Paper & Paperboard Interlaboratory Testing Program

Summary Report #274S - January 2015

Introduction to the Paper & Paperboard Interlaboratory Program

Explanation of Tables and Definitions of Terms

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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:

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Office Hours: 8:00 a.m. - 4:30 p.m. ET

WebCode   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.

Lab Mean   The average of the values obtained for each sample by the participant.

Grand Mean   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.

**Difference from
Grand Mean**   The difference of the LAB MEAN from the GRAND MEAN.

**Between-Lab
Standard Deviation**   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).

**Comparative
Performance Value**   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.

Inst Code   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.

Data Flag   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	**CAUTION - 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	**STOP - 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	**PROCEED - 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.

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.

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.

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

WebCode	Data Flag	Sample SA15			Sample SA16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3MTN9K		23.22	2.27	1.00	30.27	1.18	0.49
4F8XJ6		20.00	-0.96	-0.42	27.78	-1.31	-0.55
6F4RKL		15.39	-5.57	-2.44	25.40	-3.70	-1.54
8E4Q9E		19.44	-1.52	-0.67	27.79	-1.30	-0.54
EHVM28		24.73	3.77	1.66	35.18	6.09	2.54
FX7AWM		20.45	-0.51	-0.22	25.20	-3.89	-1.62
H49WPE		21.67	0.71	0.31	28.96	-0.13	-0.05
KAGEQC		20.15	-0.81	-0.36	28.14	-0.95	-0.40
KCRD7E		22.60	1.64	0.72	30.30	1.21	0.50
KQBZFC		20.03	-0.92	-0.41	28.33	-0.76	-0.32
L34G6D		19.53	-1.42	-0.62	27.65	-1.44	-0.60
L4CQWB		25.15	4.19	1.84	33.24	4.15	1.73
L7JBKB		20.09	-0.87	-0.38	30.77	1.68	0.70
LZYHKR		19.15	-1.81	-0.79	28.60	-0.49	-0.20
M4AJ73		22.30	1.35	0.59	30.38	1.29	0.54
M9MT8R		23.70	2.74	1.21	29.70	0.61	0.25
MNE2G6		21.51	0.56	0.24	29.14	0.05	0.02
NU37MD		18.60	-2.36	-1.03	27.00	-2.09	-0.87
PKAAZ3		22.97	2.01	0.88	31.19	2.10	0.87
PXTW8F		22.73	1.77	0.78	31.11	2.02	0.84
QNJW47		22.71	1.75	0.77	29.93	0.84	0.35
QUQGCX		18.30	-2.65	-1.16	24.82	-4.27	-1.78
RHCZ9R		16.90	-4.06	-1.78	25.75	-3.34	-1.39
VQUBY3		20.17	-0.78	-0.34	28.31	-0.78	-0.32
X2NN8K		20.45	-0.51	-0.22	30.34	1.25	0.52
YBNXQF		22.60	1.64	0.72	28.60	-0.49	-0.20
ZJKVEH		21.25	0.29	0.13	31.59	2.50	1.04

Summary Statistics

	Sample SA15	Sample SA16
Grand Means	20.955 psi	29.091 psi
SD Btwn Labs	2.277 psi	2.400 psi

Statistics based on 27 of 27 reporting participants
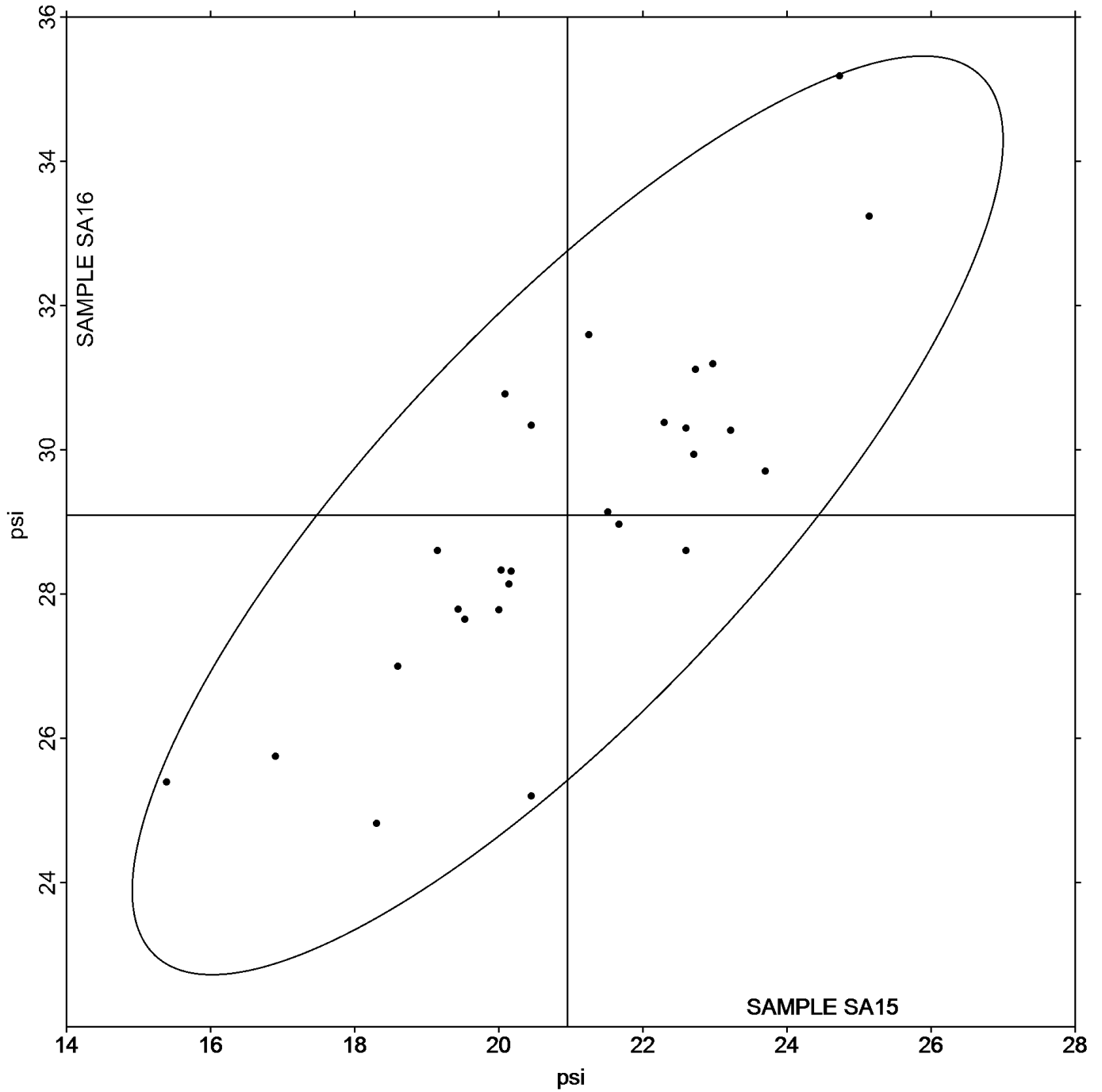
TAPPI-CTS Interlaboratory Testing Program
Analysis 305
Bursting Strength - Printing Papers

Grand Mean Sample **SA15** = 20.955 psi

Grand Mean Sample **SA16** = 29.091 psi

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

WebCode	Data Flag	Sample SB15			Sample SB16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2RTHQV		57.22	-0.45	-0.12	74.56	-0.73	-0.18
4TEKDG		56.87	-0.80	-0.20	76.22	0.93	0.23
6GXDBR		58.42	0.75	0.19	78.47	3.18	0.79
6WCQHR	X	49.33	-8.35	-2.12	79.70	4.41	1.10
9DLYT3		60.82	3.15	0.80	78.31	3.01	0.75
APDF9B		58.74	1.07	0.27	75.14	-0.15	-0.04
AU8EM7		56.60	-1.07	-0.27	75.30	0.01	0.00
B4T7XH		53.97	-3.71	-0.94	71.96	-3.33	-0.83
EY2EUG		54.70	-2.97	-0.75	71.77	-3.52	-0.88
FZUJ9A		56.40	-1.27	-0.32	74.10	-1.19	-0.30
GFZWRX		56.45	-1.22	-0.31	74.50	-0.79	-0.20
H49WPE		57.57	-0.11	-0.03	74.06	-1.24	-0.31
HQHCZB		53.36	-4.31	-1.09	73.97	-1.32	-0.33
HVFMG6		61.87	4.20	1.07	76.24	0.95	0.24
M4AJ73	*	67.58	9.91	2.51	86.61	11.31	2.83
NTQ7QJ		63.34	5.67	1.44	82.76	7.47	1.87
P8YPT4		64.10	6.43	1.63	77.90	2.61	0.65
QNJW47		56.76	-0.91	-0.23	75.72	0.43	0.11
RWXY98		53.98	-3.70	-0.94	71.18	-4.11	-1.03
TE7PF3		60.80	3.13	0.79	79.80	4.51	1.13
TMKZHN		59.20	1.53	0.39	76.80	1.51	0.38
VG9REP		53.07	-4.60	-1.17	72.14	-3.15	-0.79
WMUAH7		50.81	-6.86	-1.74	68.52	-6.77	-1.69
XDX4UW		52.32	-5.36	-1.36	68.75	-6.54	-1.64
XJP2RZ		59.10	1.43	0.36	73.20	-2.09	-0.52
ZZA2LC		57.78	0.11	0.03	74.34	-0.95	-0.24

Summary Statistics

	Sample SB15	Sample SB16
Grand Means	57.673 psi	75.293 psi
SD Btwn Labs	3.941 psi	4.003 psi

Statistics based on 25 of 26 reporting participants

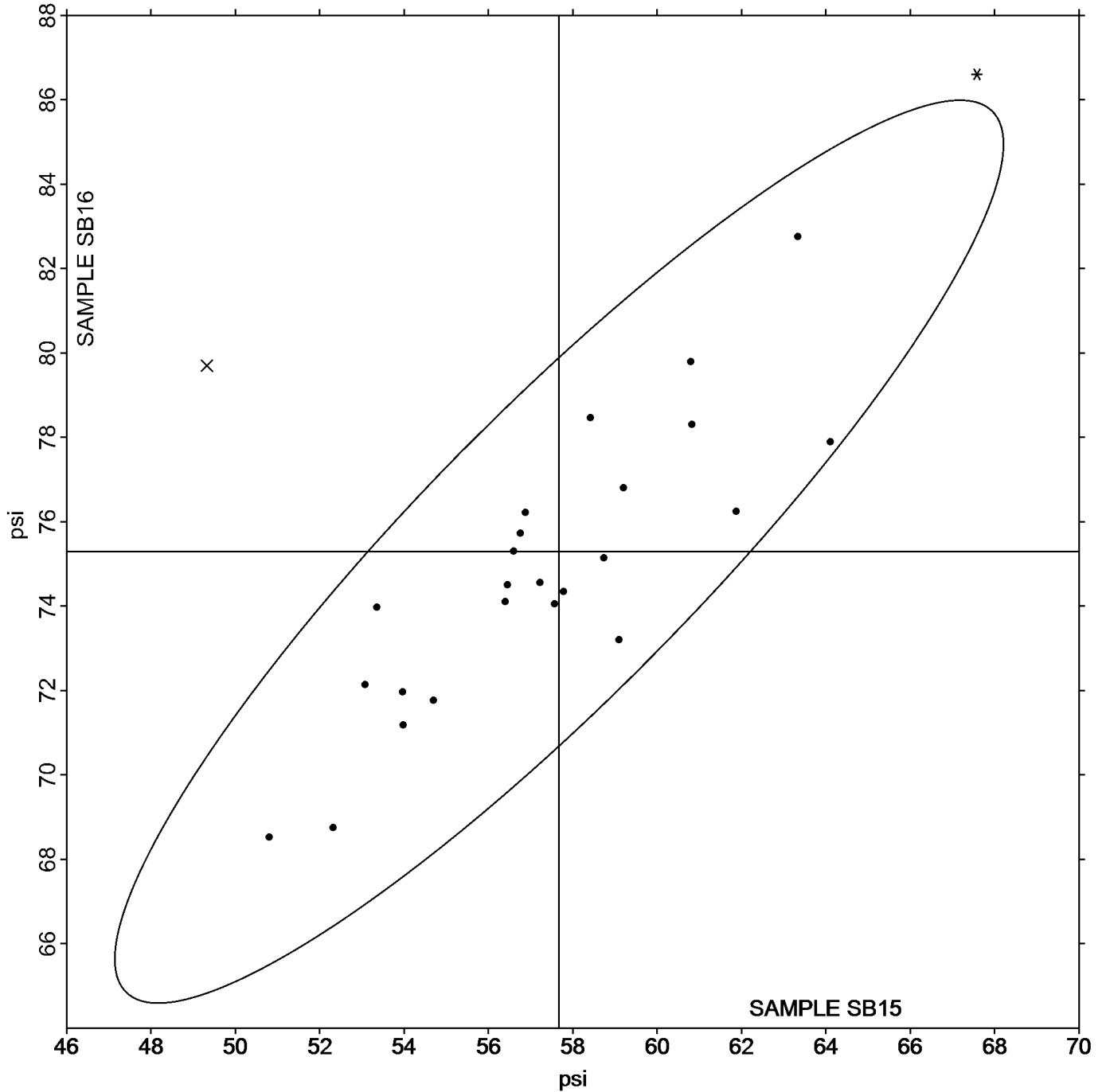## Comments on assigned Data Flags for Test #310

6WCQHR (X) - Inconsistent in testing between samples.

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

Grand Mean Sample **SB15** = 57.673 psi

Grand Mean Sample **SB16** = 75.293 psi

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

WebCode	Data Flag	Sample SK15			Sample SK16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6P9YXZ		25.00	0.08	0.10	23.40	-2.78	-1.45
B88ZEE		23.61	-1.30	-1.54	26.15	-0.04	-0.02
L68CLV		26.35	1.43	1.69	29.23	3.05	1.58
MNE2EJ		25.50	0.58	0.69	23.50	-2.68	-1.40
PKAAZ3		24.69	-0.23	-0.27	26.86	0.68	0.35
QNJW47		24.01	-0.90	-1.07	26.45	0.27	0.14
VW78PX		25.08	0.16	0.19	26.99	0.81	0.42
ZMGAN7		25.10	0.18	0.21	26.90	0.72	0.37

Summary Statistics

	Sample SK15	Sample SK16
Grand Means	24.919 Grams	26.185 Grams
SD Btwn Labs	0.847 Grams	1.924 Grams

Statistics based on 8 of 8 reporting participants

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

Grand Mean Sample **SK15** = 24.919 Grams

Grand Mean Sample **SK16** = 26.185 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 SC15			Sample SC16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2RTHQV		65.73	0.80	0.18	47.60	-0.95	-0.30
3XB8QW	*	55.36	-9.57	-2.18	39.25	-9.30	-2.89
4F8XJ6		65.82	0.89	0.20	49.92	1.37	0.43
4U8UKH		67.66	2.73	0.62	49.83	1.28	0.40
6F4RKL		66.80	1.87	0.43	48.80	0.25	0.08
6GXDBR		62.54	-2.39	-0.54	48.47	-0.08	-0.03
6P9YXZ	X	64.10	-0.83	-0.19	53.60	5.05	1.57
72FLQD		66.60	1.67	0.38	49.70	1.15	0.36
77V8L6		65.69	0.76	0.17	49.05	0.50	0.15
7ADWU2		69.88	4.95	1.13	50.64	2.09	0.65
7F2KQT		64.78	-0.15	-0.03	48.50	-0.05	-0.02
8E4Q9E		68.28	3.35	0.76	51.02	2.46	0.77
9PY9CL	X	102.60	37.67	8.58	58.80	10.25	3.18
APDF9B		67.93	3.00	0.68	49.93	1.37	0.43
AU8EM7		59.97	-4.96	-1.13	44.72	-3.83	-1.19
B4T7XH		62.20	-2.73	-0.62	46.96	-1.59	-0.49
EY2EUG		63.36	-1.57	-0.36	48.16	-0.39	-0.12
GFZWRX		60.73	-4.20	-0.96	45.62	-2.93	-0.91
H49WPE		62.30	-2.63	-0.60	47.79	-0.76	-0.24
HCFLJD	*	59.82	-5.11	-1.16	48.33	-0.22	-0.07
HW8KQW		65.82	0.89	0.20	49.32	0.77	0.24
JCX8CF		65.78	0.85	0.19	50.16	1.61	0.50
KAGEQC		69.82	4.89	1.11	49.71	1.16	0.36
KCRD7E		66.38	1.45	0.33	48.76	0.21	0.06
KK6279		67.38	2.45	0.56	51.02	2.47	0.77
KQBZFC		70.10	5.17	1.18	52.02	3.47	1.08
L34G6D		71.96	7.03	1.60	52.78	4.23	1.31
L4CQWB	X	60.64	-4.29	-0.98	52.10	3.55	1.10
L7JBKB		72.29	7.36	1.68	54.53	5.98	1.86
LZYHKR		69.14	4.21	0.96	51.76	3.21	1.00
M4AJ73		62.80	-2.13	-0.49	47.80	-0.75	-0.23
M9MT8R		60.90	-4.03	-0.92	44.50	-4.05	-1.26
MNE2EJ		65.90	0.97	0.22	50.80	2.25	0.70
MNE2G6	X	69.96	5.03	1.15	57.04	8.48	2.64
NAU7CR		62.40	-2.53	-0.58	47.20	-1.35	-0.42
NMZLBP		57.70	-7.23	-1.65	45.40	-3.15	-0.98
NNCTMB		60.80	-4.13	-0.94	45.00	-3.55	-1.10
P8YPT4	X	29.90	-35.03	-7.98	23.20	-25.35	-7.88
PGVFK7		65.74	0.81	0.18	49.30	0.75	0.23
PTNYYB		69.28	4.35	0.99	50.98	2.43	0.75
PXTW8F		68.30	3.37	0.77	49.19	0.64	0.20
PZYHX2	*	53.12	-11.81	-2.69	40.66	-7.89	-2.45
QNJW47		65.84	0.91	0.21	47.01	-1.54	-0.48

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

WebCode	Data Flag	Sample SC15			Sample SC16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
QUQGCX		62.14	-2.79	-0.64	46.27	-2.28	-0.71
RPDXQA	X	54.80	-10.13	-2.31	46.00	-2.55	-0.79
RWXY98		72.18	7.24	1.65	53.71	5.16	1.60
TGXE9V		67.36	2.43	0.55	48.32	-0.23	-0.07
VAN4KZ	*	62.88	-2.05	-0.47	50.24	1.69	0.52
VG9REP		68.23	3.30	0.75	52.24	3.69	1.15
VQUBY3		67.97	3.04	0.69	50.58	2.03	0.63
VRR23J		66.10	1.17	0.27	48.20	-0.35	-0.11
VY4UXR		60.82	-4.11	-0.94	45.20	-3.35	-1.04
WEGHT8		68.60	3.67	0.84	52.30	3.75	1.16
X2NN8K		65.50	0.57	0.13	48.90	0.35	0.11
XDX4UW		66.02	1.09	0.25	49.76	1.21	0.38
XTDZH7		56.24	-8.69	-1.98	42.72	-5.83	-1.81
Y3JQCF		56.42	-8.51	-1.94	41.26	-7.29	-2.27
ZJKVEH		61.85	-3.08	-0.70	45.69	-2.86	-0.89
ZMGAN7		65.20	0.27	0.06	49.60	1.05	0.33
ZXFRGU		71.86	6.93	1.58	54.63	6.08	1.89

Summary Statistics

	Sample SC15	Sample SC16
Grand Means	64.931 Grams	48.552 Grams
SD Btwn Labs	4.392 Grams	3.218 Grams

Statistics based on 54 of 60 reporting participants

Comments on assigned Data Flags for Test #312

6P9YXZ (X) - Inconsistent in testing between samples and within the determinations for both samples.

9PY9CL (X) - Extreme data.

L4CQWB (X) - Inconsistent in testing between samples.

MNE2G6 (X) - Inconsistent in testing between samples and within the determinations for Sample SC15.

P8YPT4 (X) - Extreme data.

RPDXQA (X) - Inconsistent in testing between samples.

Analysis Notes:

8E4Q9E - Determination #2, Sample SC16, appears to have a misplaced decimal point. Data corrected by CTS.
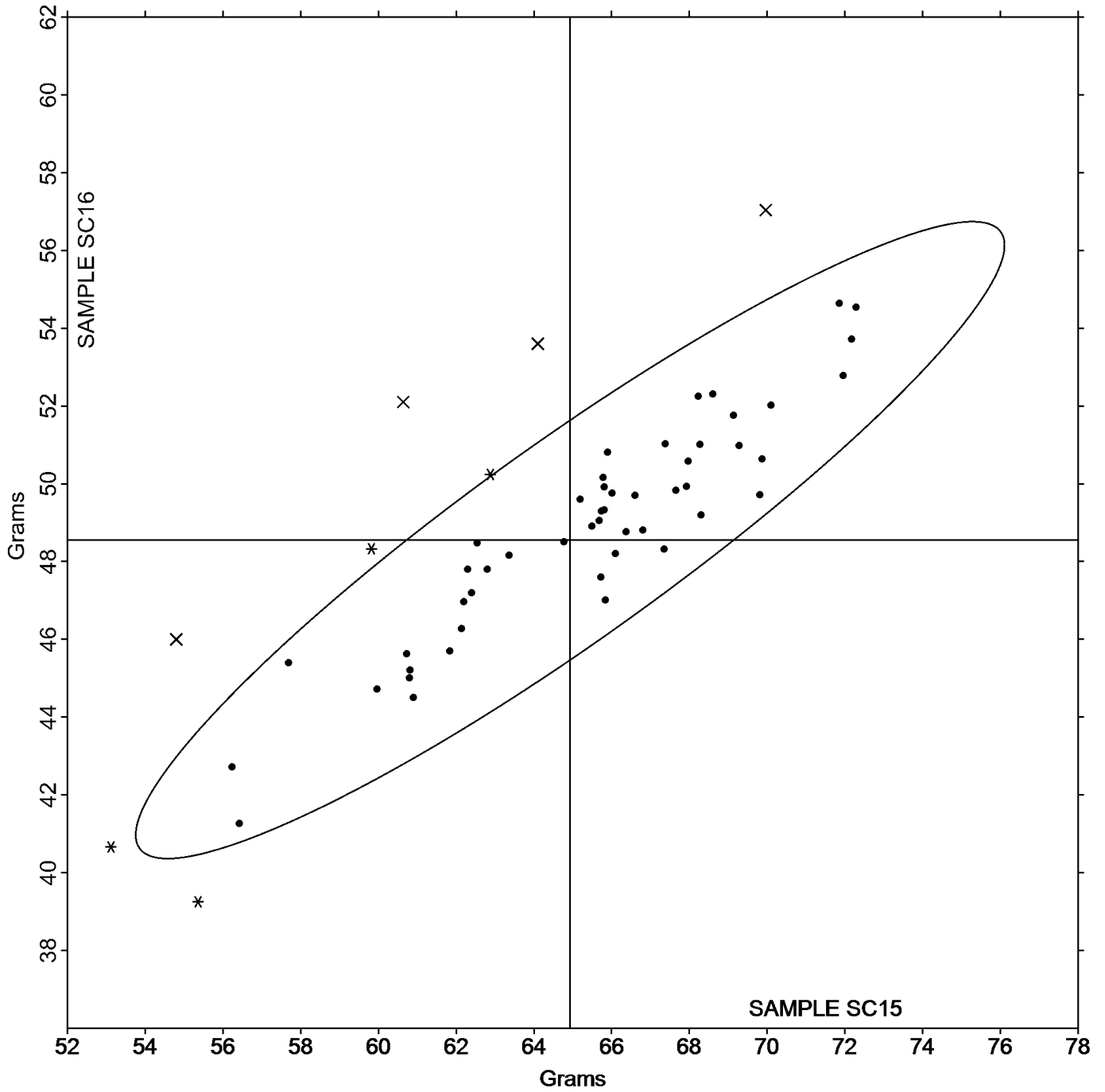
TGXE9V - Determination #2, Sample SC16, appears to have a misplaced decimal point. Data corrected by CTS.

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

Grand Mean Sample **SC15** = 64.931 Grams   Grand Mean Sample **SC16** = 48.552 Grams

ANALYSIS 312

SAMPLE SC16

Grams

SAMPLE SC15

Grams

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

WebCode	Data Flag	Sample SD15			Sample SD16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2B3CJ3		158.9	-1.4	-0.13	147.5	2.3	0.28
34KX6H		158.1	-2.3	-0.21	139.3	-6.0	-0.73
4TEKDG		164.8	4.4	0.41	155.7	10.4	1.27
6WCQHR		173.4	13.0	1.21	152.4	7.2	0.87
8DRUY4		171.8	11.4	1.06	152.3	7.0	0.85
94YZ6H		167.0	6.6	0.62	148.9	3.7	0.45
9DLYT3		158.0	-2.4	-0.22	144.2	-1.0	-0.12
9YPKVU		183.0	22.6	2.10	159.1	13.8	1.69
B88ZEE		153.3	-7.1	-0.66	141.1	-4.1	-0.50
BQ49UY		159.3	-1.1	-0.10	142.9	-2.3	-0.29
CP8FAY		164.7	4.3	0.40	149.9	4.6	0.57
D44RH4		154.0	-6.4	-0.59	146.0	0.8	0.09
DQYTCH		167.3	6.9	0.64	150.5	5.3	0.64
EHVM28		148.4	-12.0	-1.11	133.8	-11.4	-1.40
FJ7EH8	X	161.3	0.9	0.09	164.3	19.1	2.33
FTXN9Q		147.1	-13.3	-1.24	140.0	-5.2	-0.64
FU8TLE	X	180.1	19.8	1.84	163.1	17.8	2.18
FX7AWM		158.4	-2.0	-0.18	143.2	-2.0	-0.25
FZUJ9A		151.7	-8.7	-0.81	141.1	-4.1	-0.51
HQHCZB		155.8	-4.6	-0.42	141.2	-4.0	-0.49
HVFMG6		155.8	-4.6	-0.43	142.0	-3.3	-0.40
JBJP9A		163.6	3.2	0.30	145.6	0.4	0.04
KCRD7E		158.6	-1.7	-0.16	141.9	-3.4	-0.41
NU37MD		149.5	-10.9	-1.01	136.0	-9.2	-1.13
P8YPT4	X	144.4	-16.0	-1.48	130.0	-15.2	-1.86
QNJW47		164.3	3.9	0.37	143.7	-1.5	-0.19
RHCZ9R		186.4	26.0	2.42	162.8	17.6	2.14
T937DQ		168.9	8.5	0.79	150.8	5.5	0.67
U7Y3C9		171.4	11.0	1.02	156.4	11.1	1.36
UCWW2U		159.1	-1.2	-0.12	141.2	-4.1	-0.50
URFF4V	X	137.2	-23.1	-2.15	130.0	-15.2	-1.86
WMUAH7		153.6	-6.8	-0.63	134.6	-10.6	-1.30
XA43YA		156.7	-3.6	-0.34	141.4	-3.8	-0.47
XJP2RZ		146.4	-14.0	-1.30	134.0	-11.2	-1.37
Y7Y9KK		141.3	-19.1	-1.77	134.8	-10.5	-1.28
ZPQRXH	*	177.8	17.5	1.62	164.3	19.0	2.32
ZXW7KW		143.8	-16.6	-1.54	134.8	-10.4	-1.27

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

	Summary Statistics	
	Sample SD15	**Sample SD16**
Grand Means	160.37 Grams	145.25 Grams
SD Btwn Labs	10.76 Grams	8.19 Grams

Statistics based on 33 of 37 reporting participants

Comments on assigned Data Flags for Test #314

FJ7EH8 (X) - Inconsistent in testing between samples.

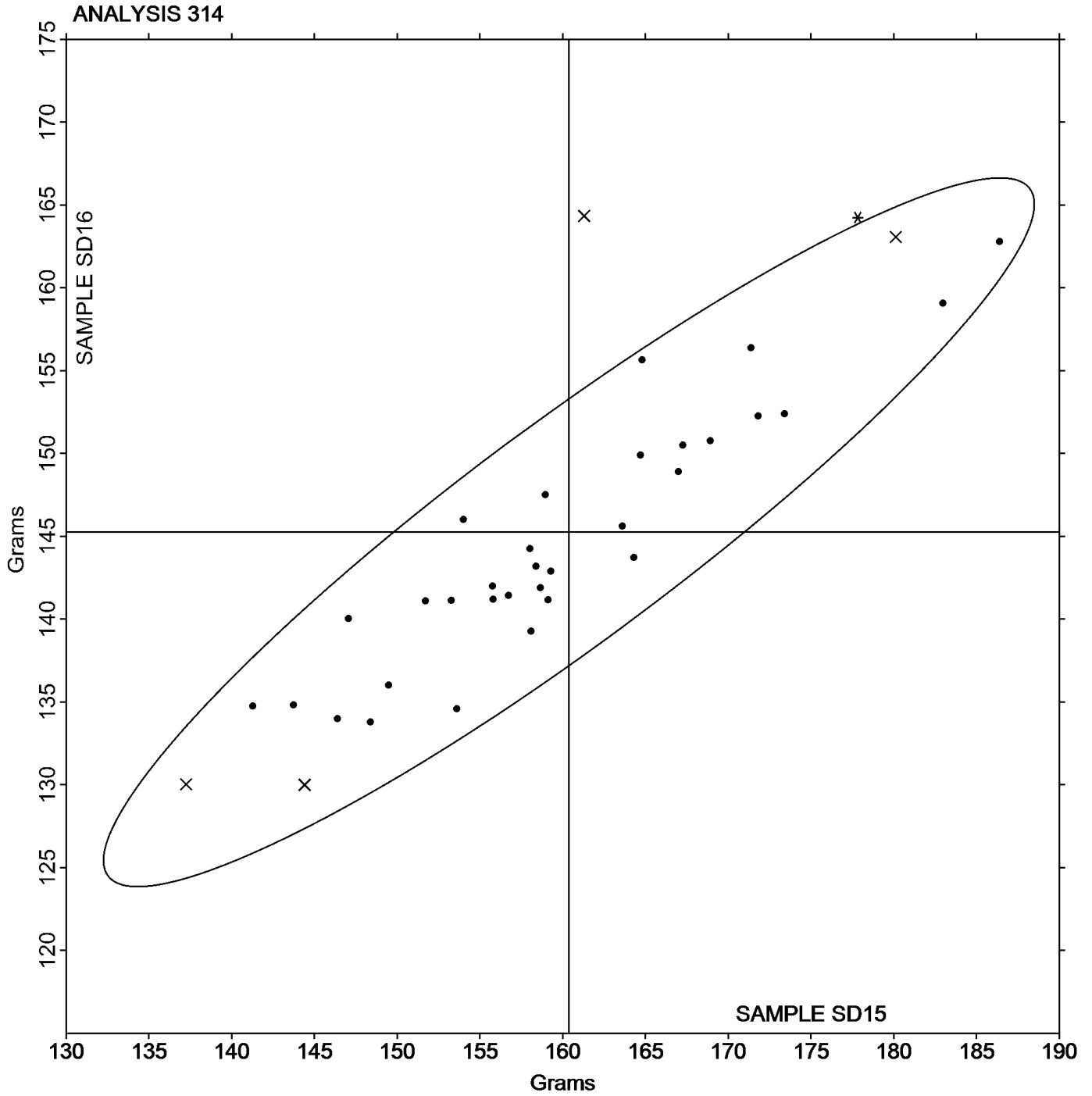FU8TLE (X) - Data appear to be off by a factor of .25; data converted by CTS (x4).

P8YPT4 (X) - Data appear to be off by a factor of .25; data converted by CTS (x4).

URFF4V (X) - 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 **SD15** = 160.37 Grams

Grand Mean Sample **SD16** = 145.25 Grams

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

WebCode	Data Flag	Sample SR15			Sample SR16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3MTN9K		2.149	-0.106	-1.19	2.531	-0.126	-1.16
6P9YXZ		2.318	0.064	0.72	2.653	-0.003	-0.03
B88ZEE		2.253	-0.002	-0.02	2.809	0.152	1.41
H49WPE		2.219	-0.036	-0.40	2.587	-0.069	-0.64
HARV7U	X	2.655	0.400	4.53	3.119	0.463	4.28
JD8Q2X		2.167	-0.087	-0.99	2.521	-0.136	-1.25
MNE2EJ		2.382	0.128	1.44	2.729	0.072	0.67
PKAAZ3		2.407	0.153	1.72	2.784	0.128	1.18
VW78PX		2.253	-0.002	-0.02	2.536	-0.120	-1.11
X2NN8K		2.183	-0.071	-0.81	2.736	0.080	0.74
ZMGAN7		2.214	-0.040	-0.46	2.679	0.022	0.20

Summary Statistics

	Sample SR15	Sample SR16
Grand Means	2.2546 kN/m	2.6565 kN/m
SD Btwn Labs	0.0885 kN/m	0.1081 kN/m

Statistics based on 10 of 11 reporting participants

Comments on assigned Data Flags for Test #320

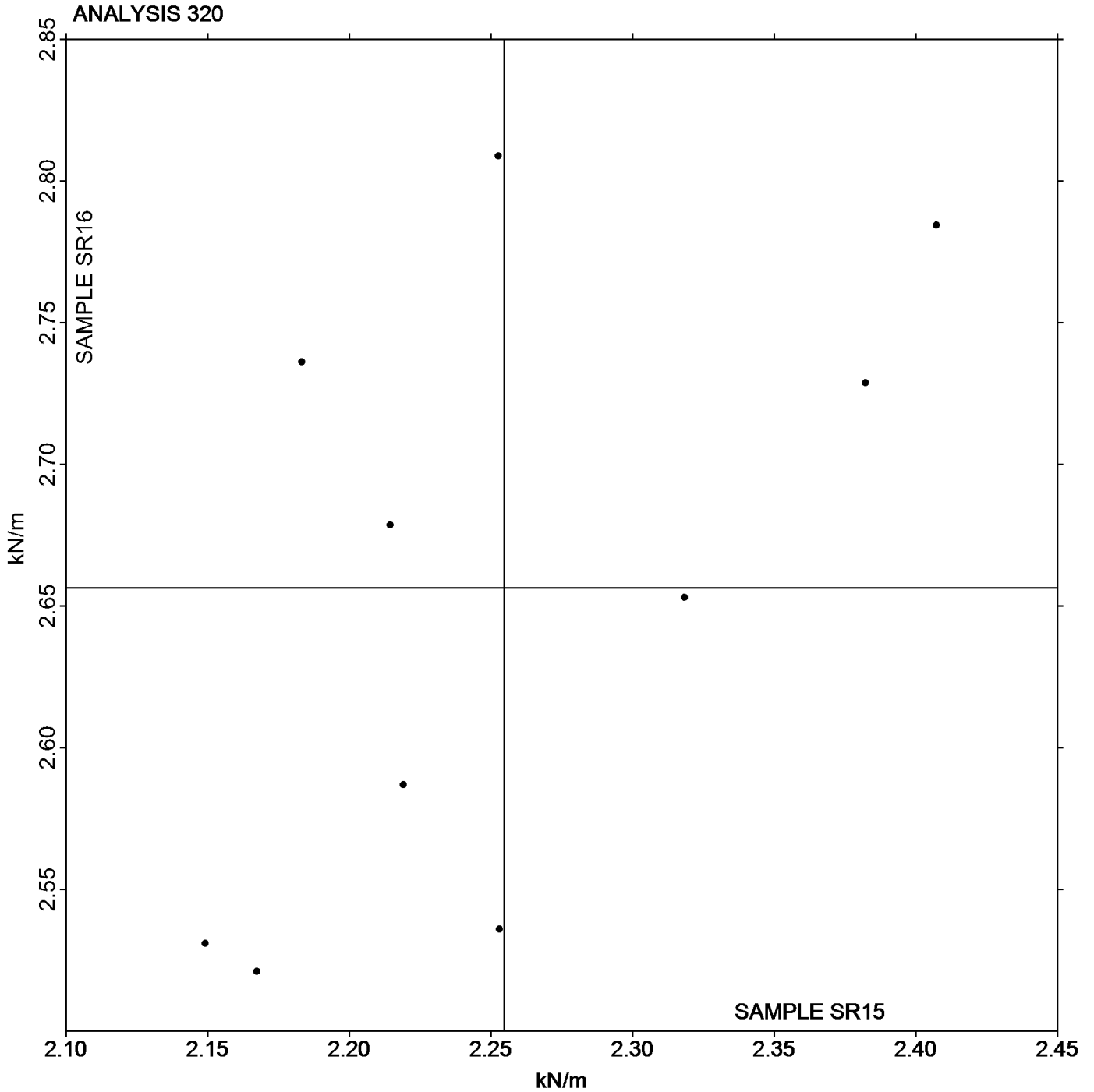HARV7U (X) - Data for both samples are high.

Analysis Notes:

MNE2EJ - Data appear to be reported as kg/15mm, not kN/m as indicated on datasheet. Units corrected by CTS.

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

Grand Mean Sample **SR15** = 2.2546 kN/m   Grand Mean Sample **SR16** = 2.6565 kN/m

ANALYSIS 320

SAMPLE SR16

SAMPLE SR15

kN/m (y-axis)

kN/m (x-axis)

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 SR15			Sample SR16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3MTN9K		12.93	-1.68	-0.92	20.74	-2.21	-1.42
6P9YXZ		16.90	2.28	1.25	24.00	1.04	0.67
B88ZEE		12.24	-2.38	-1.31	23.92	0.96	0.62
H49WPE		13.62	-1.00	-0.55	22.28	-0.68	-0.44
HARV7U	X	18.28	3.66	2.01	29.06	6.10	3.93
JD8Q2X		16.55	1.93	1.06	25.47	2.51	1.62
MNE2EJ		16.20	1.58	0.87	22.50	-0.46	-0.29
PKAAZ3		15.84	1.23	0.67	23.61	0.65	0.42
VW78PX		15.88	1.27	0.70	23.41	0.45	0.29
X2NN8K		12.46	-2.15	-1.18	20.30	-2.66	-1.71
ZMGAN7		13.53	-1.09	-0.60	23.34	0.38	0.25

Summary Statistics

	Sample SR15	Sample SR16
Grand Means	14.616 Joules/sq m	22.956 Joules/sq m
SD Btwn Labs	1.822 Joules/sq m	1.553 Joules/sq m

Statistics based on 10 of 11 reporting participants

Comments on assigned Data Flags for Test #321

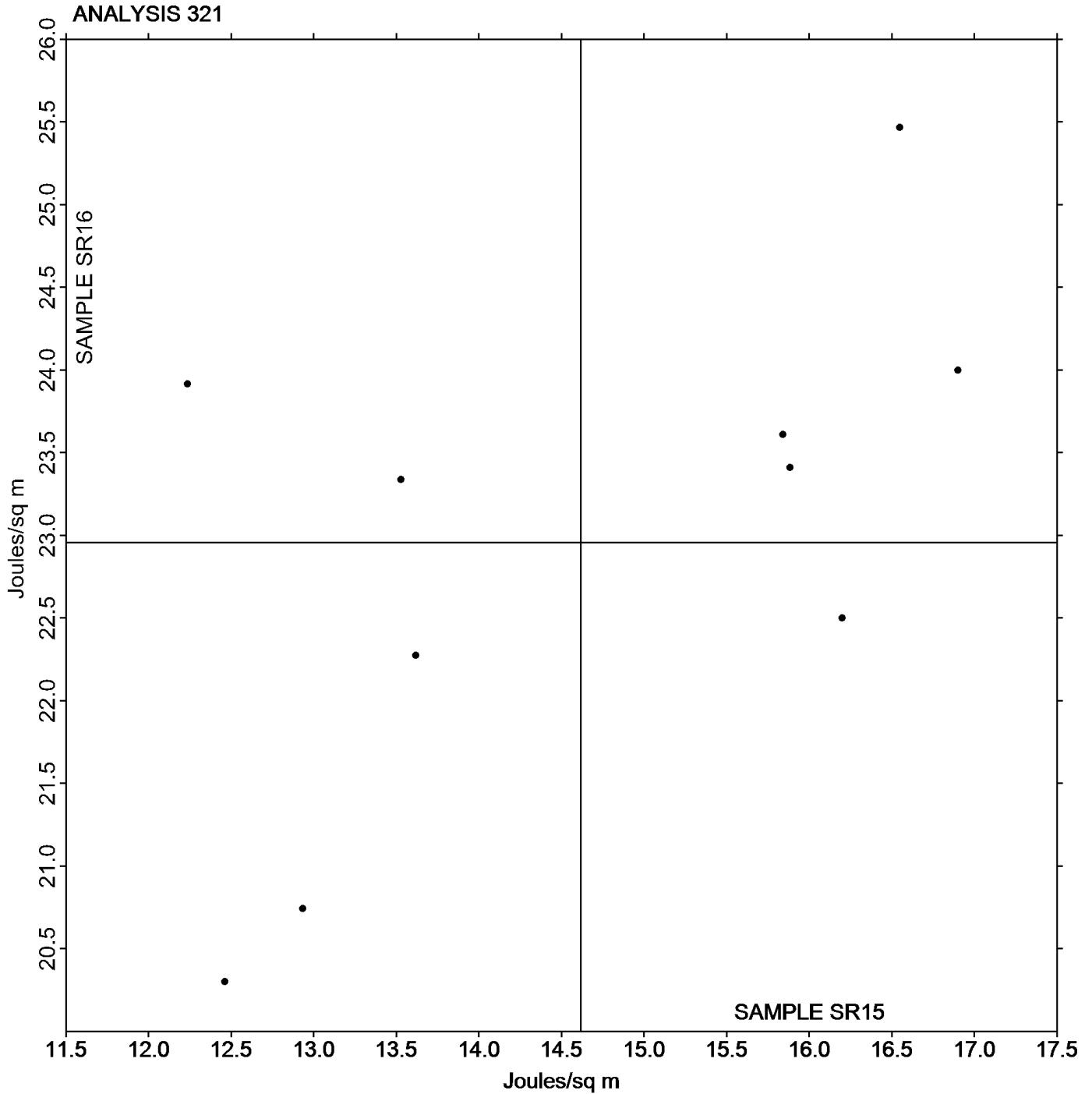HARV7U (X) - Data for Sample SR16 are high.

TAPPI-CTS Interlaboratory Testing Program
Analysis 321
Tensile Energy Absorption - Newsprint

Grand Mean Sample **SR15** = 14.616 Joules/sq m   Grand Mean Sample **SR16** = 22.956 Joules/sq m

ANALYSIS 321

SAMPLE SR16

SAMPLE SR15

Joules/sq m (y-axis)

Joules/sq m (x-axis)

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
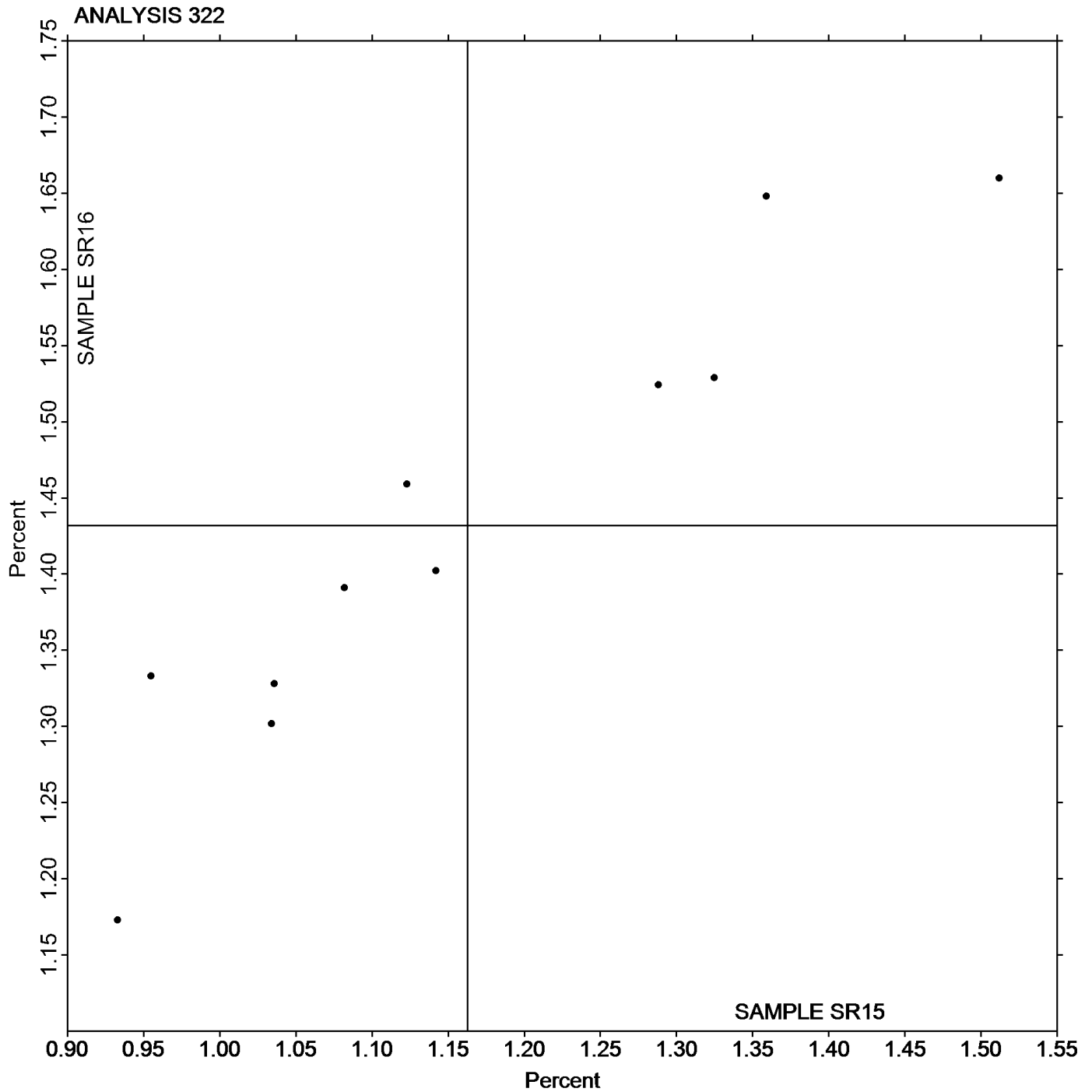## Analysis 322
Elongation to Break - Newsprint

WebCode	Data Flag	Sample SR15 Lab Mean	Sample SR15 Diff from Grand Mean	Sample SR15 CPV	Sample SR16 Lab Mean	Sample SR16 Diff from Grand Mean	Sample SR16 CPV
3MTN9K		1.034	-0.129	-0.70	1.302	-0.130	-0.87
6P9YXZ		1.359	0.196	1.07	1.648	0.216	1.44
B88ZEE		0.955	-0.208	-1.13	1.333	-0.099	-0.66
H49WPE		1.036	-0.127	-0.69	1.328	-0.104	-0.69
HARV7U		1.082	-0.081	-0.44	1.391	-0.041	-0.27
JD8Q2X		1.512	0.349	1.90	1.660	0.228	1.52
MNE2EJ		1.288	0.125	0.68	1.524	0.092	0.62
PKAAZ3		1.325	0.162	0.88	1.529	0.097	0.65
VW78PX		1.142	-0.021	-0.11	1.402	-0.030	-0.20
X2NN8K		0.933	-0.230	-1.25	1.173	-0.259	-1.73
ZMGAN7		1.123	-0.040	-0.22	1.459	0.027	0.18

Summary Statistics

	Sample SR15	Sample SR16
Grand Means	1.1626 Percent	1.4317 Percent
SD Btwn Labs	0.1843 Percent	0.1498 Percent

Statistics based on 11 of 11 reporting participants

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

Grand Mean Sample **SR15** = 1.1626 Percent

Grand Mean Sample **SR16** = 1.4317 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 SF15			Sample SF16			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2RTHQV		3.894	-0.171	-0.63	4.726	-0.063	-0.24	XX
3XB8QW	X	4.294	0.229	0.85	5.711	0.922	3.46	TJ
4F8XJ6		3.776	-0.289	-1.07	4.538	-0.251	-0.94	TB
4U8UKH		3.472	-0.594	-2.20	4.342	-0.447	-1.68	SP
6P9YXZ		3.896	-0.169	-0.63	4.625	-0.165	-0.62	XX
72FLQD		4.419	0.354	1.31	5.065	0.275	1.03	LH
7F2KQT		4.020	-0.045	-0.17	4.820	0.031	0.12	LE
8E4Q9E		4.317	0.251	0.93	4.963	0.173	0.65	LH
8EMEQA		4.260	0.195	0.72	5.068	0.279	1.05	TB
APDF9B		3.878	-0.187	-0.69	4.672	-0.117	-0.44	LI
AU8EM7		4.272	0.206	0.76	4.900	0.111	0.42	TP
B4T7XH		4.177	0.112	0.41	5.001	0.211	0.79	TA
DL3H86		3.984	-0.081	-0.30	4.581	-0.208	-0.78	IN
DQXV2M		3.984	-0.081	-0.30	4.835	0.046	0.17	TB
H49WPE		3.990	-0.075	-0.28	4.700	-0.089	-0.34	LH
HCFLJD		4.210	0.145	0.54	4.975	0.186	0.70	XX
HW8KQW		4.132	0.067	0.25	5.007	0.218	0.82	MR
JCX8CF	*	4.564	0.499	1.85	5.045	0.256	0.96	LA
KAGEQC		4.118	0.053	0.20	4.828	0.039	0.15	LH
KK6279		3.637	-0.428	-1.59	4.404	-0.385	-1.45	IM
KQBZFC		3.403	-0.662	-2.45	4.137	-0.652	-2.45	ID
L34G6D		3.832	-0.233	-0.86	4.411	-0.378	-1.42	IM
L4CQWB	X	4.515	0.450	1.67	4.676	-0.113	-0.43	TJ
L7JBKB		3.556	-0.509	-1.88	4.351	-0.438	-1.64	LH
LZYHKR		3.930	-0.135	-0.50	4.856	0.067	0.25	TO
M4AJ73		4.003	-0.062	-0.23	4.832	0.043	0.16	DL
M9MT8R		4.266	0.201	0.74	4.953	0.163	0.61	TO
MNE2EJ		4.100	0.035	0.13	4.759	-0.030	-0.11	XX
MNE2G6	*	4.069	0.003	0.01	4.526	-0.263	-0.99	LA
NMZLBP		4.086	0.021	0.08	4.563	-0.226	-0.85	TB
NNCTMB		4.152	0.087	0.32	5.005	0.216	0.81	TO
PGVFK7		3.777	-0.288	-1.07	4.496	-0.293	-1.10	XX
PTNYYB		4.111	0.046	0.17	4.882	0.093	0.35	LH
PXTW8F		4.080	0.015	0.05	4.833	0.044	0.17	LH
PZYHX2		4.027	-0.038	-0.14	4.818	0.029	0.11	TF
QNJW47		4.082	0.017	0.06	4.848	0.058	0.22	LH
QUQGCX		4.443	0.377	1.40	5.069	0.280	1.05	LX
TGXE9V		3.876	-0.189	-0.70	4.530	-0.259	-0.97	LI
TQY763		3.926	-0.139	-0.52	4.649	-0.140	-0.53	LH
UTA2V2		4.676	0.611	2.26	5.459	0.669	2.51	TJ
VG9REP		4.096	0.031	0.11	4.707	-0.082	-0.31	LI
VQUBY3		3.984	-0.081	-0.30	4.622	-0.167	-0.63	LI
VRR23J		4.244	0.179	0.66	5.048	0.259	0.97	LH

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

| WebCode | Data Flag | Sample SF15 | | | Sample SF16 | | | Instr Code |
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
VY4UXR		4.523	0.458	1.70	5.277	0.487	1.83	TB
WEGHT8		3.857	-0.208	-0.77	4.563	-0.226	-0.85	TC
WMUAH7		3.974	-0.091	-0.34	4.818	0.029	0.11	IM
XDX4UW		4.029	-0.037	-0.14	4.711	-0.079	-0.30	LH
XTDZH7		4.300	0.234	0.87	5.064	0.274	1.03	LF
Y3JQCF		4.667	0.602	2.23	5.370	0.581	2.18	LH
ZJKVEH		4.003	-0.062	-0.23	4.638	-0.151	-0.57	LH
ZMGAN7		4.123	0.058	0.21	4.784	-0.006	-0.02	XX
ZXFRGU	X	3.550	-0.515	-1.91	4.882	0.093	0.35	TP

Summary Statistics

	Sample SF15	Sample SF16
Grand Means	4.0652 kN/m	4.7893 kN/m
SD Btwn Labs	0.2700 kN/m	0.2665 kN/m

Statistics based on 49 of 52 reporting participants

Comments on assigned Data Flags for Test #325

3XB8QW (X) - Inconsistent in testing between samples, data for Sample SF16 are high.

L4CQWB (X) - Inconsistent in testing between samples.

ZXFRGU (X) - Inconsistent in testing between samples.

Analysis Notes:

6P9YXZ - Data appear to be reported as kg/15 mm, not kN/m as indicated on datasheet. Units corrected by CTS.

8EMEQA - Data appear to be reported as kN/m, not kg/15 mm as indicated on datasheet. Units corrected by CTS.

MNE2EJ - Data appear to be reported as kg/15 mm, not kN/m as indicated on datasheet. Units corrected by CTS.

ZMGAN7 - Data appear to be reported as kg/15 mm, not kN/m as indicated on datasheet. Units corrected by CTS.
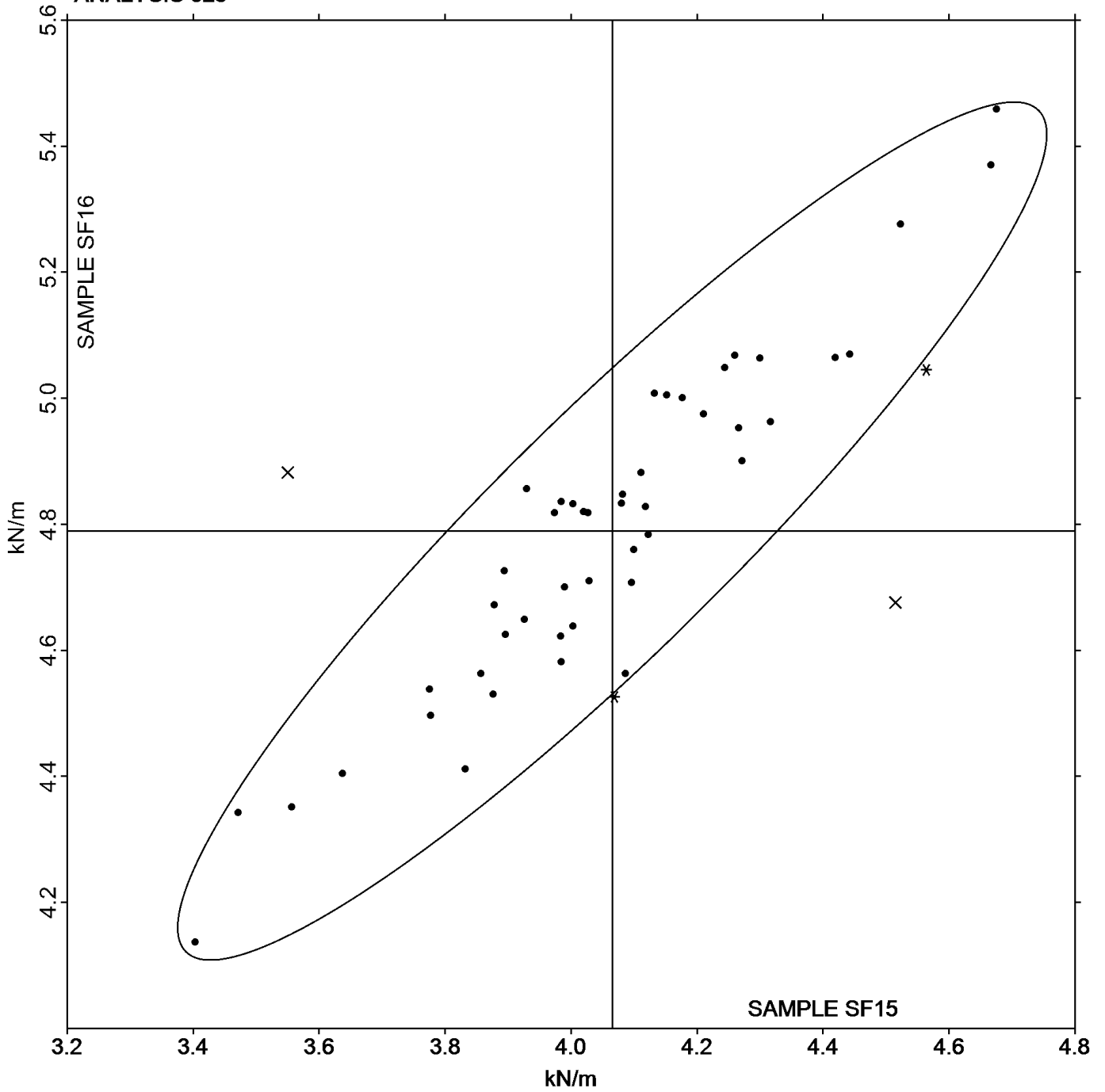
Instrument Code List

(DL) - EMIC DL500 Universal Testing Machines	(ID) - Instron 4201/4202
(IM) - Instron 5500 Series	(IN) - Instron 3340 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	(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
(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 **SF15** = 4.0652 kN/m

Grand Mean Sample **SF16** = 4.7893 kN/m

ANALYSIS 325

SAMPLE SF16

kN/m

SAMPLE SF15

kN/m

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

WebCode	Data Flag	Sample SF15			Sample SF16			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2RTHQV		31.84	0.14	0.04	65.47	0.36	0.05	XX
4F8XJ6		30.73	-0.97	-0.26	66.78	1.67	0.23	TB
6P9YXZ		30.40	-1.30	-0.35	59.90	-5.21	-0.73	XX
8E4Q9E		37.04	5.34	1.45	70.24	5.13	0.72	LH
8EMEQA		29.09	-2.61	-0.71	61.84	-3.27	-0.46	TB
APDF9B		29.11	-2.59	-0.70	64.16	-0.95	-0.13	LI
AU8EM7	*	22.69	-9.01	-2.44	45.49	-19.62	-2.75	TP
DQXV2M		32.08	0.38	0.10	68.64	3.54	0.50	TB
H49WPE		31.08	-0.62	-0.17	63.99	-1.12	-0.16	LH
HW8KQW		32.93	1.23	0.33	69.40	4.30	0.60	MR
JCX8CF	X	43.55	11.85	3.21	75.55	10.45	1.46	LA
KAGEQC		30.45	-1.25	-0.34	61.15	-3.96	-0.55	LH
KK6279		29.94	-1.76	-0.48	70.24	5.13	0.72	IM
KQBZFC		25.25	-6.45	-1.75	56.81	-8.30	-1.16	ID
L34G6D		39.77	8.07	2.19	77.91	12.80	1.79	IM
L7JBKB		30.83	-0.87	-0.24	66.23	1.13	0.16	LH
M4AJ73		34.57	2.87	0.78	73.54	8.43	1.18	DL
M9MT8R		39.99	8.29	2.25	79.97	14.87	2.08	TO
MNE2EJ		30.20	-1.50	-0.41	53.10	-12.01	-1.68	XX
MNE2G6		28.08	-3.62	-0.98	53.40	-11.71	-1.64	LA
NNCTMB		29.07	-2.63	-0.71	64.45	-0.66	-0.09	TO
PGVFK7		38.71	7.01	1.90	71.95	6.84	0.96	XX
PTNYYB		31.71	0.01	0.00	63.64	-1.46	-0.21	LH
PXTW8F		31.83	0.13	0.03	67.97	2.86	0.40	LH
QNJW47		31.60	-0.10	-0.03	63.16	-1.95	-0.27	LH
QUQGCX		33.97	2.27	0.62	67.22	2.11	0.30	LX
TGXE9V		28.97	-2.73	-0.74	58.67	-6.44	-0.90	LI
TQY763		30.82	-0.88	-0.24	66.07	0.96	0.13	LH
UTA2V2		27.84	-3.86	-1.05	53.15	-11.96	-1.67	TJ
VG9REP		33.26	1.56	0.42	63.84	-1.27	-0.18	LI
VQUBY3		33.66	1.96	0.53	63.84	-1.27	-0.18	LI
VRR23J		33.29	1.59	0.43	70.63	5.52	0.77	LX
VY4UXR		35.97	4.27	1.16	74.18	9.07	1.27	TB
WMUAH7		30.95	-0.75	-0.20	68.33	3.22	0.45	IM
XDX4UW		34.10	2.40	0.65	69.41	4.30	0.60	LH
XTDZH7		24.23	-7.47	-2.03	53.62	-11.49	-1.61	LW
Y3JQCF		33.83	2.13	0.58	66.00	0.89	0.13	LH
ZJKVEH		30.50	-1.20	-0.33	64.76	-0.35	-0.05	LH
ZMGAN7		34.10	2.40	0.65	66.46	1.35	0.19	XX
ZXFRGU		31.81	0.11	0.03	73.61	8.50	1.19	TP

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

	Summary Statistics	
Sample SF15		**Sample SF16**
Grand Means	31.700 Joules/sq m	65.108 Joules/sq m
SD Btwn Labs	3.690 Joules/sq m	7.141 Joules/sq m

Statistics based on 39 of 40 reporting participants

Comments on assigned Data Flags for Test #327

JCX8CF (X) - Data for Sample SF15 are high.

Analysis Notes:

8EMEQA - Data appear to be reported as J/sq m, not kg-m/sq m as indicated on datasheet. Units corrected by CTS.

DQXV2M - Data appear to be reported as kg-m/sq m, not J/sq m as indicated on datasheet. Units corrected by CTS.

UTA2V2 - Data appear to be reported as kg-m/sq m, not inch-lb/sq inch as indicated on datasheet. Units corrected by CTS.

Instrument Code List

(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	(TB) - Thwing-Albert EJA/1000
(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 **SF15** = 31.700 Joules/sq m   Grand Mean Sample **SF16** = 65.108 Joules/sq m

ANALYSIS 327

SAMPLE SF16

Joules/sq m

SAMPLE SF15

Joules/sq m

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

WebCode	Data Flag	Sample SF15			Sample SF16			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2RTHQV		1.331	0.015	0.10	2.097	-0.026	-0.12	XX
3XB8QW	X	1.380	0.064	0.41	1.760	-0.363	-1.61	LH
4F8XJ6		1.303	-0.013	-0.09	2.230	0.106	0.47	TB
6P9YXZ		1.498	0.182	1.17	2.388	0.265	1.17	XX
8E4Q9E		1.316	0.000	0.00	2.070	-0.053	-0.24	LH
8EMEQA	X	31.480	30.164	193.30	51.339	49.216	217.37	TB
APDF9B		1.181	-0.135	-0.86	2.057	-0.066	-0.29	LI
AU8EM7		1.234	-0.082	-0.52	1.978	-0.145	-0.64	TP
DL3H86		1.296	-0.020	-0.13	1.997	-0.126	-0.56	IN
DQXV2M		1.297	-0.019	-0.12	2.129	0.006	0.03	TB
H49WPE		1.251	-0.065	-0.42	2.009	-0.114	-0.51	LH
HW8KQW		1.314	-0.002	-0.01	2.103	-0.020	-0.09	MR
JCX8CF		1.337	0.021	0.14	2.023	-0.100	-0.44	LA
KAGEQC		1.071	-0.245	-1.57	1.781	-0.342	-1.51	LH
KK6279		1.485	0.169	1.08	2.532	0.409	1.80	XX
KQBZFC		1.166	-0.150	-0.96	2.030	-0.094	-0.41	ID
L34G6D		1.611	0.295	1.89	2.657	0.533	2.36	IM
L7JBKB		1.326	0.010	0.06	2.246	0.123	0.54	LH
LZYHKR	X	4.085	2.769	17.75	5.969	3.846	16.98	TO
M4AJ73		1.549	0.233	1.49	2.452	0.329	1.45	DL
M9MT8R	*	1.759	0.443	2.84	2.697	0.574	2.53	TO
MNE2EJ		1.419	0.103	0.66	2.044	-0.079	-0.35	XX
MNE2G6		1.300	-0.016	-0.10	2.085	-0.038	-0.17	LA
NMZLBP		1.410	0.094	0.60	2.110	-0.013	-0.06	TF
NNCTMB		1.091	-0.225	-1.44	1.894	-0.229	-1.01	TG
PGVFK7		1.551	0.235	1.51	2.359	0.236	1.04	XX
PTNYYB		1.156	-0.160	-1.02	1.885	-0.238	-1.05	LH
PXTW8F		1.235	-0.081	-0.52	2.073	-0.050	-0.22	LH
PZYHX2		1.400	0.084	0.54	2.260	0.137	0.60	TF
QNJW47		1.220	-0.096	-0.61	1.943	-0.180	-0.80	LH
QUQGCX		1.228	-0.088	-0.56	1.975	-0.148	-0.66	LX
TGXE9V		1.215	-0.101	-0.65	1.863	-0.260	-1.15	LI
TQY763		1.230	-0.086	-0.55	2.118	-0.005	-0.02	LH
UTA2V2		1.498	0.182	1.17	2.262	0.139	0.61	TJ
VG9REP		1.271	-0.045	-0.29	2.027	-0.096	-0.43	LI
VQUBY3		1.306	-0.010	-0.06	2.037	-0.086	-0.38	LI
VRR23J		1.226	-0.090	-0.58	2.061	-0.062	-0.28	LX
VY4UXR		1.265	-0.051	-0.32	2.092	-0.031	-0.14	TB
WMUAH7		1.237	-0.079	-0.51	2.103	-0.020	-0.09	IM
XDX4UW		1.308	-0.008	-0.05	2.164	0.041	0.18	LH
XTDZH7		0.985	-0.331	-2.12	1.652	-0.471	-2.08	LX
Y3JQCF		1.167	-0.149	-0.95	1.829	-0.294	-1.30	LH
ZJKVEH		1.220	-0.096	-0.61	2.088	-0.035	-0.16	XX

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

WebCode	Data Flag	Sample SF15			Sample SF16			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
ZMGAN7		1.392	0.076	0.49	2.159	0.036	0.16	XX
ZXFRGU		1.612	0.296	1.90	2.625	0.502	2.22	TP

Summary Statistics

	Sample SF15	Sample SF16
Grand Means	1.3159 Percent	2.1234 Percent
SD Btwn Labs	0.1561 Percent	0.2264 Percent

Statistics based on 42 of 45 reporting participants

Comments on assigned Data Flags for Test #328

3XB8QW (X) - Inconsistent in testing between samples.

8EMEQA (X) - Extreme data.

LZYHKR (X) - Extreme data.
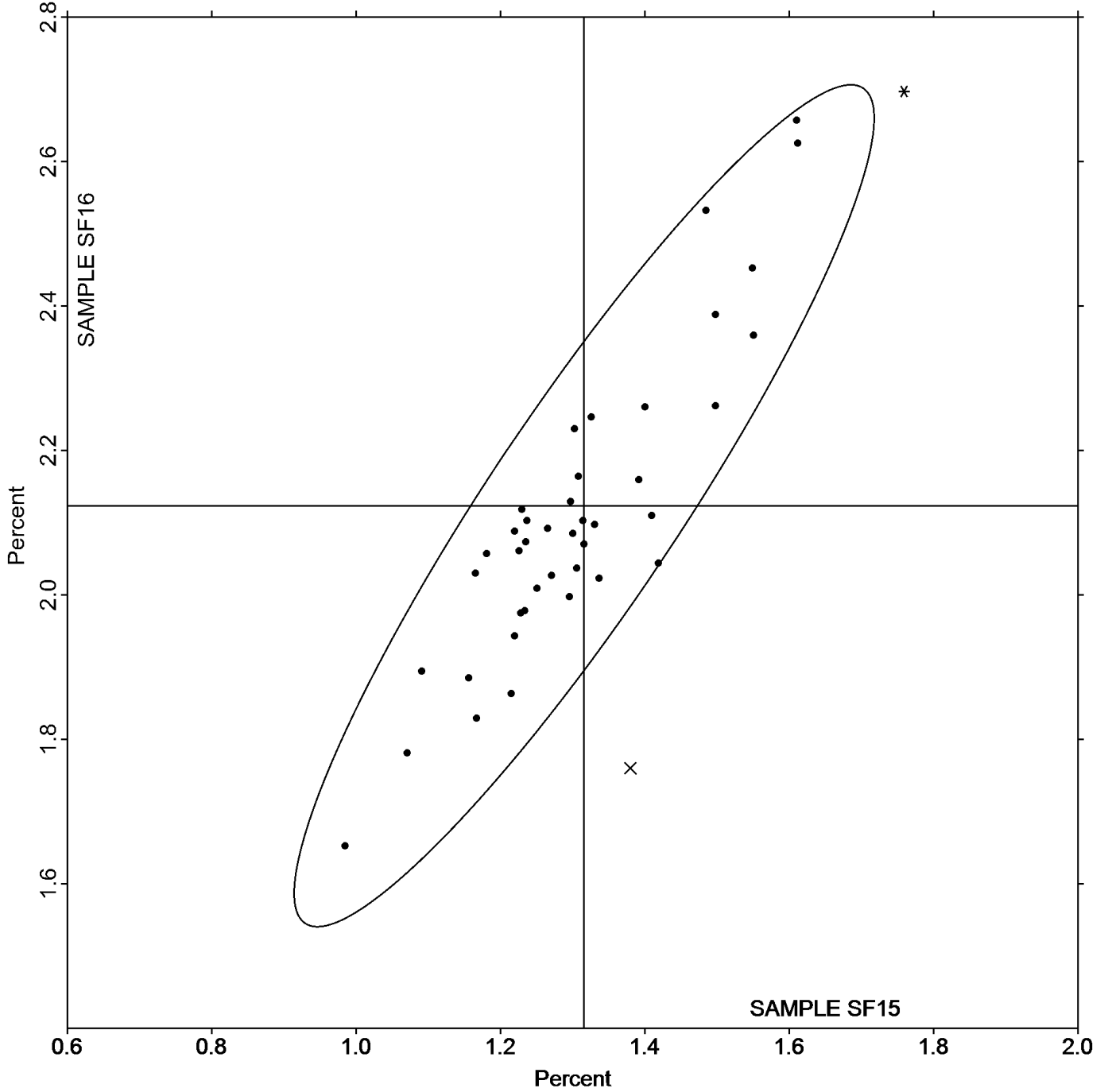
Instrument Code List

(DL) - EMIC DL500 Universal Testing Machines	(ID) - Instron 4201
(IM) - Instron 5500	(IN) - Instron 3340 Series
(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	(TB) - Thwing-Albert EJA/1000
(TF) - Thwing-Albert EJA Vantage-1	(TG) - Thwing-Albert QC
(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 328
Elongation to Break - Printing Papers

Grand Mean Sample **SF15** = 1.3159 Percent

Grand Mean Sample **SF16** = 2.1234 Percent

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

WebCode	Data Flag	Sample SE15			Sample SE16			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2B3CJ3		8.991	0.277	0.47	14.72	0.96	1.01	TP
34KX6H		9.795	1.081	1.83	15.90	2.14	2.25	LA
4TEKDG		9.938	1.225	2.08	16.10	2.34	2.46	LA
6GXDBR		7.951	-0.763	-1.29	13.20	-0.55	-0.58	IF
7ADWU2		8.208	-0.506	-0.86	12.95	-0.81	-0.85	TR
8DRUY4		7.898	-0.816	-1.38	12.17	-1.59	-1.66	TK
94YZ6H		8.917	0.204	0.35	14.40	0.65	0.68	LH
9DLYT3		8.581	-0.132	-0.22	13.60	-0.15	-0.16	LH
9WKUQZ		7.919	-0.794	-1.35	12.96	-0.79	-0.83	IM
9YPKVU		7.848	-0.866	-1.47	12.33	-1.43	-1.50	LW
APXN9J		8.603	-0.111	-0.19	13.16	-0.59	-0.62	LW
AU8EM7		9.308	0.594	1.01	14.22	0.46	0.48	TO
B93L6K		8.815	0.101	0.17	13.57	-0.19	-0.20	LE
BC6L7H		8.335	-0.379	-0.64	13.21	-0.55	-0.57	LA
BFKN29		8.513	-0.201	-0.34	13.80	0.04	0.04	XX
BQ49UY		9.150	0.437	0.74	14.37	0.62	0.65	TO
CP8FAY		8.420	-0.294	-0.50	13.47	-0.28	-0.30	IM
D44RH4		8.844	0.130	0.22	14.30	0.54	0.57	LW
EHVM28		9.587	0.873	1.48	15.27	1.52	1.59	TH
FJ7EH8		8.454	-0.259	-0.44	13.46	-0.30	-0.31	ID
FTXN9Q		8.781	0.067	0.11	14.10	0.34	0.36	TB
FX7AWM		9.212	0.498	0.85	13.98	0.23	0.24	TK
HVFMG6		8.849	0.135	0.23	13.73	-0.03	-0.03	IK
JBJP9A		8.226	-0.487	-0.83	13.21	-0.55	-0.58	SP
KCRD7E	X	12.817	4.103	6.96	20.68	6.92	7.27	TB
NU37MD		8.494	-0.220	-0.37	14.18	0.43	0.45	TO
P8YPT4		8.063	-0.651	-1.10	12.45	-1.31	-1.37	IF
QNJW47		8.805	0.091	0.15	13.94	0.19	0.20	LH
RHCZ9R		8.659	-0.055	-0.09	13.48	-0.28	-0.30	TH
RK3EJN		8.679	-0.034	-0.06	13.72	-0.03	-0.03	TB
RWXY98		8.255	-0.459	-0.78	12.91	-0.85	-0.89	LE
T937DQ	X	1.310	-7.404	-12.57	1.87	-11.89	-12.48	LA
U7Y3C9		8.241	-0.473	-0.80	13.36	-0.39	-0.41	XX
UCWW2U		8.807	0.093	0.16	13.46	-0.30	-0.31	IF
XA43YA		8.126	-0.588	-1.00	12.87	-0.89	-0.93	SA
XJP2RZ		8.871	0.157	0.27	13.41	-0.35	-0.36	LE
Y7Y9KK	X	6.958	-1.755	-2.98	13.73	-0.02	-0.03	IM
Y8RCZC	X	9.497	0.783	1.33	13.68	-0.08	-0.08	TA
YQ682C	*	10.317	1.603	2.72	15.87	2.12	2.22	LA
ZPQP9D	X	9.510	0.796	1.35	13.36	-0.40	-0.42	TX
ZPQRXH		8.601	-0.113	-0.19	12.82	-0.93	-0.98	TP
ZXW7KW		9.695	0.981	1.66	15.07	1.31	1.38	TO
ZZA2LC		8.365	-0.348	-0.59	13.01	-0.75	-0.79	TA

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

	Summary Statistics	
Sample SE15		**Sample SE16**
Grand Means	8.7137 kN/m	13.757 kN/m
SD Btwn Labs	0.5892 kN/m	0.953 kN/m
		Statistics based on 38 of 43 reporting participants

Comments on assigned Data Flags for Test #330

KCRD7E (X) - Extreme data.

T937DQ (X) - Extreme data.

Y7Y9KK (X) - Data for Sample SE15 are low. Inconsistent in testing within the determinations for both samples.

Y8RCZC (X) - Data appears to be transposed between samples. Data Switched by CTS.

ZPQP9D (X) - Inconsistent in testing between samples and within the determinations for Sample SE16.

Analysis Notes:

7ADWU2 - Data appear to be reported as lb/inch, not kN/m as indicated on datasheet. Units corrected by CTS.

BFKN29 - Data appear to be reported as lb/inch, not kN/m as indicated on datasheet. Units corrected by CTS.
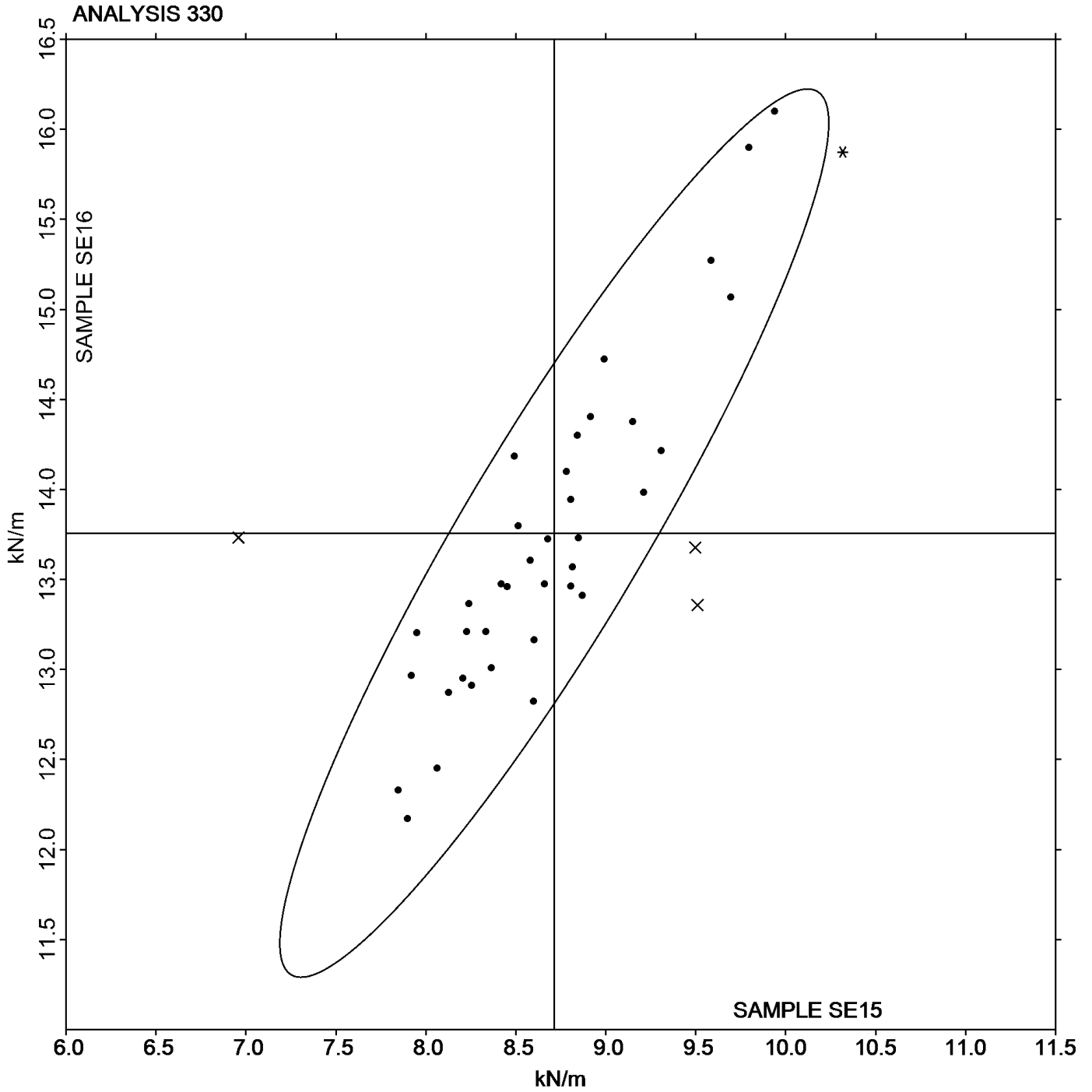
Instrument Code List

(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)

(TR) - TMI Horizontal Tensile Tester

(TX) - Thwing-Albert (model not specified)

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

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

Grand Mean Sample **SE15** = 8.7137 kN/m   Grand Mean Sample **SE16** = 13.757 kN/m

ANALYSIS 330

SAMPLE SE16

kN/m

SAMPLE SE15

kN/m

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

WebCode	Data Flag	Sample SE15 Lab Mean	Sample SE15 Diff from Grand Mean	Sample SE15 CPV	Sample SE16 Lab Mean	Sample SE16 Diff from Grand Mean	Sample SE16 CPV	Instr Code
2B3CJ3	X	52.33	-34.46	-4.34	161.0	-45.4	-2.58	TP
34KX6H		90.39	3.60	0.45	219.5	13.1	0.75	LA
4TEKDG		87.27	0.48	0.06	207.1	0.8	0.04	LA
6GXDBR		85.55	-1.24	-0.16	220.4	14.1	0.80	IF
7ADWU2		87.87	1.08	0.14	207.1	0.8	0.05	TR
8DRUY4		79.31	-7.48	-0.94	180.4	-25.9	-1.47	TK
94YZ6H		84.06	-2.73	-0.34	204.5	-1.9	-0.11	LH
9DLYT3		89.31	2.52	0.32	209.2	2.9	0.17	LH
9WKUQZ		72.48	-14.31	-1.80	184.1	-22.2	-1.26	IM
9YPKVU		77.06	-9.73	-1.23	188.7	-17.7	-1.00	LW
AU8EM7		92.09	5.30	0.67	223.1	16.8	0.96	TO
B93L6K		88.49	1.70	0.21	204.5	-1.8	-0.10	LE
BC6L7H		87.52	0.73	0.09	211.9	5.6	0.32	LA
BQ49UY		81.52	-5.27	-0.66	199.2	-7.1	-0.40	TO
CP8FAY		83.35	-3.44	-0.43	210.0	3.6	0.21	IM
D44RH4		73.05	-13.74	-1.73	179.4	-26.9	-1.53	LW
EHVM28		105.79	19.00	2.39	247.1	40.8	2.32	TH
FTXN9Q		85.41	-1.38	-0.17	197.9	-8.4	-0.48	TB
HVFMG6		102.01	15.22	1.92	234.7	28.4	1.61	IK
NU37MD		86.98	0.19	0.02	229.6	23.2	1.32	TO
P8YPT4		82.75	-4.04	-0.51	189.6	-16.8	-0.95	IN
QNJW47		79.46	-7.33	-0.92	197.8	-8.5	-0.48	LH
RHCZ9R		97.18	10.39	1.31	231.3	24.9	1.42	TH
RK3EJN		96.90	10.11	1.27	209.7	3.4	0.19	TB
T937DQ		89.01	2.22	0.28	200.8	-5.5	-0.31	LA
U7Y3C9		79.27	-7.52	-0.95	194.7	-11.6	-0.66	XX
XA43YA		80.21	-6.58	-0.83	190.8	-15.5	-0.88	SA
XJP2RZ	*	84.21	-2.58	-0.33	175.6	-30.8	-1.75	LX
Y7Y9KK	X	47.71	-39.08	-4.92	184.1	-22.3	-1.26	IM
YQ682C		90.64	3.85	0.48	213.2	6.9	0.39	LA
ZPQP9D	X	105.09	18.30	2.30	175.3	-31.1	-1.77	XX
ZXW7KW	X	112.85	26.06	3.28	287.1	80.8	4.59	TO
ZZA2LC		97.79	11.00	1.38	221.5	15.2	0.86	TA

Summary Statistics

	Sample SE15	Sample SE16
Grand Means	86.791 Joules/sq m	206.33 Joules/sq m
SD Btwn Labs	7.945 Joules/sq m	17.60 Joules/sq m

Statistics based on 29 of 33 reporting participants

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

Comments on assigned Data Flags for Test #331

2B3CJ3 (X) - Data for Sample SE15 are low.

Y7Y9KK (X) - Data for Sample SE15 are low. Inconsistent in testing within determinations for Sample SE16.

ZPQP9D (X) - Inconsistent in testing between samples and within the determinations for Sample SE16.

ZXW7KW (X) - Data for both samples are high. Inconsistent within the determinations for Sample SE16.

Instrument Code List

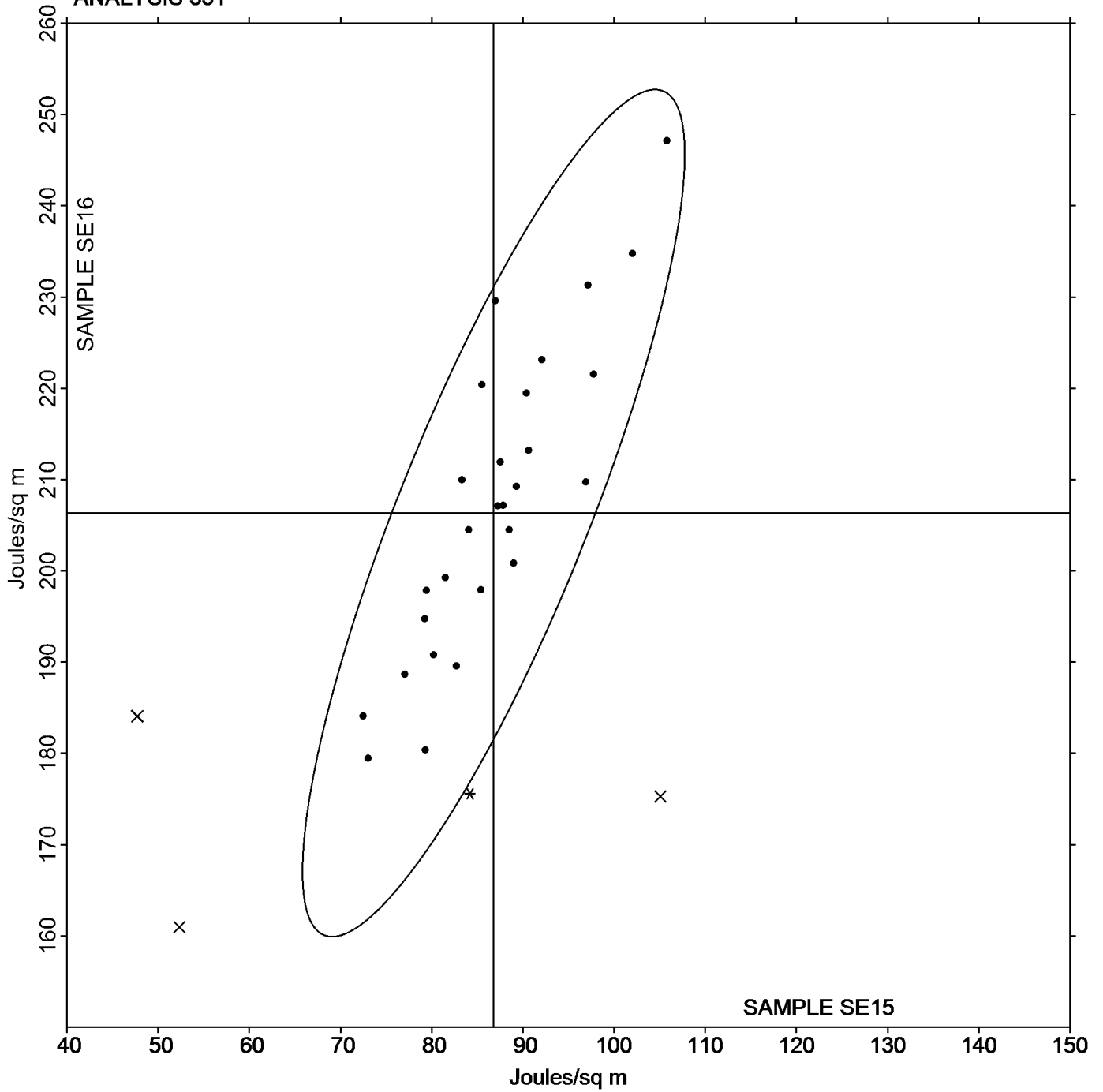|	
(IF) - Instron 3340 Series	(IK) - Instron 4400 Series
(IM) - Instron 5500 Series	(IN) - Instron 3360 Series
(LA) - L & W Autoline	(LE) - L & W Tensile Tester 066
(LH) - L & W Alwetron TH1 (Horizontal) SE 060	(LW) - L & W Tensile Tester SE062
(LX) - L & W (model not specified)	(SA) - Shimadzu Autograph AG 2000 A
(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)
(TR) - TMI Horizontal Tensile Tester	(XX) - Instrument make/model not specified by lab

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

WebCode	Data Flag	Sample SE15			Sample SE16			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2B3CJ3	X	0.225	-1.326	-7.39	0.216	-2.082	-8.05	TP
34KX6H		1.345	-0.206	-1.15	2.007	-0.291	-1.12	LA
4TEKDG	*	1.447	-0.104	-0.58	1.939	-0.359	-1.39	LA
6GXDBR		1.806	0.255	1.42	2.725	0.427	1.65	IF
7ADWU2		1.688	0.137	0.76	2.468	0.170	0.66	TR
8DRUY4		1.569	0.018	0.10	2.255	-0.043	-0.16	TK
94YZ6H		1.440	-0.111	-0.62	2.160	-0.138	-0.53	LH
9DLYT3		1.555	0.004	0.02	2.281	-0.017	-0.06	LH
9WKUQZ		1.681	0.130	0.72	2.458	0.160	0.62	IM
9YPKVU		1.492	-0.059	-0.33	2.288	-0.010	-0.04	LW
APXN9J		1.462	-0.089	-0.50	2.185	-0.113	-0.44	LW
AU8EM7		1.562	0.011	0.06	2.379	0.081	0.31	TO
B93L6K		1.513	-0.038	-0.21	2.238	-0.060	-0.23	LE
BC6L7H		1.338	-0.213	-1.19	2.044	-0.254	-0.98	LA
BQ49UY		1.384	-0.167	-0.93	2.083	-0.215	-0.83	TO
CP8FAY		1.504	-0.047	-0.26	2.343	0.045	0.18	IM
D44RH4		1.333	-0.218	-1.21	1.969	-0.329	-1.27	LW
EHVM28		1.893	0.342	1.90	2.676	0.378	1.46	TH
FJ7EH8		1.472	-0.079	-0.44	2.274	-0.024	-0.09	ID
FTXN9Q		1.484	-0.067	-0.37	2.122	-0.176	-0.68	TB
HVFMG6		1.864	0.313	1.74	2.735	0.438	1.69	IK
KCRD7E		1.437	-0.114	-0.64	2.204	-0.094	-0.36	TB
NU37MD	X	2.326	0.775	4.32	3.186	0.888	3.43	TO
P8YPT4	X	5.680	4.129	23.00	8.340	6.042	23.36	IN
QNJW47		1.374	-0.177	-0.99	2.109	-0.189	-0.73	LH
RHCZ9R		1.758	0.207	1.15	2.556	0.258	1.00	TH
RK3EJN		1.690	0.139	0.77	2.400	0.102	0.40	TB
T937DQ	X	10.105	8.554	47.66	15.980	13.682	52.89	LA
U7Y3C9		1.452	-0.099	-0.55	2.175	-0.123	-0.47	XX
XA43YA		1.543	-0.008	-0.05	2.304	0.006	0.02	SA
XJP2RZ		1.434	-0.117	-0.65	1.966	-0.332	-1.28	LX
Y7Y9KK	X	1.096	-0.455	-2.54	2.124	-0.174	-0.67	IM
YQ682C		1.286	-0.265	-1.48	2.014	-0.284	-1.10	XX
ZPQP9D	X	1.960	0.409	2.28	2.224	-0.074	-0.28	XX
ZXW7KW	*	1.937	0.386	2.15	2.954	0.656	2.54	TO
ZZA2LC		1.790	0.239	1.33	2.617	0.319	1.23	TA

	Summary Statistics	
	Sample SE15	**Sample SE16**
Grand Means	1.5511 Percent	2.2976 Percent
SD Btwn Labs	0.1795 Percent	0.2587 Percent
		Statistics based on 30 of 36 reporting participants

Comments on assigned Data Flags for Test #332

2B3CJ3 (X) - Extreme data.

NU37MD (X) - Data for both samples are high. Inconsistent in testing within the determinations for both samples.

P8YPT4 (X) - Extreme data.

T937DQ (X) - Extreme data.

Y7Y9KK (X) - Inconsistent in testing between samples and within the determinations for Sample SE15.

ZPQP9D (X) - Inconsistent in testing between samples and within the determinations for Sample SE16.

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

(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)

(TR) - TMI Horizontal Tensile Tester

(XX) - Instrument make/model not specified by lab
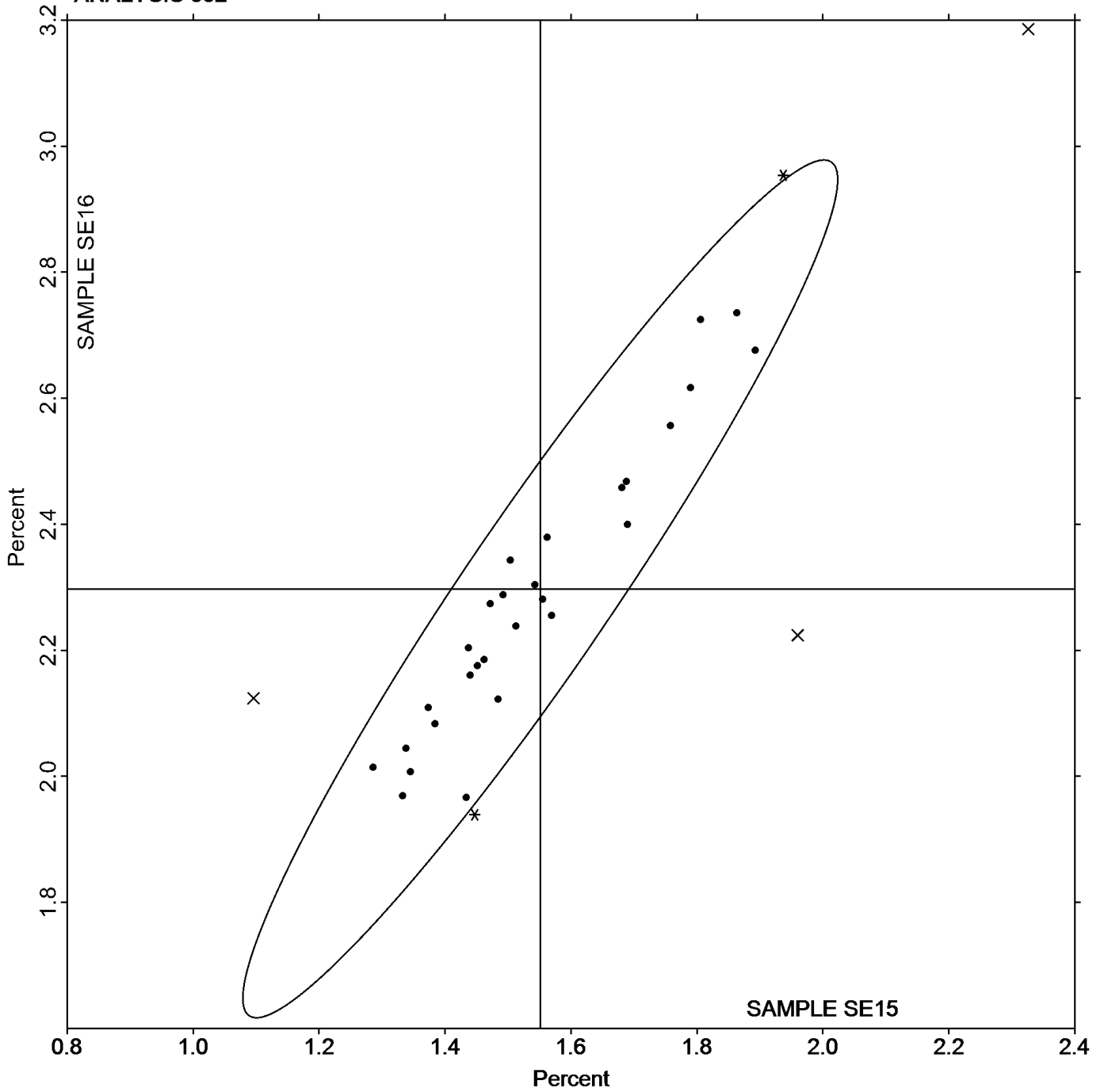
TAPPI-CTS Interlaboratory Testing Program
Analysis 332
Elongation to Break - Packaging Papers

Grand Mean Sample **SE15** = 1.5511 Percent

Grand Mean Sample **SE16** = 2.2976 Percent

ANALYSIS 332

SAMPLE SE16

Percent

SAMPLE SE15

Percent

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

WebCode	Data Flag	Sample SG15			Sample SG16			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3XB8QW		12.90	-16.76	-1.48	94.50	12.16	0.48	MT
7ADWU2		37.50	7.84	0.69	100.10	17.76	0.70	MT
7F2KQT		40.40	10.74	0.95	87.30	4.96	0.20	MT
APXN9J		10.40	-19.26	-1.70	13.30	-69.04	-2.74	MT
FX7AWM		20.90	-8.76	-0.77	73.90	-8.44	-0.33	MT
KCRD7E		25.40	-4.26	-0.38	57.30	-25.04	-0.99	MT
KK6279		30.90	1.24	0.11	113.20	30.86	1.22	MT
KQBZFC		30.50	0.84	0.07	91.00	8.66	0.34	MT
L34G6D		37.70	8.04	0.71	91.50	9.16	0.36	MT
L4CQWB		22.60	-7.06	-0.62	53.20	-29.14	-1.16	XX
PK9WHV		45.30	15.64	1.38	101.80	19.46	0.77	MT
PZYHX2		29.10	-0.56	-0.05	71.70	-10.64	-0.42	MT
T937DQ		31.70	2.04	0.18	85.00	2.66	0.11	XX
TGXE9V		55.50	25.84	2.29	115.10	32.76	1.30	MT
XUM92Q		25.70	-3.96	-0.35	100.90	18.56	0.74	XX
YBNXQF		25.50	-4.16	-0.37	85.70	3.36	0.13	MT
ZPQRXH		22.20	-7.46	-0.66	64.30	-18.04	-0.72	MT

Summary Statistics

	Sample SG15	Sample SG16
Grand Means	29.659 Double Folds	82.341 Double Folds
SD Btwn Labs	11.307 Double Folds	25.207 Double Folds

Statistics based on 17 of 17 reporting participants
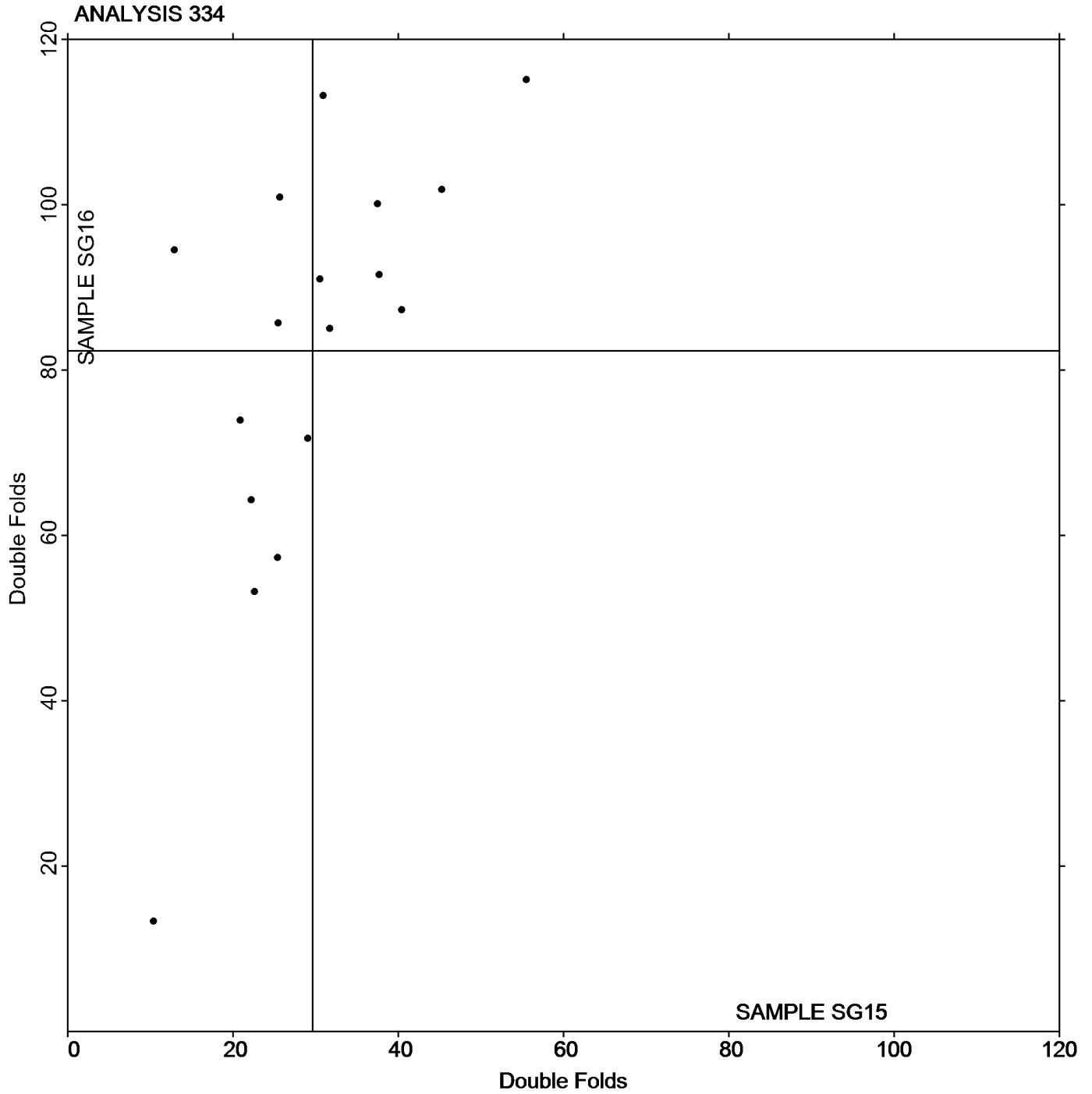
Instrument Code List

(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 **SG15** = 29.659 Double Folds   Grand Mean Sample **SG16** = 82.341 Double Folds

ANALYSIS 334

SAMPLE SG16

Double Folds

SAMPLE SG15

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 SH15			Sample SH16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3XB8QW		238.3	-6.6	-0.35	121.0	-5.5	-0.44
6GXDBR		253.1	8.2	0.43	147.6	21.2	1.70
6WCQHR		277.3	32.4	1.70	131.4	5.0	0.40
72FLQD		243.1	-1.8	-0.09	144.3	17.8	1.43
77V8L6		249.8	4.9	0.26	138.1	11.6	0.93
7ADWU2		257.5	12.6	0.66	133.4	7.0	0.56
DQXV2M		229.1	-15.8	-0.83	102.2	-24.2	-1.94
HW8KQW		230.7	-14.2	-0.74	112.6	-13.9	-1.11
KCRD7E		220.0	-24.9	-1.30	112.3	-14.1	-1.13
L34G6D		245.1	0.2	0.01	121.4	-5.0	-0.40
L68CLV		245.4	0.5	0.03	133.8	7.3	0.59
L7JBKB		204.5	-40.4	-2.12	115.9	-10.6	-0.85
M9MT8R		232.9	-12.0	-0.63	116.5	-10.0	-0.80
MNE2G6		252.9	8.0	0.42	125.4	-1.0	-0.08
NAU7CR		233.0	-11.9	-0.62	120.9	-5.5	-0.44
NU37MD		275.0	30.1	1.58	145.0	18.5	1.49
PXTW8F		261.4	16.5	0.86	122.3	-4.1	-0.33
VAN4KZ	X	124.5	-120.3	-6.30	74.4	-52.1	-4.17
WEGHT8		230.8	-14.1	-0.74	121.5	-5.0	-0.40
Y3JQCF		273.1	28.2	1.47	137.0	10.5	0.84

Summary Statistics

	Sample SH15	Sample SH16
Grand Means	244.88 Gurley Units	126.46 Gurley Units
SD Btwn Labs	19.11 Gurley Units	12.48 Gurley Units

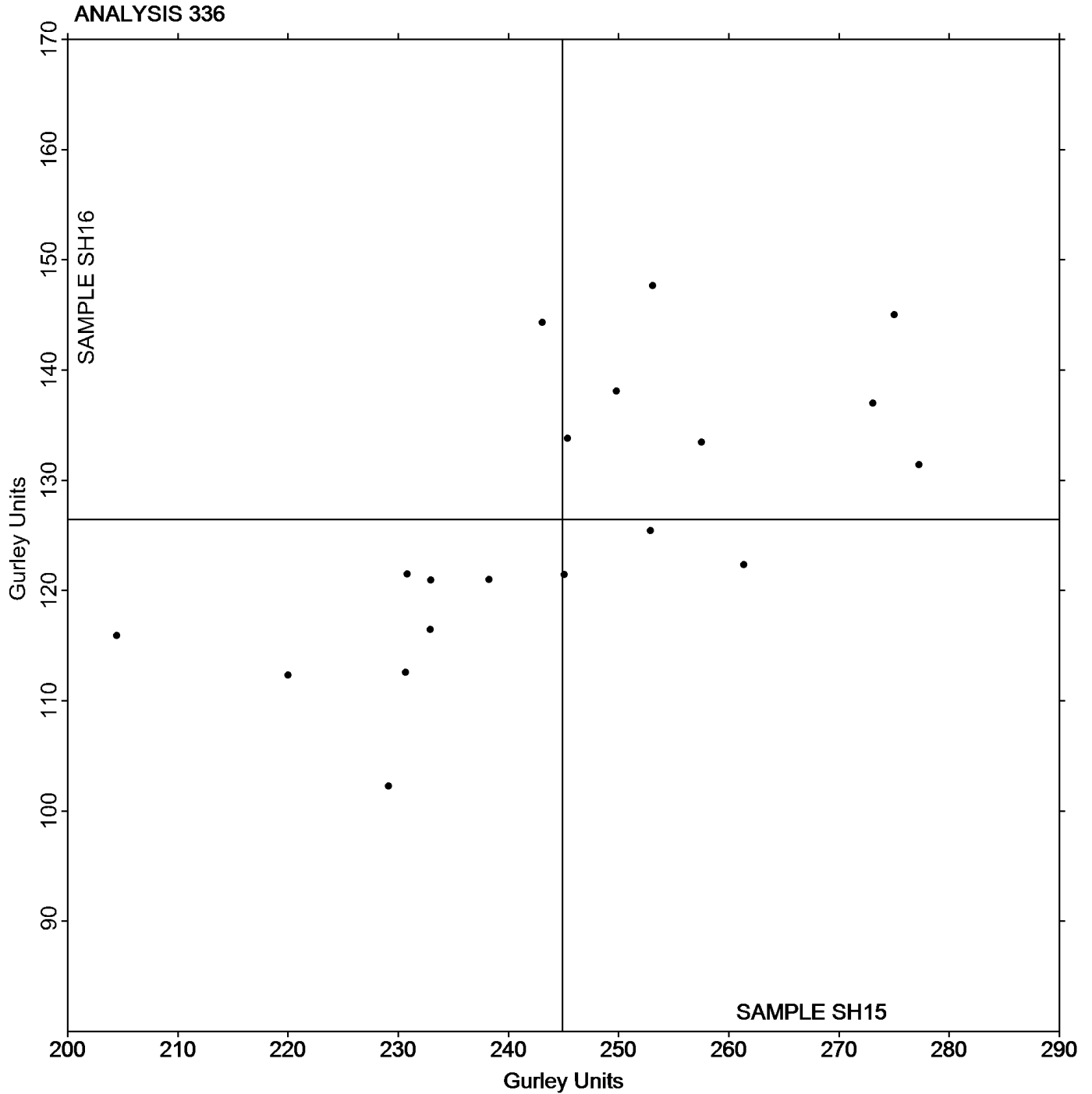Statistics based on 19 of 20 reporting participants

Comments on assigned Data Flags for Test #336

VAN4KZ (X) - Extreme data.

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

Grand Mean Sample **SH15** = 244.88 Gurley Units

Grand Mean Sample **SH16** = 126.46 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 SJ15			Sample SJ16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4F8XJ6		3.528	0.110	0.40	1.961	0.006	0.03
6GXDBR		3.261	-0.157	-0.58	1.870	-0.084	-0.38
9PY9CL		3.273	-0.145	-0.54	1.894	-0.060	-0.27
D44RH4		2.960	-0.458	-1.69	1.630	-0.324	-1.46
DQXV2M		3.237	-0.181	-0.67	1.842	-0.113	-0.51
HW8KQW		3.444	0.026	0.10	1.894	-0.060	-0.27
KQBZFC		3.390	-0.028	-0.10	1.916	-0.038	-0.17
L34G6D		3.281	-0.137	-0.51	1.778	-0.176	-0.79
L4CQWB		3.785	0.367	1.36	2.047	0.093	0.42
P8YPT4		3.670	0.252	0.93	2.310	0.356	1.60
PK9WHV		3.257	-0.161	-0.59	1.867	-0.087	-0.39
PXTW8F		3.930	0.512	1.89	2.440	0.486	2.19
UTA2V2	X	39.445	36.027	133.04	24.090	22.136	99.59
ZMGAN7	X	1.557	-1.861	-6.87	1.046	-0.908	-4.09

Summary Statistics

	Sample SJ15	Sample SJ16
Grand Means	3.4180 Taber Units	1.9540 Taber Units
SD Btwn Labs	0.2708 Taber Units	0.2223 Taber Units

Statistics based on 12 of 14 reporting participants
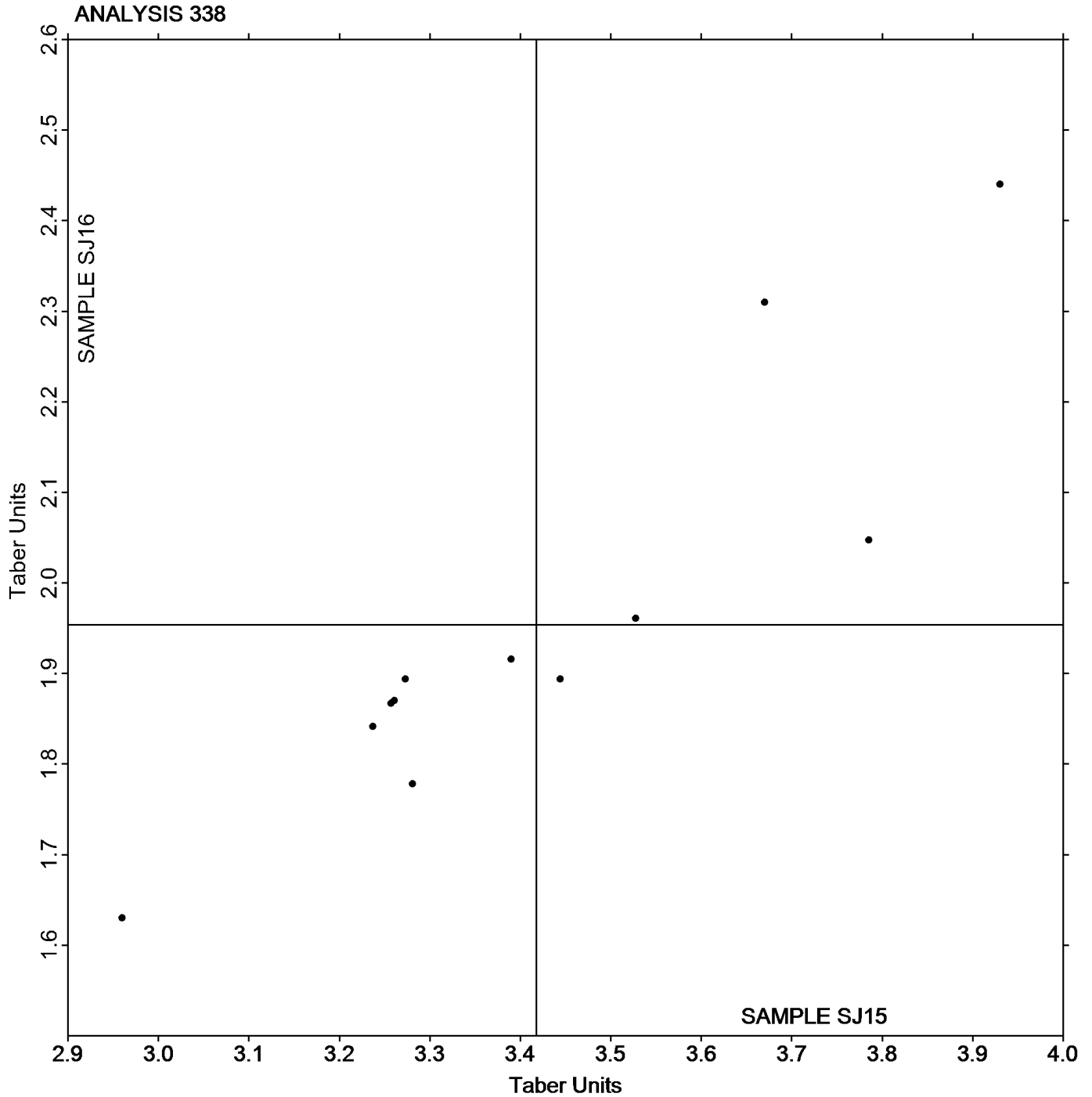
Comments on assigned Data Flags for Test #338

UTA2V2 (X) - Extreme data.

ZMGAN7 (X) - Extreme data.

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

Grand Mean Sample **SJ15** = 3.4180 Taber Units   Grand Mean Sample **SJ16** = 1.9540 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 SQ15			Sample SQ16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6WCQHR		20.41	-1.40	-1.04	32.12	-1.22	-0.66
APXN9J		22.94	1.13	0.84	34.56	1.22	0.66
B93L6K		22.49	0.67	0.50	33.33	-0.02	-0.01
BC6L7H		22.45	0.64	0.47	33.77	0.43	0.23
D44RH4		22.10	0.29	0.21	33.05	-0.29	-0.16
L34G6D		21.89	0.08	0.06	33.23	-0.11	-0.06
M4AJ73		19.40	-2.41	-1.79	30.74	-2.60	-1.41
NNCTMB		22.70	0.89	0.66	34.40	1.06	0.57
PGVFK7		22.60	0.79	0.58	33.83	0.49	0.26
RK3EJN	X	20.32	-1.49	-1.11	17.10	-16.24	-8.79
T937DQ		21.94	0.13	0.09	34.95	1.61	0.87
WMUAH7		23.45	1.64	1.22	36.50	3.16	1.71
ZXFRGU		19.40	-2.41	-1.79	29.65	-3.69	-2.00

Summary Statistics

	Sample SQ15	Sample SQ16
Grand Means	21.814 Taber Units	33.344 Taber Units
SD Btwn Labs	1.346 Taber Units	1.848 Taber Units

Statistics based on 12 of 13 reporting participants

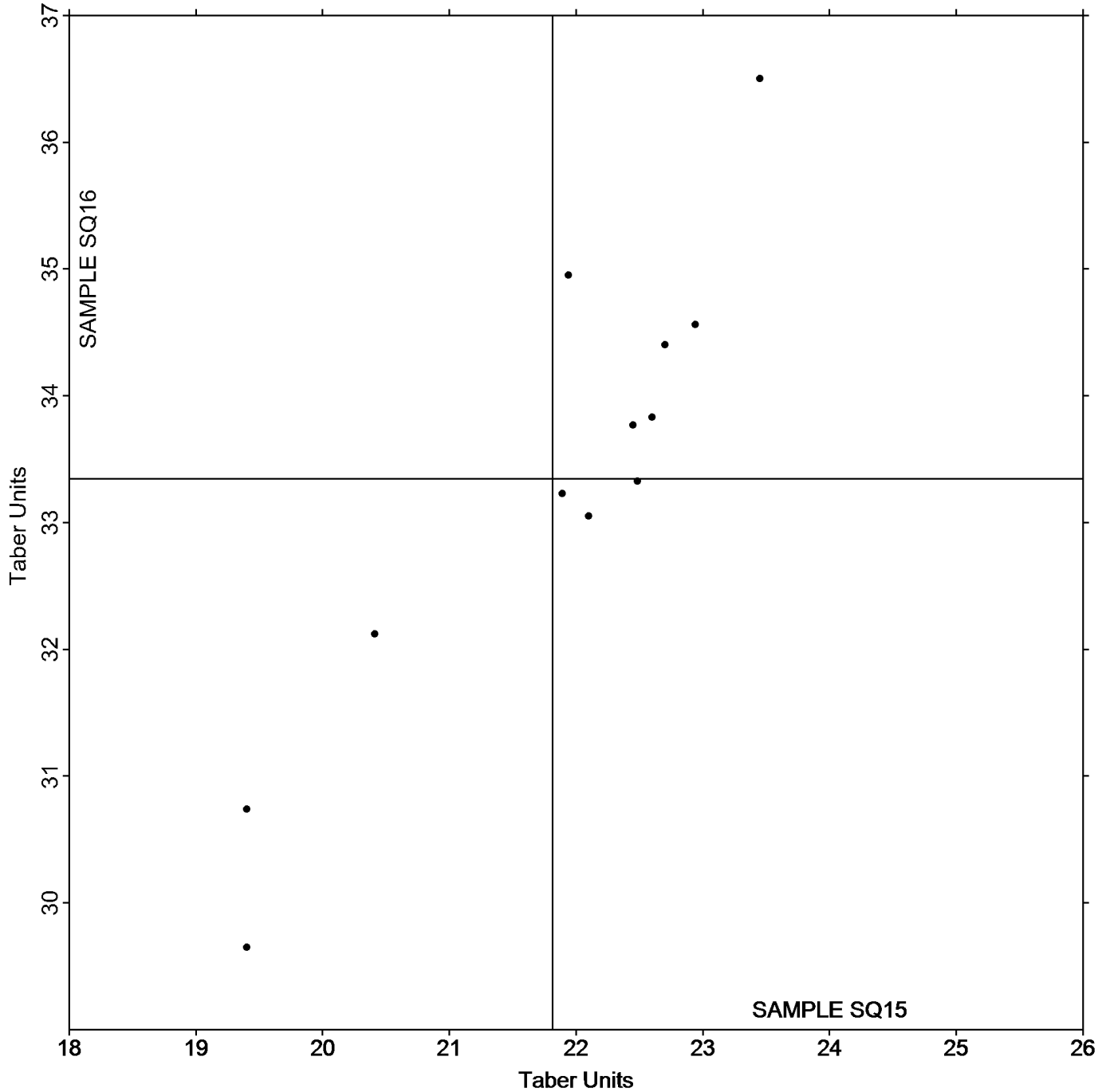## Comments on assigned Data Flags for Test #339

RK3EJN (X) - Extreme data for Sample SQ16.

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

Grand Mean Sample **SQ15** = 21.814 Taber Units   Grand Mean Sample **SQ16** = 33.344 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 ST15			Sample ST16		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
7ADWU2		232.5	-21.5	-1.50	234.1	-13.2	-0.67
B88ZEE		243.7	-10.3	-0.72	243.2	-4.1	-0.21
D44RH4		243.8	-10.2	-0.71	245.0	-2.3	-0.12
F2ACX6		276.4	22.4	1.56	268.2	20.9	1.07
FECBUV	X	121.8	-132.2	-9.23	96.3	-151.0	-7.71
FJ7EH8		261.0	7.0	0.49	245.0	-2.3	-0.12
FTD8V9		246.0	-8.0	-0.56	248.0	0.7	0.04
FU8TLE		266.7	12.7	0.89	261.2	13.9	0.71
FZUJ9A		264.6	10.6	0.74	279.6	32.3	1.65
UCWW2U		262.3	8.3	0.58	260.5	13.2	0.68
URFF4V		268.3	14.3	1.00	243.3	-4.0	-0.20
XA43YA		234.2	-19.8	-1.38	237.2	-10.1	-0.51
Y8RCZC		248.5	-5.5	-0.38	202.0	-45.3	-2.31

Summary Statistics	Sample ST15	Sample ST16
Grand Means	253.99 Taber Units	247.27 Taber Units
SD Btwn Labs	14.33 Taber Units	19.59 Taber Units
		Statistics based on 12 of 13 reporting participants

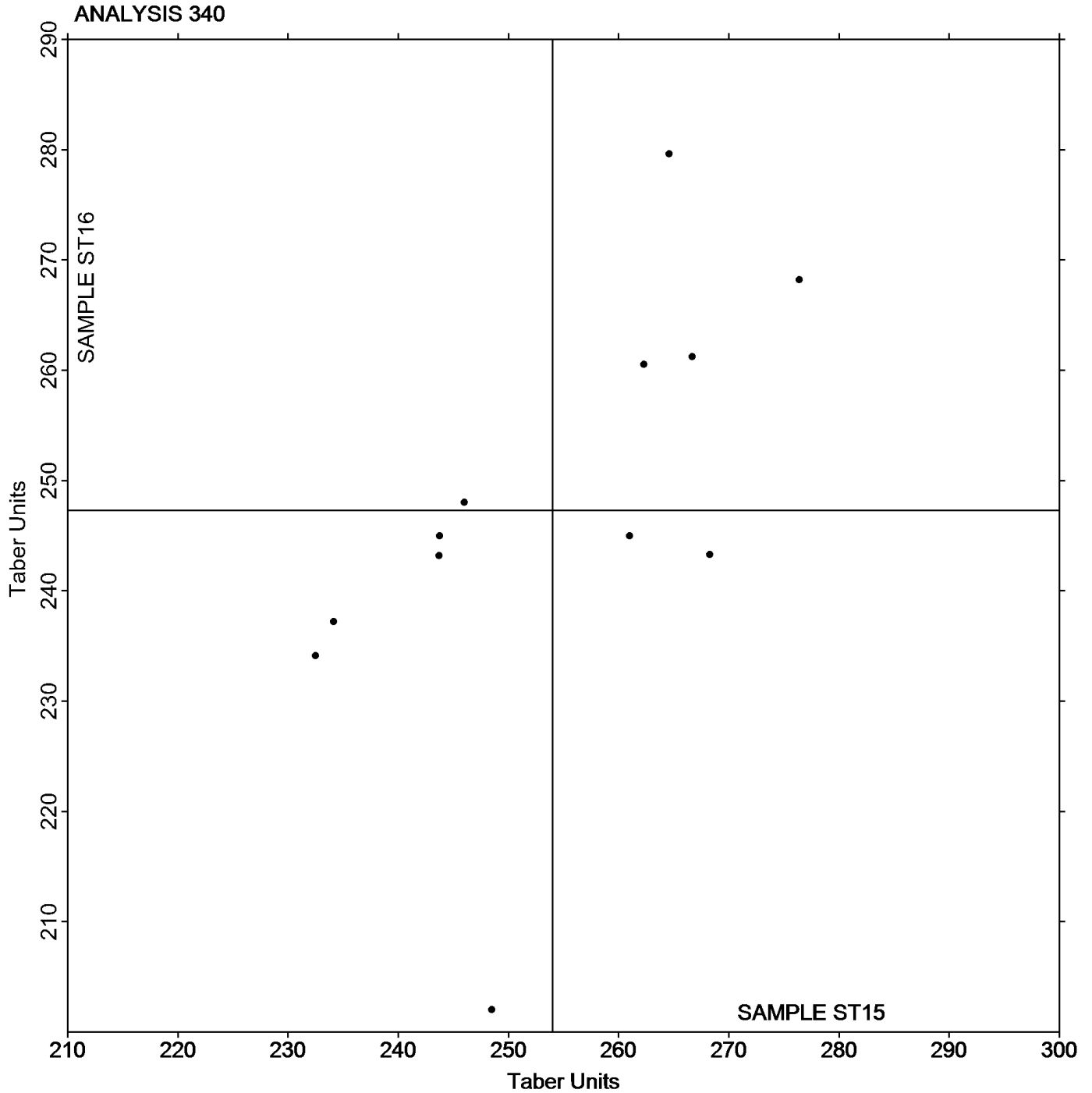## Comments on assigned Data Flags for Test #340

FECBUV (X) - Extreme data.

TAPPI-CTS Interlaboratory Testing Program
Analysis 340
Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard

Grand Mean Sample **ST15** = 253.99 Taber Units   Grand Mean Sample **ST16** = 247.27 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

		Sample SM15			Sample SM16			
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	Instr Code
6GXDBR		86.94	7.33	0.69	68.78	10.04	1.21	TL
8EMEQA		87.21	7.60	0.72	63.45	4.71	0.57	TA
APXN9J		85.44	5.83	0.55	61.80	3.06	0.37	CD
B93L6K		80.10	0.49	0.05	61.06	2.32	0.28	TA
DQYTCH		86.36	6.75	0.64	63.24	4.50	0.54	TA
FECBUV		90.28	10.67	1.00	65.08	6.34	0.76	CA
G2NN39		75.18	-4.43	-0.42	55.92	-2.82	-0.34	XX
HWL866		73.40	-6.21	-0.58	57.80	-0.94	-0.11	DT
KQBZFC		77.76	-1.85	-0.17	55.08	-3.66	-0.44	CD
L34G6D		69.19	-10.42	-0.98	51.63	-7.11	-0.86	TZ
PGVFK7		56.86	-22.75	-2.14	41.82	-16.92	-2.04	LW
RK3EJN		92.98	13.37	1.26	66.50	7.76	0.93	TA
RPDXQA		94.32	14.71	1.38	68.24	9.50	1.14	XX
T937DQ		82.84	3.23	0.30	65.62	6.88	0.83	LW
VQUBY3		67.07	-12.54	-1.18	47.05	-11.69	-1.41	LW
ZZA2LC		67.78	-11.83	-1.11	46.78	-11.96	-1.44	DT

Summary Statistics

	Sample SM15	Sample SM16
Grand Means	79.607 psi	58.740 psi
SD Btwn Labs	10.633 psi	8.306 psi

Statistics based on 16 of 16 reporting participants
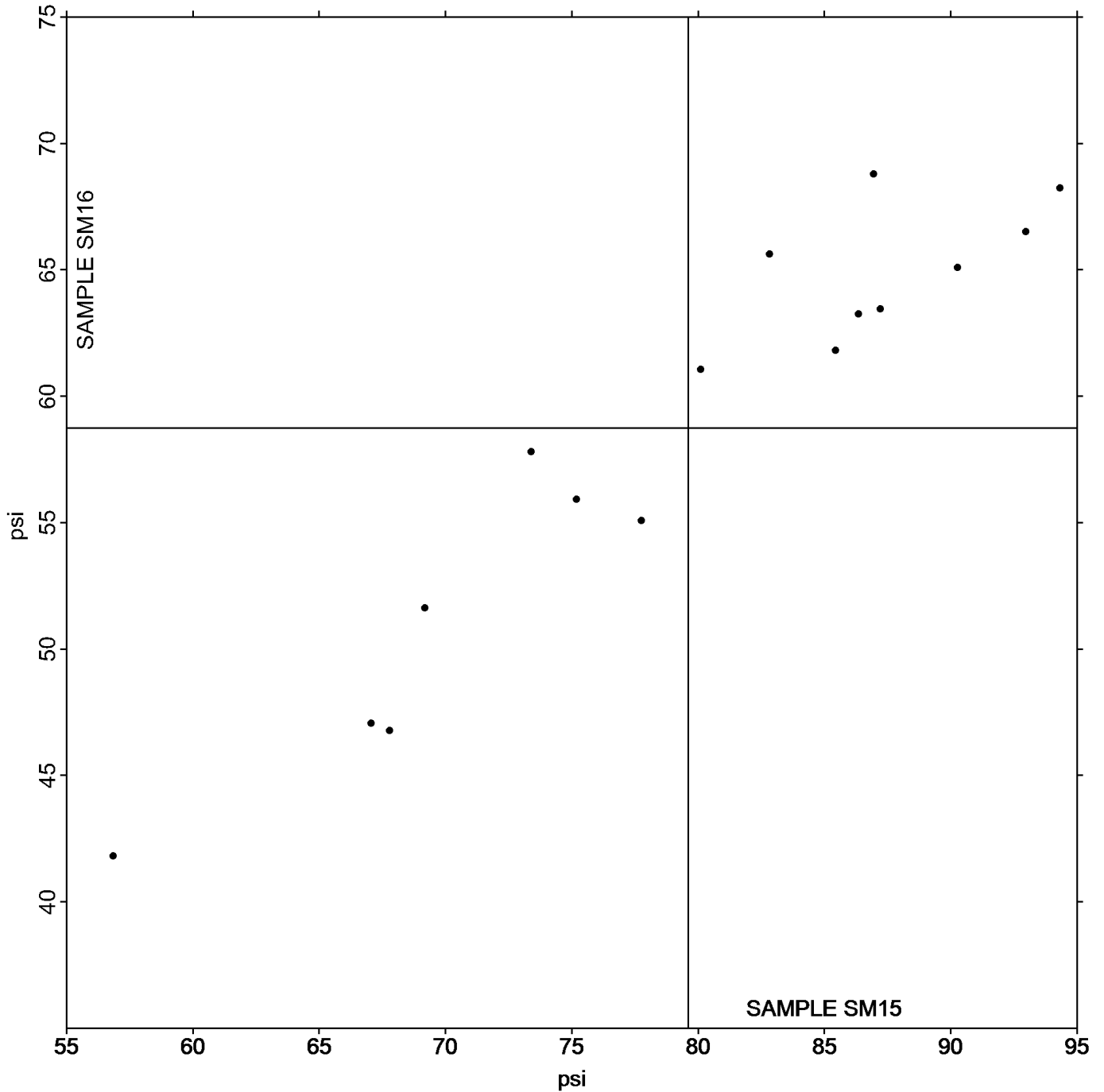
Instrument Code List

(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

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

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

Grand Mean Sample **SM15** = 79.607 psi   Grand Mean Sample **SM16** = 58.740 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 SZ15 Lab Mean	Diff from Grand Mean	CPV	Sample SZ16 Lab Mean	Diff from Grand Mean	CPV	Instr Code
2YBQD8		39.33	0.09	0.04	39.12	-1.15	-0.46	LW
34KX6H		39.35	0.12	0.05	40.97	0.70	0.28	XX
3MTN9K		40.46	1.22	0.51	41.44	1.17	0.46	CA
7ADWU2		39.08	-0.16	-0.06	40.00	-0.27	-0.11	CA
B88ZEE		37.40	-1.84	-0.76	40.00	-0.27	-0.11	CA
BFKN29		36.14	-3.10	-1.28	36.76	-3.51	-1.40	TL
F2ACX6		39.20	-0.04	-0.02	39.40	-0.87	-0.35	TZ
FTD8V9		39.80	0.56	0.23	41.00	0.73	0.29	CA
FU8TLE		40.24	1.00	0.41	41.94	1.67	0.66	TL
FZUJ9A		40.40	1.16	0.48	41.20	0.93	0.37	CA
G7CZQW		40.00	0.76	0.32	40.20	-0.07	-0.03	TL
HVFMG6		44.65	5.41	2.24	45.39	5.11	2.04	PG
MEUUGF		37.88	-1.36	-0.56	36.46	-3.81	-1.52	LW
NTQ7QJ		34.80	-4.44	-1.83	36.60	-3.67	-1.46	LW
YJK4VV		42.62	3.38	1.40	44.62	4.35	1.73	TL
ZMGAPR		36.44	-2.80	-1.16	39.28	-0.99	-0.40	XX

Summary Statistics

	Sample SZ15	Sample SZ16
Grand Means	39.237 psi	40.274 psi
SD Btwn Labs	2.420 psi	2.512 psi

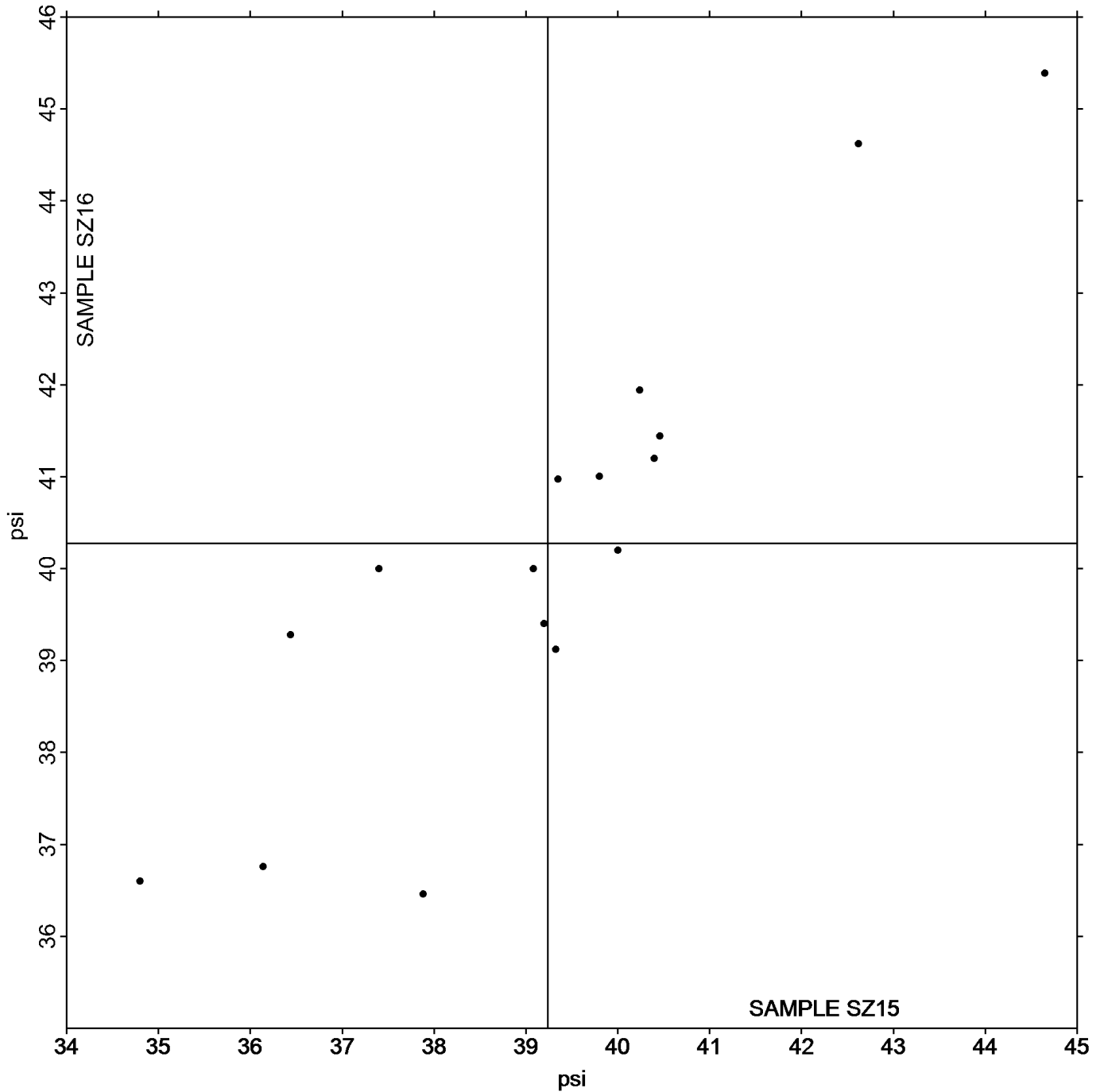Statistics based on 16 of 16 reporting participants

Instrument Code List

(CA) - CSI CS-163

(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 **SZ15** = 39.237 psi

Grand Mean Sample **SZ16** = 40.274 psi

ANALYSIS 345

SAMPLE SZ16

SAMPLE SZ15

psi

psi

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

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

WebCode	Data Flag	Sample SN15			Sample SN16			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3XB8QW		100.40	2.32	0.44	69.00	-7.47	-1.71	HY
7ADWU2		102.40	4.32	0.82	78.80	2.33	0.53	XX
APXN9J		99.20	1.12	0.21	76.40	-0.07	-0.02	HY
B93L6K		106.40	8.32	1.57	86.60	10.13	2.32	HY
BQ49UY		94.40	-3.68	-0.69	70.40	-6.07	-1.39	HY
DQXV2M		94.08	-4.00	-0.75	76.32	-0.15	-0.03	HY
DQYTCH		106.40	8.32	1.57	79.00	2.53	0.58	HY
JXWE4R		90.60	-7.48	-1.41	68.60	-7.87	-1.80	XX
KQBZFC		102.20	4.12	0.78	80.20	3.73	0.85	HY
L34G6D		101.20	3.12	0.59	81.00	4.53	1.04	HY
LZYHKR		97.60	-0.48	-0.09	73.80	-2.67	-0.61	HY
M9MT8R		96.40	-1.68	-0.32	77.00	0.53	0.12	HY
MBTRRD		90.07	-8.01	-1.51	74.08	-2.39	-0.55	HY
PXTW8F		93.08	-5.00	-0.94	75.36	-1.11	-0.25	KR
RK3EJN		96.60	-1.48	-0.28	78.40	1.93	0.44	HZ
VRR23J		98.12	0.04	0.01	74.68	-1.79	-0.41	XX
Y3JQCF		89.00	-9.08	-1.71	74.76	-1.71	-0.39	HZ
ZMGAN7		104.97	6.89	1.30	79.56	3.09	0.71	HY
ZXW7KW		100.40	2.32	0.44	79.00	2.53	0.58	HZ

Summary Statistics

	Sample SN15	Sample SN16
Grand Means	98.080 1000th ft-lbs	76.472 1000th ft-lbs
SD Btwn Labs	5.300 1000th ft-lbs	4.369 1000th ft-lbs

Statistics based on 19 of 19 reporting participants
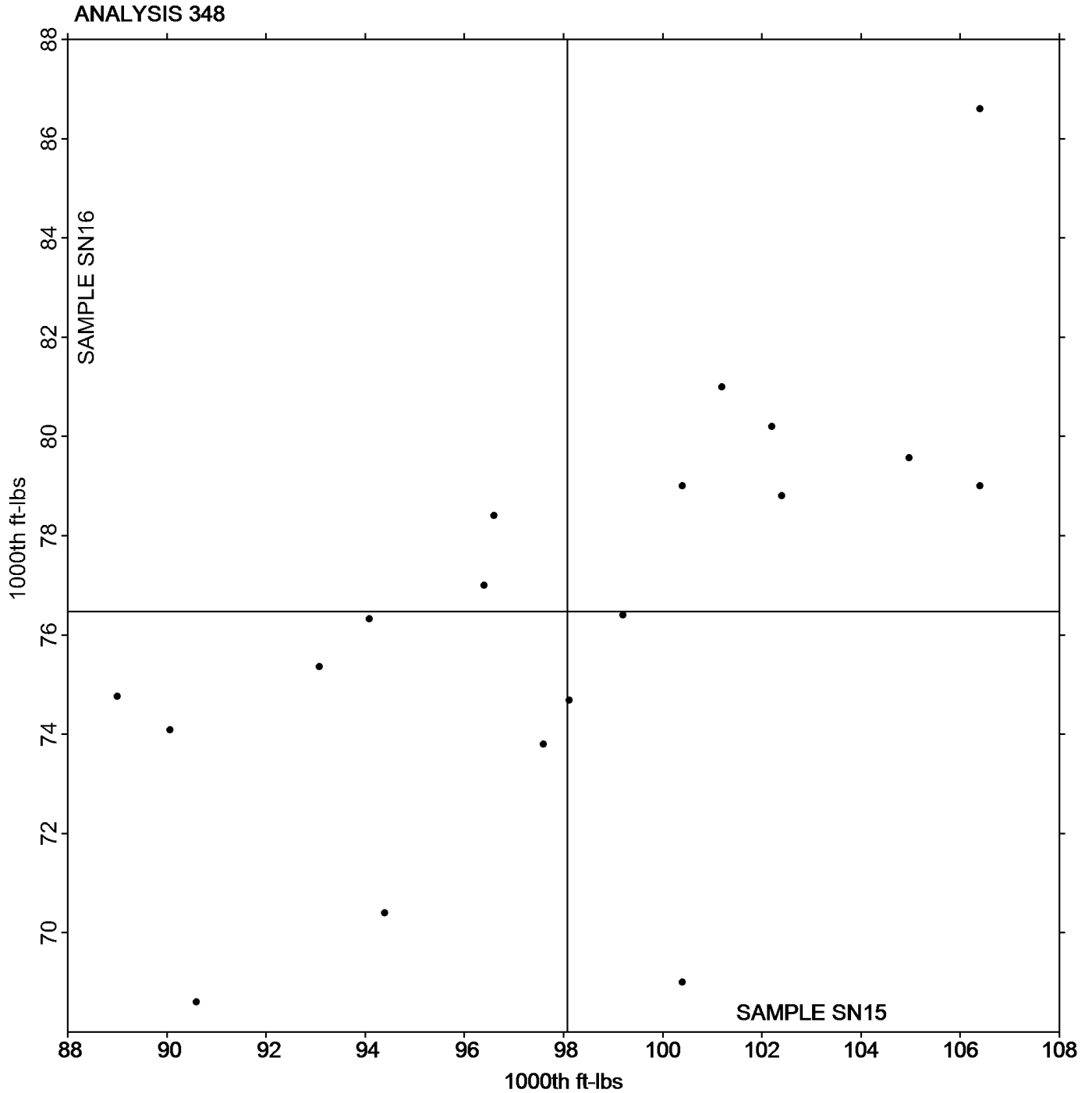
Instrument Code List

(HY) - Huygen Digitized Scott Internal Bond Tester

(HZ) - Huygen Internal Bond Tester with AccuPress

(KR) - Kumagai Riki Kogyo Internal Bond Tester

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

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

Grand Mean Sample **SN15** = 98.080 1000th ft-lbs

Grand Mean Sample **SN16** = 76.472 1000th ft-lbs

ANALYSIS 348

SAMPLE SN16

SAMPLE SN15

1000th ft-lbs

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 SP15 Lab Mean	Sample SP15 Diff from Grand Mean	Sample SP15 CPV	Sample SP16 Lab Mean	Sample SP16 Diff from Grand Mean	Sample SP16 CPV	Instr Code
8UH8PC		96.20	8.72	0.83	82.40	16.14	1.69	SC
BFKN29		82.20	-5.28	-0.50	61.00	-5.26	-0.55	XX
D44RH4		95.66	8.18	0.78	68.90	2.64	0.28	SC
H49WPE		78.13	-9.35	-0.89	60.15	-6.11	-0.64	XX
HVFMG6		83.20	-4.28	-0.41	56.80	-9.46	-0.99	TM
JPMCVT		93.20	5.72	0.54	65.20	-1.06	-0.11	XX
K78K7V		104.20	16.72	1.58	73.99	7.74	0.81	TM
L4CQWB		81.00	-6.48	-0.61	68.60	2.34	0.24	TM
M4AJ73		73.79	-13.69	-1.30	55.01	-11.25	-1.17	TM
NTQ7QJ		103.80	16.32	1.55	83.60	17.34	1.81	XX
QNJW47		78.11	-9.38	-0.89	61.75	-4.51	-0.47	TM
XJP2RZ		80.32	-7.16	-0.68	57.68	-8.58	-0.90	SC

Summary Statistics

	Sample SP15	Sample SP16
Grand Means	87.485 1000th ft-lbs	66.256 1000th ft-lbs
SD Btwn Labs	10.547 1000th ft-lbs	9.581 1000th ft-lbs

Statistics based on 12 of 12 reporting participants

Instrument Code List

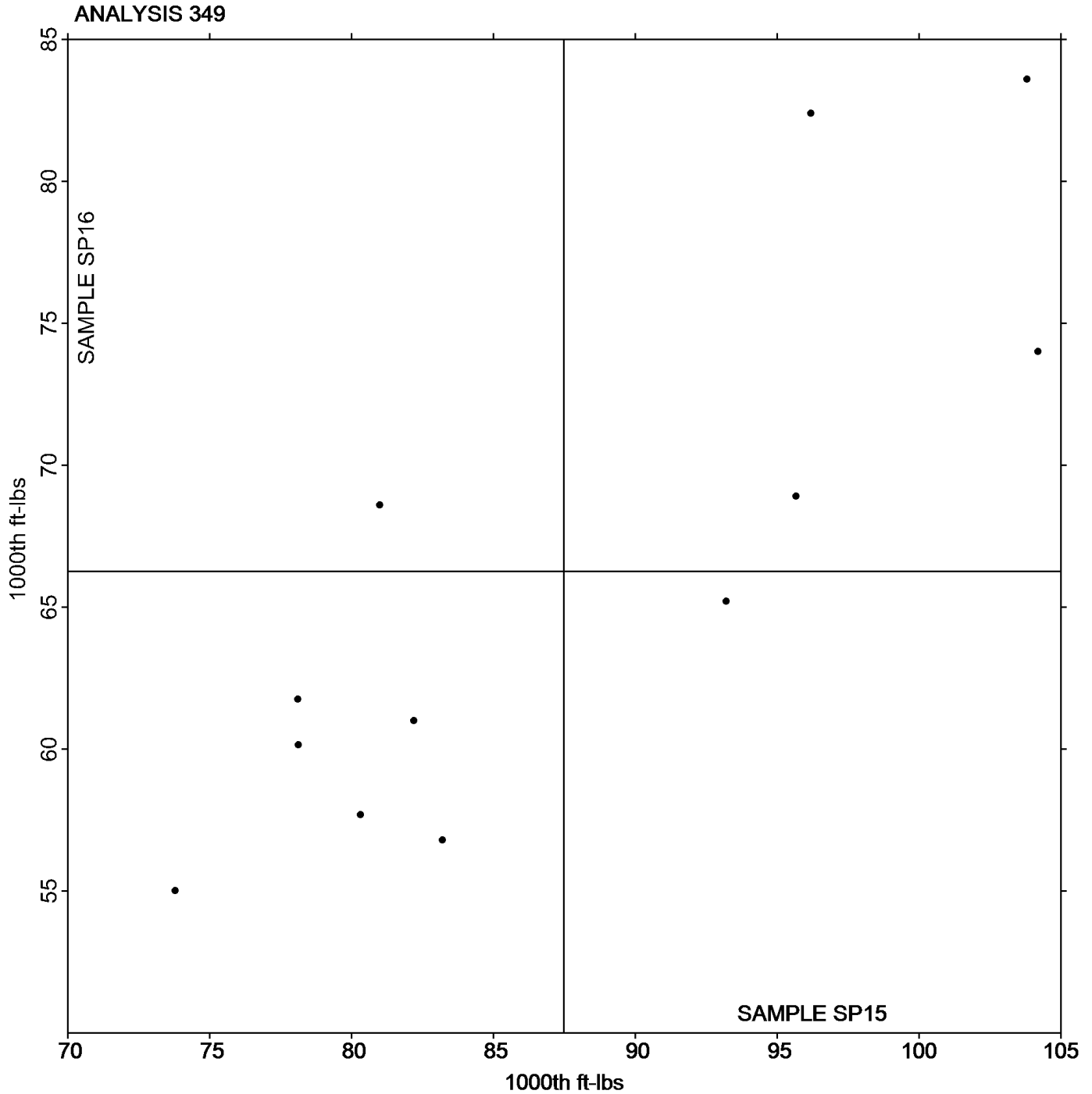(SC) - Scott Internal Bond Tester (Manual)   (TM) - TMI Monitor/Internal Bond Tester

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

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

Grand Mean Sample **SP15** = 87.485 1000th ft-lbs   Grand Mean Sample **SP16** = 66.256 1000th ft-lbs

ANALYSIS 349

SAMPLE SP16

1000th ft-lbs

SAMPLE SP15

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.