Collaborative Testing Services, Inc.

Paper & Paperboard Interlaboratory Testing Program

Summary Report #285S - November 2016

Introduction to the Paper & Paperboard Interlaboratory Program

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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.

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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.

Paper & Paperboard Interlaboratory Testing Program

Analysis 305

Bursting Strength - Printing Papers

TAPPI Official Test Method T403

WebCode	Data Flag	Sample SA37 Lab Mean	Sample SA37 Diff from Grand Mean	Sample SA37 CPV	Sample SA38 Lab Mean	Sample SA38 Diff from Grand Mean	Sample SA38 CPV
2F76YM		39.97	-3.32	-1.10	42.12	-1.28	-0.46
3DUUD3		41.42	-1.87	-0.62	42.33	-1.07	-0.38
4L69Y6		44.32	1.03	0.34	46.06	2.67	0.96
7K2M3F		47.50	4.21	1.40	46.00	2.61	0.94
7WDUWV		44.55	1.26	0.42	45.13	1.73	0.63
8KFBY2		45.20	1.91	0.63	43.70	0.31	0.11
9ZQCBH		42.00	-1.29	-0.43	44.80	1.41	0.51
CPCNNL		42.63	-0.66	-0.22	40.65	-2.74	-0.99
ERE728		45.02	1.73	0.58	43.97	0.58	0.21
ETP9M7		41.90	-1.39	-0.46	41.45	-1.94	-0.70
FKRXNU		39.80	-3.49	-1.16	41.80	-1.59	-0.57
GFUJYJ		42.29	-1.00	-0.33	41.84	-1.55	-0.56
JDEX4E		40.42	-2.87	-0.95	41.28	-2.11	-0.76
JKG3Y6	X	10.33	-32.96	-10.94	13.64	-29.75	-10.73
LQFBCB		44.87	1.58	0.52	47.91	4.52	1.63
NK39KZ		45.17	1.88	0.62	42.42	-0.97	-0.35
PX9XKD		46.67	3.38	1.12	46.43	3.03	1.09
TE4CPW		40.97	-2.32	-0.77	40.70	-2.70	-0.97
V32VRQ		38.40	-4.89	-1.62	39.70	-3.69	-1.33
W2LWBM		48.66	5.37	1.78	45.46	2.07	0.75
XBPLA3		44.58	1.29	0.43	41.03	-2.36	-0.85
XUXV49	*	49.80	6.51	2.16	51.40	8.01	2.89
YLEQRY		40.47	-2.82	-0.94	41.96	-1.43	-0.52
YPGMF9		42.80	-0.49	-0.16	42.10	-1.29	-0.47
ZZZJXL		39.54	-3.75	-1.25	41.19	-2.20	-0.79

Summary Statistics

	Sample SA37	Sample SA38
Grand Means	43.290 psi	43.393 psi
SD Btwn Labs	3.014 psi	2.773 psi

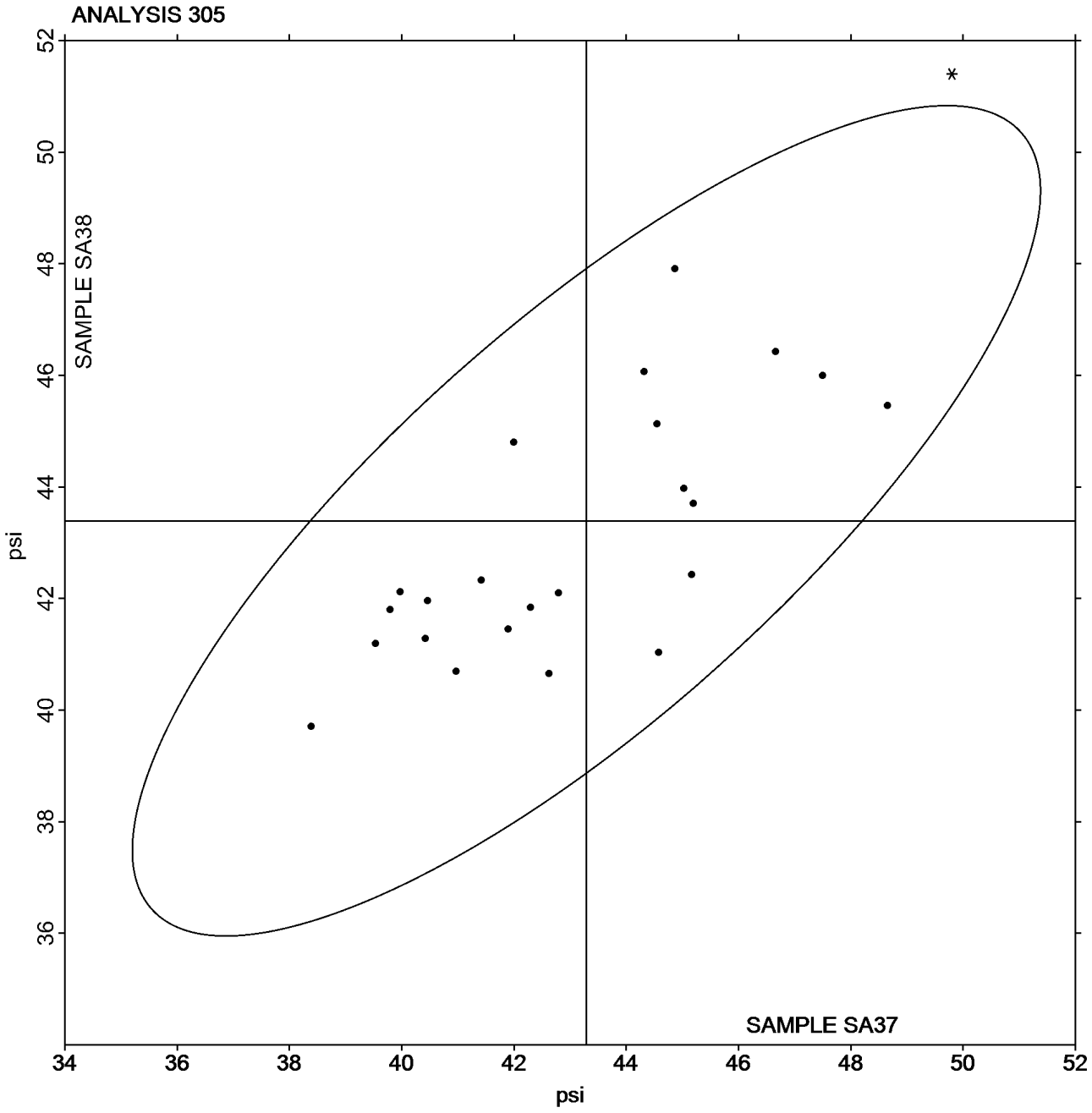
Statistics based on 24 of 25 reporting participants

Comments on Assigned Data Flags for Test #305

JKG3Y6 (X) - Extreme Data.

Grand Mean Sample **SA37** = 43.290 psi

Grand Mean Sample **SA38** = 43.393 psi



Paper & Paperboard Interlaboratory Testing Program

Analysis 310

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

WebCode	Data Flag	Sample SB37 Lab Mean	Sample SB37 Diff from Grand Mean	Sample SB37 CPV	Sample SB38 Lab Mean	Sample SB38 Diff from Grand Mean	Sample SB38 CPV
3DUUD3		93.29	-2.08	-0.35	85.53	-4.60	-1.00
3H9FC2		96.87	1.49	0.25	88.73	-1.40	-0.30
6A667V		102.99	7.62	1.29	91.98	1.86	0.40
6UVFTU		99.50	4.12	0.70	93.89	3.76	0.82
7PVJMZ		91.20	-4.18	-0.71	88.00	-2.13	-0.46
7WDUWV		88.37	-7.01	-1.19	83.82	-6.31	-1.37
8LCMYA		97.18	1.80	0.31	92.71	2.58	0.56
8TQVZC		97.50	2.12	0.36	94.30	4.17	0.91
A9EMVW		92.75	-2.63	-0.45	88.30	-1.83	-0.40
AMEB9W	*	78.60	-16.78	-2.85	84.40	-5.73	-1.24
BPJEFD		90.47	-4.91	-0.83	81.04	-9.09	-1.97
CFMZQX		102.11	6.73	1.14	100.08	9.95	2.16
CX7YRP		94.42	-0.96	-0.16	88.62	-1.51	-0.33
CZU97W		91.85	-3.53	-0.60	85.25	-4.88	-1.06
FKRXNU		96.82	1.44	0.25	88.07	-2.06	-0.45
GMVTC4		99.44	4.06	0.69	91.19	1.06	0.23
HHHEZJ		89.88	-5.50	-0.93	87.08	-3.05	-0.66
KADEEL		89.68	-5.70	-0.97	89.81	-0.32	-0.07
KZNNUE		98.45	3.08	0.52	96.76	6.63	1.44
NK39KZ		93.09	-2.29	-0.39	89.71	-0.42	-0.09
Q26NKX		94.04	-1.33	-0.23	90.98	0.85	0.19
Q8M2GB		99.50	4.12	0.70	98.34	8.21	1.78
QLPVMD		86.79	-8.58	-1.46	84.56	-5.57	-1.21
T4GKWC		101.80	6.42	1.09	90.70	0.57	0.12
TRQJLX		106.73	11.35	1.93	94.89	4.76	1.03
VJ6H26	*	103.24	7.86	1.33	86.57	-3.55	-0.77
VJLQY8		94.90	-0.47	-0.08	92.72	2.59	0.56
WNXURU		92.84	-2.54	-0.43	87.84	-2.28	-0.50
Y6BEZA		94.38	-1.00	-0.17	90.38	0.25	0.05
ZNMAE3		102.60	7.22	1.23	97.60	7.47	1.62

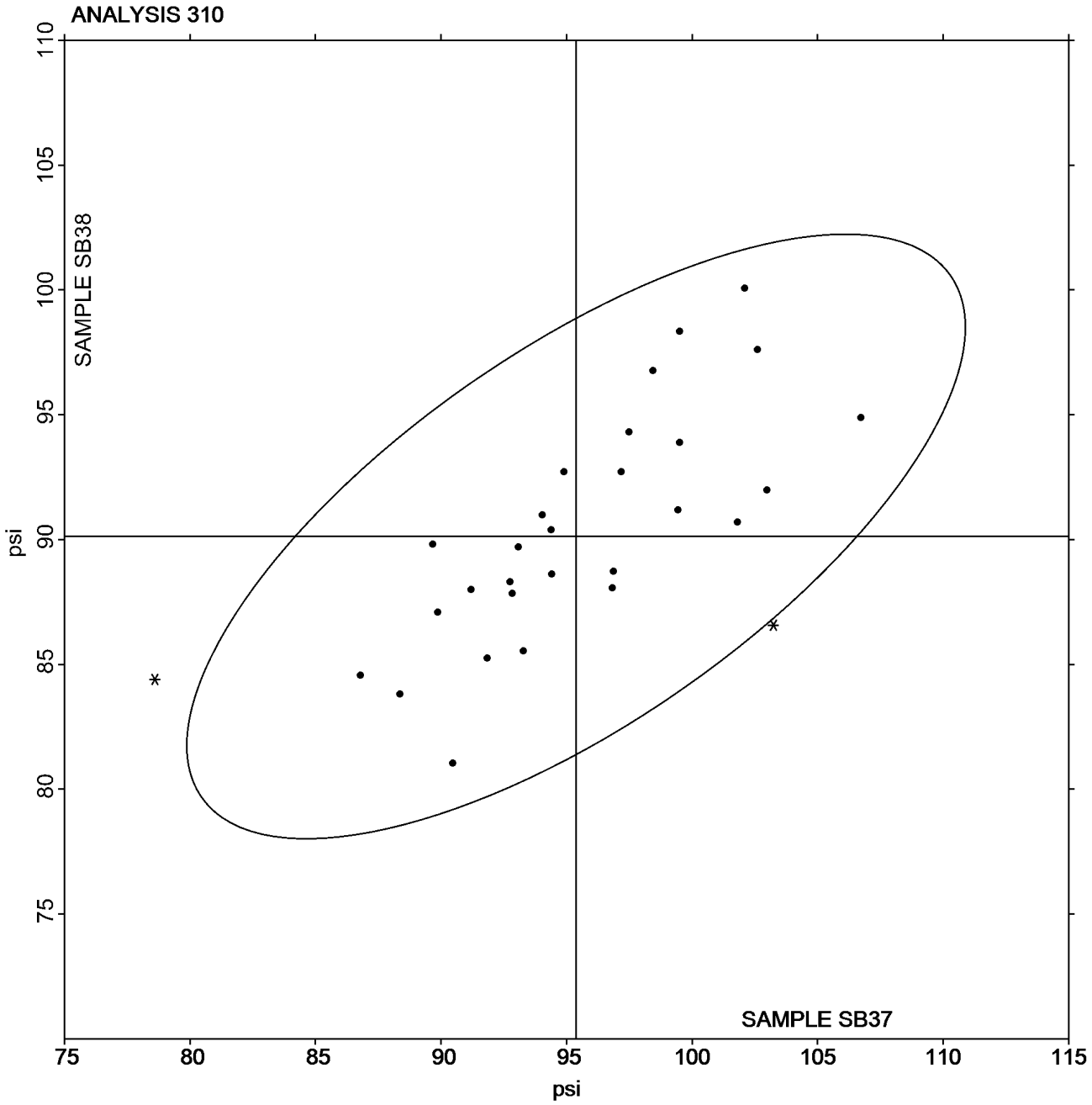
Summary Statistics

	Sample SB37	Sample SB38
Grand Means	95.376 psi	90.128 psi
SD Btwn Labs	5.893 psi	4.603 psi

Statistics based on 30 of 30 reporting participants

Grand Mean Sample **SB37** = 95.376 psi

Grand Mean Sample **SB38** = 90.128 psi



Paper & Paperboard Interlaboratory Testing Program

Analysis 311
Tearing Strength - Newsprint
TAPPI Official Test Method T414

WebCode	Data Flag	Sample SK37 Lab Mean	Sample SK37 Diff from Grand Mean	Sample SK37 CPV	Sample SK38 Lab Mean	Sample SK38 Diff from Grand Mean	Sample SK38 CPV
3DUUD3		25.48	-0.75	-1.07	26.41	-0.50	-1.27
6YQVT4		26.63	0.39	0.56	27.46	0.55	1.40
9MHNXE	X	33.70	7.47	10.58	34.11	7.20	18.30
H28N66		27.24	1.00	1.42	27.08	0.17	0.44
K467VW		26.09	-0.15	-0.21	26.87	-0.04	-0.10
W2LWBM		25.74	-0.50	-0.70	26.72	-0.19	-0.48

Summary Statistics

	Sample SK37	Sample SK38
Grand Means	26.236 Grams	26.909 Grams
SD Btwn Labs	0.706 Grams	0.394 Grams

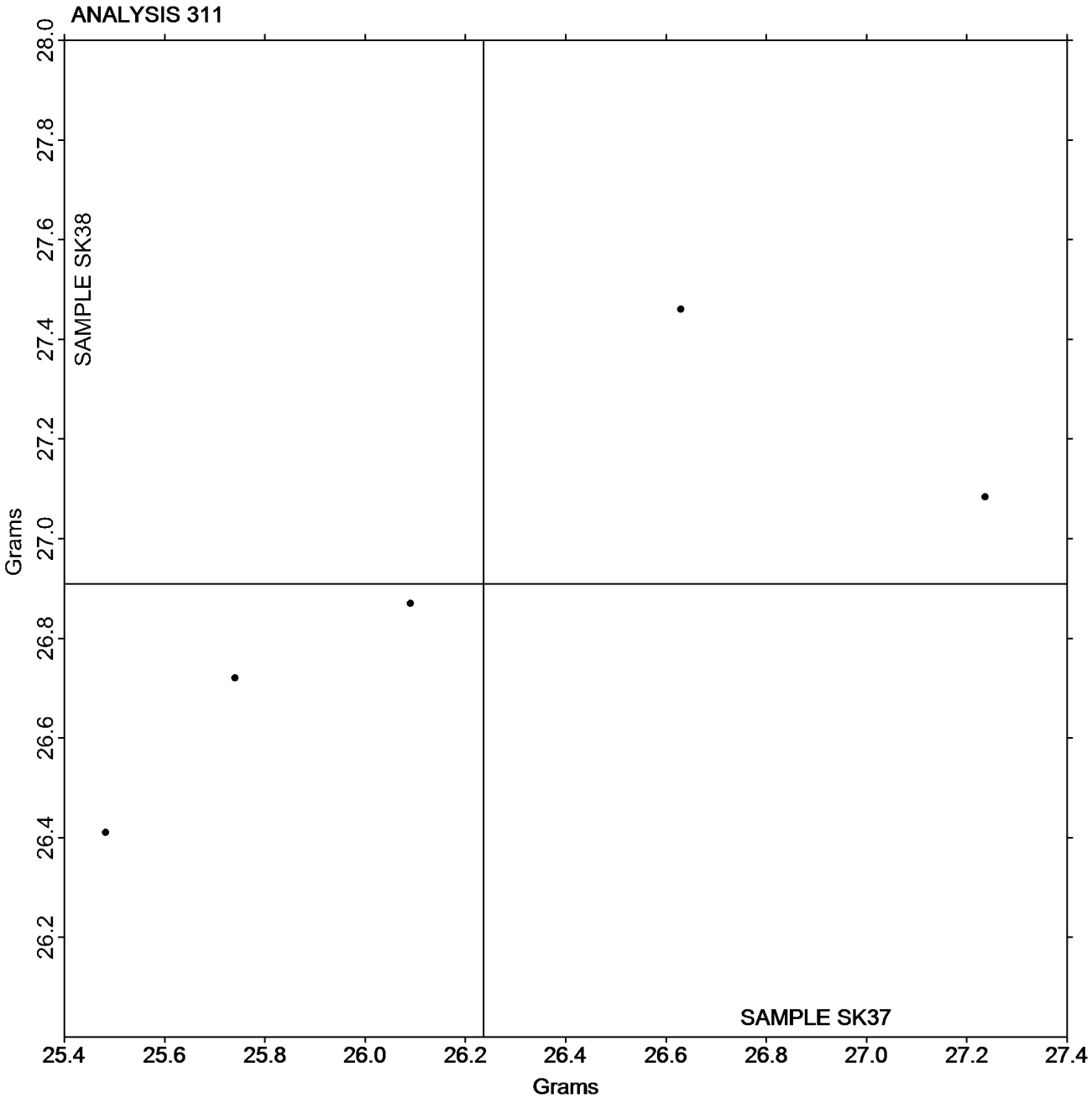
Statistics based on 5 of 6 reporting participants

Comments on Assigned Data Flags for Test #311

9MHNXE (X) - Extreme Data.

Grand Mean Sample **SK37** = 26.236 Grams

Grand Mean Sample **SK38** = 26.909 Grams



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 312

Tearing Strength - Printing Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SC37 Lab Mean	Sample SC37 Diff from Grand Mean	Sample SC37 CPV	Sample SC38 Lab Mean	Sample SC38 Diff from Grand Mean	Sample SC38 CPV
2ALZ98		60.84	-2.25	-0.48	60.14	-2.92	-0.62
2F76YM		64.62	1.53	0.33	64.44	1.38	0.30
3DUUD3		63.69	0.60	0.13	63.03	-0.03	-0.01
3HQ97K		61.46	-1.63	-0.35	62.66	-0.40	-0.08
3UEHMX		59.82	-3.27	-0.69	59.84	-3.22	-0.69
3XMLM2		56.77	-6.32	-1.34	57.97	-5.09	-1.09
7K2M3F		63.70	0.61	0.13	65.90	2.84	0.61
7WDUWV		68.98	5.90	1.25	69.65	6.60	1.41
8JMFED		64.63	1.54	0.33	65.60	2.54	0.54
8LCMYA		61.06	-2.03	-0.43	60.12	-2.94	-0.63
8RXPXZ		61.14	-1.95	-0.41	60.44	-2.62	-0.56
9HBY2Z		60.14	-2.95	-0.63	59.26	-3.80	-0.81
9ZQCBH		64.04	0.95	0.20	65.50	2.44	0.52
A8MQBA		60.32	-2.77	-0.59	61.72	-1.34	-0.29
A9EMVW		56.56	-6.53	-1.39	57.12	-5.94	-1.27
AMEB9W	*	75.20	12.11	2.57	76.40	13.34	2.85
AMZWM9	X	55.62	-7.47	-1.59	57.78	-5.28	-1.13
BPJEFD		56.80	-6.29	-1.34	57.16	-5.90	-1.26
BZFK9B		61.50	-1.59	-0.34	62.30	-0.76	-0.16
CAKWWT		69.20	6.11	1.30	69.12	6.06	1.30
CBR7TW		57.28	-5.81	-1.23	58.52	-4.54	-0.97
CPCNNL	X	66.60	3.51	0.75	61.80	-1.26	-0.27
CX7YRP		63.76	0.68	0.14	66.43	3.38	0.72
CZU97W		57.21	-5.88	-1.25	58.17	-4.89	-1.05
EETRX8		57.46	-5.63	-1.19	56.92	-6.14	-1.31
ERE728	X	55.84	-7.25	-1.54	66.33	3.27	0.70
ETP9M7		66.87	3.78	0.80	64.81	1.75	0.38
EWQ6FL		63.42	0.33	0.07	63.90	0.84	0.18
F9YECA		53.00	-10.09	-2.14	52.40	-10.66	-2.28
FTL4L3		65.73	2.64	0.56	63.74	0.69	0.15
GFUJYJ		64.64	1.55	0.33	64.48	1.42	0.30
HHHEZJ		63.08	-0.01	0.00	63.08	0.02	0.01
JDEX4E	X	123.98	60.89	12.93	62.53	-0.53	-0.11
KADEEL		62.25	-0.83	-0.18	63.22	0.17	0.04
KTUERW		59.46	-3.63	-0.77	60.06	-3.00	-0.64
L6FCPC		61.00	-2.09	-0.44	60.12	-2.94	-0.63
LL7DM4		57.50	-5.59	-1.19	57.80	-5.26	-1.12
LQFBCB		55.60	-7.49	-1.59	56.20	-6.86	-1.47
M99UL3	*	69.01	5.92	1.26	65.73	2.67	0.57
MHZ3CL		70.00	6.91	1.47	69.20	6.14	1.31

Paper & Paperboard Interlaboratory Testing Program

Analysis 312

Tearing Strength - Printing Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SC37 Lab Mean	Sample SC37 Diff from Grand Mean	Sample SC37 CPV	Sample SC38 Lab Mean	Sample SC38 Diff from Grand Mean	Sample SC38 CPV
NK39KZ		60.09	-3.00	-0.64	59.65	-3.40	-0.73
NZVZ72		67.16	4.07	0.86	65.33	2.28	0.49
PX9XKD		66.74	3.65	0.78	67.23	4.17	0.89
Q26NKX		59.65	-3.43	-0.73	59.40	-3.66	-0.78
QLPVMD		63.89	0.80	0.17	63.01	-0.05	-0.01
QXZ7FA		57.76	-5.33	-1.13	56.72	-6.34	-1.36
R4M937		71.18	8.09	1.72	68.57	5.51	1.18
T6U8EQ		66.03	2.95	0.63	66.79	3.73	0.80
TE4CPW		67.57	4.48	0.95	65.13	2.07	0.44
UK4FPE		67.47	4.38	0.93	68.21	5.15	1.10
V32VRQ		71.03	7.94	1.69	71.50	8.44	1.81
VJLQY8		70.60	7.51	1.60	72.60	9.54	2.04
WNXURU		65.48	2.39	0.51	64.86	1.81	0.39
XBPLA3		62.50	-0.59	-0.12	61.02	-2.04	-0.44
XUXV49		60.28	-2.81	-0.60	59.56	-3.50	-0.75
YLEQRY	X	126.98	63.89	13.57	63.02	-0.04	-0.01
YMB3R9		66.60	3.51	0.75	66.80	3.74	0.80
YPGMF9		66.28	3.19	0.68	65.96	2.90	0.62
ZZZJXL		58.66	-4.43	-0.94	59.51	-3.55	-0.76

Summary Statistics

	Sample SC37	Sample SC38
Grand Means	63.087 Grams	63.056 Grams
SD Btwn Labs	4.709 Grams	4.675 Grams

Statistics based on 54 of 59 reporting participants

Comments on Assigned Data Flags for Test #312

ERE728 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SC38.

AMZWM9 (X) - Data appear to be off by a factor of 2; data converted by CTS (x.5).

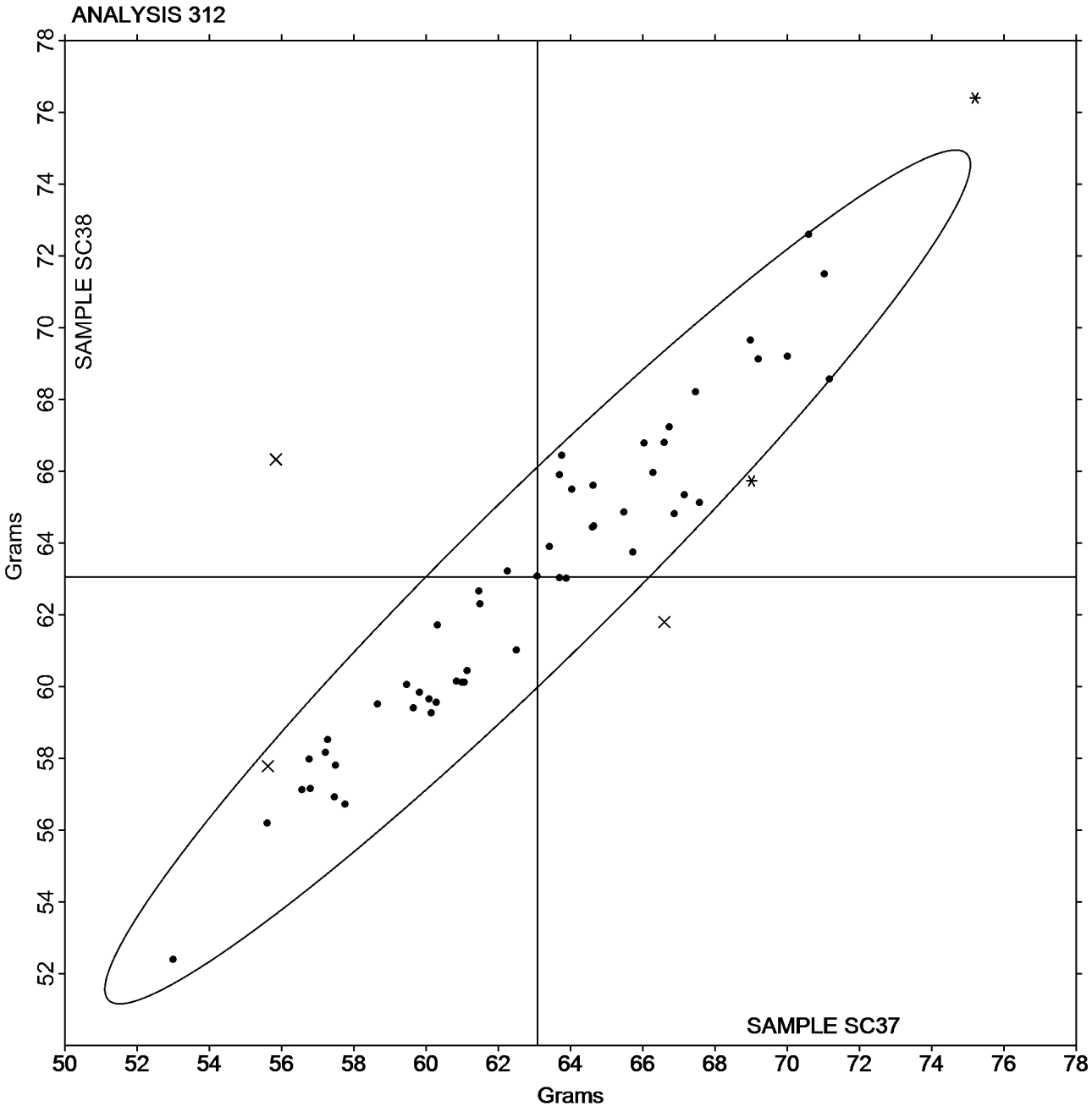
CPCNNL (X) - Inconsistent in testing between samples.

JDEX4E (X) - Extreme Data for Sample SC37.

YLEQRY (X) - Extreme Data for Sample SC37.

Grand Mean Sample **SC37** = 63.087 Grams

Grand Mean Sample **SC38** = 63.056 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 314

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SD37 Lab Mean	Sample SD37 Diff from Grand Mean	Sample SD37 CPV	Sample SD38 Lab Mean	Sample SD38 Diff from Grand Mean	Sample SD38 CPV
226L63		199.0	17.0	1.14	226.4	24.0	1.41
28VVEZ		170.3	-11.7	-0.79	195.9	-6.5	-0.38
3DUUD3		178.3	-3.6	-0.25	200.8	-1.7	-0.10
3H9FC2		174.2	-7.8	-0.52	198.6	-3.8	-0.23
4QXCN3		178.4	-3.6	-0.24	200.4	-2.0	-0.12
6A667V		188.8	6.8	0.46	216.8	14.4	0.84
76ME2C	X	194.8	12.8	0.86	228.2	25.7	1.51
7PVJMZ		172.0	-10.0	-0.67	180.0	-22.4	-1.32
8TQVZC		177.5	-4.5	-0.30	186.3	-16.1	-0.95
9ZQCBH		186.5	4.5	0.31	214.6	12.2	0.71
AMEB9W		214.4	32.4	2.18	242.8	40.4	2.37
ANQ2FF		209.7	27.7	1.87	218.7	16.3	0.96
CFMZQX		188.0	6.0	0.41	214.4	12.0	0.70
CLGVT6		206.3	24.3	1.64	220.4	17.9	1.05
DAGQVP		164.3	-17.7	-1.19	193.6	-8.9	-0.52
F7TWBT		189.6	7.6	0.51	209.0	6.6	0.39
FKRXNU		177.6	-4.4	-0.29	188.0	-14.4	-0.85
GBM4FN		187.2	5.2	0.35	211.4	8.9	0.52
GMVTC4		150.2	-31.8	-2.14	162.7	-39.7	-2.33
H33BEN	X	162.6	-19.3	-1.30	188.9	-13.6	-0.80
HD2A3N		155.4	-26.6	-1.79	179.0	-23.4	-1.38
HHV7RE		180.0	-2.0	-0.13	194.9	-7.6	-0.44
JUJMXR		172.8	-9.2	-0.62	182.8	-19.6	-1.15
JYKMHH		156.3	-25.7	-1.73	174.0	-28.4	-1.67
KZNNUE		190.0	8.1	0.54	194.5	-8.0	-0.47
L2VLK2		178.1	-3.9	-0.26	197.6	-4.8	-0.28
M2B7MC		173.0	-9.0	-0.61	189.6	-12.9	-0.76
Q8M2GB		184.1	2.1	0.14	207.4	5.0	0.29
QEAZXB		177.6	-4.3	-0.29	192.1	-10.3	-0.61
R4KKJ8		194.6	12.6	0.85	219.2	16.8	0.98
R4M937		189.7	7.7	0.52	207.9	5.5	0.32
T8JEYN		173.2	-8.8	-0.59	199.8	-2.7	-0.16
VJ6H26		190.7	8.7	0.58	215.6	13.2	0.77
W7QYR9		180.4	-1.6	-0.11	206.8	4.3	0.25
WT6H4B		163.5	-18.5	-1.24	194.3	-8.1	-0.48
Y6BEZA		196.6	14.6	0.99	226.1	23.7	1.39
YQEXEH		201.0	19.0	1.28	223.2	20.7	1.22

Summary Statistics

	Sample SD37	Sample SD38
Grand Means	181.98 Grams	202.45 Grams
SD Btwn Labs	14.85 Grams	17.03 Grams

Statistics based on 35 of 37 reporting participants

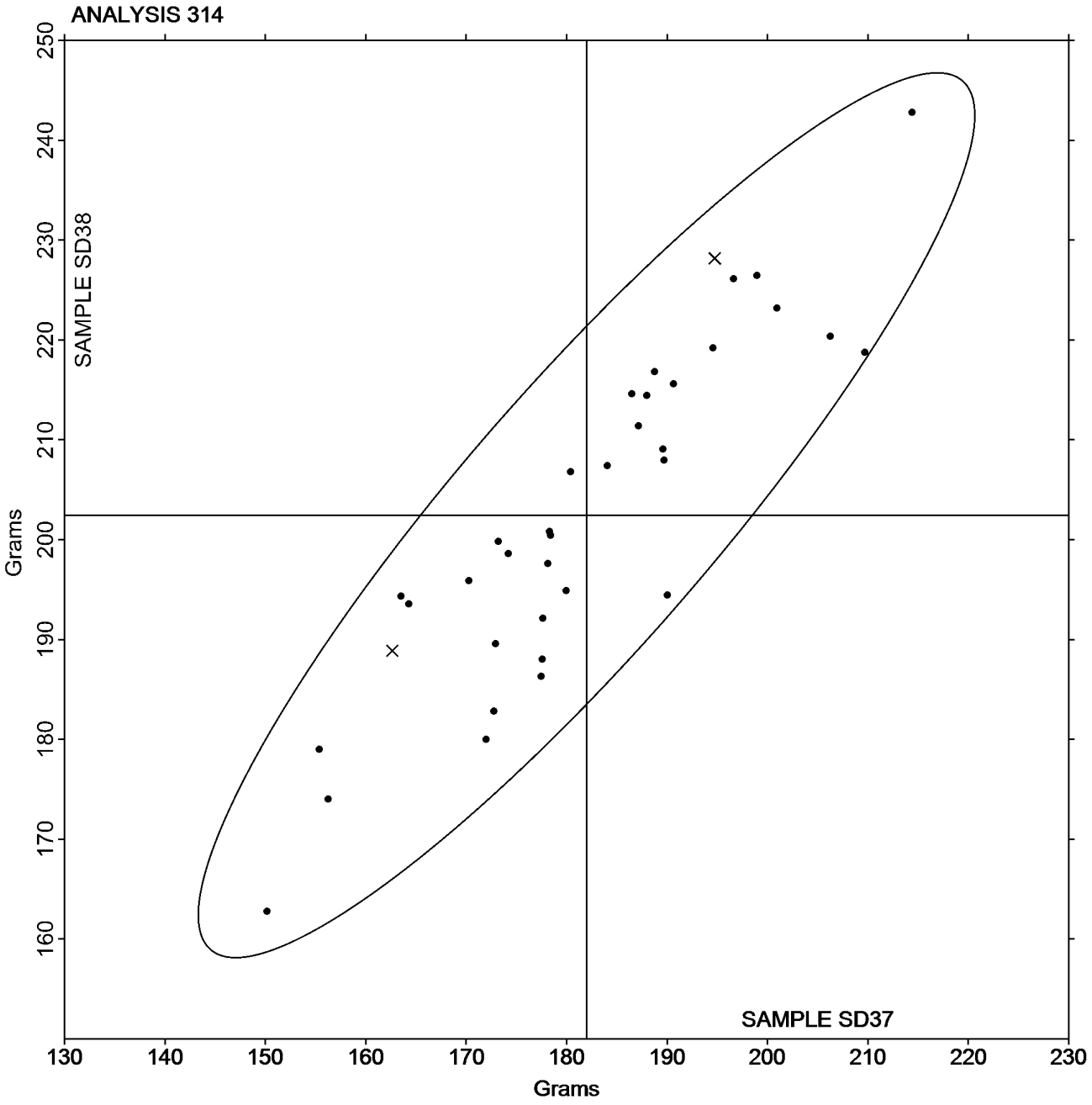
Comments on Assigned Data Flags for Test #314

76ME2C (X) - Data appear to be off by a factor of 2; data converted by CTS (x.5).

H33BEN (X) - Data appear to be off by a factor of 4; data converted by CTS (x.25).

Grand Mean Sample **SD37** = 181.98 Grams

Grand Mean Sample **SD38** = 202.45 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 320

Tensile Breaking Strength - Newsprint

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SR37 Lab Mean	Sample SR37 Diff from Grand Mean	Sample SR37 CPV	Sample SR38 Lab Mean	Sample SR38 Diff from Grand Mean	Sample SR38 CPV
6YQVT4		2.536	-0.132	-1.04	2.666	-0.255	-1.64
9EK4PQ	X	3.291	0.623	4.92	3.381	0.460	2.95
9MHNXE		2.686	0.019	0.15	2.996	0.074	0.48
H28N66		2.506	-0.162	-1.28	2.949	0.028	0.18
K467VW		2.768	0.100	0.79	2.934	0.013	0.08
LQFBCB		2.771	0.104	0.82	3.110	0.189	1.21
NK39KZ		2.546	-0.122	-0.96	2.718	-0.203	-1.31
NUUQXM		2.539	-0.128	-1.01	2.852	-0.069	-0.44
R4M937		2.668	0.000	0.00	2.857	-0.065	-0.42
T4GKWC		2.798	0.131	1.03	3.092	0.170	1.09
W2LWBM		2.884	0.216	1.71	3.137	0.216	1.39
YQVCHL		2.641	-0.026	-0.21	2.824	-0.097	-0.62

Summary Statistics

	Sample SR37	Sample SR38
Grand Means	2.6675 kN/m	2.9213 kN/m
SD Btwn Labs	0.1267 kN/m	0.1557 kN/m

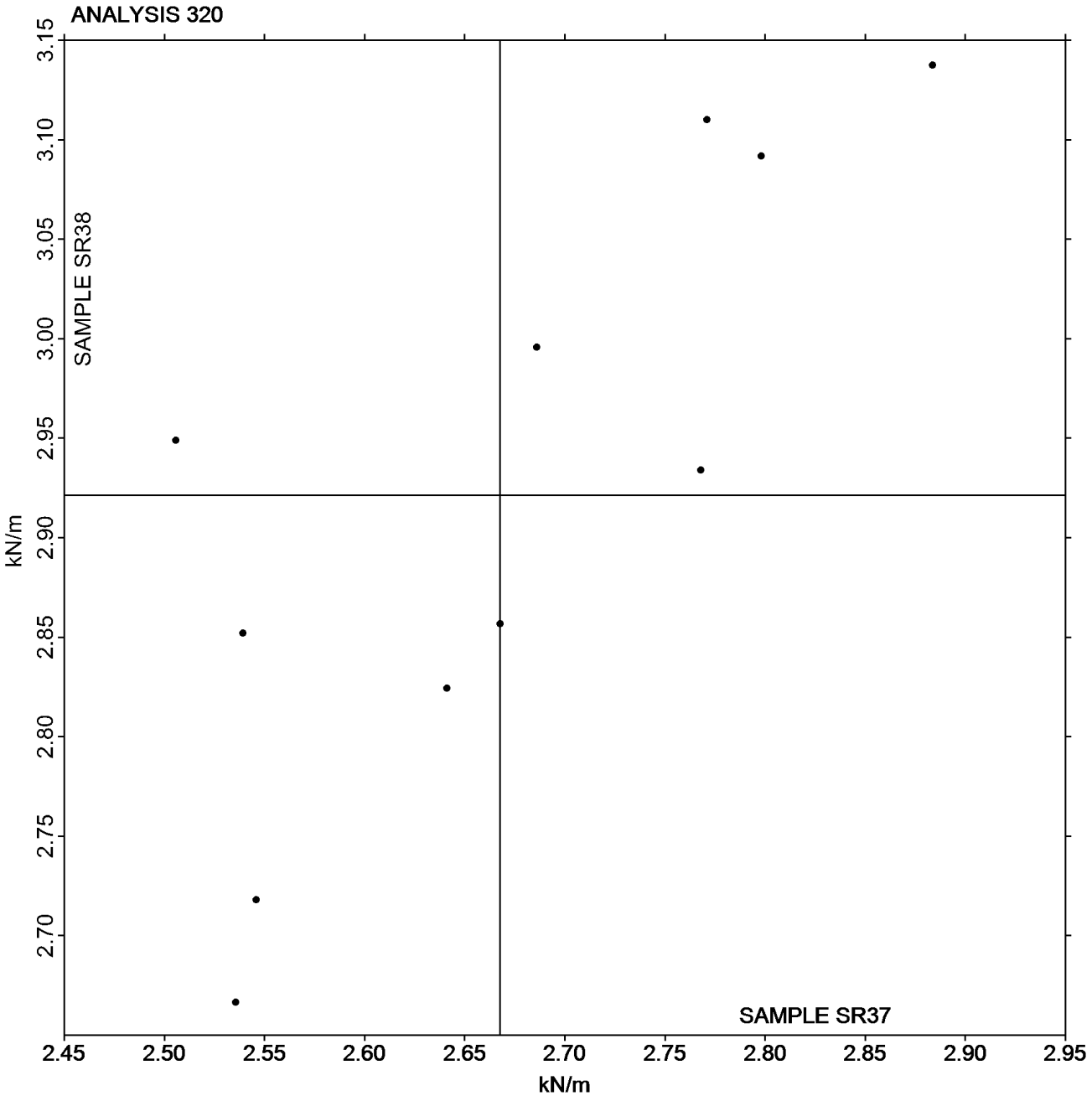
Statistics based on 11 of 12 reporting participants

Comments on Assigned Data Flags for Test #320

9EK4PQ (X) - Data for both samples are high.

Grand Mean Sample **SR37** = 2.6675 kN/m

Grand Mean Sample **SR38** = 2.9213 kN/m



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 321

Tensile Energy Absorption - Newsprint

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SR37 Lab Mean	Sample SR37 Diff from Grand Mean	Sample SR37 CPV	Sample SR38 Lab Mean	Sample SR38 Diff from Grand Mean	Sample SR38 CPV
9EK4PQ		21.85	2.99	1.26	24.80	0.56	0.24
9MHNXE		16.57	-2.30	-0.97	22.44	-1.80	-0.75
H28N66		14.32	-4.55	-1.93	21.73	-2.51	-1.05
K467VW		20.41	1.55	0.66	24.16	-0.08	-0.03
LQFBCB		21.23	2.37	1.00	27.86	3.62	1.52
NK39KZ		16.55	-2.32	-0.98	20.22	-4.02	-1.69
NUUQXM		20.34	1.48	0.63	27.61	3.37	1.41
R4M937		20.56	1.69	0.72	25.29	1.05	0.44
T4GKWC		17.59	-1.27	-0.54	24.14	-0.10	-0.04
W2LWBM		19.63	0.77	0.33	25.79	1.56	0.65
YQVCHL		18.46	-0.40	-0.17	22.57	-1.66	-0.70

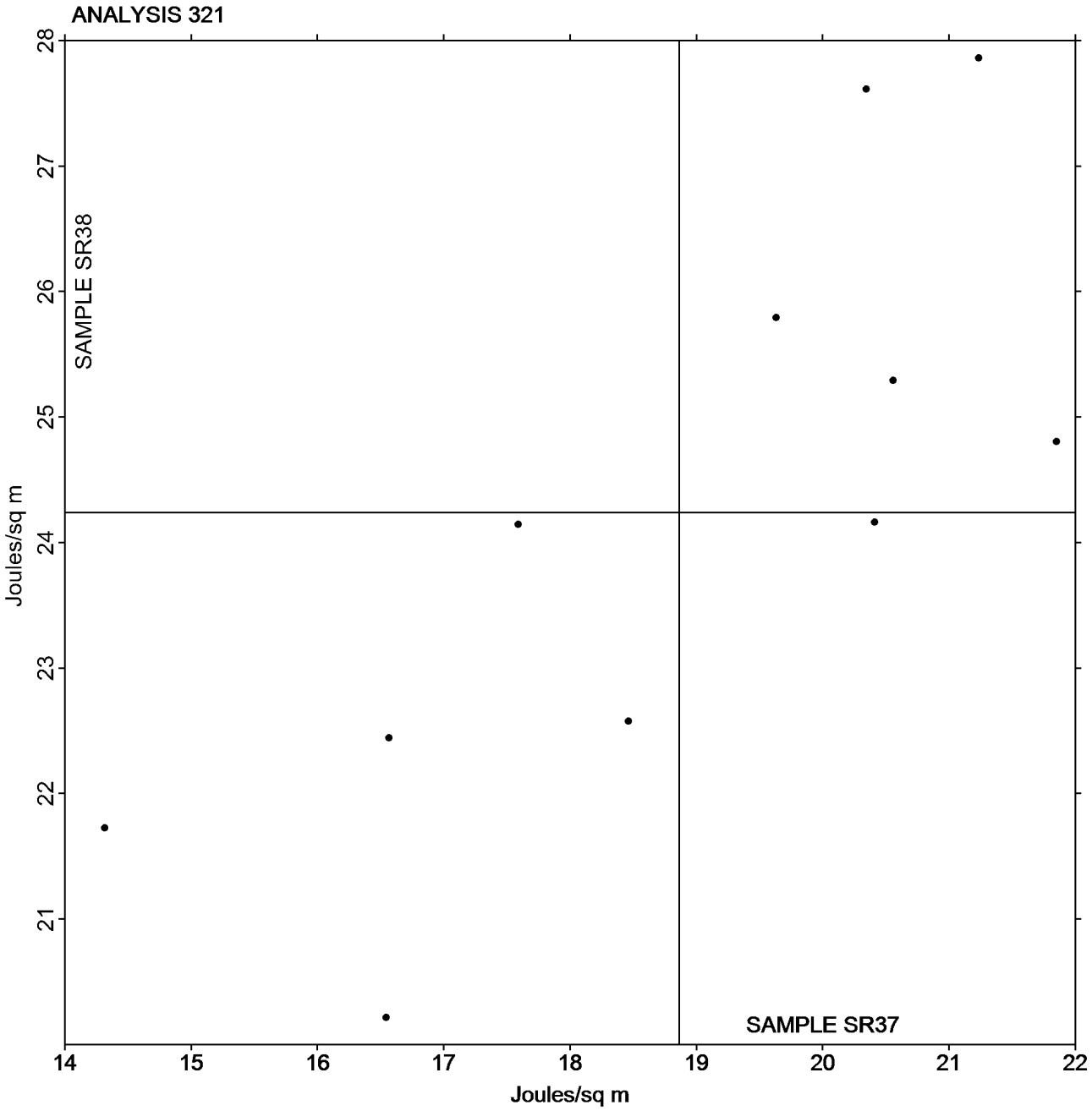
Summary Statistics

	Sample SR37	Sample SR38
Grand Means	18.865 Joules/sq m	24.238 Joules/sq m
SD Btwn Labs	2.361 Joules/sq m	2.384 Joules/sq m

Statistics based on 11 of 11 reporting participants

Grand Mean Sample **SR37** = 18.865 Joules/sq m

Grand Mean Sample **SR38** = 24.238 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.

Paper & Paperboard Interlaboratory Testing Program

Analysis 322
Elongation to Break - Newsprint
TAPPI Official Test Method T494

WebCode	Data Flag	Sample SR37 Lab Mean	Sample SR37 Diff from Grand Mean	Sample SR37 CPV	Sample SR38 Lab Mean	Sample SR38 Diff from Grand Mean	Sample SR38 CPV
9EK4PQ		1.081	-0.140	-0.68	1.162	-0.225	-0.97
9MHNXE		1.046	-0.175	-0.85	1.244	-0.143	-0.62
K467VW		1.216	-0.005	-0.03	1.329	-0.058	-0.25
LQFBCB		1.373	0.152	0.74	1.559	0.172	0.75
NK39KZ		1.081	-0.140	-0.68	1.223	-0.164	-0.71
NUUQXM		1.699	0.478	2.32	1.913	0.526	2.28
R4M937		1.089	-0.132	-0.64	1.222	-0.165	-0.71
T4GKWC		1.085	-0.137	-0.66	1.314	-0.073	-0.32
W2LWBM		1.369	0.148	0.72	1.576	0.189	0.82
YQVCHL		1.175	-0.046	-0.22	1.326	-0.061	-0.26

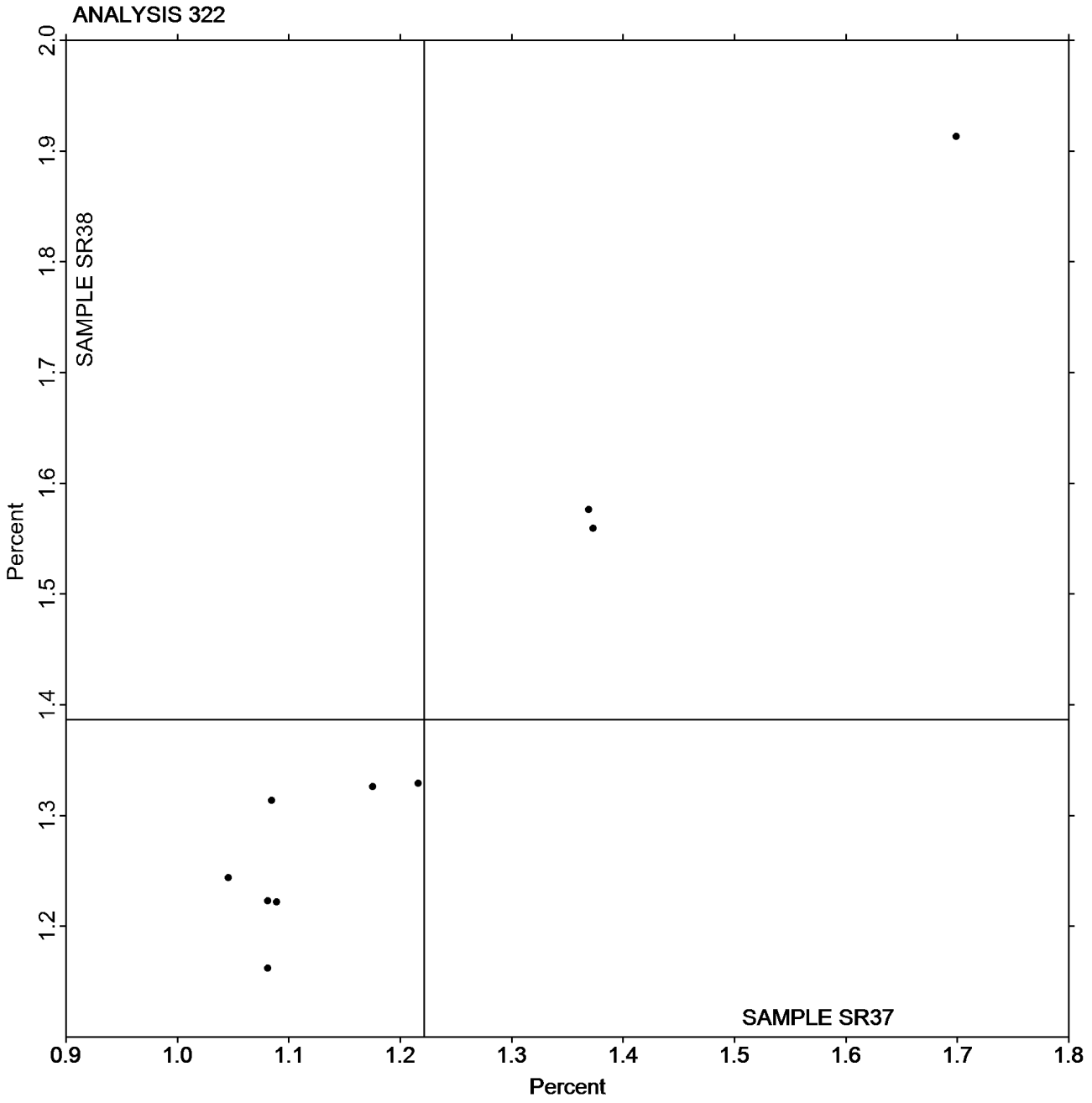
Summary Statistics

	Sample SR37	Sample SR38
Grand Means	1.2214 Percent	1.3868 Percent
SD Btwn Labs	0.2059 Percent	0.2309 Percent

Statistics based on 10 of 10 reporting participants

Grand Mean Sample **SR37** = 1.2214 Percent

Grand Mean Sample **SR38** = 1.3868 Percent



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

WebCode	Data Flag	Sample SF37 Lab Mean	Sample SF37 Diff from Grand Mean	Sample SF37 CPV	Sample SF38 Lab Mean	Sample SF38 Diff from Grand Mean	Sample SF38 CPV	Instr Code
2ALZ98		7.007	0.239	0.61	7.114	0.387	0.93	TO
2F76YM		5.930	-0.838	-2.13	5.861	-0.865	-2.08	ID
3DUUD3		6.778	0.010	0.03	6.752	0.026	0.06	LH
3H9FC2		6.702	-0.066	-0.17	6.480	-0.247	-0.59	IM
3HQ97K		6.605	-0.163	-0.41	6.761	0.035	0.08	LE
3XMLM2		6.923	0.155	0.39	6.952	0.226	0.54	LF
3YDWC9		6.826	0.058	0.15	6.898	0.172	0.41	LA
4L69Y6		5.946	-0.822	-2.09	5.944	-0.782	-1.88	XX
7K2M3F		6.712	-0.056	-0.14	6.506	-0.221	-0.53	LH
8JMFED		6.472	-0.296	-0.75	6.374	-0.352	-0.85	LI
8RXPXZ		7.146	0.378	0.96	7.002	0.276	0.66	XX
9HBY2Z		6.930	0.162	0.41	6.962	0.236	0.57	MR
A8MQBA		6.538	-0.230	-0.58	6.466	-0.260	-0.63	TF
AMZWM9	X	7.376	0.608	1.54	6.496	-0.231	-0.55	TJ
BPJEFD		7.034	0.266	0.68	6.727	0.001	0.00	TA
BZFK9B		6.969	0.201	0.51	7.107	0.380	0.91	TC
CBR7TW		7.385	0.617	1.57	7.437	0.711	1.71	LH
CX7YRP		6.373	-0.395	-1.00	6.354	-0.372	-0.89	LI
CZU97W		7.177	0.409	1.04	7.091	0.365	0.88	TX
EETRX8	X	6.412	-0.356	-0.90	7.509	0.783	1.88	TJ
EKGGGW		6.846	0.078	0.20	6.626	-0.100	-0.24	IN
ERE728	X	7.357	0.589	1.49	6.686	-0.040	-0.10	TJ
ETP9M7		7.004	0.236	0.60	7.053	0.327	0.79	LH
GFUJYJ		5.940	-0.828	-2.10	5.917	-0.809	-1.94	TF
HHHEZJ		6.998	0.230	0.58	6.870	0.144	0.35	LI
JDEX4E		7.089	0.321	0.81	7.273	0.547	1.31	LI
KADEEL		6.867	0.099	0.25	6.657	-0.069	-0.17	LH
KTUERW		6.827	0.059	0.15	6.851	0.125	0.30	XX
KXXMQC		6.133	-0.635	-1.61	6.288	-0.438	-1.05	RE
L6FCPC		6.984	0.216	0.55	7.247	0.521	1.25	TB
LL7DM4		7.040	0.272	0.69	6.900	0.174	0.42	TO
LLZ4NC		7.170	0.402	1.02	7.210	0.484	1.16	LI
M99UL3		7.567	0.799	2.03	7.383	0.657	1.58	LA
NK39KZ		6.379	-0.389	-0.99	6.403	-0.323	-0.78	LH
NZVZ72		6.058	-0.710	-1.80	6.122	-0.604	-1.45	XX
PD2DXL		7.101	0.333	0.85	7.154	0.428	1.03	XX
PX9XKD		6.864	0.096	0.24	6.631	-0.095	-0.23	LH
Q26NKX		6.553	-0.215	-0.54	6.514	-0.212	-0.51	XX
QGT2UJ		7.433	0.665	1.69	7.239	0.512	1.23	TN
QXZ7FA		6.655	-0.113	-0.29	6.499	-0.228	-0.55	TB

Paper & Paperboard Interlaboratory Testing Program

Analysis 325

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF37 Lab Mean	Sample SF37 Diff from Grand Mean	Sample SF37 CPV	Sample SF38 Lab Mean	Sample SF38 Diff from Grand Mean	Sample SF38 CPV	Instr Code
R2W7WH		6.807	0.039	0.10	6.933	0.207	0.50	TP
T6U8EQ		6.087	-0.681	-1.73	5.851	-0.875	-2.10	CB
TE4CPW		6.154	-0.614	-1.56	6.090	-0.637	-1.53	LA
TRQJLX		6.992	0.224	0.57	6.899	0.173	0.42	TB
UK4FPE		6.854	0.086	0.22	7.161	0.435	1.05	LA
V32VRQ	X	11.316	4.548	11.54	11.196	4.470	10.75	LH
VJLQY8		6.706	-0.062	-0.16	6.562	-0.164	-0.39	DL
XBPLA3		6.664	-0.104	-0.26	6.524	-0.202	-0.49	TB
XUXV49	*	6.916	0.148	0.38	6.448	-0.278	-0.67	TO
YLEQRY		7.360	0.592	1.50	7.347	0.621	1.49	LI
YMB3R9		6.661	-0.107	-0.27	6.794	0.068	0.16	LH
YPGMF9		6.646	-0.122	-0.31	6.460	-0.266	-0.64	LX
ZZZJXL		6.821	0.053	0.13	6.888	0.162	0.39	IM

Summary Statistics

	Sample SF37	Sample SF38
Grand Means	6.7680 kN/m	6.7262 kN/m
SD Btwn Labs	0.3941 kN/m	0.4159 kN/m

Statistics based on 49 of 53 reporting participants

Comments on Assigned Data Flags for Test #325

V32VRQ (X) - Extreme Data.

ERE728 (X) - Inconsistent in testing between samples.

EETRX8 (X) - Inconsistent in testing between samples.

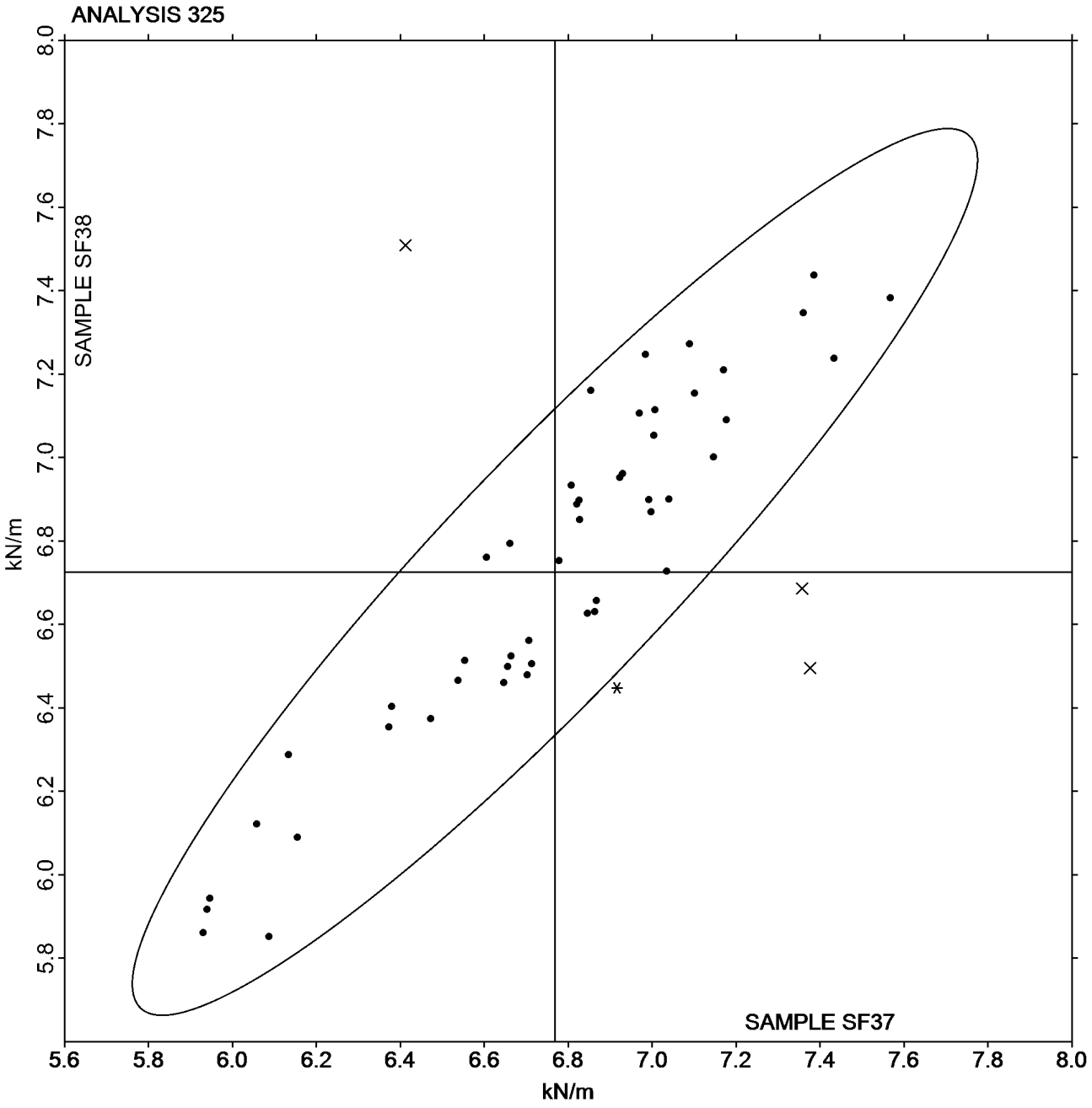
AMZWM9 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SF38.

Key to Instrument Codes Reported by Participants

CB	Chatillon DFIS 50 (Digital Gauge)/TCD 200	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	TJ	Thwing-Albert QC II-XS
TN	Testometric M100-1CT	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		

Grand Mean Sample **SF37** = 6.7680 kN/m

Grand Mean Sample **SF38** = 6.7262 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF37 Lab Mean	Sample SF37 Diff from Grand Mean	Sample SF37 CPV	Sample SF38 Lab Mean	Sample SF38 Diff from Grand Mean	Sample SF38 CPV	Instr Code
2ALZ98		101.43	5.92	0.56	103.76	10.39	1.08	TO
2F76YM		96.42	0.92	0.09	96.13	2.75	0.29	ID
3DUUD3		89.63	-5.87	-0.56	87.27	-6.10	-0.64	LH
3H9FC2		98.51	3.00	0.29	92.58	-0.79	-0.08	IM
3XMLM2		70.47	-25.03	-2.39	71.13	-22.25	-2.32	LW
4L69Y6		83.01	-12.50	-1.19	84.09	-9.29	-0.97	XX
7K2M3F		96.39	0.89	0.08	87.02	-6.35	-0.66	LH
8JMFED		87.59	-7.92	-0.76	85.63	-7.75	-0.81	LI
9HBY2Z		94.20	-1.30	-0.12	91.93	-1.45	-0.15	MR
AMZWM9	*	119.31	23.80	2.27	103.63	10.26	1.07	TJ
CBR7TW		96.14	0.63	0.06	98.56	5.18	0.54	LH
CX7YRP		87.27	-8.24	-0.79	86.07	-7.31	-0.76	LI
CZU97W		98.67	3.16	0.30	95.46	2.08	0.22	TA
ETP9M7		98.42	2.92	0.28	102.13	8.75	0.91	LH
GFUJYJ		81.68	-13.83	-1.32	80.77	-12.61	-1.32	TF
HHHEZJ		97.88	2.37	0.23	94.56	1.18	0.12	LI
JDEX4E		103.20	7.69	0.73	106.60	13.22	1.38	LI
KADEEL		100.02	4.51	0.43	90.85	-2.53	-0.26	LH
KTUERW		105.60	10.09	0.96	110.59	17.21	1.80	XX
KXXMQC		86.74	-8.76	-0.84	88.96	-4.42	-0.46	RE
L6FCPC		101.07	5.57	0.53	105.46	12.08	1.26	TB
LL7DM4		91.03	-4.48	-0.43	86.24	-7.13	-0.74	TO
LLZ4NC		105.36	9.85	0.94	108.56	15.18	1.58	LI
M99UL3		104.69	9.18	0.88	91.51	-1.86	-0.19	LA
NK39KZ		87.57	-7.94	-0.76	88.26	-5.12	-0.53	LH
NZVZ72		78.25	-17.25	-1.65	81.33	-12.04	-1.26	XX
PX9XKD		97.07	1.56	0.15	88.49	-4.88	-0.51	LH
Q26NKX		91.69	-3.82	-0.36	90.12	-3.26	-0.34	XX
QGT2UJ		99.90	4.39	0.42	93.75	0.37	0.04	LX
TE4CPW		72.78	-22.73	-2.17	69.64	-23.73	-2.48	LA
UK4FPE		91.64	-3.87	-0.37	95.47	2.09	0.22	LA
V32VRQ	X	152.37	56.86	5.42	146.50	53.12	5.54	LH
VJLQY8		105.09	9.59	0.91	100.01	6.63	0.69	DL
XBPLA3		103.64	8.13	0.78	98.39	5.01	0.52	TB
XUXV49	*	118.06	22.56	2.15	104.05	10.68	1.11	TO
YLEQRY		100.69	5.18	0.49	102.04	8.66	0.90	LI
YPGMF9		90.53	-4.97	-0.47	91.55	-1.82	-0.19	LX
ZZZJXL		102.13	6.62	0.63	102.33	8.96	0.93	IM

Paper & Paperboard Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

Summary Statistics

	Sample SF37	Sample SF38
Grand Means	95.507 Joules/sq m	93.376 Joules/sq m
SD Btwn Labs	10.486 Joules/sq m	9.584 Joules/sq m

Statistics based on 37 of 38 reporting participants

Comments on Assigned Data Flags for Test #327

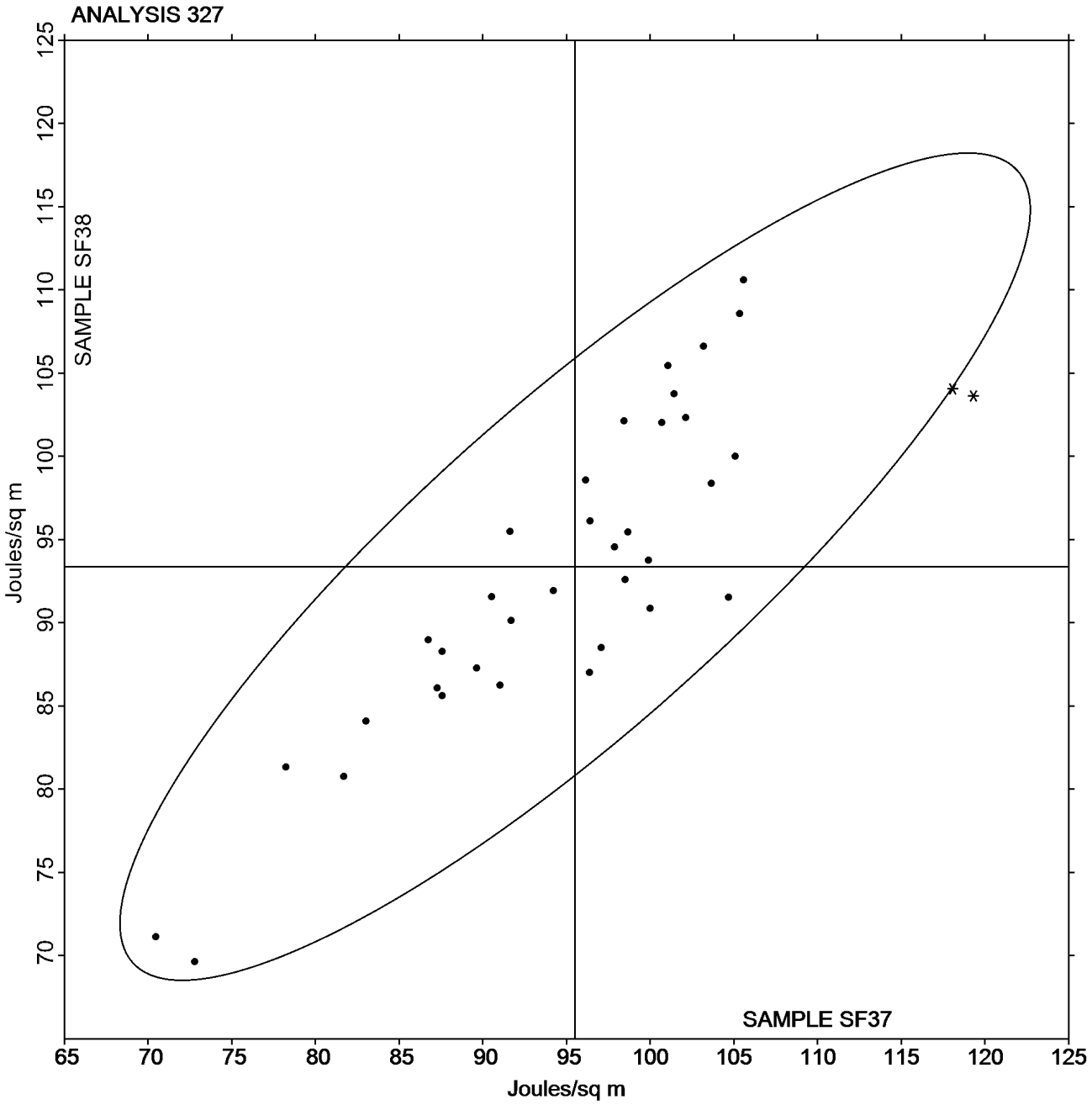
V32VRQ (X) - Data for both samples are high. Possible Systematic Error.

Key to Instrument Codes Reported by Participants

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
TF	Thwing-Albert EJA Vantage-1	TJ	Thwing-Albert QC II-XS
TO	Thwing-Albert QC-1000	XX	Instrument make/model not specified by lab

Grand Mean Sample **SF37** = 95.507 Joules/sq m

Grand Mean Sample **SF38** = 93.376 Joules/sq m



Paper & Paperboard Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF37 Lab Mean	Sample SF37 Diff from Grand Mean	Sample SF37 CPV	Sample SF38 Lab Mean	Sample SF38 Diff from Grand Mean	Sample SF38 CPV	Instr Code
2ALZ98		2.222	0.028	0.15	2.219	0.056	0.30	TO
2F76YM		2.462	0.268	1.48	2.486	0.323	1.75	ID
3DUUD3		2.046	-0.148	-0.82	2.002	-0.161	-0.87	LH
3H9FC2		2.251	0.057	0.32	2.188	0.025	0.14	IM
3XMLM2	*	1.623	-0.571	-3.16	1.636	-0.527	-2.85	LX
4L69Y6		2.149	-0.046	-0.25	2.170	0.007	0.04	XX
7K2M3F		2.182	-0.012	-0.07	2.044	-0.119	-0.64	LH
8JMFED		2.081	-0.113	-0.63	2.075	-0.088	-0.48	LI
9HBY2Z		2.128	-0.066	-0.37	2.049	-0.114	-0.61	MR
A8MQBA		2.440	0.246	1.36	2.340	0.177	0.96	TF
AMZWM9		2.514	0.320	1.77	2.418	0.255	1.38	TJ
CBR7TW		1.984	-0.210	-1.16	2.015	-0.148	-0.80	LH
CX7YRP		2.078	-0.116	-0.64	2.066	-0.097	-0.52	LI
CZU97W		2.244	0.050	0.28	2.208	0.045	0.24	TX
EETRX8	X	2.360	0.166	0.92	1.952	-0.211	-1.14	LH
EKGGGW		2.318	0.124	0.69	2.246	0.083	0.45	IN
ETP9M7		2.132	-0.062	-0.34	2.186	0.023	0.13	LH
GFUJYJ		2.102	-0.092	-0.51	2.082	-0.081	-0.44	TF
HHHEZJ		2.149	-0.045	-0.25	2.115	-0.048	-0.26	LI
JDEX4E		2.220	0.026	0.14	2.234	0.071	0.39	LI
KADEEL		2.198	0.004	0.02	2.064	-0.099	-0.53	LH
KTUERW		2.333	0.139	0.77	2.405	0.242	1.31	XX
KXXMQC		2.239	0.045	0.25	2.292	0.129	0.70	RE
L6FCPC		2.246	0.052	0.29	2.227	0.064	0.35	TB
LL7DM4		1.962	-0.232	-1.29	1.898	-0.265	-1.43	TG
LLZ4NC		2.255	0.061	0.34	2.297	0.134	0.73	LI
M99UL3	*	1.911	-0.283	-1.57	1.731	-0.432	-2.34	LA
NK39KZ		2.088	-0.106	-0.59	2.085	-0.078	-0.42	LH
NZVZ72		2.479	0.285	1.58	2.529	0.366	1.98	XX
PX9XKD		2.145	-0.049	-0.27	2.026	-0.137	-0.74	LH
Q26NKX		2.226	0.032	0.18	2.193	0.030	0.16	XX
QGT2UJ		2.310	0.116	0.64	2.226	0.063	0.34	LX
QXZ7FA		2.330	0.136	0.75	2.260	0.097	0.53	TF
TE4CPW		2.111	-0.083	-0.46	2.048	-0.115	-0.62	LA
TRQJLX		2.167	-0.027	-0.15	2.155	-0.008	-0.04	TB
V32VRQ		2.144	-0.050	-0.28	2.082	-0.081	-0.44	LH
VJLQY8		2.538	0.344	1.91	2.442	0.279	1.51	DL
XBPLA3		2.415	0.221	1.22	2.350	0.187	1.01	TB
XUXV49	X	3.012	0.818	4.53	2.822	0.659	3.57	TO
YLEQRY		1.934	-0.260	-1.44	1.963	-0.200	-1.08	LI

Paper & Paperboard Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF37 Lab Mean	Sample SF37 Diff from Grand Mean	Sample SF37 CPV	Sample SF38 Lab Mean	Sample SF38 Diff from Grand Mean	Sample SF38 CPV	Instr Code
YPGMF9		2.063	-0.131	-0.73	2.142	-0.021	-0.11	LX
ZZZJXL		2.345	0.151	0.84	2.320	0.157	0.85	IM

Summary Statistics

	Sample SF37	Sample SF38
Grand Means	2.1941 Percent	2.1628 Percent
SD Btwn Labs	0.1805 Percent	0.1848 Percent

Statistics based on 40 of 42 reporting participants

Comments on Assigned Data Flags for Test #328

EETRX8 (X) - Inconsistent in testing between samples.

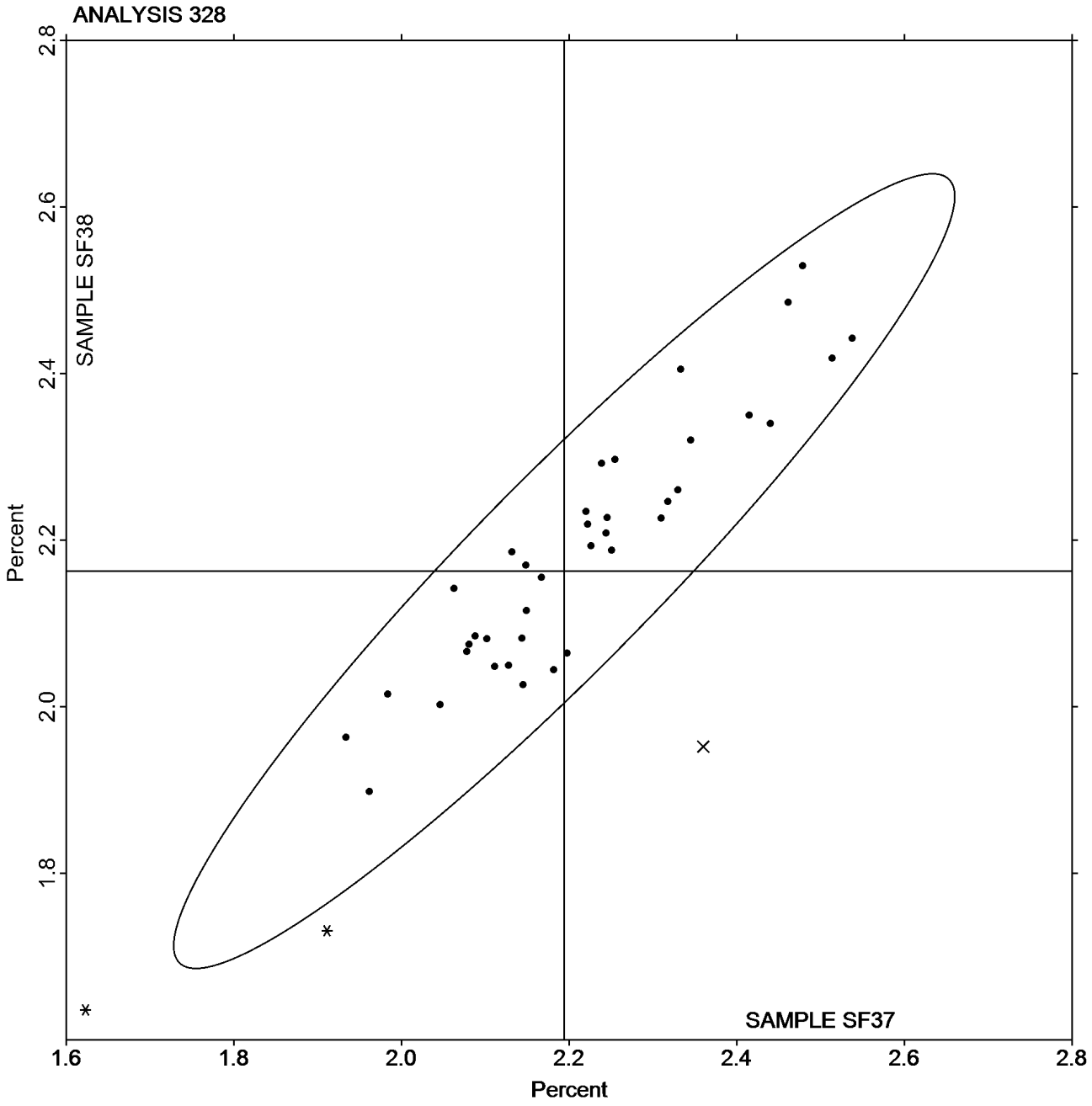
XUXV49 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample SF38.

Key to Instrument Codes Reported by Participants

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	TJ	Thwing-Albert QC II-XS
TO	Thwing-Albert QC-1000	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		

Grand Mean Sample **SF37** = 2.1941 Percent

Grand Mean Sample **SF38** = 2.1628 Percent



Paper & Paperboard Interlaboratory Testing Program

Analysis 330

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE37 Lab Mean	Sample SE37 Diff from Grand Mean	Sample SE37 CPV	Sample SE38 Lab Mean	Sample SE38 Diff from Grand Mean	Sample SE38 CPV	Instr Code
226L63		8.289	-0.797	-0.99	10.57	-1.03	-1.09	LE
28VVEZ		9.139	0.053	0.07	12.02	0.42	0.44	TO
2WCGCX		8.614	-0.471	-0.58	10.96	-0.64	-0.68	IM
3DUUD3		9.041	-0.045	-0.06	11.55	-0.05	-0.05	LH
4HGYLX		9.958	0.873	1.08	12.54	0.94	0.99	LA
4QXCN3	X	38.083	28.998	35.96	42.19	30.59	32.38	LH
6A667V		8.388	-0.697	-0.86	10.98	-0.62	-0.66	TP
6UVFTU		9.563	0.477	0.59	12.38	0.78	0.83	XX
7PVJMZ		9.617	0.532	0.66	11.85	0.25	0.26	IK
7WDUWV		9.056	-0.029	-0.04	11.21	-0.39	-0.41	TR
8LCMYA		9.614	0.529	0.66	12.71	1.12	1.18	IF
8MPGEB		8.461	-0.625	-0.77	10.82	-0.78	-0.83	LW
9ZQCBH	X	12.924	3.839	4.76	16.57	4.98	5.27	TB
AMEB9W		8.589	-0.497	-0.62	10.80	-0.80	-0.84	IF
ANQ2FF		8.347	-0.739	-0.92	10.90	-0.70	-0.74	LH
B6AGUV		8.052	-1.034	-1.28	10.50	-1.10	-1.17	IM
CLGVT6		9.017	-0.068	-0.08	11.33	-0.27	-0.28	LE
CUPATL		8.736	-0.350	-0.43	10.88	-0.72	-0.77	TH
CZU97W		9.366	0.280	0.35	11.85	0.25	0.26	TO
EWQ6FL		8.371	-0.714	-0.89	10.61	-0.99	-1.05	XX
F7TWBT		9.862	0.777	0.96	12.15	0.56	0.59	TA
FKRXNU		10.164	1.078	1.34	13.01	1.41	1.50	TH
GBM4FN		8.649	-0.436	-0.54	10.97	-0.63	-0.66	XX
GMVTC4		9.286	0.201	0.25	12.15	0.55	0.58	IK
HHV7RE		8.989	-0.096	-0.12	11.66	0.06	0.07	TP
JHRY7X		8.265	-0.821	-1.02	10.74	-0.86	-0.91	LA
JUJMXR		10.017	0.932	1.16	12.97	1.37	1.45	TH
JYKMHH		9.370	0.285	0.35	11.90	0.31	0.32	LW
L2VLK2		8.940	-0.145	-0.18	11.17	-0.43	-0.45	LE
LE2GWC		9.474	0.389	0.48	11.96	0.36	0.38	TO
M2B7MC	X	8.721	-0.364	-0.45	9.72	-1.88	-1.99	IF
NPVCCH		9.068	-0.017	-0.02	11.85	0.26	0.27	TB
PXN4XH		7.562	-1.524	-1.89	10.02	-1.58	-1.67	ID
QEAZXB		8.214	-0.871	-1.08	10.45	-1.15	-1.22	SA
R4KKJ8		8.234	-0.851	-1.06	10.88	-0.72	-0.76	ID
TWHVF9	X	12.329	3.244	4.02	14.53	2.93	3.10	LA
TYNF39		10.227	1.142	1.42	12.96	1.36	1.44	TH
VJ6H26		9.063	-0.022	-0.03	11.91	0.31	0.33	LH
W7QYR9	*	9.185	0.100	0.12	11.01	-0.59	-0.63	TO
WNXURU		8.640	-0.445	-0.55	11.01	-0.59	-0.62	LE

Paper & Paperboard Interlaboratory Testing Program

Analysis 330

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE37 Lab Mean	Sample SE37 Diff from Grand Mean	Sample SE37 CPV	Sample SE38 Lab Mean	Sample SE38 Diff from Grand Mean	Sample SE38 CPV	Instr Code
WT6H4B		7.546	-1.539	-1.91	10.16	-1.44	-1.53	IN
XNPAFB		9.275	0.190	0.24	11.72	0.12	0.13	TX
Y6BEZA	*	11.198	2.112	2.62	13.89	2.29	2.42	LA
YL3676		10.517	1.432	1.78	13.42	1.82	1.92	LA
Z8F4ZX		10.538	1.453	1.80	13.15	1.55	1.65	LI

Summary Statistics

	Sample SE37	Sample SE38
Grand Means	9.0854 kN/m	11.599 kN/m
SD Btwn Labs	0.8065 kN/m	0.945 kN/m

Statistics based on 41 of 45 reporting participants

Comments on Assigned Data Flags for Test #330

9ZQCBH (X) - Data for both samples are high. Possible Systematic Error.

4QXCN3 (X) - Extreme Data.

M2B7MC (X) - Inconsistent in testing between samples.

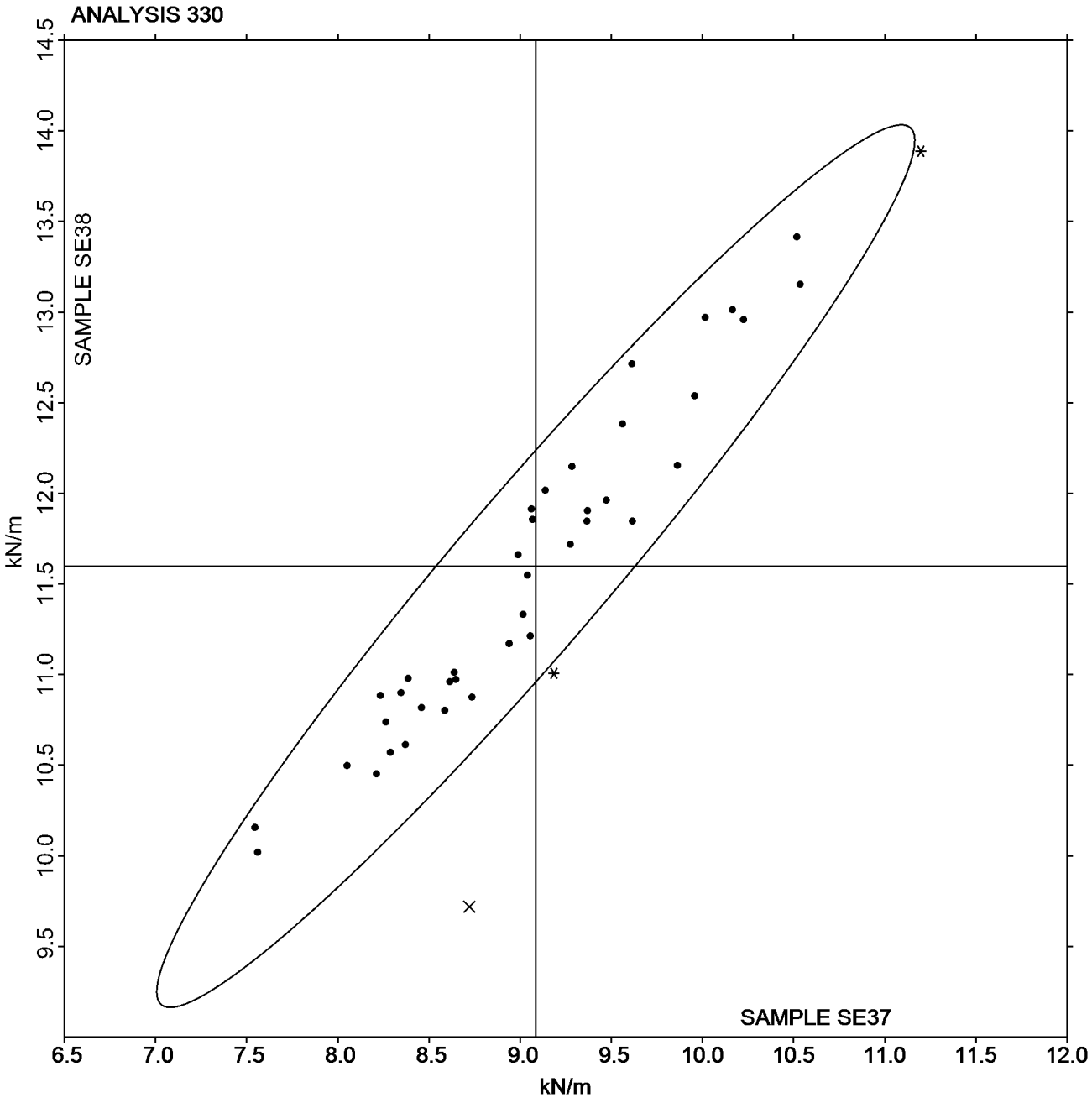
TWHVF9 (X) - Data for both samples are high. Possible Systematic Error.

Key to Instrument Codes Reported by Participants

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
SA	Shimadzu Autograph AG 2000 A	TA	Thwing-Albert Tensile Tester
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
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		

Grand Mean Sample **SE37** = 9.0854 kN/m

Grand Mean Sample **SE38** = 11.599 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE37 Lab Mean	Sample SE37 Diff from Grand Mean	Sample SE37 CPV	Sample SE38 Lab Mean	Sample SE38 Diff from Grand Mean	Sample SE38 CPV	Instr Code
226L63		89.3	-12.2	-1.06	165.3	-19.8	-0.89	LE
28VVEZ		94.5	-6.9	-0.60	192.2	7.1	0.32	TO
2WCGCX		95.6	-5.9	-0.51	172.3	-12.8	-0.58	IM
3DUUD3		93.5	-8.0	-0.69	176.1	-9.0	-0.41	LH
4HGYLX		112.9	11.5	1.00	181.9	-3.2	-0.15	LA
4QXCN3	X	139.5	38.1	3.31	199.9	14.8	0.67	LH
6A667V	*	129.4	28.0	2.43	244.3	59.2	2.68	TP
6UVFTU		119.8	18.4	1.60	226.2	41.1	1.86	XX
7PVJMZ		113.5	12.0	1.04	192.0	6.9	0.31	XX
7WDUWV		104.9	3.5	0.30	180.7	-4.4	-0.20	TR
8LCMYA		99.4	-2.1	-0.18	191.8	6.7	0.30	IF
8MPGEB		89.8	-11.7	-1.01	168.5	-16.6	-0.75	LW
AMEB9W		95.2	-6.3	-0.55	170.5	-14.6	-0.66	IN
ANQ2FF		91.4	-10.1	-0.88	160.5	-24.6	-1.11	LH
B6AGUV		93.2	-8.2	-0.72	177.2	-7.9	-0.36	IM
CLGVT6		103.8	2.3	0.20	182.0	-3.1	-0.14	LE
CUPATL		109.0	7.6	0.66	191.8	6.7	0.30	TH
CZU97W		106.2	4.8	0.42	196.0	10.9	0.49	TO
EWQ6FL		100.8	-0.7	-0.06	181.4	-3.7	-0.17	XX
F7TWBT		116.3	14.8	1.29	209.6	24.5	1.11	TA
FKRXNU		112.6	11.1	0.97	215.3	30.2	1.37	TH
GBM4FN		92.0	-9.5	-0.82	165.8	-19.3	-0.87	XX
GMVTC4		112.9	11.5	1.00	226.2	41.1	1.86	IK
JHRY7X		105.5	4.1	0.35	186.0	0.8	0.04	LA
JUJMXR		103.5	2.1	0.18	211.5	26.4	1.19	TH
JYKMHH		91.0	-10.4	-0.91	178.7	-6.4	-0.29	LW
L2VLK2		92.5	-9.0	-0.78	169.3	-15.8	-0.72	LE
LE2GWC		109.0	7.6	0.66	198.5	13.4	0.60	TO
NPVCCH		103.2	1.8	0.15	202.9	17.7	0.80	TB
PXN4XH	*	67.8	-33.7	-2.93	132.7	-52.4	-2.37	ID
QEAZXB		89.4	-12.0	-1.04	158.5	-26.6	-1.21	SA
TWHVF9		102.7	1.3	0.11	167.5	-17.6	-0.79	LA
VJ6H26		97.8	-3.7	-0.32	187.2	2.0	0.09	LH
W7QYR9		102.9	1.4	0.12	161.0	-24.1	-1.09	TO
WNXURU		90.8	-10.7	-0.93	175.0	-10.1	-0.46	LE
WT6H4B		96.3	-5.1	-0.45	163.2	-21.9	-0.99	IN
XNPAFB		121.3	19.8	1.72	211.8	26.6	1.21	XX
Y6BEZA		109.7	8.2	0.72	184.9	-0.3	-0.01	LA
YL3676		95.8	-5.6	-0.49	177.9	-7.2	-0.32	LA

Summary Statistics

	Sample SE37	Sample SE38
Grand Means	101.46 Joules/sq m	185.11 Joules/sq m
SD Btwn Labs	11.51 Joules/sq m	22.11 Joules/sq m

Statistics based on 38 of 39 reporting participants

4QXCN3 (X) - Data for sample SE37 are high. Inconsistent within the determinations of sample SE37.

Analysis Notes:

28VVEZ - Data appear to be reported as ft-lb/sq ft, not inch-lb/sq inch as indicated on datasheet. Units corrected by CTS.

6A667V - Data appear to be reported as ft-lb/sq ft, not J/sq m as indicated on datasheet. Units corrected by CTS.

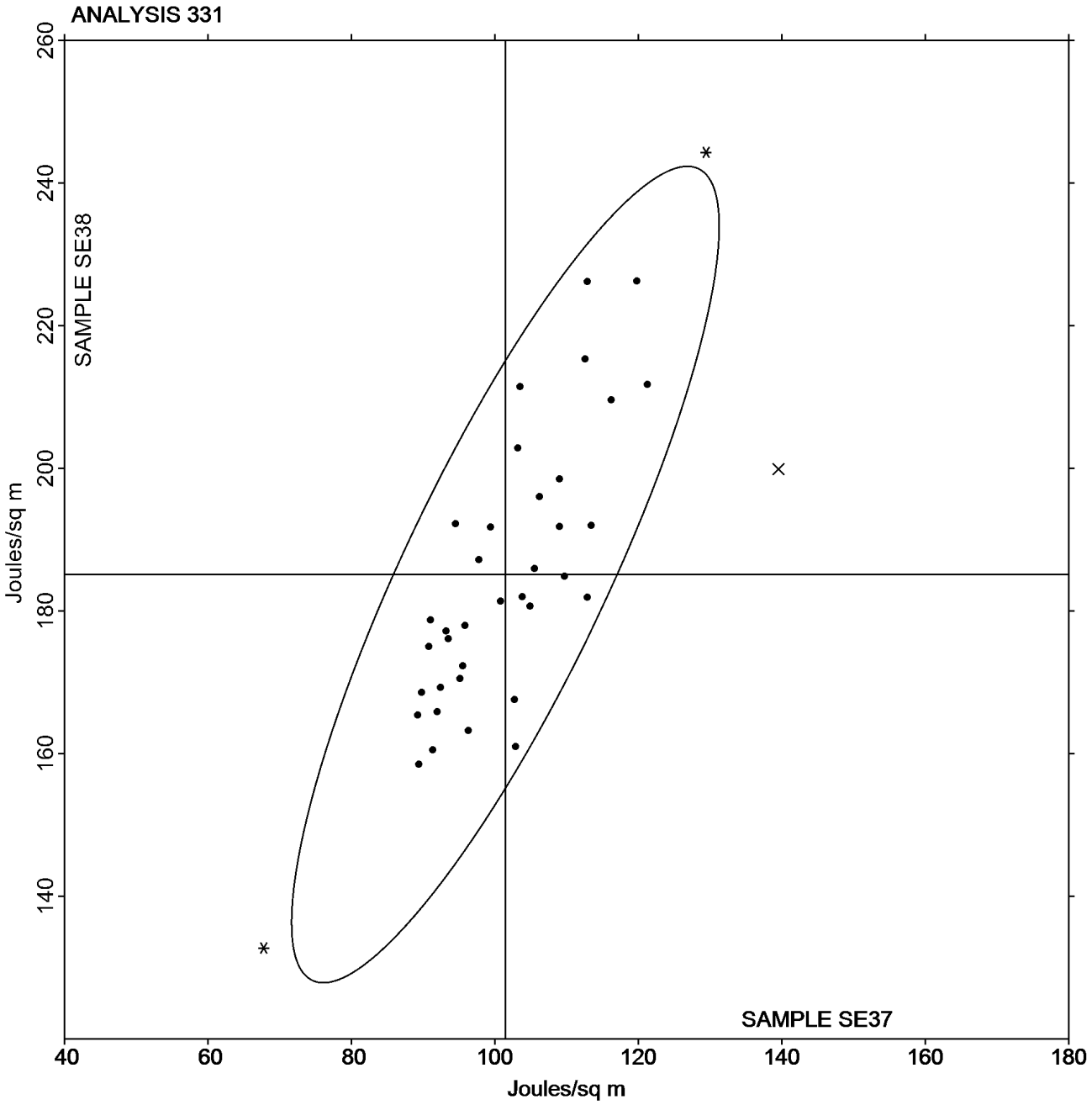
6UVFTU - Data appear to be reported as ft-lb/sq ft, not inch-lb/sq inch as indicated on datasheet. Units corrected by CTS.

Key to Instrument Codes Reported by Participants

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	SA	Shimadzu Autograph AG 2000 A
TA	Thwing-Albert Tensile Tester	TB	Thwing-Albert EJA/1000
TH	Thwing-Albert QC-3A	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		

Grand Mean Sample **SE37** = 101.46 Joules/sq m

Grand Mean Sample **SE38** = 185.11 Joules/sq m



Paper & Paperboard Interlaboratory Testing Program

Analysis 332

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE37 Lab Mean	Sample SE37 Diff from Grand Mean	Sample SE37 CPV	Sample SE38 Lab Mean	Sample SE38 Diff from Grand Mean	Sample SE38 CPV	Instr Code
226L63		1.639	-0.117	-0.65	2.321	-0.106	-0.47	LE
28VVEZ		1.593	-0.163	-0.90	2.365	-0.062	-0.27	TO
2WCGCX		1.987	0.231	1.28	2.644	0.217	0.97	IM
3DUUD3		1.610	-0.146	-0.81	2.275	-0.152	-0.68	LH
4HGYLX		1.681	-0.075	-0.42	2.134	-0.293	-1.31	LA
4QXCN3		1.848	0.092	0.51	2.343	-0.084	-0.37	LH
6A667V		1.620	-0.136	-0.75	2.370	-0.057	-0.25	TP
6UVFTU		1.982	0.226	1.25	2.776	0.349	1.56	XX
7PVJMZ		1.470	-0.286	-1.59	2.100	-0.327	-1.46	XX
7WDUWV		1.834	0.078	0.44	2.487	0.060	0.27	TR
8LCMYA		1.765	0.009	0.05	2.466	0.039	0.18	IF
8MPGEB		1.609	-0.147	-0.81	2.300	-0.127	-0.56	LW
9ZQCBH		1.734	-0.022	-0.12	2.477	0.050	0.22	TB
AMEB9W		1.680	-0.076	-0.42	2.378	-0.049	-0.22	IN
ANQ2FF		1.660	-0.096	-0.53	2.180	-0.247	-1.10	LH
B6AGUV		1.908	0.152	0.84	2.688	0.261	1.17	IM
CLGVT6		1.761	0.005	0.03	2.395	-0.032	-0.14	LE
CUPATL		2.149	0.393	2.18	2.901	0.474	2.12	TH
CZU97W		1.825	0.069	0.38	2.559	0.132	0.59	TO
EWQ6FL		1.882	0.126	0.70	2.602	0.175	0.78	XX
F7TWBT		1.769	0.013	0.07	2.515	0.088	0.39	TA
FKRXNU		1.899	0.143	0.79	2.622	0.195	0.87	TH
GBM4FN		1.619	-0.137	-0.76	2.253	-0.174	-0.77	XX
GMVTC4		1.943	0.187	1.04	2.901	0.475	2.12	IK
JHRY7X		1.605	-0.151	-0.84	2.191	-0.236	-1.05	LA
JUJMXR		1.841	0.085	0.47	2.659	0.232	1.04	TH
JYKMHH		1.511	-0.245	-1.36	2.240	-0.187	-0.83	LW
L2VLK2		1.568	-0.188	-1.04	2.232	-0.195	-0.87	LE
LE2GWC		1.950	0.194	1.08	2.640	0.213	0.95	TO
NPVCCH		1.715	-0.041	-0.23	2.590	0.163	0.73	TB
PXN4XH		1.525	-0.231	-1.28	2.125	-0.302	-1.35	ID
QEAZXB		1.709	-0.047	-0.26	2.353	-0.074	-0.33	SA
R4KKJ8		1.610	-0.146	-0.81	2.344	-0.083	-0.37	ID
TWHVF9	*	2.052	0.296	1.64	2.494	0.067	0.30	XX
VJ6H26		1.660	-0.096	-0.53	2.354	-0.073	-0.32	LH
W7QYR9		1.799	0.043	0.24	2.242	-0.185	-0.82	TO
WNXURU		1.604	-0.152	-0.84	2.359	-0.068	-0.30	LE
WT6H4B	*	2.150	0.394	2.18	2.640	0.213	0.95	IN
XNPAFB		2.090	0.334	1.85	2.791	0.364	1.63	XX
Y6BEZA		1.521	-0.235	-1.30	1.917	-0.510	-2.27	LA

Paper & Paperboard Interlaboratory Testing Program

Analysis 332

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE37 Lab Mean	Sample SE37 Diff from Grand Mean	Sample SE37 CPV	Sample SE38 Lab Mean	Sample SE38 Diff from Grand Mean	Sample SE38 CPV	Instr Code
YL3676		1.615	-0.141	-0.78	2.269	-0.158	-0.70	XX

Summary Statistics

	Sample SE37	Sample SE38
Grand Means	1.7559 Percent	2.4266 Percent
SD Btwn Labs	0.1804 Percent	0.2241 Percent

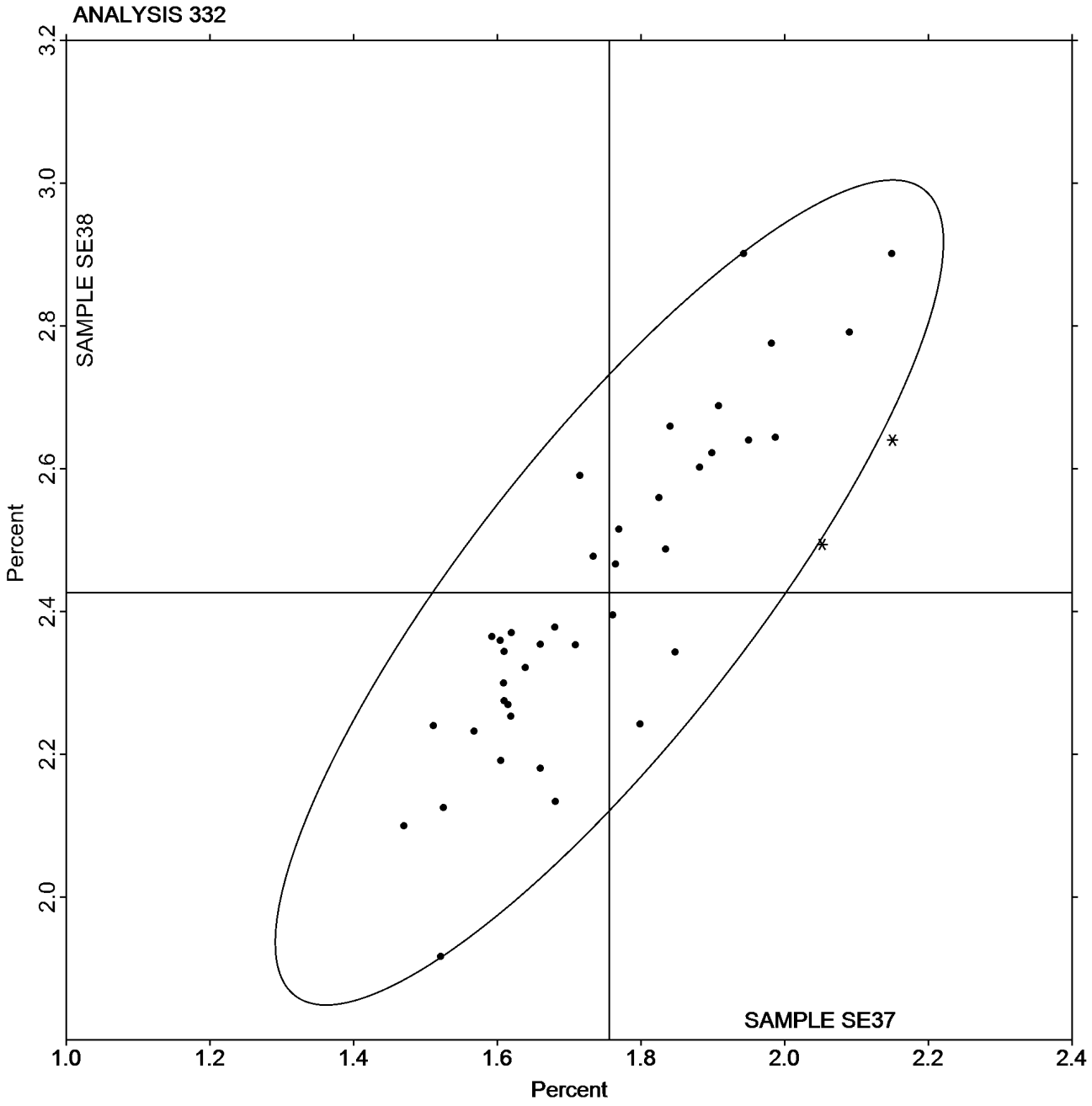
Statistics based on 41 of 41 reporting participants

Key to Instrument Codes Reported by Participants

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	SA	Shimadzu Autograph AG 2000 A
TA	Thwing-Albert Tensile Tester	TB	Thwing-Albert EJA/1000
TH	Thwing-Albert QC-3A	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		

Grand Mean Sample **SE37** = 1.7559 Percent

Grand Mean Sample **SE38** = 2.4266 Percent



Paper & Paperboard Interlaboratory Testing Program

Report #285S
November 2016

Analysis 334
Folding Endurance (MIT) - Double Folds
TAPPI Official Test Method T511

WebCode	Data Flag	Sample SG37 Lab Mean	Sample SG37 Diff from Grand Mean	Sample SG37 CPV	Sample SG38 Lab Mean	Sample SG38 Diff from Grand Mean	Sample SG38 CPV	Instr Code
2F76YM		290.7	35.2	0.39	250.6	48.9	0.78	MT
3HQ97K		417.3	161.8	1.81	274.8	73.1	1.16	MT
6YQVT4		205.8	-49.7	-0.56	187.3	-14.4	-0.23	XX
8JMFED		377.3	121.8	1.36	284.3	82.6	1.31	MT
8KFBY2		198.3	-57.2	-0.64	164.5	-37.2	-0.59	MT
8MPGEB		138.5	-117.0	-1.31	127.8	-73.9	-1.17	MT
9ZQCBH		140.5	-115.0	-1.29	122.2	-79.5	-1.26	MT
A8MQBA	*	227.9	-27.6	-0.31	275.1	73.4	1.17	MT
CUPATL		177.5	-78.0	-0.87	152.5	-49.2	-0.78	MT
EETRX8		313.0	57.5	0.64	203.3	1.6	0.03	MT
ERE728		170.0	-85.5	-0.96	112.0	-89.7	-1.42	XX
EWQ6FL		358.8	103.3	1.16	275.8	74.1	1.18	MT
HHV7RE		202.2	-53.3	-0.60	134.0	-67.7	-1.07	MT
WPRJU3		319.4	63.9	0.72	236.4	34.7	0.55	MT
ZZZJXL		296.0	40.5	0.45	224.2	22.5	0.36	MT

Summary Statistics

	Sample SG37	Sample SG38
Grand Means	255.55 Double Folds	201.65 Double Folds
SD Btwn Labs	89.29 Double Folds	63.00 Double Folds

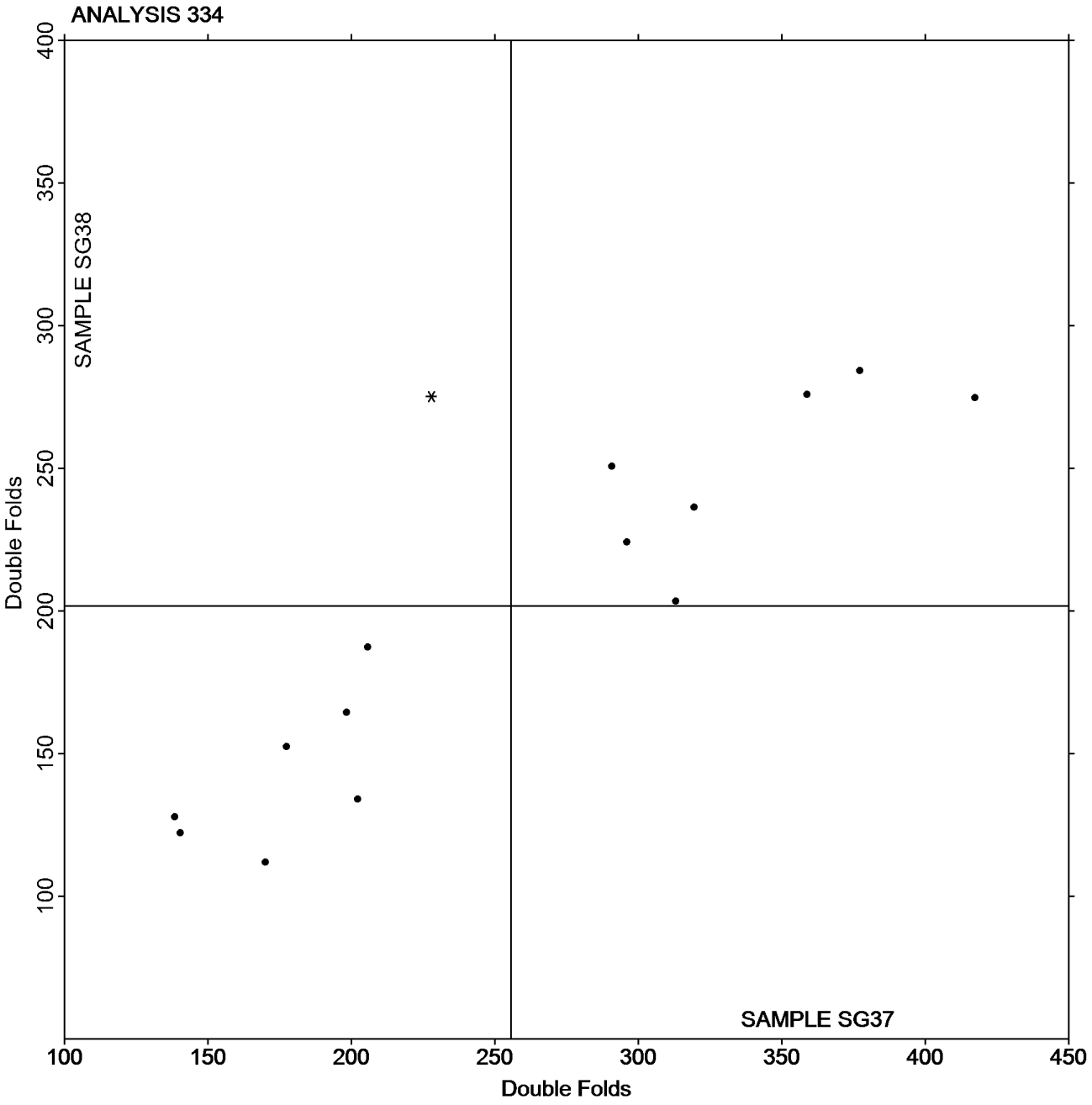
Statistics based on 15 of 15 reporting participants

Key to Instrument Codes Reported by Participants

MT	MIT - Tinius Olsen	XX	Instrument make/model not specified by lab

Grand Mean Sample **SG37** = 255.55 Double Folds

Grand Mean Sample **SG38** = 201.65 Double Folds



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 336

Bending Resistance, Gurley Type

TAPPI Official Test Method T543

WebCode	Data Flag	Sample SH37 Lab Mean	Sample SH37 Diff from Grand Mean	Sample SH37 CPV	Sample SH38 Lab Mean	Sample SH38 Diff from Grand Mean	Sample SH38 CPV
2ALZ98		306.9	-23.0	-0.92	286.9	-8.7	-0.38
6YQVT4		313.8	-16.1	-0.65	284.9	-10.7	-0.46
8LCMYA		364.1	34.2	1.37	328.6	32.9	1.42
9HBY2Z		309.7	-20.2	-0.81	273.1	-22.6	-0.97
9ZQCBH		351.3	21.4	0.86	298.6	2.9	0.13
BZFK9B		325.1	-4.8	-0.19	305.4	9.8	0.42
CAKWWT		361.0	31.1	1.25	322.1	26.5	1.14
CBR7TW		355.2	25.3	1.01	297.5	1.8	0.08
EETRX8		324.9	-5.0	-0.20	290.3	-5.4	-0.23
EWQ6FL		343.2	13.2	0.53	322.3	26.6	1.15
GFUJYJ		318.3	-11.7	-0.47	280.7	-15.0	-0.65
MHZ3CL		325.3	-4.6	-0.19	303.7	8.1	0.35
PX9XKD		366.3	36.4	1.46	308.5	12.8	0.55
TE4CPW		357.4	27.5	1.10	336.9	41.2	1.78
TRQJLX		289.5	-40.4	-1.62	261.7	-33.9	-1.46
UK4FPE		324.6	-5.3	-0.21	317.4	21.8	0.94
V32VRQ		277.4	-52.5	-2.11	259.1	-36.5	-1.57
XBPLA3		344.9	15.0	0.60	293.4	-2.3	-0.10
XUXV49		309.4	-20.5	-0.82	264.0	-31.6	-1.36
YMB3R9		345.2	15.3	0.61	310.8	15.2	0.65
ZZZJXL		314.7	-15.2	-0.61	262.7	-32.9	-1.42

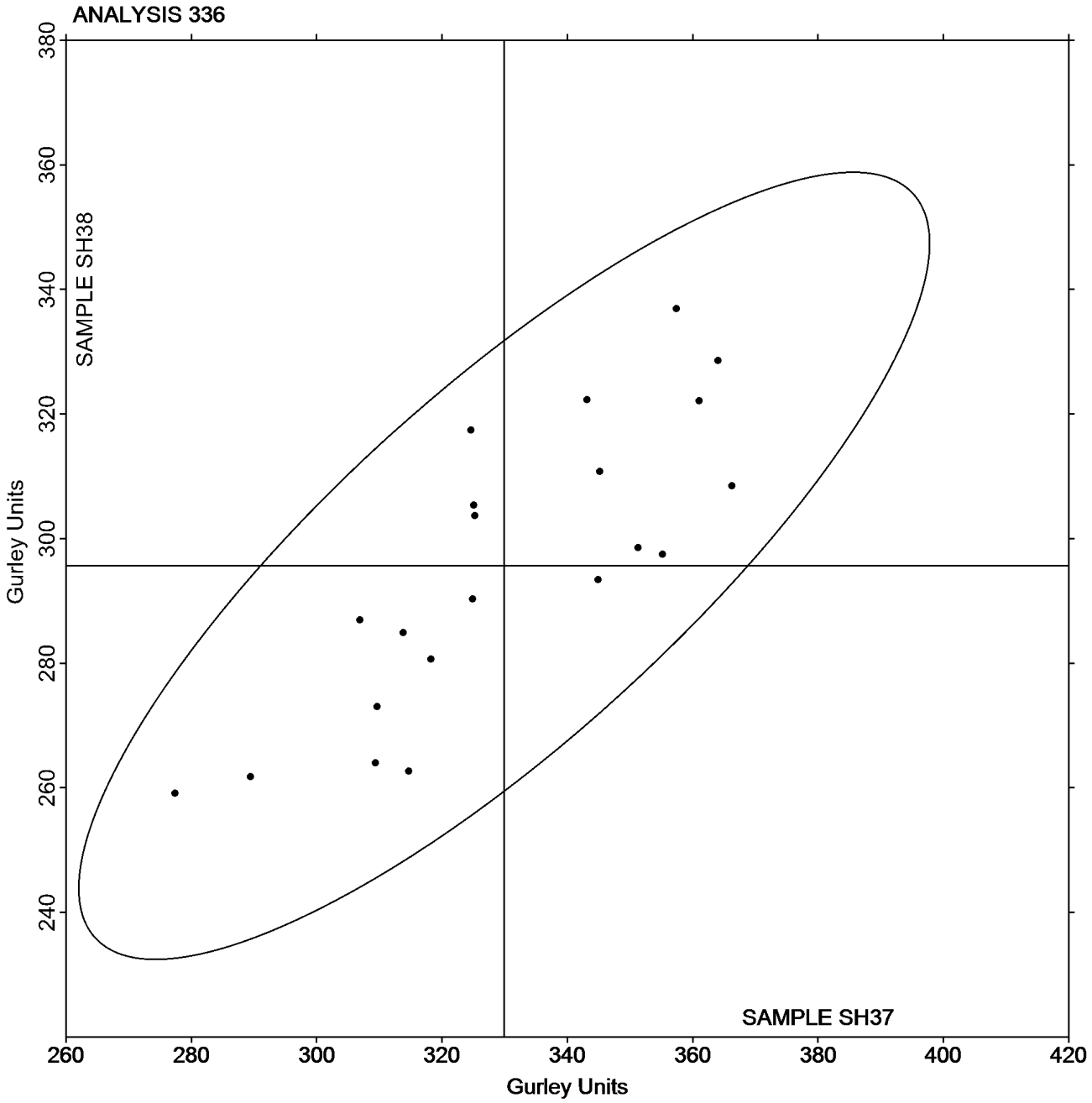
Summary Statistics

	Sample SH37	Sample SH38
Grand Means	329.91 Gurley Units	295.64 Gurley Units
SD Btwn Labs	24.92 Gurley Units	23.19 Gurley Units

Statistics based on 21 of 21 reporting participants

Grand Mean Sample **SH37** = 329.91 Gurley Units

Grand Mean Sample **SH38** = 295.64 Gurley Units



Paper & Paperboard Interlaboratory Testing Program

Analysis 338

Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

WebCode	Data Flag	Sample SJ37 Lab Mean	Sample SJ37 Diff from Grand Mean	Sample SJ37 CPV	Sample SJ38 Lab Mean	Sample SJ38 Diff from Grand Mean	Sample SJ38 CPV
2F76YM		4.128	0.132	0.20	4.228	0.119	0.27
6YQVT4		4.980	0.984	1.47	4.890	0.781	1.75
8LCMYA		4.252	0.256	0.38	4.604	0.495	1.11
AMEB9W		5.150	1.154	1.73	4.810	0.701	1.57
AMZWM9		3.386	-0.610	-0.91	3.553	-0.556	-1.24
ERE728		4.324	0.328	0.49	4.131	0.022	0.05
JYKMHH		3.410	-0.586	-0.88	3.610	-0.499	-1.11
PX9XKD		3.967	-0.029	-0.04	3.954	-0.155	-0.35
QGT2UJ		2.598	-1.398	-2.09	3.765	-0.344	-0.77
R2W7WH		3.928	-0.068	-0.10	3.766	-0.343	-0.77
TRQJLX		3.593	-0.404	-0.60	3.667	-0.442	-0.99
XBPLA3		4.150	0.154	0.23	4.264	0.155	0.35
ZZZJXL		4.087	0.091	0.14	4.174	0.065	0.15

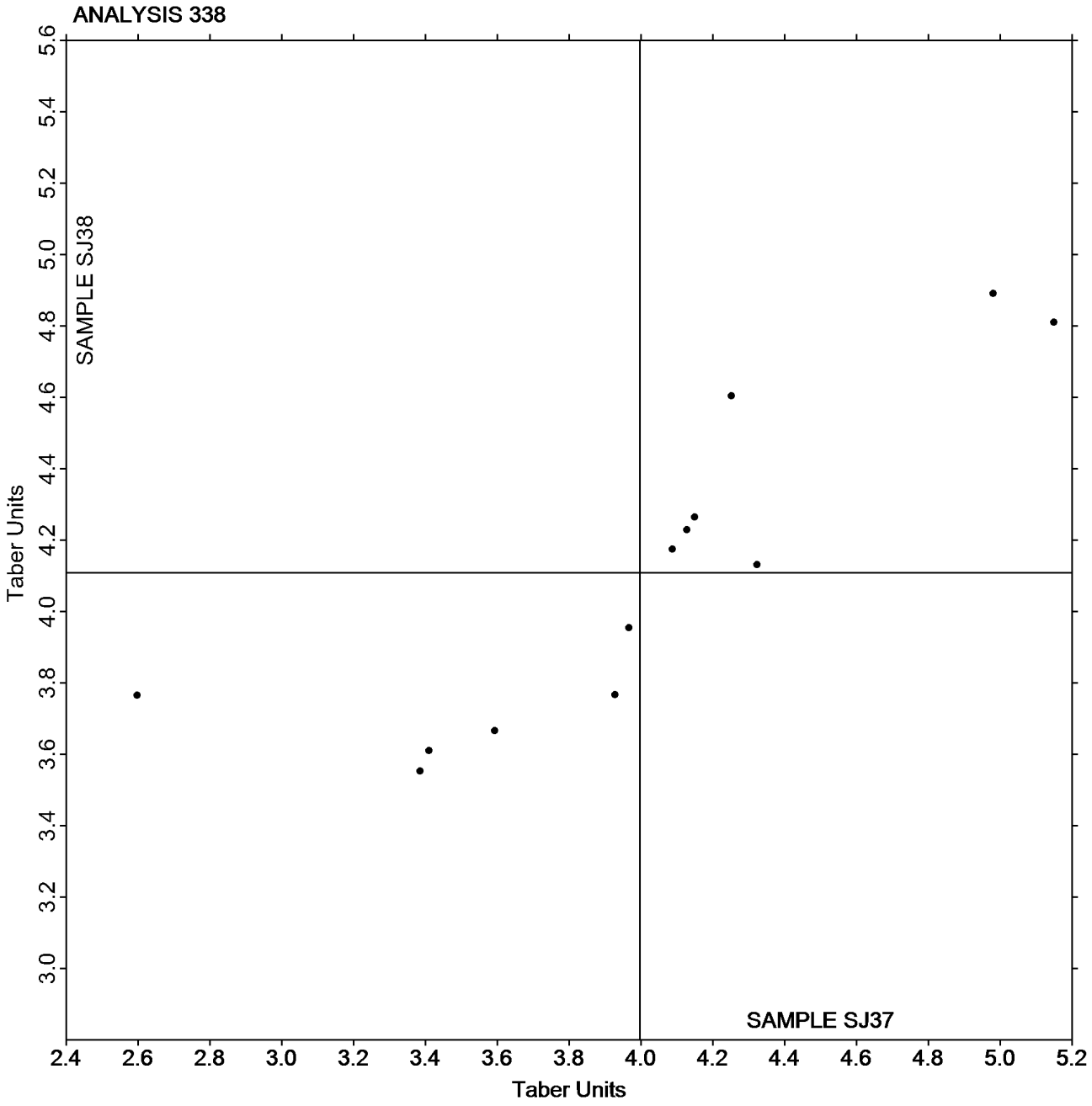
Summary Statistics

	Sample SJ37	Sample SJ38
Grand Means	3.9963 Taber Units	4.1089 Taber Units
SD Btwn Labs	0.6684 Taber Units	0.4475 Taber Units

Statistics based on 13 of 13 reporting participants

Grand Mean Sample **SJ37** = 3.9963 Taber Units

Grand Mean Sample **SJ38** = 4.1089 Taber Units



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 339

Bending Resistance, Taber Type - 10 to 100 Taber Units

TAPPI Official Test Method T489

WebCode	Data Flag	Sample SQ37 Lab Mean	Sample SQ37 Diff from Grand Mean	Sample SQ37 CPV	Sample SQ38 Lab Mean	Sample SQ38 Diff from Grand Mean	Sample SQ38 CPV
3H9FC2		35.00	1.31	0.48	39.90	2.68	1.13
8MPGEB		36.48	2.79	1.02	39.53	2.31	0.98
CLGVT6		38.30	4.61	1.69	35.10	-2.12	-0.90
JHRY7X		35.96	2.27	0.83	38.60	1.38	0.58
JKG3Y6		32.34	-1.35	-0.50	40.57	3.35	1.42
JYKMHH		33.20	-0.49	-0.18	36.95	-0.27	-0.12
KTUERW		29.62	-4.07	-1.49	34.63	-2.59	-1.10
LL7DM4		33.55	-0.14	-0.05	38.40	1.18	0.50
NPVCCH		30.52	-3.17	-1.16	33.59	-3.63	-1.54
VJLQY8		29.88	-3.81	-1.40	34.22	-3.00	-1.27
YQVCHL		34.17	0.47	0.17	38.11	0.88	0.37
ZZZJXL		35.27	1.58	0.58	37.06	-0.16	-0.07

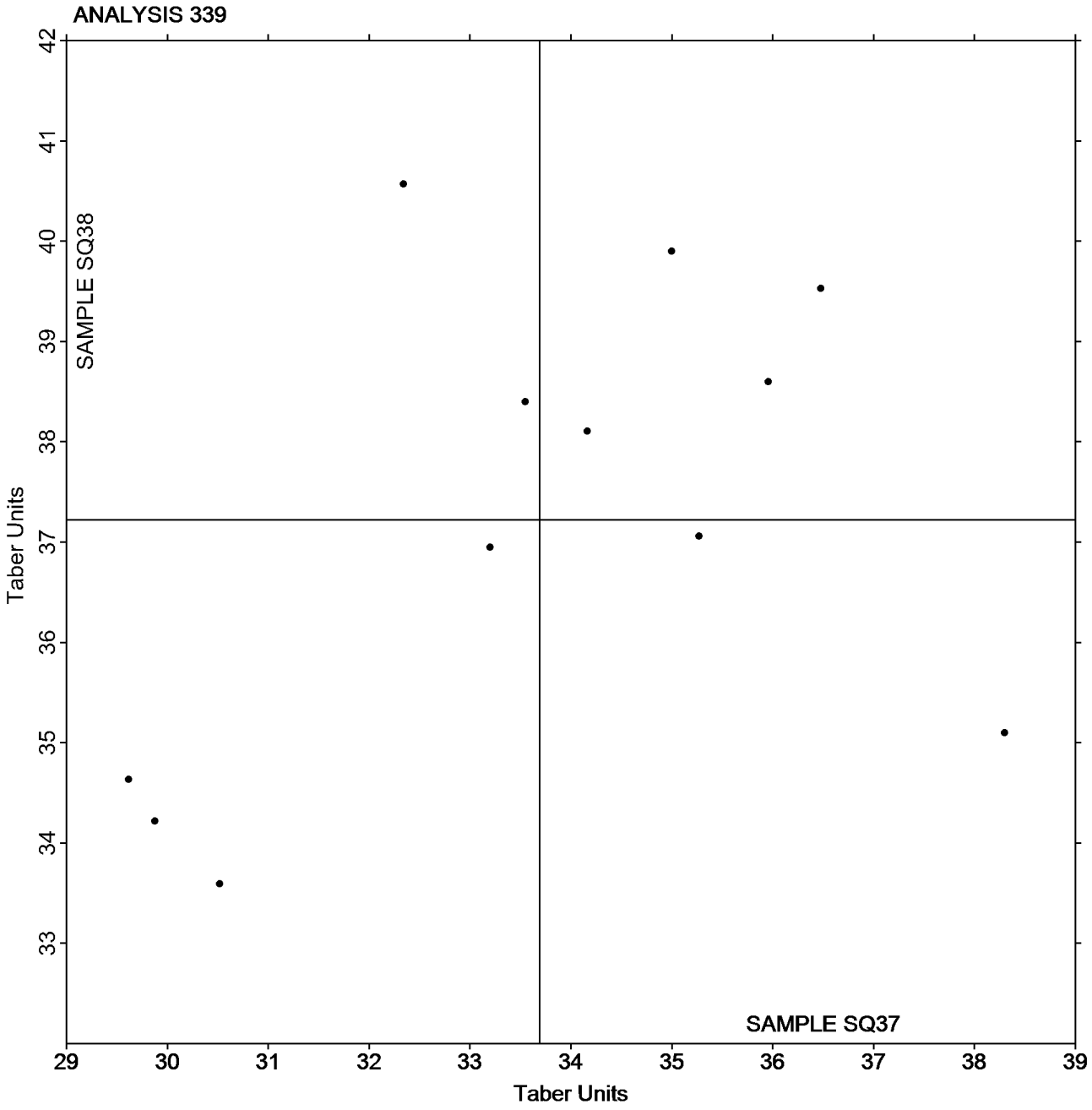
Summary Statistics

	Sample SQ37	Sample SQ38
Grand Means	33.690 Taber Units	37.222 Taber Units
SD Btwn Labs	2.728 Taber Units	2.360 Taber Units

Statistics based on 12 of 12 reporting participants

Grand Mean Sample **SQ37** = 33.690 Taber Units

Grand Mean Sample **SQ38** = 37.222 Taber Units



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 340

nding Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboc

TAPPI Official Test Method T489

WebCode	Data Flag	Sample ST37 Lab Mean	Sample ST37 Diff from Grand Mean	Sample ST37 CPV	Sample ST38 Lab Mean	Sample ST38 Diff from Grand Mean	Sample ST38 CPV
2ECGD7		320.2	30.5	1.91	265.4	22.3	1.51
3KXMWY	X	123.1	-166.6	-10.42	97.9	-145.3	-9.86
6A667V		272.0	-17.7	-1.11	230.8	-12.4	-0.84
76ME2C		292.8	3.1	0.20	240.9	-2.2	-0.15
8MPGEB		298.0	8.3	0.52	251.8	8.7	0.59
8TQVZC		303.6	13.9	0.87	246.8	3.7	0.25
CUPATL		310.3	20.6	1.29	263.5	20.4	1.38
EWQ6FL		279.8	-9.9	-0.62	233.9	-9.3	-0.63
G9EV74		288.3	-1.4	-0.09	238.2	-4.9	-0.33
H33BEN		285.6	-4.1	-0.26	235.6	-7.5	-0.51
JYKMHH		292.5	2.8	0.18	251.0	7.9	0.53
KZNNUE		257.6	-32.1	-2.01	203.2	-39.9	-2.71
M2B7MC		300.7	11.0	0.69	252.7	9.6	0.65
QEAZXB		268.4	-21.3	-1.33	234.4	-8.7	-0.59
T8JEYN		279.1	-10.6	-0.66	253.4	10.3	0.70
TYNF39		297.0	7.3	0.46	245.0	1.9	0.13
YQVCHL		289.2	-0.5	-0.03	243.5	0.3	0.02

Summary Statistics

	Sample ST37	Sample ST38
Grand Means	289.68 Taber Units	243.12 Taber Units
SD Btwn Labs	15.99 Taber Units	14.74 Taber Units

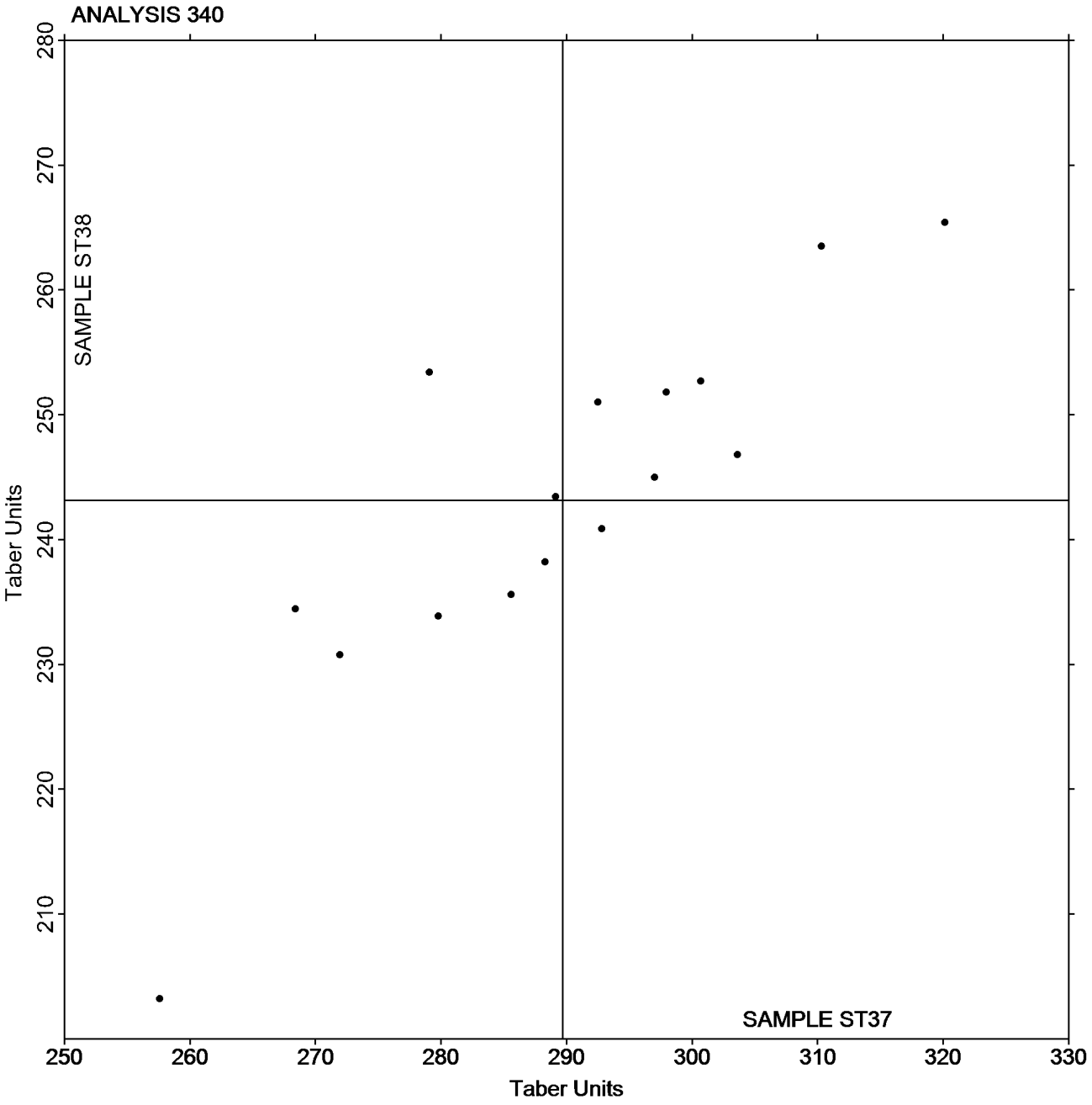
Statistics based on 16 of 17 reporting participants

Comments on Assigned Data Flags for Test #340

3KXMWY (X) - Extreme Data.

Grand Mean Sample **ST37** = 289.68 Taber Units

Grand Mean Sample **ST38** = 243.12 Taber Units



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 343
Z-Direction Tensile
TAPPI Official Test Method T541

WebCode	Data Flag	Sample SM37 Lab Mean	Sample SM37 Diff from Grand Mean	Sample SM37 CPV	Sample SM38 Lab Mean	Sample SM38 Diff from Grand Mean	Sample SM38 CPV	Instr Code
2F76YM		51.30	-17.13	-2.40	61.90	-32.44	-2.33	CD
3KXMWY		81.54	13.11	1.84	96.56	2.22	0.16	CA
4W3AFF		68.46	0.03	0.00	91.64	-2.70	-0.19	XX
6A667V		63.99	-4.44	-0.62	83.66	-10.68	-0.77	LX
8LCMYA		72.35	3.93	0.55	99.08	4.74	0.34	TL
8MPGEB		67.90	-0.53	-0.07	103.76	9.42	0.68	LW
CLGVT6		66.80	-1.63	-0.23	101.00	6.66	0.48	TA
CUPATL		67.84	-0.59	-0.08	94.04	-0.30	-0.02	LW
F9YECA		72.94	4.51	0.63	113.56	19.22	1.38	LW
JDEX4E		58.14	-10.29	-1.44	79.98	-14.36	-1.03	LW
KTUERW		72.62	4.19	0.59	112.13	17.79	1.28	LW
LE2GWC		72.00	3.57	0.50	83.00	-11.34	-0.82	TA
LRQCFW		67.70	-0.73	-0.10	75.80	-18.54	-1.33	XX
NPVCCH		79.73	11.31	1.58	105.12	10.77	0.77	TA
R4M937		64.70	-3.73	-0.52	101.96	7.62	0.55	XX
YQEXEH		70.20	1.77	0.25	109.00	14.66	1.05	TA
ZZZJXL		65.04	-3.39	-0.47	91.64	-2.70	-0.19	TZ

Summary Statistics

	Sample SM37	Sample SM38
Grand Means	68.427 psi	94.343 psi
SD Btwn Labs	7.146 psi	13.909 psi

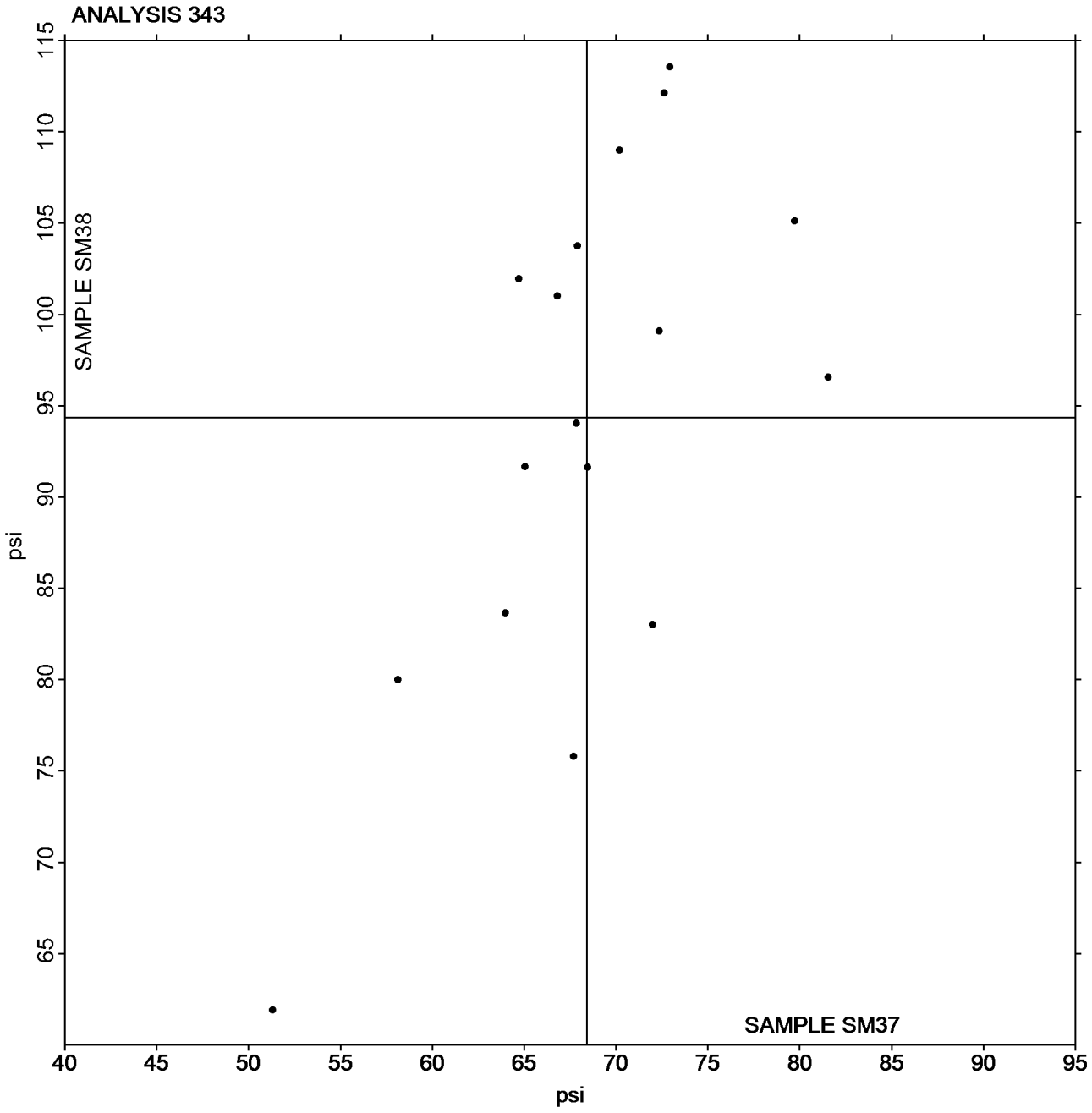
Statistics based on 17 of 17 reporting participants

Key to Instrument Codes Reported by Participants

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

Grand Mean Sample **SM37** = 68.427 psi

Grand Mean Sample **SM38** = 94.343 psi



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 345
Z-Direction Tensile, Recycled Paperboard
TAPPI Official Test Method T541

WebCode	Data Flag	Sample SZ37 Lab Mean	Sample SZ37 Diff from Grand Mean	Sample SZ37 CPV	Sample SZ38 Lab Mean	Sample SZ38 Diff from Grand Mean	Sample SZ38 CPV	Instr Code
2ECGD7		37.90	2.43	0.71	47.18	6.01	1.53	TA
4HGYLX		33.97	-1.50	-0.44	41.08	-0.09	-0.02	TA
8TQVZC		37.20	1.73	0.50	43.20	2.03	0.52	CA
D6LUEB		33.26	-2.21	-0.64	37.60	-3.57	-0.91	DP
EWQ6FL		35.00	-0.47	-0.14	41.60	0.43	0.11	CA
G9EV74		36.60	1.13	0.33	40.80	-0.37	-0.09	CA
GMVTC4		44.28	8.81	2.57	49.37	8.20	2.09	PG
H33BEN		32.42	-3.05	-0.89	39.70	-1.47	-0.37	TL
KZNNUE		30.18	-5.29	-1.54	34.58	-6.59	-1.68	TL
L7QA3U		37.04	1.57	0.46	42.60	1.43	0.36	CD
PWRTX9		38.90	3.43	1.00	44.00	2.83	0.72	CA
T8JEYN		37.12	1.65	0.48	42.04	0.87	0.22	CD
XKAR78		31.38	-4.09	-1.19	40.36	-0.81	-0.21	LW
YQVCHL		33.34	-2.13	-0.62	37.00	-4.17	-1.06	CA
Z29NG2		31.88	-3.59	-1.05	38.40	-2.77	-0.70	LW
Z8F4ZX		37.59	2.12	0.62	44.78	3.61	0.92	CH
ZNMAE3		34.88	-0.59	-0.17	35.58	-5.59	-1.42	LW

Summary Statistics

	Sample SZ37	Sample SZ38
Grand Means	35.467 psi	41.169 psi
SD Btwn Labs	3.432 psi	3.929 psi

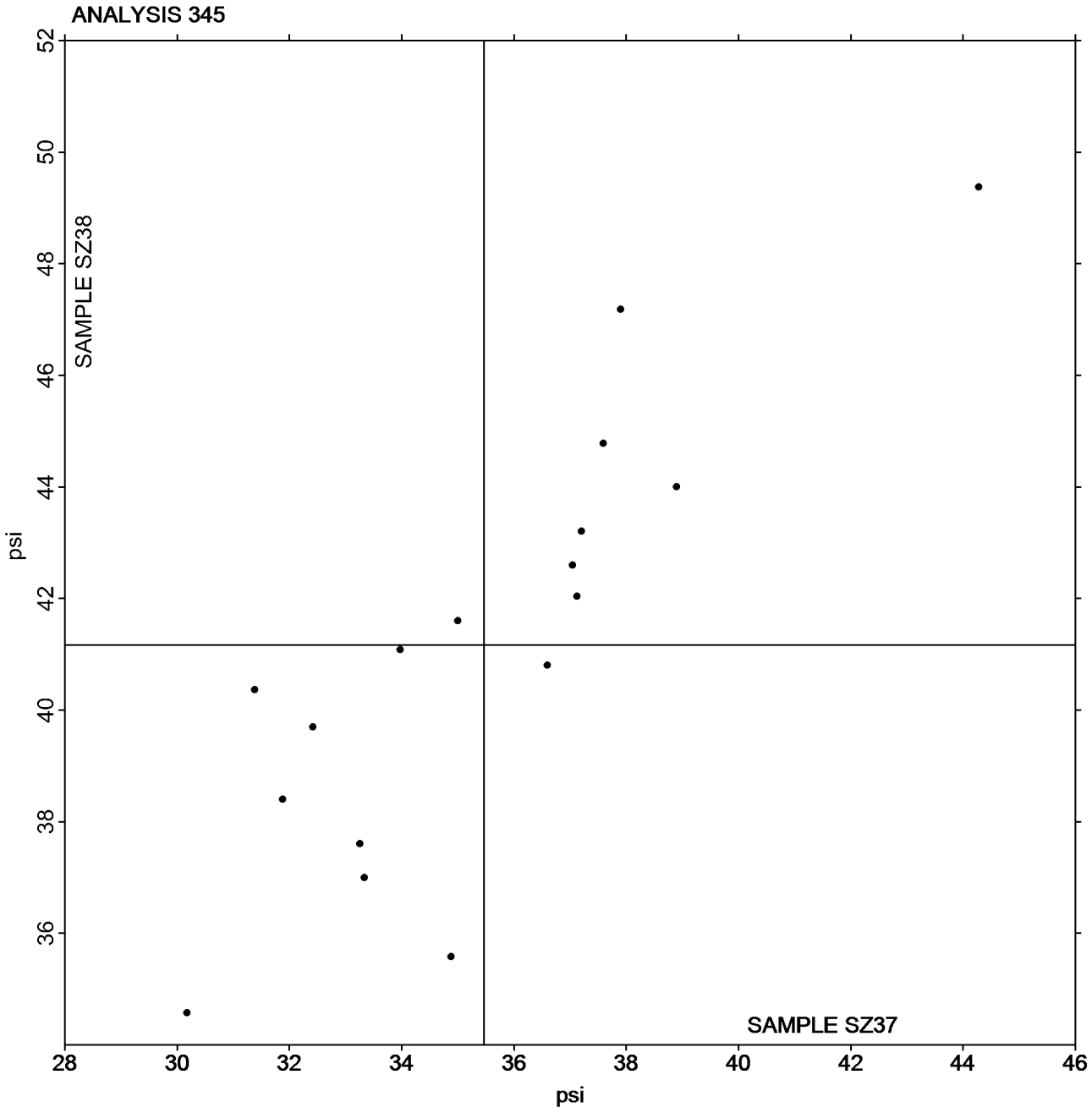
Statistics based on 17 of 17 reporting participants

Key to Instrument Codes Reported by Participants

CA	CSI CS-163	CD	CSI CS-163D
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

Grand Mean Sample **SZ37** = 35.467 psi

Grand Mean Sample **SZ38** = 41.169 psi



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

Paper & Paperboard Interlaboratory Testing Program

Report #285S
November 2016

Analysis 348
Internal Bond Strength - Modified Scott Mechanics
TAPPI Provisional Test Method T569

WebCode	Data Flag	Sample SN37 Lab Mean	Sample SN37 Diff from Grand Mean	Sample SN37 CPV	Sample SN38 Lab Mean	Sample SN38 Diff from Grand Mean	Sample SN38 CPV	Instr Code
28VVEZ		95.6	-7.3	-1.46	146.6	-1.1	-0.07	HY
2F76YM		100.8	-2.1	-0.42	146.6	-1.1	-0.07	HY
6848LU		97.4	-5.5	-1.10	172.4	24.7	1.54	XX
8MPGEB		106.0	3.1	0.61	146.8	-0.9	-0.06	HY
CBR7TW		104.2	1.2	0.24	159.0	11.2	0.70	HZ
CLGVT6		113.0	10.1	2.00	170.0	22.3	1.39	HY
CUPATL	*	96.2	-6.7	-1.34	99.2	-48.5	-3.02	HZ
EETRX8		96.2	-6.7	-1.34	138.6	-9.1	-0.57	HY
EWQ6FL		101.2	-1.7	-0.35	136.6	-11.1	-0.69	HZ
GFUJYJ		104.0	1.1	0.21	136.2	-11.5	-0.72	HY
JKG3Y6		107.6	4.7	0.93	136.0	-11.7	-0.73	HY
KZNNUE		110.0	7.1	1.40	165.2	17.5	1.09	HZ
NPVCCH		100.4	-2.5	-0.50	162.8	15.1	0.94	HZ
PX9XKD		106.5	3.5	0.70	141.8	-5.9	-0.37	KR
TRQJLX		102.5	-0.4	-0.08	147.4	-0.4	-0.02	HY
W7QYR9		102.6	-0.3	-0.07	139.4	-8.3	-0.52	HZ
XUXV49		104.0	1.1	0.21	145.6	-2.1	-0.13	HY
YPGMF9		99.4	-3.5	-0.70	150.4	2.7	0.17	HY
YQEXEH		111.4	8.5	1.68	160.0	12.3	0.76	HY
ZZZJXL		99.8	-3.1	-0.62	153.8	6.1	0.38	HY

Summary Statistics

	Sample SN37	Sample SN38
Grand Means	102.94 1000th ft-lbs	147.72 1000th ft-lbs
SD Btwn Labs	5.04 1000th ft-lbs	16.06 1000th ft-lbs

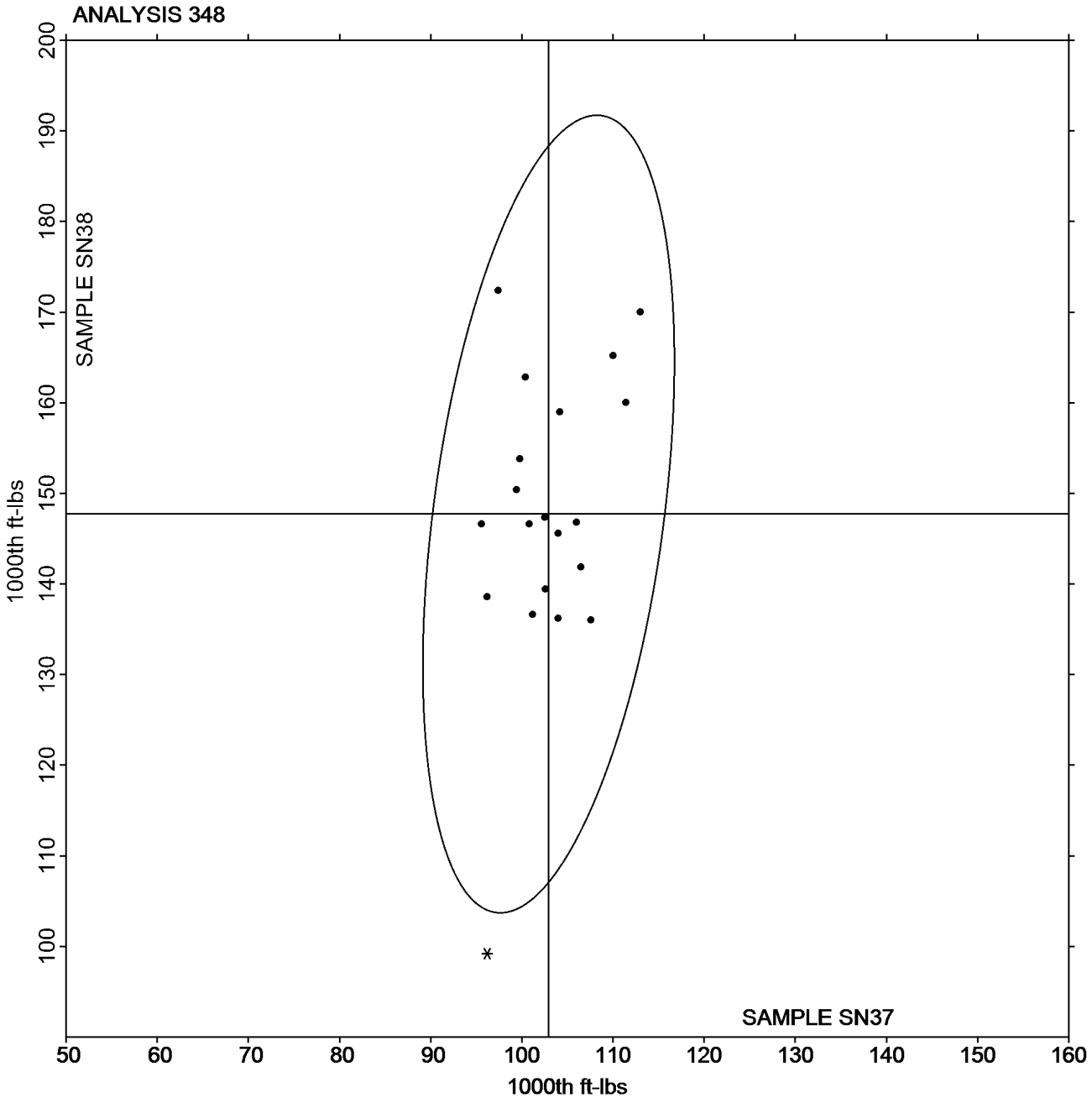
Statistics based on 20 of 20 reporting participants

Key to Instrument Codes Reported by Participants

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

Grand Mean Sample **SN37** = 102.94 1000th ft-lbs

Grand Mean Sample **SN38** = 147.72 1000th ft-lbs



Paper & Paperboard Interlaboratory Testing Program

Analysis 349

Internal Bond Strength - Scott Bond Models

TAPPI Provisional Test Method T569

WebCode	Data Flag	Sample SP37 Lab Mean	Sample SP37 Diff from Grand Mean	Sample SP37 CPV	Sample SP38 Lab Mean	Sample SP38 Diff from Grand Mean	Sample SP38 CPV	Instr Code
3DUUD3		92.78	0.38	0.04	148.4	9.7	0.44	TM
3KCZCV		86.40	-6.00	-0.55	136.2	-2.5	-0.12	SC
3UEHMX		104.20	11.80	1.08	170.2	31.5	1.43	SC
6A667V		64.33	-28.06	-2.57	90.6	-48.1	-2.19	TM
6UVFTU	X	118.20	25.80	2.36	143.4	4.7	0.21	XX
GMVTC4		98.40	6.00	0.55	158.4	19.7	0.90	TM
JYKMHH		97.26	4.86	0.44	143.1	4.3	0.20	XX
NK39KZ		84.99	-7.41	-0.68	115.0	-23.8	-1.08	XX
RYRJF8		99.00	6.60	0.60	144.0	5.3	0.24	XX
UK4FPE		100.60	8.20	0.75	156.8	18.1	0.82	SC
Z8F4ZX		93.60	1.20	0.11	131.6	-7.1	-0.32	TM
ZNMAE3		94.80	2.40	0.22	131.8	-6.9	-0.32	XX

Summary Statistics

	Sample SP37	Sample SP38
Grand Means	92.396 1000th ft-lbs	138.73 1000th ft-lbs
SD Btwn Labs	10.935 1000th ft-lbs	21.98 1000th ft-lbs

Statistics based on 11 of 12 reporting participants

Comments on Assigned Data Flags for Test #349

6UVFTU (X) - Data appear to be off by a factor of .001. Corrected by CTS (x1000).

Key to Instrument Codes Reported by Participants

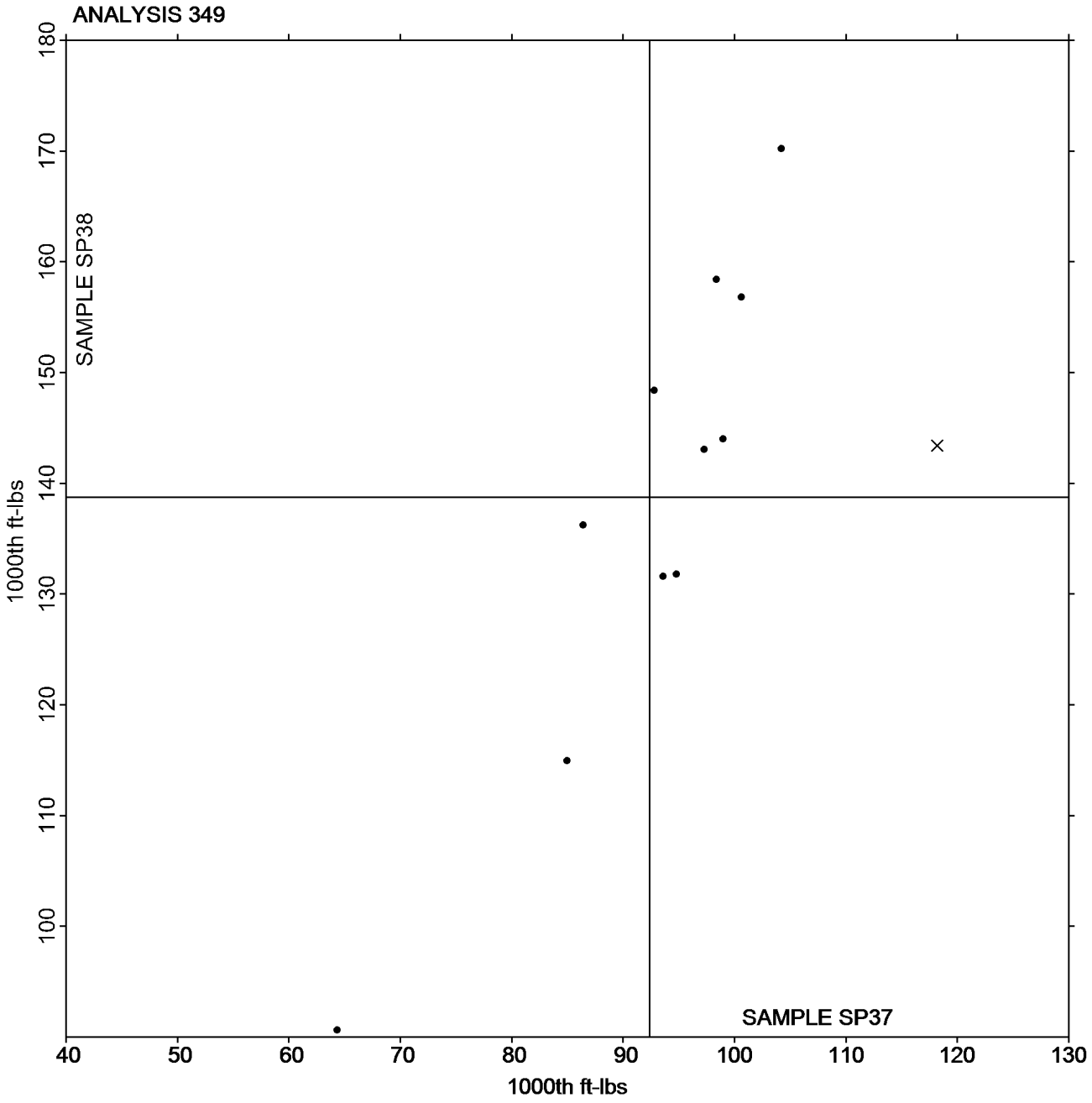
SC Scott Internal Bond Tester (Manual)

TM TMI Monitor/Internal Bond Tester

XX Instrument make/model not specified by lab

Grand Mean Sample **SP37** = 92.396 1000th ft-lbs

Grand Mean Sample **SP38** = 138.73 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.