JH		1.563	0.210	1.07	1.413	0.239	1.34
L49HFE		1.658	0.305	1.55	1.378	0.204	1.14
PY8DF7		1.347	-0.006	-0.03	1.122	-0.052	-0.29
Q6CX7H		1.240	-0.113	-0.57	1.037	-0.137	-0.77
U3RH4C		1.165	-0.188	-0.95	1.046	-0.128	-0.72
ZBXVET		1.061	-0.292	-1.48	0.937	-0.237	-1.33

		Summary Statistics	
	Sample SR11		Sample SR12
Grand Means	1.3527 Percent		1.1741 Percent
SD Btwn Labs	0.1968 Percent		0.1782 Percent
Statistics based on 12 of 12 reporting participants			

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

Grand Mean Sample **SR11** = 1.3527 Percent

Grand Mean Sample **SR12** = 1.1741 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 SF11			Sample SF12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3BDR3X		3.994	0.055	0.24	4.777	0.003	0.01	LH
3DL2VV		4.028	0.089	0.39	4.717	-0.057	-0.24	LH
4949AU		4.351	0.412	1.83	5.158	0.384	1.61	LH
64RZWQ	*	3.587	-0.353	-1.57	4.161	-0.613	-2.56	TP
6CFDKU		4.096	0.157	0.70	4.970	0.196	0.82	TO
6ZRTDE		4.367	0.427	1.90	5.241	0.466	1.95	TB
7LNUWV		3.833	-0.106	-0.47	4.640	-0.134	-0.56	LI
8GPDUQ		3.589	-0.350	-1.56	4.370	-0.405	-1.69	TP
8HHNVU		4.091	0.152	0.67	4.878	0.104	0.43	LX
AFMYBP		4.443	0.504	2.24	5.134	0.360	1.50	LH
AWP6PR		4.063	0.124	0.55	4.925	0.150	0.63	TP
BRV288		3.956	0.017	0.08	4.720	-0.055	-0.23	TI
BT8NZU		3.955	0.016	0.07	4.766	-0.008	-0.03	XX
CUXX4L		3.749	-0.190	-0.84	4.692	-0.082	-0.34	LI
CZ7YPP		3.742	-0.197	-0.87	4.549	-0.226	-0.94	RE
DA4GEH		3.798	-0.141	-0.62	4.740	-0.034	-0.14	TB
DEHJQN		4.081	0.142	0.63	5.150	0.376	1.57	TJ
DY7G3E		3.787	-0.152	-0.68	4.667	-0.108	-0.45	LH
FLUEJM		3.784	-0.155	-0.69	4.773	-0.001	0.00	LH
FTQEWU		3.787	-0.152	-0.67	4.617	-0.157	-0.66	BU
GVYNNR		3.624	-0.315	-1.40	4.413	-0.361	-1.51	ID
GX2ZHC		4.157	0.218	0.97	4.987	0.213	0.89	LI
HRUV6J		3.717	-0.222	-0.99	4.383	-0.391	-1.64	LH
J42U9J		4.078	0.139	0.62	4.895	0.121	0.51	TP
JQQXYF		3.981	0.042	0.19	4.935	0.161	0.67	LH
L3YWWE		3.976	0.037	0.16	4.874	0.100	0.42	LE
LAKUMM	*	3.661	-0.278	-1.23	4.923	0.149	0.62	TC
LNFCDL		4.054	0.115	0.51	4.805	0.031	0.13	LF
LPRCKE		3.695	-0.244	-1.08	4.837	0.063	0.26	LA
N8Y2GA		4.182	0.243	1.08	5.034	0.260	1.09	LH
NCTECC		3.744	-0.195	-0.86	4.675	-0.099	-0.42	XX
P9EE68		3.637	-0.303	-1.34	4.250	-0.524	-2.19	IM
PZZRUH		4.125	0.186	0.83	4.705	-0.069	-0.29	LH
Q6CX7H		3.642	-0.297	-1.32	4.514	-0.260	-1.09	LH
QCREB3		3.843	-0.096	-0.43	4.723	-0.051	-0.21	TB
RKYXC9		3.969	0.030	0.13	4.647	-0.127	-0.53	XX
TAU88C		3.919	-0.021	-0.09	4.777	0.003	0.01	IM
TKDQGA		3.848	-0.091	-0.40	4.681	-0.093	-0.39	DL
TPB3M9		4.123	0.183	0.81	4.746	-0.028	-0.12	LH
U9XR76		4.290	0.351	1.56	5.156	0.382	1.60	TB
UXHY86		3.531	-0.408	-1.81	4.434	-0.340	-1.42	IM
V37BBZ		3.990	0.051	0.23	4.876	0.101	0.42	LH
VH2NU3		3.925	-0.014	-0.06	4.762	-0.012	-0.05	SP



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

WebCode	Data Flag	Sample SF11			Sample SF12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
VTKZ8Z		4.226	0.287	1.27	5.182	0.408	1.71	TJ
WYGRNY		4.033	0.094	0.42	4.873	0.099	0.41	TO
XDK3XZ		4.164	0.224	1.00	4.945	0.171	0.71	LH
XF4WWL		4.090	0.151	0.67	4.967	0.192	0.80	MR
XF9C82	*	4.210	0.271	1.20	4.685	-0.090	-0.37	TJ
Y3G8FV		3.666	-0.274	-1.21	4.564	-0.210	-0.88	LA
YZ8794		3.681	-0.258	-1.15	4.616	-0.159	-0.66	TF
ZY9EX3		4.035	0.096	0.43	4.981	0.207	0.87	TO

Sample SF11		Summary Statistics	Sample SF12	
Grand Means	3.9392 kN/m		4.7743 kN/m	
SD Btwn Labs	0.2253 kN/m		0.2392 kN/m	
Statistics based on 51 of 51 reporting participants				

**Analysis Notes:**

YZ8794 - Data appear to be reported as kg/15mm, not lb/15mm as indicated on datasheet. Units corrected by CTS.

**Instrument Code List**

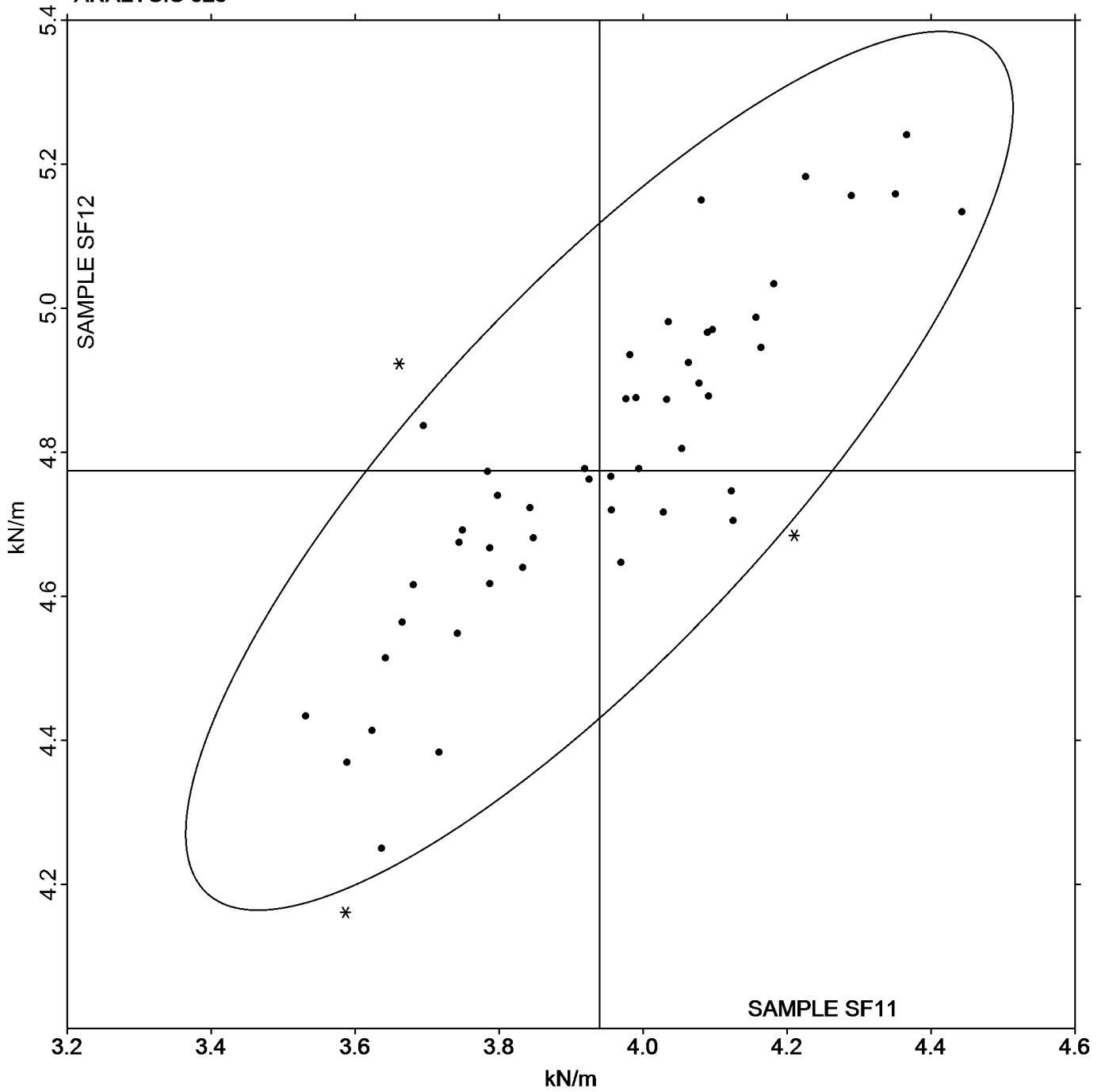
- |   |  |
|---|--|
| (BU) - Buchel   | (DL) - EMIC DL500 Universal Testing Machines       |
| (ID) - Instron 4201/4202                              | (IM) - Instron 5500 Series                         |
| (LA) - L & W Tensile - Autoline 300                   | (LE) - L & W Tensile Tester 066                    |
| (LF) - L & W Tensile/Fracture Toughness Tester SE 064 | (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                         | (RE) - Regmed                                      |
| (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)          |
| (XX) - Instrument make/model not specified by lab     |  |

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

Grand Mean Sample SF11 = 3.9392 kN/m

Grand Mean Sample SF12 = 4.7743 kN/m

ANALYSIS 325



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 327

## Tensile Energy Absorption - Printing Papers

WebCode	Data Flag	Sample SF11			Sample SF12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3BDR3X		33.00	3.26	0.86	68.87	2.33	0.32	LH
3DL2VV		27.42	-2.32	-0.62	62.19	-4.35	-0.60	LH
4949AU		35.30	5.56	1.47	69.32	2.78	0.39	LH
6CFDKU	X	25.03	-4.71	-1.25	40.72	-25.82	-3.58	TO
6ZRTDE		35.25	5.51	1.46	73.50	6.96	0.96	TB
7LNUWV		30.32	0.58	0.15	63.10	-3.44	-0.48	LI
8GPDUQ		20.84	-8.90	-2.36	48.45	-18.09	-2.51	TP
8HHNVU		32.92	3.18	0.84	72.49	5.96	0.83	LX
AFMYBP		30.84	1.10	0.29	60.96	-5.58	-0.77	LH
BRV288		32.25	2.51	0.66	73.85	7.31	1.01	TI
CUXX4L		27.38	-2.36	-0.63	68.65	2.11	0.29	LI
CZ7YPP		28.21	-1.54	-0.41	66.44	-0.10	-0.01	RE
DY7G3E		28.05	-1.69	-0.45	64.66	-1.87	-0.26	LH
FLUEJM		28.28	-1.46	-0.39	65.68	-0.86	-0.12	LH
FTQEWU		29.71	-0.03	-0.01	68.08	1.54	0.21	BU
GVYNNR		29.58	-0.16	-0.04	67.04	0.50	0.07	ID
GX2ZHC		31.74	2.00	0.53	72.80	6.26	0.87	LI
HRUV6J		30.64	0.90	0.24	64.73	-1.81	-0.25	LH
J42U9J		21.96	-7.78	-2.06	53.41	-13.12	-1.82	TP
LNFCDL		23.70	-6.04	-1.60	53.22	-13.31	-1.84	LW
N8Y2GA		29.58	-0.16	-0.04	65.97	-0.57	-0.08	LH
P9EE68		30.26	0.52	0.14	62.36	-4.18	-0.58	IM
PZZRUH		33.10	3.36	0.89	63.69	-2.85	-0.39	LH
Q6CX7H		24.18	-5.56	-1.47	60.86	-5.68	-0.79	LH
QCREB3	X	36.95	7.21	1.91	84.85	18.31	2.54	TB
RKYXC9		31.88	2.14	0.57	65.34	-1.20	-0.17	XX
TAU88C		28.39	-1.36	-0.36	70.33	3.79	0.52	IM
TKDQGA		31.03	1.29	0.34	73.10	6.56	0.91	DL
TPB3M9		31.01	1.27	0.34	63.07	-3.46	-0.48	LH
U9XR76		33.88	4.13	1.09	77.20	10.66	1.48	TB
UXHY86		30.95	1.21	0.32	74.83	8.29	1.15	IM
V37BBZ		32.97	3.23	0.86	73.87	7.33	1.02	LH
VTKZ8Z	X	33.83	4.09	1.08	72.17	5.63	0.78	TJ
WYGRNY		34.54	4.79	1.27	80.42	13.88	1.92	TF
XDK3XZ		32.87	3.13	0.83	73.64	7.10	0.98	LH
XF4WWL	X	1.21	-28.53	-7.55	2.04	-64.50	-8.93	MR
Y3G8FV		21.89	-7.85	-2.08	53.55	-12.99	-1.80	LA
ZY9EX3		27.28	-2.46	-0.65	66.61	0.07	0.01	TO

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

	Sample SF11	Summary Statistics	Sample SF12
Grand Means	29.741 Joules/sq m		66.538 Joules/sq m
SD Btwn Labs	3.777 Joules/sq m		7.219 Joules/sq m
Statistics based on 34 of 38 reporting participants			

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

6CFDKU (X) - Data for Sample SF12 are low.

XF4WWL (X) - Extreme data.

**Analysis Notes:**

QCREB3 - Data appear to be off by a factor of 10; data converted by CTS (x.1).

VTKZ8Z - Data appear to be off by a factor of 10; data converted by CTS (x.1).

**Instrument Code List**

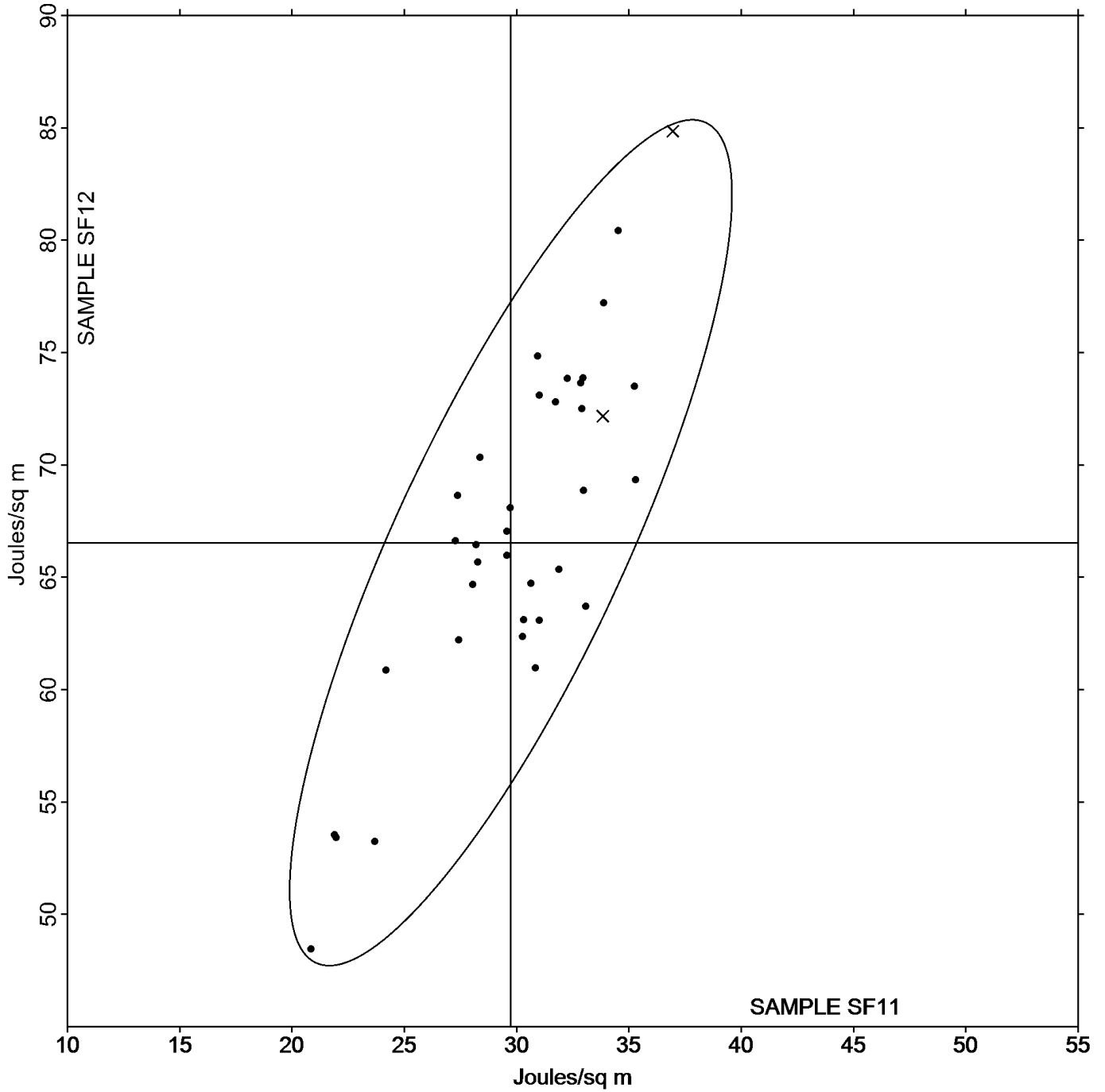
(BU) - Buchel	(DL) - EMIC DL500 Universal Testing Machines
(ID) - Instron 4201	(IM) - Instron 5500 Series
(LA) - L & W Tensile - Autoline 300	(LH) - L & W Alwetron TH1 (Horizontal) SE 060
(LI) - L & W Tensile Tester SE 062	(LW) - L & W Tensile Tester SE 064
(LX) - L & W (model not specified)	(MR) - MTS 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)	(XX) - Instrument make/model not specified by lab

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

Grand Mean Sample SF11 = 29.741 Joules/sq m

Grand Mean Sample SF12 = 66.538 Joules/sq m

ANALYSIS 327



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 328

## Elongation to Break - Printing Papers

WebCode	Data Flag	Sample SF11			Sample SF12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3BDR3X		1.308	0.084	0.77	2.156	0.022	0.11	LH
3DL2VV		1.008	-0.216	-1.96	1.860	-0.274	-1.39	LH
4949AU		1.264	0.040	0.37	1.991	-0.143	-0.73	LH
6CFDKU	X	2.500	1.276	11.60	5.700	3.566	18.18	TO
6ZRTDE	X	39.555	38.331	348.26	58.292	56.158	286.30	TB
7LNUWV		1.233	0.009	0.08	2.028	-0.106	-0.54	LI
8GPDUQ		1.244	0.020	0.18	2.292	0.158	0.81	TP
8HHNVU		1.257	0.033	0.30	2.200	0.066	0.34	LX
AFMYBP		1.137	-0.087	-0.79	1.786	-0.348	-1.77	LH
BRV288		1.238	0.014	0.13	2.271	0.137	0.70	TI
CUXX4L		1.149	-0.075	-0.68	2.170	0.036	0.19	LI
CZ7YPP		1.333	0.109	0.99	2.246	0.112	0.57	RE
DA4GEH		1.240	0.016	0.15	2.130	-0.004	-0.02	TF
DEHJQN	X	1.560	0.336	3.05	2.160	0.026	0.13	TJ
DY7G3E		1.157	-0.067	-0.61	2.040	-0.094	-0.48	LH
FLUEJM		1.122	-0.102	-0.92	1.992	-0.142	-0.72	LH
FTQEWU		1.339	0.115	1.05	2.264	0.130	0.66	BU
GVYNNR		1.269	0.046	0.41	2.247	0.113	0.58	ID
GX2ZHC		1.202	-0.022	-0.20	2.159	0.025	0.13	LI
HRUV6J		1.300	0.076	0.69	2.226	0.092	0.47	LH
J42U9J	X	0.054	-1.170	-10.63	0.089	-2.044	-10.42	TP
LNFCDL		0.988	-0.236	-2.14	1.680	-0.454	-2.31	LX
N8Y2GA		1.131	-0.093	-0.84	1.951	-0.183	-0.93	LH
P9EE68		1.399	0.175	1.59	2.268	0.134	0.68	XX
PZZRUH		1.254	0.030	0.27	2.000	-0.134	-0.68	LH
Q6CX7H		1.063	-0.161	-1.46	2.000	-0.134	-0.68	LH
QCREB3		1.293	0.069	0.63	2.250	0.116	0.59	TB
RKYXC9		1.300	0.076	0.69	2.154	0.020	0.10	XX
TAU88C		1.168	-0.056	-0.51	2.190	0.056	0.29	IM
TKDQGA		1.452	0.228	2.07	2.521	0.387	1.98	DL
TPB3M9		1.190	-0.034	-0.31	1.970	-0.164	-0.83	LH
U9XR76		1.253	0.029	0.27	2.230	0.097	0.49	TB
UXHY86		1.378	0.154	1.40	2.517	0.383	1.95	IM
V37BBZ		1.252	0.028	0.26	2.216	0.082	0.42	LH
VTKZ8Z		1.114	-0.110	-1.00	1.788	-0.346	-1.76	TJ
WYGRNY		1.369	0.146	1.32	2.433	0.299	1.53	TO
XDK3XZ		1.225	0.001	0.01	2.178	0.044	0.23	LH
XF4WWL	X	0.172	-1.052	-9.56	0.384	-1.750	-8.92	MR
Y3G8FV		1.139	-0.085	-0.77	2.083	-0.051	-0.26	LA
YZ8794		1.280	0.056	0.51	2.410	0.276	1.41	TF
ZY9EX3		1.006	-0.218	-1.98	1.912	-0.222	-1.13	TG

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

	Sample SF11	Summary Statistics	Sample SF12
Grand Means	1.2238 Percent		2.1336 Percent
SD Btwn Labs	0.1101 Percent		0.1962 Percent
Statistics based on 36 of 41 reporting participants			

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

6CFDKU (X) - Extreme data.

6ZRTDE (X) - Extreme data.

DEHJQN (X) - Data for Sample SF11 are high.

J42U9J (X) - Extreme data.

XF4WWL (X) - Extreme data.

**Instrument Code List**

(BU) - Buchel

(ID) - Instron 4201

(LA) - L & W Tensile - Autoline 300

(LI) - L & W Tensile Tester SE 062

(MR) - MTS Alliance RT series

(TB) - Thwing-Albert EJA/1000

(TG) - Thwing-Albert QC

(TJ) - Thwing-Albert QC II-XS

(TP) - TMI Monitor/Tensile 100 (84-21-01)

(DL) - EMIC DL500 Universal Testing Machines

(IM) - Instron 5500

(LH) - L & W Alwetron TH1 (Horizontal) SE 060

(LX) - L & W (model not specified)

(RE) - Regmed

(TF) - Thwing-Albert EJA Vantage-1

(TI) - Thwing-Albert QC II

(TO) - Thwing-Albert QC-1000

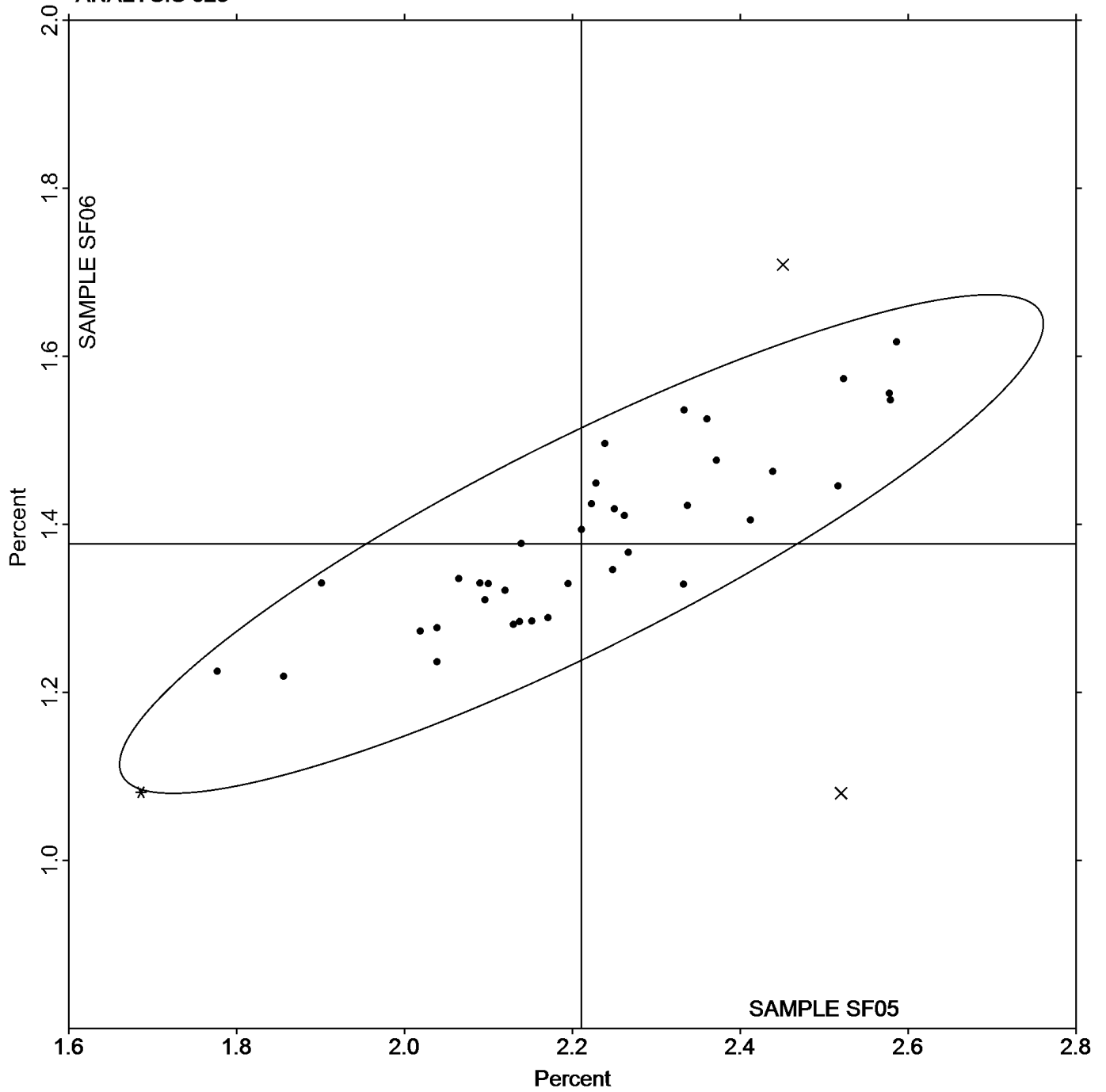
(XX) - Instrument make/model not specified by lab

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

Grand Mean Sample SF11 = 1.2238 Percent

Grand Mean Sample SF12 = 2.1336 Percent

ANALYSIS 328





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

WebCode	Data Flag	Sample SE11			Sample SE12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3C8YCB		8.096	-0.684	-1.40	10.56	-1.03	-1.43	TK
3JNJC3		8.238	-0.543	-1.11	11.37	-0.22	-0.30	SP
3K7JFR		8.182	-0.599	-1.23	11.32	-0.27	-0.37	LH
4DDHKW		9.606	0.826	1.69	12.59	1.00	1.40	TP
6HLA6U		9.114	0.333	0.68	11.71	0.12	0.17	IK
6W724W		9.072	0.291	0.60	11.69	0.10	0.14	LE
8GNXV8		7.797	-0.983	-2.02	10.48	-1.10	-1.54	LW
8GPDUQ		8.623	-0.157	-0.32	11.38	-0.21	-0.29	TO
8JVD4Y		7.950	-0.831	-1.70	10.73	-0.85	-1.19	TK
9JT3LZ		8.353	-0.428	-0.88	11.35	-0.24	-0.33	SA
9LVG6P		9.141	0.360	0.74	12.23	0.65	0.90	TO
A4UFUY		8.538	-0.243	-0.50	11.20	-0.39	-0.54	TB
ALVZWT		8.427	-0.354	-0.73	11.48	-0.11	-0.16	TB
BEL3BJ		8.290	-0.491	-1.01	10.30	-1.29	-1.80	TP
BYDKJU		8.401	-0.380	-0.78	11.63	0.04	0.06	IF
DPGEMX		8.987	0.207	0.42	12.06	0.48	0.66	LH
DZMYCL		8.437	-0.344	-0.71	11.24	-0.34	-0.48	IK
EHXD6Z		8.882	0.102	0.21	11.81	0.22	0.31	IM
EKZM9F		9.201	0.421	0.86	11.35	-0.24	-0.34	TA
ETYCPK		8.577	-0.204	-0.42	11.44	-0.15	-0.21	ID
EXTUUX		8.546	-0.234	-0.48	10.94	-0.64	-0.90	IM
G2GVXA		8.655	-0.126	-0.26	10.70	-0.88	-1.23	TH
GBKDFE		8.425	-0.356	-0.73	10.97	-0.62	-0.87	IM
HQK8UU		9.696	0.915	1.88	12.60	1.02	1.42	TO
HWYYKJ		9.650	0.869	1.78	13.08	1.49	2.08	TH
KUCGTK		8.519	-0.261	-0.54	11.28	-0.30	-0.42	XX
LT9RYD		8.667	-0.114	-0.23	10.58	-1.01	-1.41	IF
MH96C9		8.800	0.019	0.04	11.24	-0.35	-0.49	LE
N8Y2GA		9.485	0.704	1.44	12.40	0.81	1.13	LH
NKDVFH		9.563	0.782	1.60	13.21	1.62	2.26	TP
P3MUNA		8.842	0.062	0.13	11.95	0.36	0.50	TB
R28R73		8.757	-0.024	-0.05	10.93	-0.66	-0.92	LA
R4WXNE		9.247	0.466	0.96	12.68	1.09	1.52	TK
RRXXLZ		8.581	-0.199	-0.41	11.47	-0.12	-0.16	TO
TPBZX4		8.389	-0.392	-0.80	11.31	-0.27	-0.38	IF
WX884D		9.087	0.306	0.63	11.95	0.36	0.51	LW
XH96Q6		9.177	0.396	0.81	12.54	0.95	1.33	TH
YFFNZT		9.414	0.633	1.30	12.22	0.63	0.88	LA
ZB6KRZ		8.991	0.210	0.43	11.77	0.18	0.26	LE
ZBXVET		9.285	0.505	1.03	12.33	0.74	1.03	LA
ZPN6CU		8.318	-0.462	-0.95	11.01	-0.58	-0.81	LW

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

	Sample SE11	Summary Statistics	Sample SE12
Grand Means	8.7807 kN/m		11.588 kN/m
SD Btwn Labs	0.4876 kN/m		0.716 kN/m
Statistics based on 41 of 41 reporting participants			

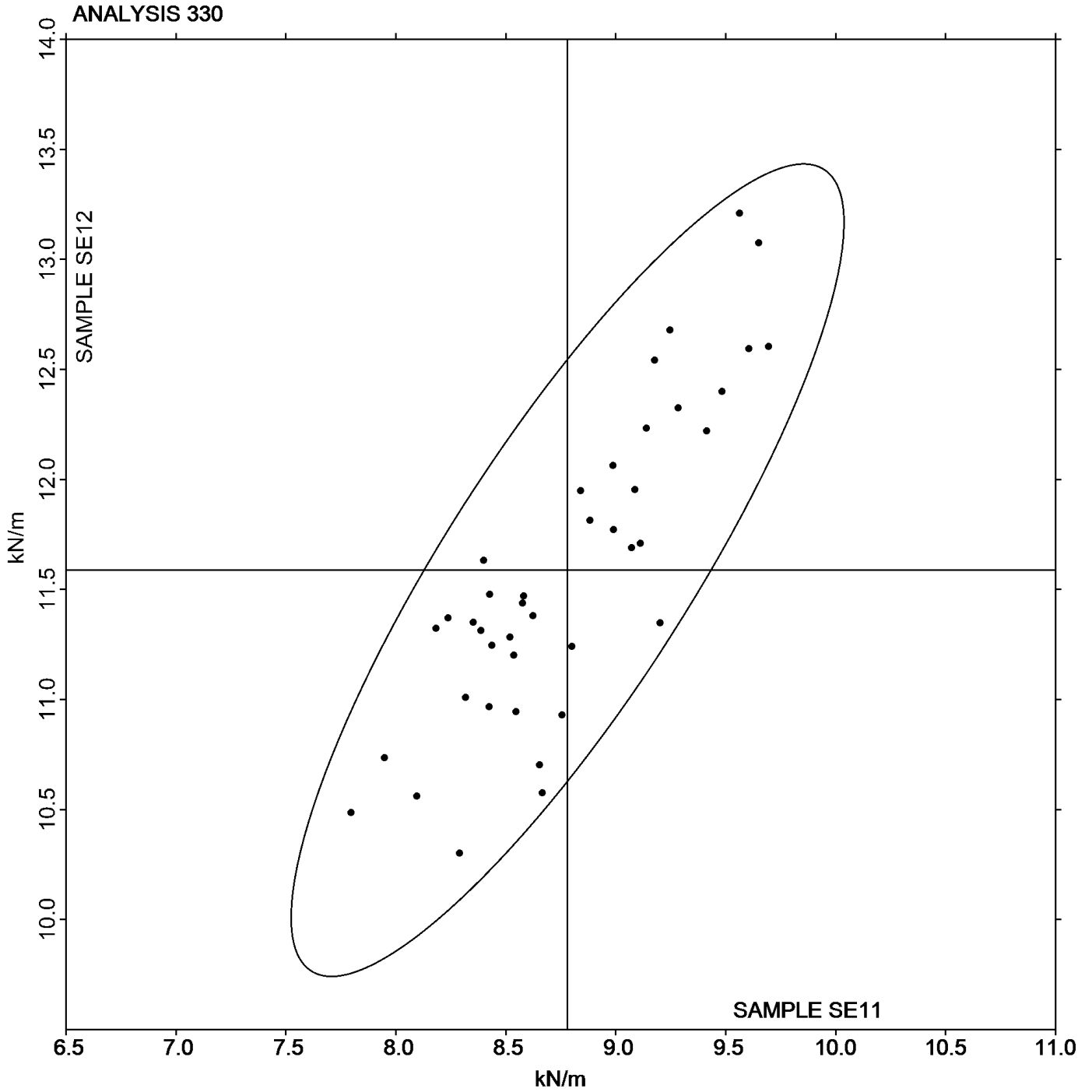
### Instrument Code List

(ID) - Instron 4201	(IF) - Instron 3340 Series
(IK) - Instron 4400 Series	(IM) - Instron 5500 Series
(LA) - L & W Autoline	(LE) - L & W Tensile Tester 066
(LH) - L & W Alwetron TH1 (Horizontal) SE 060	(LW) - L & W Tensile Tester SE062
(SA) - Shimadzu Autograph AG 2000 A	(SP) - Schopper Type Tensile Tester (TMI)
(TA) - Thwing-Albert Tensile Tester	(TB) - Thwing-Albert EJA/1000
(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	

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

Grand Mean Sample **SE11** = 8.7807 kN/m

Grand Mean Sample **SE12** = 11.588 kN/m



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

WebCode	Data Flag	Sample SE11			Sample SE12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3C8YCB		69.50	-12.64	-1.41	158.3	-40.7	-1.71	TK
3K7JFR		67.57	-14.57	-1.63	175.0	-24.0	-1.01	LH
6HLA6U		79.84	-2.30	-0.26	188.2	-10.8	-0.46	XX
8GNXV8		68.82	-13.31	-1.49	171.6	-27.5	-1.16	LW
8GPDUQ		77.93	-4.21	-0.47	205.3	6.3	0.27	TO
9JT3LZ		75.69	-6.45	-0.72	189.6	-9.4	-0.40	SA
9LVG6P		97.72	15.58	1.74	255.1	56.1	2.36	TO
A4UFUY		72.68	-9.46	-1.06	187.1	-11.9	-0.50	TB
BEL3BJ		86.80	4.66	0.52	183.5	-15.5	-0.65	TP
BYDKJU	X	14.11	-68.03	-7.59	24.8	-174.2	-7.33	IN
DPGEMX		77.86	-4.28	-0.48	207.6	8.6	0.36	LH
DZMYCL		97.18	15.04	1.68	229.2	30.2	1.27	IK
EHXD6Z		80.95	-1.19	-0.13	206.4	7.4	0.31	IM
EXTUUX		79.53	-2.61	-0.29	169.7	-29.3	-1.23	IM
G2GVXA		90.88	8.74	0.97	201.7	2.7	0.11	TH
GBKDFE		75.79	-6.35	-0.71	173.3	-25.7	-1.08	IM
HQK8UU		92.03	9.89	1.10	227.3	28.3	1.19	TO
HWYYKJ		91.94	9.80	1.09	229.1	30.1	1.27	TH
KUCGTK		73.04	-9.10	-1.02	189.1	-9.9	-0.42	XX
MH96C9		88.16	6.02	0.67	201.4	2.4	0.10	LE
N8Y2GA		82.38	0.24	0.03	204.2	5.1	0.22	LH
NKDVFH	*	67.74	-14.39	-1.61	137.6	-61.4	-2.58	TP
P3MUNA		87.27	5.13	0.57	219.6	20.6	0.87	TB
R28R73		95.77	13.63	1.52	211.1	12.1	0.51	LA
RRXXLZ		86.10	3.96	0.44	217.0	18.0	0.76	XX
TPBZX4		81.94	-0.20	-0.02	210.3	11.3	0.48	IF
WX884D		75.96	-6.18	-0.69	196.1	-2.9	-0.12	LW
XH96Q6		81.22	-0.92	-0.10	199.3	0.3	0.01	TH
YFFNZT		85.53	3.40	0.38	215.4	16.4	0.69	LA
ZB6KRZ		80.41	-1.73	-0.19	199.8	0.8	0.03	LX
ZBXVET		95.94	13.80	1.54	211.3	12.2	0.52	LA

Sample SE11		Summary Statistics	Sample SE12	
Grand Means	82.139 Joules/sq m		199.01 Joules/sq m	
SD Btwn Labs	8.962 Joules/sq m		23.77 Joules/sq m	
Statistics based on 30 of 31 reporting participants				

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

BYDKJU (X) - Extreme data.

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

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**Analysis Notes:**

BEL3BJ - Data appear to be reported as J/sq m, not kg-m/sq m as indicated on datasheet. Units corrected by CTS.

HQK8UU - Data appear to be reported as ft-lb/sq ft, not inch-lb/sq inch as indicated on datasheet. Units corrected by CTS.

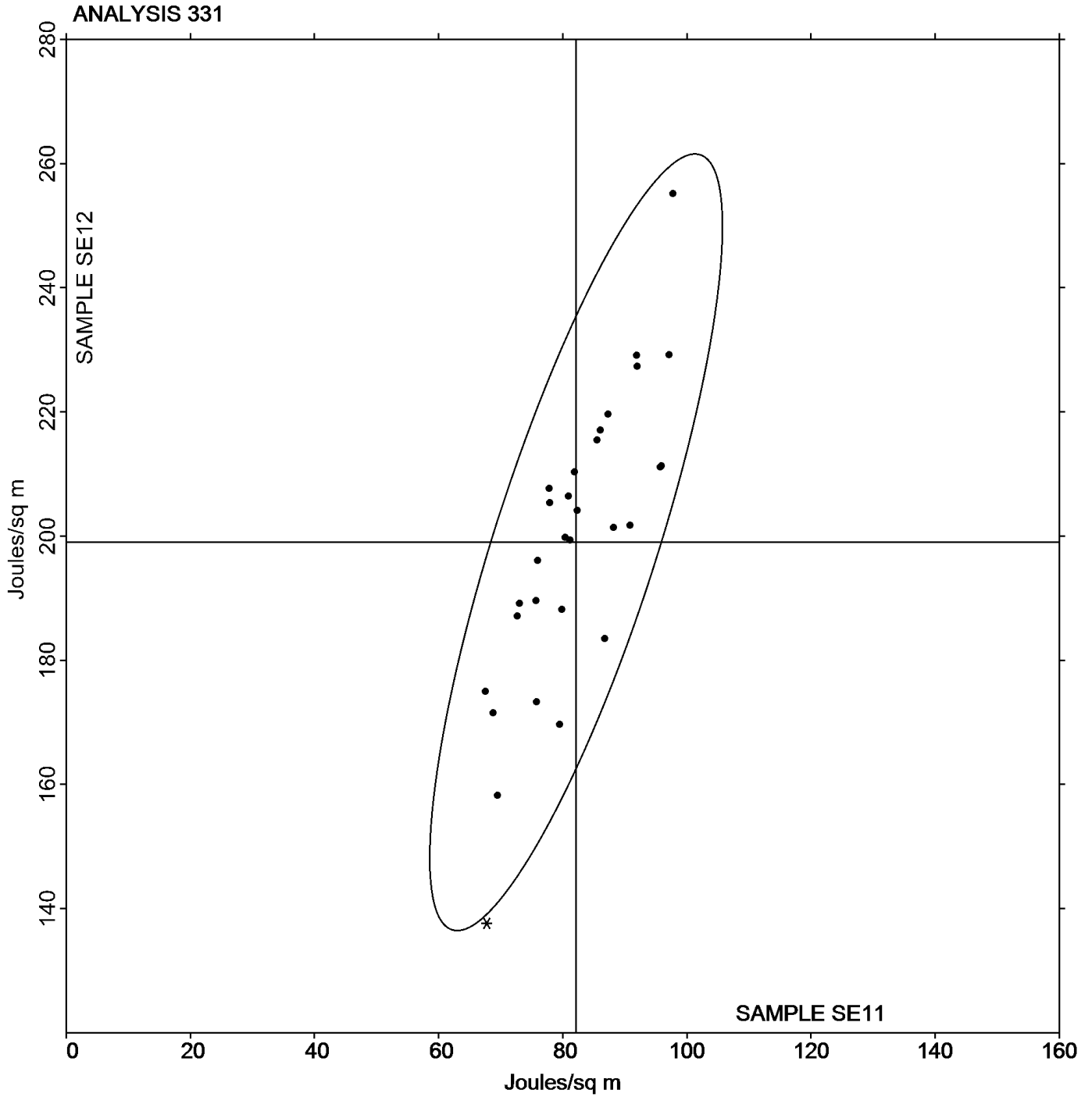
**Instrument Code List**

(IF) - Instron 3340 Series	(IK) - Instron 4400 Series
(IM) - Instron 5500 Series	(IN) - Instron 3360 Series
(LA) - L & W Autoline	(LE) - L & W Tensile Tester 066
(LH) - L & W Alwetron TH1 (Horizontal) SE 060	(LW) - L & W Tensile Tester SE062
(LX) - L & W (model not specified)	(SA) - Shimadzu Autograph AG 2000 A
(TB) - Thwing-Albert EJA/1000	(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

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

Grand Mean Sample **SE11** = 82.139 Joules/sq m

Grand Mean Sample **SE12** = 199.01 Joules/sq m



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

WebCode	Data Flag	Sample SE11			Sample SE12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3C8YCB		1.347	-0.190	-0.84	2.236	-0.407	-1.37	TK
3K7JFR		1.310	-0.227	-1.00	2.290	-0.353	-1.19	LH
6HLA6U		1.510	-0.027	-0.12	2.440	-0.203	-0.69	XX
8GNXV8		1.378	-0.159	-0.70	2.423	-0.220	-0.74	LW
8GPDUQ		1.464	-0.073	-0.32	2.690	0.047	0.16	TO
9JT3LZ		1.436	-0.101	-0.45	2.487	-0.156	-0.53	SA
9LVG6P		1.758	0.221	0.98	3.142	0.499	1.69	TO
A4UFUY		1.322	-0.215	-0.95	2.458	-0.185	-0.62	TB
ALVZWT		1.411	-0.126	-0.56	2.554	-0.089	-0.30	TB
BEL3BJ		2.070	0.533	2.36	3.220	0.577	1.95	TP
BYDKJU	X	8.175	6.638	29.41	19.846	17.203	58.11	IN
DPGEMX		1.354	-0.183	-0.81	2.522	-0.121	-0.41	XX
DZMYCL		1.857	0.321	1.42	3.113	0.470	1.59	IK
EHXD6Z		1.431	-0.106	-0.47	2.583	-0.060	-0.20	IM
ETYCPK		1.444	-0.093	-0.41	2.575	-0.068	-0.23	ID
EXTUUX	*	1.736	0.199	0.88	2.577	-0.066	-0.22	IM
G2GVXA		1.858	0.321	1.42	3.031	0.388	1.31	TH
GBKDFE		1.523	-0.014	-0.06	2.515	-0.128	-0.43	IM
HQK8UU		1.480	-0.057	-0.25	2.642	-0.001	0.00	TO
HWYYKJ		1.729	0.192	0.85	2.961	0.318	1.07	TH
KUCGTK		1.339	-0.198	-0.88	2.460	-0.183	-0.62	XX
MH96C9		1.532	-0.005	-0.02	2.602	-0.041	-0.14	LE
N8Y2GA		1.351	-0.186	-0.82	2.406	-0.237	-0.80	LH
NKDVFH		2.111	0.574	2.55	3.409	0.766	2.59	TP
P3MUNA		1.620	0.083	0.37	2.740	0.097	0.33	TB
R28R73		1.408	-0.129	-0.57	2.380	-0.263	-0.89	LA
RRXXLZ		1.730	0.193	0.86	2.970	0.327	1.10	XX
TPBZX4		1.914	0.377	1.67	3.054	0.411	1.39	IF
WX884D		1.317	-0.220	-0.97	2.401	-0.242	-0.82	LW
XH96Q6		1.472	-0.065	-0.29	2.547	-0.096	-0.32	TH
YFFNZT		1.360	-0.177	-0.78	2.486	-0.157	-0.53	LA
ZB6KRZ		1.381	-0.156	-0.69	2.449	-0.194	-0.66	LX
ZBXVET		1.361	-0.176	-0.78	2.397	-0.246	-0.83	XX
ZPN6CU		1.391	-0.146	-0.64	2.457	-0.186	-0.63	LW

Sample SE11		Summary Statistics	Sample SE12	
Grand Means	1.5365 Percent		2.6429 Percent	
SD Btw Labs	0.2257 Percent		0.2960 Percent	
Statistics based on 33 of 34 reporting participants				

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

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

BYDKJU (X) - Extreme data.

**Instrument Code List**

(ID) - Instron 4201	(IF) - Instron 3340 Series
(IK) - Instron 4400 Series	(IM) - Instron 5500 Series
(IN) - Instron 3360 Series	(LA) - L & W Autoline 300
(LE) - L & W Tensile Tester 066	(LH) - L & W Alwetron TH1 (Horizontal) SE 060
(LW) - L & W Tensile Tester SE062	(LX) - L & W (model not specified)
(SA) - Shimadzu Autograph AG 2000 A	(TB) - Thwing-Albert EJA/1000
(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	

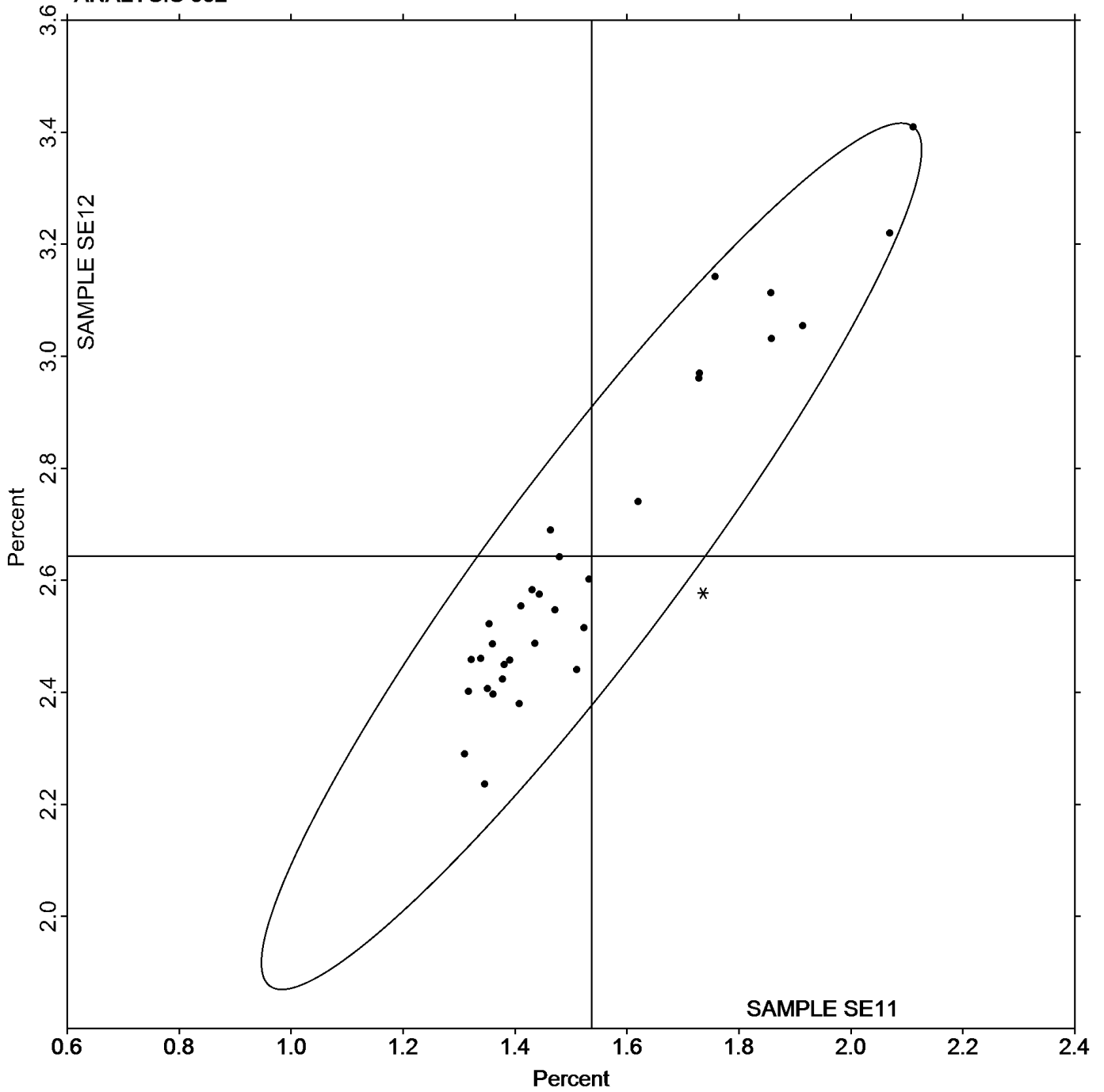


TAPPI-CTS Interlaboratory Testing Program  
Analysis 332  
Elongation to Break - Packaging Papers

Grand Mean Sample **SE11** = 1.5365 Percent

Grand Mean Sample **SE12** = 2.6429 Percent

**ANALYSIS 332**



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

WebCode	Data Flag	Sample SG11			Sample SG12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4DDHKW		77.00	-15.96	-0.67	84.90	-0.66	-0.03	MT
7LNUWV		127.80	34.84	1.47	113.70	28.14	1.17	MT
ALVZWT		67.60	-25.36	-1.07	66.50	-19.06	-0.79	XX
DEHJQN		126.30	33.34	1.41	131.30	45.74	1.90	MT
FTQEWU		86.80	-6.16	-0.26	92.20	6.64	0.28	MT
GVYNNR		84.70	-8.26	-0.35	92.60	7.04	0.29	MT
L3YWWE		124.00	31.04	1.31	103.30	17.74	0.74	MT
NNMV2D		117.70	24.74	1.04	95.90	10.34	0.43	MT
P9EE68		92.70	-0.26	-0.01	93.80	8.24	0.34	MT
PBY4ZA		113.00	20.04	0.85	80.90	-4.66	-0.19	XX
R4WXNE	*	79.00	-13.96	-0.59	31.70	-53.86	-2.24	MT
RF4JL4		94.40	1.44	0.06	101.80	16.24	0.67	MT
UXHY86		93.70	0.74	0.03	91.50	5.94	0.25	MT
XF9C82		85.80	-7.16	-0.30	74.40	-11.16	-0.46	XX
Y3G8FV		103.20	10.24	0.43	92.80	7.24	0.30	MT
YZ8794		63.20	-29.76	-1.26	54.50	-31.06	-1.29	MT
ZPN6CU		43.50	-49.46	-2.09	52.80	-32.76	-1.36	MT

		Summary Statistics	
	Sample SG11		Sample SG12
Grand Means	92.965 Double Folds		85.565 Double Folds
SD Btwn Labs	23.707 Double Folds		24.067 Double Folds
Statistics based on 17 of 17 reporting participants			

**Instrument Code List**

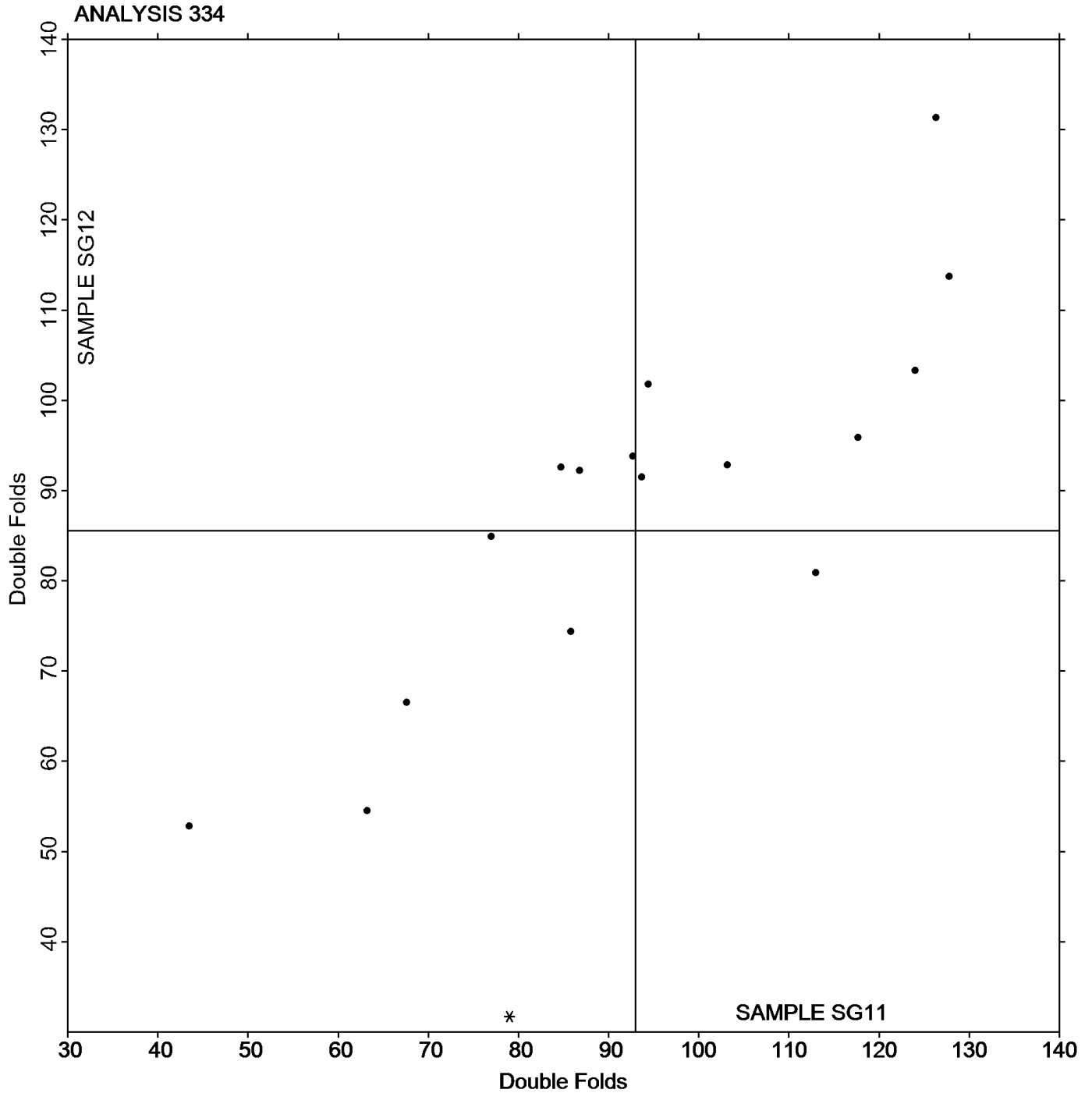
(MT) - MIT - Tinius Olsen

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

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

Grand Mean Sample **SG11** = 92.965 Double Folds

Grand Mean Sample **SG12** = 85.565 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 SH11			Sample SH12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6CFDKU		225.4	-26.0	-1.39	111.2	-17.3	-1.42
6RZBY7		234.6	-16.7	-0.89	117.0	-11.5	-0.94
9LVEEL		272.9	21.6	1.15	140.3	11.7	0.96
AFMYBP		238.2	-13.2	-0.70	132.5	4.0	0.32
ALVZWT		232.0	-19.4	-1.03	114.5	-14.1	-1.15
BRV288		262.3	10.9	0.58	131.9	3.3	0.27
BWALBM	X	127.3	-124.1	-6.61	67.2	-61.4	-5.02
DEHJQN		237.4	-14.0	-0.75	114.1	-14.5	-1.18
DJBP2J		271.1	19.8	1.05	129.2	0.6	0.05
FTQEWU		276.6	25.3	1.35	135.4	6.9	0.56
G7G873		251.2	-0.2	-0.01	140.9	12.3	1.01
JQXYF	*	252.0	0.6	0.03	158.7	30.2	2.46
LAKUMM		252.2	0.8	0.04	129.4	0.8	0.07
PZZRUH		290.8	39.5	2.10	132.3	3.7	0.31
TPBZX4	X	124.9	-126.5	-6.74	72.1	-56.4	-4.61
UXHY86		245.5	-5.8	-0.31	121.7	-6.9	-0.56
XF4WWL		232.5	-18.9	-1.01	127.6	-1.0	-0.08
Y3G8FV		247.1	-4.2	-0.23	120.3	-8.2	-0.67

		Summary Statistics	
	Sample SH11		Sample SH12
Grand Means	251.36 Gurley Units		128.57 Gurley Units
SD Btwn Labs	18.76 Gurley Units		12.24 Gurley Units
Statistics based on 16 of 18 reporting participants			

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

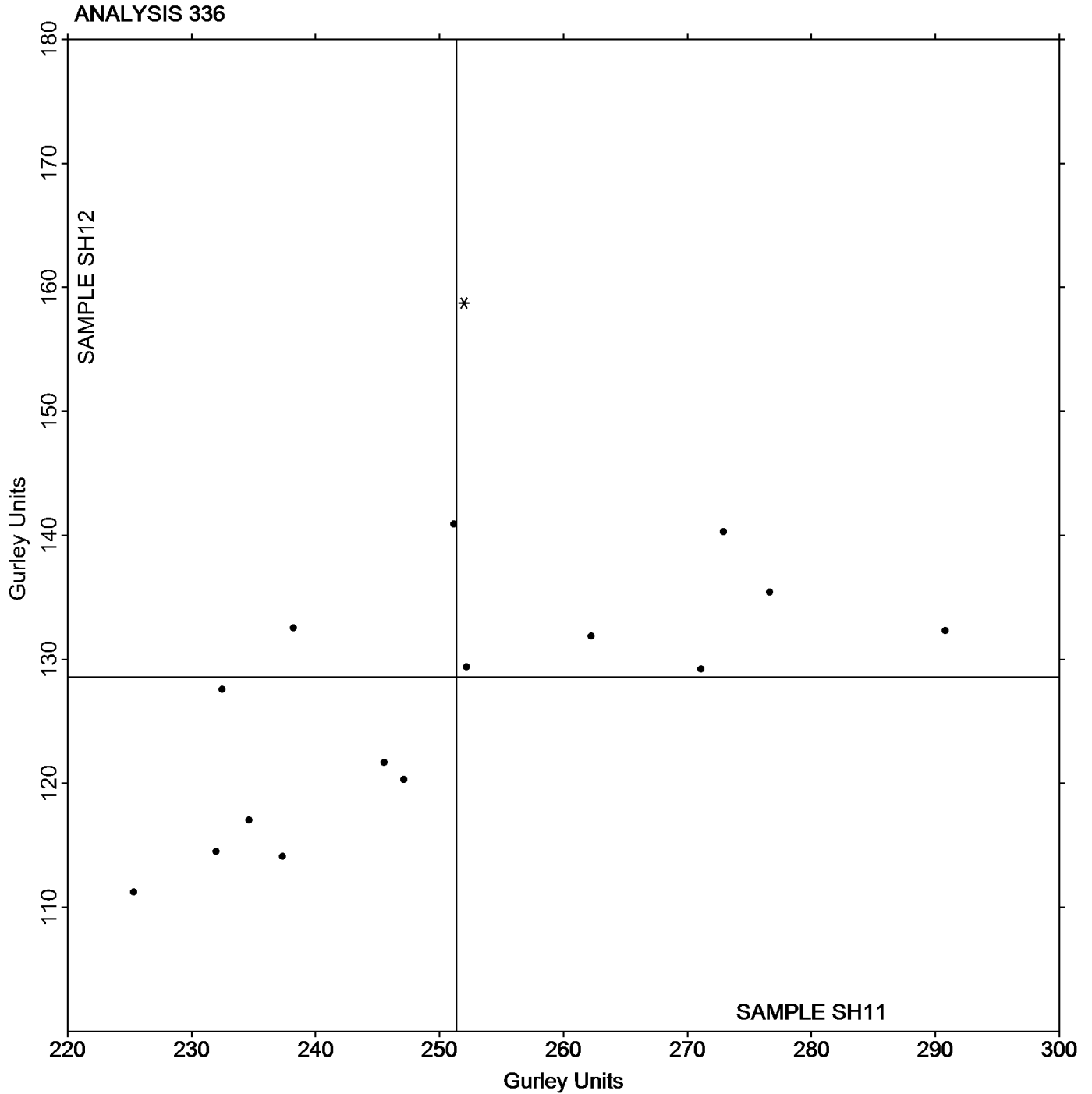
BWALBM (X) - Data for both samples are low.

TPBZX4 (X) - Data for both samples are low.

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

Grand Mean Sample SH11 = 251.36 Gurley Units

Grand Mean Sample SH12 = 128.57 Gurley 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 338**  
**Bending Resistance, Taber Type - 0 to 10 Units**

WebCode	Data Flag	Sample SJ11			Sample SJ12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
AWP6PR		3.754	0.177	0.50	1.946	-0.031	-0.11
AX98NM		3.420	-0.157	-0.44	1.792	-0.185	-0.67
BYDKJU		4.090	0.513	1.45	2.380	0.403	1.47
GVYNNR		3.683	0.106	0.30	1.889	-0.088	-0.32
NCTECC		3.345	-0.232	-0.65	1.825	-0.152	-0.55
NNMV2D		3.464	-0.113	-0.32	1.979	0.002	0.01
PZZRUH		3.861	0.284	0.80	2.277	0.300	1.09
TPBZX4		3.407	-0.170	-0.48	1.865	-0.112	-0.41
UXHY86		3.369	-0.208	-0.59	1.728	-0.249	-0.91
VTKZ8Z		4.241	0.664	1.87	2.545	0.568	2.07
WX884D		3.050	-0.527	-1.49	1.820	-0.157	-0.57
XF4WWL		3.240	-0.337	-0.95	1.676	-0.301	-1.09
XF9C82	X	3.538	-0.039	-0.11	3.648	1.671	6.08

		Summary Statistics	
	Sample SJ11		Sample SJ12
Grand Means	3.5770 Taber Units		1.9769 Taber Units
SD Btwn Labs	0.3544 Taber Units		0.2748 Taber Units
Statistics based on 12 of 13 reporting participants			

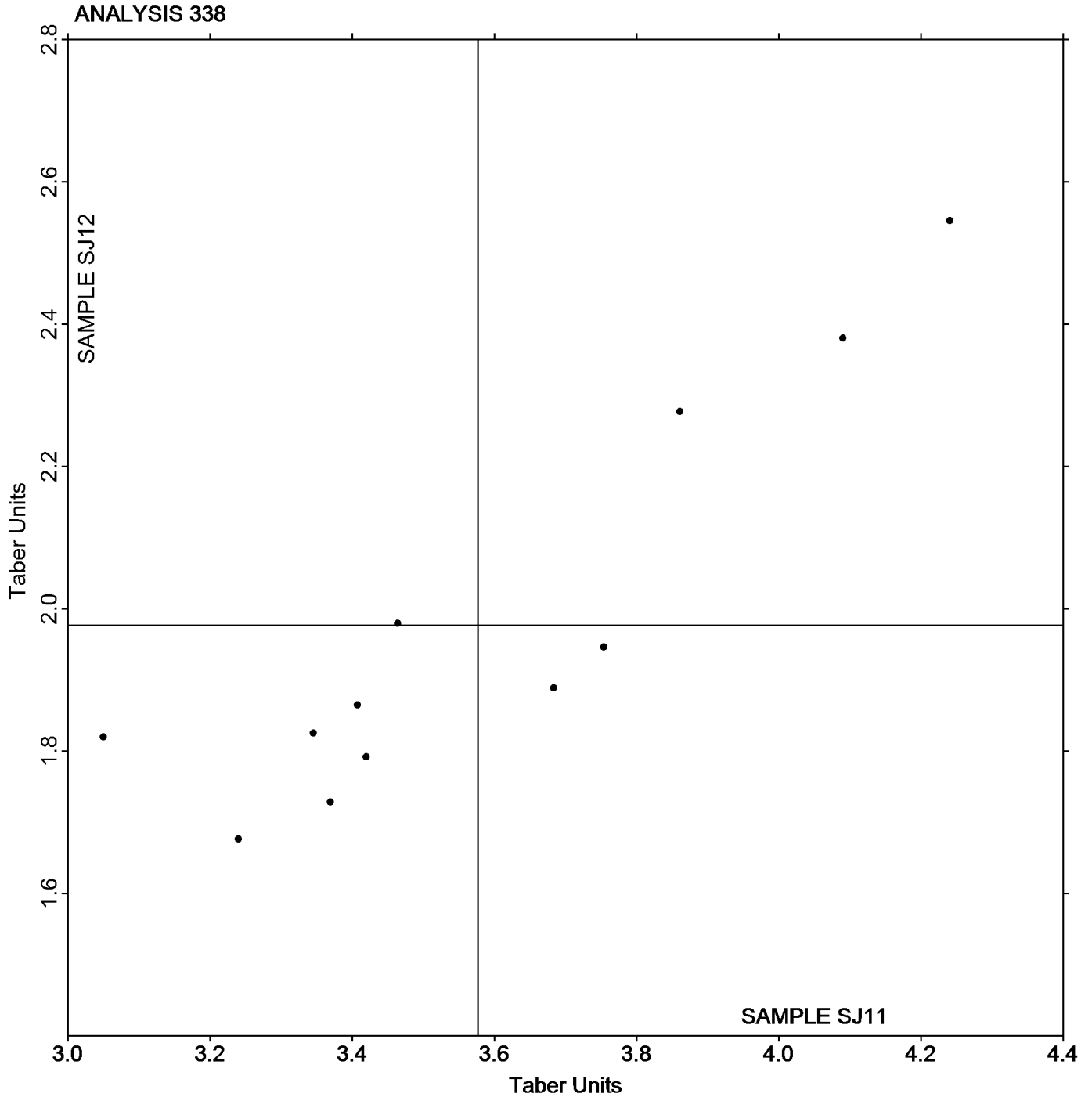
**Comments on assigned Data Flags for Test #338**

XF9C82 (X) - Data for Sample SJ12 are high. Inconsistent in testing within the determinations for both samples.

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

Grand Mean Sample **SJ11** = 3.5770 Taber Units

Grand Mean Sample **SJ12** = 1.9769 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 SQ11			Sample SQ12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
64RZWQ	X	32.51	10.13	10.69	29.72	-6.86	-4.13
6NGFX		23.39	1.01	1.07	39.63	3.05	1.84
DJBP2J		21.21	-1.17	-1.23	34.39	-2.19	-1.32
FTQEWU		22.29	-0.09	-0.09	37.98	1.40	0.84
J42U9J	X	30.67	8.29	8.75	48.24	11.66	7.02
MH96C9		22.07	-0.31	-0.32	35.10	-1.48	-0.89
P3MUNA		21.86	-0.52	-0.55	35.81	-0.77	-0.46
R28R73		23.88	1.50	1.58	35.63	-0.95	-0.57
TAU88C		23.15	0.77	0.81	38.80	2.22	1.34
TKDQGA		20.53	-1.85	-1.95	34.78	-1.80	-1.08
UXHY86		23.00	0.62	0.66	37.31	0.73	0.44
WX884D		21.85	-0.53	-0.56	35.40	-1.18	-0.71
ZPN6CU		22.80	0.42	0.45	37.17	0.59	0.36
ZY9EX3		22.50	0.12	0.13	36.95	0.37	0.22

Summary Statistics		
	Sample SQ11	Sample SQ12
Grand Means	22.378 Taber Units	36.579 Taber Units
SD Btwn Labs	0.948 Taber Units	1.660 Taber Units
Statistics based on 12 of 14 reporting participants		

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

64RZWQ (X) - Extreme data.

J42U9J (X) - Extreme data.

**Analysis Notes:**

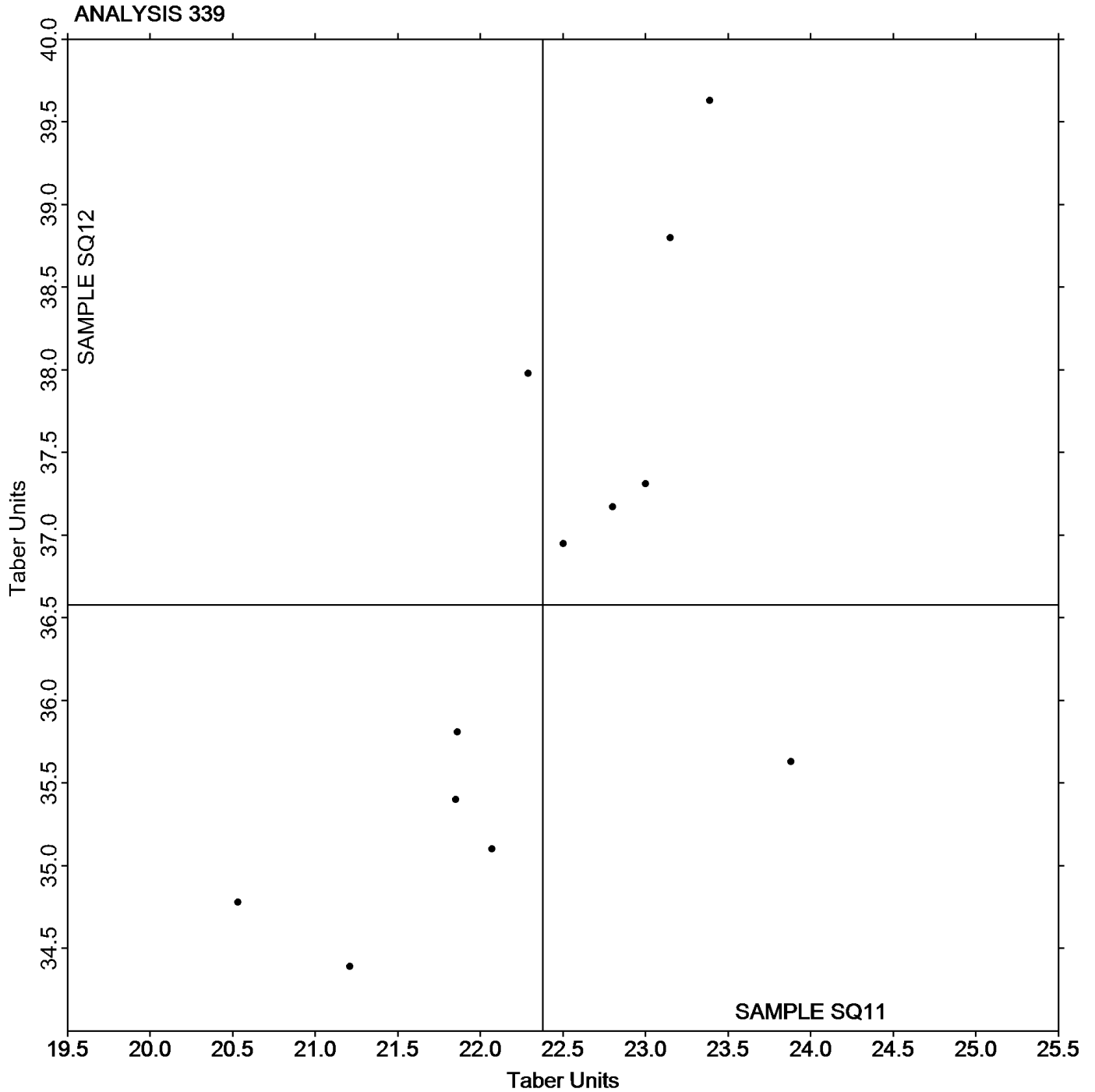
P3MUNA - Data appear to be reported as g-cm, not mN-m as indicated on datasheet. Units corrected by CTS.



TAPPI-CTS Interlaboratory Testing Program  
Analysis 339  
Bending Resistance, Taber Type - 10 to 100 Taber Units

Grand Mean Sample **SQ11** = 22.378 Taber Units

Grand Mean Sample **SQ12** = 36.579 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 340

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

WebCode	Data Flag	Sample ST11			Sample ST12		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2VQKC2		236.7	-8.5	-0.60	246.8	-5.5	-0.41
3PW6ZY		275.2	30.0	2.12	268.6	16.4	1.24
96MWMV		244.2	-1.0	-0.07	249.9	-2.4	-0.18
9JT3LZ		264.7	19.5	1.38	276.9	24.6	1.87
BEL3BJ		226.7	-18.5	-1.31	229.4	-22.8	-1.73
DWYPZY	X	90.1	-155.1	-10.95	116.0	-136.3	-10.34
EKZM9F		245.3	0.0	0.00	248.8	-3.5	-0.27
ETYCPK		252.0	6.8	0.48	257.5	5.2	0.40
G2GVXA		228.3	-16.9	-1.20	242.5	-9.8	-0.74
JFBKWD		258.3	13.1	0.92	270.5	18.2	1.38
KK3WLH		233.3	-11.9	-0.84	243.6	-8.7	-0.66
LT9RYD		244.1	-1.1	-0.08	247.9	-4.4	-0.33
VJE63A		239.5	-5.7	-0.40	242.8	-9.5	-0.72
WX884D		239.8	-5.5	-0.39	254.3	2.0	0.15

Summary Statistics		
	Sample ST11	Sample ST12
Grand Means	245.23 Taber Units	252.27 Taber Units
SD Btwn Labs	14.16 Taber Units	13.19 Taber Units
Statistics based on 13 of 14 reporting participants		

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

DWYPZY (X) - Extreme data.



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

WebCode	Data Flag	Sample SM11			Sample SM12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
64RZWQ		88.82	2.45	0.26	72.07	0.86	0.13	LW
6J69XU		92.22	5.85	0.61	74.78	3.57	0.54	TA
6NGFX Y		72.73	-13.65	-1.42	63.70	-7.51	-1.13	TZ
6ZRTDE		93.14	6.77	0.70	77.88	6.67	1.01	TA
CUX X4L		74.23	-12.14	-1.26	63.06	-8.14	-1.23	LW
DWYPZY		101.08	14.71	1.53	80.96	9.75	1.47	CA
G2GVXA		77.00	-9.37	-0.97	64.06	-7.15	-1.08	LW
GJ2RHJ		76.20	-10.17	-1.06	68.20	-3.01	-0.45	DT
GVYNNR		85.42	-0.95	-0.10	70.38	-0.83	-0.12	CD
MH96C9		84.00	-2.37	-0.25	70.78	-0.43	-0.06	TA
P3MUNA		99.23	12.85	1.34	85.65	14.44	2.18	TA
QCREB3		78.92	-7.45	-0.77	63.56	-7.65	-1.15	CD
RRXXLZ		81.80	-4.57	-0.48	70.20	-1.01	-0.15	TA
TPBZX4	*	101.32	14.95	1.55	72.27	1.06	0.16	TL
UXHY86		81.44	-4.94	-0.51	65.76	-5.44	-0.82	TZ
ZPN6CU		94.40	8.03	0.83	76.00	4.79	0.72	LW

		Summary Statistics	
	Sample SM11		Sample SM12
Grand Means	86.372 psi		71.208 psi
SD Btwn Labs	9.618 psi		6.627 psi
Statistics based on 16 of 16 reporting participants			

**Instrument Code List**

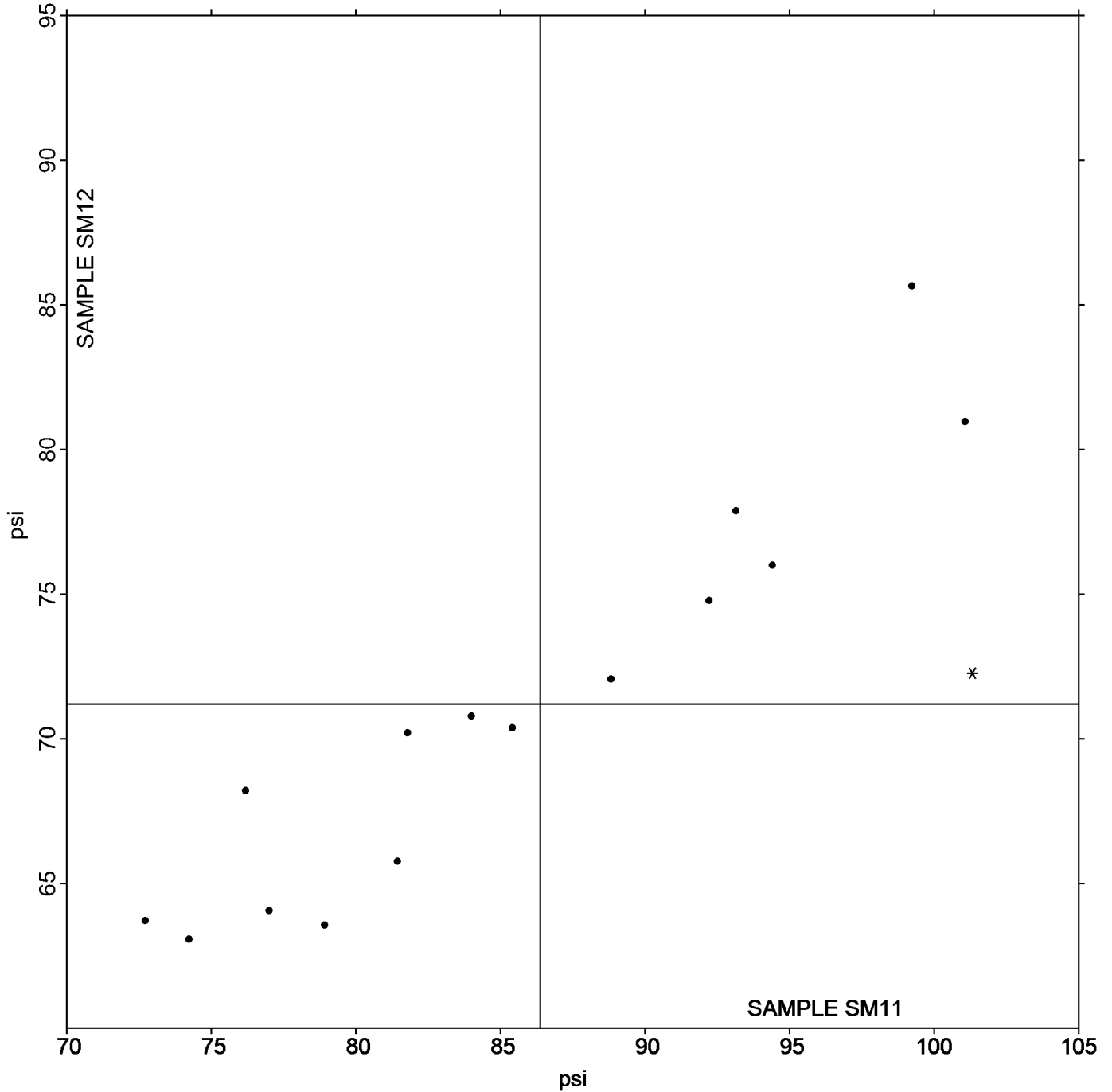
- |                                     |                                |
|-------------------------------------|--------------------------------|
| (CA) - CSI CS-163                   | (CD) - CSI CS-163D             |
| (DT) - Dek-Tron DCS-163A ZDT Tester | (LW) - L & W ZD Tensile Tester |
| (TA) - Thwing-Albert Tensile Tester | (TL) - TMI Lab Master          |
| (TZ) - TMI Monitor/ZDT Tester       |                                |

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

Grand Mean Sample **SM11** = 86.372 psi

Grand Mean Sample **SM12** = 71.208 psi

**ANALYSIS 343**



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 SZ11			Sample SZ12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2VQKC2		36.40	-3.14	-0.99	38.20	0.02	0.01	CA
96MWMV		38.40	-1.14	-0.36	37.40	-0.78	-0.25	CA
AYJ636		38.44	-1.10	-0.35	36.94	-1.24	-0.39	XX
BEL3BJ		31.18	-8.36	-2.64	30.49	-7.69	-2.43	LW
DZMYCL		43.69	4.15	1.31	43.17	4.99	1.58	PG
FTQEWU		40.88	1.34	0.42	38.60	0.42	0.13	CA
HJCKRH		38.10	-1.44	-0.46	38.42	0.24	0.08	TL
JFBKWD		41.90	2.36	0.74	41.76	3.58	1.13	TL
KK3WLH		43.60	4.06	1.28	41.00	2.82	0.89	CA
LT9RYD		40.58	1.03	0.33	35.14	-3.04	-0.96	TZ
MGVBVN		38.73	-0.81	-0.26	35.80	-2.38	-0.75	LW
Q8FTQ7		42.60	3.06	0.96	42.28	4.10	1.30	TL
RNJMKV		39.04	-0.50	-0.16	37.74	-0.44	-0.14	DP
VJE63A		38.40	-1.14	-0.36	37.34	-0.84	-0.27	TZ
YFFNZT		41.22	1.67	0.53	38.44	0.26	0.08	XX

Sample SZ11		Summary Statistics	Sample SZ12	
Grand Means	39.544 psi		38.181 psi	
SD Btwn Labs	3.171 psi		3.161 psi	
Statistics based on 15 of 15 reporting participants				

**Instrument Code List**

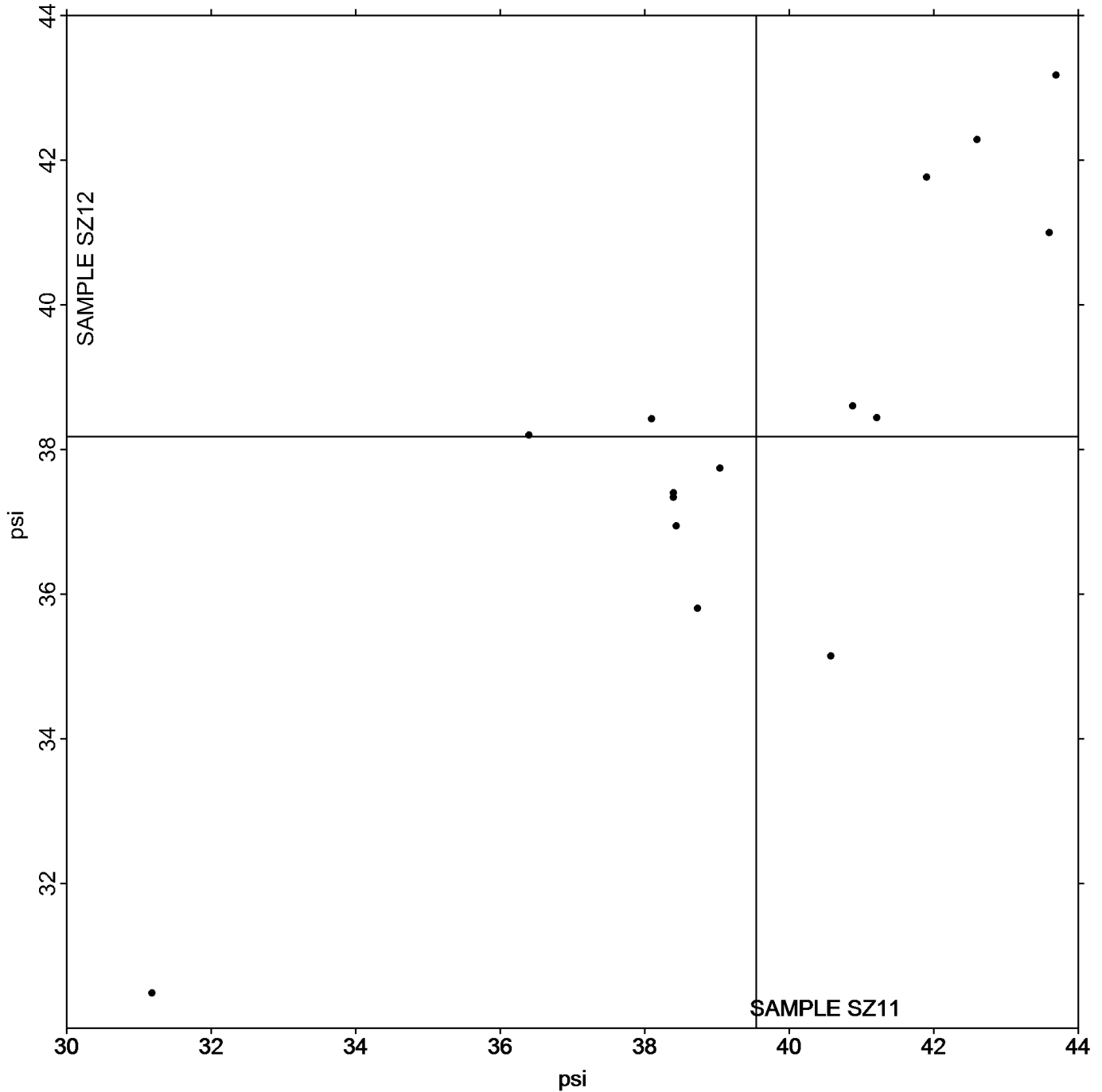
- |   |                                      |
|---|--------------------------------------|
| (CA) - CSI CS-163                                 | (DP) - Dek-Tron XP Series            |
| (LW) - L & W ZD Tensile Tester                    | (PG) - Perkins Model A Mullen Tester |
| (TL) - TMI Lab Master                             | (TZ) - TMI Monitor/ZDT Tester        |
| (XX) - Instrument make/model not specified by lab |                                      |

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

Grand Mean Sample **SZ11** = 39.544 psi

Grand Mean Sample **SZ12** = 38.181 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 SN11			Sample SN12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4949AU		119.9	-3.9	-0.40	99.8	-5.2	-0.90	HZ
6CFDKU		129.4	5.6	0.56	106.4	1.4	0.24	HY
6J69XU		128.6	4.8	0.48	112.6	7.6	1.31	HY
6NGFX Y		109.4	-14.4	-1.46	96.6	-8.4	-1.45	HY
9LVG6P		120.6	-3.2	-0.33	107.4	2.4	0.41	HZ
DEHJQN		116.4	-7.4	-0.75	99.0	-6.0	-1.03	HY
DY7G3E		134.4	10.6	1.07	114.0	9.0	1.55	HY
FTQEWU		126.8	3.0	0.30	113.4	8.4	1.44	XX
G2GVXA		109.8	-14.0	-1.42	96.0	-9.0	-1.55	HZ
GVYNNR		127.6	3.8	0.38	106.2	1.2	0.20	HY
HQK8UU		111.0	-12.8	-1.30	101.0	-4.0	-0.69	HY
MH96C9		142.4	18.6	1.87	115.6	10.6	1.82	HY
P3MUNA		129.8	6.0	0.60	103.6	-1.4	-0.24	HZ
PZZRUH		109.1	-14.8	-1.49	100.2	-4.8	-0.83	KR
Q38ATD		117.4	-6.4	-0.65	104.8	-0.2	-0.04	HY
U9XR76		133.4	9.6	0.97	103.6	-1.4	-0.24	HY
UXHY86		137.6	13.8	1.39	108.4	3.4	0.58	HY
VJE63A	X	146.1	22.3	2.25	154.6	49.6	8.54	HZ
WYGRNY		126.2	2.4	0.24	102.4	-2.6	-0.45	HY
ZPN6CU		123.2	-0.6	-0.06	104.2	-0.8	-0.14	HY

Sample SN11		Summary Statistics	Sample SN12	
Grand Means	123.84 1000th ft-lbs		105.01 1000th ft-lbs	
SD Btwn Labs	9.90 1000th ft-lbs		5.81 1000th ft-lbs	
Statistics based on 19 of 20 reporting participants				

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

VJE63A (X) - Extreme data for Sample SN12. Inconsistent in testing within the determinations for both samples.

**Instrument Code List**

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

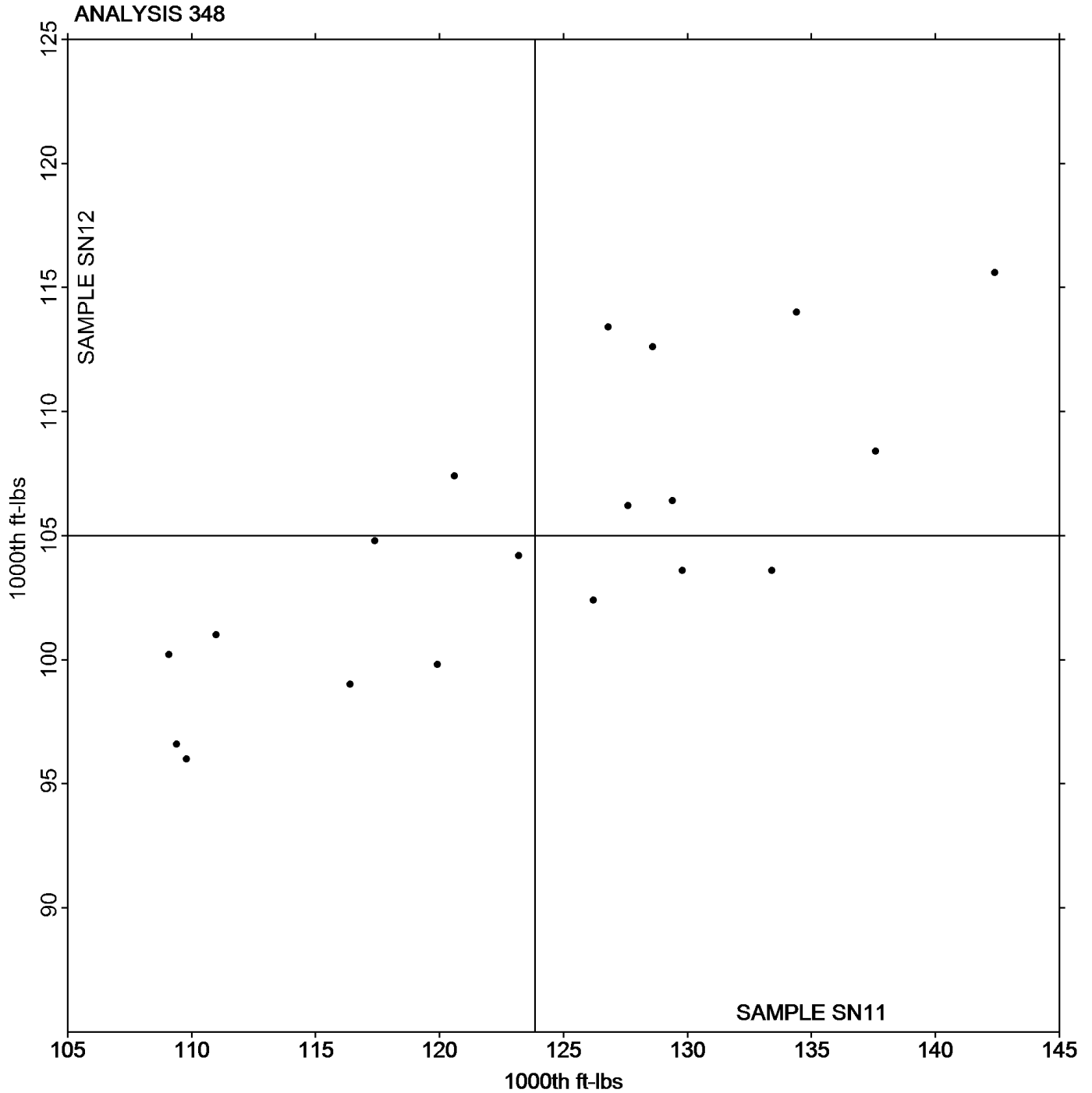
(HZ) - Huygen Internal Bond Tester with AccuPress  
 (XX) - Instrument make/model not specified by lab



TAPPI-CTS Interlaboratory Testing Program  
Analysis 348  
Internal Bond Strength - Modified Scott Mechanics

Grand Mean Sample **SN11** = 123.84 1000th ft-lbs

Grand Mean Sample **SN12** = 105.01 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.

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

WebCode	Data Flag	Sample SP11			Sample SP12			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
BEL3BJ		81.1	-24.1	-1.32	78.51	-11.21	-1.08	TM
DZMYCL		115.0	9.8	0.54	94.80	5.07	0.49	TM
HJCKRH		100.4	-4.8	-0.26	82.80	-6.93	-0.67	XX
LYCTY8		129.6	24.4	1.34	105.40	15.67	1.51	XX
N8Y2GA		89.9	-15.3	-0.84	83.54	-6.19	-0.60	TM
Q6CX7H		93.8	-11.4	-0.62	80.89	-8.84	-0.85	XX
TKDQGA		95.4	-9.8	-0.54	87.78	-1.95	-0.19	TM
WX884D		139.3	34.1	1.87	108.84	19.11	1.84	SC
XF9C82		109.6	4.4	0.24	91.00	1.27	0.12	TM
ZB6KRZ		97.9	-7.3	-0.40	83.72	-6.01	-0.58	SC

		Summary Statistics			
		Sample SP11		Sample SP12	
Grand Means		105.20	1000th ft-lbs	89.729	1000th ft-lbs
SD Btwn Labs		18.22	1000th ft-lbs	10.372	1000th ft-lbs
Statistics based on 10 of 10 reporting participants					

**Instrument Code List**

(SC) - Scott Internal Bond Tester (Manual)

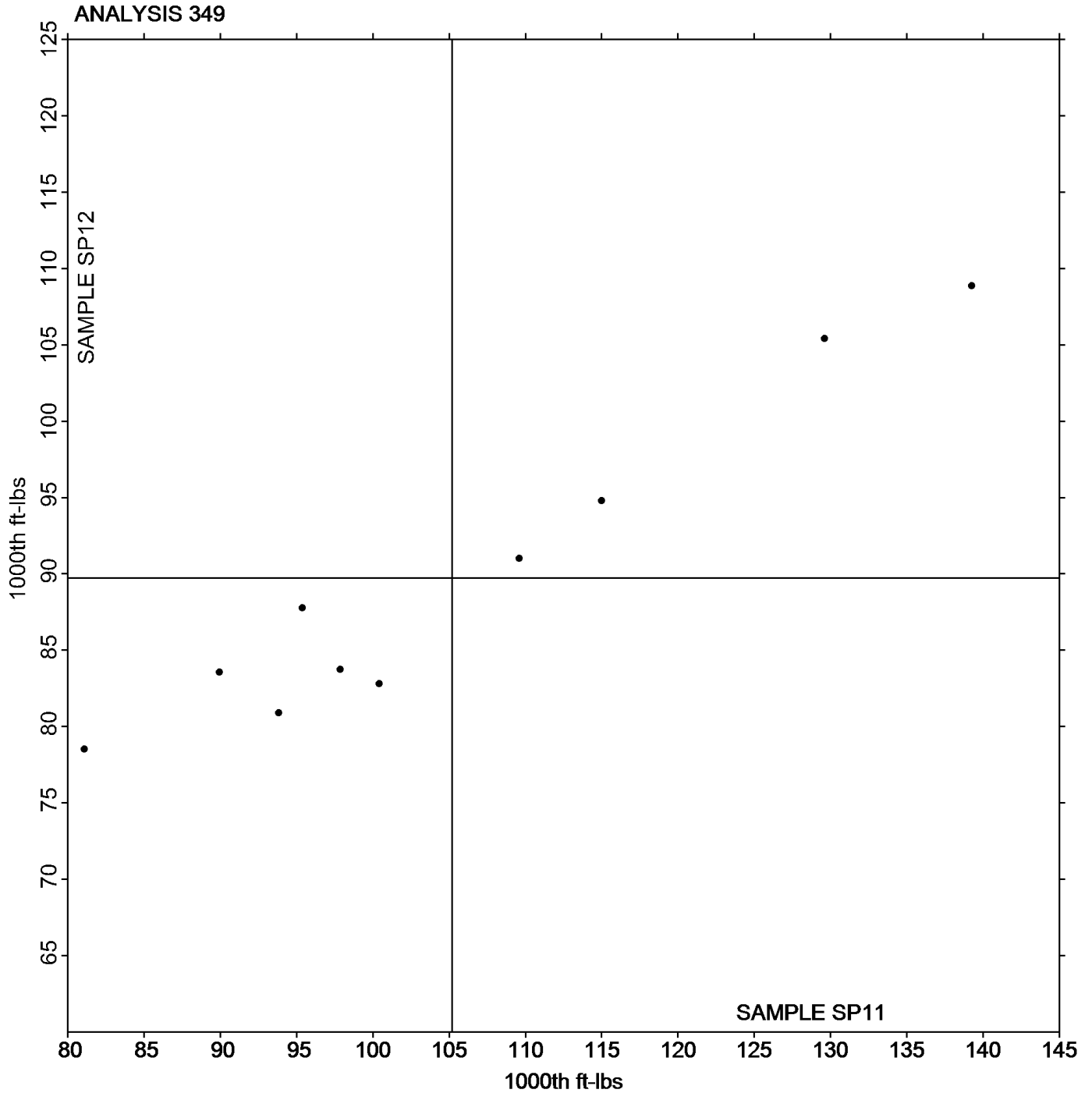
(TM) - TMI Monitor/Internal Bond Tester

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

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

Grand Mean Sample **SP11** = 105.20 1000th ft-lbs

Grand Mean Sample **SP12** = 89.729 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.