Collaborative Testing Services, Inc.

Paper & Paperboard Interlaboratory Testing Program

Summary Report #280S - January 2016

Analysis	Analysis Name
305	Bursting Strength - Printing Papers
310	Bursting Strength - Packaging Papers
311	Tearing Strength - Newsprint
312	Tearing Strength - Printing Papers
314	Tearing Strength - Packaging Papers
320	Tensile Breaking Strength - Newsprint
321	Tensile Energy Absorption - Newsprint
322	Elongation to Break - Newsprint
325	Tensile Breaking Strength - Printing Papers
327	Tensile Energy Absorption - Printing Papers
328	Elongation to Break - Printing Papers
330	Tensile Breaking Strength - Packaging Papers
331	Tensile Energy Absorption - Packaging Papers
332	Elongation to Break - Packaging Papers
334	Folding Endurance (MIT) - Double Folds
336	Bending Resistance, Gurley Type
338	Bending Resistance, Taber Type - 0 to 10 Units
339	Bending Resistance, Taber Type - 10 to 100 Taber Units
340	Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard
343	Z-Direction Tensile
345	Z-Direction Tensile, Recycled Paperboard
348	Internal Bond Strength - Modified Scott Mechanics
349	Internal Bond Strength - Scott Bond Models

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

Key for Web Summary Reports (Page 1 of 2)

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 SA27 Lab Mean	Sample SA27 Diff from Grand Mean	Sample SA27 CPV	Sample SA28 Lab Mean	Sample SA28 Diff from Grand Mean	Sample SA28 CPV
22WH9W		21.44	0.66	0.33	26.21	0.49	0.21
32RKB7		19.46	-1.32	-0.67	22.93	-2.79	-1.20
7828DX		21.69	0.90	0.46	26.41	0.69	0.30
7FE4H6		17.75	-3.03	-1.55	22.65	-3.07	-1.32
7MFFD2		20.74	-0.04	-0.02	25.54	-0.18	-0.08
8RNWMP		21.50	0.72	0.37	29.20	3.48	1.49
8WKMT2		19.25	-1.54	-0.78	24.35	-1.37	-0.59
9HUBUW		18.84	-1.94	-0.99	24.12	-1.60	-0.69
9HYUHZ		24.54	3.76	1.92	28.50	2.78	1.19
9XB9YX		22.20	1.42	0.72	27.04	1.32	0.57
AQ8LMN		20.50	-0.28	-0.14	23.70	-2.02	-0.87
BPAVRT		17.74	-3.04	-1.55	22.48	-3.24	-1.39
D36WJK		20.41	-0.37	-0.19	24.76	-0.96	-0.41
EALRZE		18.10	-2.68	-1.37	24.80	-0.92	-0.39
F8AC4T		18.93	-1.85	-0.95	24.18	-1.54	-0.66
FXMBNJ		22.00	1.22	0.62	27.12	1.40	0.60
HUZBL9	*	23.70	2.92	1.49	31.30	5.58	2.39
J8GTQG		21.27	0.49	0.25	25.23	-0.49	-0.21
JZZGBV		20.06	-0.72	-0.37	24.95	-0.77	-0.33
LQ7NGA		19.35	-1.43	-0.73	23.30	-2.42	-1.04
P2DYXM		19.75	-1.03	-0.53	24.50	-1.22	-0.52
PV84DM		20.69	-0.10	-0.05	26.00	0.28	0.12
TNFUJ8		22.19	1.41	0.72	25.78	0.06	0.03
UXW2V2		24.89	4.11	2.09	30.71	4.99	2.14
XMJ9RB		23.50	2.71	1.38	28.20	2.48	1.06
YWMMA3		19.85	-0.93	-0.48	24.75	-0.97	-0.42

Summary Statistics

	Sample SA27	Sample SA28
Grand Means	20.781 psi	25.720 psi
SD Btwn Labs	1.960 psi	2.333 psi

Statistics based on 26 of 26 reporting participants

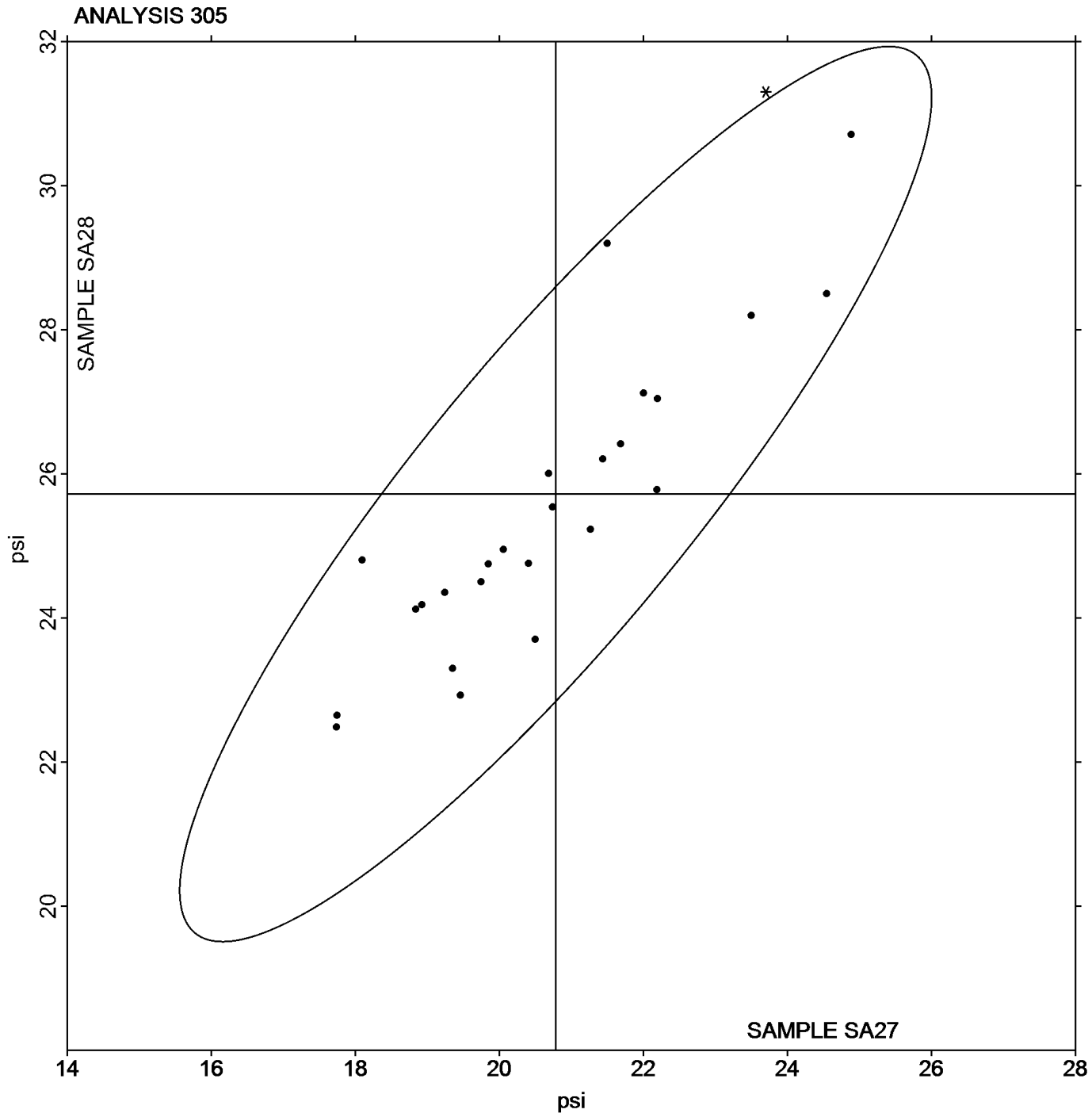
TAPPI-CTS Interlaboratory Testing Program

Analysis 305

Bursting Strength - Printing Papers

Grand Mean Sample **SA27** = 20.781 psi

Grand Mean Sample **SA28** = 25.720 psi



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

WebCode	Data Flag	Sample SB27 Lab Mean	Sample SB27 Diff from Grand Mean	Sample SB27 CPV	Sample SB28 Lab Mean	Sample SB28 Diff from Grand Mean	Sample SB28 CPV
66F46Z	*	75.14	-15.48	-2.84	77.03	-10.85	-2.01
7DN3AV		91.59	0.97	0.18	84.45	-3.43	-0.64
88HN76		88.04	-2.58	-0.47	87.40	-0.48	-0.09
8BG3TV		97.90	7.28	1.34	88.50	0.62	0.11
8DMKRQ		94.20	3.58	0.66	92.50	4.62	0.85
BKE2UR		97.45	6.83	1.25	96.78	8.90	1.65
BRTM4V		87.13	-3.48	-0.64	82.74	-5.14	-0.95
BZ7YWM		87.80	-2.82	-0.52	85.80	-2.08	-0.39
DTHV2P		93.37	2.75	0.51	92.32	4.44	0.82
ETUR8U		90.63	0.02	0.00	86.44	-1.44	-0.27
ETWGDC		87.35	-3.27	-0.60	80.35	-7.53	-1.40
F2PCNF		97.47	6.85	1.26	98.34	10.45	1.94
FXMBNJ		89.35	-1.26	-0.23	88.07	0.19	0.03
JFBVVD		96.84	6.22	1.14	91.84	3.96	0.73
NLP3K9		83.34	-7.28	-1.33	83.91	-3.98	-0.74
P6VWR6		90.05	-0.57	-0.10	79.95	-7.93	-1.47
QLCM2N		88.03	-2.58	-0.47	89.56	1.67	0.31
RDHU83		87.46	-3.16	-0.58	87.12	-0.76	-0.14
RM7P7J		93.01	2.40	0.44	94.64	6.75	1.25
TDUQC8		101.48	10.86	1.99	95.82	7.93	1.47
UXW2V2		92.98	2.37	0.43	88.27	0.39	0.07
XAHCW4		92.90	2.28	0.42	92.40	4.52	0.84
XGG2ET		86.70	-3.92	-0.72	83.00	-4.88	-0.90
XHAVAC		84.46	-6.16	-1.13	84.27	-3.61	-0.67
XMJ9RB		90.74	0.12	0.02	84.14	-3.75	-0.69
YWMMA3		90.59	-0.03	0.00	89.37	1.49	0.28

Summary Statistics

	Sample SB27	Sample SB28
Grand Means	90.616 psi	87.885 psi
SD Btwn Labs	5.452 psi	5.401 psi

Statistics based on 26 of 26 reporting participants

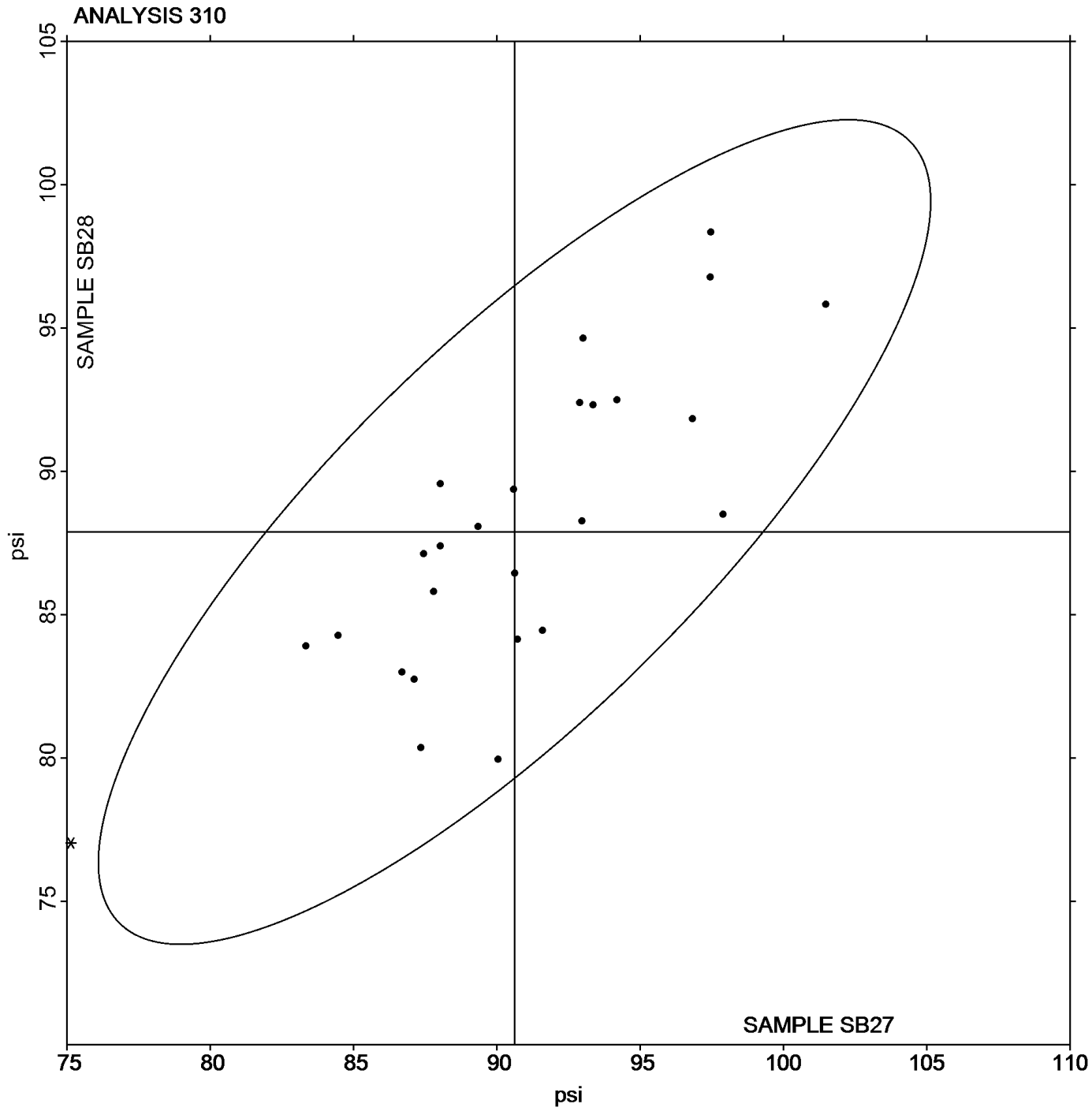
TAPPI-CTS Interlaboratory Testing Program

Analysis 310

Bursting Strength - Packaging Papers

Grand Mean Sample **SB27** = 90.616 psi

Grand Mean Sample **SB28** = 87.885 psi



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

WebCode	Data Flag	Sample SK27 Lab Mean	Sample SK27 Diff from Grand Mean	Sample SK27 CPV	Sample SK28 Lab Mean	Sample SK28 Diff from Grand Mean	Sample SK28 CPV
3FADYD		25.82	-1.70	-0.37	26.43	-1.38	-0.27
8K34A6		32.77	5.25	1.14	33.69	5.88	1.16
9XB9YX		21.40	-6.12	-1.33	21.00	-6.81	-1.34
DNNXDY		33.22	5.70	1.24	34.01	6.19	1.22
FXMBNJ		25.68	-1.85	-0.40	25.82	-2.00	-0.39
YBPEV8		26.24	-1.28	-0.28	25.94	-1.87	-0.37

Summary Statistics

	Sample SK27	Sample SK28
Grand Means	27.522 Grams	27.815 Grams
SD Btwn Labs	4.594 Grams	5.074 Grams

Statistics based on 6 of 6 reporting participants

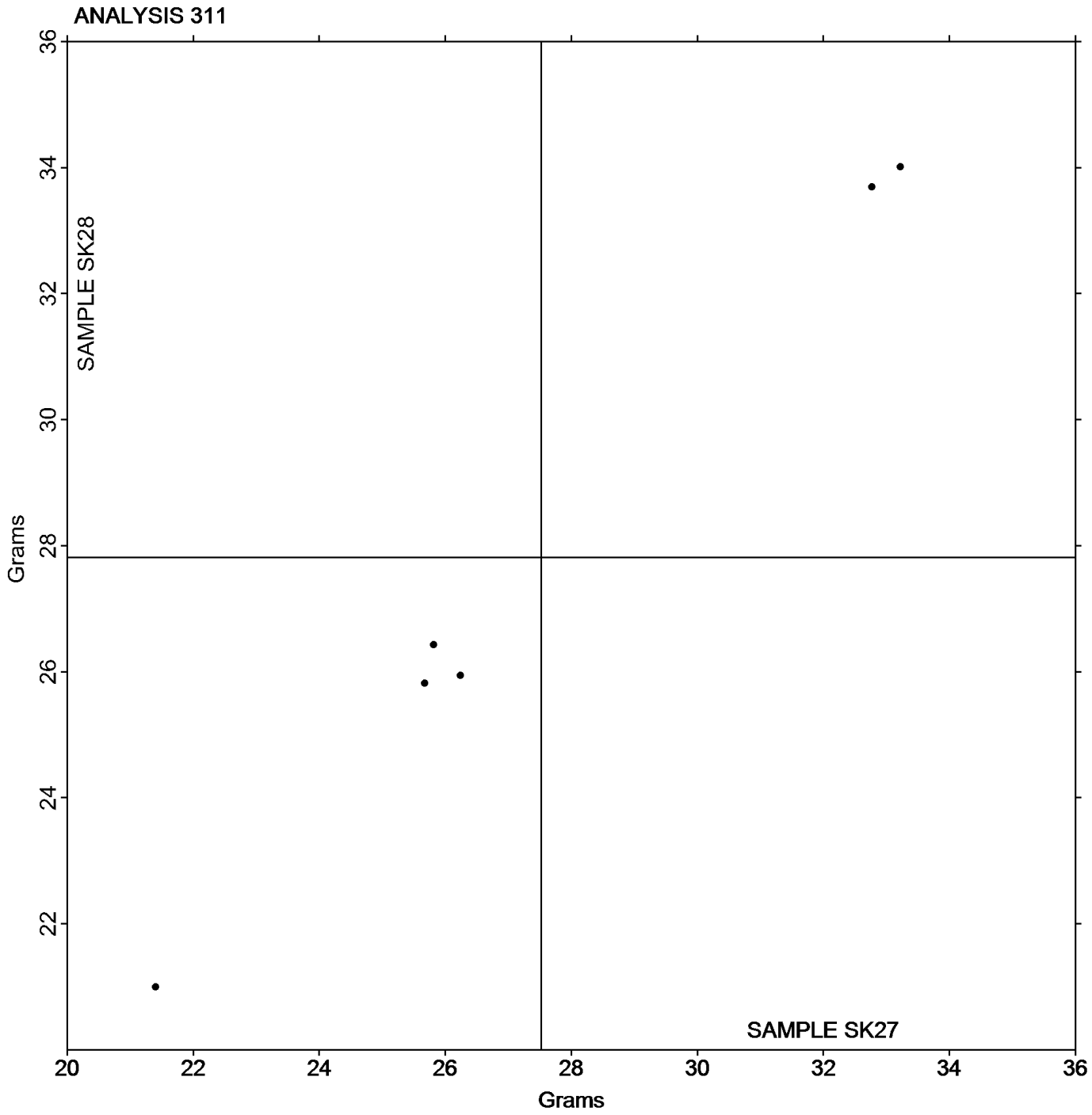
TAPPI-CTS Interlaboratory Testing Program

Analysis 311

Tearing Strength - Newsprint

Grand Mean Sample **SK27** = 27.522 Grams

Grand Mean Sample **SK28** = 27.815 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 SC27 Lab Mean	Sample SC27 Diff from Grand Mean	Sample SC27 CPV	Sample SC28 Lab Mean	Sample SC28 Diff from Grand Mean	Sample SC28 CPV
22WH9W		48.99	0.43	0.12	56.80	1.91	0.41
2EHUK7		55.17	6.61	1.90	60.99	6.10	1.31
32RKB7		51.34	2.78	0.80	60.46	5.57	1.19
3LZMAB	*	53.06	4.50	1.29	64.86	9.97	2.14
66F46Z		45.76	-2.80	-0.80	49.76	-5.13	-1.10
67CL82		49.73	1.18	0.34	56.28	1.39	0.30
6GXNPW	X	56.20	7.64	2.19	82.80	27.91	5.99
7FE4H6		49.56	1.00	0.29	58.07	3.18	0.68
7MFFD2	*	55.21	6.65	1.91	59.99	5.10	1.09
8BG3TV	X	21.20	-27.36	-7.84	23.90	-30.99	-6.64
8G7EUJ		50.70	2.14	0.61	59.80	4.91	1.05
8WKMT2		54.44	5.88	1.69	64.80	9.91	2.13
9HUBUW		49.59	1.04	0.30	56.86	1.97	0.42
9HYUHZ		43.12	-5.44	-1.56	47.42	-7.47	-1.60
AQ8LMN		49.92	1.36	0.39	57.26	2.37	0.51
B3GLU2		49.42	0.86	0.25	55.44	0.55	0.12
BKE2UR		44.45	-4.11	-1.18	49.30	-5.59	-1.20
BPAVRT		45.18	-3.37	-0.97	49.16	-5.73	-1.23
BRTM4V		50.26	1.71	0.49	58.77	3.88	0.83
D36WJK		49.68	1.12	0.32	56.31	1.42	0.30
EALRZE		51.00	2.44	0.70	59.52	4.63	0.99
ETUR8U		46.69	-1.86	-0.53	53.31	-1.58	-0.34
ETWGDC		42.85	-5.71	-1.64	46.53	-8.36	-1.79
EU9F9L		52.90	4.35	1.25	59.51	4.62	0.99
F8AC4T		49.65	1.09	0.31	57.93	3.04	0.65
FXMBNJ		47.86	-0.70	-0.20	55.15	0.26	0.06
GPRVCJ		47.41	-1.15	-0.33	52.80	-2.09	-0.45
GYET3P		42.60	-5.96	-1.71	49.60	-5.29	-1.13
HUZBL9		45.08	-3.48	-1.00	50.12	-4.77	-1.02
J8GTQG		48.20	-0.36	-0.10	52.20	-2.69	-0.58
JZZGBV		49.08	0.52	0.15	55.60	0.71	0.15
LGKMYE		45.59	-2.97	-0.85	49.41	-5.48	-1.17
LGWJ4J		47.68	-0.88	-0.25	54.86	-0.03	-0.01
LUHVFT		52.20	3.64	1.04	61.20	6.31	1.35
MM3CXE		46.50	-2.06	-0.59	49.29	-5.60	-1.20
N2DHHD		47.50	-1.06	-0.30	52.39	-2.50	-0.54
ND8WLF		48.15	-0.41	-0.12	57.73	2.84	0.61
NLP3K9		52.44	3.89	1.11	59.61	4.73	1.01
P6VWR6		43.46	-5.10	-1.46	48.72	-6.17	-1.32
PLGKYE		50.24	1.68	0.48	53.48	-1.41	-0.30
PV84DM		48.19	-0.37	-0.11	56.84	1.95	0.42
R3FG9N		48.30	-0.26	-0.07	53.58	-1.31	-0.28
RDHU83		50.00	1.44	0.41	59.10	4.22	0.90

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

WebCode	Data Flag	Sample SC27 Lab Mean	Sample SC27 Diff from Grand Mean	Sample SC27 CPV	Sample SC28 Lab Mean	Sample SC28 Diff from Grand Mean	Sample SC28 CPV
RZEBV4		42.28	-6.28	-1.80	47.08	-7.81	-1.67
TDUQC8		54.50	5.94	1.70	58.80	3.91	0.84
TEQ7MJ		43.30	-5.26	-1.51	48.23	-6.66	-1.43
TNFUJ8		49.60	1.04	0.30	54.80	-0.09	-0.02
TRG3NG		40.72	-7.84	-2.25	46.99	-7.90	-1.69
TTMKMD		45.46	-3.10	-0.89	50.45	-4.44	-0.95
UKR6BE		51.90	3.34	0.96	58.20	3.31	0.71
UXW2V2		48.79	0.23	0.07	54.78	-0.11	-0.02
VP3F39		53.62	5.06	1.45	58.16	3.27	0.70
XMJ9RB		47.75	-0.80	-0.23	54.09	-0.80	-0.17
XYDNGC		49.44	0.88	0.25	55.32	0.43	0.09
ZBHLFW		47.00	-1.56	-0.45	51.33	-3.56	-0.76

Summary Statistics

	Sample SC27	Sample SC28
Grand Means	48.557 Grams	54.887 Grams
SD Btwn Labs	3.488 Grams	4.664 Grams

Statistics based on 53 of 55 reporting participants

Comments on assigned Data Flags for Test #312

6GXNPW (X) - Data for Sample SC28 are high. Inconsistent in testing within the determinations for both samples.

8BG3TV (X) - Extreme data.

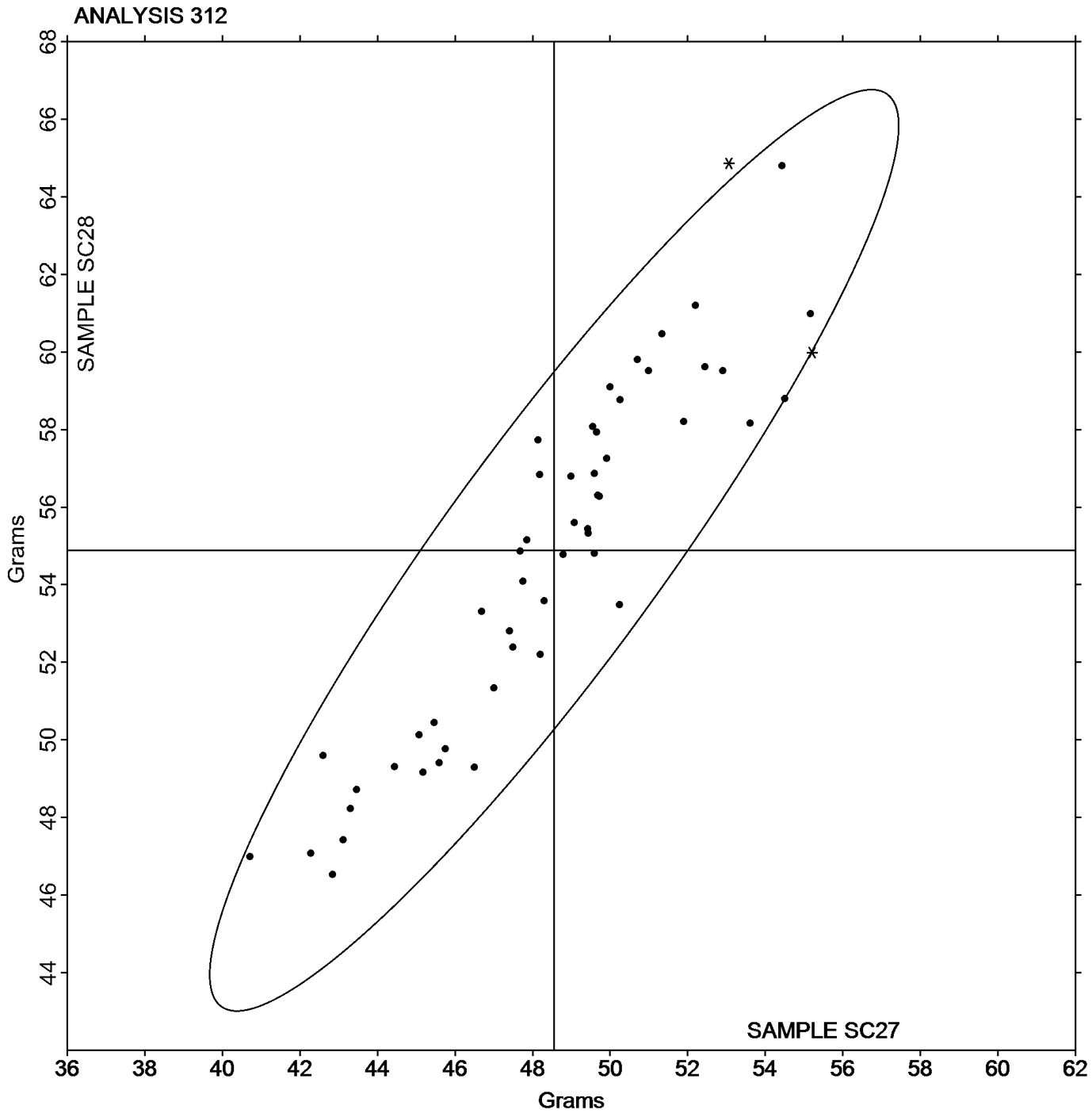
TAPPI-CTS Interlaboratory Testing Program

Analysis 312

Tearing Strength - Printing Papers

Grand Mean Sample **SC27** = 48.557 Grams

Grand Mean Sample **SC28** = 54.887 Grams



TAPPI-CTS Interlaboratory Testing Program

Analysis 314

Tearing Strength - Packaging Papers

WebCode	Data Flag	Sample SD27 Lab Mean	Sample SD27 Diff from Grand Mean	Sample SD27 CPV	Sample SD28 Lab Mean	Sample SD28 Diff from Grand Mean	Sample SD28 CPV
2GPCJ3	X	232.1	16.8	0.70	104.5	-0.5	-0.04
2N7TBC		237.9	22.6	0.95	107.5	2.5	0.22
36RV87		204.7	-10.6	-0.45	99.9	-5.1	-0.45
4C48YX	X	189.2	-26.1	-1.10	94.6	-10.4	-0.92
7DN3AV	X	288.0	72.7	3.05	106.0	1.0	0.09
877PBW		217.5	2.2	0.09	120.9	15.9	1.41
88HN76		203.4	-11.9	-0.50	102.0	-3.0	-0.27
8BG3TV	X	191.6	-23.7	-0.99	86.8	-18.2	-1.62
9NYA6L		228.6	13.3	0.56	107.3	2.3	0.20
BZ7YWM		234.4	19.1	0.80	106.6	1.6	0.14
DTHV2P		208.7	-6.6	-0.28	99.5	-5.5	-0.49
EU9F9L	*	191.6	-23.7	-0.99	77.7	-27.3	-2.42
F2PCNF		237.3	22.0	0.92	114.7	9.7	0.86
FETH2Z	X	202.4	-12.9	-0.54	95.2	-9.8	-0.87
FKYBVV		216.9	1.6	0.07	107.7	2.7	0.24
FXMBNJ		216.2	0.9	0.04	102.3	-2.7	-0.24
G7W3QL	*	281.1	65.8	2.76	135.8	30.8	2.73
GZAC6Q		220.2	4.9	0.20	103.0	-2.0	-0.18
HGC93F		205.9	-9.4	-0.39	97.7	-7.3	-0.65
K8FFJE		216.1	0.8	0.03	103.4	-1.6	-0.14
MW8JDE		202.0	-13.4	-0.56	96.3	-8.7	-0.77
P2DYXM		172.6	-42.7	-1.79	95.1	-9.9	-0.88
PX9CFC		271.7	56.4	2.36	124.6	19.6	1.74
R96YKE		213.1	-2.2	-0.09	102.2	-2.8	-0.25
RM7P7J		203.0	-12.3	-0.51	102.2	-2.8	-0.25
TNQ2F9		186.8	-28.5	-1.19	98.4	-6.6	-0.59
U6YBZ9	*	212.8	-2.5	-0.10	123.4	18.4	1.63
UHKMCH		217.8	2.5	0.11	108.5	3.5	0.31
XAHCW4		217.9	2.6	0.11	100.7	-4.3	-0.38
XGG2ET		177.2	-38.1	-1.60	91.6	-13.4	-1.19
Y9HWWC		233.5	18.2	0.76	109.4	4.4	0.39
YJFWAF		192.4	-22.9	-0.96	98.8	-6.2	-0.55
YWMMA3		207.2	-8.1	-0.34	102.8	-2.2	-0.20

Summary Statistics

	Sample SD27	Sample SD28
Grand Means	215.30 Grams	105.00 Grams
SD Btwn Labs	23.87 Grams	11.26 Grams

Statistics based on 28 of 33 reporting participants

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

Comments on assigned Data Flags for Test #314

2GPCJ3 (X) - Data appear to be off by a factor of .25; data converted by CTS (x4).

4C48YX (X) - Data appear to be off by a factor of .25; data converted by CTS (x4).

7DN3AV (X) - Data for Sample SD27 are high.

8BG3TV (X) - Data appear to be off by a factor of .25; data converted by CTS (x4).

FETH2Z (X) - Data appear to be off by a factor of .25; data converted by CTS (x4).

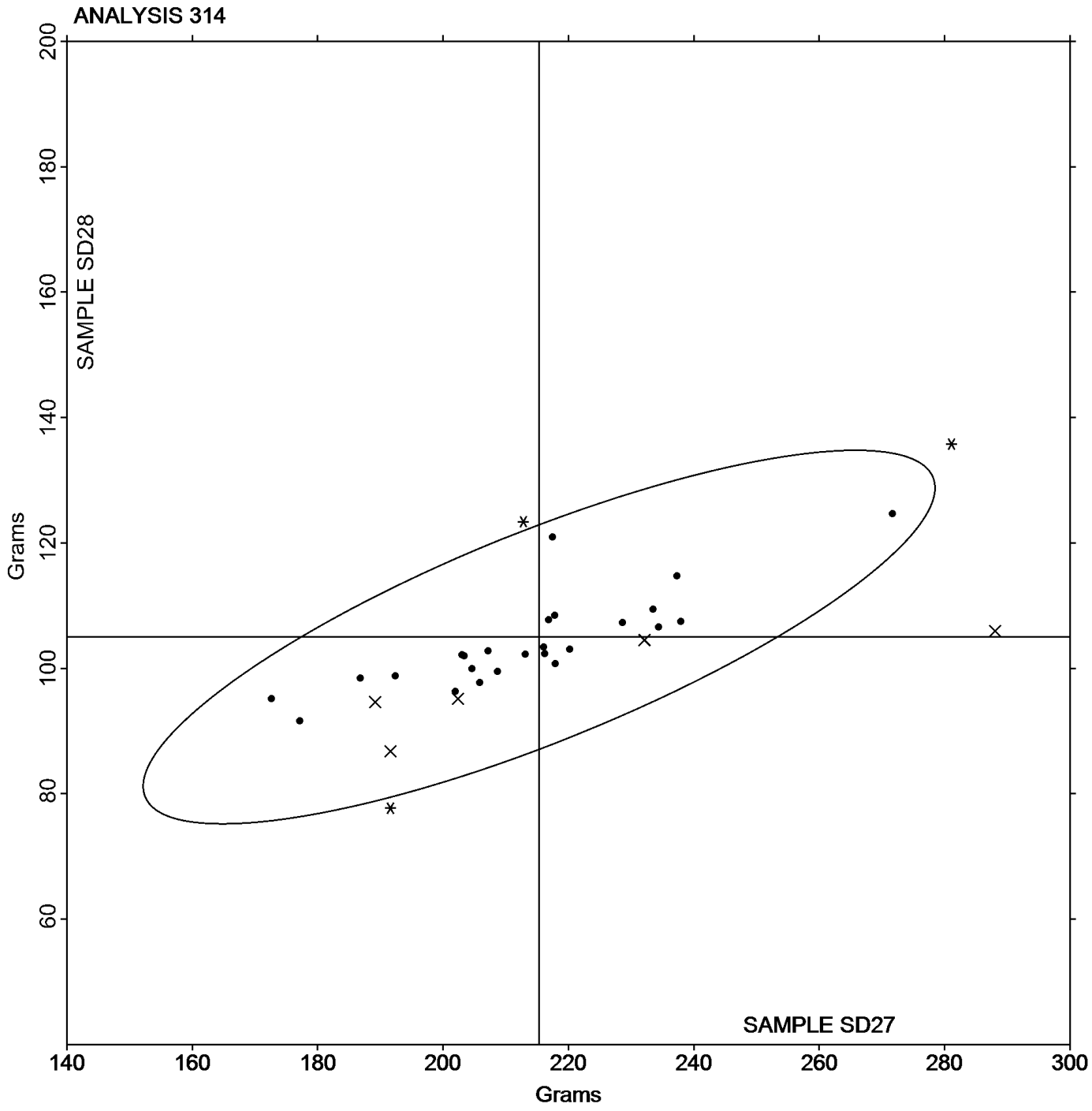
TAPPI-CTS Interlaboratory Testing Program

Analysis 314

Tearing Strength - Packaging Papers

Grand Mean Sample **SD27** = 215.30 Grams

Grand Mean Sample **SD28** = 105.00 Grams



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

WebCode	Data Flag	Sample SR27 Lab Mean	Sample SR27 Diff from Grand Mean	Sample SR27 CPV	Sample SR28 Lab Mean	Sample SR28 Diff from Grand Mean	Sample SR28 CPV
3FADYD		2.365	-0.189	-1.08	2.444	-0.210	-1.48
877TLY		2.439	-0.115	-0.66	2.479	-0.176	-1.24
8DMKRQ		2.667	0.113	0.65	2.754	0.099	0.70
8K34A6		2.504	-0.050	-0.29	2.545	-0.109	-0.77
9XB9YX		2.849	0.295	1.69	2.895	0.241	1.70
DNNXDY		2.637	0.083	0.48	2.734	0.080	0.56
EU9F9L		2.565	0.011	0.06	2.614	-0.040	-0.28
TNFUJ8		2.762	0.208	1.19	2.770	0.116	0.82
XMJ9RB		2.442	-0.112	-0.64	2.602	-0.052	-0.37
YBPEV8		2.310	-0.244	-1.40	2.705	0.051	0.36

Summary Statistics

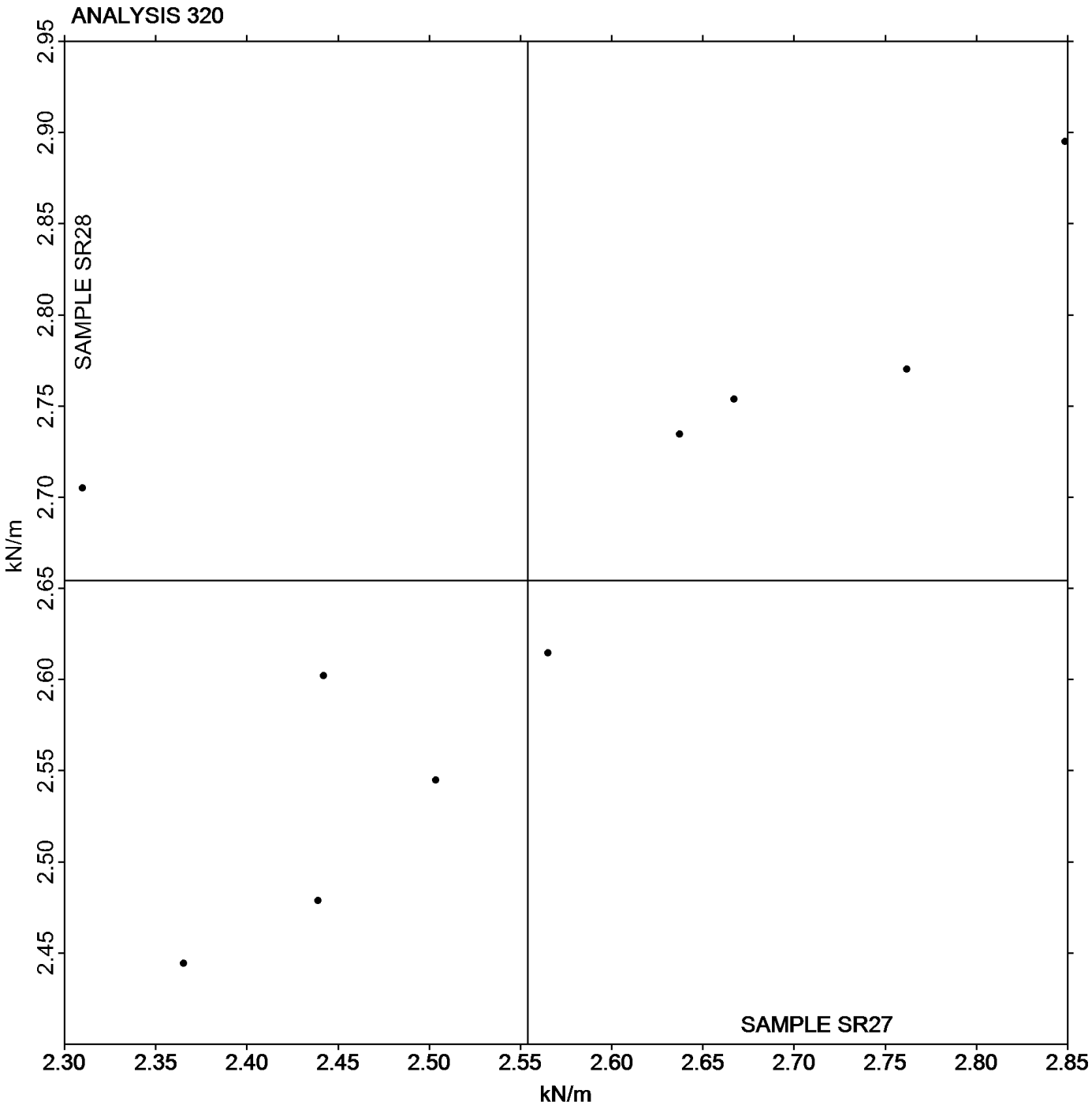
	Sample SR27	Sample SR28
Grand Means	2.5540 kN/m	2.6542 kN/m
SD Btwn Labs	0.1743 kN/m	0.1420 kN/m

Statistics based on 10 of 10 reporting participants

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

Grand Mean Sample **SR27** = 2.5540 kN/m

Grand Mean Sample **SR28** = 2.6542 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 SR27 Lab Mean	Sample SR27 Diff from Grand Mean	Sample SR27 CPV	Sample SR28 Lab Mean	Sample SR28 Diff from Grand Mean	Sample SR28 CPV
877TLY		20.20	1.39	0.52	19.23	1.79	0.78
8DMKRQ		15.97	-2.84	-1.06	15.03	-2.42	-1.05
8K34A6		15.79	-3.02	-1.13	14.45	-2.99	-1.30
9XB9YX		23.27	4.46	1.66	21.88	4.43	1.93
DNNXDY		17.74	-1.07	-0.40	16.99	-0.45	-0.20
EU9F9L		19.55	0.74	0.28	17.64	0.20	0.09
TNFUJ8		21.99	3.18	1.19	16.87	-0.57	-0.25
XMJ9RB		16.27	-2.54	-0.95	16.00	-1.44	-0.63
YBPEV8		18.52	-0.29	-0.11	18.89	1.44	0.63

Summary Statistics

	Sample SR27	Sample SR28
Grand Means	18.810 Joules/sq m	17.442 Joules/sq m
SD Btwn Labs	2.679 Joules/sq m	2.301 Joules/sq m

Statistics based on 9 of 9 reporting participants

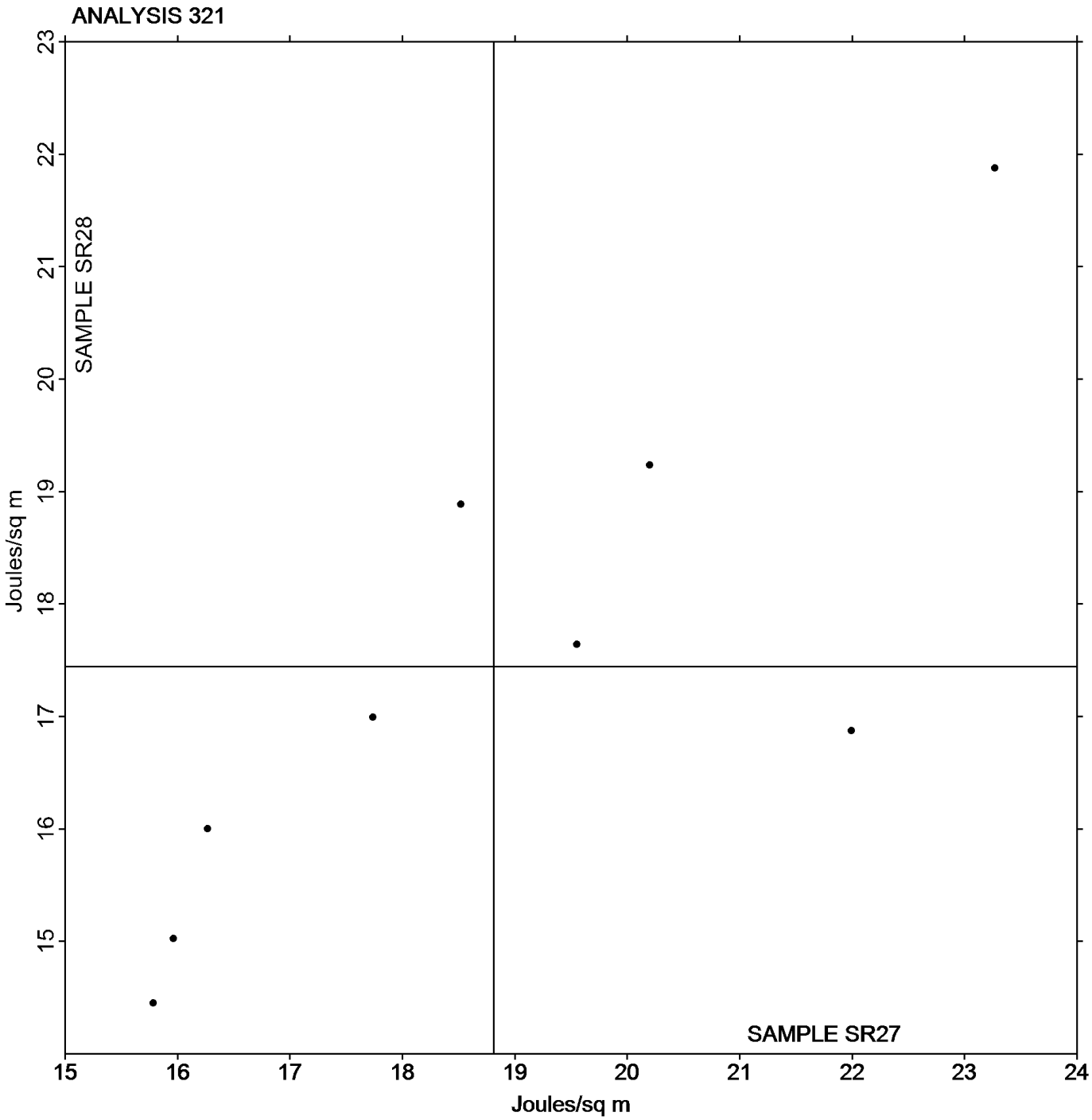
TAPPI-CTS Interlaboratory Testing Program

Analysis 321

Tensile Energy Absorption - Newsprint

Grand Mean Sample **SR27** = 18.810 Joules/sq m

Grand Mean Sample **SR28** = 17.442 Joules/sq 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 322
Elongation to Break - Newsprint

WebCode	Data Flag	Sample SR27 Lab Mean	Sample SR27 Diff from Grand Mean	Sample SR27 CPV	Sample SR28 Lab Mean	Sample SR28 Diff from Grand Mean	Sample SR28 CPV
877TLY		1.496	0.279	1.76	1.483	0.336	1.96
8DMKRQ		1.046	-0.171	-1.08	0.969	-0.178	-1.03
9XB9YX		1.386	0.169	1.07	1.285	0.138	0.80
DNNXDY		1.132	-0.085	-0.54	1.064	-0.083	-0.48
EU9F9L		1.102	-0.115	-0.73	0.991	-0.156	-0.91
TNFUJ8		1.290	0.073	0.46	1.170	0.023	0.13
XMJ9RB		1.107	-0.110	-0.70	1.043	-0.104	-0.61
YBPEV8		1.179	-0.038	-0.24	1.171	0.024	0.14

Summary Statistics

	Sample SR27	Sample SR28
Grand Means	1.2172 Percent	1.1470 Percent
SD Btwn Labs	0.1581 Percent	0.1718 Percent

Statistics based on 8 of 8 reporting participants

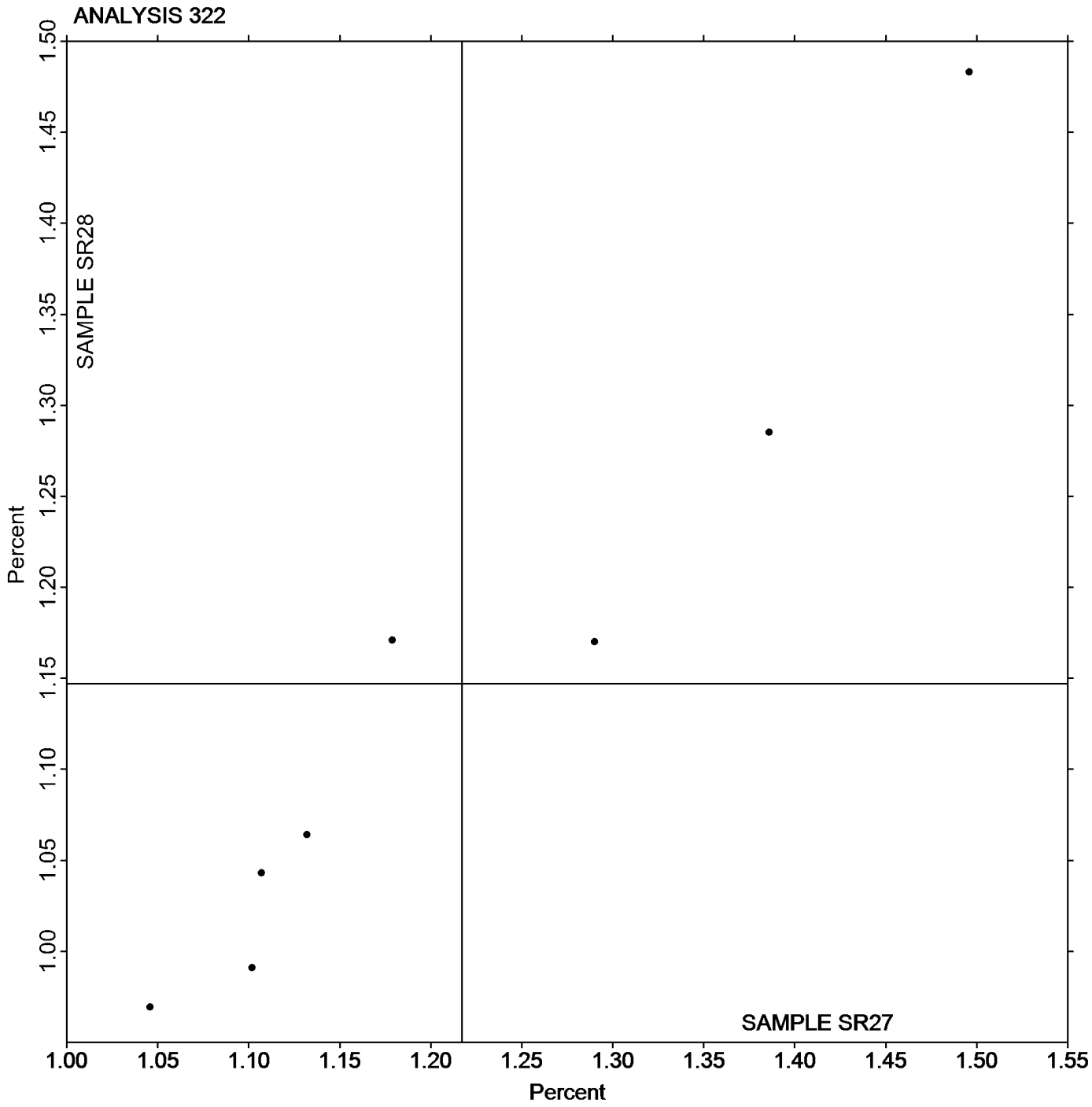
TAPPI-CTS Interlaboratory Testing Program

Analysis 322

Elongation to Break - Newsprint

Grand Mean Sample **SR27** = 1.2172 Percent

Grand Mean Sample **SR28** = 1.1470 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 SF27 Lab Mean	Sample SF27 Diff from Grand Mean	Sample SF27 CPV	Sample SF28 Lab Mean	Sample SF28 Diff from Grand Mean	Sample SF28 CPV	Instr Code
22WH9W		4.944	0.095	0.35	4.844	-0.155	-0.48	LH
2EHUK7		4.589	-0.260	-0.96	4.559	-0.440	-1.38	XX
32RKB7		4.672	-0.177	-0.65	4.786	-0.213	-0.67	ID
3LZMAB		4.779	-0.070	-0.26	4.936	-0.063	-0.20	MR
66F46Z		4.553	-0.296	-1.09	4.954	-0.044	-0.14	TA
67CL82	*	4.244	-0.605	-2.22	4.123	-0.876	-2.74	IM
6GXNPW		5.165	0.315	1.16	5.322	0.323	1.01	XX
7FE4H6		4.652	-0.197	-0.72	4.503	-0.496	-1.55	LH
7MFFD2		4.614	-0.235	-0.86	4.776	-0.223	-0.70	LA
88HN76		4.701	-0.148	-0.54	4.850	-0.149	-0.46	IM
8G7EUJ		5.269	0.420	1.54	5.421	0.422	1.32	LH
8WKMT2		4.399	-0.451	-1.65	4.493	-0.506	-1.58	LH
9HUBUW		5.020	0.171	0.63	5.118	0.119	0.37	LH
9HYUHZ	X	4.804	-0.046	-0.17	5.590	0.591	1.85	TJ
AQ8LMN		4.912	0.063	0.23	4.998	-0.001	0.00	TO
BJE76U		4.968	0.119	0.44	5.103	0.104	0.33	IN
BPAVRT		5.035	0.186	0.68	5.014	0.015	0.05	LX
D36WJK		4.627	-0.222	-0.82	4.801	-0.198	-0.62	LI
EALRZE		4.767	-0.083	-0.30	4.894	-0.105	-0.33	LX
ETUR8U		4.650	-0.200	-0.73	5.000	0.001	0.00	XX
F8AC4T		4.602	-0.248	-0.91	4.769	-0.230	-0.72	IM
FE89MP		4.856	0.006	0.02	5.191	0.192	0.60	TP
FXMBNJ		4.796	-0.053	-0.20	4.961	-0.038	-0.12	LH
FYHUPK	*	4.294	-0.555	-2.04	4.697	-0.302	-0.94	RE
GPRVCJ		4.773	-0.077	-0.28	4.596	-0.403	-1.26	TF
GYET3P		5.251	0.402	1.48	5.413	0.414	1.30	TO
HUZBL9		4.872	0.023	0.08	5.042	0.043	0.13	TO
JZZGBV		4.489	-0.361	-1.32	4.768	-0.231	-0.72	TB
KPG3AD		4.635	-0.214	-0.79	4.745	-0.254	-0.79	LH
LGKMYE		5.127	0.278	1.02	5.400	0.401	1.26	TP
LGWJ4J		5.001	0.152	0.56	4.966	-0.033	-0.10	LH
MM3CXE		5.224	0.374	1.37	5.341	0.342	1.07	XX
N2DHHD		4.841	-0.009	-0.03	4.893	-0.106	-0.33	LA
ND8WLF		4.882	0.033	0.12	4.872	-0.127	-0.40	LI
NLP3K9		4.790	-0.059	-0.22	4.961	-0.038	-0.12	LI
P6VWR6		5.255	0.405	1.49	5.162	0.163	0.51	TX
P8JD2D		4.975	0.125	0.46	5.219	0.220	0.69	XX
PLGKYE		4.562	-0.287	-1.05	4.518	-0.481	-1.51	XX
PV84DM		4.991	0.142	0.52	5.257	0.258	0.81	LH
R3FG9N		4.883	0.033	0.12	5.075	0.076	0.24	TI
RDHU83		4.594	-0.255	-0.94	4.730	-0.269	-0.84	LI
REQRWD		5.352	0.502	1.84	5.504	0.505	1.58	XX
RZEBV4		5.333	0.484	1.78	5.614	0.615	1.92	LH

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

WebCode	Data Flag	Sample SF27 Lab Mean	Sample SF27 Diff from Grand Mean	Sample SF27 CPV	Sample SF28 Lab Mean	Sample SF28 Diff from Grand Mean	Sample SF28 CPV	Instr Code
TDUQC8		4.802	-0.047	-0.17	4.949	-0.050	-0.16	DL
TEQ7MJ		4.953	0.104	0.38	5.025	0.026	0.08	LF
TRG3NG	*	5.165	0.316	1.16	5.759	0.760	2.38	TJ
TTMKMD		5.046	0.197	0.72	5.350	0.351	1.10	LA
UKR6BE		4.459	-0.391	-1.43	4.681	-0.318	-0.99	TC
VP3F39		5.404	0.555	2.04	5.505	0.506	1.58	TJ
X639H8		5.061	0.211	0.78	5.397	0.398	1.25	LA
XHAVAC		4.981	0.132	0.48	5.253	0.254	0.79	TB
XMJ9RB		4.655	-0.194	-0.71	4.841	-0.158	-0.49	LH
XYDNGC		4.787	-0.062	-0.23	4.948	-0.051	-0.16	LE
ZBHLFW		4.766	-0.083	-0.31	5.047	0.048	0.15	TB

Summary Statistics

	Sample SF27	Sample SF28
Grand Means	4.8494 kN/m	4.9989 kN/m
SD Btwn Labs	0.2724 kN/m	0.3196 kN/m

Statistics based on 53 of 54 reporting participants

Comments on assigned Data Flags for Test #325

9HYUHZ (X) - Inconsistent in testing between samples and within the determinations for Sample SF27.

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
(RE) - Regmed
(TA) - Testometric AX
(TB) - Thwing-Albert EJA/1000
(TC) - Thwing-Albert Electro-Hydraulic, Model 30LT
(TF) - Thwing-Albert EJA Vantage-1
(TI) - Thwing-Albert QC II
(TJ) - Thwing-Albert QC II-XS
(TO) - Thwing-Albert QC-1000
(TP) - TMI Monitor/Tensile 100 (84-21-01)
(TX) - Thwing-Albert (model not specified)
(XX) - Instrument make/model not specified by lab

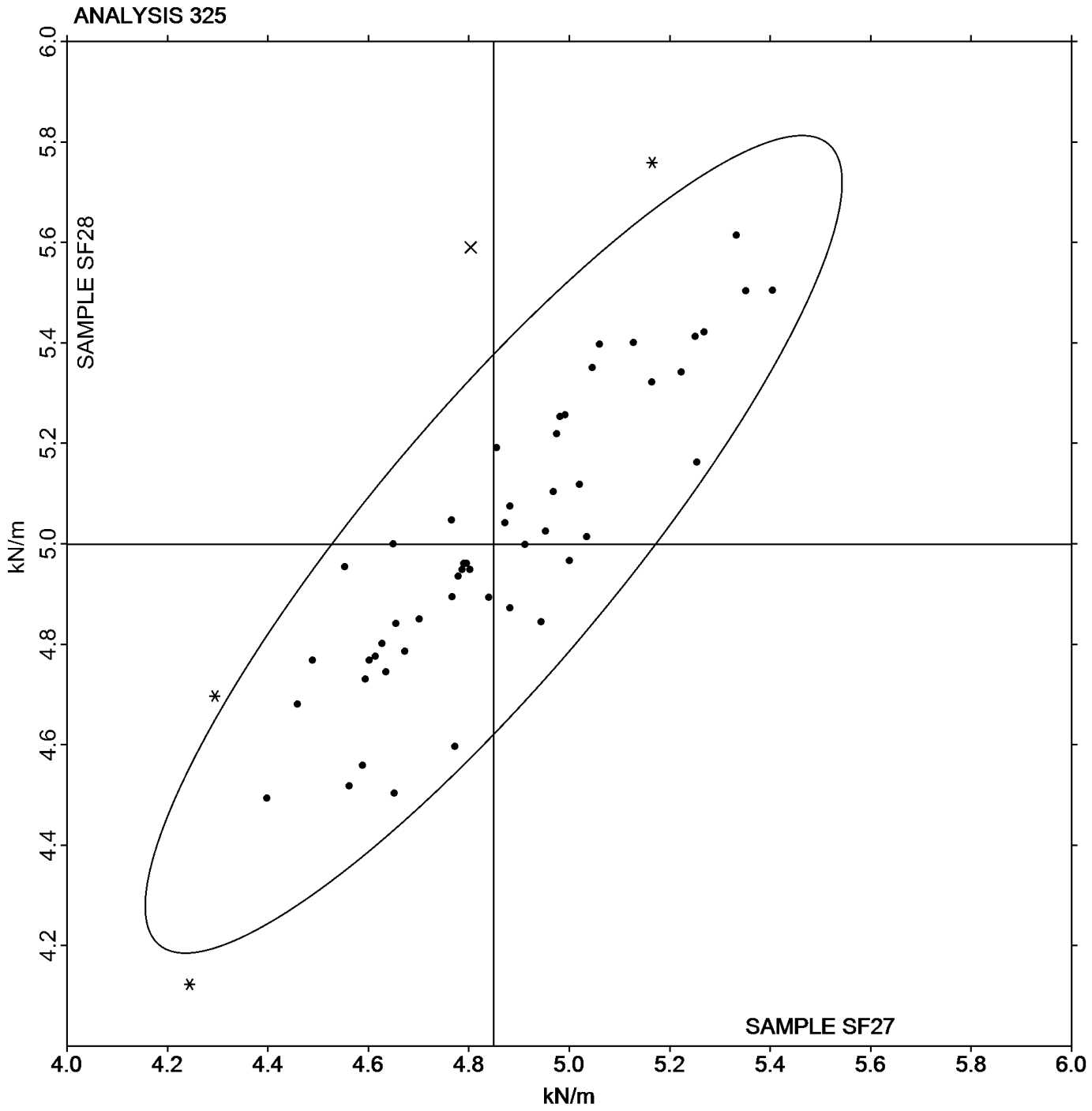
TAPPI-CTS Interlaboratory Testing Program

Analysis 325

Tensile Breaking Strength - Printing Papers

Grand Mean Sample **SF27** = 4.8494 kN/m

Grand Mean Sample **SF28** = 4.9989 kN/m



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

WebCode	Data Flag	Sample SF27 Lab Mean	Sample SF27 Diff from Grand Mean	Sample SF27 CPV	Sample SF28 Lab Mean	Sample SF28 Diff from Grand Mean	Sample SF28 CPV	Instr Code
22WH9W		63.85	-2.29	-0.39	44.04	-6.82	-1.08	LH
2EHUK7		57.16	-8.98	-1.54	38.41	-12.45	-1.97	XX
32RKB7	X	350.55	284.41	48.86	272.20	221.34	35.07	ID
3LZMAB		61.57	-4.57	-0.79	47.09	-3.77	-0.60	MR
67CL82		61.31	-4.83	-0.83	38.71	-12.15	-1.93	IM
7FE4H6		63.57	-2.57	-0.44	50.01	-0.85	-0.13	LH
7MFFD2		54.40	-11.74	-2.02	40.00	-10.86	-1.72	LA
88HN76		65.38	-0.76	-0.13	50.28	-0.58	-0.09	IM
8WKMT2		66.65	0.51	0.09	50.49	-0.38	-0.06	LH
9HUBUW		77.45	11.31	1.94	56.98	6.12	0.97	LH
BPAVRT		65.48	-0.66	-0.11	52.72	1.85	0.29	LX
D36WJK		65.27	-0.87	-0.15	50.34	-0.52	-0.08	LI
EALRZE		65.80	-0.34	-0.06	53.66	2.80	0.44	LX
ETUR8U		65.03	-1.12	-0.19	59.48	8.61	1.36	XX
F8AC4T		77.78	11.64	2.00	58.13	7.27	1.15	IM
FXMBNJ		63.43	-2.71	-0.47	50.47	-0.39	-0.06	LH
FYHUPK	*	58.10	-8.05	-1.38	52.40	1.54	0.24	RE
GYET3P		62.30	-3.84	-0.66	46.24	-4.62	-0.73	TO
HUZBL9	X	40.63	-25.51	-4.38	32.56	-18.30	-2.90	TO
JZZGBV		66.13	-0.01	0.00	54.50	3.64	0.58	TB
KPG3AD		65.03	-1.11	-0.19	50.77	-0.09	-0.01	LH
LGKMYE	X	1.16	-64.98	-11.16	0.97	-49.89	-7.90	TP
LGWJ4J		61.16	-4.98	-0.86	43.35	-7.51	-1.19	LH
ND8WLF		66.09	-0.05	-0.01	50.66	-0.20	-0.03	LI
NLP3K9		68.26	2.12	0.36	54.50	3.64	0.58	LI
P6VWR6		70.08	3.94	0.68	44.85	-6.01	-0.95	TA
P8JD2D		70.49	4.35	0.75	57.02	6.16	0.98	LX
PLGKYE		75.04	8.89	1.53	59.82	8.96	1.42	XX
PV84DM		69.04	2.89	0.50	56.58	5.72	0.91	LH
R3FG9N		72.39	6.24	1.07	56.92	6.06	0.96	TI
RDHU83		64.12	-2.02	-0.35	48.78	-2.09	-0.33	LI
RZEBV4		68.97	2.83	0.49	54.58	3.72	0.59	LH
TDUQC8		71.27	5.13	0.88	54.99	4.13	0.65	DL
TEQ7MJ		56.68	-9.46	-1.62	38.40	-12.46	-1.97	LW
TTMKMD		70.74	4.60	0.79	56.02	5.16	0.82	LA
VP3F39		77.42	11.28	1.94	60.68	9.82	1.56	TJ
XMJ9RB		61.38	-4.76	-0.82	47.42	-3.44	-0.55	LH

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

Summary Statistics

	Sample SF27	Sample SF28
Grand Means	66.142 Joules/sq m	50.860 Joules/sq m
SD Btwn Labs	5.821 Joules/sq m	6.312 Joules/sq m

Statistics based on 34 of 37 reporting participants

Comments on assigned Data Flags for Test #327

32RKB7 (X) - Extreme data.

HUZBL9 (X) - Systematic error (data for both samples are low).

LGKMYE (X) - Extreme data.

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

(RE) - Regmed

(TA) - Thwing-Albert

(TB) - Thwing-Albert EJA/1000

(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

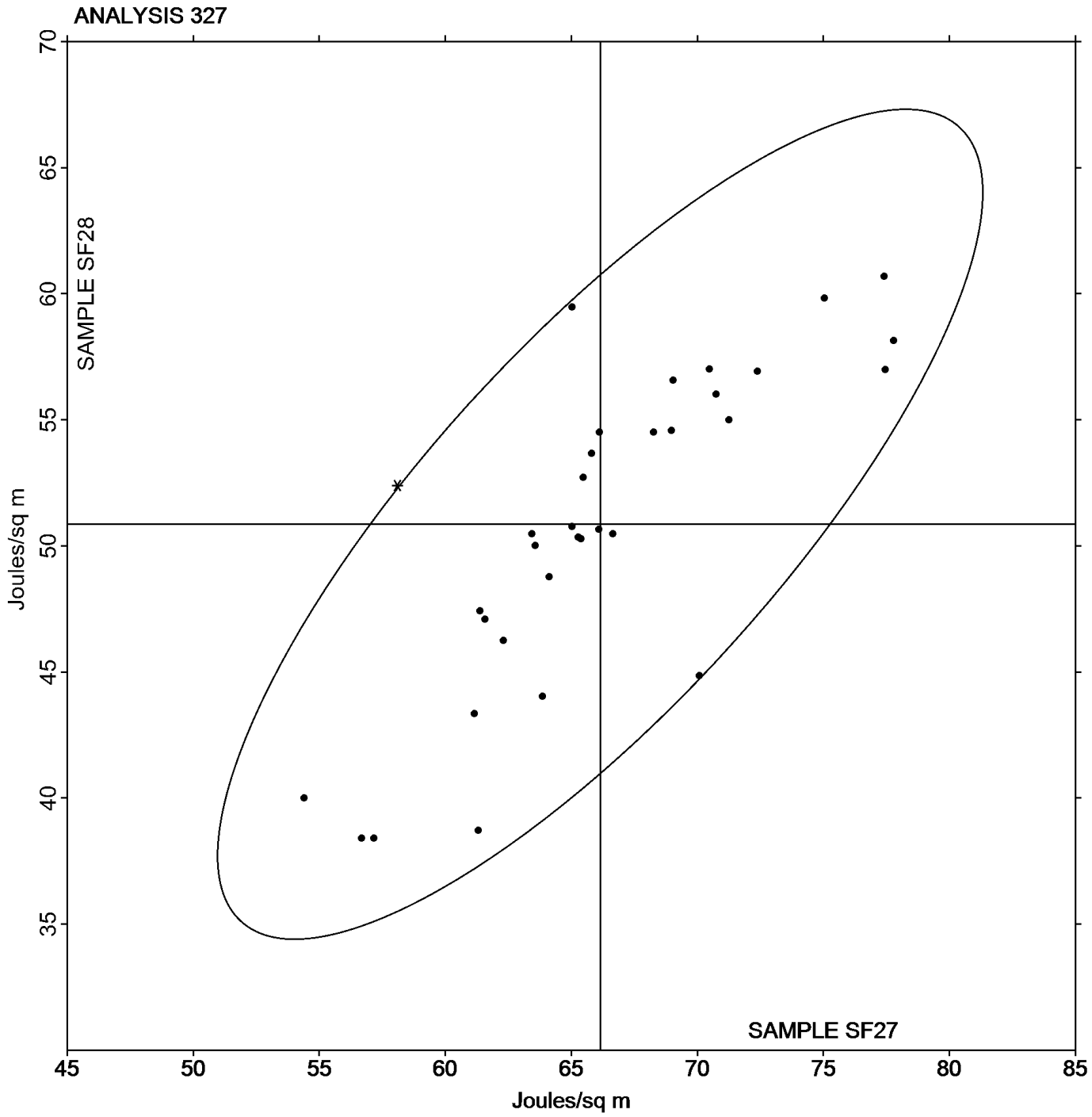
TAPPI-CTS Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

Grand Mean Sample **SF27** = 66.142 Joules/sq m

Grand Mean Sample **SF28** = 50.860 Joules/sq m



TAPPI-CTS Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

WebCode	Data Flag	Sample SF27 Lab Mean	Sample SF27 Diff from Grand Mean	Sample SF27 CPV	Sample SF28 Lab Mean	Sample SF28 Diff from Grand Mean	Sample SF28 CPV	Instr Code
22WH9W		1.814	-0.285	-1.51	1.314	-0.311	-1.90	LH
2EHUK7		2.402	0.303	1.61	1.754	0.129	0.79	XX
32RKB7		2.272	0.174	0.92	1.777	0.152	0.93	ID
3LZMAB		1.946	-0.152	-0.81	1.529	-0.096	-0.59	MR
67CL82		2.331	0.232	1.24	1.660	0.035	0.21	XX
7FE4H6		2.017	-0.082	-0.43	1.549	-0.076	-0.46	LH
7MFFD2		2.083	-0.016	-0.08	1.547	-0.078	-0.48	LA
88HN76		2.068	-0.031	-0.16	1.610	-0.015	-0.09	IM
8WKMT2		2.230	0.131	0.70	1.711	0.086	0.53	LH
9HUBUW		2.255	0.156	0.83	1.691	0.066	0.40	LH
AQ8LMN	X	3.412	1.313	6.98	2.487	0.862	5.27	TO
BJE76U		2.122	0.023	0.12	1.583	-0.042	-0.26	IN
BPAVRT		1.962	-0.137	-0.73	1.628	0.003	0.02	LX
D36WJK		2.087	-0.012	-0.06	1.618	-0.007	-0.04	LI
EALRZE		2.034	-0.065	-0.34	1.620	-0.005	-0.03	LX
ETUR8U	*	2.083	-0.016	-0.08	1.865	0.240	1.47	XX
F8AC4T		2.531	0.433	2.30	1.909	0.284	1.74	IM
FXMBNJ		1.927	-0.172	-0.91	1.540	-0.085	-0.52	LH
FYHUPK		2.036	-0.063	-0.34	1.799	0.174	1.06	RE
GPRVCJ		2.360	0.261	1.39	1.740	0.115	0.70	TF
GYET3P		1.766	-0.333	-1.77	1.344	-0.281	-1.72	TG
HUZBL9	X	5.580	3.481	18.50	4.360	2.735	16.72	TO
JZZGBV		2.224	0.125	0.67	1.825	0.200	1.22	TB
KPG3AD		2.086	-0.013	-0.07	1.666	0.041	0.25	LH
LGKMYE	X	3.708	1.609	8.55	3.021	1.396	8.53	TP
LGWJ4J		1.766	-0.333	-1.77	1.312	-0.313	-1.91	LH
ND8WLF		2.051	-0.048	-0.25	1.640	0.015	0.09	LI
NLP3K9		2.109	0.010	0.06	1.679	0.054	0.33	LI
P6VWR6		2.128	0.029	0.16	1.522	-0.103	-0.63	TX
P8JD2D		1.987	-0.112	-0.59	1.584	-0.041	-0.25	LX
PLGKYE		2.431	0.332	1.77	1.843	0.218	1.33	XX
PV84DM		2.039	-0.060	-0.32	1.658	0.033	0.20	LH
R3FG9N		2.209	0.110	0.59	1.756	0.131	0.80	TI
RDHU83		2.058	-0.041	-0.22	1.586	-0.039	-0.24	LI
RZEBV4		1.908	-0.191	-1.01	1.509	-0.116	-0.71	LH
TDUQC8		2.390	0.291	1.55	1.918	0.293	1.79	DL
TEQ7MJ		1.740	-0.359	-1.91	1.258	-0.367	-2.24	LX
TRG3NG	*	2.078	-0.021	-0.11	1.327	-0.298	-1.82	LH
TTMKMD		1.894	-0.205	-1.09	1.494	-0.131	-0.80	LA
VP3F39		2.252	0.153	0.82	1.791	0.166	1.02	TJ
XHAVAC		2.044	-0.054	-0.29	1.622	-0.003	-0.02	TB
XMJ9RB		1.972	-0.127	-0.67	1.528	-0.097	-0.59	LH
ZBHLFW		2.250	0.151	0.80	1.690	0.065	0.40	TF

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

Summary Statistics

	Sample SF27	Sample SF28
Grand Means	2.0986 Percent	1.6249 Percent
SD Btwn Labs	0.1882 Percent	0.1636 Percent

Statistics based on 40 of 43 reporting participants

Comments on assigned Data Flags for Test #328

AQ8LMN (X) - Extreme data.

HUZBL9 (X) - Extreme data.

LGKMYE (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
(RE) - Regmed
(TB) - Thwing-Albert EJA/1000
(TF) - Thwing-Albert EJA Vantage-1
(TG) - Thwing-Albert QC
(TI) - Thwing-Albert QC II
(TJ) - Thwing-Albert QC II-XS
(TO) - Thwing-Albert QC-1000
(TP) - TMI Monitor/Tensile 100 (84-21-01)
(TX) - Thwing-Albert (model not specified)
(XX) - Instrument make/model not specified by lab

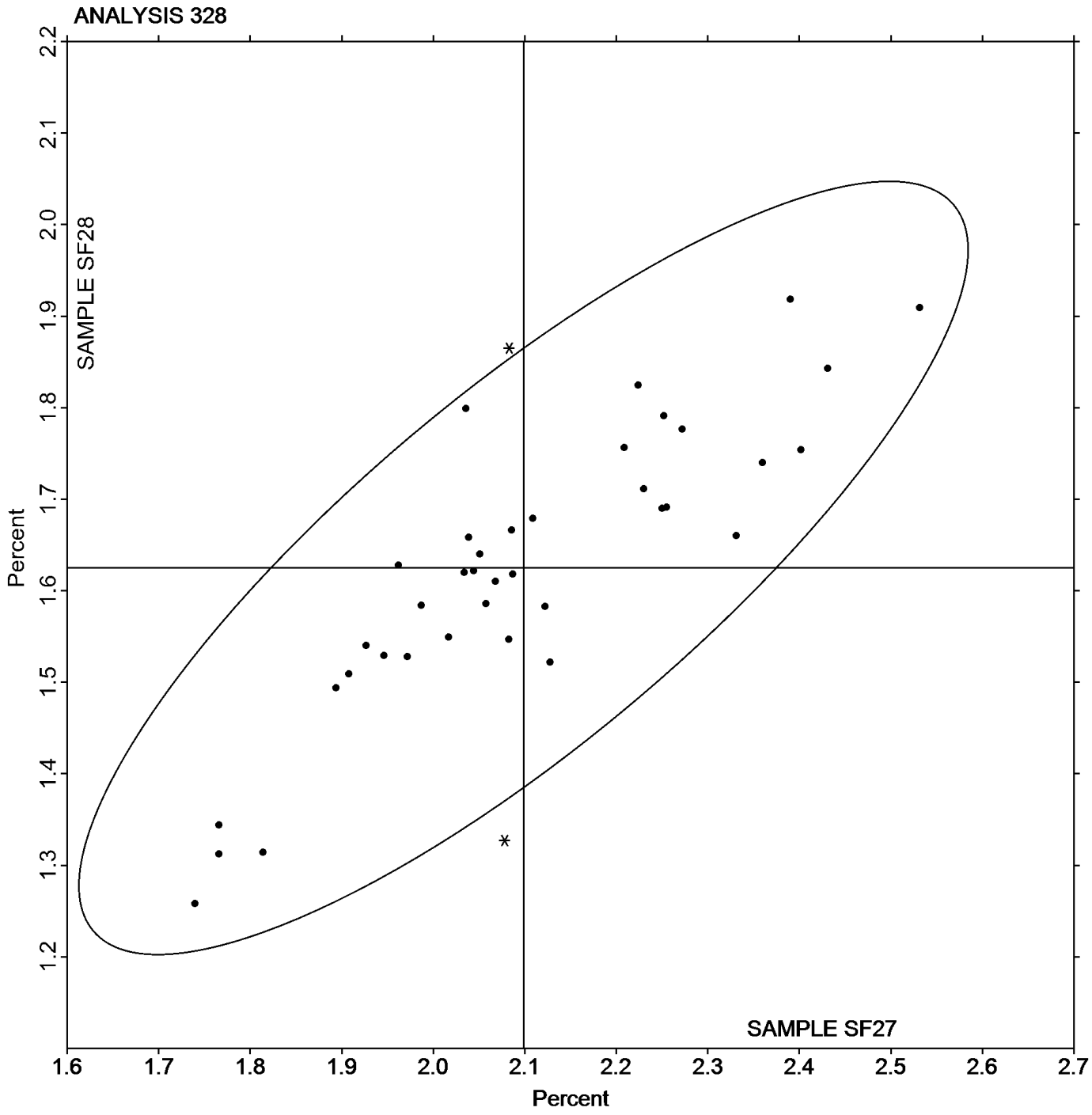
TAPPI-CTS Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

Grand Mean Sample **SF27** = 2.0986 Percent

Grand Mean Sample **SF28** = 1.6249 Percent



TAPPI-CTS Interlaboratory Testing Program

Analysis 330

Tensile Breaking Strength - Packaging Papers

WebCode	Data Flag	Sample SE27 Lab Mean	Sample SE27 Diff from Grand Mean	Sample SE27 CPV	Sample SE28 Lab Mean	Sample SE28 Diff from Grand Mean	Sample SE28 CPV	Instr Code
2N7TBC		9.97	-1.17	-1.32	8.534	-0.797	-1.04	LE
2N8JHU		12.29	1.16	1.30	10.513	1.182	1.54	TA
36RV87		11.01	-0.13	-0.14	9.289	-0.041	-0.05	LE
43DQ42	*	9.41	-1.73	-1.95	8.388	-0.943	-1.23	ID
7DN3AV		12.62	1.48	1.67	10.739	1.408	1.83	LA
877PBW		12.08	0.94	1.06	10.245	0.914	1.19	LE
8BG3TV		11.93	0.79	0.90	10.013	0.682	0.89	IF
9NYA6L		13.10	1.97	2.21	10.931	1.600	2.08	LA
B3GLU2		10.34	-0.80	-0.91	8.824	-0.507	-0.66	XX
BKE2UR		11.21	0.07	0.08	9.492	0.161	0.21	IF
BRTM4V		10.26	-0.88	-0.99	8.742	-0.588	-0.77	LE
CMDG2U		10.36	-0.78	-0.88	8.684	-0.647	-0.84	IM
D4ZELL		11.50	0.37	0.41	9.226	-0.104	-0.14	LI
DTHV2P		11.40	0.26	0.30	9.407	0.077	0.10	IK
DVPDZL		10.81	-0.33	-0.38	9.054	-0.276	-0.36	TO
FETH2Z		11.15	0.01	0.02	9.348	0.018	0.02	TO
FKYBVV		11.23	0.09	0.10	8.975	-0.356	-0.46	IM
FQ66PQ		10.14	-1.00	-1.13	8.657	-0.673	-0.88	LW
FXMBNJ		11.05	-0.09	-0.10	9.274	-0.056	-0.07	LH
GZAC6Q		10.63	-0.51	-0.58	8.737	-0.593	-0.77	LH
HGC93F		12.07	0.93	1.05	9.895	0.564	0.73	TO
J4XXQA		12.13	0.99	1.11	10.534	1.203	1.57	TX
JFBVVD		11.15	0.02	0.02	9.178	-0.153	-0.20	XX
K8FFJE		10.48	-0.66	-0.74	8.742	-0.589	-0.77	ID
MWPDDP		10.36	-0.78	-0.87	8.508	-0.823	-1.07	IM
P6VWR6		11.35	0.21	0.24	9.616	0.286	0.37	TO
PX9CFC		11.44	0.30	0.33	9.670	0.339	0.44	TA
R96YKE		10.24	-0.90	-1.01	8.313	-1.017	-1.32	IN
RM7P7J		11.30	0.16	0.18	9.609	0.278	0.36	LH
TNQ2F9		12.71	1.57	1.77	10.798	1.467	1.91	TH
UHKMCH		10.30	-0.84	-0.95	8.570	-0.761	-0.99	XX
UXW2V2		11.75	0.61	0.69	9.317	-0.013	-0.02	TT
XGG2ET		10.77	-0.37	-0.42	8.761	-0.570	-0.74	IK
Y6M6QZ		10.65	-0.49	-0.55	8.964	-0.367	-0.48	TH
Y9HWWC		10.35	-0.79	-0.89	8.760	-0.571	-0.74	TK
YJFWAF		10.76	-0.38	-0.43	8.902	-0.428	-0.56	LW
YJZFG9		10.17	-0.97	-1.09	8.470	-0.861	-1.12	LA
YWMMA3		12.79	1.66	1.87	10.884	1.553	2.02	TH

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

Summary Statistics

	Sample SE27	Sample SE28
Grand Means	11.139 kN/m	9.3305 kN/m
SD Btwn Labs	0.888 kN/m	0.7680 kN/m

Statistics based on 38 of 38 reporting participants

Analysis Notes:

877PBW - Data appear to be reported as kg/15mm, not kN/m as indicated on datasheet. Units corrected by CTS.

YJZFG9 - Data appear to be reported as lb/15mm, not lb/inch 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
(IN) - Instron 3360 Series
(LA) - L & W Autoline
(LE) - L & W Tensile Tester 066
(LH) - L & W Alwetron TH1 (Horizontal) SE 060
(LI) - LLoyds Instruments
(LW) - L & W Tensile Tester SE062
(TA) - Thwing-Albert Tensile Tester
(TH) - Thwing-Albert QC-3A
(TK) - Thwing-Albert Model 37-4
(TO) - Thwing-Albert QC-1000
(TT) - Tinius Olsen Model MHT
(TX) - Thwing-Albert (model not specified)
(XX) - Instrument make/model not specified by lab

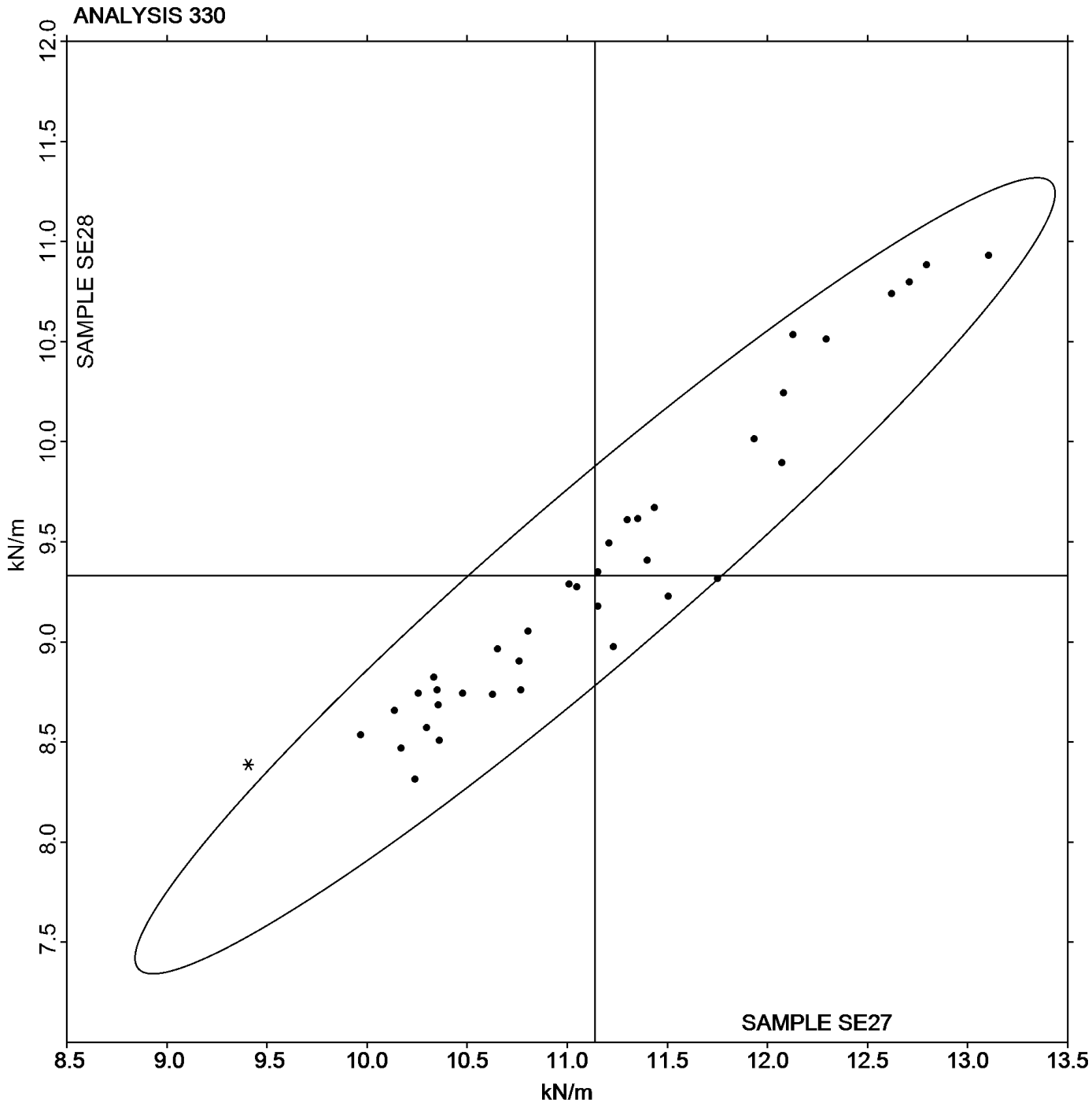
TAPPI-CTS Interlaboratory Testing Program

Analysis 330

Tensile Breaking Strength - Packaging Papers

Grand Mean Sample **SE27** = 11.139 kN/m

Grand Mean Sample **SE28** = 9.3305 kN/m



TAPPI-CTS Interlaboratory Testing Program

Analysis 331

Tensile Energy Absorption - Packaging Papers

WebCode	Data Flag	Sample SE27 Lab Mean	Sample SE27 Diff from Grand Mean	Sample SE27 CPV	Sample SE28 Lab Mean	Sample SE28 Diff from Grand Mean	Sample SE28 CPV	Instr Code
2N7TBC		170.5	-31.0	-1.45	126.6	-18.9	-1.21	LE
36RV87		184.9	-16.5	-0.77	133.6	-11.9	-0.76	LE
43DQ42	*	138.0	-63.4	-2.97	114.9	-30.6	-1.97	ID
7DN3AV		208.0	6.6	0.31	154.4	8.9	0.57	LA
877PBW	X	333.3	131.9	6.18	239.0	93.5	6.00	LE
8BG3TV		204.3	2.8	0.13	139.1	-6.4	-0.41	IN
9NYA6L		205.9	4.5	0.21	147.3	1.8	0.12	LA
B3GLU2		192.4	-9.0	-0.42	146.2	0.7	0.04	XX
BKE2UR		211.5	10.1	0.47	156.1	10.6	0.68	IF
BRTM4V		183.6	-17.8	-0.83	137.5	-8.0	-0.51	XX
CMDG2U		191.4	-10.0	-0.47	143.2	-2.3	-0.15	IM
DTHV2P		236.4	35.0	1.64	159.7	14.2	0.91	IK
DVPDZL		214.1	12.7	0.59	157.6	12.1	0.78	XX
FETH2Z		209.8	8.4	0.39	138.9	-6.6	-0.42	TO
FKYBVV		203.2	1.8	0.08	139.5	-6.0	-0.38	IM
FQ66PQ		181.6	-19.8	-0.93	136.3	-9.2	-0.59	LW
FXMBNJ		194.6	-6.9	-0.32	138.9	-6.6	-0.42	LH
GZAC6Q		182.7	-18.7	-0.88	120.4	-25.1	-1.61	LH
HGC93F		224.2	22.8	1.07	153.7	8.2	0.52	TO
J4XXQA	*	222.3	20.9	0.98	179.1	33.6	2.16	XX
JFBVVD		251.3	49.9	2.34	175.3	29.8	1.91	XX
MWPDDP		182.0	-19.4	-0.91	122.0	-23.5	-1.51	IM
P6VWR6		206.4	4.9	0.23	159.5	14.0	0.90	TO
PX9CFC		220.4	19.0	0.89	158.0	12.5	0.80	TA
R96YKE	X	210.0	8.6	0.40	118.4	-27.1	-1.74	IN
RM7P7J		188.3	-13.1	-0.61	148.7	3.2	0.21	LH
TNQ2F9		228.7	27.3	1.28	168.1	22.6	1.45	TH
UHKMCH		181.0	-20.4	-0.96	130.7	-14.9	-0.95	XX
UXW2V2		211.0	9.6	0.45	142.2	-3.3	-0.21	TT
XGG2ET		205.0	3.5	0.17	141.4	-4.1	-0.26	XX
Y6M6QZ		201.2	-0.2	-0.01	140.5	-5.1	-0.32	TH
Y9HWWC		201.7	0.3	0.01	147.8	2.2	0.14	TK
YJFWAF		184.5	-16.9	-0.79	128.9	-16.6	-1.06	LW
YJZFG9		202.9	1.4	0.07	142.5	-3.0	-0.19	LA
YWMMA3		223.0	21.6	1.01	173.2	27.7	1.78	TH

Summary Statistics

	Sample SE27	Sample SE28
Grand Means	201.41 Joules/sq m	145.51 Joules/sq m
SD Btwn Labs	21.34 Joules/sq m	15.58 Joules/sq m

Statistics based on 33 of 35 reporting participants

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

Comments on assigned Data Flags for Test #331

877PBW (X) - Extreme data.

R96YKE (X) - Inconsistent in testing between samples and within the determinations for both samples.

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
(LE) - L & W Tensile Tester 066
(LH) - L & W Alwetron TH1 (Horizontal) SE 060
(LW) - L & W Tensile Tester SE062
(TA) - Thwing-Albert Tensile Tester
(TH) - Thwing-Albert QC-3A
(TK) - Thwing-Albert Model 37-4
(TO) - Thwing-Albert QC-1000
(TT) - Tinius Olsen Model MHT
(XX) - Instrument make/model not specified by lab

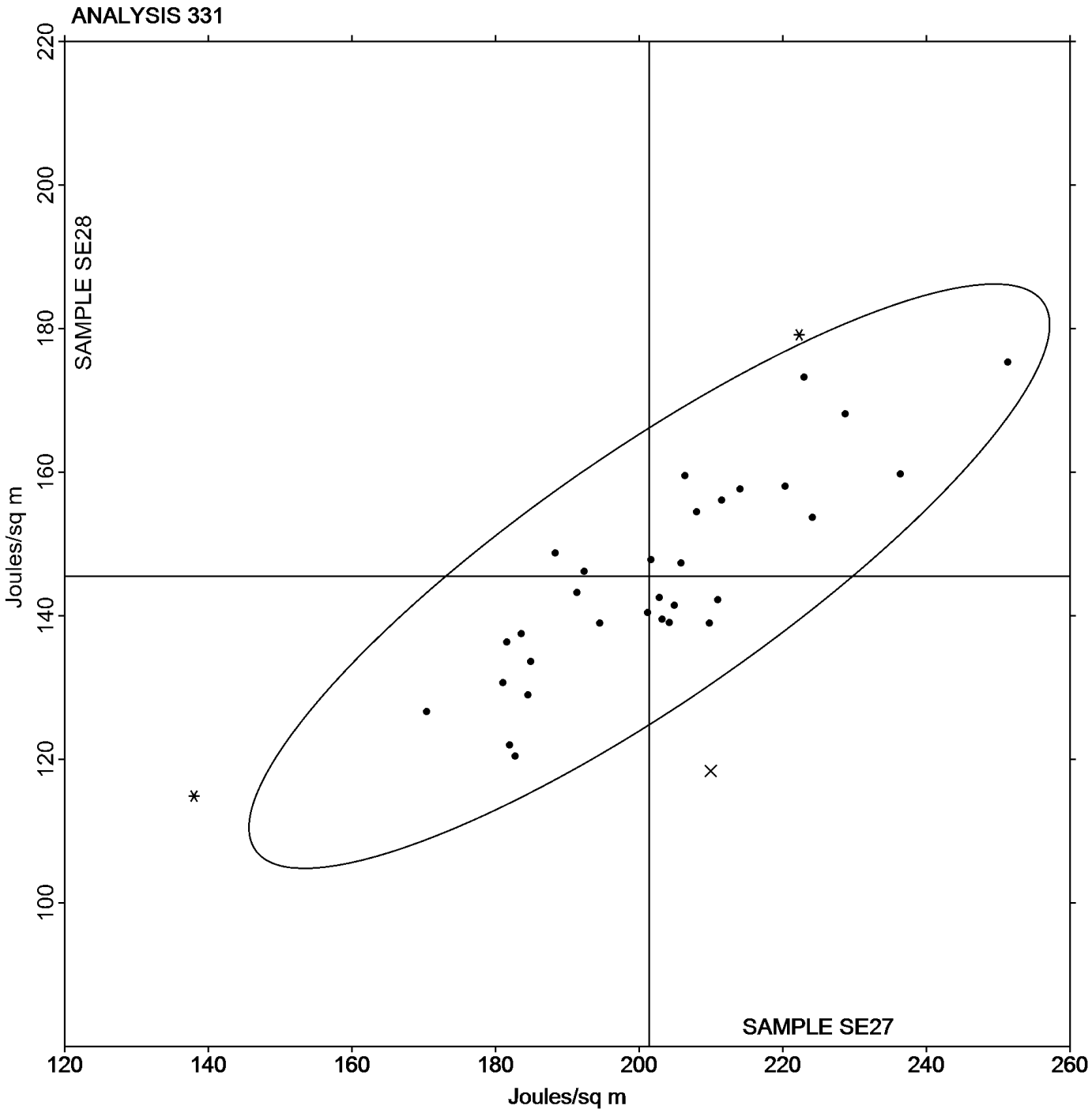
TAPPI-CTS Interlaboratory Testing Program

Analysis 331

Tensile Energy Absorption - Packaging Papers

Grand Mean Sample **SE27** = 201.41 Joules/sq m

Grand Mean Sample **SE28** = 145.51 Joules/sq m



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

WebCode	Data Flag	Sample SE27 Lab Mean	Sample SE27 Diff from Grand Mean	Sample SE27 CPV	Sample SE28 Lab Mean	Sample SE28 Diff from Grand Mean	Sample SE28 CPV	Instr Code
2N7TBC		2.505	-0.218	-0.92	2.198	-0.163	-0.75	LE
36RV87		2.472	-0.251	-1.06	2.134	-0.227	-1.05	LE
43DQ42		2.480	-0.243	-1.02	2.360	-0.001	-0.01	ID
877PBW		2.643	-0.080	-0.34	2.257	-0.104	-0.48	LE
8BG3TV		2.550	-0.173	-0.73	2.077	-0.284	-1.31	IN
9NYA6L		2.263	-0.460	-1.94	1.971	-0.390	-1.80	LA
B3GLU2		2.788	0.065	0.27	2.508	0.147	0.67	XX
BKE2UR		2.915	0.192	0.81	2.512	0.151	0.69	IF
BRTM4V		2.616	-0.107	-0.45	2.312	-0.049	-0.23	XX
CMDG2U		2.807	0.084	0.35	2.495	0.134	0.61	IM
DTHV2P		3.230	0.507	2.14	2.682	0.321	1.47	IK
DVPDZL		3.120	0.397	1.67	2.740	0.379	1.74	XX
FETH2Z		2.780	0.057	0.24	2.264	-0.097	-0.45	TO
FKYBVV		2.685	-0.038	-0.16	2.340	-0.021	-0.10	IM
FQ66PQ		2.625	-0.098	-0.41	2.323	-0.038	-0.18	LW
FXMBNJ		2.556	-0.167	-0.70	2.196	-0.165	-0.76	LH
GZAC6Q		2.500	-0.223	-0.94	2.030	-0.331	-1.52	LH
HGC93F		2.813	0.090	0.38	2.382	0.021	0.09	TO
J4XXQA		2.902	0.179	0.75	2.708	0.347	1.59	XX
JFBVVD	*	3.381	0.658	2.77	2.905	0.544	2.50	XX
K8FFJE		2.637	-0.086	-0.36	2.243	-0.118	-0.54	ID
MWPDDP		2.821	0.098	0.41	2.372	0.011	0.05	IM
P6VWR6		2.734	0.011	0.05	2.531	0.170	0.78	TO
PX9CFC		2.896	0.173	0.73	2.507	0.146	0.67	TA
R96YKE	X	3.200	0.477	2.01	2.270	-0.091	-0.42	IN
RM7P7J		2.502	-0.221	-0.93	2.295	-0.066	-0.31	LH
TNQ2F9		2.790	0.067	0.28	2.406	0.045	0.20	TH
UHKMCH		2.585	-0.138	-0.58	2.254	-0.107	-0.49	XX
UXW2V2		2.777	0.054	0.23	2.390	0.029	0.13	XX
XGG2ET		2.500	-0.223	-0.94	2.048	-0.313	-1.44	XX
Y6M6QZ		3.049	0.326	1.37	2.569	0.208	0.95	TH
Y9HWWC		2.902	0.179	0.75	2.535	0.173	0.80	TK
YJFWAF		2.536	-0.187	-0.79	2.171	-0.190	-0.88	LW
YJZFG9		2.488	-0.235	-0.99	2.114	-0.247	-1.14	LA
YWMMA3		2.734	0.011	0.05	2.460	0.099	0.45	TH

Summary Statistics

	Sample SE27	Sample SE28
Grand Means	2.7230 Percent	2.3615 Percent
SD Btwn Labs	0.2373 Percent	0.2174 Percent

Statistics based on 34 of 35 reporting participants

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

Comments on assigned Data Flags for Test #332

R96YKE (X) - Inconsistent in testing between samples.

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
(TA) - Thwing-Albert Tensile Tester
(TH) - Thwing-Albert QC-3A
(TK) - Thwing-Albert Model 37-4
(TO) - Thwing-Albert QC-1000
(XX) - Instrument make/model not specified by lab

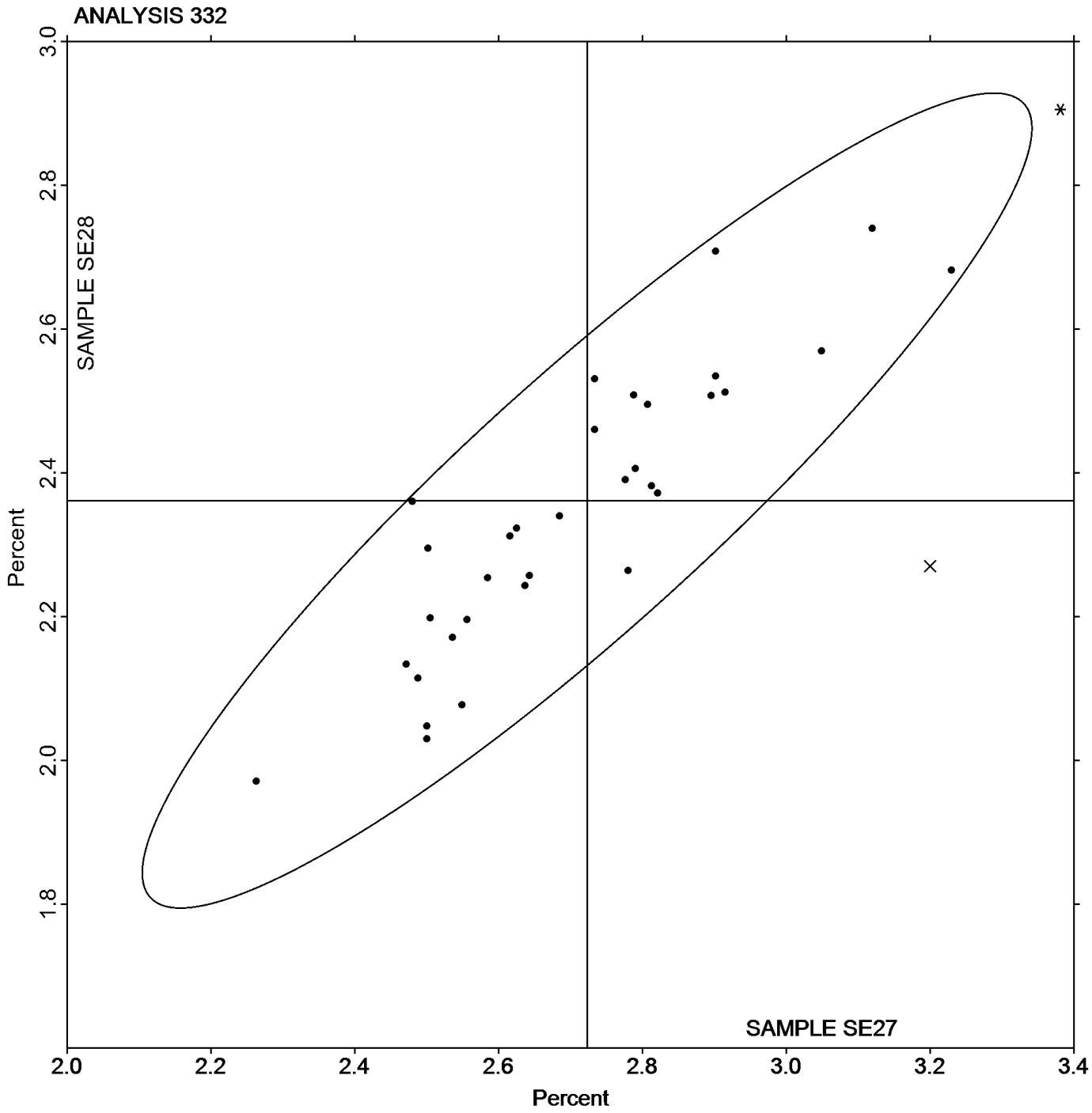
TAPPI-CTS Interlaboratory Testing Program

Analysis 332

Elongation to Break - Packaging Papers

Grand Mean Sample **SE27** = 2.7230 Percent

Grand Mean Sample **SE28** = 2.3615 Percent



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

WebCode	Data Flag	Sample SG27 Lab Mean	Sample SG27 Diff from Grand Mean	Sample SG27 CPV	Sample SG28 Lab Mean	Sample SG28 Diff from Grand Mean	Sample SG28 CPV	Instr Code
32RKB7		43.00	-2.15	-0.17	56.20	-0.10	-0.01	MT
3FADYD		42.70	-2.45	-0.19	49.40	-6.90	-0.49	XX
8RNWMP		47.40	2.25	0.17	51.70	-4.60	-0.33	MT
9HYUHZ		25.20	-19.95	-1.54	46.70	-9.60	-0.68	XX
B3GLU2		53.90	8.75	0.67	76.50	20.20	1.43	MT
F8AC4T		69.40	24.25	1.87	81.10	24.80	1.76	MT
FQ66PQ		45.60	0.45	0.03	49.90	-6.40	-0.45	MT
GPRVCJ		28.60	-16.55	-1.28	38.60	-17.70	-1.26	MT
ND8WLF		62.80	17.65	1.36	79.50	23.20	1.65	MT
TRG3NG		30.10	-15.05	-1.16	51.30	-5.00	-0.35	MT
VPZKJ3		40.40	-4.75	-0.37	53.00	-3.30	-0.23	XX
XYDNGC		55.10	9.95	0.77	58.00	1.70	0.12	MT
Y6M6QZ		42.80	-2.35	-0.18	40.00	-16.30	-1.16	XX

Summary Statistics

	Sample SG27	Sample SG28
Grand Means	45.154 Double Folds	56.300 Double Folds
SD Btwn Labs	12.966 Double Folds	14.086 Double Folds

Statistics based on 13 of 13 reporting participants

Instrument Code List

(MT) - MIT - Tinius Olsen

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

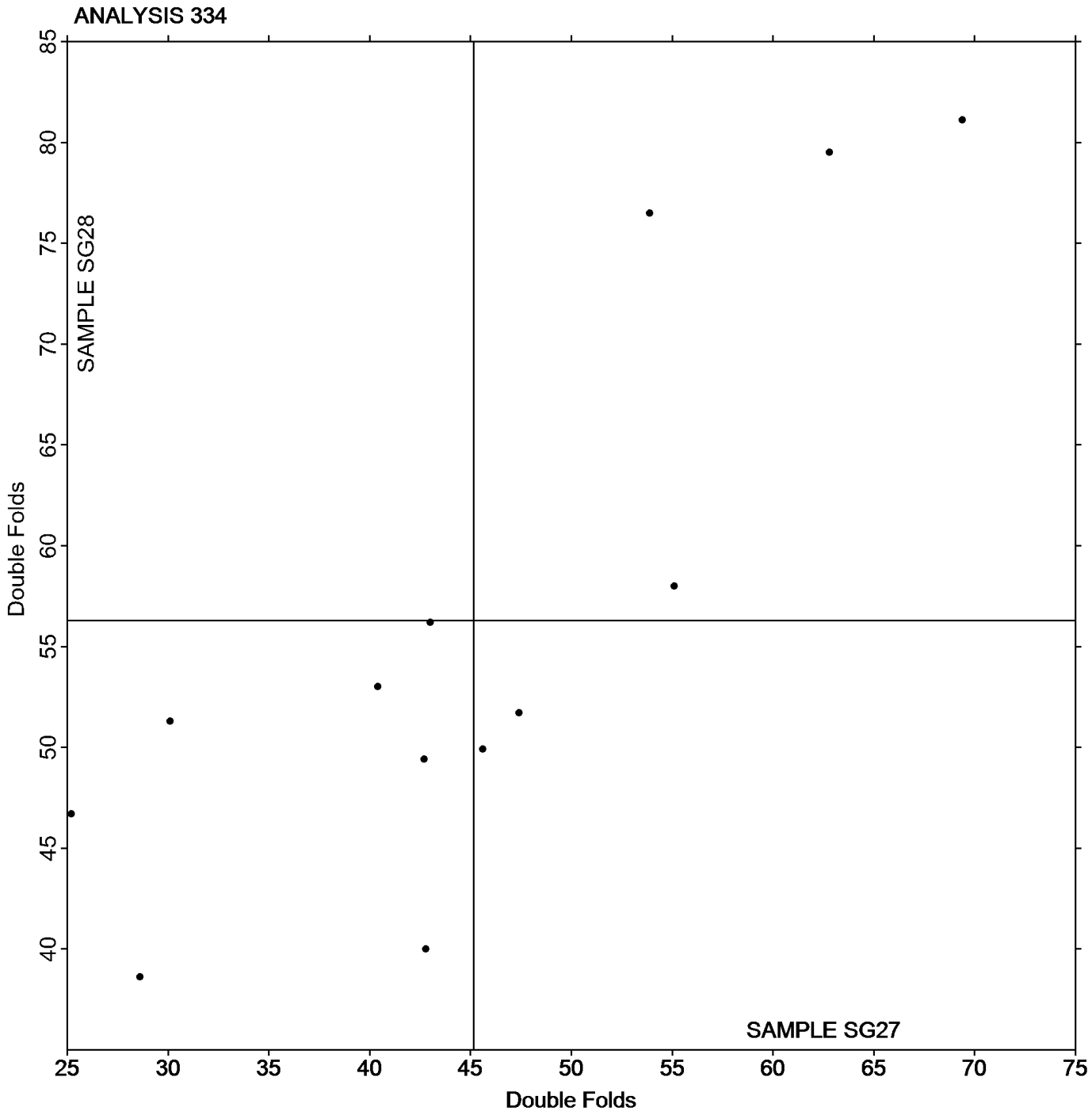
TAPPI-CTS Interlaboratory Testing Program

Analysis 334

Folding Endurance (MIT) - Double Folds

Grand Mean Sample **SG27** = 45.154 Double Folds

Grand Mean Sample **SG28** = 56.300 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 SH27 Lab Mean	Sample SH27 Diff from Grand Mean	Sample SH27 CPV	Sample SH28 Lab Mean	Sample SH28 Diff from Grand Mean	Sample SH28 CPV
3FADYD		132.9	-4.1	-0.20	213.8	-11.9	-0.66
3LZMAB		132.0	-4.9	-0.24	208.0	-17.7	-0.98
7828DX		127.1	-9.9	-0.47	231.3	5.6	0.31
7MFFD2		140.4	3.4	0.17	239.7	14.0	0.78
8G7EUJ	*	193.8	56.8	2.73	250.5	24.8	1.37
8WKMT2	X	226.2	89.2	4.28	358.8	133.0	7.38
AQ8LMN		142.7	5.8	0.28	222.2	-3.5	-0.20
B3GLU2		135.0	-2.0	-0.09	235.5	9.8	0.54
BKE2UR		165.4	28.4	1.36	255.1	29.4	1.63
BZ7YWM		124.3	-12.6	-0.61	216.9	-8.9	-0.49
F8AC4T		122.8	-14.2	-0.68	211.1	-14.6	-0.81
HUZBL9		115.4	-21.5	-1.03	206.5	-19.3	-1.07
LUHVFT		128.2	-8.8	-0.42	214.9	-10.9	-0.60
P2DYXM		166.5	29.5	1.42	241.0	15.3	0.85
PV84DM	*	140.7	3.8	0.18	264.0	38.3	2.12
R3FG9N		128.6	-8.4	-0.40	214.6	-11.1	-0.62
RZEBV4		143.1	6.2	0.30	232.9	7.2	0.40
TRG3NG		134.3	-2.6	-0.13	214.7	-11.0	-0.61
UKR6BE		132.7	-4.3	-0.20	217.6	-8.1	-0.45
XHAVAC		96.2	-40.7	-1.96	198.7	-27.1	-1.50

Summary Statistics

	Sample SH27	Sample SH28
Grand Means	136.95 Gurley Units	225.75 Gurley Units
SD Btwn Labs	20.82 Gurley Units	18.02 Gurley Units

Statistics based on 19 of 20 reporting participants

Comments on assigned Data Flags for Test #336

8WKMT2 (X) - Extreme data.

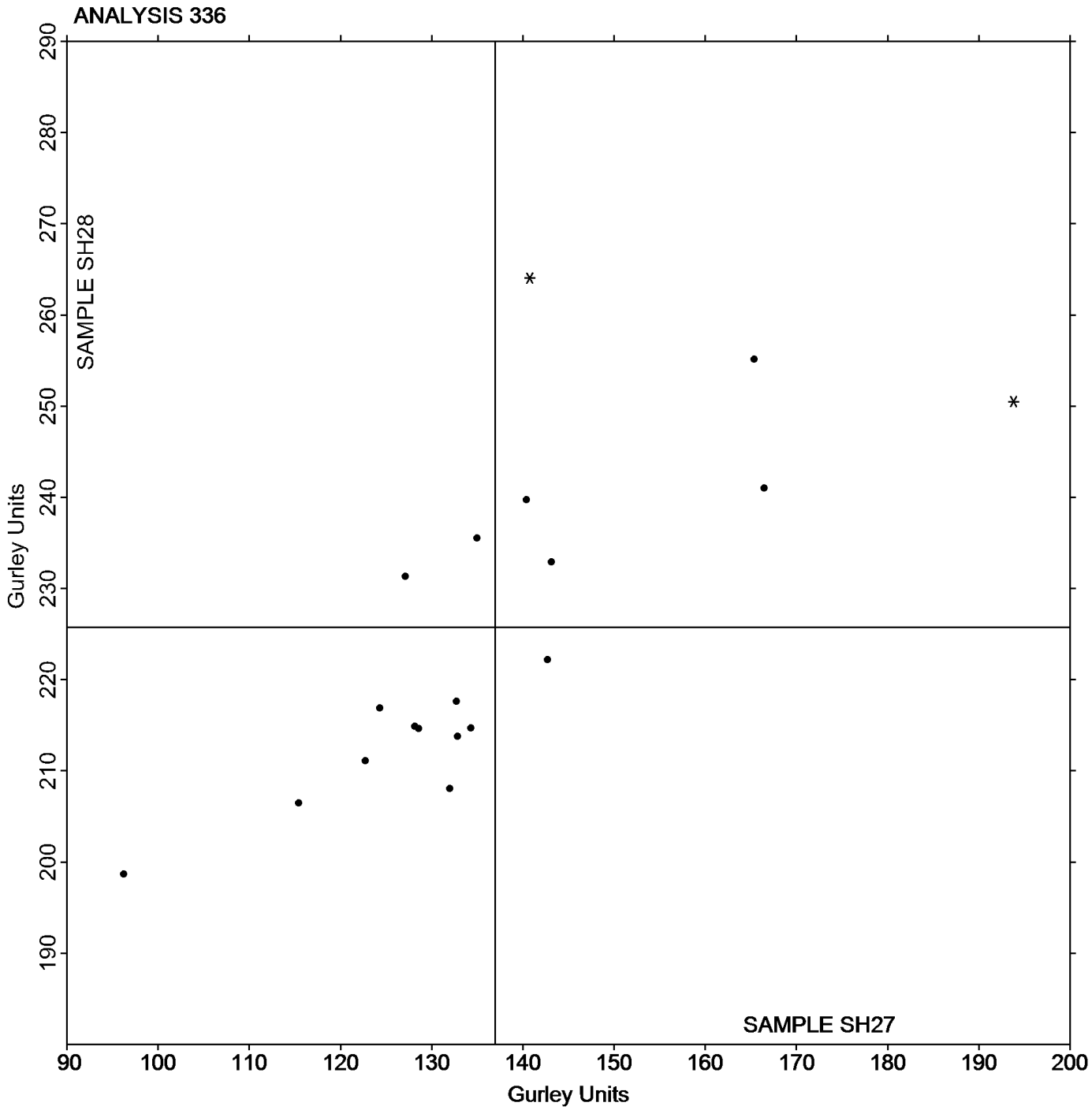
TAPPI-CTS Interlaboratory Testing Program

Analysis 336

Bending Resistance, Gurley Type

Grand Mean Sample **SH27** = 136.95 Gurley Units

Grand Mean Sample **SH28** = 225.75 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 SJ27 Lab Mean	Sample SJ27 Diff from Grand Mean	Sample SJ27 CPV	Sample SJ28 Lab Mean	Sample SJ28 Diff from Grand Mean	Sample SJ28 CPV
32RKB7		2.202	0.158	0.31	3.232	0.080	0.15
6GXNPW		1.800	-0.244	-0.48	2.946	-0.206	-0.40
8BG3TV		2.600	0.556	1.09	3.940	0.788	1.53
9HYUHZ		2.575	0.531	1.04	3.469	0.317	0.61
BKE2UR	X	0.129	-1.915	-3.75	0.016	-3.136	-6.09
F8AC4T		2.057	0.013	0.03	3.131	-0.021	-0.04
FE89MP		1.868	-0.176	-0.34	3.040	-0.112	-0.22
JZZGBV		1.924	-0.120	-0.24	2.910	-0.243	-0.47
P8JD2D	*	0.850	-1.194	-2.34	2.540	-0.612	-1.19
PV84DM		2.321	0.277	0.54	3.308	0.156	0.30
TTMKMD		1.849	-0.195	-0.38	2.771	-0.381	-0.74
VP3F39		2.911	0.867	1.70	4.296	1.144	2.22
XHAVAC		1.862	-0.182	-0.36	2.897	-0.255	-0.50
YJFWAF		1.750	-0.294	-0.57	2.500	-0.652	-1.27

Summary Statistics

	Sample SJ27	Sample SJ28
Grand Means	2.0437 Taber Units	3.1523 Taber Units
SD Btwn Labs	0.5110 Taber Units	0.5152 Taber Units

Statistics based on 13 of 14 reporting participants

Comments on assigned Data Flags for Test #338

BKE2UR (X) - Extreme data.

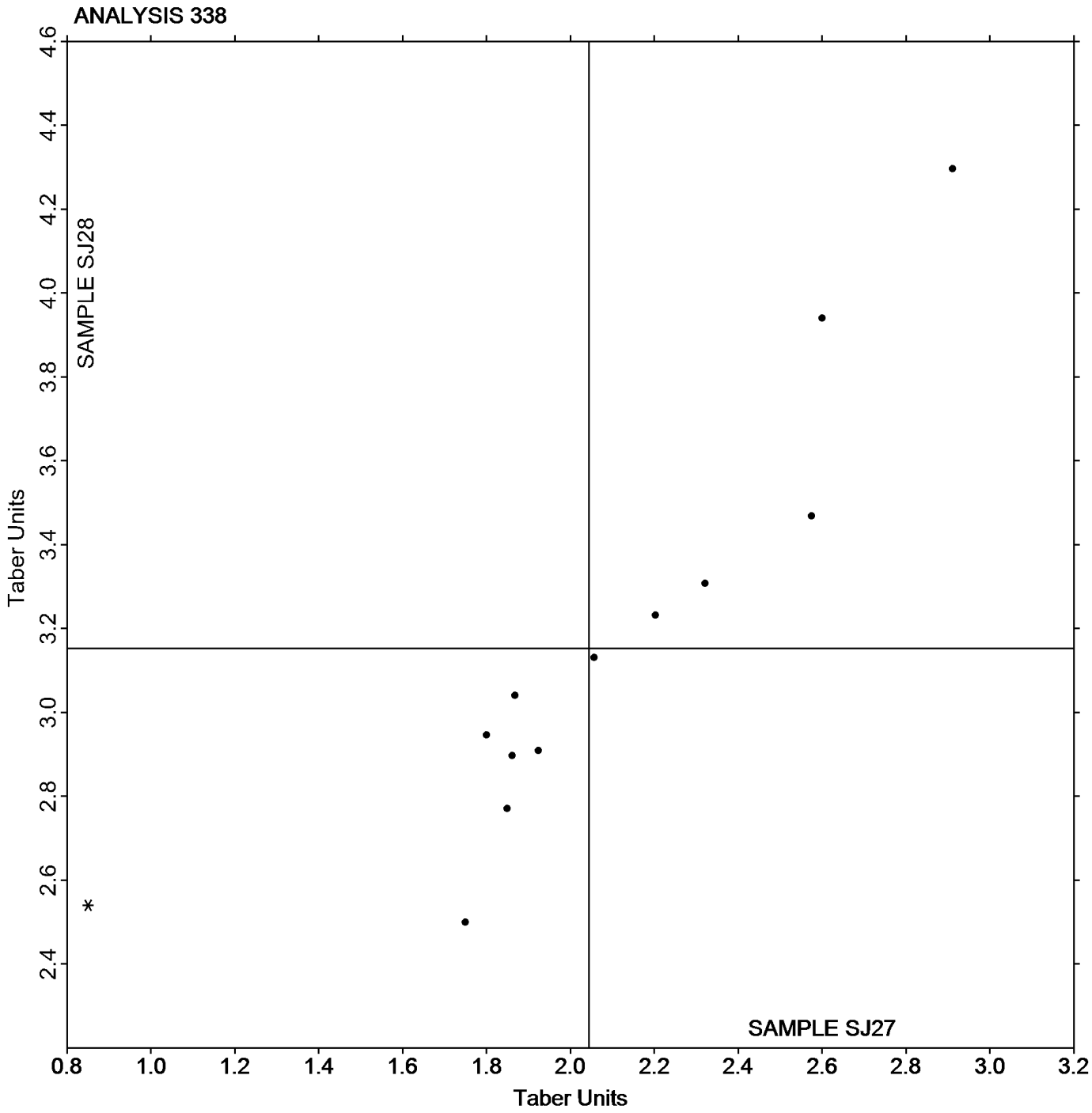
TAPPI-CTS Interlaboratory Testing Program

Analysis 338

Bending Resistance, Taber Type - 0 to 10 Units

Grand Mean Sample **SJ27** = 2.0437 Taber Units

Grand Mean Sample **SJ28** = 3.1523 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 SQ27 Lab Mean	Sample SQ27 Diff from Grand Mean	Sample SQ27 CPV	Sample SQ28 Lab Mean	Sample SQ28 Diff from Grand Mean	Sample SQ28 CPV
7828DX		34.53	0.41	0.25	18.89	0.51	0.40
877PBW		36.10	1.98	1.22	21.10	2.72	2.16
88HN76		36.40	2.28	1.41	19.45	1.07	0.85
9XB9YX		34.61	0.49	0.30	18.15	-0.23	-0.18
BZ7YWM		31.97	-2.15	-1.33	16.01	-2.37	-1.88
F8AC4T		35.80	1.68	1.04	18.78	0.40	0.32
FQ66PQ		32.91	-1.21	-0.75	17.84	-0.54	-0.43
GYET3P		35.50	1.38	0.85	18.40	0.02	0.02
LGKMYE		33.31	-0.81	-0.50	18.57	0.19	0.15
PLGKYE		31.62	-2.49	-1.54	17.38	-1.00	-0.79
TDUQC8		32.92	-1.20	-0.74	17.21	-1.17	-0.93
YJFWAF		33.75	-0.37	-0.23	18.75	0.37	0.30
YJZFG9	X	39.54	5.42	3.35	27.30	8.92	7.08

Summary Statistics

	Sample SQ27	Sample SQ28
Grand Means	34.119 Taber Units	18.377 Taber Units
SD Btwn Labs	1.618 Taber Units	1.260 Taber Units

Statistics based on 12 of 13 reporting participants

Comments on assigned Data Flags for Test #339

YJZFG9 (X) - Extreme data.

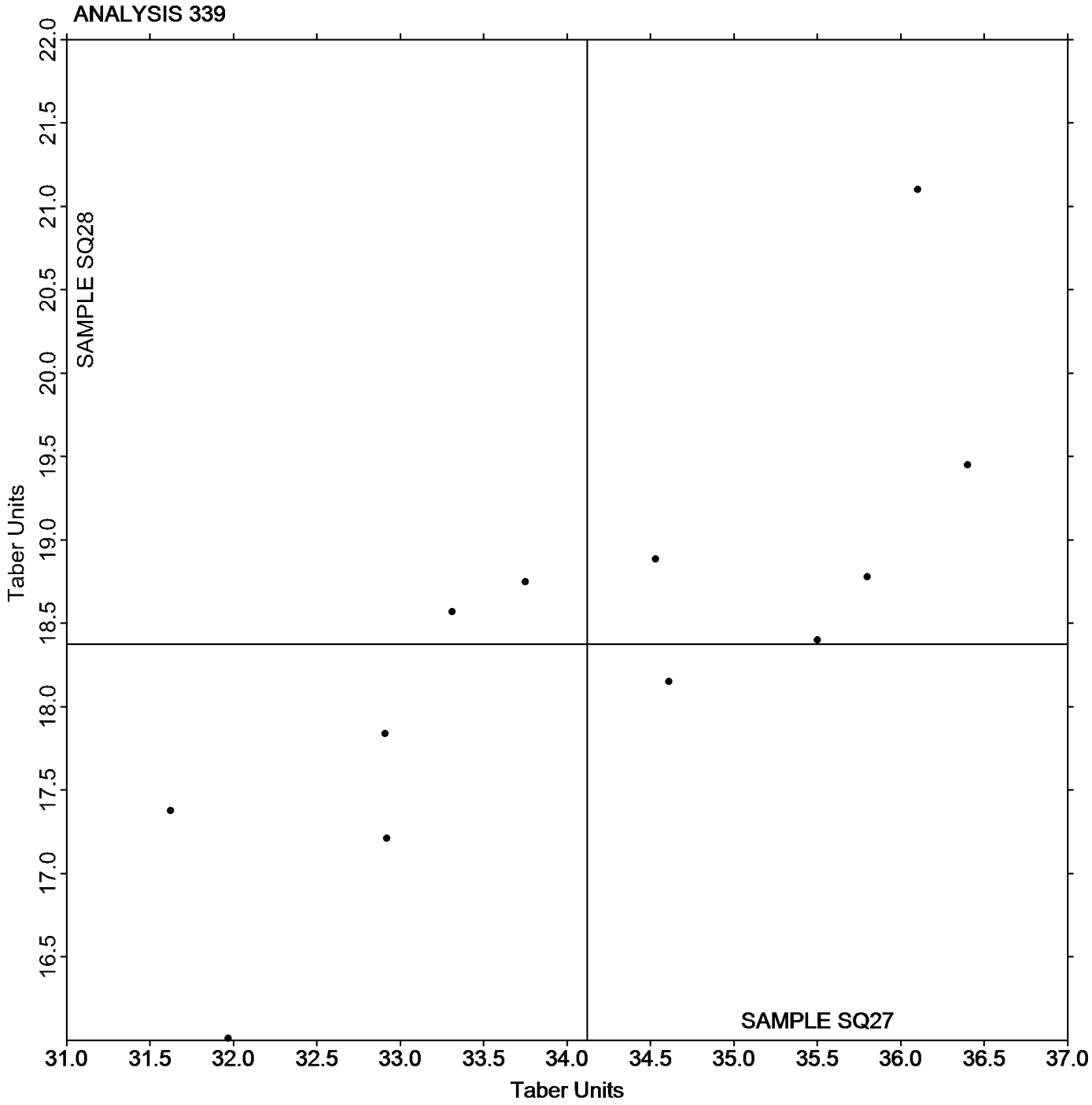
TAPPI-CTS Interlaboratory Testing Program

Analysis 339

Bending Resistance, Taber Type - 10 to 100 Taber Units

Grand Mean Sample **SQ27** = 34.119 Taber Units

Grand Mean Sample **SQ28** = 18.377 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 ST27 Lab Mean	Sample ST27 Diff from Grand Mean	Sample ST27 CPV	Sample ST28 Lab Mean	Sample ST28 Diff from Grand Mean	Sample ST28 CPV
2GPCJ3		288.6	-2.0	-0.13	260.5	14.0	0.87
2N8JHU		295.0	4.4	0.30	247.0	0.5	0.03
4C48YX		322.0	31.4	2.14	274.5	28.0	1.74
7828DX		289.6	-1.0	-0.07	248.1	1.5	0.10
B3GLU2		281.9	-8.6	-0.59	238.5	-8.1	-0.50
CUHB2G		313.8	23.2	1.58	266.8	20.3	1.26
E8EA2J		275.3	-15.3	-1.04	217.9	-28.6	-1.78
FQ66PQ		274.9	-15.7	-1.07	233.8	-12.7	-0.79
NHQQP9		298.2	7.6	0.52	263.8	17.3	1.07
UDPTEG	X	123.0	-167.6	-11.40	101.0	-145.6	-9.04
XAHCW4		292.9	2.3	0.16	242.9	-3.6	-0.23
Y6M6QZ		284.9	-5.7	-0.38	233.7	-12.8	-0.80
YJFWAF		270.8	-19.8	-1.35	232.5	-14.0	-0.87
ZPLTV2		289.5	-1.1	-0.07	245.1	-1.4	-0.09

Summary Statistics

	Sample ST27	Sample ST28
Grand Means	290.56 Taber Units	246.54 Taber Units
SD Btwn Labs	14.70 Taber Units	16.10 Taber Units

Statistics based on 13 of 14 reporting participants

Comments on assigned Data Flags for Test #340

UDPTEG (X) - Extreme data.

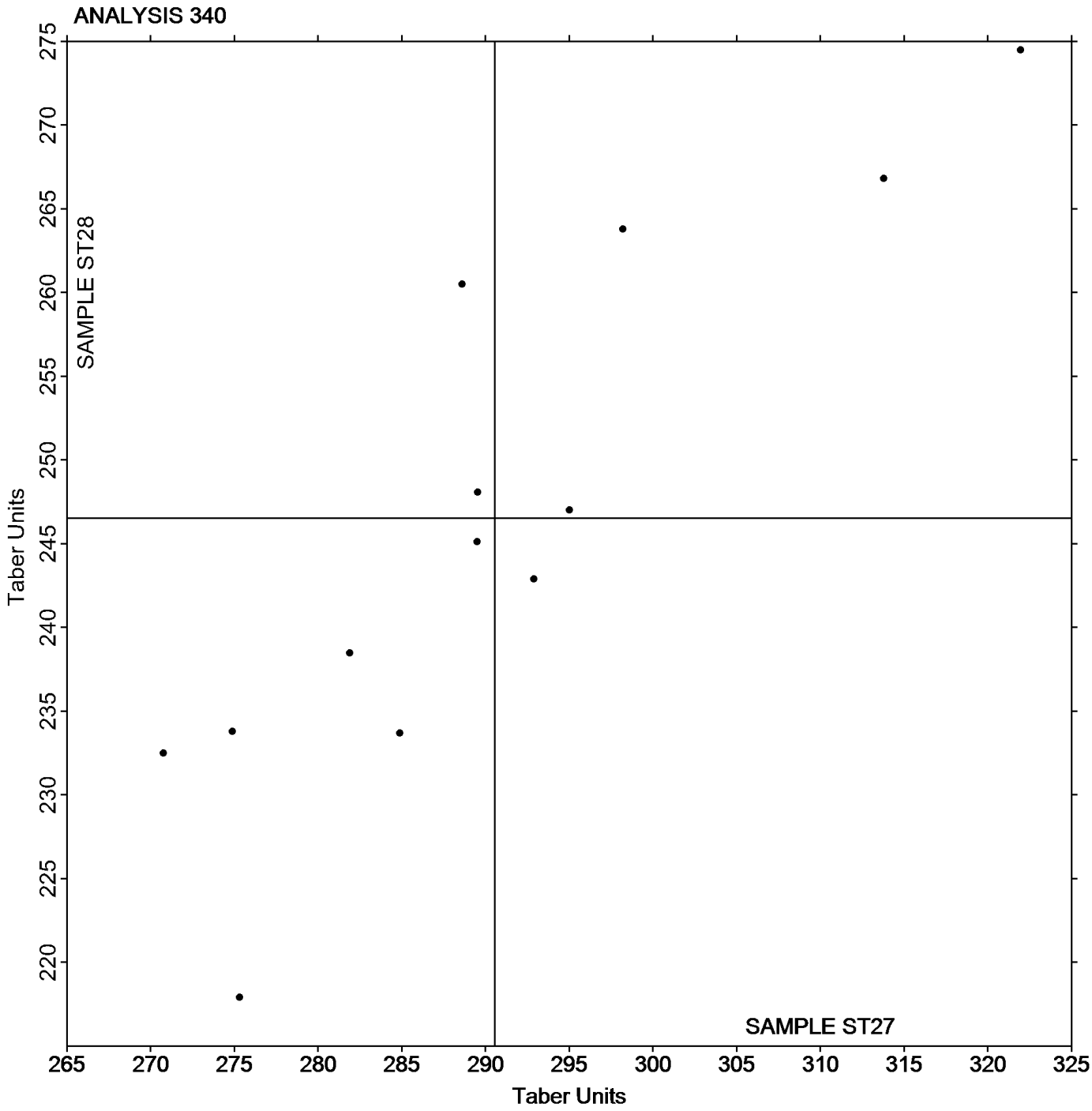
TAPPI-CTS Interlaboratory Testing Program

Analysis 340

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

Grand Mean Sample **ST27** = 290.56 Taber Units

Grand Mean Sample **ST28** = 246.54 Taber Units



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

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

WebCode	Data Flag	Sample SM27 Lab Mean	Sample SM27 Diff from Grand Mean	Sample SM27 CPV	Sample SM28 Lab Mean	Sample SM28 Diff from Grand Mean	Sample SM28 CPV	Instr Code
32RKB7		94.64	-0.23	-0.02	65.06	-4.88	-0.58	CD
877PBW		101.88	7.01	0.60	77.28	7.34	0.87	TA
9XB9YX		84.15	-10.71	-0.92	65.79	-4.15	-0.49	TZ
BKE2UR		90.79	-4.07	-0.35	73.71	3.77	0.44	TL
D36WJK		76.67	-18.20	-1.57	56.77	-13.17	-1.56	LW
DVPDZL		93.00	-1.87	-0.16	64.80	-5.14	-0.61	TA
EU9F9L		100.84	5.97	0.51	73.12	3.18	0.38	XX
F8AC4T		74.79	-20.08	-1.73	62.17	-7.77	-0.92	TZ
FQ66PQ		103.82	8.95	0.77	76.38	6.44	0.76	LW
JFBVVD		83.42	-11.45	-0.99	54.70	-15.24	-1.80	DT
PLGKYE		107.65	12.78	1.10	74.02	4.07	0.48	LW
U6YBZ9		108.80	13.93	1.20	79.40	9.46	1.12	TA
UDPTEG		109.60	14.73	1.27	82.60	12.66	1.50	CA
Y6M6QZ		98.08	3.21	0.28	73.40	3.46	0.41	LW

Summary Statistics

	Sample SM27	Sample SM28
Grand Means	94.866 psi	69.943 psi
SD Btwn Labs	11.603 psi	8.465 psi

Statistics based on 14 of 14 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

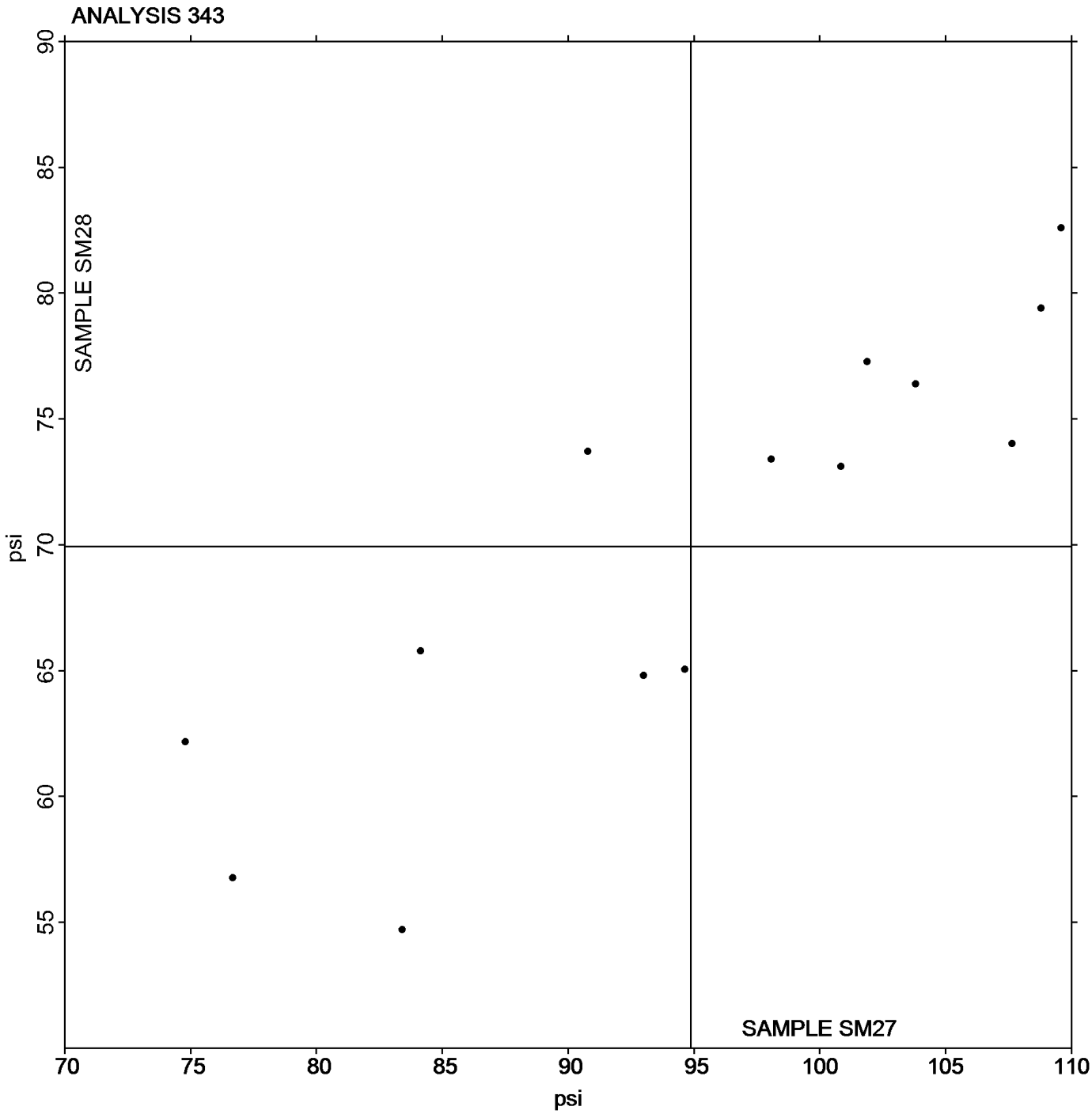
TAPPI-CTS Interlaboratory Testing Program

Analysis 343

Z-Direction Tensile

Grand Mean Sample **SM27** = 94.866 psi

Grand Mean Sample **SM28** = 69.943 psi



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

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

WebCode	Data Flag	Sample SZ27 Lab Mean	Sample SZ27 Diff from Grand Mean	Sample SZ27 CPV	Sample SZ28 Lab Mean	Sample SZ28 Diff from Grand Mean	Sample SZ28 CPV	Instr Code
2GPCJ3		38.88	3.24	1.16	42.50	2.46	0.95	TL
7828DX		31.28	-4.36	-1.56	35.98	-4.06	-1.56	CA
92P4FU		38.82	3.18	1.14	42.72	2.68	1.03	TL
9NYA6L		38.14	2.50	0.90	39.29	-0.75	-0.29	TA
AAYUHX		32.74	-2.90	-1.04	40.46	0.42	0.16	DP
B3GLU2		33.60	-2.04	-0.73	38.92	-1.12	-0.43	CA
CUHB2G		33.80	-1.84	-0.66	36.28	-3.76	-1.45	TL
D4ZELL		35.44	-0.20	-0.07	43.34	3.30	1.27	CH
DTHV2P		40.15	4.50	1.61	41.33	1.29	0.50	PG
NHQQP9		35.60	-0.04	-0.02	40.40	0.36	0.14	TZ
QLCM2N		32.50	-3.14	-1.13	37.50	-2.54	-0.98	LW
XAHCW4		36.80	1.16	0.41	43.60	3.56	1.37	CA
ZPLTV2		35.60	-0.04	-0.02	38.20	-1.84	-0.71	CA

Summary Statistics

	Sample SZ27	Sample SZ28
Grand Means	35.643 psi	40.040 psi
SD Btwn Labs	2.790 psi	2.599 psi

Statistics based on 13 of 13 reporting participants

Instrument Code List

(CA) - CSI CS-163
(CH) - Chatillon Ametek
(DP) - Dek-Tron XP Series
(LW) - L & W ZD Tensile Tester
(PG) - Perkins Model A Mullen Tester
(TA) - Thwing-Albert Tensile Tester
(TL) - TMI Lab Master
(TZ) - TMI Monitor/ZDT Tester

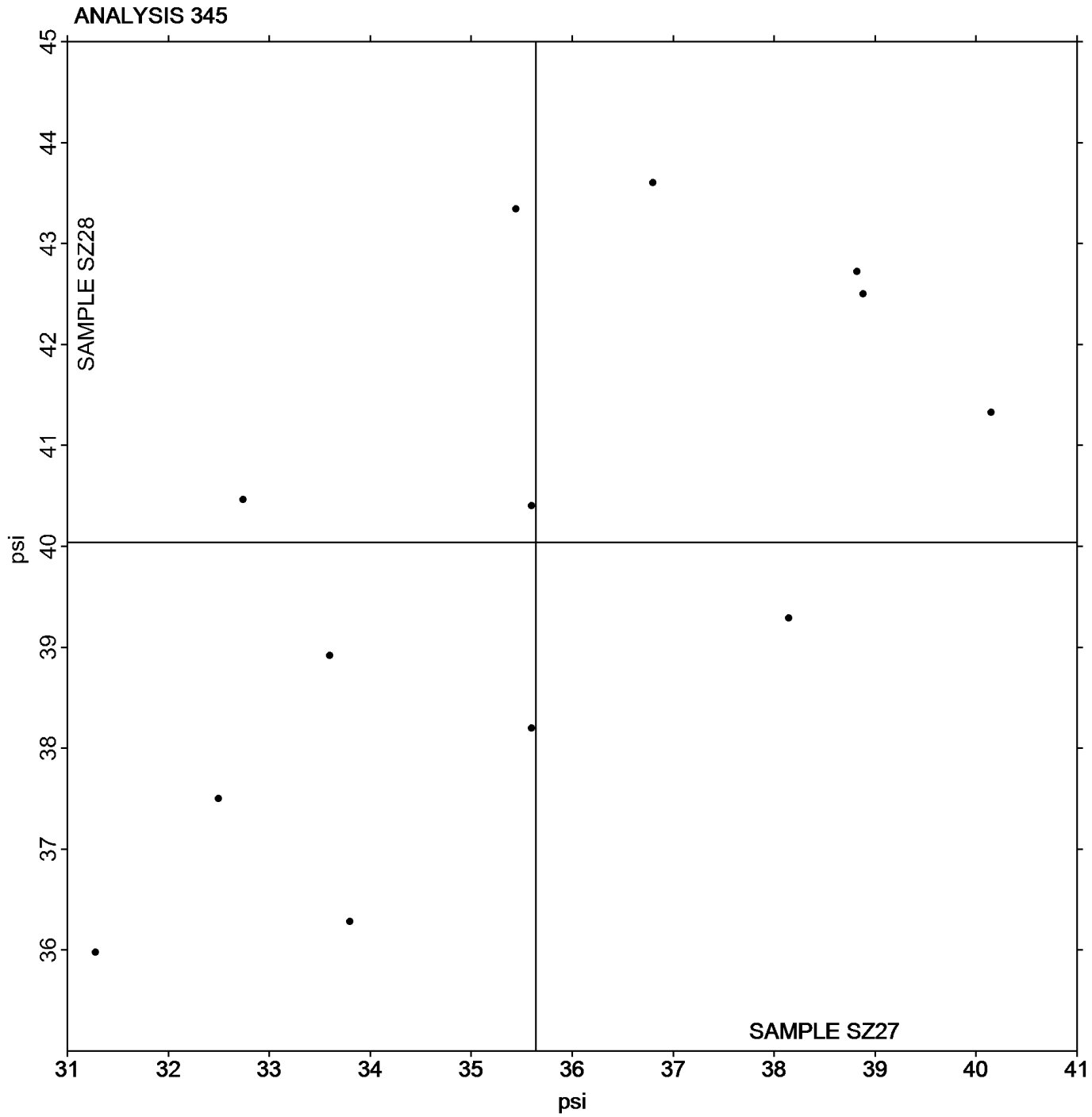
TAPPI-CTS Interlaboratory Testing Program

Analysis 345

Z-Direction Tensile, Recycled Paperboard

Grand Mean Sample **SZ27** = 35.643 psi

Grand Mean Sample **SZ28** = 40.040 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 SN27 Lab Mean	Sample SN27 Diff from Grand Mean	Sample SN27 CPV	Sample SN28 Lab Mean	Sample SN28 Diff from Grand Mean	Sample SN28 CPV	Instr Code
32RKB7		159.0	10.4	0.71	83.60	3.10	0.38	HY
877PBW		168.6	20.0	1.37	88.80	8.30	1.01	HY
9XB9YX		137.6	-11.0	-0.75	75.40	-5.10	-0.62	HY
AQ8LMN		135.8	-12.8	-0.87	74.40	-6.10	-0.74	HY
B3GLU2		140.8	-7.8	-0.53	80.00	-0.50	-0.06	HZ
EALRZE		148.0	-0.6	-0.04	77.60	-2.90	-0.35	HY
F8AC4T		168.8	20.2	1.39	89.20	8.70	1.06	HY
FETH2Z		143.4	-5.2	-0.35	79.40	-1.10	-0.13	HY
FQ66PQ		152.8	4.2	0.29	82.80	2.30	0.28	HY
FYHUPK		145.4	-3.1	-0.22	85.37	4.87	0.59	HY
HGC93F		158.2	9.6	0.66	93.40	12.90	1.57	HZ
HUZBL9		161.2	12.6	0.87	81.40	0.90	0.11	HY
PV84DM		135.2	-13.3	-0.91	78.56	-1.94	-0.24	KR
RZEBV4		152.3	3.8	0.26	79.88	-0.62	-0.08	HZ
TRG3NG		135.8	-12.8	-0.87	71.20	-9.30	-1.13	HY
U6YBZ9		171.2	22.6	1.55	97.60	17.10	2.08	HY
UGP4AG		156.2	7.6	0.52	71.60	-8.90	-1.08	XX
XHAVAC		139.2	-9.4	-0.64	76.52	-3.98	-0.48	HY
Y6M6QZ		113.2	-35.4	-2.42	62.80	-17.70	-2.15	HZ

Summary Statistics

	Sample SN27	Sample SN28
Grand Means	148.57 1000th ft-lbs	80.501 1000th ft-lbs
SD Btwn Labs	14.60 1000th ft-lbs	8.215 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

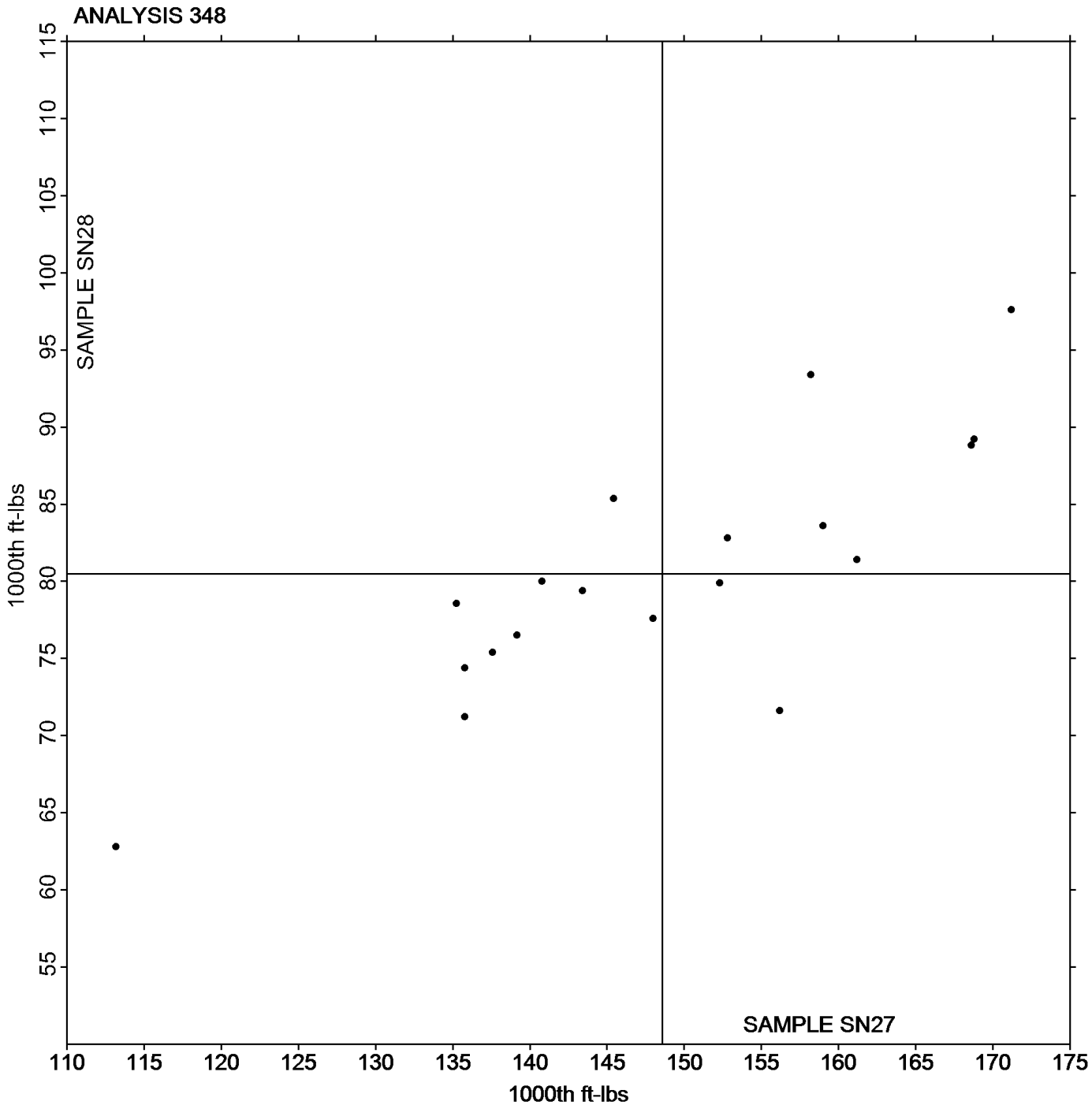
TAPPI-CTS Interlaboratory Testing Program

Analysis 348

Internal Bond Strength - Modified Scott Mechanics

Grand Mean Sample **SN27** = 148.57 1000th ft-lbs

Grand Mean Sample **SN28** = 80.501 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 SP27 Lab Mean	Sample SP27 Diff from Grand Mean	Sample SP27 CPV	Sample SP28 Lab Mean	Sample SP28 Diff from Grand Mean	Sample SP28 CPV	Instr Code
D4ZELL		128.2	-13.1	-0.52	60.40	-10.13	-0.89	TM
DTHV2P	X	145.0	3.7	0.15	62.80	-7.73	-0.68	TM
FXMBNJ		109.2	-32.1	-1.28	59.64	-10.89	-0.95	TM
JFBVVD	X	145.0	3.7	0.15	84.80	14.27	1.25	XX
LQ7NGA		183.0	41.7	1.66	84.80	14.27	1.25	SC
N2DHHD		150.0	8.7	0.35	78.40	7.87	0.69	SC
QLCM2N		124.2	-17.1	-0.68	56.60	-13.93	-1.22	XX
XMJ9RB		132.9	-8.4	-0.33	80.23	9.69	0.85	XX
YJFWAF		161.4	20.2	0.80	73.66	3.13	0.27	XX

Summary Statistics

	Sample SP27	Sample SP28
Grand Means	141.27 1000th ft-lbs	70.533 1000th ft-lbs
SD Btwn Labs	25.12 1000th ft-lbs	11.435 1000th ft-lbs

Statistics based on 7 of 9 reporting participants

Comments on assigned Data Flags for Test #349

DTHV2P (X) - Data appear to be off by a factor of .01; data converted by CTS (x100).

JFBVVD (X) - Data appear to be off by a factor of .01; data converted by CTS (x100).

Instrument Code List

(SC) - Scott Internal Bond Tester (Manual)

(TM) - TMI Monitor/Internal Bond Tester

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

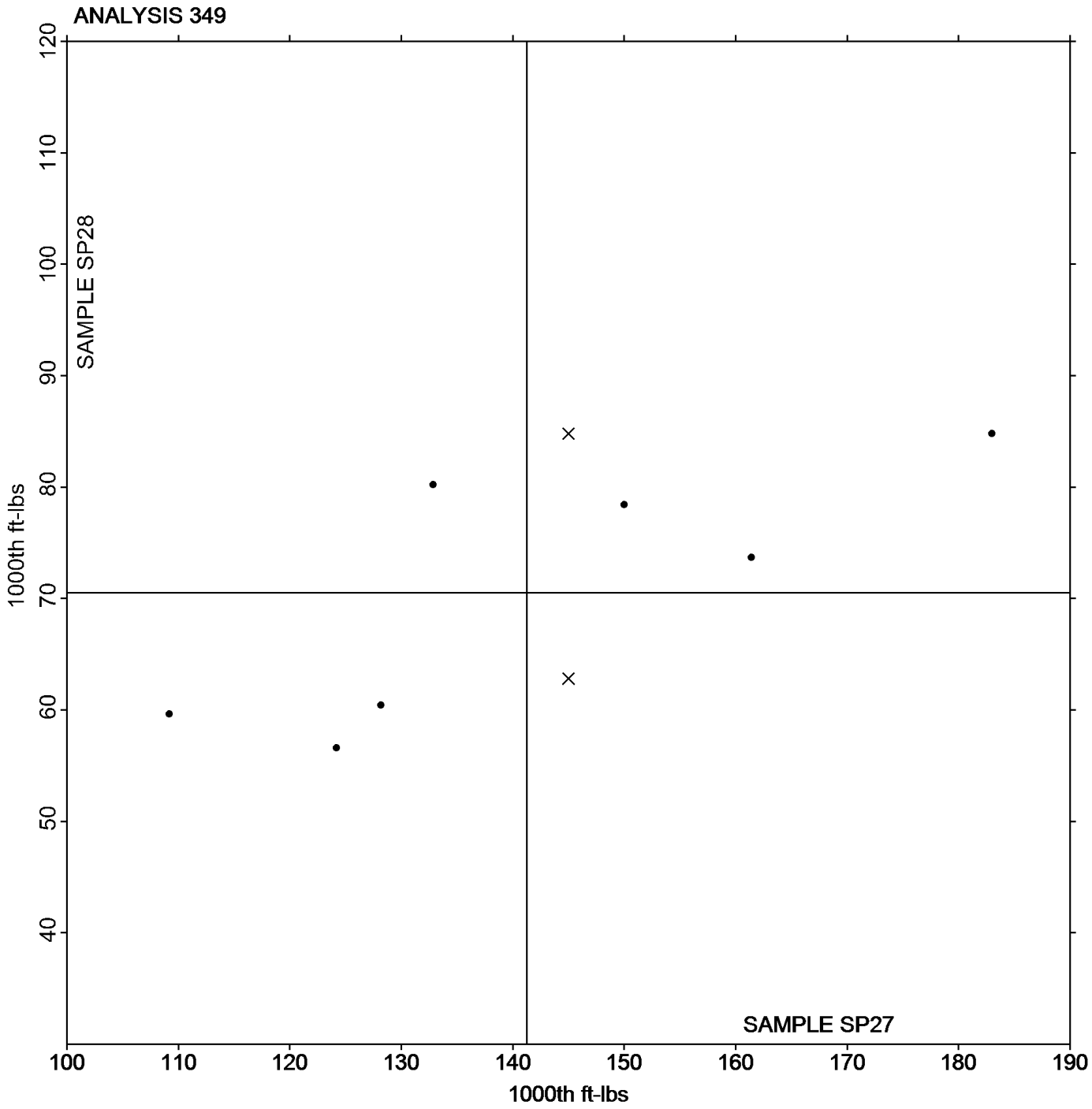
TAPPI-CTS Interlaboratory Testing Program

Analysis 349

Internal Bond Strength - Scott Bond Models

Grand Mean Sample **SP27** = 141.27 1000th ft-lbs

Grand Mean Sample **SP28** = 70.533 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.