Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #3211 S - November 2022

Analysis	Analysis Name
305	Bursting Strength - Printing Papers
310	Bursting Strength - Packaging Papers
312	Tearing Strength - Printing Papers
314	Tearing Strength - Packaging Papers
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
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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 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 sectors: including color, rubber, plastics, fasteners and metals, containerboard, paper, agriculture, hemp, 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 100 countries, currently participate in the CTS programs.

If there are any questions on the report or testing program, please contact:

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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 Website. The WebCode for each analysis can be found on the datasheets and in the Performance Analysis Report mailed to each participant.

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

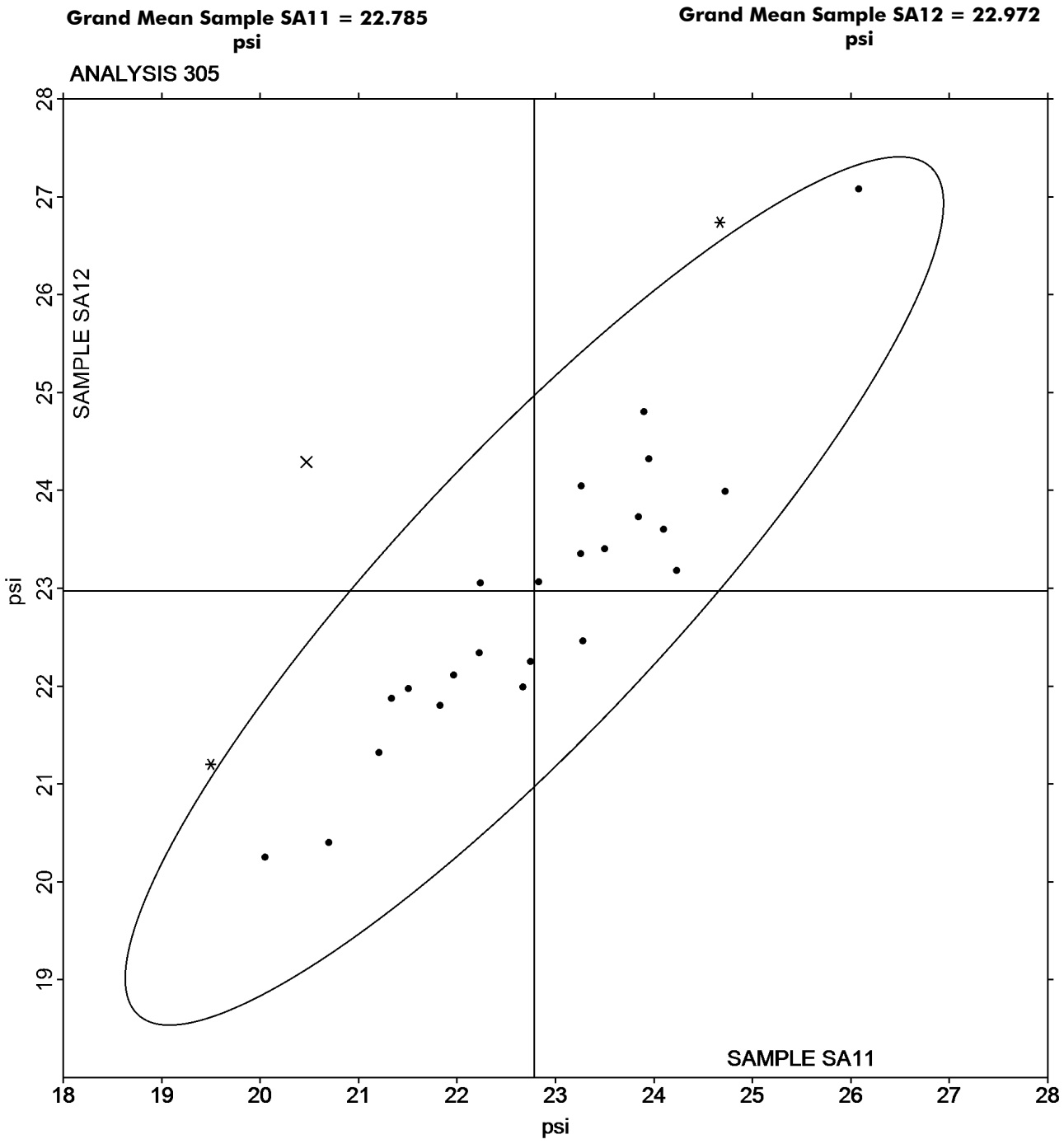
WebCode	Data Flag	Sample SA11 Lab Mean	Sample SA11 Diff from Grand Mean	Sample SA11 CPV	Sample SA12 Lab Mean	Sample SA12 Diff from Grand Mean	Sample SA12 CPV
23YM3J		22.83	0.04	0.03	23.06	0.09	0.05
6D7U79		21.34	-1.45	-0.93	21.87	-1.10	-0.66
6VLG2A		23.95	1.17	0.75	24.32	1.35	0.81
7BVCM4		24.10	1.31	0.85	23.60	0.63	0.38
7EWDPL		23.90	1.11	0.72	24.80	1.83	1.10
86LB4K		20.70	-2.09	-1.34	20.40	-2.57	-1.55
8F6P63		22.67	-0.12	-0.07	21.99	-0.98	-0.59
8N2MUP		22.23	-0.56	-0.36	22.34	-0.63	-0.38
DHDTJL		23.26	0.47	0.30	23.35	0.38	0.23
GHERQ3		21.51	-1.28	-0.82	21.97	-1.00	-0.60
GV9BKV		23.50	0.71	0.46	23.40	0.43	0.26
HZVHKF		22.24	-0.55	-0.35	23.05	0.08	0.05
JAYRAW		21.97	-0.82	-0.52	22.11	-0.86	-0.52
LP2D26	X	20.47	-2.32	-1.49	24.29	1.32	0.79
NBYLC7	*	19.50	-3.29	-2.11	21.20	-1.77	-1.07
NMMQFV		24.23	1.45	0.93	23.18	0.21	0.12
PWDT24		23.28	0.49	0.32	22.46	-0.51	-0.31
PZ9VAQ		23.85	1.06	0.68	23.73	0.76	0.46
QVWUJZ		22.75	-0.04	-0.02	22.25	-0.72	-0.44
R43TBT		20.05	-2.74	-1.76	20.25	-2.72	-1.64
VAF9NU		21.21	-1.58	-1.01	21.32	-1.65	-0.99
VFLGXN		26.08	3.30	2.12	27.08	4.10	2.47
WAEVGR		23.26	0.48	0.31	24.04	1.07	0.64
WQHAXL		21.83	-0.96	-0.62	21.80	-1.17	-0.71
XNNDWC	*	24.67	1.88	1.21	26.74	3.77	2.27
ZTFRPX		24.73	1.94	1.25	23.99	1.01	0.61

Summary Statistics	Sample SA11	Sample SA12
Grand Means	22.79 psi	22.97 psi
Stnd Dev Btwn Labs	1.55 psi	1.66 psi

Statistics based on 25 of 26 reporting participants.

Comments on Assigned Data Flags for Test #305

LP2D26 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SA12.



Paper & Paperboard Interlaboratory Testing Program

Analysis 310

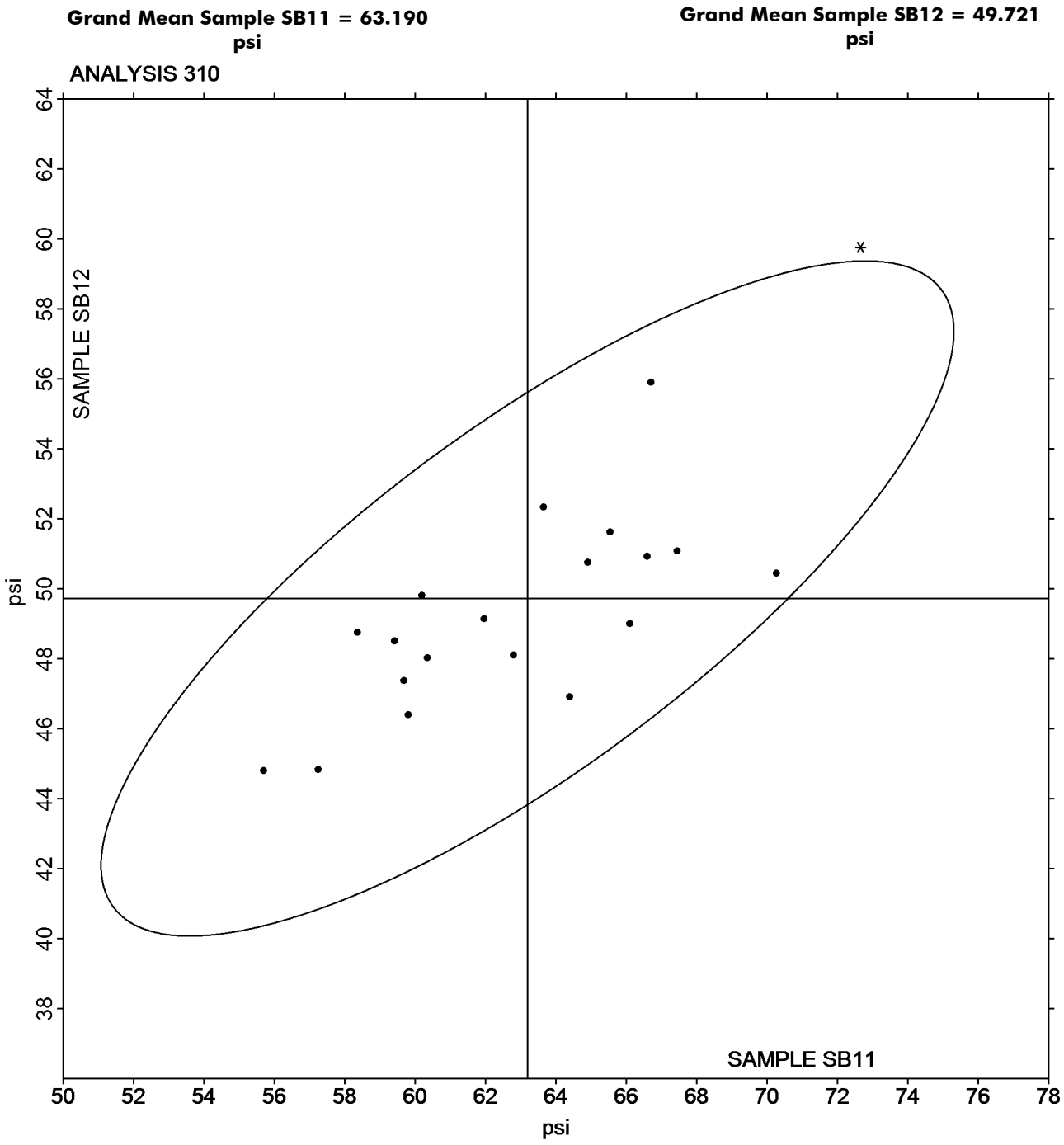
Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

WebCode	Data Flag	Sample SB11 Lab Mean	Sample SB11 Diff from Grand Mean	Sample SB11 CPV	Sample SB12 Lab Mean	Sample SB12 Diff from Grand Mean	Sample SB12 CPV
2W9DRK		60.35	-2.84	-0.64	48.02	-1.70	-0.48
3JEEF9		57.25	-5.94	-1.34	44.83	-4.89	-1.39
6VP3EG		59.80	-3.39	-0.77	46.40	-3.32	-0.94
87FYLF		62.80	-0.39	-0.09	48.10	-1.62	-0.46
9MKVEE		59.69	-3.50	-0.79	47.38	-2.34	-0.67
9W8QFE		58.36	-4.83	-1.09	48.75	-0.97	-0.28
AVUJRC		64.40	1.21	0.27	46.90	-2.82	-0.80
BG7WZQ		66.60	3.41	0.77	50.92	1.20	0.34
FGULB9		70.26	7.07	1.60	50.45	0.73	0.21
GRNL2H		67.44	4.25	0.96	51.08	1.36	0.39
GTHAJD		66.70	3.51	0.79	55.90	6.18	1.75
GUEM77		59.42	-3.77	-0.85	48.50	-1.22	-0.35
NBYLC7		55.70	-7.49	-1.69	44.80	-4.92	-1.40
NMMQFV		61.96	-1.23	-0.28	49.13	-0.59	-0.17
PQKRVJ		60.20	-2.99	-0.68	49.80	0.08	0.02
PX4U3L		63.66	0.47	0.11	52.33	2.61	0.74
TVL68X		65.54	2.35	0.53	51.62	1.90	0.54
WPNLEQ	*	72.65	9.47	2.14	59.76	10.04	2.85
YMAYXN		66.10	2.91	0.66	49.00	-0.72	-0.20
YXV6QL		64.90	1.72	0.39	50.75	1.03	0.29

Summary Statistics	Sample SB11	Sample SB12
Grand Means	63.19 psi	49.72 psi
Stnd Dev Btwn Labs	4.42 psi	3.52 psi

Statistics based on 20 of 20 reporting participants.



Paper & Paperboard Interlaboratory Testing Program

Analysis 312

Tearing Strength - Printing Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SC11 Lab Mean	Sample SC11 Diff from Grand Mean	Sample SC11 CPV	Sample SC12 Lab Mean	Sample SC12 Diff from Grand Mean	Sample SC12 CPV
26MZ4A		52.60	5.32	1.24	50.40	3.08	0.71
2W9DRK		46.90	-0.38	-0.09	47.77	0.46	0.11
3ELE4Y		52.02	4.74	1.10	51.92	4.61	1.07
3M2VYU		56.90	9.62	2.24	56.80	9.48	2.20
4E7DWQ	*	56.74	9.46	2.20	58.54	11.22	2.60
4KRBLD		47.81	0.53	0.12	48.94	1.62	0.38
6D7U79		48.64	1.36	0.32	49.50	2.18	0.51
7BVCM4		48.50	1.22	0.28	48.70	1.38	0.32
7K7E94		46.50	-0.78	-0.18	46.90	-0.42	-0.10
7RZJ26	X	52.60	5.32	1.24	42.40	-4.92	-1.14
87FYLF		40.06	-7.22	-1.68	39.40	-7.92	-1.83
8F6P63		42.26	-5.02	-1.17	42.78	-4.54	-1.05
8N2MUP		46.12	-1.16	-0.27	46.78	-0.54	-0.12
9W8QFE		50.13	2.85	0.66	49.16	1.84	0.43
AVUJRC		50.20	2.92	0.68	48.80	1.48	0.34
AXY6HX		50.46	3.18	0.74	50.39	3.07	0.71
BG7WZQ		44.33	-2.95	-0.69	44.46	-2.86	-0.66
BZW6VZ		47.82	0.54	0.13	46.36	-0.96	-0.22
CUN4CG		37.73	-9.55	-2.22	38.58	-8.74	-2.02
GHERQ3		50.04	2.76	0.64	50.13	2.81	0.65
GV9BKV		50.43	3.15	0.73	48.60	1.28	0.30
HZVHKF		50.40	3.12	0.73	50.40	3.08	0.71
JAYRAW		48.46	1.18	0.27	46.50	-0.82	-0.19
JDFHQ9		53.96	6.68	1.55	55.56	8.24	1.91
JF7LGU		47.08	-0.20	-0.05	47.34	0.02	0.00
L6U7NQ		44.06	-3.22	-0.75	45.04	-2.28	-0.53
LP2D26		42.10	-5.18	-1.20	43.60	-3.72	-0.86
MFP9CX		42.60	-4.68	-1.09	43.80	-3.52	-0.81
NLT3XZ		43.04	-4.24	-0.99	42.56	-4.76	-1.10
NMMQFV		47.37	0.09	0.02	47.57	0.25	0.06
PX4U3L		50.96	3.68	0.86	51.12	3.80	0.88
REHK2N		49.08	1.80	0.42	49.66	2.34	0.54
RJYFUM		43.52	-3.76	-0.87	43.82	-3.50	-0.81
VAF9NU		47.44	0.16	0.04	48.22	0.90	0.21
VFLGXN		42.36	-4.92	-1.14	41.70	-5.62	-1.30
WAEVGR		45.56	-1.72	-0.40	44.80	-2.52	-0.58
WQHAXL		48.91	1.63	0.38	48.39	1.07	0.25
XNNDWC	X	51.55	4.27	0.99	46.55	-0.77	-0.18
YMAYXN		41.83	-5.45	-1.27	42.96	-4.36	-1.01
YR49BN	X	49.12	1.84	0.43	42.72	-4.60	-1.07

WebCode	Data Flag	Sample SC11 Lab Mean	Sample SC11 Diff from Grand Mean	Sample SC11 CPV	Sample SC12 Lab Mean	Sample SC12 Diff from Grand Mean	Sample SC12 CPV
YXV6QL		45.76	-1.52	-0.35	45.92	-1.40	-0.32
ZTFRPX		43.20	-4.08	-0.95	41.55	-5.77	-1.34

Summary Statistics	Sample SC11	Sample SC12
Grand Means	47.28 Grams	47.32 Grams
Stnd Dev Btwn Labs	4.30 Grams	4.32 Grams

Statistics based on 39 of 42 reporting participants.

Comments on Assigned Data Flags for Test #312

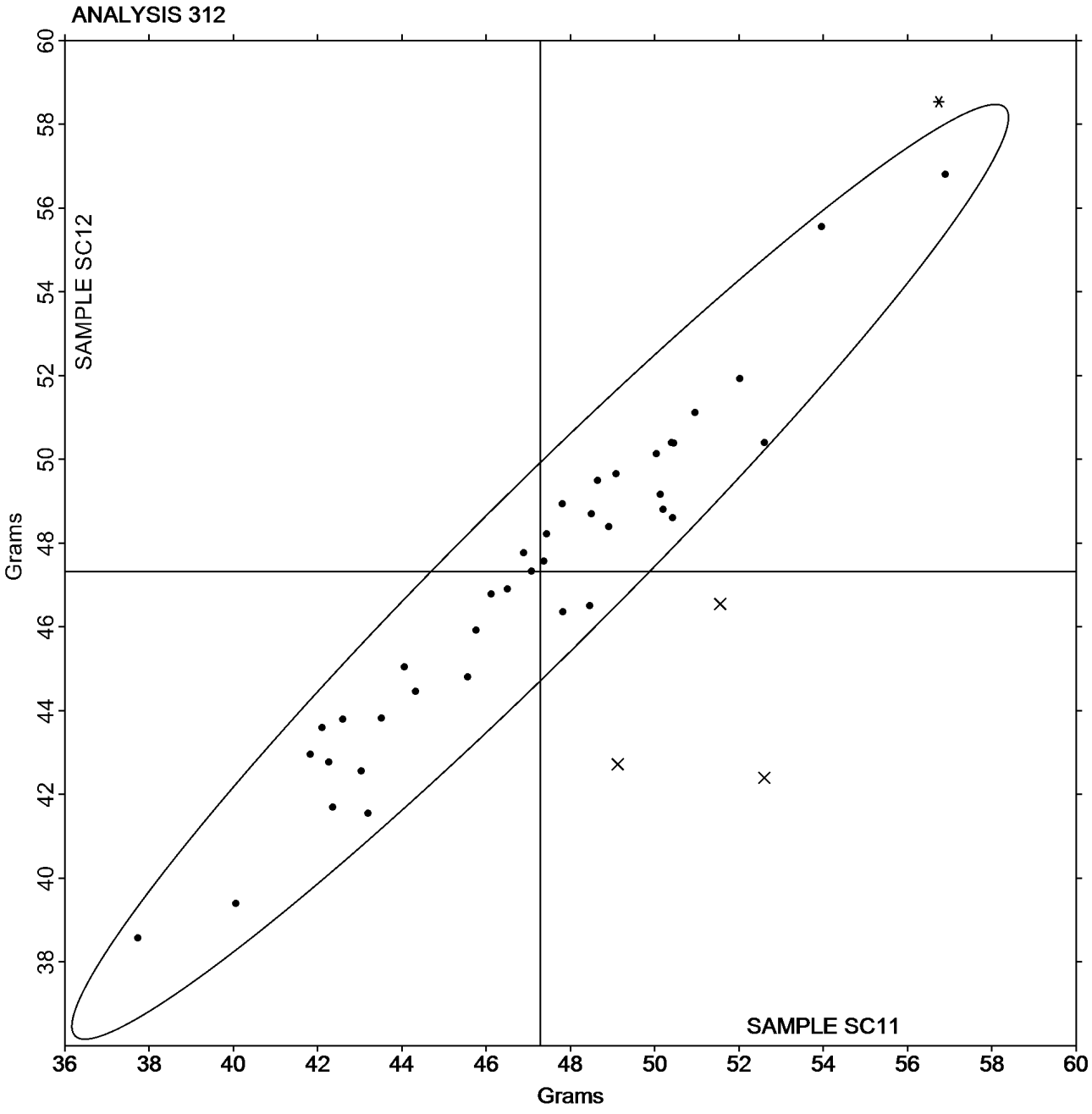
XNNDWC (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SC11.

YR49BN (X) - Inconsistent in testing between samples.

7RZJ26 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SC11.

Grand Mean Sample SC11 = 47.278 Grams

Grand Mean Sample SC12 = 47.318 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 314

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SD11 Lab Mean	Sample SD11 Diff from Grand Mean	Sample SD11 CPV	Sample SD12 Lab Mean	Sample SD12 Diff from Grand Mean	Sample SD12 CPV
32KJ77		203.8	24.7	1.26	199.0	19.1	0.94
3JEEF9		141.7	-37.4	-1.91	146.8	-33.2	-1.63
3NEZEJ		168.9	-10.3	-0.52	172.1	-7.9	-0.39
3W969K		179.9	0.7	0.03	186.2	6.3	0.31
6VLG2A		164.5	-14.7	-0.75	165.4	-14.5	-0.71
6VP3EG		172.2	-6.9	-0.35	175.8	-4.1	-0.20
7EWDPL		181.5	2.3	0.12	178.0	-2.0	-0.10
7GH28D		177.4	-1.8	-0.09	176.6	-3.3	-0.16
7K7E94		177.0	-2.2	-0.11	181.0	1.1	0.05
847Q2F		184.6	5.4	0.27	189.7	9.8	0.48
86LB4K		176.6	-2.6	-0.13	168.2	-11.7	-0.58
88NFEK		192.9	13.7	0.70	202.8	22.8	1.12
8J6ZZ2		172.2	-6.9	-0.35	174.5	-5.4	-0.26
9MKVEE		175.0	-4.2	-0.21	164.8	-15.1	-0.74
AVUJRC		184.0	4.8	0.25	187.2	7.3	0.36
FGULB9	X	38.8	-140.3	-7.14	37.7	-142.2	-6.98
GVMXWH	*	135.2	-44.0	-2.24	125.7	-54.2	-2.66
MCQXGX		171.7	-7.5	-0.38	166.1	-13.8	-0.68
NBYLC7		154.8	-24.4	-1.24	163.6	-16.3	-0.80
NMMQFV		172.3	-6.8	-0.35	176.2	-3.7	-0.18
NMQDT3		163.9	-15.3	-0.78	169.0	-10.9	-0.54
PQKRVJ	*	240.6	61.4	3.12	238.9	59.0	2.89
PWDT24		192.2	13.0	0.66	195.3	15.4	0.76
PX4U3L		187.4	8.2	0.42	183.8	3.9	0.19
PZ9VAQ		166.9	-12.2	-0.62	163.7	-16.2	-0.79
QKCMKB		201.3	22.1	1.13	208.8	28.9	1.42
R43TBT		200.8	21.6	1.10	202.1	22.2	1.09
RVTWJN		181.5	2.4	0.12	183.0	3.1	0.15
TVL68X		178.7	-0.5	-0.02	183.9	4.0	0.20
UGHBHM		206.0	26.9	1.37	201.5	21.6	1.06
X8K4QK		166.4	-12.8	-0.65	164.7	-15.3	-0.75
XBJM7K	X	49.3	-129.9	-6.61	47.9	-132.0	-6.48
Z3JEMH		182.3	3.1	0.16	183.0	3.1	0.15

Summary Statistics	Sample SD11	Sample SD12
Grand Means	179.16 Grams	179.91 Grams
Stnd Dev Btwn Labs	19.65 Grams	20.37 Grams

Statistics based on 31 of 33 reporting participants.

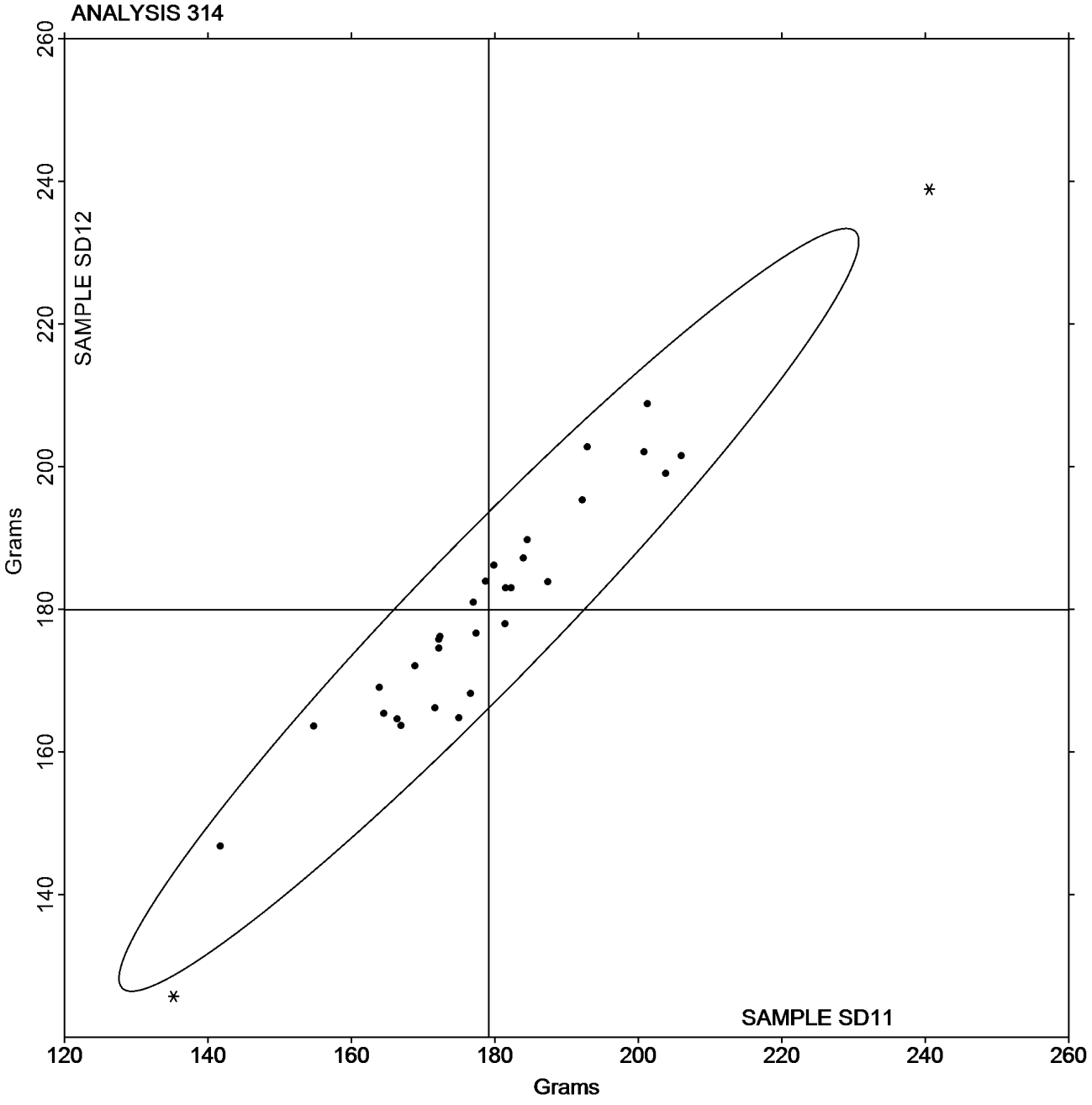
Comments on Assigned Data Flags for Test #314

XBJM7K (X) - Extreme Data.

FGULB9 (X) - Extreme Data.

Grand Mean Sample SD11 = 179.16 Grams

Grand Mean Sample SD12 = 179.91 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 325

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF11 Lab Mean	Sample SF11 Diff from Grand Mean	Sample SF11 CPV	Sample SF12 Lab Mean	Sample SF12 Diff from Grand Mean	Sample SF12 CPV	Instr Code
23YM3J		4.402	0.083	0.25	4.446	0.144	0.48	LF
26MZ4A	*	4.753	0.434	1.30	4.367	0.065	0.22	LB
2YD4WE		4.575	0.256	0.77	4.658	0.356	1.19	LC
32KJ77		4.029	-0.290	-0.87	3.904	-0.399	-1.33	LI
3ELE4Y		4.245	-0.074	-0.22	4.205	-0.097	-0.33	TO
3M2VYU		4.298	-0.021	-0.06	4.252	-0.050	-0.17	TO
4E7DWQ	*	4.851	0.532	1.59	4.523	0.220	0.74	XX
4KRBLD		4.263	-0.056	-0.17	4.230	-0.072	-0.24	LJ
6D7U79		4.262	-0.057	-0.17	4.256	-0.046	-0.15	LX
6EHA3V		4.689	0.370	1.11	4.631	0.329	1.10	TV
7BVCM4		4.188	-0.131	-0.39	4.148	-0.154	-0.52	TO
7GH28D		4.393	0.074	0.22	4.435	0.133	0.45	TO
7RZJ26		4.524	0.205	0.61	4.378	0.076	0.25	VM
8F6P63		4.344	0.025	0.08	4.461	0.159	0.53	LB
8MQHHM	*	3.295	-1.024	-3.06	3.542	-0.760	-2.54	LY
8N2MUP	*	5.024	0.705	2.11	5.054	0.752	2.52	VM
9NEJWA		3.773	-0.546	-1.64	3.746	-0.556	-1.86	IM
9W8QFE		4.018	-0.301	-0.90	3.952	-0.350	-1.17	LI
AT3HTF		4.340	0.021	0.06	4.403	0.101	0.34	TV
AXY6HX		4.639	0.320	0.96	4.472	0.169	0.57	LB
BG7WZQ		4.190	-0.129	-0.39	4.200	-0.102	-0.34	LH
BZW6VZ		4.479	0.160	0.48	4.530	0.228	0.76	LE
CUN4CG		4.664	0.345	1.03	4.563	0.261	0.87	LA
DHDTJL		3.728	-0.591	-1.77	3.717	-0.585	-1.96	TS
GHERQ3		4.241	-0.078	-0.23	4.216	-0.086	-0.29	LE
GV9BKV		4.205	-0.114	-0.34	4.232	-0.070	-0.23	LH
HZVHKF		4.736	0.417	1.25	4.638	0.336	1.12	TO
JAYRAW		4.121	-0.198	-0.59	4.154	-0.149	-0.50	TB
JDFHQ9		3.896	-0.423	-1.27	3.899	-0.403	-1.35	TB
JF7LGU		4.116	-0.203	-0.61	4.110	-0.192	-0.64	LB
L6U7NQ	*	3.877	-0.442	-1.32	4.173	-0.129	-0.43	TF
LP2D26		4.749	0.431	1.29	4.772	0.470	1.57	TJ
MFP9CX		4.472	0.153	0.46	4.426	0.124	0.41	TC
NMMQFV		4.390	0.071	0.21	4.383	0.080	0.27	LH
PUKDUU		3.912	-0.407	-1.22	3.888	-0.414	-1.39	ID
QNWEUR		4.480	0.161	0.48	4.371	0.069	0.23	FP
RJYFUM		4.640	0.321	0.96	4.604	0.302	1.01	LI
VAF9NU		4.120	-0.199	-0.60	4.226	-0.077	-0.26	TF
VFLGXN	X	4.033	-0.286	-0.86	4.735	0.433	1.45	TJ
VVJWCJ		4.062	-0.257	-0.77	4.018	-0.284	-0.95	ID

Paper & Paperboard Interlaboratory Testing Program

Analysis 325

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF11 Lab Mean	Sample SF11 Diff from Grand Mean	Sample SF11 CPV	Sample SF12 Lab Mean	Sample SF12 Diff from Grand Mean	Sample SF12 CPV	Instr Code
WAEVGR		4.217	-0.102	-0.31	4.164	-0.138	-0.46	LX
WPNLEQ		4.503	0.184	0.55	4.452	0.150	0.50	PT
WQHAXL		4.560	0.241	0.72	4.660	0.358	1.20	LI
XNNDWC		4.242	-0.077	-0.23	4.304	0.002	0.01	IN
YMAYXN		4.531	0.212	0.64	4.602	0.300	1.00	TV
YR49BN		4.646	0.327	0.98	4.542	0.239	0.80	LI
ZTFRPX		3.990	-0.329	-0.98	3.996	-0.307	-1.03	TR

Summary Statistics	Sample SF11	Sample SF12
Grand Means	4.32 kN/m	4.30 kN/m
Stnd Dev Btwn Labs	0.33 kN/m	0.30 kN/m

Statistics based on 46 of 47 reporting participants.

Comments on Assigned Data Flags for Test #325

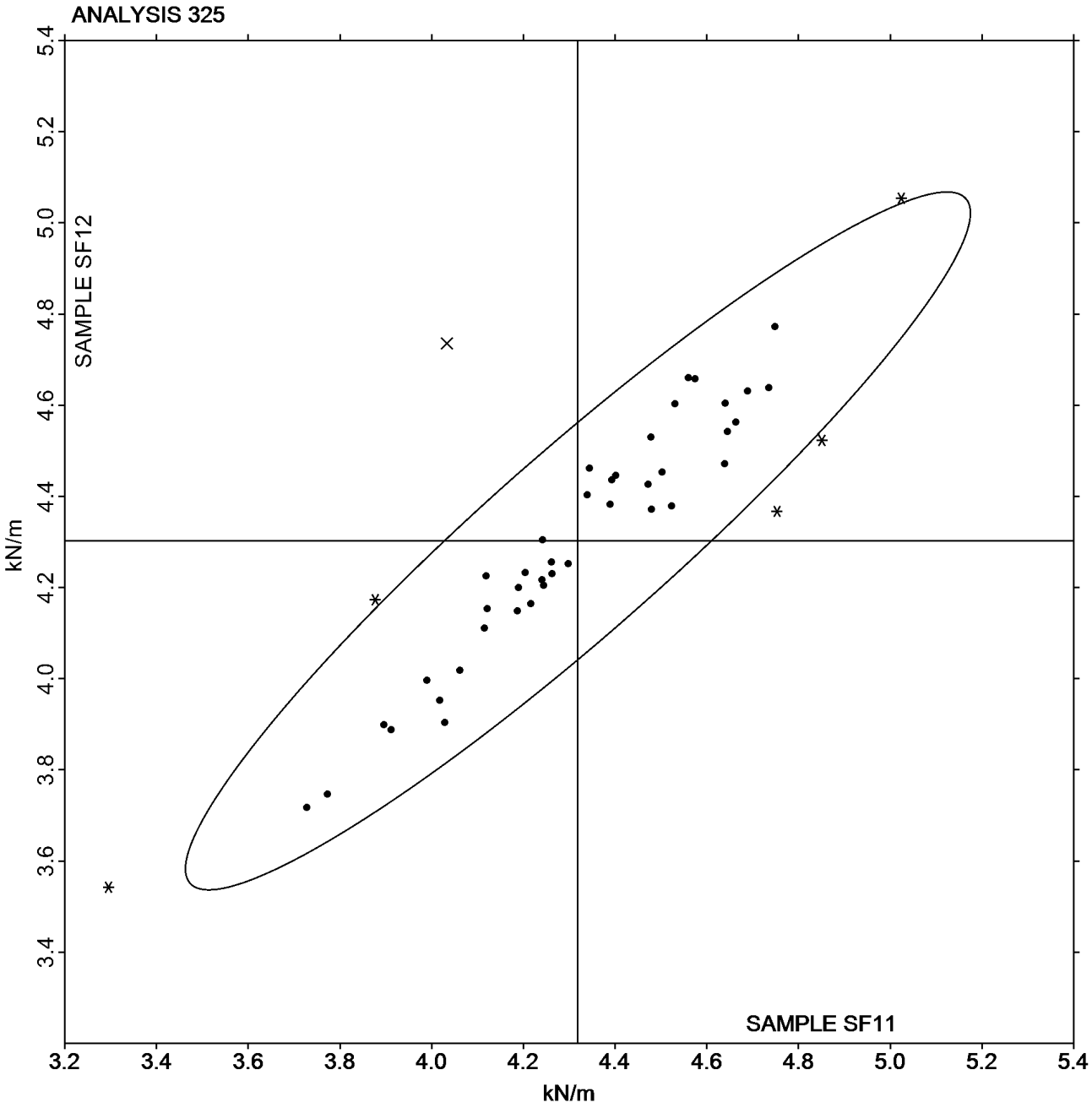
VFLGXN (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SF11.

Key to Instrument Codes Reported by Participants

FP	Frank PTI Universal Tester TS	ID	Instron 4200 Series
IM	Instron 5500 Series	IN	Instron 3340 series
LA	L & W Tensile - Autoline 300	LB	L & W Tensile - Autoline 400
LC	L & W Tensile - Autoline 600	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	LJ	L & W Tensile Tester SE 063
LX	L & W (model not specified)	LY	Lloyd TCD500
PT	PTA Horizontal Tensile Machine	TB	Thwing-Albert EJA/1000
TC	Thwing-Albert Electro-Hydraulic, Model 30LT	TF	Thwing-Albert EJA Vantage-1
TJ	Thwing-Albert QC II-XS	TO	Thwing-Albert QC-1000
TR	Testometric 220D	TS	Tinius Olsen 1000
TV	Thwing-Albert Vantage NX	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		

Grand Mean Sample SF11 = 4.3189 kN/m

Grand Mean Sample SF12 = 4.3022 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF11 Lab Mean	Sample SF11 Diff from Grand Mean	Sample SF11 CPV	Sample SF12 Lab Mean	Sample SF12 Diff from Grand Mean	Sample SF12 CPV	Instr Code
23YM3J		51.19	5.28	1.07	50.17	4.43	0.83	LF
26MZ4A		48.55	2.64	0.53	45.62	-0.12	-0.02	LB
2YD4WE		53.49	7.58	1.53	51.92	6.18	1.16	LC
32KJ77		42.95	-2.96	-0.60	42.91	-2.83	-0.53	LI
3ELE4Y		46.99	1.08	0.22	44.37	-1.37	-0.26	TO
3M2VYU		49.77	3.86	0.78	48.60	2.86	0.53	TO
4E7DWQ	*	51.57	5.67	1.14	44.48	-1.25	-0.23	XX
4KRBLD		45.26	-0.65	-0.13	44.18	-1.56	-0.29	LJ
6D7U79		46.73	0.83	0.17	45.90	0.17	0.03	LX
6EHA3V		47.96	2.05	0.41	44.46	-1.28	-0.24	TV
7BVCM4		44.32	-1.59	-0.32	45.46	-0.28	-0.05	TO
7GH28D		52.57	6.66	1.34	53.97	8.23	1.54	TO
8F6P63	X	27.86	-18.05	-3.64	32.62	-13.12	-2.45	LB
8MQHHM	*	58.46	12.55	2.53	59.57	13.84	2.59	LY
8N2MUP		49.13	3.22	0.65	48.90	3.16	0.59	VM
9NEJWA		36.47	-9.43	-1.90	36.73	-9.01	-1.68	IM
9W8QFE		40.06	-5.85	-1.18	38.43	-7.31	-1.37	LI
AT3HTF		49.25	3.34	0.67	52.94	7.20	1.35	TV
AXY6HX	*	32.59	-13.32	-2.69	30.50	-15.24	-2.85	LB
BG7WZQ		44.90	-1.01	-0.20	45.95	0.21	0.04	LH
CUN4CG		48.26	2.35	0.47	45.41	-0.33	-0.06	LA
DHDTJL		47.45	1.54	0.31	48.86	3.12	0.58	BU
GHERQ3		45.94	0.03	0.01	44.07	-1.67	-0.31	LE
GV9BKV		42.02	-3.89	-0.79	43.64	-2.10	-0.39	LH
HZVHKF		39.18	-6.73	-1.36	37.40	-8.33	-1.56	XX
JAYRAW		45.88	-0.03	-0.01	46.93	1.20	0.22	TB
JF7LGU		48.85	2.94	0.59	49.47	3.73	0.70	LB
LP2D26	X	235.84	189.93	38.31	226.94	181.20	33.87	TQ
NMMQFV		43.64	-2.27	-0.46	45.79	0.05	0.01	LH
PUKDUU		44.53	-1.37	-0.28	46.86	1.13	0.21	ID
QNWEUR		50.81	4.90	0.99	53.01	7.27	1.36	FP
RJYFUM		40.93	-4.98	-1.00	42.39	-3.35	-0.63	LI
VAF9NU		45.92	0.01	0.00	49.32	3.58	0.67	TF
VVJWCJ		44.00	-1.91	-0.39	42.54	-3.19	-0.60	ID
WAEVGR		43.43	-2.48	-0.50	41.78	-3.95	-0.74	LX
WPNLEQ		48.05	2.14	0.43	47.28	1.55	0.29	PT
WQHAXL		49.24	3.33	0.67	51.14	5.40	1.01	LI
XNNDWC		43.55	-2.36	-0.48	44.90	-0.84	-0.16	IN
YMAYXN		39.69	-6.21	-1.25	43.06	-2.68	-0.50	TV
YR49BN		40.94	-4.97	-1.00	39.10	-6.64	-1.24	LX

Paper & Paperboard Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SF11	Sample SF12
Grand Means	45.91 Joules/sq m	45.74 Joules/sq m
Stnd Dev Btwn Labs	4.96 Joules/sq m	5.35 Joules/sq m

Statistics based on 38 of 40 reporting participants.

Comments on Assigned Data Flags for Test #327

8F6P63 (X) - Data for sample SF11 are low.

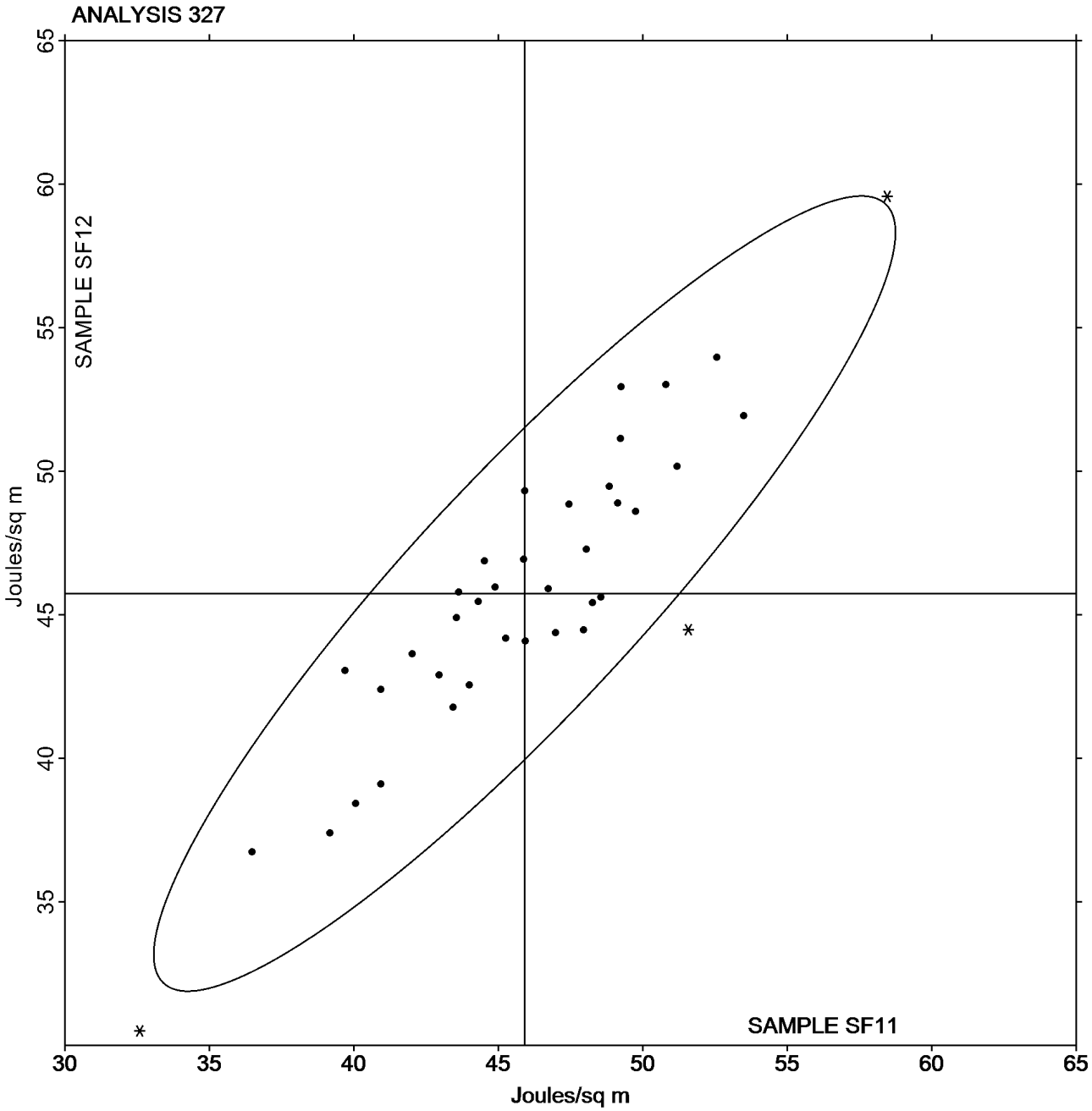
LP2D26 (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

BU	Buchel	FP	Frank PTI Universal Tester TS
ID	Instron 4200 Series	IM	Instron 5500 Series
IN	Instron 3340 series	LA	L & W Tensile - Autoline 300
LB	L & W Tensile - Autoline 400	LC	L & W Tensile - Autoline 600
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
LJ	L & W Tensile Tester SE 063	LX	L & W (model not specified)
LY	Lloyd TCD500	PT	PTA Horizontal Tensile Machine
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TO	Thwing-Albert QC-1000	TQ	Thwing-Albert QC 3A
TV	Thwing-Albert Vantage NX	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		

Grand Mean Sample SF11 = 45.908 Joules/sq m

Grand Mean Sample SF12 = 45.737 Joules/sq m



Paper & Paperboard Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF11 Lab Mean	Sample SF11 Diff from Grand Mean	Sample SF11 CPV	Sample SF12 Lab Mean	Sample SF12 Diff from Grand Mean	Sample SF12 CPV	Instr Code
23YM3J		1.771	0.141	0.68	1.731	0.089	0.42	LF
26MZ4A		1.550	-0.080	-0.39	1.581	-0.061	-0.29	LB
2YD4WE		1.741	0.111	0.54	1.675	0.033	0.16	LC
32KJ77		1.632	0.002	0.01	1.688	0.046	0.22	LI
3ELE4Y		1.851	0.221	1.07	1.794	0.152	0.72	TO
3M2VYU		1.779	0.149	0.72	1.749	0.107	0.51	TO
4E7DWQ		1.771	0.141	0.68	1.817	0.175	0.83	XX
4KRBLD		1.627	-0.003	-0.02	1.612	-0.030	-0.14	LJ
6D7U79		1.664	0.034	0.16	1.655	0.013	0.06	LX
6EHA3V		1.635	0.005	0.02	1.547	-0.095	-0.45	TV
7BVCM4		1.659	0.029	0.14	1.688	0.046	0.22	TO
7GH28D		1.899	0.269	1.30	1.956	0.314	1.48	TO
7RZJ26		1.440	-0.190	-0.92	1.400	-0.242	-1.14	VM
8F6P63	*	1.264	-0.366	-1.78	1.410	-0.232	-1.09	LB
8MQHHM		1.301	-0.329	-1.60	1.366	-0.276	-1.30	LY
8N2MUP		1.303	-0.327	-1.59	1.308	-0.334	-1.57	VM
9NEJWA		1.505	-0.125	-0.61	1.528	-0.114	-0.54	IM
9W8QFE		1.528	-0.102	-0.50	1.486	-0.156	-0.73	LI
AT3HTF		1.981	0.351	1.70	2.062	0.421	1.98	TV
AXY6HX		1.421	-0.209	-1.01	1.383	-0.259	-1.22	LB
BG7WZQ		1.640	0.010	0.05	1.680	0.038	0.18	LH
CUN4CG		1.481	-0.149	-0.72	1.456	-0.186	-0.87	LA
DHDTJL	*	2.230	0.600	2.91	2.310	0.668	3.15	BU
GHERQ3		1.642	0.012	0.06	1.589	-0.053	-0.25	LE
GV9BKV		1.542	-0.088	-0.43	1.591	-0.051	-0.24	LH
HZVHKF		2.014	0.384	1.86	1.957	0.315	1.49	TO
JAYRAW		1.778	0.148	0.72	1.796	0.154	0.73	TB
JDFHQ9		1.442	-0.188	-0.91	1.447	-0.195	-0.92	TF
JF7LGU		1.489	-0.141	-0.69	1.510	-0.132	-0.62	LB
L6U7NQ		1.479	-0.151	-0.73	1.499	-0.143	-0.67	TF
LP2D26	X	8.690	7.060	34.20	8.610	6.968	32.82	TJ
NMMQFV		1.642	0.012	0.06	1.610	-0.032	-0.15	LH
PUKDUU		1.745	0.114	0.55	1.834	0.192	0.90	ID
QNWEUR		1.805	0.175	0.85	1.861	0.219	1.03	FP
RJYFUM		1.406	-0.224	-1.09	1.456	-0.186	-0.87	LI
VAF9NU		1.889	0.258	1.25	1.964	0.322	1.52	TF
VVJWCJ		1.673	0.042	0.20	1.647	0.005	0.03	ID
WAEVGR		1.568	-0.062	-0.30	1.526	-0.116	-0.54	LX
WPNLEQ		1.703	0.072	0.35	1.714	0.073	0.34	PT
WQHAXL		1.561	-0.069	-0.34	1.577	-0.065	-0.30	LI

Paper & Paperboard Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF11 Lab Mean	Sample SF11 Diff from Grand Mean	Sample SF11 CPV	Sample SF12 Lab Mean	Sample SF12 Diff from Grand Mean	Sample SF12 CPV	Instr Code
XNNDWC	X	2.016	0.386	1.87	1.843	0.201	0.95	IN
YMAYXN		1.387	-0.243	-1.18	1.462	-0.180	-0.85	TV
YR49BN		1.409	-0.221	-1.07	1.387	-0.255	-1.20	LI

Summary Statistics	Sample SF11	Sample SF12
Grand Means	1.63 Percent	1.64 Percent
Stnd Dev Btwn Labs	0.21 Percent	0.21 Percent

Statistics based on 41 of 43 reporting participants.

Comments on Assigned Data Flags for Test #328

XNNDWC (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SF11.

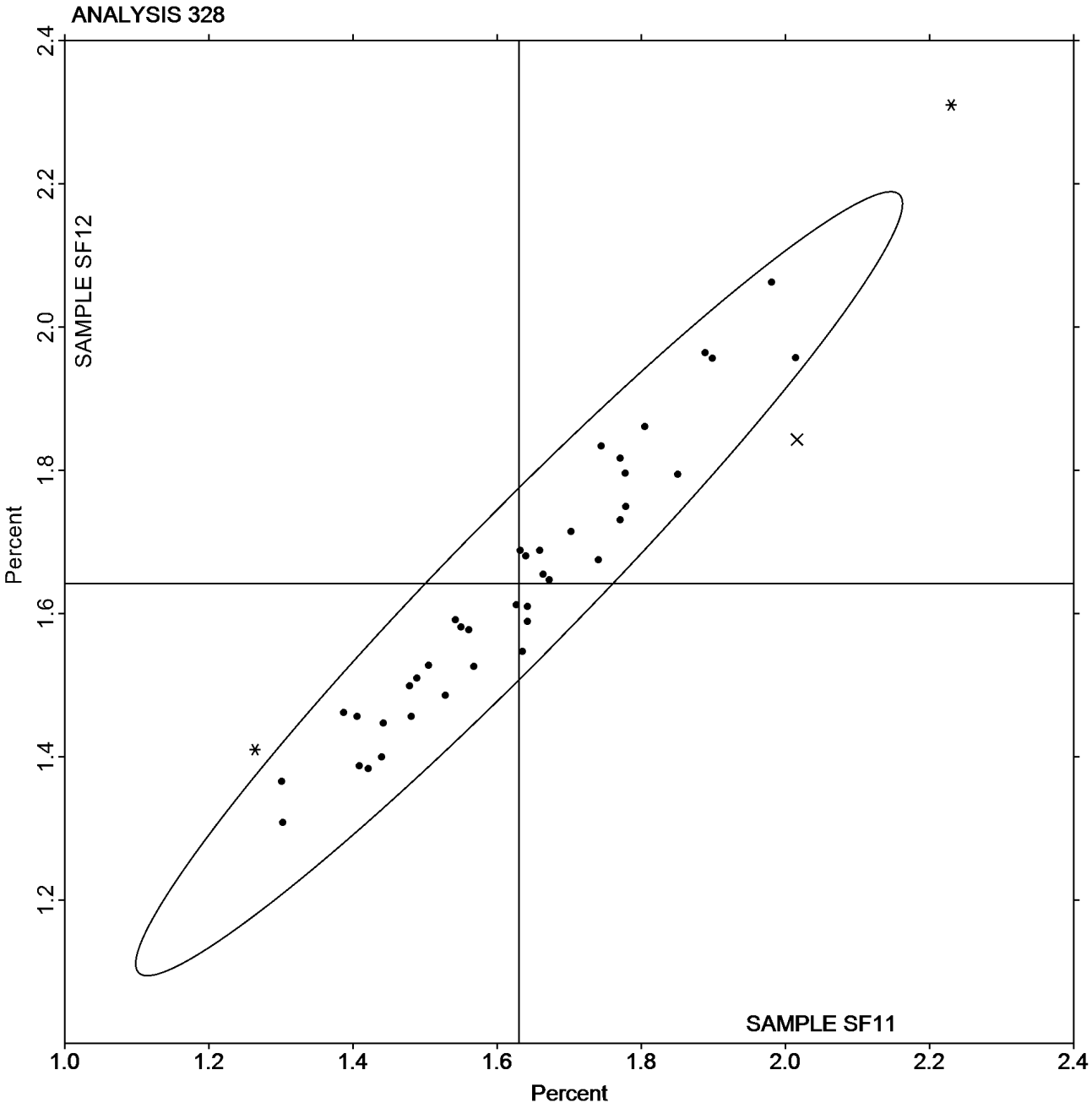
LP2D26 (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

BU	Buchel	FP	Frank PTI Universal Tester TS
ID	Instron 4200 Series	IM	Instron 5500 Series
IN	Instron 3340 Series	LA	L & W Tensile - Autoline 300
LB	L & W Tensile - Autoline 400	LC	L & W Tensile - Autoline 600
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
LJ	L & W Tensile Tester SE 063	LX	L & W (model not specified)
LY	Lloyd TCD500	PT	PTA Horizontal Tensile Machine
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TJ	Thwing-Albert QC II-XS	TO	Thwing-Albert QC-1000
TV	Thwing-Albert Vantage NX	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		

Grand Mean Sample SF11 = 1.6304
Percent

Grand Mean Sample SF12 = 1.6417
Percent



Paper & Paperboard Interlaboratory Testing Program

Analysis 330

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE11 Lab Mean	Sample SE11 Diff from Grand Mean	Sample SE11 CPV	Sample SE12 Lab Mean	Sample SE12 Diff from Grand Mean	Sample SE12 CPV	Instr Code
2HPQHM		9.754	0.420	0.77	9.545	0.165	0.29	LA
2W9DRK		9.028	-0.307	-0.57	9.132	-0.248	-0.44	XX
2YD4WE		9.401	0.066	0.12	9.478	0.098	0.17	LC
32KJ77		8.268	-1.066	-1.97	8.418	-0.962	-1.69	LW
3JEEF9		8.847	-0.487	-0.90	8.816	-0.564	-0.99	IM
3NEZEJ		9.152	-0.182	-0.34	9.063	-0.317	-0.56	LE
3W969K		8.622	-0.713	-1.32	8.657	-0.724	-1.27	LE
6VLG2A		9.254	-0.080	-0.15	9.037	-0.343	-0.60	IF
6VP3EG		9.476	0.142	0.26	9.233	-0.147	-0.26	LE
76R8VJ	*	10.774	1.439	2.65	10.668	1.288	2.27	LI
7EWDPL		9.192	-0.142	-0.26	9.156	-0.224	-0.39	LE
7K7E94		9.051	-0.284	-0.52	9.114	-0.266	-0.47	TB
847Q2F		8.419	-0.915	-1.69	8.600	-0.780	-1.37	TK
86LB4K		9.930	0.596	1.10	9.898	0.518	0.91	LA
88NFEK		9.428	0.093	0.17	9.275	-0.105	-0.18	ID
8J6ZZ2		8.800	-0.534	-0.99	8.930	-0.450	-0.79	LH
9MKVEE		8.827	-0.507	-0.94	8.870	-0.510	-0.90	TX
AVUJRC	X	11.964	2.630	4.85	9.791	0.411	0.72	IF
B8EF7F		9.457	0.122	0.23	9.492	0.112	0.20	TH
CNMU34		9.787	0.452	0.83	9.743	0.363	0.64	LE
CU7M22		9.054	-0.281	-0.52	8.979	-0.401	-0.71	IM
H6T3MD		9.121	-0.213	-0.39	9.216	-0.164	-0.29	TB
MCQXGX		9.478	0.143	0.26	9.518	0.138	0.24	LE
NBYLC7	*	9.681	0.346	0.64	10.256	0.875	1.54	TH
NMMQFV		9.560	0.226	0.42	9.528	0.148	0.26	LH
NMQDT3		9.240	-0.095	-0.17	9.178	-0.202	-0.36	IF
NZEHZZ		10.089	0.754	1.39	10.236	0.856	1.51	TH
PQKRVJ		9.739	0.404	0.75	9.870	0.490	0.86	LE
PWDT24		9.770	0.436	0.80	9.732	0.352	0.62	LA
PX4U3L		8.847	-0.488	-0.90	8.783	-0.597	-1.05	LE
PZ9VAQ		9.369	0.035	0.06	9.931	0.551	0.97	TO
REHK2N		8.409	-0.926	-1.71	8.312	-1.068	-1.88	XX
UGHBHM		8.492	-0.843	-1.55	8.658	-0.722	-1.27	TR
VEUTTU		9.882	0.547	1.01	9.898	0.518	0.91	LA
WPNLEQ		9.486	0.152	0.28	9.708	0.328	0.58	PT
X8K4QK		9.428	0.093	0.17	9.457	0.077	0.14	LW
XCFX7T		8.880	-0.454	-0.84	8.929	-0.452	-0.79	TB
XUG6XZ		9.272	-0.062	-0.12	9.710	0.330	0.58	MA
YMAYXN	*	9.924	0.590	1.09	9.436	0.056	0.10	TO
ZVGX3J		10.170	0.835	1.54	10.568	1.188	2.09	DM

Paper & Paperboard Interlaboratory Testing Program

Analysis 330

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE11 Lab Mean	Sample SE11 Diff from Grand Mean	Sample SE11 CPV	Sample SE12 Lab Mean	Sample SE12 Diff from Grand Mean	Sample SE12 CPV	Instr Code
ZVKKFQ		10.023	0.688	1.27	10.180	0.800	1.41	TH

Summary Statistics	Sample SE11	Sample SE12
Grand Means	9.33 kN/m	9.38 kN/m
Stnd Dev Btwn Labs	0.54 kN/m	0.57 kN/m

Statistics based on 40 of 41 reporting participants.

Comments on Assigned Data Flags for Test #330

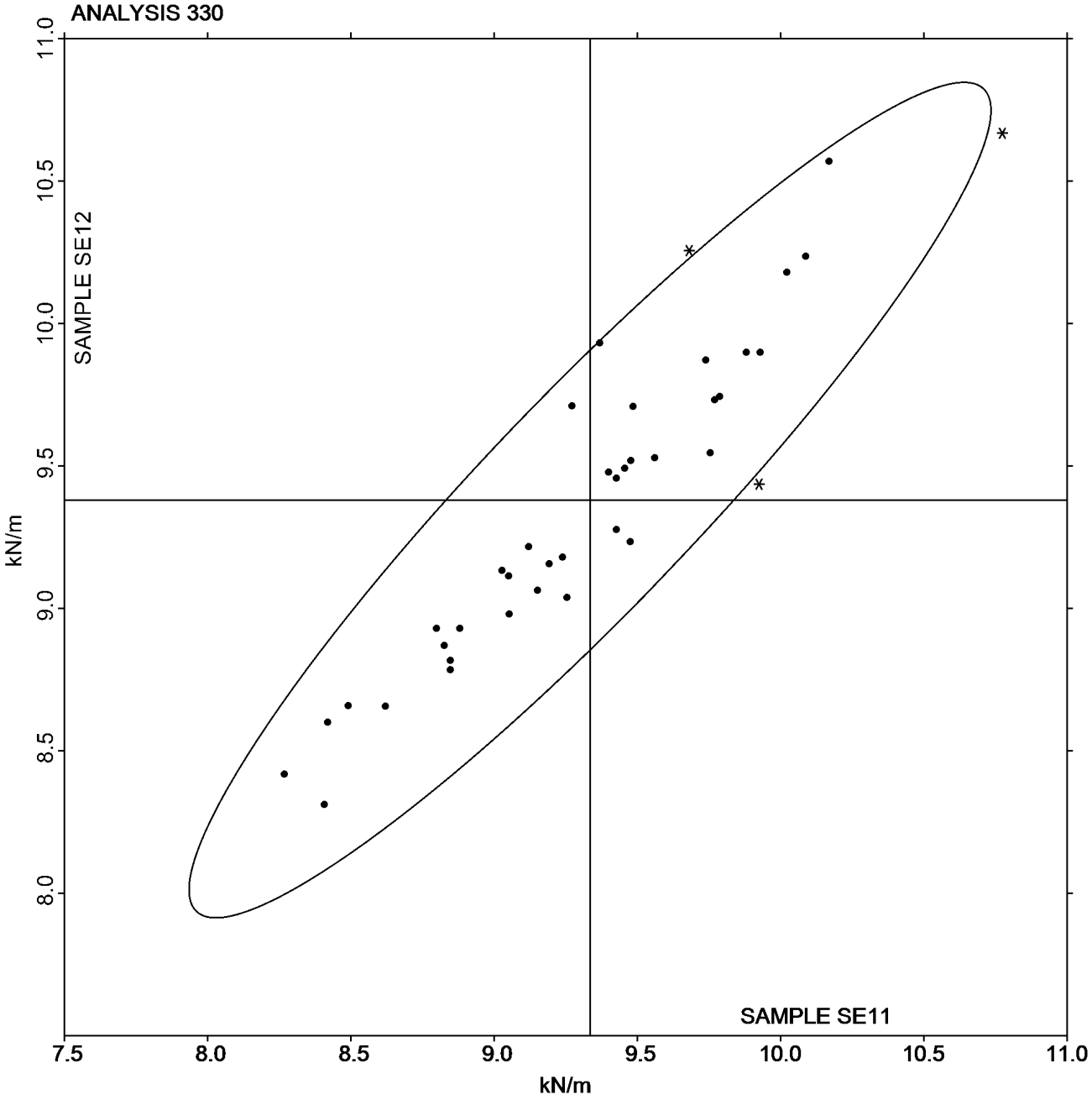
AVUJRC (X) - Data for sample SE11 are high. Inconsistent within the determinations of both samples.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	ID	Instron 4200 Series
IF	Instron 3340 Series	IM	Instron 5500 Series
LA	L & W Autoline	LC	L & W Tensile - Autoline 600
LE	L & W Tensile Tester 066	LH	L & W Alwetron TH1 (Horizontal) SE 060
LI	LLoyds Instruments	LW	L & W Tensile Tester SE062
MA	Mark-10 ESM301L	PT	PTA Horizontal Tensile Machine
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TK	Thwing-Albert Model 37-4	TO	Thwing-Albert QC-1000
TR	TMI Horizontal Tensile Tester	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		

Grand Mean Sample SE11 = 9.3346 kN/m

Grand Mean Sample SE12 = 9.3801 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE11 Lab Mean	Sample SE11 Diff from Grand Mean	Sample SE11 CPV	Sample SE12 Lab Mean	Sample SE12 Diff from Grand Mean	Sample SE12 CPV	Instr Code
2HPQHM	*	80.7	-32.5	-2.57	71.2	-42.4	-2.85	LA
2W9DRK		113.1	-0.1	0.00	114.4	0.8	0.05	XX
2YD4WE		105.3	-7.9	-0.62	106.4	-7.2	-0.49	LC
32KJ77		99.2	-14.0	-1.11	101.2	-12.4	-0.84	LW
3JEEF9		121.3	8.1	0.64	116.7	3.1	0.21	IM
3NEZEJ		112.1	-1.0	-0.08	108.4	-5.2	-0.35	LE
3W969K		104.8	-8.3	-0.66	106.9	-6.7	-0.45	LE
6VLG2A		118.8	5.6	0.44	109.6	-4.0	-0.27	IF
6VP3EG		118.0	4.8	0.38	108.3	-5.3	-0.36	LE
7EWDPL		110.1	-3.0	-0.24	112.3	-1.3	-0.09	LE
847Q2F		105.8	-7.4	-0.58	109.7	-3.9	-0.26	TK
86LB4K		102.0	-11.2	-0.89	93.4	-20.2	-1.36	LA
8J6ZZ2		99.1	-14.1	-1.11	104.2	-9.4	-0.63	LH
9MKVEE		117.0	3.8	0.30	128.0	14.4	0.97	TX
AVUJRC	X	153.8	40.7	3.22	118.9	5.3	0.35	IN
B8EF7F		133.4	20.2	1.60	132.4	18.8	1.26	TH
CNMU34		128.9	15.7	1.25	127.3	13.7	0.92	LE
CU7M22		114.4	1.2	0.10	109.2	-4.4	-0.29	IM
H6T3MD		120.7	7.5	0.59	119.7	6.2	0.41	TB
MCQXGX		113.0	-0.2	-0.01	108.9	-4.7	-0.32	LE
NBYLC7	*	114.9	1.8	0.14	135.9	22.3	1.50	TH
NMMQFV		119.0	5.8	0.46	115.2	1.6	0.10	LH
PQKRVJ		121.5	8.3	0.66	123.7	10.1	0.68	LE
PWDT24		104.2	-9.0	-0.71	99.5	-14.1	-0.95	LA
PX4U3L		102.8	-10.3	-0.82	97.1	-16.5	-1.11	LE
PZ9VAQ	X	102.4	-10.8	-0.85	131.3	17.7	1.19	TO
REHK2N		116.0	2.8	0.22	115.5	1.9	0.13	XX
UGHBHM		102.4	-10.8	-0.85	102.2	-11.4	-0.77	TR
VEUTTU		98.3	-14.9	-1.18	108.7	-4.9	-0.33	LA
WPNLEQ		112.4	-0.8	-0.06	119.1	5.5	0.37	PT
X8K4QK		102.1	-11.0	-0.87	110.7	-2.9	-0.19	LW
XCFX7T		130.2	17.1	1.35	127.6	14.0	0.94	TB
YMAYXN		125.5	12.4	0.98	122.6	9.0	0.60	TO
ZVGX3J	*	148.3	35.1	2.78	157.3	43.7	2.94	DM
ZVKKFQ		119.1	6.0	0.47	125.7	12.1	0.81	TH

Paper & Paperboard Interlaboratory Testing Program

Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SE11	Sample SE12
Grand Means	113.16 Joules/sq m	113.60 Joules/sq m
Stnd Dev Btwn Labs	12.62 Joules/sq m	14.87 Joules/sq m

Statistics based on 33 of 35 reporting participants.

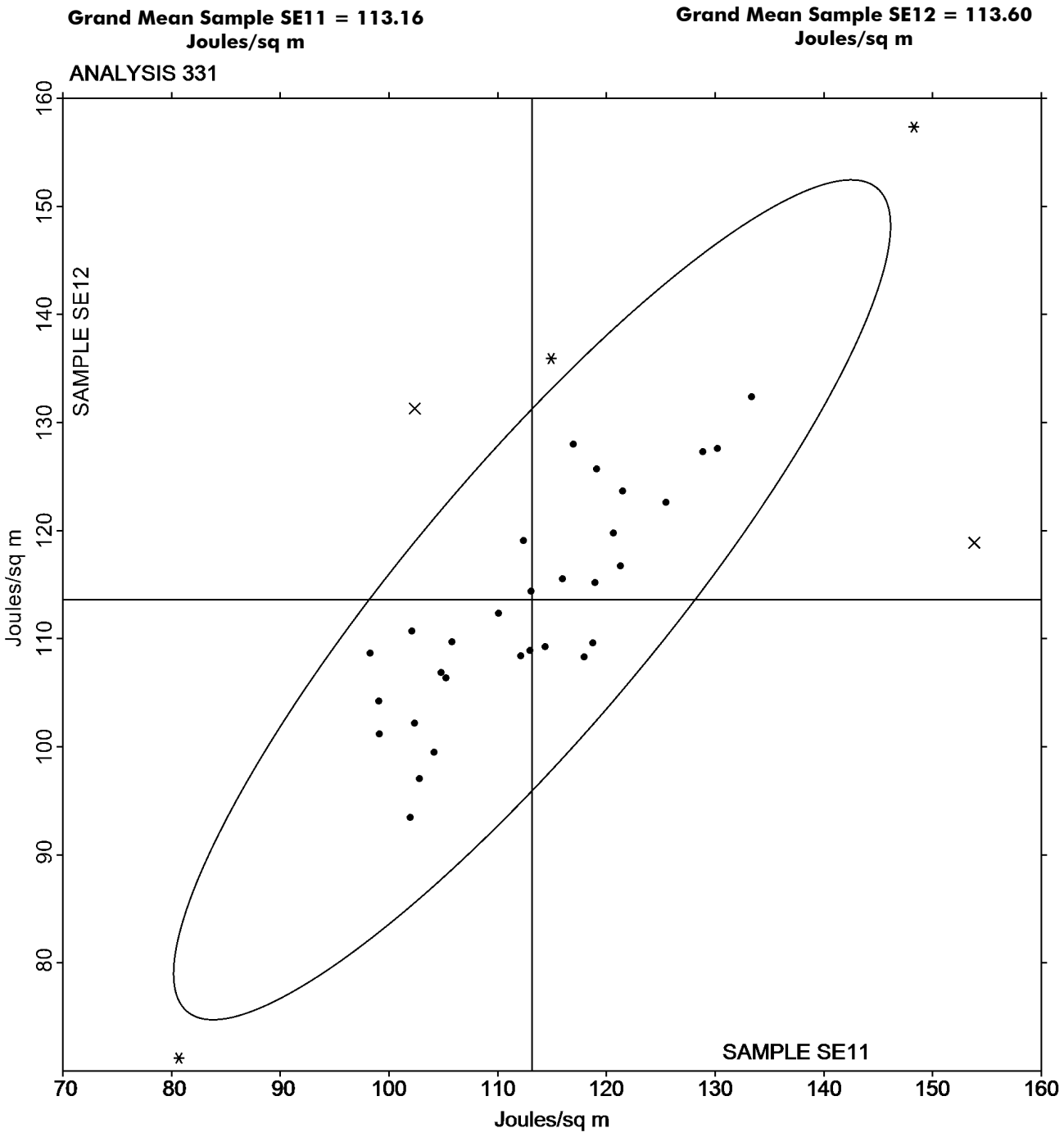
Comments on Assigned Data Flags for Test #331

PZ9VAQ (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SE11.

AVUJRC (X) - Data for sample SE11 are high.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	IF	Instron 3340 Series
IM	Instron 5500 Series	IN	Instron 3360 Series
LA	L & W Autoline	LC	L & W Tensile - Autoline 600
LE	L & W Tensile Tester 066	LH	L & W Alwetron TH1 (Horizontal) SE 060
LW	L & W Tensile Tester SE062	PT	PTA Horizontal Tensile Machine
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TK	Thwing-Albert Model 37-4	TO	Thwing-Albert QC-1000
TR	TMI Horizontal Tensile Tester	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		



Paper & Paperboard Interlaboratory Testing Program

Analysis 332

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE11 Lab Mean	Sample SE11 Diff from Grand Mean	Sample SE11 CPV	Sample SE12 Lab Mean	Sample SE12 Diff from Grand Mean	Sample SE12 CPV	Instr Code
2HPQHM	X	2.856	1.044	5.54	2.702	0.875	4.43	LA
2W9DRK		1.790	-0.022	-0.12	1.789	-0.038	-0.19	XX
2YD4WE		1.560	-0.252	-1.34	1.552	-0.275	-1.40	LC
32KJ77		1.745	-0.067	-0.36	1.740	-0.087	-0.44	LW
3JEEF9		1.998	0.186	0.99	1.942	0.114	0.58	IM
3NEZEJ		1.755	-0.057	-0.30	1.722	-0.105	-0.53	LE
3W969K		1.731	-0.081	-0.43	1.758	-0.069	-0.35	LE
6VLG2A		1.870	0.058	0.31	1.797	-0.030	-0.15	IF
6VP3EG		1.787	-0.025	-0.13	1.715	-0.112	-0.57	LE
7EWDPL		1.717	-0.095	-0.50	1.756	-0.071	-0.36	LE
7K7E94		1.811	-0.001	-0.01	1.879	0.052	0.26	TB
847Q2F		1.861	0.049	0.26	1.877	0.050	0.25	TK
86LB4K		1.464	-0.348	-1.85	1.364	-0.463	-2.35	LX
88NFEK		1.876	0.064	0.34	1.854	0.027	0.13	ID
8J6ZZ2		1.640	-0.172	-0.91	1.690	-0.137	-0.70	LH
9MKVEE		1.934	0.122	0.65	2.076	0.249	1.26	TX
AVUJRC	X	2.376	0.564	2.99	1.700	-0.127	-0.65	IN
B8EF7F		2.070	0.258	1.37	2.050	0.223	1.13	TH
CNMU34		1.900	0.088	0.47	1.889	0.062	0.31	LE
CU7M22		2.030	0.218	1.16	1.945	0.118	0.60	IM
H6T3MD		1.947	0.135	0.71	1.911	0.084	0.42	TB
MCQXGX		1.712	-0.100	-0.53	1.660	-0.167	-0.85	LE
NBYLC7		2.033	0.221	1.17	2.188	0.361	1.83	TH
NMMQFV		1.775	-0.037	-0.20	1.774	-0.053	-0.27	LH
PQKRVJ	X	0.070	-1.742	-9.24	0.071	-1.756	-8.90	LE
PWDT24		1.515	-0.297	-1.58	1.461	-0.366	-1.86	LA
PX4U3L		1.671	-0.141	-0.75	1.605	-0.222	-1.13	LE
PZ9VAQ	*	1.696	-0.116	-0.62	1.936	0.109	0.55	TO
REHK2N		2.026	0.214	1.14	2.039	0.212	1.07	XX
UGHBHM		1.784	-0.028	-0.15	1.825	-0.002	-0.01	TR
VEUTTU		1.426	-0.386	-2.05	1.541	-0.286	-1.45	LA
WPNLEQ		1.764	-0.048	-0.26	1.884	0.056	0.28	PT
X8K4QK		1.583	-0.229	-1.22	1.704	-0.123	-0.63	LW
XCFX7T		2.183	0.371	1.97	2.141	0.313	1.59	TB
YMAYXN		1.924	0.112	0.59	1.965	0.138	0.70	TO
ZVGX3J		2.201	0.389	2.06	2.222	0.395	2.00	DM
ZVKKFQ		1.832	0.020	0.11	1.883	0.056	0.28	TH

Paper & Paperboard Interlaboratory Testing Program

Analysis 332

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SE11	Sample SE12
Grand Means	1.81 Percent	1.83 Percent
Stnd Dev Btwn Labs	0.19 Percent	0.20 Percent

Statistics based on 34 of 37 reporting participants.

Comments on Assigned Data Flags for Test #332

PQKRVJ (X) - Extreme Data.

AVUJRC (X) - Data for sample SE11 are high.

2HPQHM (X) - Data for both samples are high. Possible Systematic Error.

Analysis Notes:

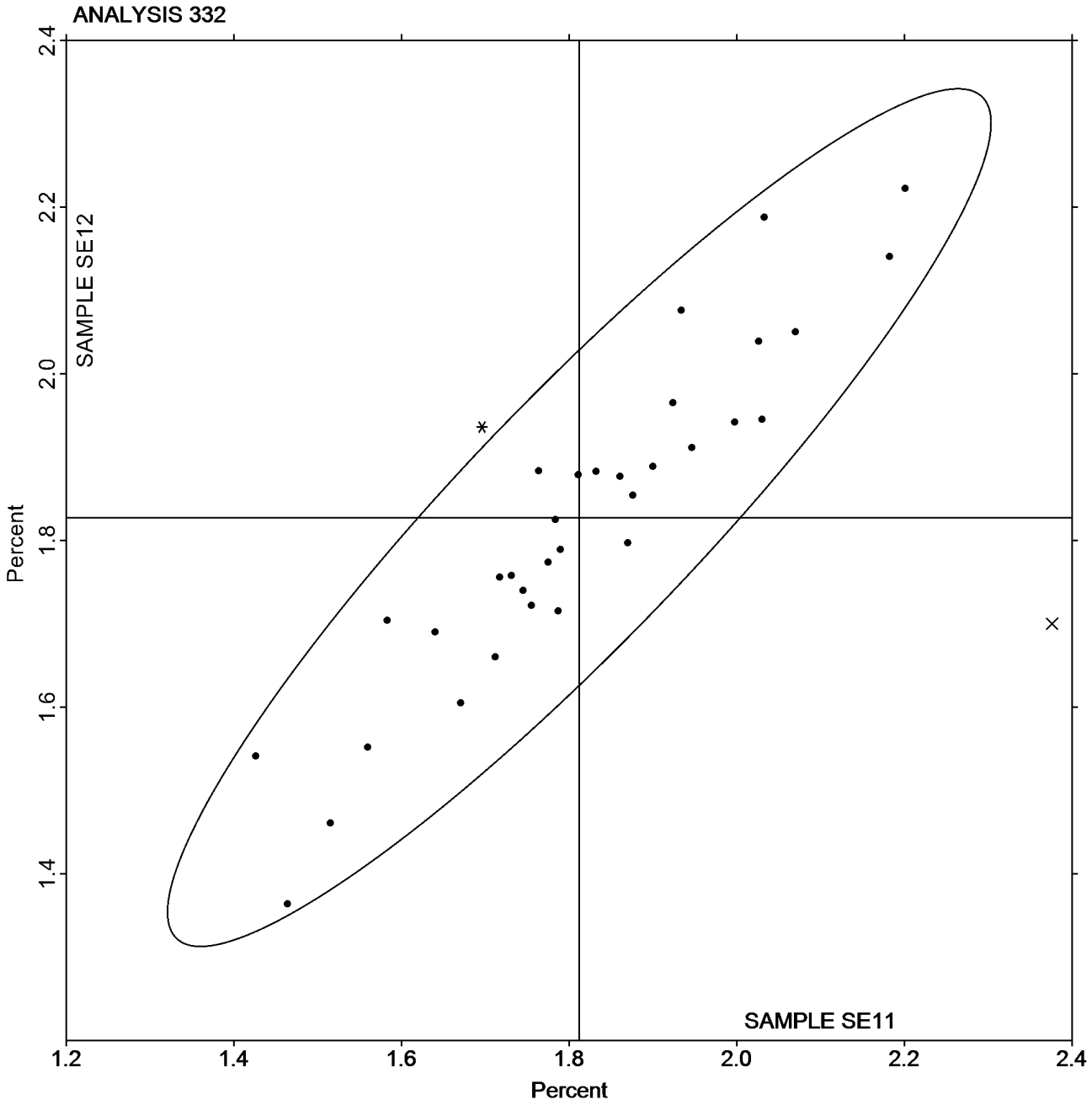
H6T3MD - One determination removed from the Lab Mean of Sample SE11 per Grubb's Test at 1% risk (TAPPI 1205).

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	ID	Instron 4200 Series
IF	Instron 3340 Series	IM	Instron 5500 Series
IN	Instron 3360 Series	LA	L & W Autoline 300
LC	L & W Tensile - Autoline 600	LE	L & W Tensile Tester 066
LH	L & W Alwetron TH1 (Horizontal) SE 060	LW	L & W Tensile Tester SE062
LX	L & W (model not specified)	PT	PTA Horizontal Tensile Machine
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TK	Thwing-Albert Model 37-4	TO	Thwing-Albert QC-1000
TR	TMI Horizontal Tensile Tester	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		

Grand Mean Sample SE11 = 1.8121
Percent

Grand Mean Sample SE12 = 1.8274
Percent



Paper & Paperboard Interlaboratory Testing Program

Analysis 334

Folding Endurance (MIT) - Double Folds

TAPPI Official Test Method T511

WebCode	Data Flag	Sample SG11 Lab Mean	Sample SG11 Diff from Grand Mean	Sample SG11 CPV	Sample SG12 Lab Mean	Sample SG12 Diff from Grand Mean	Sample SG12 CPV	Instr Code
32KJ77		57.00	11.78	0.67	63.50	9.17	0.36	MT
38BTF6		42.90	-2.32	-0.13	42.20	-12.13	-0.47	XX
3JEEF9		40.40	-4.82	-0.27	58.00	3.67	0.14	MT
7K7E94		25.60	-19.62	-1.12	19.10	-35.23	-1.38	MT
7RZJ26		24.70	-20.52	-1.17	26.20	-28.13	-1.10	MT
BZW6VZ		59.20	13.98	0.79	57.20	2.87	0.11	MT
GUEM77		81.50	36.28	2.06	108.60	54.27	2.12	XX
L6U7NQ	X	444.90	399.68	22.72	87.10	32.77	1.28	MT
RJYFUM		31.70	-13.52	-0.77	50.50	-3.83	-0.15	MT
VVJWCJ		61.50	16.28	0.93	86.70	32.37	1.26	MT
XNNDWC		38.40	-6.82	-0.39	43.10	-11.23	-0.44	MT
ZVKKFQ		34.50	-10.72	-0.61	42.50	-11.83	-0.46	MT

Summary Statistics	Sample SG11	Sample SG12
Grand Means	45.22 Double Folds	54.33 Double Folds
Stnd Dev Btwn Labs	17.59 Double Folds	25.61 Double Folds

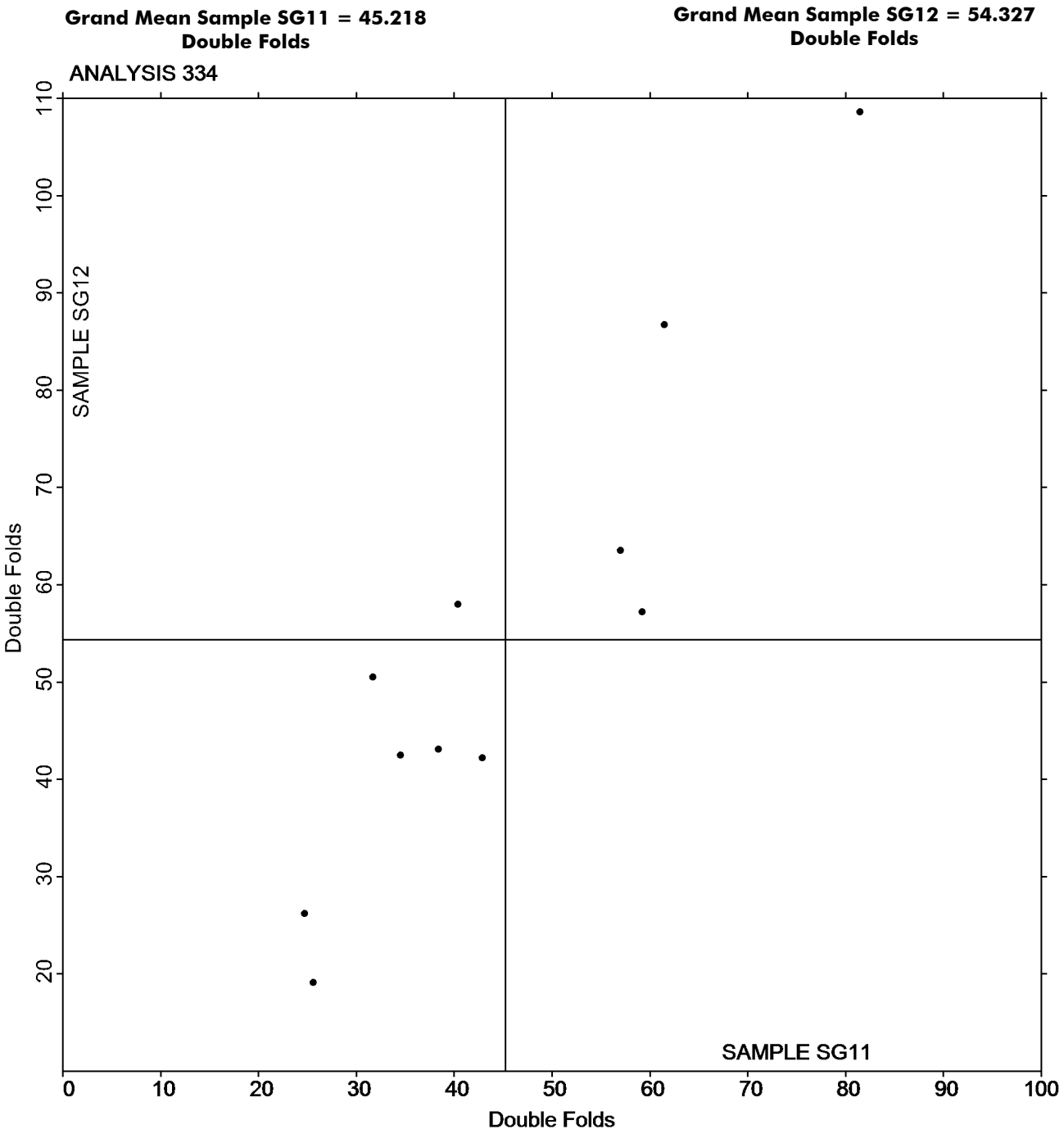
Statistics based on 11 of 12 reporting participants.

Comments on Assigned Data Flags for Test #334

L6U7NQ (X) - Extreme Data for Sample SG11.

Key to Instrument Codes Reported by Participants

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



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

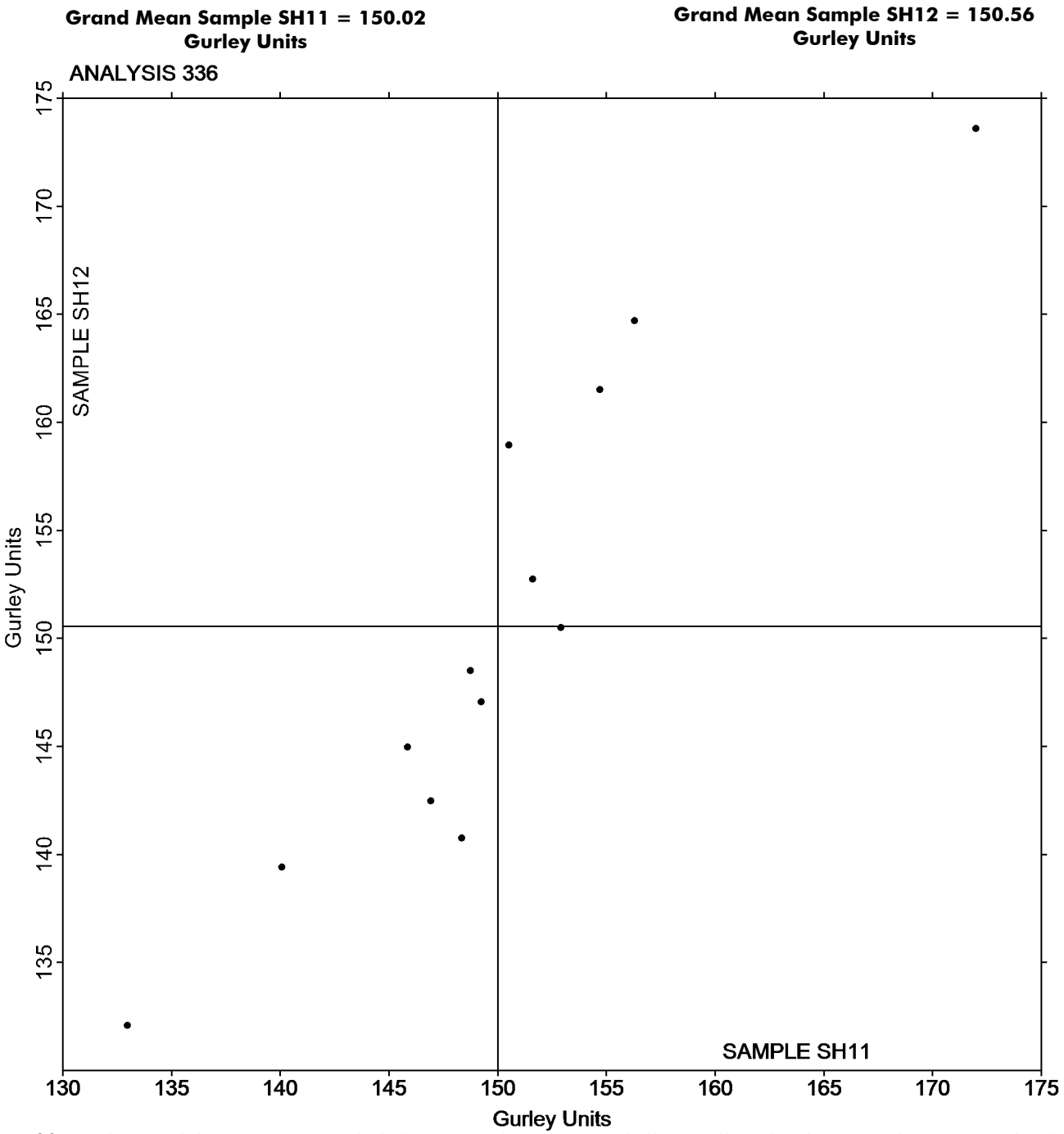
WebCode	Data Flag	Sample SH11 Lab Mean	Sample SH11 Diff from Grand Mean	Sample SH11 CPV	Sample SH12 Lab Mean	Sample SH12 Diff from Grand Mean	Sample SH12 CPV
3JEEF9		148.3	-1.7	-0.19	140.7	-9.8	-0.85
7K7E94		152.9	2.9	0.32	150.5	-0.1	0.00
7RZJ26		172.0	22.0	2.44	173.6	23.0	2.00
GHERQ3		150.5	0.5	0.05	159.0	8.4	0.73
HZVHKF	M	No data reported for this sample			128.1	-22.4	-1.94
JAYRAW		145.9	-4.2	-0.46	145.0	-5.6	-0.48
MFP9CX		154.7	4.7	0.52	161.5	10.9	0.95
Q8QB92		146.9	-3.1	-0.34	142.5	-8.1	-0.70
R43TBT		148.8	-1.3	-0.14	148.5	-2.1	-0.18
REHK2N		151.6	1.6	0.18	152.7	2.2	0.19
VAF9NU		140.1	-9.9	-1.10	139.4	-11.1	-0.96
VFLGXN		149.3	-0.8	-0.08	147.1	-3.5	-0.30
VVJWCJ		133.0	-17.0	-1.89	132.1	-18.5	-1.60
XNNDWC		156.3	6.3	0.70	164.7	14.1	1.22

Summary Statistics	Sample SH11	Sample SH12
Grand Means	150.02 Gurley Units	150.56 Gurley Units
Stnd Dev Btwn Labs	9.02 Gurley Units	11.55 Gurley Units

Statistics based on 13 of 14 reporting participants.

Comments on Assigned Data Flags for Test #336

HZVHKF (M) - Participant did not submit data for sample SH11.



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 338

Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

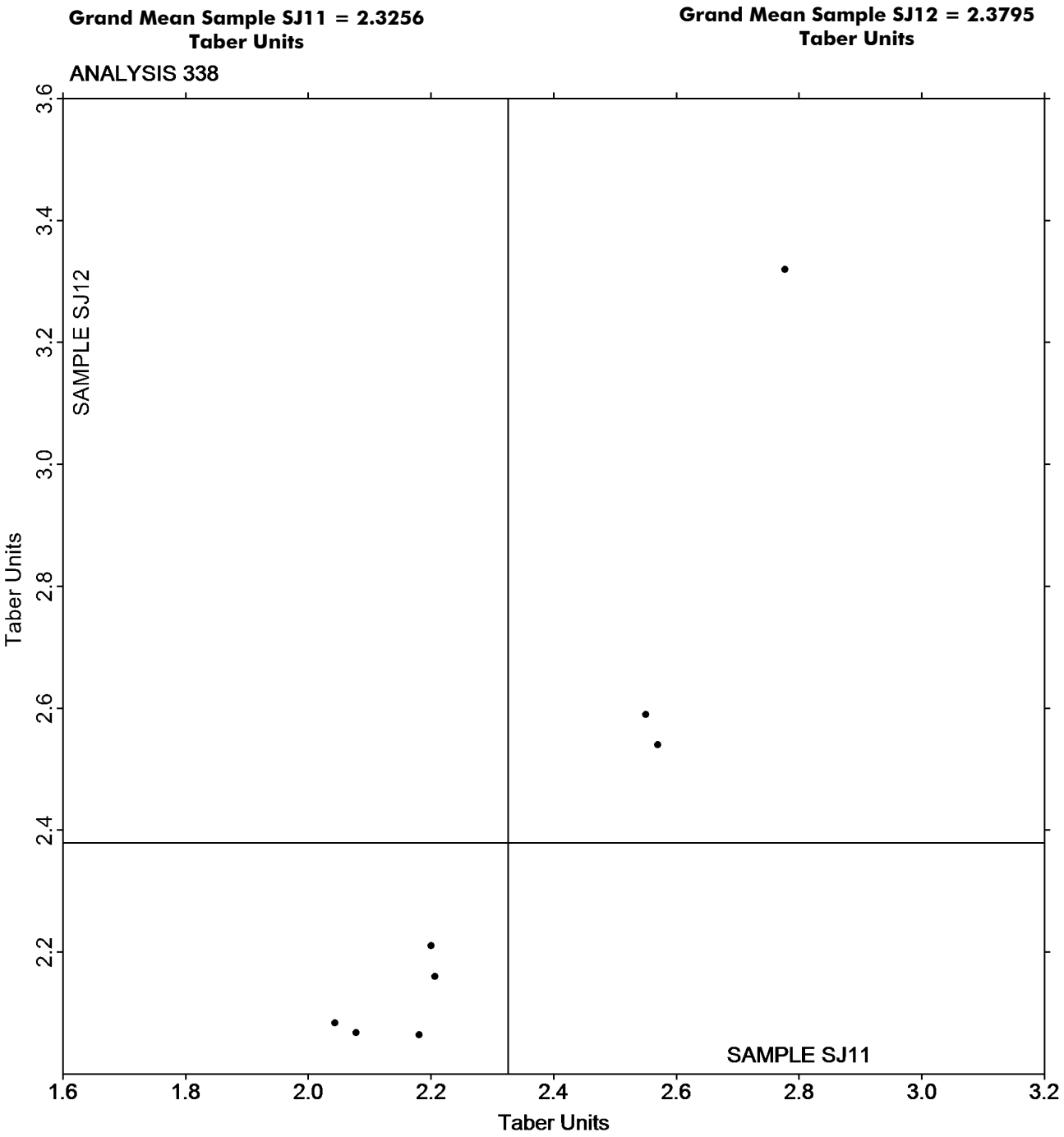
WebCode	Data Flag	Sample SJ11 Lab Mean	Sample SJ11 Diff from Grand Mean	Sample SJ11 CPV	Sample SJ12 Lab Mean	Sample SJ12 Diff from Grand Mean	Sample SJ12 CPV
26MZ4A		2.777	0.451	1.68	3.320	0.941	2.17
3ELE4Y	X	21.231	18.905	70.31	21.394	19.014	43.86
3JEEF9		2.078	-0.248	-0.92	2.068	-0.312	-0.72
AVUJRC		2.570	0.244	0.91	2.540	0.160	0.37
GHERQ3		2.550	0.224	0.83	2.590	0.210	0.49
HZVHKF		2.206	-0.120	-0.44	2.160	-0.220	-0.51
JAYRAW		2.043	-0.283	-1.05	2.084	-0.296	-0.68
MCQXGX		2.200	-0.126	-0.47	2.210	-0.170	-0.39
VFLGXN		2.181	-0.145	-0.54	2.064	-0.316	-0.73

Summary Statistics	Sample SJ11	Sample SJ12
Grand Means	2.33 Taber Units	2.38 Taber Units
Stnd Dev Btwn Labs	0.27 Taber Units	0.43 Taber Units

Statistics based on 8 of 9 reporting participants.

Comments on Assigned Data Flags for Test #338

3ELE4Y (X) - Extreme Data.



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

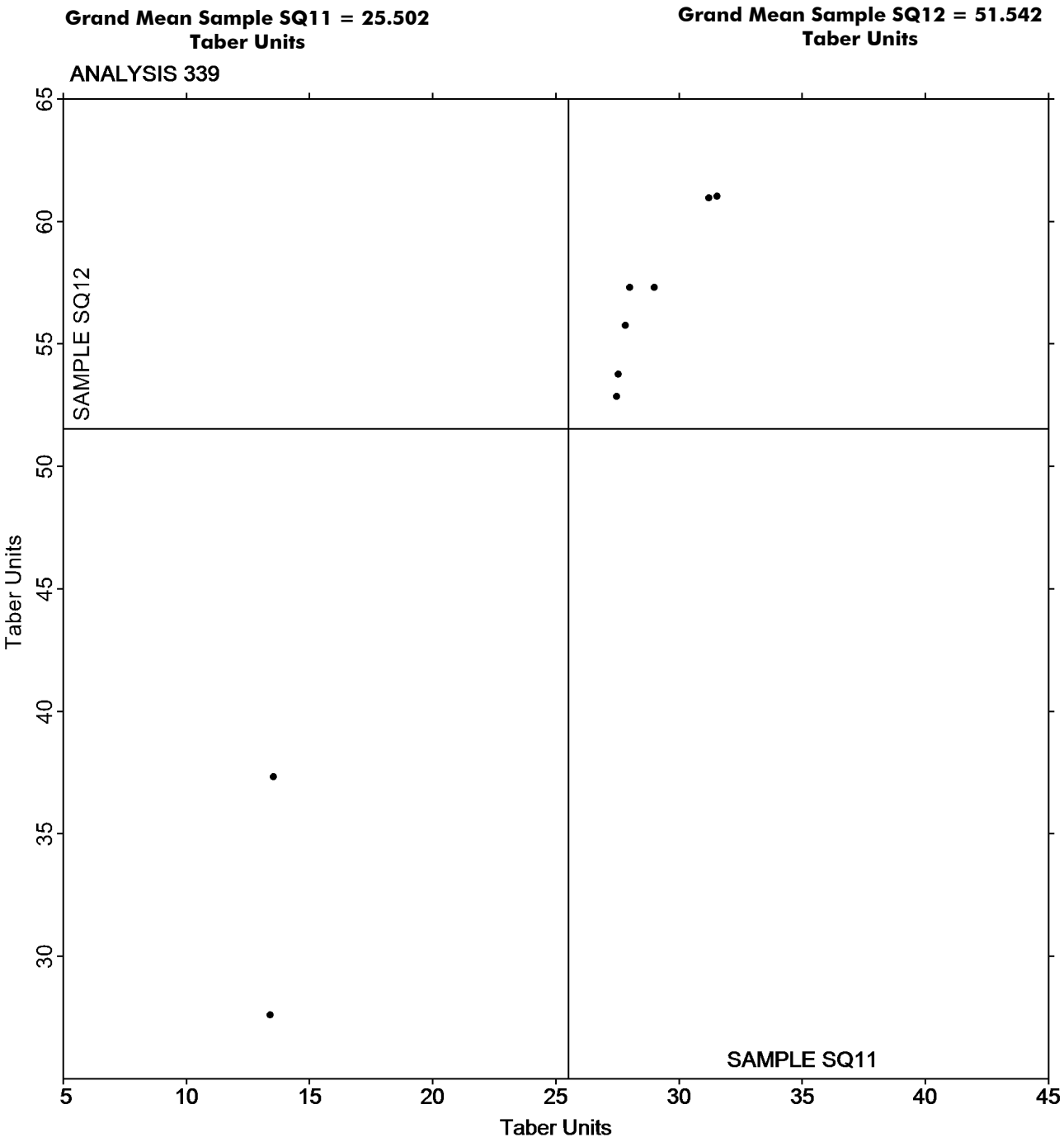
Bending Resistance, Taber Type - 10 to 100 Taber Units

TAPPI Official Test Method T489

WebCode	Data Flag	Sample SQ11 Lab Mean	Sample SQ11 Diff from Grand Mean	Sample SQ11 CPV	Sample SQ12 Lab Mean	Sample SQ12 Diff from Grand Mean	Sample SQ12 CPV
32KJ77		27.46	1.96	0.28	52.85	1.31	0.11
3T43DW		13.54	-11.97	-1.71	37.32	-14.22	-1.24
7BVCM4		27.83	2.32	0.33	55.75	4.21	0.37
CNMU34		31.21	5.71	0.82	60.96	9.42	0.82
H6T3MD		13.40	-12.10	-1.73	27.60	-23.94	-2.10
HZVHKF		28.01	2.51	0.36	57.30	5.76	0.50
RVTWJN		31.55	6.05	0.87	61.03	9.49	0.83
VVJWCJ		27.53	2.02	0.29	53.77	2.23	0.19
X8K4QK		29.00	3.50	0.50	57.30	5.76	0.50

Summary Statistics	Sample SQ11	Sample SQ12
Grand Means	25.50 Taber Units	51.54 Taber Units
Stnd Dev Btwn Labs	6.99 Taber Units	11.43 Taber Units

Statistics based on 9 of 9 reporting participants.



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

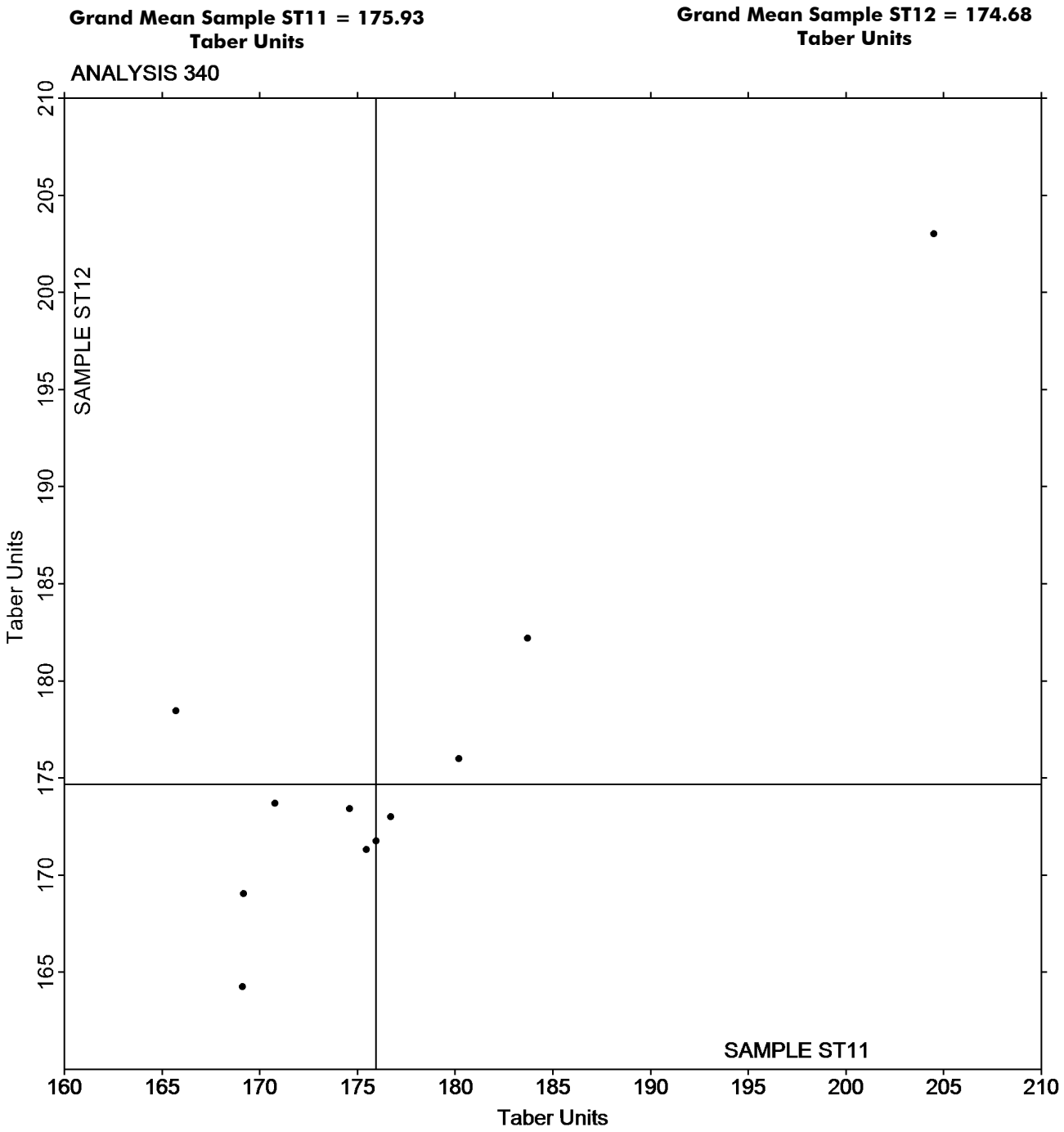
Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard

TAPPI Official Test Method T489

WebCode	Data Flag	Sample ST11 Lab Mean	Sample ST11 Diff from Grand Mean	Sample ST11 CPV	Sample ST12 Lab Mean	Sample ST12 Diff from Grand Mean	Sample ST12 CPV
32KJ77		170.8	-5.1	-0.49	173.7	-1.0	-0.09
8PTNV8		176.7	0.8	0.07	173.0	-1.7	-0.16
FGULB9		165.7	-10.2	-0.97	178.5	3.8	0.35
NMQDT3		165.3	-10.6	-1.00	160.0	-14.7	-1.37
NZEHZZ		204.5	28.6	2.70	203.0	28.3	2.65
REHK2N		176.0	0.0	0.00	171.8	-2.9	-0.27
TVL68X		180.2	4.3	0.40	176.0	1.3	0.12
UGHBHM		169.1	-6.8	-0.64	164.3	-10.4	-0.98
VVJWCJ		169.2	-6.8	-0.64	169.1	-5.6	-0.53
XBJM7K		183.7	7.8	0.73	182.2	7.5	0.70
YAMRY2		175.5	-0.5	-0.05	171.3	-3.4	-0.32
ZVKKFQ		174.6	-1.3	-0.13	173.4	-1.3	-0.12

Summary Statistics	Sample ST11	Sample ST12
Grand Means	175.93 Taber Units	174.68 Taber Units
Stnd Dev Btwn Labs	10.59 Taber Units	10.69 Taber Units

Statistics based on 12 of 12 reporting participants.



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

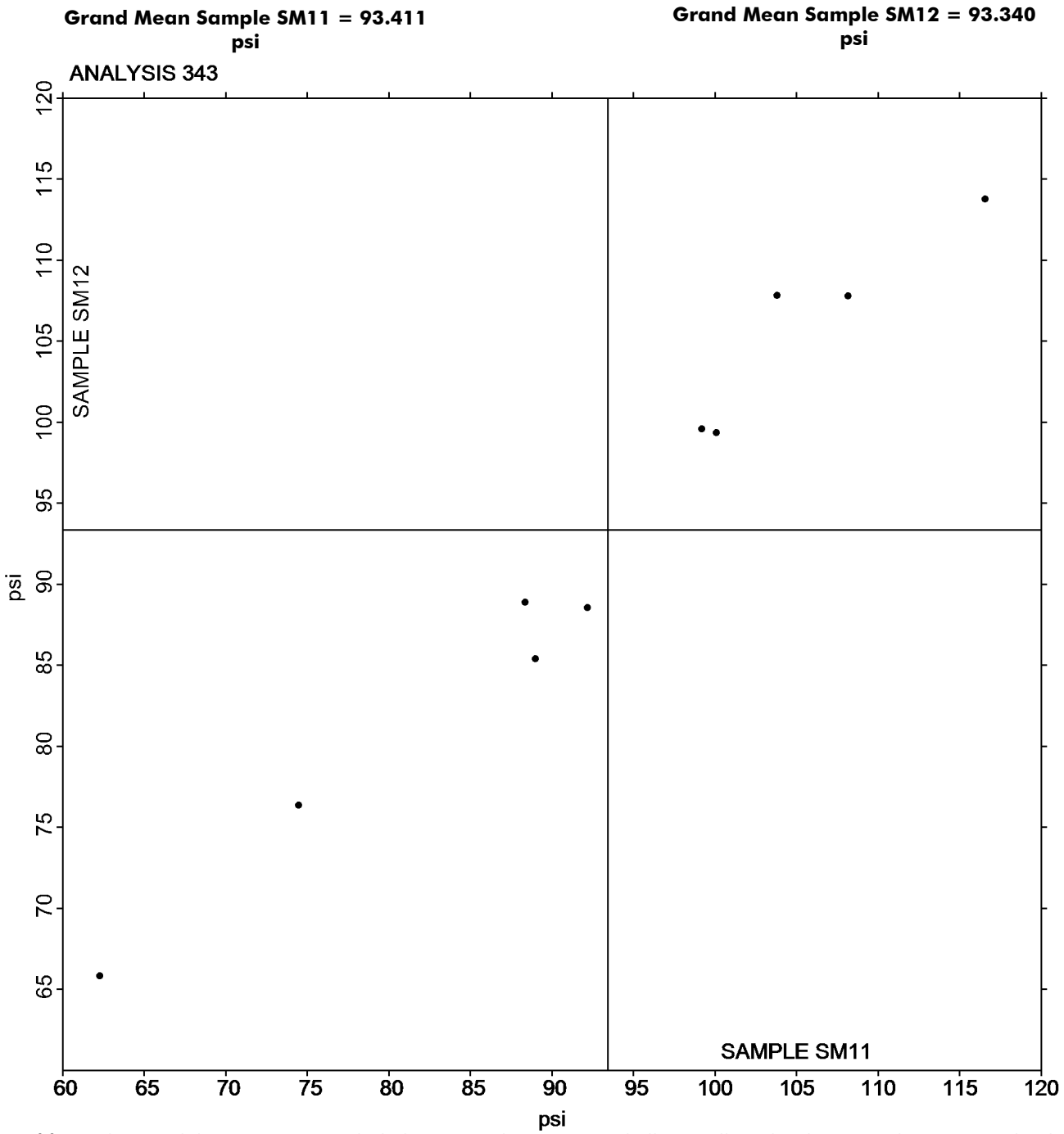
WebCode	Data Flag	Sample SM11 Lab Mean	Sample SM11 Diff from Grand Mean	Sample SM11 CPV	Sample SM12 Lab Mean	Sample SM12 Diff from Grand Mean	Sample SM12 CPV	Instr Code
23YM3J		92.19	-1.22	-0.08	88.56	-4.78	-0.32	LW
32KJ77		103.82	10.41	0.65	107.82	14.48	0.96	LW
3JEEF9		74.48	-18.93	-1.18	76.36	-16.98	-1.12	CD
B8EF7F		89.00	-4.41	-0.28	85.40	-7.94	-0.52	TA
CNMU34		100.08	6.67	0.42	99.36	6.02	0.40	CD
FGULB9		62.27	-31.15	-1.94	65.82	-27.52	-1.82	LW
H6T3MD		99.20	5.79	0.36	99.60	6.26	0.41	TA
R7M8UG		88.36	-5.05	-0.31	88.90	-4.44	-0.29	DX
RVTWJN		108.16	14.75	0.92	107.80	14.46	0.96	CD
ZVKKFQ		116.56	23.15	1.44	113.78	20.44	1.35	LW

Summary Statistics	Sample SM11	Sample SM12
Grand Means	93.41 psi	93.34 psi
Stnd Dev Btwn Labs	16.04 psi	15.14 psi

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

CD	CSI CS-163D	DX	Dek-Tron XP2 Series
LW	L & W ZD Tensile Tester	TA	Thwing-Albert Tensile Tester



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 SZ11 Lab Mean	Sample SZ11 Diff from Grand Mean	Sample SZ11 CPV	Sample SZ12 Lab Mean	Sample SZ12 Diff from Grand Mean	Sample SZ12 CPV	Instr Code
32KJ77		56.34	-6.97	-0.92	55.30	-8.74	-1.36	LW
3GCGAM		66.58	3.27	0.43	69.12	5.08	0.79	TA
438C3D		71.32	8.01	1.06	72.22	8.18	1.27	LW
76R8VJ		74.24	10.94	1.45	71.64	7.61	1.18	CH
8PTNV8		59.16	-4.15	-0.55	59.16	-4.88	-0.76	TA
9MKVEE		44.50	-18.81	-2.49	52.74	-11.30	-1.76	XX
CU7M22		59.40	-3.91	-0.52	59.20	-4.84	-0.75	CA
DYHWRB		51.88	-11.43	-1.52	60.12	-3.92	-0.61	LW
JF7LGU		65.24	1.93	0.26	67.82	3.78	0.59	DT
NMQDT3		66.52	3.21	0.43	58.84	-5.20	-0.81	LW
REHK2N		67.64	4.33	0.57	63.68	-0.36	-0.06	CA
TVL68X		59.60	-3.71	-0.49	64.20	0.16	0.03	CA
VEUTTU		68.34	5.03	0.67	67.40	3.36	0.52	TA
VVJWCJ		66.20	2.89	0.38	66.26	2.22	0.35	CA
XBJM7K		56.20	-7.11	-0.94	58.20	-5.84	-0.91	CD
XCFX7T		72.84	9.53	1.26	71.92	7.88	1.23	DP
YAMRY2		60.54	-2.77	-0.37	59.94	-4.10	-0.64	TA
YQQXXG		71.96	8.65	1.15	72.14	8.10	1.26	LW
YYPTAG		61.00	-2.31	-0.31	57.40	-6.64	-1.03	CA
Z3JEMH		66.66	3.35	0.44	73.42	9.38	1.46	LW

Summary Statistics	Sample SZ11	Sample SZ12
Grand Means	63.31 psi	64.04 psi
Stnd Dev Btwn Labs	7.54 psi	6.43 psi

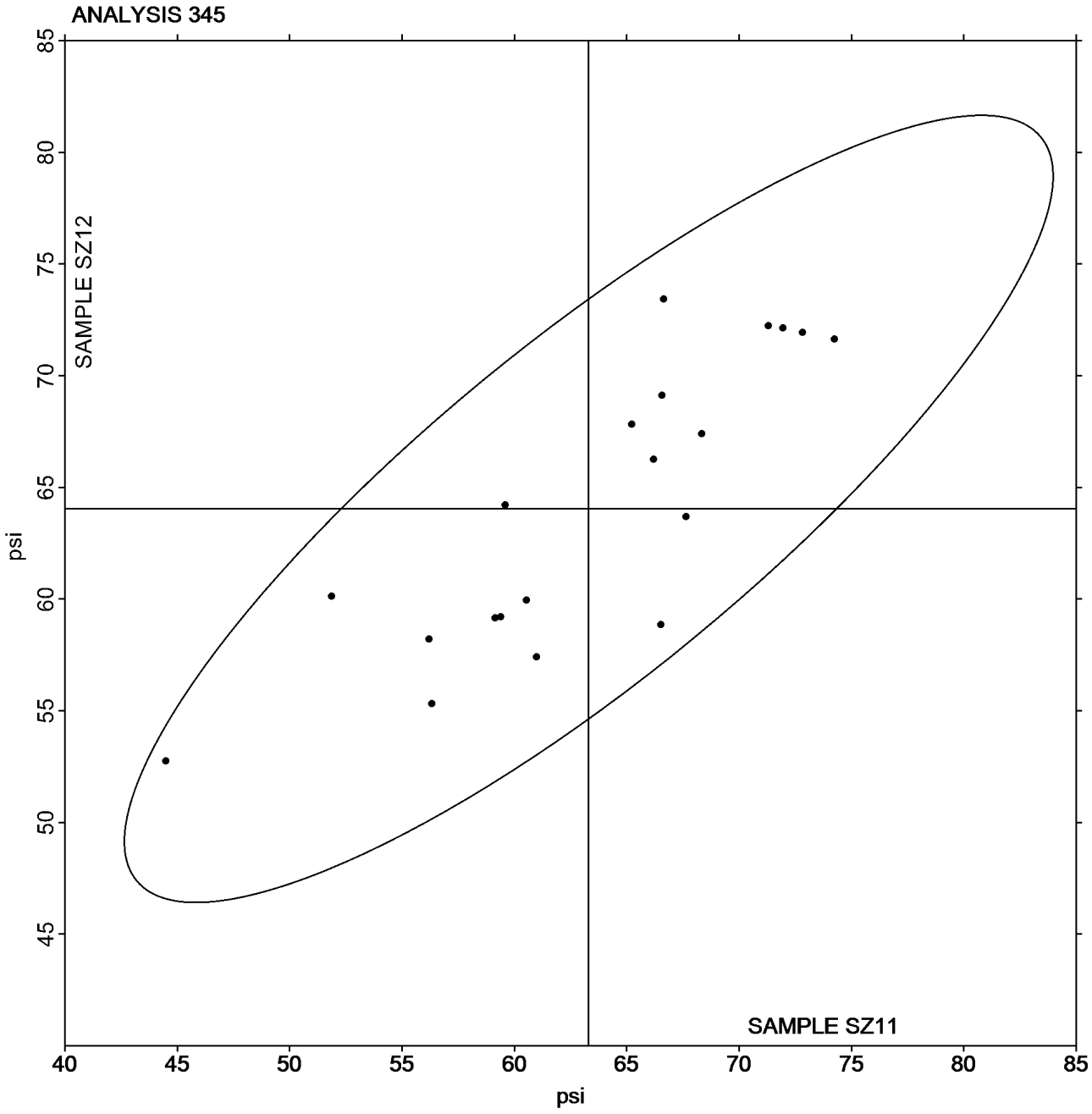
Statistics based on 20 of 20 reporting participants.

Key to Instrument Codes Reported by Participants

CA	CSI CS-163	CD	CSI CS-163D
CH	Chatillon Ametek	DP	Dek-Tron XP Series
DT	Dek-Tron DCS-163D ZDT Tester	LW	L & W ZD Tensile Tester
TA	Thwing-Albert Tensile Tester	XX	Instrument make/model not specified by lab

Grand Mean Sample SZ11 = 63.308 psi

Grand Mean Sample SZ12 = 64.036 psi



Paper & Paperboard Interlaboratory Testing Program

Analysis 348

Internal Bond Strength - Modified Scott Mechanics

TAPPI Provisional Test Method T569

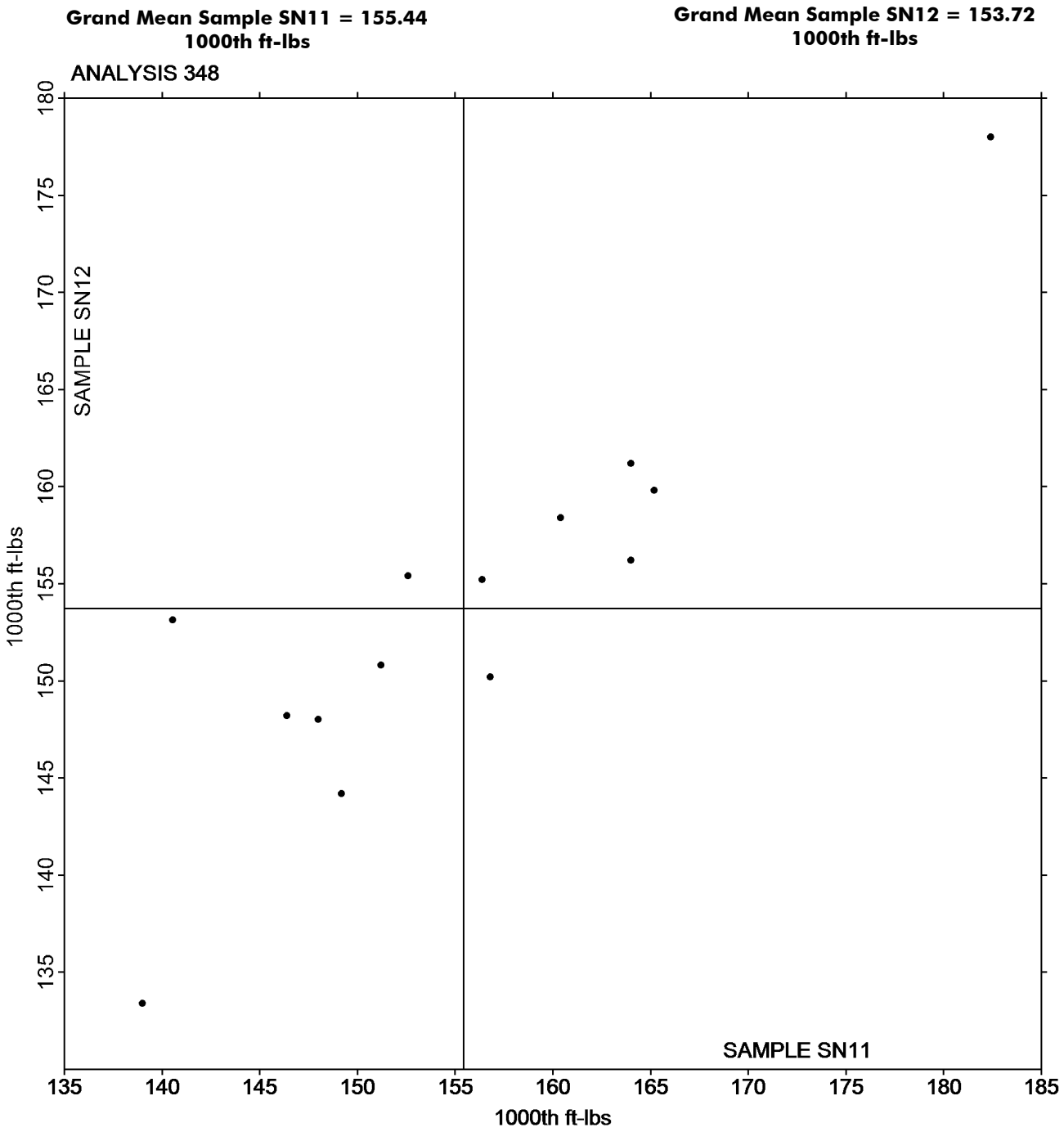
WebCode	Data Flag	Sample SN11 Lab Mean	Sample SN11 Diff from Grand Mean	Sample SN11 CPV	Sample SN12 Lab Mean	Sample SN12 Diff from Grand Mean	Sample SN12 CPV	Instr Code
32KJ77		152.6	-2.8	-0.25	155.4	1.7	0.17	HY
3M2VYU		156.4	1.0	0.08	155.2	1.5	0.15	HY
7GH28D		146.4	-9.0	-0.79	148.2	-5.5	-0.55	HZ
7RZJ26		148.0	-7.4	-0.65	148.0	-5.7	-0.57	HY
CNMU34		165.2	9.8	0.86	159.8	6.1	0.61	HY
GHERQ3		139.0	-16.4	-1.44	133.4	-20.3	-2.03	KR
H6T3MD		182.4	27.0	2.36	178.0	24.3	2.42	HZ
PZ9VAQ		164.0	8.6	0.75	161.2	7.5	0.75	HY
REHK2N		140.6	-14.9	-1.31	153.1	-0.6	-0.06	HZ
RVTWJN		156.8	1.4	0.12	150.2	-3.5	-0.35	HY
TVL68X		164.0	8.6	0.75	156.2	2.5	0.25	XX
VAF9NU		149.2	-6.2	-0.55	144.2	-9.5	-0.95	HY
WAEVGR		160.4	5.0	0.44	158.4	4.7	0.47	HX
ZVKKFQ		151.2	-4.2	-0.37	150.8	-2.9	-0.29	HZ

Summary Statistics	Sample SN11	Sample SN12
Grand Means	155.44 1000th ft-lbs	153.72 1000th ft-lbs
Stnd Dev Btwn Labs	11.40 1000th ft-lbs	10.01 1000th ft-lbs

Statistics based on 14 of 14 reporting participants.

Key to Instrument Codes Reported by Participants

HX	Huygen Internal Scott Bond Tester	HY	Huygen Digitized Internal Scott Bond Tester
HZ	Huygen Internal Bond Tester with AccuPress	KR	Kumagai Riki Kogyo Internal Bond Tester
XX	Instrument make/model not specified by lab		



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 349

Internal Bond Strength - Scott Bond Models

TAPPI Provisional Test Method T569

WebCode	Data Flag	Sample SP11 Lab Mean	Sample SP11 Diff from Grand Mean	Sample SP11 CPV	Sample SP12 Lab Mean	Sample SP12 Diff from Grand Mean	Sample SP12 CPV	Instr Code
3ELE4Y		144.6	3.0	0.13	145.6	1.2	0.06	SC
6LJQBF		134.5	-7.1	-0.32	135.6	-8.8	-0.39	SC
76R8VJ		91.2	-50.4	-2.24	95.0	-49.4	-2.21	TM
7EWDPL		158.0	16.4	0.73	170.2	25.8	1.16	TM
86LB4K		146.6	5.0	0.22	152.4	8.0	0.36	TM
CUN4CG		146.4	4.8	0.21	152.8	8.4	0.38	SC
FGULB9		145.1	3.5	0.16	141.5	-2.9	-0.13	TM
HZVHKF		154.4	12.8	0.57	148.8	4.4	0.20	SC
JAYRAW		167.2	25.5	1.13	176.1	31.7	1.42	TM
NMMQFV		141.6	0.0	0.00	142.8	-1.6	-0.07	TM
X8K4QK		164.6	23.0	1.02	157.8	13.4	0.60	XX
XCFX7T		105.2	-36.4	-1.61	113.9	-30.5	-1.37	TM

Summary Statistics	Sample SP11	Sample SP12
Grand Means	141.62 1000th ft-lbs	144.37 1000th ft-lbs
Stnd Dev Btwn Labs	22.56 1000th ft-lbs	22.29 1000th ft-lbs

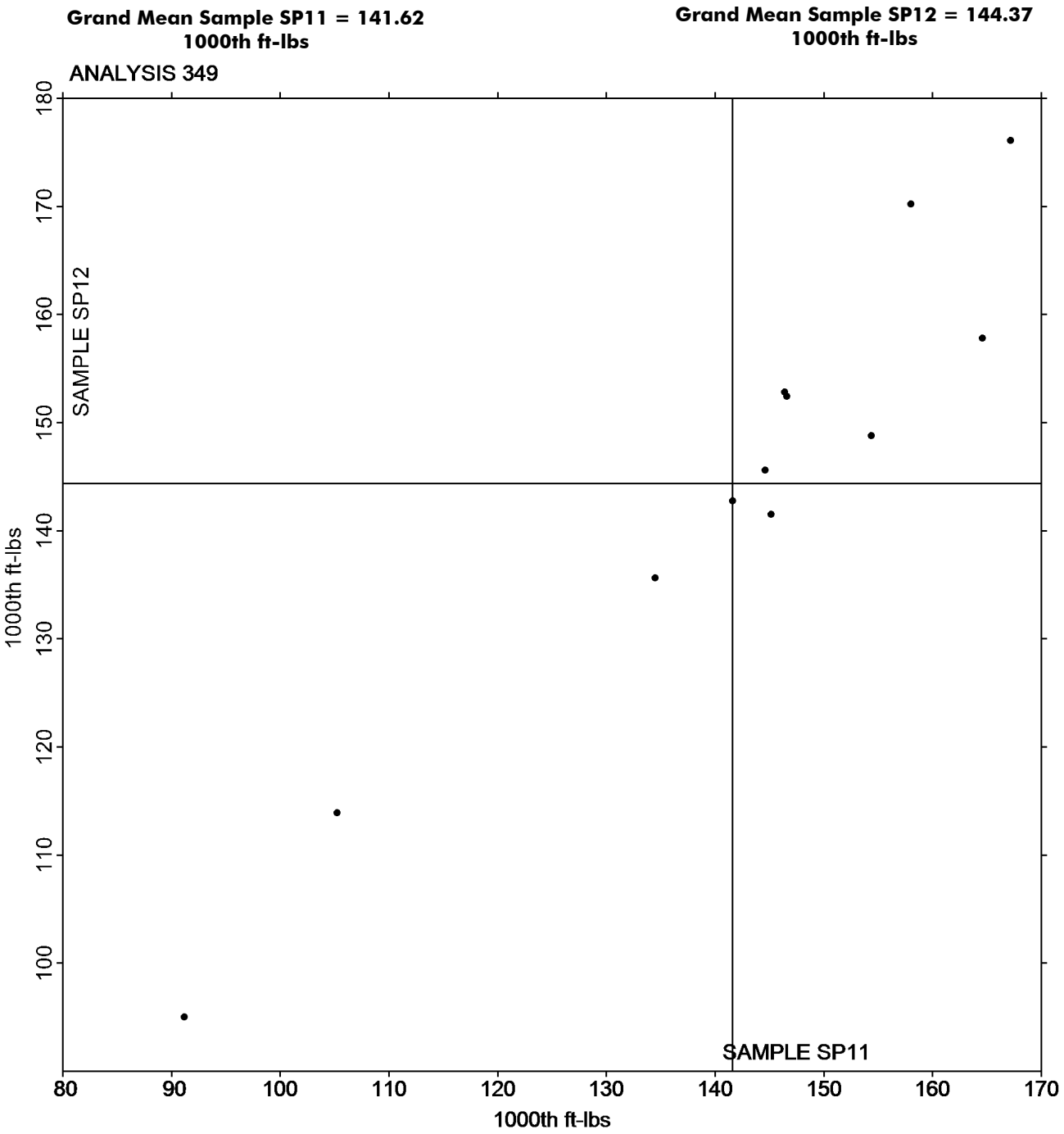
Statistics based on 12 of 12 reporting participants.

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



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

-End of Report-

