Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #3201 S - September 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
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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
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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 SA09 Lab Mean	Sample SA09 Diff from Grand Mean	Sample SA09 CPV	Sample SA10 Lab Mean	Sample SA10 Diff from Grand Mean	Sample SA10 CPV
3BRRVP		43.91	0.50	0.29	45.39	2.16	1.01
3NE2FA		42.29	-1.12	-0.66	42.31	-0.93	-0.44
4RGCVA	*	43.59	0.18	0.10	37.15	-6.08	-2.86
9KXMEW		44.03	0.62	0.36	45.92	2.69	1.26
9WBM94		43.24	-0.18	-0.10	43.27	0.03	0.01
E72CE7	*	38.55	-4.86	-2.85	41.40	-1.83	-0.86
ETDCJX		44.54	1.13	0.66	42.52	-0.71	-0.34
EX6GC2		42.05	-1.36	-0.80	41.45	-1.78	-0.84
FJ4CEN	X	16.39	-27.02	-15.85	15.59	-27.64	-12.99
FX2EZ3		43.38	-0.04	-0.02	40.41	-2.82	-1.33
GDANK3		42.16	-1.25	-0.73	42.05	-1.19	-0.56
HWXFWK		42.40	-1.01	-0.60	43.20	-0.03	-0.02
JDM4LA		43.59	0.18	0.10	43.16	-0.07	-0.03
KEW9XC		45.40	1.99	1.16	45.30	2.07	0.97
LWACUN		40.38	-3.04	-1.78	42.03	-1.20	-0.56
MB7TFF		44.18	0.77	0.45	45.02	1.79	0.84
N8GYX6		43.33	-0.08	-0.05	43.58	0.35	0.16
NH4WNB		45.28	1.86	1.09	43.87	0.63	0.30
RJ4ZBH		43.77	0.36	0.21	45.65	2.42	1.14
VNLTDJ		42.79	-0.62	-0.36	44.08	0.85	0.40
WBW2HH		46.72	3.30	1.94	44.12	0.89	0.42
WHVLNJ		43.71	0.30	0.17	42.56	-0.67	-0.32
WKYG72		46.00	2.59	1.52	47.70	4.47	2.10
WX92M9		43.56	0.15	0.09	43.18	-0.05	-0.03
Y3TVJW		43.10	-0.31	-0.18	42.30	-0.93	-0.44

Summary Statistics	Sample SA09	Sample SA10
Grand Means	43.41 psi	43.23 psi
Stnd Dev Btwn Labs	1.71 psi	2.13 psi

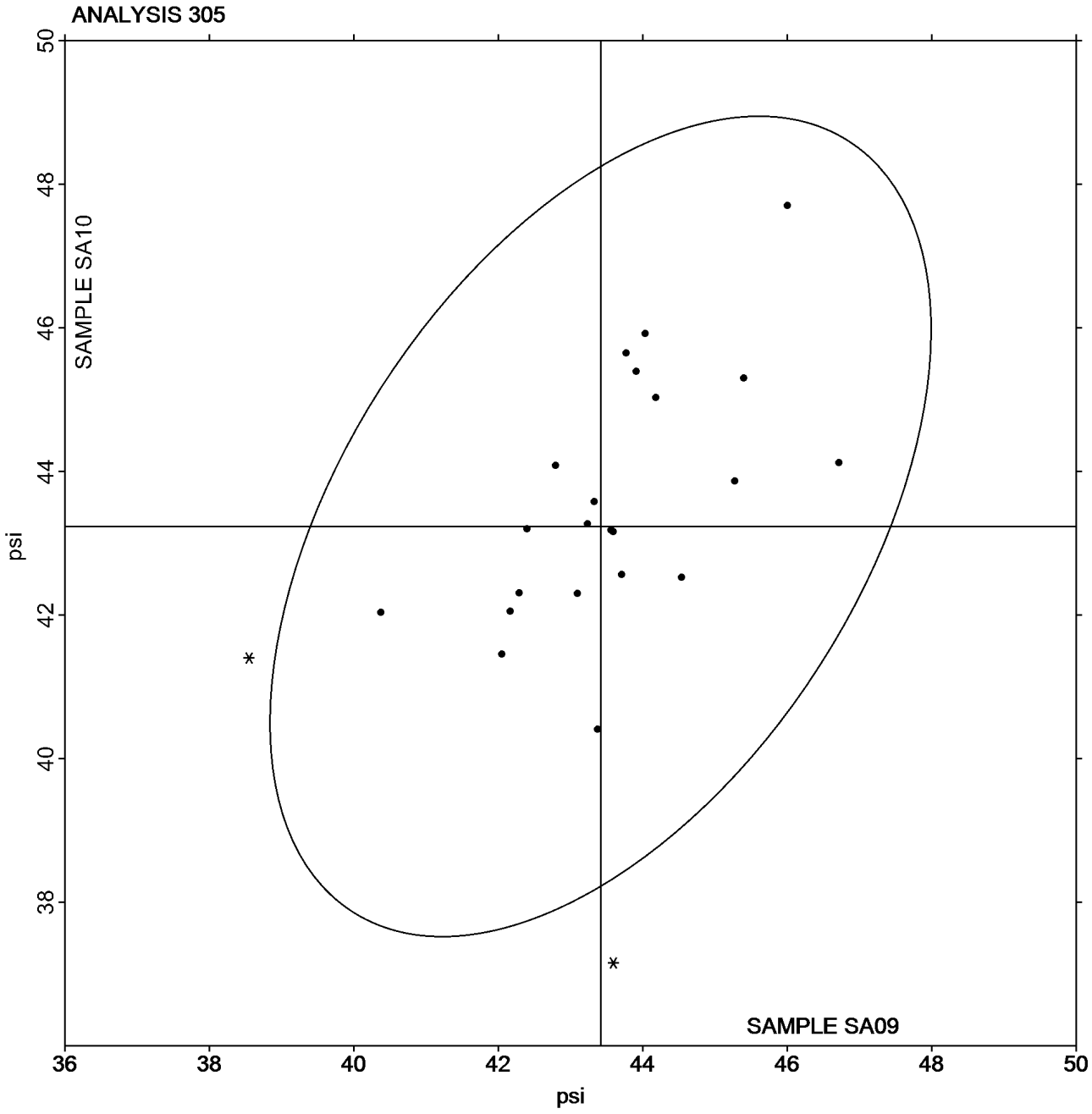
Statistics based on 24 of 25 reporting participants.

Comments on Assigned Data Flags for Test #305

FJ4CEN (X) - Extreme Data.

Grand Mean Sample SA09 = 43.415 psi

Grand Mean Sample SA10 = 43.234 psi



Paper & Paperboard Interlaboratory Testing Program

Analysis 310

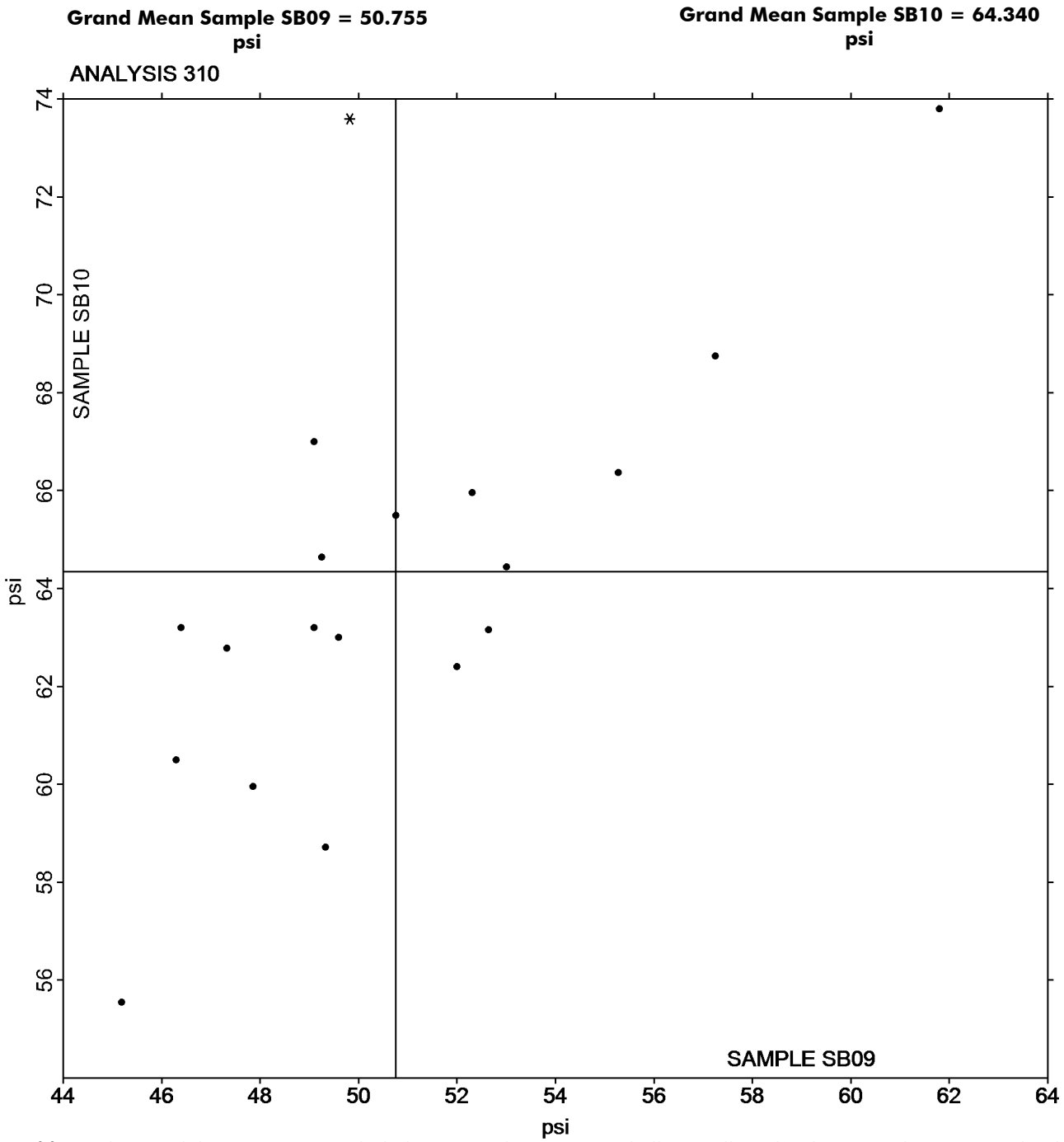
Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

WebCode	Data Flag	Sample SB09 Lab Mean	Sample SB09 Diff from Grand Mean	Sample SB09 CPV	Sample SB10 Lab Mean	Sample SB10 Diff from Grand Mean	Sample SB10 CPV
36QFYT		49.26	-1.50	-0.37	64.63	0.29	0.07
6UVE88		53.01	2.26	0.55	64.44	0.10	0.02
76V33B		57.25	6.49	1.59	68.75	4.41	0.98
7JRGZJ		47.33	-3.43	-0.84	62.77	-1.57	-0.35
89DNBN		46.30	-4.45	-1.09	60.50	-3.84	-0.85
A2GVT7		55.27	4.52	1.11	66.37	2.03	0.45
AYYEXF		46.40	-4.35	-1.07	63.20	-1.14	-0.25
EVEHWH		45.19	-5.56	-1.36	55.55	-8.79	-1.95
FEAD6Y		47.86	-2.90	-0.71	59.96	-4.39	-0.97
FNBVK9		61.80	11.05	2.71	73.80	9.46	2.10
FRFJ46		49.10	-1.65	-0.41	67.00	2.66	0.59
H6XXBW		49.33	-1.43	-0.35	58.71	-5.63	-1.25
JEGR66		49.60	-1.15	-0.28	63.00	-1.34	-0.30
KCKT6W		52.64	1.89	0.46	63.15	-1.19	-0.26
L3F32Z		49.10	-1.65	-0.41	63.20	-1.14	-0.25
QJAYPZ	*	49.82	-0.93	-0.23	73.59	9.25	2.06
RULQQE		52.00	1.25	0.31	62.40	-1.94	-0.43
VD7LVX		52.32	1.56	0.38	65.95	1.61	0.36
WBW2HH		50.77	0.01	0.00	65.49	1.15	0.26

Summary Statistics	Sample SB09	Sample SB10
Grand Means	50.75 psi	64.34 psi
Stnd Dev Btwn Labs	4.08 psi	4.50 psi

Statistics based on 19 of 19 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 312

Tearing Strength - Printing Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SC09 Lab Mean	Sample SC09 Diff from Grand Mean	Sample SC09 CPV	Sample SC10 Lab Mean	Sample SC10 Diff from Grand Mean	Sample SC10 CPV
24YXH2		54.39	-9.25	-2.33	54.72	-8.33	-2.14
36QFYT		67.50	3.85	0.97	66.10	3.05	0.78
3NE2FA		66.11	2.46	0.62	65.34	2.30	0.59
6UVE88		62.36	-1.29	-0.32	61.94	-1.11	-0.28
78MZEN		62.32	-1.32	-0.33	61.66	-1.39	-0.36
7JRGZJ		73.32	9.67	2.43	71.95	8.90	2.28
9KXMEW		64.78	1.13	0.29	62.54	-0.51	-0.13
9WBM94		66.21	2.57	0.65	65.45	2.40	0.62
AYYEXF		61.75	-1.89	-0.48	59.90	-3.15	-0.81
B7D3Q9	X	57.20	-6.44	-1.62	60.40	-2.65	-0.68
CV6RTG		56.19	-7.46	-1.88	56.43	-6.62	-1.70
E6NM8M		65.44	1.80	0.45	65.74	2.69	0.69
E8WZTV		58.62	-5.02	-1.26	57.90	-5.15	-1.32
EHG662		66.74	3.10	0.78	66.18	3.13	0.80
ETDCJX		59.10	-4.54	-1.14	59.20	-3.85	-0.99
FJ4CEN	*	72.61	8.97	2.26	73.66	10.61	2.72
FX2EZ3		63.52	-0.12	-0.03	63.58	0.53	0.14
GDANK3		65.63	1.99	0.50	64.05	1.00	0.26
H6XXBW		64.43	0.78	0.20	64.02	0.97	0.25
JEGR66		64.19	0.55	0.14	62.69	-0.36	-0.09
KEW9XC		67.10	3.46	0.87	68.40	5.35	1.37
L4AQJV		58.44	-5.20	-1.31	57.68	-5.37	-1.38
LJKAF3		61.14	-2.50	-0.63	61.02	-2.03	-0.52
LWACUN		67.31	3.66	0.92	64.91	1.86	0.48
MB7TFF		60.38	-3.27	-0.82	60.60	-2.45	-0.63
NH4WNB		59.44	-4.20	-1.06	60.30	-2.75	-0.70
NVNEGE		68.60	4.95	1.25	68.59	5.55	1.42
P3N9WR		60.44	-3.20	-0.81	58.50	-4.55	-1.17
PUFF6K		60.98	-2.66	-0.67	60.30	-2.75	-0.70
Q67XP4	*	66.00	2.36	0.59	62.60	-0.45	-0.11
QQMAF7		61.28	-2.36	-0.59	60.72	-2.33	-0.60
QR44J2		67.60	3.96	1.00	67.22	4.17	1.07
QVFEAA		68.58	4.94	1.24	67.14	4.09	1.05
RFZBMF		58.26	-5.38	-1.35	58.66	-4.39	-1.13
RJ4ZBH		61.61	-2.03	-0.51	62.39	-0.66	-0.17
RULQQE		67.80	4.16	1.05	68.00	4.95	1.27
TLKTGG		63.56	-0.08	-0.02	63.10	0.05	0.01
VD7LVX		60.07	-3.57	-0.90	58.87	-4.18	-1.07
WBW2HH		64.82	1.18	0.30	64.64	1.59	0.41
WHVLNJ		63.48	-0.16	-0.04	63.57	0.52	0.13

Paper & Paperboard Interlaboratory Testing Program

Analysis 312

Tearing Strength - Printing Papers

TAPPI Official Test Method T414

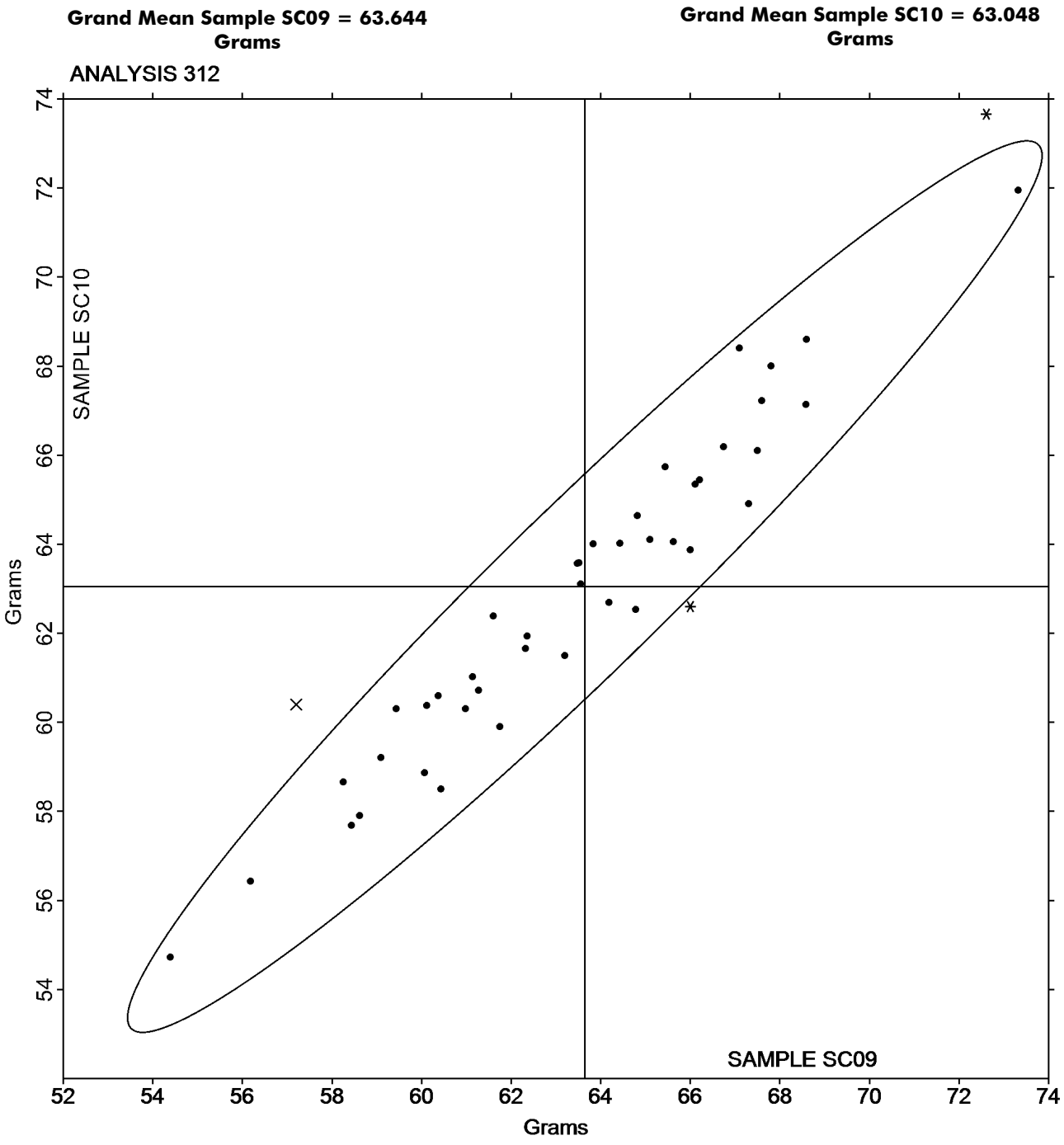
WebCode	Data Flag	Sample SC09 Lab Mean	Sample SC09 Diff from Grand Mean	Sample SC09 CPV	Sample SC10 Lab Mean	Sample SC10 Diff from Grand Mean	Sample SC10 CPV
WKYG72		63.84	0.20	0.05	64.00	0.95	0.24
WNYR22		66.00	2.36	0.59	63.87	0.82	0.21
WX92M9		65.10	1.46	0.37	64.10	1.05	0.27
X9Z3JA		60.12	-3.52	-0.89	60.38	-2.67	-0.68
Y3TVJW		63.20	-0.44	-0.11	61.50	-1.55	-0.40

Summary Statistics	Sample SC09	Sample SC10
Grand Means	63.64 Grams	63.05 Grams
Stnd Dev Btwn Labs	3.98 Grams	3.90 Grams

Statistics based on 44 of 45 reporting participants.

Comments on Assigned Data Flags for Test #312

B7D3Q9 (X) - Inconsistent in testing between samples.



Paper & Paperboard Interlaboratory Testing Program

Analysis 314

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SD09 Lab Mean	Sample SD09 Diff from Grand Mean	Sample SD09 CPV	Sample SD10 Lab Mean	Sample SD10 Diff from Grand Mean	Sample SD10 CPV
2WGKLM		182.1	4.8	0.32	136.4	1.8	0.13
36QFYT		187.5	10.3	0.68	134.9	0.3	0.02
3BRRVP		162.8	-14.4	-0.95	110.2	-24.3	-1.73
4BCN3J		167.1	-10.2	-0.67	135.2	0.7	0.05
4RGCVA		177.4	0.1	0.01	133.1	-1.5	-0.10
62XGFE		166.6	-10.7	-0.70	123.3	-11.3	-0.80
76V33B		172.3	-4.9	-0.32	127.9	-6.6	-0.47
89DNBN		188.6	11.3	0.74	139.8	5.2	0.37
8BGJR7		182.1	4.8	0.32	137.1	2.6	0.18
9NZNET	X	23.5	-153.8	-10.11	17.7	-116.8	-8.33
AC4W9F	*	135.3	-41.9	-2.76	105.2	-29.3	-2.09
AJ68JE		172.6	-4.7	-0.31	143.7	9.2	0.65
D7H93Z		193.5	16.3	1.07	152.4	17.9	1.27
E72CE7	*	223.8	46.6	3.06	171.8	37.3	2.66
EA4DE4		156.5	-20.8	-1.36	127.7	-6.8	-0.49
EVEHWH		175.9	-1.4	-0.09	139.2	4.6	0.33
FEAD6Y		168.6	-8.7	-0.57	126.0	-8.5	-0.61
FRFJ46		176.2	-1.0	-0.07	130.4	-4.1	-0.30
H6XXBW		186.4	9.2	0.60	149.0	14.4	1.03
JDM4LA		169.6	-7.7	-0.50	132.5	-2.0	-0.15
KCKT6W		183.9	6.6	0.44	141.8	7.3	0.52
N4ZNQT		197.9	20.6	1.36	155.0	20.4	1.46
N8GYX6		176.1	-1.2	-0.08	141.6	7.1	0.50
PD2D4N		176.9	-0.4	-0.03	126.2	-8.3	-0.59
PMDDVE	X	247.4	70.1	4.61	186.1	51.6	3.67
QBBRQQ		167.7	-9.6	-0.63	130.0	-4.5	-0.32
RULQQE		183.6	6.3	0.42	136.0	1.5	0.10
VNLTDJ		176.0	-1.3	-0.09	128.5	-6.1	-0.43
VY2PCV		192.3	15.0	0.99	152.7	18.2	1.29
WBW2HH		178.3	1.0	0.07	138.5	4.0	0.28
WEX6A4		188.6	11.3	0.74	138.8	4.2	0.30
XHPVV7		178.7	1.4	0.09	131.9	-2.6	-0.19
Y3TVJW		175.2	-2.1	-0.14	128.9	-5.6	-0.40
Z6RVUE	*	152.5	-24.8	-1.63	99.6	-35.0	-2.49

Summary Statistics	Sample SD09	Sample SD10
Grand Means	177.27 Grams	134.54 Grams
Stnd Dev Btwn Labs	15.22 Grams	14.03 Grams

Statistics based on 32 of 34 reporting participants.

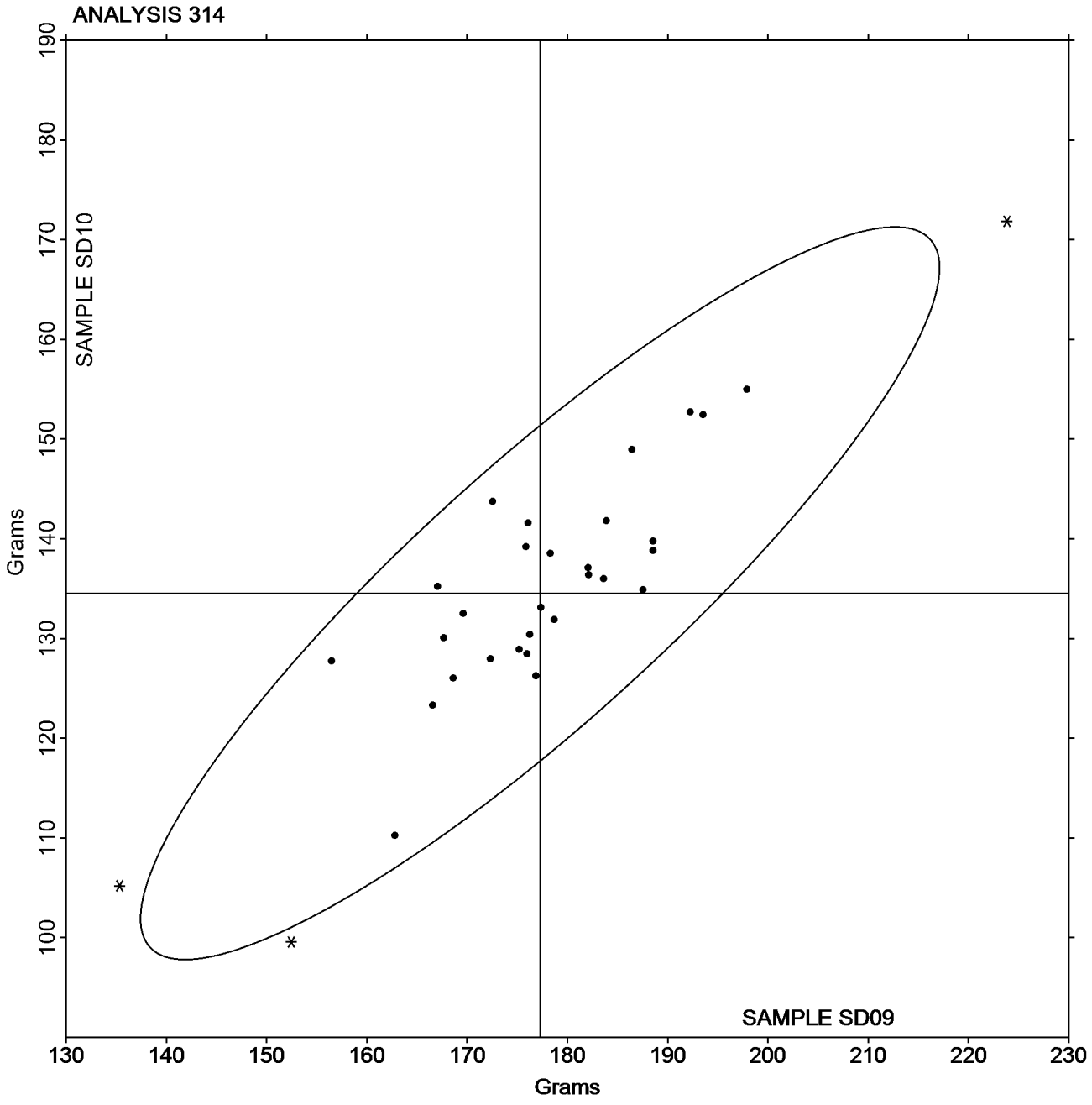
Comments on Assigned Data Flags for Test #314

PMDDVE (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample SD10.

9NZNET (X) - Extreme Data.

Grand Mean Sample SD09 = 177.27 Grams

Grand Mean Sample SD10 = 134.54 Grams



WebCode	Data Flag	Sample SF09 Lab Mean	Sample SF09 Diff from Grand Mean	Sample SF09 CPV	Sample SF10 Lab Mean	Sample SF10 Diff from Grand Mean	Sample SF10 CPV	Instr Code
24YXH2		7.042	0.231	0.75	6.984	0.178	0.67	TJ
3NE2FA		7.240	0.429	1.39	7.239	0.433	1.62	LI
4PRT76		6.607	-0.204	-0.66	6.592	-0.214	-0.80	ID
78MZEN		7.280	0.469	1.52	7.357	0.551	2.05	XX
8BGJR7		6.774	-0.037	-0.12	6.762	-0.044	-0.16	TO
9KXMEW		6.447	-0.364	-1.18	6.613	-0.193	-0.72	LB
9WBM94		7.227	0.416	1.35	7.147	0.341	1.27	LF
B7D3Q9		6.950	0.139	0.45	6.917	0.111	0.41	TC
BLK2V6		7.106	0.295	0.96	7.017	0.211	0.79	TV
CV6RTG		6.957	0.146	0.47	7.020	0.214	0.80	LA
DU8JKX		6.923	0.112	0.36	7.045	0.239	0.89	FP
E6NM8M		6.502	-0.309	-1.00	6.511	-0.295	-1.10	LJ
ETDCJX		7.059	0.248	0.81	6.895	0.089	0.33	TJ
FJ4CEN	X	7.823	1.012	3.28	8.047	1.241	4.63	VM
FX2EZ3		6.777	-0.034	-0.11	6.720	-0.086	-0.32	TF
GDANK3		6.804	-0.007	-0.02	6.967	0.161	0.60	LE
HWXFWK		6.539	-0.272	-0.88	6.420	-0.386	-1.44	TS
JEGR66		6.754	-0.057	-0.18	6.720	-0.086	-0.32	TV
K3ZA4K		6.475	-0.336	-1.09	6.474	-0.332	-1.24	TV
KEW9XC		6.400	-0.411	-1.33	6.522	-0.284	-1.06	TO
L4AQJV		6.509	-0.302	-0.98	6.319	-0.487	-1.82	TB
LJKAF3		6.874	0.063	0.20	6.967	0.161	0.60	TO
LWACUN		6.928	0.117	0.38	6.685	-0.121	-0.45	LX
MB7TFF		6.565	-0.246	-0.80	6.604	-0.202	-0.76	TR
NH4WNB		7.431	0.620	2.01	7.115	0.309	1.15	TJ
NVNEGE		6.851	0.040	0.13	7.033	0.227	0.85	LB
NVTR8W		6.320	-0.491	-1.59	6.229	-0.577	-2.15	ID
P3N9WR		6.549	-0.262	-0.85	6.685	-0.121	-0.45	TB
PMDDVE		6.441	-0.370	-1.20	6.466	-0.340	-1.27	LI
PUFF6K		6.543	-0.268	-0.87	6.835	0.029	0.11	TO
Q67XP4	X	7.262	0.451	1.46	7.657	0.851	3.18	LB
QQMAF7		6.960	0.149	0.48	7.039	0.233	0.87	LE
QR44J2		6.665	-0.146	-0.47	6.830	0.024	0.09	TO
RFZBMF	X	6.772	-0.039	-0.13	6.284	-0.522	-1.95	TF
RJ4ZBH		6.796	-0.015	-0.05	6.786	-0.020	-0.07	IN
TLKTGG		7.221	0.410	1.33	6.983	0.177	0.66	LI
TVCCWB		7.316	0.505	1.64	7.218	0.412	1.54	LC
V33T4H		6.538	-0.273	-0.89	6.535	-0.270	-1.01	RE
VD7LVX		6.480	-0.331	-1.07	6.600	-0.206	-0.77	LH
WBW2HH		6.929	0.118	0.38	6.911	0.105	0.39	LH

Paper & Paperboard Interlaboratory Testing Program

Analysis 325

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF09 Lab Mean	Sample SF09 Diff from Grand Mean	Sample SF09 CPV	Sample SF10 Lab Mean	Sample SF10 Diff from Grand Mean	Sample SF10 CPV	Instr Code
WHVLNJ		6.524	-0.287	-0.93	6.596	-0.210	-0.78	LX
WKYG72		6.769	-0.042	-0.14	6.771	-0.035	-0.13	LH
WNYR22		6.988	0.177	0.57	6.942	0.136	0.51	VM
WX92M9		6.958	0.147	0.48	7.003	0.197	0.74	TO
X9Z3JA		6.372	-0.439	-1.42	6.445	-0.361	-1.35	LB
YT63AL	*	7.487	0.676	2.19	7.139	0.333	1.24	LE

Summary Statistics	Sample SF09	Sample SF10
Grand Means	6.81 kN/m	6.81 kN/m
Stnd Dev Btwn Labs	0.31 kN/m	0.27 kN/m

Statistics based on 43 of 46 reporting participants.

Comments on Assigned Data Flags for Test #325

Q67XP4 (X) - Data for sample SF10 are high. Inconsistent within the determinations of sample SF10.

RFZBMF (X) - Inconsistent in testing between samples.

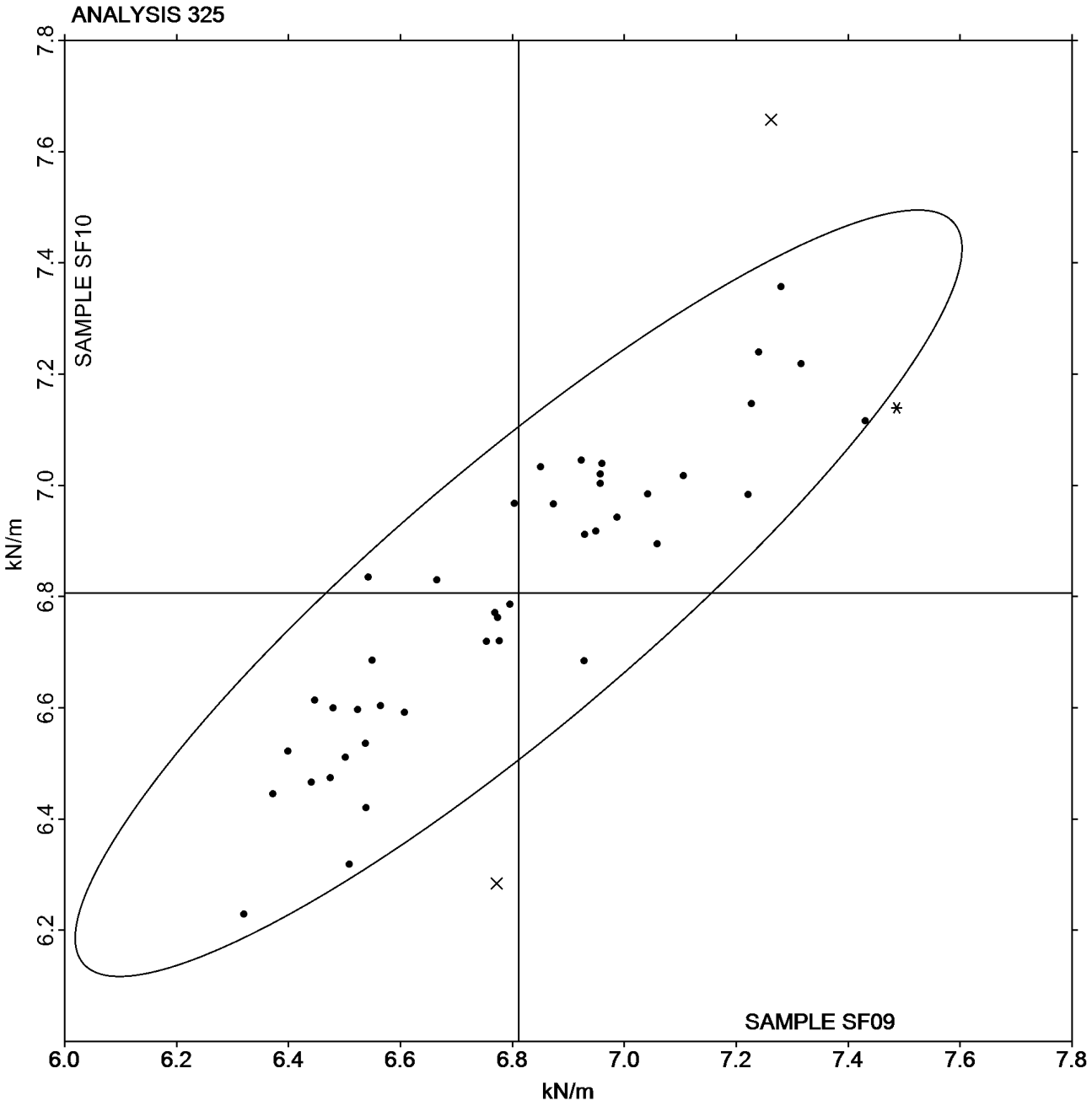
FJ4CEN (X) - Data for both samples are high. Possible Systematic Error.

Key to Instrument Codes Reported by Participants

FP	Frank PTI Universal Tester TS	ID	Instron 4200 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)
RE	Regmed	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 SF09 = 6.8110 kN/m

Grand Mean Sample SF10 = 6.8060 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF09 Lab Mean	Sample SF09 Diff from Grand Mean	Sample SF09 CPV	Sample SF10 Lab Mean	Sample SF10 Diff from Grand Mean	Sample SF10 CPV	Instr Code
24YXH2		97.66	-0.06	0.00	95.34	-2.95	-0.25	TJ
3NE2FA		107.23	9.51	0.83	102.98	4.69	0.40	LI
4PRT76		98.41	0.69	0.06	99.97	1.68	0.14	ID
78MZEN		113.61	15.89	1.38	110.87	12.58	1.06	XX
8BGJR7		113.39	15.68	1.36	113.80	15.51	1.31	TO
9KXMEW		68.88	-28.84	-2.51	70.17	-28.12	-2.38	LB
9WBM94		108.74	11.02	0.96	102.51	4.22	0.36	LF
BLK2V6		114.24	16.52	1.44	112.61	14.32	1.21	TV
CV6RTG		94.97	-2.75	-0.24	99.10	0.81	0.07	LA
DU8JKX		108.83	11.11	0.97	111.78	13.49	1.14	FP
E6NM8M		92.30	-5.42	-0.47	91.17	-7.12	-0.60	LJ
ETDCJX	*	123.84	26.12	2.27	131.20	32.91	2.78	TQ
FJ4CEN		110.26	12.54	1.09	115.26	16.97	1.44	VM
FX2EZ3		110.00	12.28	1.07	106.51	8.22	0.70	TF
GDANK3		96.56	-1.16	-0.10	97.88	-0.41	-0.03	LE
HWXFWK		100.10	2.38	0.21	99.79	1.50	0.13	BU
JEGR66		90.17	-7.55	-0.66	88.56	-9.73	-0.82	TV
K3ZA4K		104.46	6.74	0.59	107.73	9.44	0.80	TV
KEW9XC		88.46	-9.26	-0.81	91.76	-6.53	-0.55	TO
LJKAF3		106.97	9.25	0.81	108.58	10.29	0.87	TO
LWACUN		96.80	-0.92	-0.08	97.09	-1.20	-0.10	LX
NVNEGE		69.89	-27.83	-2.42	73.70	-24.59	-2.08	LB
NVTR8W		100.82	3.10	0.27	95.76	-2.53	-0.21	ID
P3N9WR		97.55	-0.17	-0.02	102.80	4.51	0.38	TB
PMDDVE		91.55	-6.17	-0.54	89.24	-9.05	-0.77	LI
Q67XP4		97.84	0.12	0.01	103.03	4.74	0.40	LB
QR44J2		95.15	-2.57	-0.22	101.43	3.14	0.27	TO
RJ4ZBH		99.57	1.85	0.16	101.70	3.41	0.29	IN
TLKTGG		92.88	-4.84	-0.42	86.90	-11.39	-0.96	LI
TVCCWB		103.38	5.66	0.49	99.89	1.60	0.14	LC
V33T4H		89.71	-8.01	-0.70	93.91	-4.38	-0.37	RE
VD7LVX		90.41	-7.31	-0.64	93.66	-4.63	-0.39	LH
WBW2HH		90.50	-7.22	-0.63	88.49	-9.80	-0.83	LH
WHVLNJ		86.51	-11.21	-0.97	92.35	-5.94	-0.50	LX
WKYG72		93.62	-4.10	-0.36	90.98	-7.31	-0.62	LH
WX92M9		78.28	-19.44	-1.69	80.66	-17.63	-1.49	XX
X9Z3JA		99.79	2.07	0.18	103.69	5.40	0.46	LB
YT63AL		89.99	-7.73	-0.67	82.21	-16.08	-1.36	LE

Paper & Paperboard Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

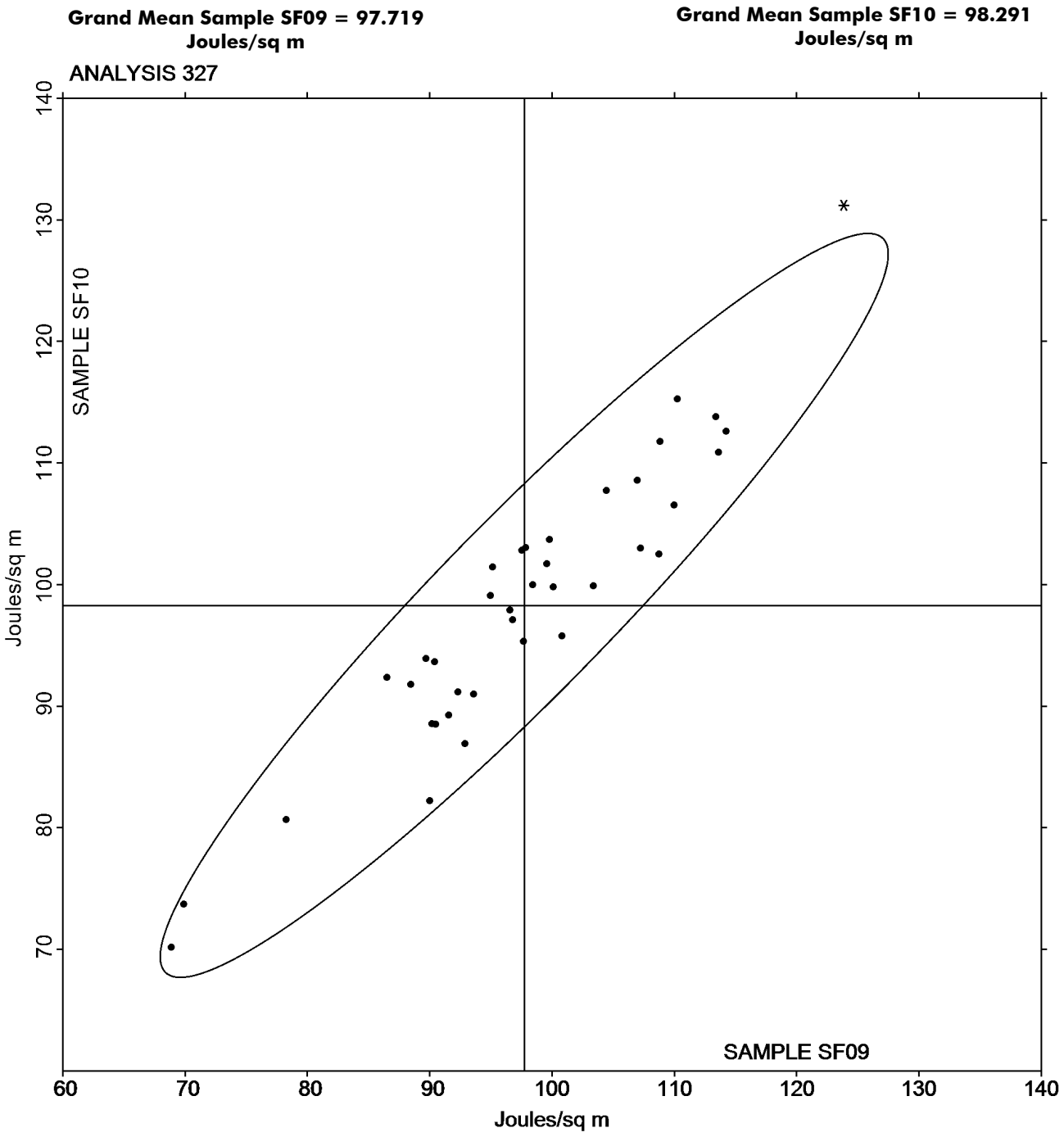
TAPPI Official Test Method T494

Summary Statistics	Sample SF09	Sample SF10
Grand Means	97.72 Joules/sq m	98.29 Joules/sq m
Stnd Dev Btwn Labs	11.50 Joules/sq m	11.82 Joules/sq m

Statistics based on 38 of 38 reporting participants.

Key to Instrument Codes Reported by Participants

BU	Buchel	FP	Frank PTI Universal Tester TS
ID	Instron 4200 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)	RE	Regmed
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TJ	Thwing-Albert QC II-XS	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



Paper & Paperboard Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF09 Lab Mean	Sample SF09 Diff from Grand Mean	Sample SF09 CPV	Sample SF10 Lab Mean	Sample SF10 Diff from Grand Mean	Sample SF10 CPV	Instr Code
24YXH2		2.336	0.111	0.48	2.298	0.081	0.33	TJ
3NE2FA		2.051	-0.174	-0.75	2.009	-0.208	-0.85	LI
4PRT76		2.271	0.046	0.20	2.311	0.094	0.39	ID
78MZEN		2.371	0.146	0.63	2.312	0.095	0.39	XX
8BGJR7		2.637	0.412	1.77	2.636	0.419	1.72	TO
9KXMEW		1.934	-0.291	-1.25	1.916	-0.301	-1.24	LB
9WBM94		2.303	0.078	0.34	2.225	0.008	0.03	LF
BLK2V6		2.680	0.455	1.96	2.657	0.440	1.80	TV
CV6RTG		1.916	-0.309	-1.33	1.980	-0.237	-0.97	LA
DU8JKX		2.465	0.240	1.03	2.527	0.310	1.27	FP
E6NM8M		2.155	-0.070	-0.30	2.131	-0.086	-0.35	LJ
ETDCJX		2.190	-0.035	-0.15	2.070	-0.147	-0.60	TJ
FJ4CEN		1.928	-0.297	-1.28	1.968	-0.249	-1.02	VM
FX2EZ3		2.671	0.446	1.92	2.577	0.359	1.47	TF
GDANK3		2.150	-0.075	-0.32	2.130	-0.087	-0.36	LE
HWXFWK		2.380	0.155	0.67	2.405	0.188	0.77	BU
JEGR66		2.074	-0.151	-0.65	2.053	-0.164	-0.67	TV
K3ZA4K		2.503	0.278	1.20	2.580	0.363	1.49	TV
KEW9XC		2.086	-0.139	-0.60	2.109	-0.108	-0.44	TO
L4AQJV		2.179	-0.046	-0.20	2.071	-0.146	-0.60	TF
LJKAF3		2.410	0.185	0.80	2.416	0.199	0.81	TO
LWACUN		2.125	-0.100	-0.43	2.158	-0.059	-0.24	LX
NVNEGE		1.932	-0.293	-1.26	1.990	-0.227	-0.93	LB
NVTR8W		2.459	0.234	1.01	2.376	0.158	0.65	ID
P3N9WR		2.316	0.091	0.39	2.395	0.178	0.73	TB
PMDDVE		2.165	-0.060	-0.26	2.108	-0.109	-0.45	LI
Q67XP4		2.008	-0.217	-0.93	2.001	-0.216	-0.89	LB
QR44J2		2.379	0.154	0.66	2.494	0.277	1.13	TO
RFZBMF	X	2.224	-0.001	0.00	1.901	-0.316	-1.30	TF
RJ4ZBH		2.489	0.264	1.14	2.517	0.300	1.23	IN
TLKTGG		2.000	-0.225	-0.97	1.940	-0.277	-1.14	LI
TVCCWB		2.123	-0.102	-0.44	2.086	-0.131	-0.54	LC
V33T4H	X	4.156	1.931	8.31	4.135	1.918	7.86	RE
VD7LVX		2.160	-0.065	-0.28	2.220	0.003	0.01	LH
WBW2HH		2.044	-0.181	-0.78	1.959	-0.258	-1.06	LH
WHVLNJ		2.123	-0.102	-0.44	2.136	-0.081	-0.33	LX
WKYG72		2.102	-0.123	-0.53	2.048	-0.169	-0.69	LH
WNYR22		2.210	-0.015	-0.06	2.160	-0.057	-0.24	VM
WX92M9		2.693	0.468	2.01	2.762	0.545	2.23	TO
X9Z3JA		1.914	-0.311	-1.34	1.968	-0.249	-1.02	LB

Paper & Paperboard Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF09 Lab Mean	Sample SF09 Diff from Grand Mean	Sample SF09 CPV	Sample SF10 Lab Mean	Sample SF10 Diff from Grand Mean	Sample SF10 CPV	Instr Code
YT63AL		1.846	-0.379	-1.63	1.778	-0.440	-1.80	LE

Summary Statistics	Sample SF09	Sample SF10
Grand Means	2.23 Percent	2.22 Percent
Stnd Dev Btwn Labs	0.23 Percent	0.24 Percent

Statistics based on 39 of 41 reporting participants.

Comments on Assigned Data Flags for Test #328

RFZBMF (X) - Inconsistent in testing between samples.

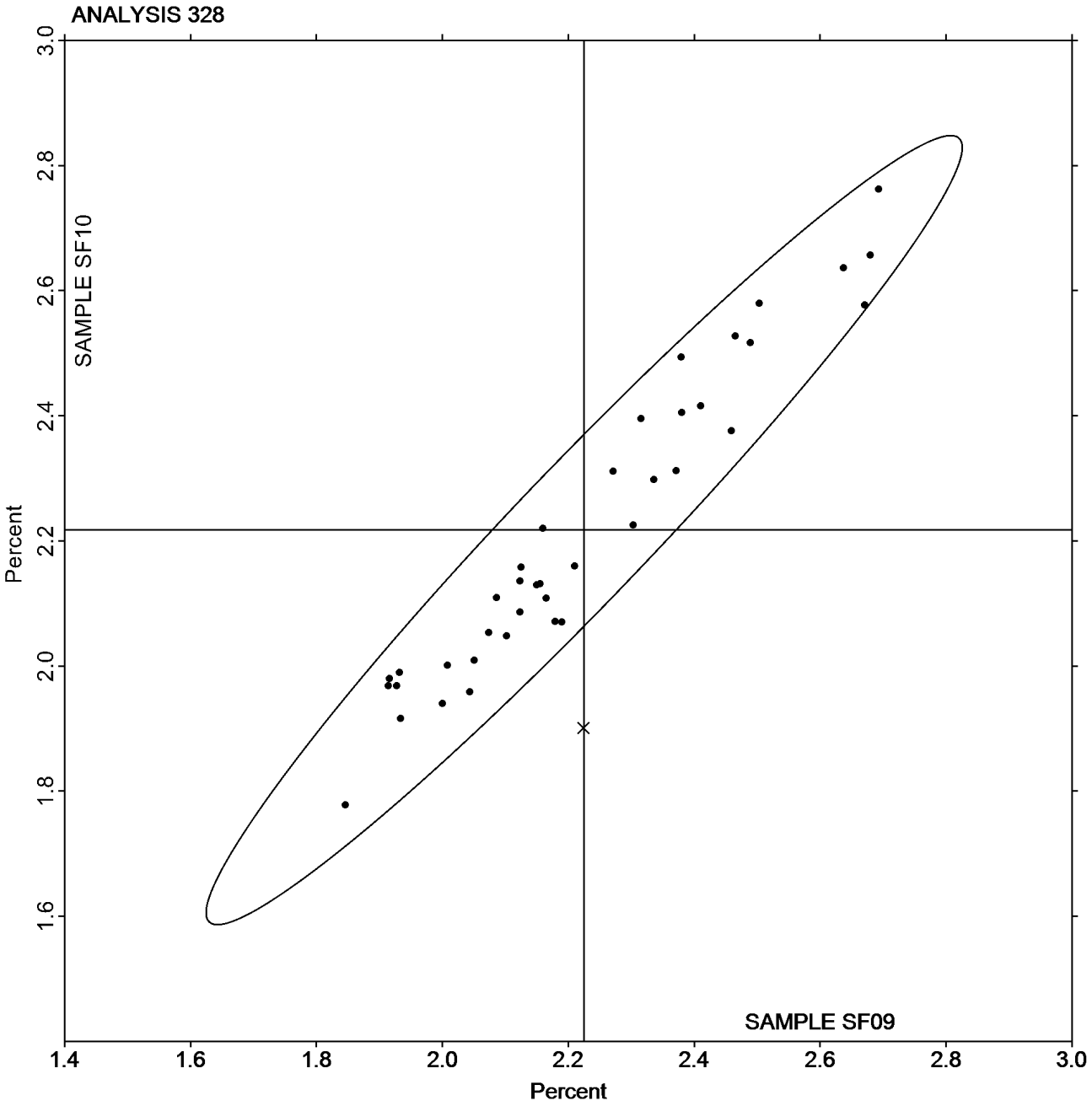
V33T4H (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

BU	Buchel	FP	Frank PTI Universal Tester TS
ID	Instron 4200 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)	RE	Regmed
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 SF09 = 2.2251
Percent

Grand Mean Sample SF10 = 2.2174
Percent



WebCode	Data Flag	Sample SE09 Lab Mean	Sample SE09 Diff from Grand Mean	Sample SE09 CPV	Sample SE10 Lab Mean	Sample SE10 Diff from Grand Mean	Sample SE10 CPV	Instr Code
2WGKLM		13.03	-0.67	-0.91	13.14	-0.54	-0.74	LE
36QFYT		12.91	-0.79	-1.08	12.91	-0.77	-1.07	LE
3BRRVP		14.30	0.60	0.82	14.37	0.69	0.95	LE
4BCN3J		13.36	-0.34	-0.46	13.66	-0.02	-0.03	LE
4RGCVA		13.83	0.13	0.18	13.45	-0.24	-0.33	IF
62XGFE		14.11	0.41	0.56	14.14	0.46	0.63	LE
7JRGZJ		14.93	1.23	1.67	15.22	1.54	2.13	LW
89DNBN		14.13	0.43	0.58	14.67	0.99	1.37	LE
9F6JLR		13.98	0.28	0.38	14.18	0.50	0.69	LE
A4BJB2	X	25.40	11.70	15.94	28.51	14.83	20.53	LA
AJ68JE		12.90	-0.80	-1.09	12.81	-0.87	-1.20	TK
C8HRPB		13.83	0.13	0.18	14.08	0.40	0.55	TB
D7H93Z		13.88	0.18	0.25	13.99	0.31	0.43	ID
EA4DE4		13.99	0.28	0.39	14.55	0.87	1.20	LW
EHG662		12.50	-1.20	-1.64	12.53	-1.16	-1.60	XX
EVEHWH		13.49	-0.21	-0.29	13.13	-0.55	-0.76	IM
FEAD6Y		12.86	-0.84	-1.15	13.26	-0.42	-0.58	TX
FNBVK9	X	14.41	0.71	0.96	12.11	-1.57	-2.18	IK
FRFJ46		13.43	-0.28	-0.38	13.28	-0.40	-0.56	LE
FTA8HU		12.97	-0.73	-1.00	13.06	-0.62	-0.85	LA
H6XXBW		13.46	-0.24	-0.33	13.52	-0.16	-0.22	XX
JDM4LA		13.80	0.10	0.13	13.87	0.19	0.27	LA
JEGR66		13.72	0.02	0.03	13.64	-0.04	-0.05	TO
KMPJAT		13.43	-0.27	-0.37	13.91	0.22	0.31	TH
L6JXMN		13.95	0.25	0.33	13.83	0.15	0.21	TH
LKEXYX		13.57	-0.13	-0.18	13.40	-0.28	-0.39	TH
MDD4FP		12.83	-0.87	-1.19	13.27	-0.42	-0.58	LI
N4ZNQT		13.34	-0.36	-0.49	13.06	-0.62	-0.86	TR
N8GYX6		15.40	1.70	2.31	15.02	1.34	1.86	LA
PD2D4N		13.37	-0.34	-0.46	12.79	-0.90	-1.24	IF
PMDDVE		12.88	-0.82	-1.12	13.06	-0.63	-0.87	LW
QA2MEN		13.54	-0.16	-0.21	13.36	-0.32	-0.44	IM
RULQQE		15.24	1.54	2.09	14.61	0.93	1.29	IF
T2EK2H		14.21	0.51	0.70	14.66	0.98	1.36	DM
TVCCWB		14.12	0.42	0.57	14.53	0.84	1.17	LC
V379GJ		13.83	0.13	0.18	13.45	-0.24	-0.33	IR
VNLTDJ		14.73	1.02	1.40	14.49	0.81	1.12	TO
WBW2HH		14.28	0.58	0.79	14.01	0.32	0.45	LH
WMMQHN		13.92	0.22	0.30	13.29	-0.39	-0.54	TB
XHPVV7		13.15	-0.55	-0.76	12.70	-0.98	-1.36	LH

Paper & Paperboard Interlaboratory Testing Program

Analysis 330

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE09 Lab Mean	Sample SE09 Diff from Grand Mean	Sample SE09 CPV	Sample SE10 Lab Mean	Sample SE10 Diff from Grand Mean	Sample SE10 CPV	Instr Code
XKVB7H	*	11.83	-1.87	-2.55	12.28	-1.40	-1.94	TT
Y3TVJW		13.76	0.06	0.08	13.13	-0.56	-0.77	TB
ZN79NP		14.97	1.26	1.72	14.64	0.96	1.33	MA

Summary Statistics	Sample SE09	Sample SE10
Grand Means	13.70 kN/m	13.68 kN/m
Stnd Dev Btwn Labs	0.73 kN/m	0.72 kN/m

Statistics based on 41 of 43 reporting participants.

Comments on Assigned Data Flags for Test #330

A4BJB2 (X) - Extreme Data.

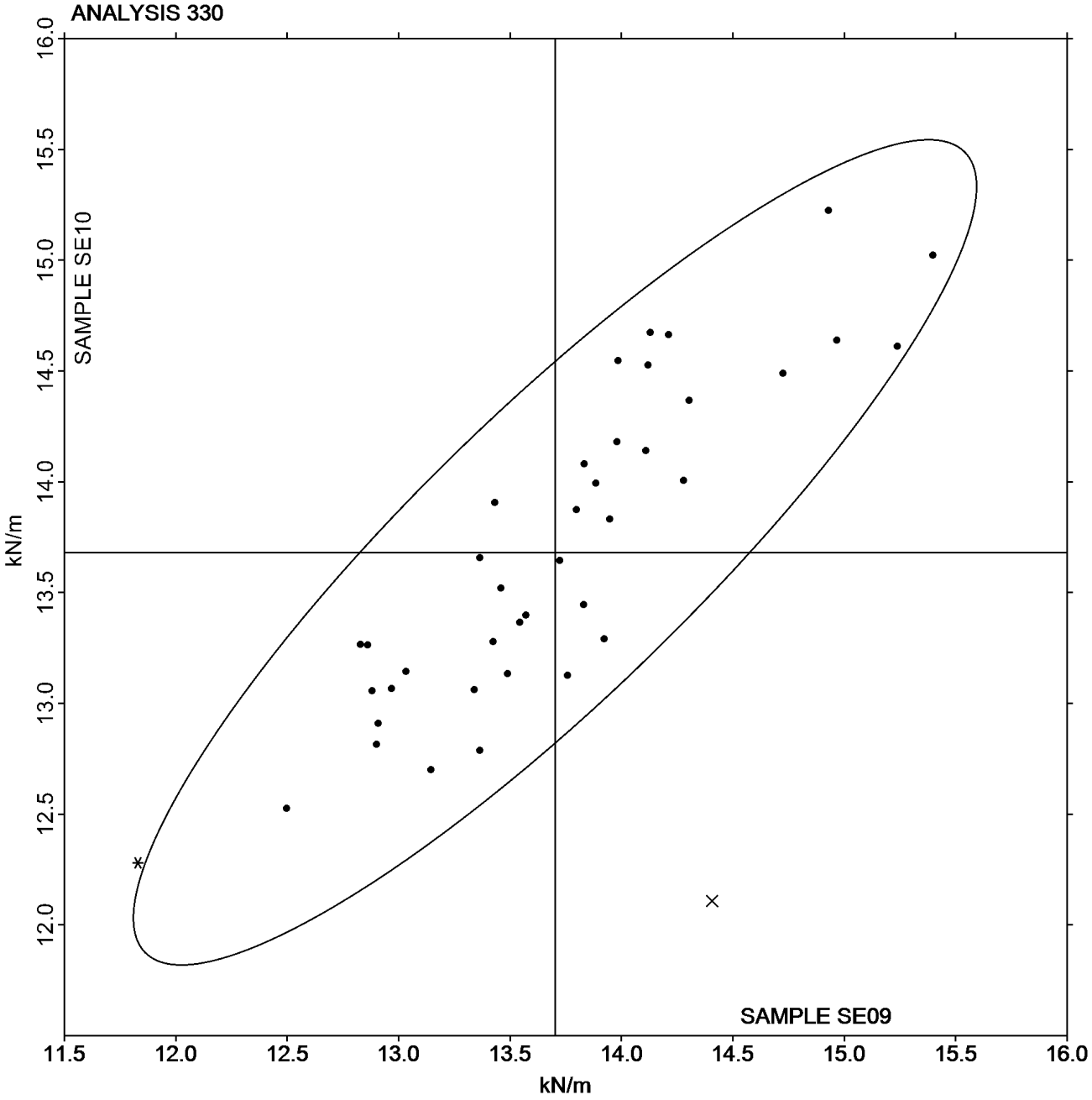
FNBVK9 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SE10.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	ID	Instron 4200 Series
IF	Instron 3340 Series	IK	Instron 4400 Series
IM	Instron 5500 Series	IR	Instron 5900 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	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
TT	Tinius Olsen Model MHT	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		

Grand Mean Sample SE09 = 13.702 kN/m

Grand Mean Sample SE10 = 13.681 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE09 Lab Mean	Sample SE09 Diff from Grand Mean	Sample SE09 CPV	Sample SE10 Lab Mean	Sample SE10 Diff from Grand Mean	Sample SE10 CPV	Instr Code
2WGKLM		217.0	-26.2	-1.11	227.1	-14.6	-0.61	LE
36QFYT		219.5	-23.7	-1.00	204.8	-36.9	-1.53	LE
3BRRVP		236.4	-6.8	-0.29	242.7	1.0	0.04	LE
4BCN3J		227.4	-15.8	-0.67	223.4	-18.2	-0.76	LE
4RGCVA		262.0	18.9	0.80	239.1	-2.5	-0.11	IF
62XGFE		224.7	-18.5	-0.78	228.6	-13.1	-0.54	LE
7JRGZJ		216.0	-27.2	-1.15	230.5	-11.1	-0.46	LW
89DNBN		251.2	8.0	0.34	263.3	21.6	0.90	LE
9F6JLR		260.9	17.7	0.75	270.7	29.0	1.21	LE
A4BJB2		209.7	-33.5	-1.42	198.3	-43.4	-1.80	LA
AJ68JE		251.6	8.4	0.36	248.1	6.4	0.27	TK
C8HRPB		265.7	22.5	0.95	267.2	25.6	1.06	TB
EA4DE4		225.9	-17.3	-0.74	229.2	-12.4	-0.52	LW
EHG662		231.9	-11.3	-0.48	236.4	-5.3	-0.22	XX
EVEHWH		269.8	26.6	1.13	258.6	16.9	0.70	IM
FEAD6Y		266.1	23.0	0.97	276.5	34.8	1.45	TX
FNBVK9	X	204.1	-39.0	-1.66	116.7	-124.9	-5.20	IF
FRFJ46		238.0	-5.2	-0.22	234.1	-7.6	-0.32	LE
FTA8HU		233.6	-9.5	-0.40	235.6	-6.0	-0.25	LA
H6XXBW		237.4	-5.8	-0.25	236.6	-5.1	-0.21	XX
JDM4LA		241.1	-2.1	-0.09	256.0	14.3	0.60	LA
JEGR66		248.0	4.8	0.20	240.2	-1.5	-0.06	TO
KMPJAT		246.5	3.3	0.14	267.5	25.8	1.07	TH
L6JXMN		283.5	40.3	1.71	277.7	36.0	1.50	TH
N4ZNQT		220.1	-23.1	-0.98	201.9	-39.8	-1.65	TR
N8GYX6		254.5	11.3	0.48	256.0	14.3	0.60	LA
PMDDVE		217.3	-25.8	-1.10	218.2	-23.5	-0.98	LW
QA2MEN		240.7	-2.5	-0.11	232.3	-9.4	-0.39	IM
RULQQE		265.8	22.6	0.96	245.7	4.0	0.17	IN
T2EK2H	*	303.7	60.6	2.57	310.9	69.3	2.88	DM
TVCCWB		249.0	5.8	0.25	248.3	6.6	0.28	LC
V379GJ		261.5	18.3	0.78	239.1	-2.5	-0.11	IR
VNLTDJ		252.5	9.4	0.40	250.6	8.9	0.37	TO
WBW2HH		240.7	-2.5	-0.11	236.7	-5.0	-0.21	LH
WMMQHN		280.3	37.1	1.57	255.6	13.9	0.58	TB
XHPVV7		212.9	-30.3	-1.29	211.8	-29.9	-1.24	LH
XKVB7H		191.7	-51.5	-2.18	200.9	-40.8	-1.70	TT

Paper & Paperboard Interlaboratory Testing Program

Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SE09	Sample SE10
Grand Means	243.18 Joules/sq m	241.68 Joules/sq m
Stnd Dev Btwn Labs	23.57 Joules/sq m	24.03 Joules/sq m

Statistics based on 36 of 37 reporting participants.

Comments on Assigned Data Flags for Test #331

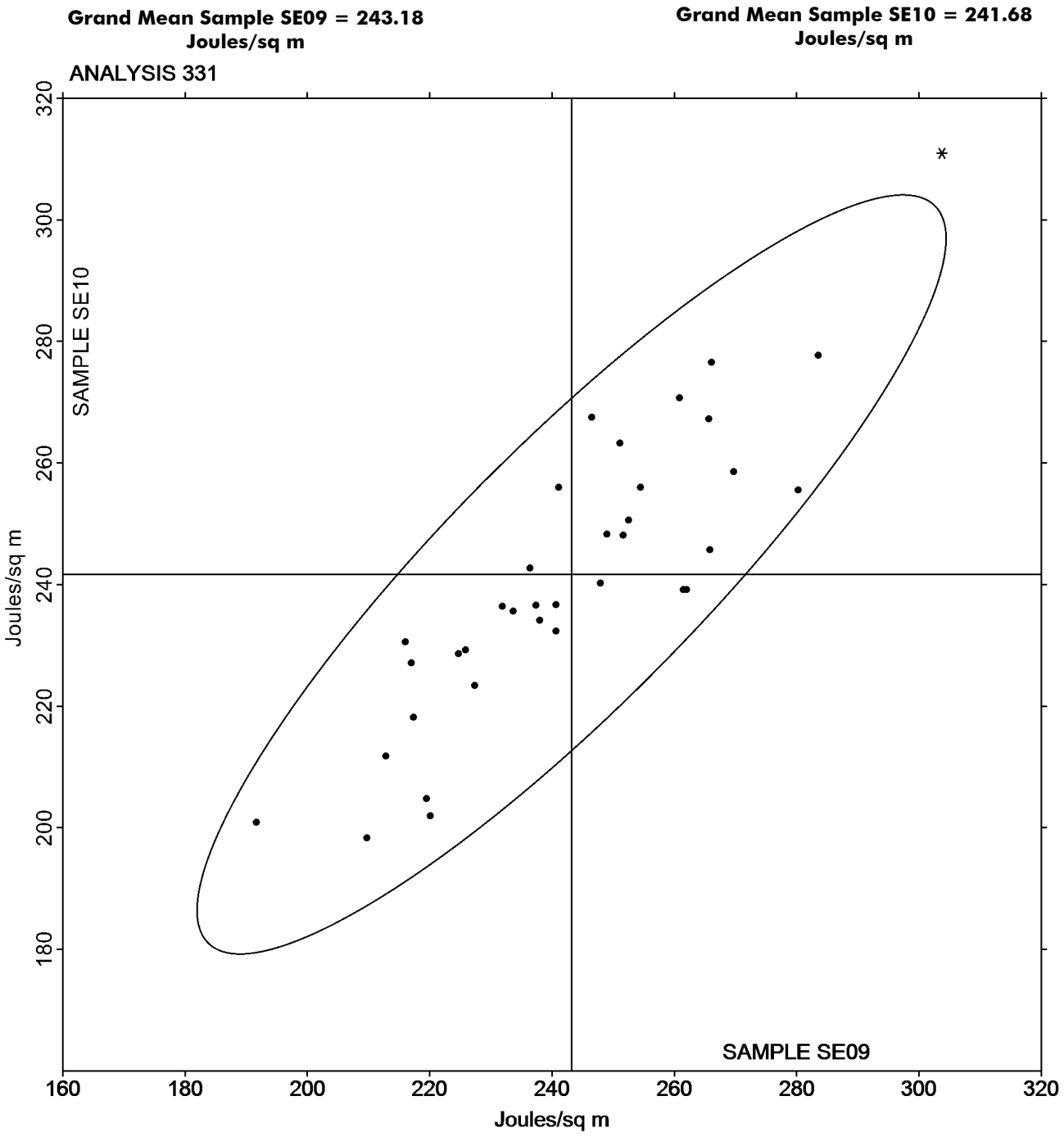
FNBVK9 (X) - Data for sample SE10 are low.

Analysis Notes:

2WGKLM - Data appears to be transposed between Analysis 331 (T.E.A.) and Analysis 332 (% Elongation). CTS will not correct going forward.

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
IR	Instron 5900 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
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	TT	Tinius Olsen Model MHT
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 SE09 Lab Mean	Sample SE09 Diff from Grand Mean	Sample SE09 CPV	Sample SE10 Lab Mean	Sample SE10 Diff from Grand Mean	Sample SE10 CPV	Instr Code
2WGKLM		2.450	-0.213	-0.87	2.500	-0.148	-0.60	LE
36QFYT		2.478	-0.185	-0.76	2.335	-0.313	-1.26	LE
3BRRVP		2.433	-0.230	-0.94	2.478	-0.170	-0.69	LE
4BCN3J		2.502	-0.161	-0.66	2.418	-0.230	-0.93	LE
4RGCVA		2.801	0.138	0.57	2.663	0.015	0.06	IF
62XGFE		2.353	-0.310	-1.27	2.387	-0.261	-1.05	LE
7JRGZJ		2.226	-0.437	-1.79	2.333	-0.315	-1.27	LW
89DNBN	X	0.101	-2.561	-10.51	0.094	-2.554	-10.30	LE
9F6JLR		2.747	0.084	0.35	2.799	0.151	0.61	LE
A4BJB2	X	1.253	-1.410	-5.79	1.053	-1.595	-6.43	LA
AJ68JE		2.882	0.219	0.90	2.867	0.219	0.88	TK
C8HRPB		2.852	0.189	0.78	2.843	0.195	0.79	TB
D7H93Z		2.702	0.039	0.16	2.740	0.092	0.37	ID
EA4DE4		2.381	-0.282	-1.16	2.335	-0.313	-1.26	LW
EHG662		2.791	0.128	0.53	2.827	0.179	0.72	XX
EVEHWH		2.981	0.318	1.31	2.932	0.284	1.14	IM
FEAD6Y		3.038	0.375	1.54	3.065	0.417	1.68	TX
FNBVK9	X	2.503	-0.160	-0.66	1.852	-0.796	-3.21	XX
FRFJ46		2.624	-0.039	-0.16	2.592	-0.056	-0.23	LE
FTA8HU		2.579	-0.084	-0.34	2.568	-0.080	-0.32	LA
H6XXBW		2.563	-0.100	-0.41	2.544	-0.104	-0.42	XX
JDM4LA	*	2.837	0.174	0.72	3.046	0.398	1.60	LA
JEGR66		2.777	0.114	0.47	2.668	0.020	0.08	TO
KMPJAT		2.750	0.087	0.36	2.870	0.222	0.89	TH
L6JXMN		3.201	0.538	2.21	3.218	0.570	2.30	TH
N4ZNQT		2.517	-0.146	-0.60	2.379	-0.269	-1.09	TR
N8GYX6		2.430	-0.233	-0.95	2.480	-0.168	-0.68	LA
PMDDVE		2.460	-0.203	-0.83	2.438	-0.210	-0.85	LW
QA2MEN		2.930	0.267	1.10	2.873	0.225	0.91	IM
RULQQE		2.416	-0.246	-1.01	2.350	-0.299	-1.20	IN
T2EK2H		3.193	0.530	2.18	3.178	0.530	2.14	DM
TVCCWB		2.487	-0.176	-0.72	2.431	-0.217	-0.88	LC
V379GJ		2.801	0.138	0.57	2.663	0.015	0.06	IR
VNLTDJ		2.709	0.046	0.19	2.695	0.047	0.19	TO
WBW2HH		2.474	-0.189	-0.77	2.479	-0.169	-0.68	LH
WMMQHN		2.972	0.310	1.27	2.779	0.131	0.53	TB
XHPVV7		2.363	-0.300	-1.23	2.420	-0.228	-0.92	LH
XKVB7H		2.522	-0.141	-0.58	2.532	-0.116	-0.47	TT
Y3TVJW		2.631	-0.032	-0.13	2.608	-0.040	-0.16	TB

Paper & Paperboard Interlaboratory Testing Program

Analysis 332

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SE09	Sample SE10
Grand Means	2.66 Percent	2.65 Percent
Stnd Dev Btwn Labs	0.24 Percent	0.25 Percent

Statistics based on 36 of 39 reporting participants.

Comments on Assigned Data Flags for Test #332

89DNBN (X) - Extreme Data.

A4BJB2 (X) - Extreme Data.

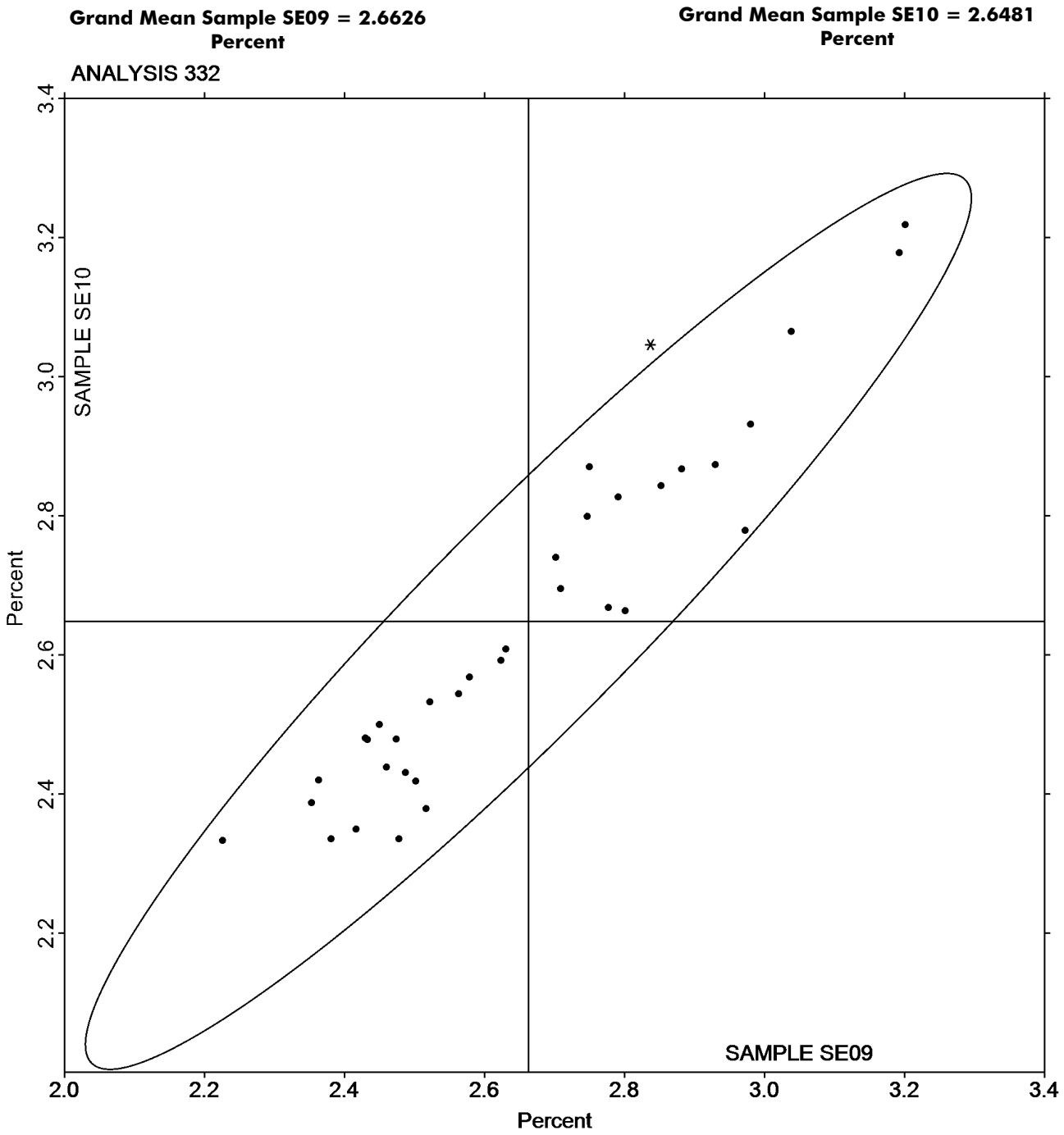
FNBVK9 (X) - Data for sample SE10 are low. Inconsistent within the determinations of sample SE10.

Analysis Notes:

2WGKLM - Data appears to be transposed between Analysis 331 (T.E.A.) and Analysis 332 (% Elongation). CTS will not correct going forward.

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	IR	Instron 5900 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	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
TT	Tinius Olsen Model MHT	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		



Paper & Paperboard Interlaboratory Testing Program

Analysis 334

Folding Endurance (MIT) - Double Folds

TAPPI Official Test Method T511

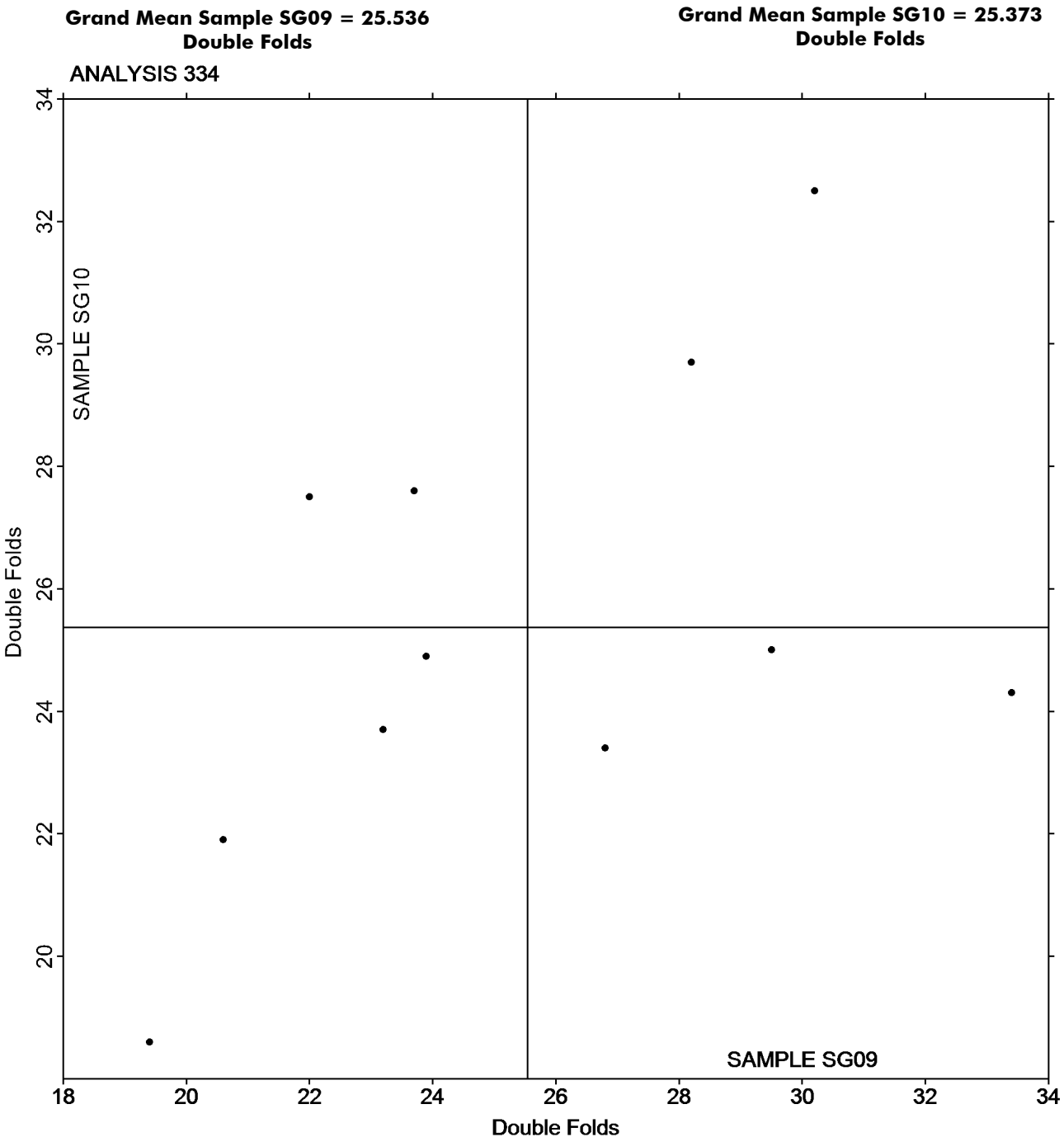
WebCode	Data Flag	Sample SG09 Lab Mean	Sample SG09 Diff from Grand Mean	Sample SG09 CPV	Sample SG10 Lab Mean	Sample SG10 Diff from Grand Mean	Sample SG10 CPV	Instr Code
4PRT76		28.20	2.66	0.60	29.70	4.33	1.14	MT
A2GVT7		23.90	-1.64	-0.37	24.90	-0.47	-0.12	XX
EVEHWH		23.20	-2.34	-0.53	23.70	-1.67	-0.44	MT
L6JXMN		30.20	4.66	1.06	32.50	7.13	1.87	MT
PMDDVE		22.00	-3.54	-0.80	27.50	2.13	0.56	MT
QQMAF7		23.70	-1.84	-0.42	27.60	2.23	0.58	MT
RFZBMF		33.40	7.86	1.79	24.30	-1.07	-0.28	MT
RJ4ZBH		26.80	1.26	0.29	23.40	-1.97	-0.52	MT
TLKTGG		29.50	3.96	0.90	25.00	-0.37	-0.10	MT
WNYR22		20.60	-4.94	-1.12	21.90	-3.47	-0.91	MT
Y3TVJW		19.40	-6.14	-1.39	18.60	-6.77	-1.78	MT

Summary Statistics	Sample SG09	Sample SG10
Grand Means	25.54 Double Folds	25.37 Double Folds
Stnd Dev Btwn Labs	4.40 Double Folds	3.81 Double Folds

Statistics based on 11 of 11 reporting participants.

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

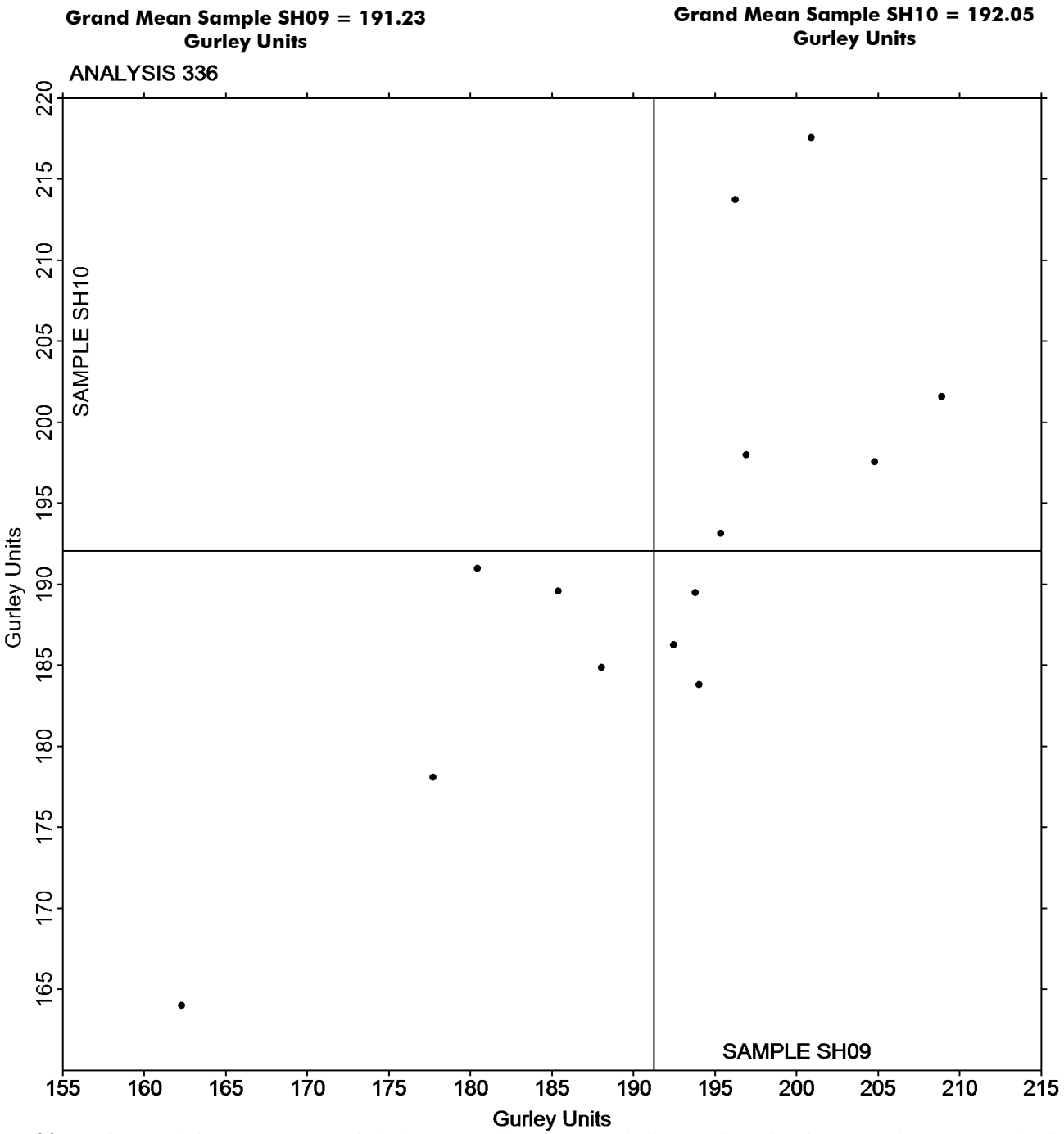
WebCode	Data Flag	Sample SH09 Lab Mean	Sample SH09 Diff from Grand Mean	Sample SH09 CPV	Sample SH10 Lab Mean	Sample SH10 Diff from Grand Mean	Sample SH10 CPV
4PRT76		192.5	1.2	0.10	186.3	-5.8	-0.42
B7D3Q9		196.9	5.7	0.47	198.0	5.9	0.44
E72CE7		196.3	5.0	0.42	213.8	21.7	1.59
EHG662		208.9	17.7	1.48	201.6	9.5	0.70
EVEHWH		185.4	-5.8	-0.49	189.6	-2.5	-0.18
FX2EZ3		188.0	-3.2	-0.27	184.9	-7.2	-0.53
GDANK3		195.4	4.1	0.34	193.1	1.1	0.08
HW4QUC		180.4	-10.8	-0.90	191.0	-1.1	-0.08
NH4WNB		204.8	13.5	1.13	197.6	5.5	0.40
P3N9WR		194.0	2.8	0.23	183.8	-8.2	-0.60
PUFF6K		200.9	9.7	0.81	217.6	25.5	1.87
RJ4ZBH	X	4.7	-186.6	-15.59	4.3	-187.7	-13.74
WNYR22		162.3	-28.9	-2.42	164.0	-28.1	-2.05
WX92M9		193.8	2.6	0.21	189.5	-2.6	-0.19
Y3TVJW		177.7	-13.5	-1.13	178.1	-14.0	-1.02

Summary Statistics	Sample SH09	Sample SH10
Grand Means	191.23 Gurley Units	192.05 Gurley Units
Stnd Dev Btwn Labs	11.97 Gurley Units	13.67 Gurley Units

Statistics based on 14 of 15 reporting participants.

Comments on Assigned Data Flags for Test #336

RJ4ZBH (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 338

Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

WebCode	Data Flag	Sample SJ09 Lab Mean	Sample SJ09 Diff from Grand Mean	Sample SJ09 CPV	Sample SJ10 Lab Mean	Sample SJ10 Diff from Grand Mean	Sample SJ10 CPV
62XGFE		4.200	-0.249	-0.49	3.900	-0.207	-0.42
EVEHWH		3.917	-0.532	-1.05	3.352	-0.755	-1.54
FJ4CEN	X	19.579	15.129	29.72	19.324	15.217	30.94
GDANK3		4.200	-0.249	-0.49	4.335	0.228	0.46
NH4WNB		4.165	-0.284	-0.56	3.772	-0.335	-0.68
P3N9WR		4.173	-0.276	-0.54	3.746	-0.362	-0.74
Q67XP4		5.087	0.638	1.25	4.598	0.491	1.00
QR44J2	X	44.164	39.715	78.00	42.951	38.843	78.97
RULQQE		5.370	0.921	1.81	4.210	0.103	0.21
WX92M9		4.109	-0.340	-0.67	4.065	-0.042	-0.09
YT63AL		4.822	0.373	0.73	4.987	0.880	1.79

Summary Statistics	Sample SJ09	Sample SJ10
Grand Means	4.45 Taber Units	4.11 Taber Units
Stnd Dev Btwn Labs	0.51 Taber Units	0.49 Taber Units

Statistics based on 9 of 11 reporting participants.

Comments on Assigned Data Flags for Test #338

QR44J2 (X) - Extreme Data.

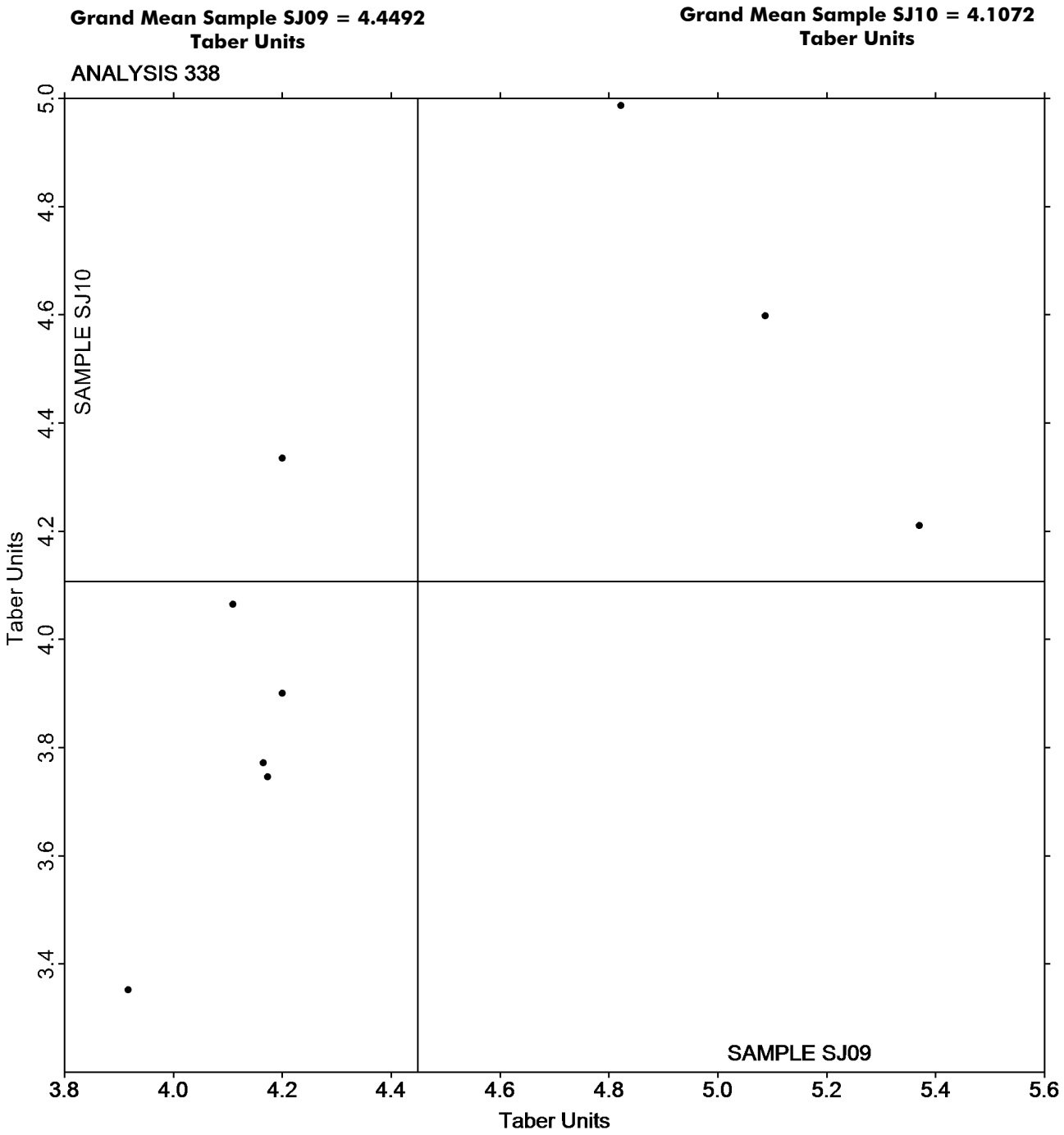
FJ4CEN (X) - Extreme Data.

Analysis Notes:

FJ4CEN - Possible unit error.

QR44J2 - Possible unit error.

YT63AL - Data appear to be off by a factor of 10 (/10). CTS will not correct going forward.



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

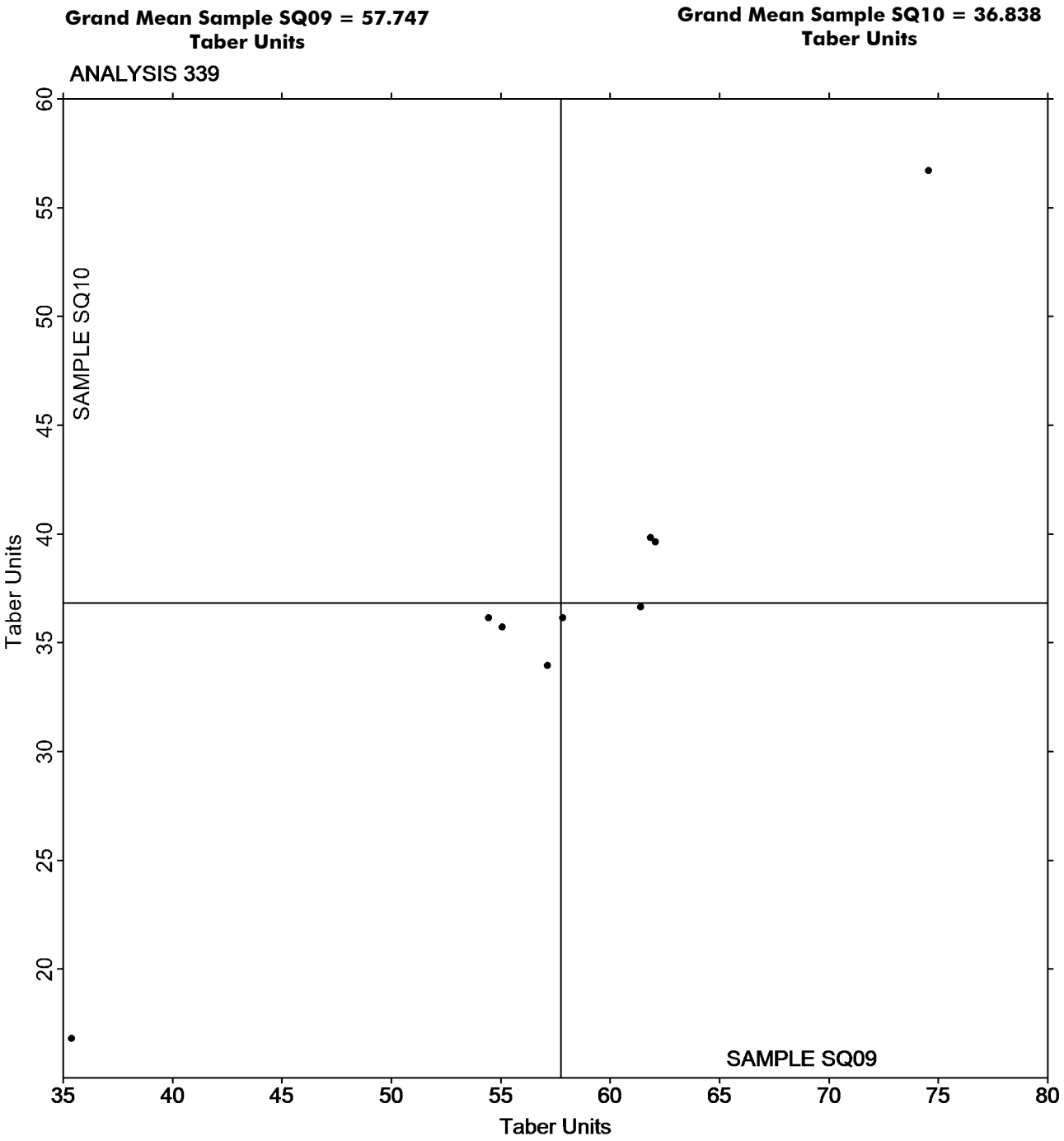
Bending Resistance, Taber Type - 10 to 100 Taber Units

TAPPI Official Test Method T489

WebCode	Data Flag	Sample SQ09 Lab Mean	Sample SQ09 Diff from Grand Mean	Sample SQ09 CPV	Sample SQ10 Lab Mean	Sample SQ10 Diff from Grand Mean	Sample SQ10 CPV
4PRT76		57.83	0.08	0.01	36.14	-0.70	-0.07
9F6JLR		61.85	4.10	0.40	39.83	2.99	0.29
C8HRPB		57.13	-0.62	-0.06	33.94	-2.90	-0.29
EA4DE4		74.55	16.80	1.63	56.70	19.86	1.96
KEW9XC		54.45	-3.30	-0.32	36.15	-0.69	-0.07
PMDDVE		61.39	3.64	0.35	36.65	-0.19	-0.02
WEX6A4		62.07	4.32	0.42	39.63	2.79	0.28
WX92M9		55.07	-2.68	-0.26	35.71	-1.13	-0.11
XX37G8		35.38	-22.36	-2.17	16.80	-20.04	-1.98

Summary Statistics	Sample SQ09	Sample SQ10
Grand Means	57.75 Taber Units	36.84 Taber Units
Stnd Dev Btwn Labs	10.31 Taber Units	10.15 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

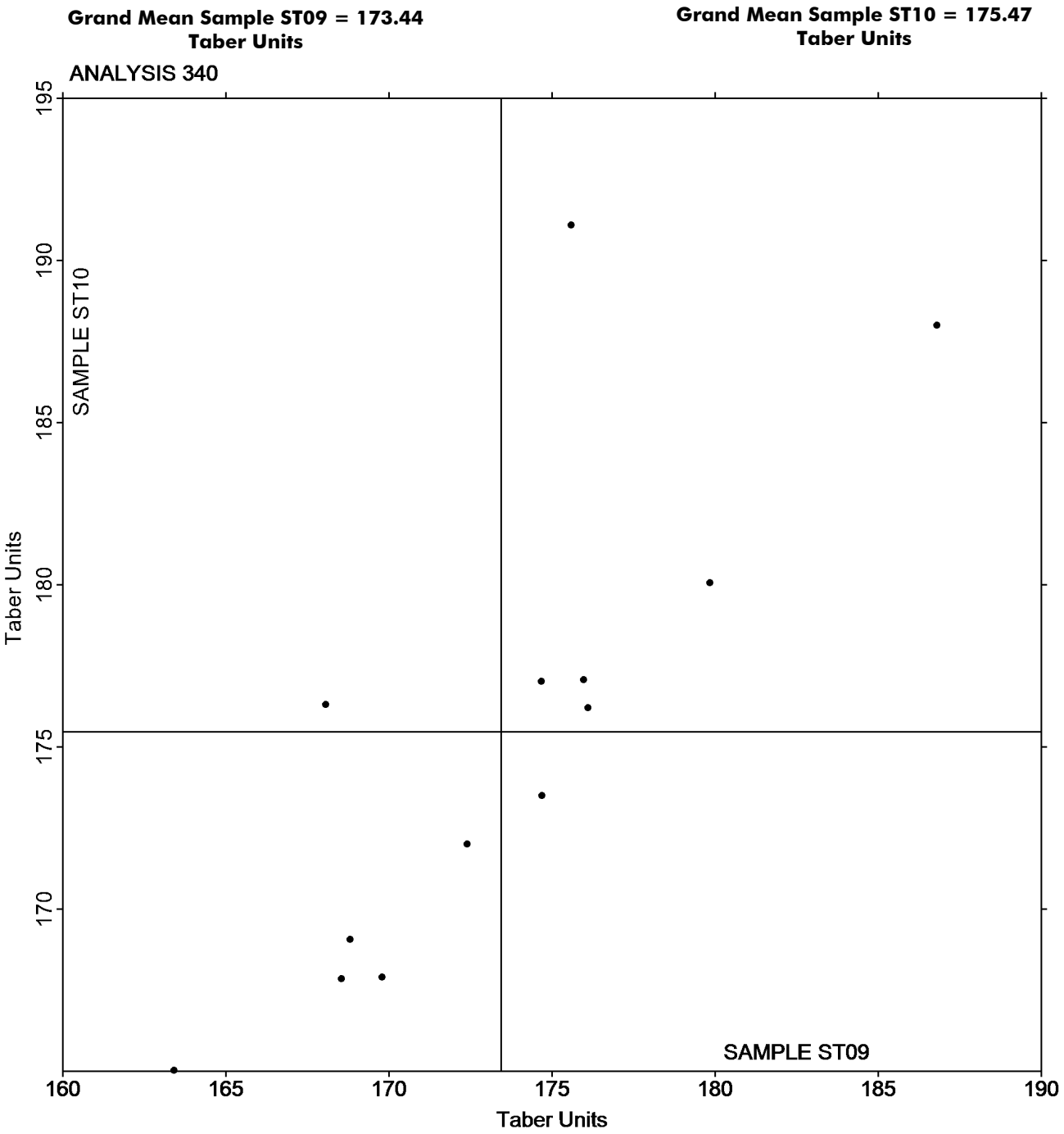
Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard

TAPPI Official Test Method T489

WebCode	Data Flag	Sample ST09 Lab Mean	Sample ST09 Diff from Grand Mean	Sample ST09 CPV	Sample ST10 Lab Mean	Sample ST10 Diff from Grand Mean	Sample ST10 CPV
4PRT76		174.7	1.2	0.21	177.0	1.6	0.20
76V33B		175.6	2.2	0.36	191.1	15.6	2.03
9NZNET		176.1	2.7	0.44	176.2	0.7	0.10
9YKVDH		168.6	-4.9	-0.82	167.9	-7.6	-0.99
EHG662		168.8	-4.6	-0.77	169.1	-6.4	-0.83
KCKT6W		176.0	2.5	0.42	177.1	1.6	0.21
L6JXMN		169.8	-3.6	-0.61	167.9	-7.6	-0.98
LKEXYX		186.8	13.4	2.23	188.0	12.5	1.63
N4ZNQT		163.4	-10.0	-1.68	165.0	-10.4	-1.36
PD2D4N		174.7	1.3	0.21	173.5	-2.0	-0.26
PMDDVE		168.1	-5.4	-0.90	176.3	0.8	0.11
XGV8CB		172.4	-1.0	-0.17	172.0	-3.5	-0.45
Z6RVUE		179.9	6.4	1.07	180.1	4.6	0.60

Summary Statistics	Sample ST09	Sample ST10
Grand Means	173.44 Taber Units	175.47 Taber Units
Stnd Dev Btwn Labs	5.99 Taber Units	7.69 Taber Units

Statistics based on 13 of 13 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 SM09 Lab Mean	Sample SM09 Diff from Grand Mean	Sample SM09 CPV	Sample SM10 Lab Mean	Sample SM10 Diff from Grand Mean	Sample SM10 CPV	Instr Code
76V33B		57.38	-36.70	-2.11	60.19	-33.14	-1.93	LW
9F6JLR		103.36	9.28	0.53	107.16	13.83	0.81	CD
9WBM94		90.74	-3.35	-0.19	91.29	-2.04	-0.12	LW
C8HRPB		102.94	8.86	0.51	95.44	2.11	0.12	TA
EVEHWH		79.92	-14.16	-0.81	79.68	-13.65	-0.80	CD
KMPJAT		88.80	-5.28	-0.30	81.40	-11.93	-0.70	TA
L6JXMN		115.00	20.92	1.20	113.86	20.53	1.20	LW
PMDDVE		100.70	6.62	0.38	103.12	9.79	0.57	LW
WEX6A4		107.92	13.84	0.79	107.84	14.51	0.85	CD

Summary Statistics	Sample SM09	Sample SM10
Grand Means	94.08 psi	93.33 psi
Stnd Dev Btwn Labs	17.41 psi	17.16 psi

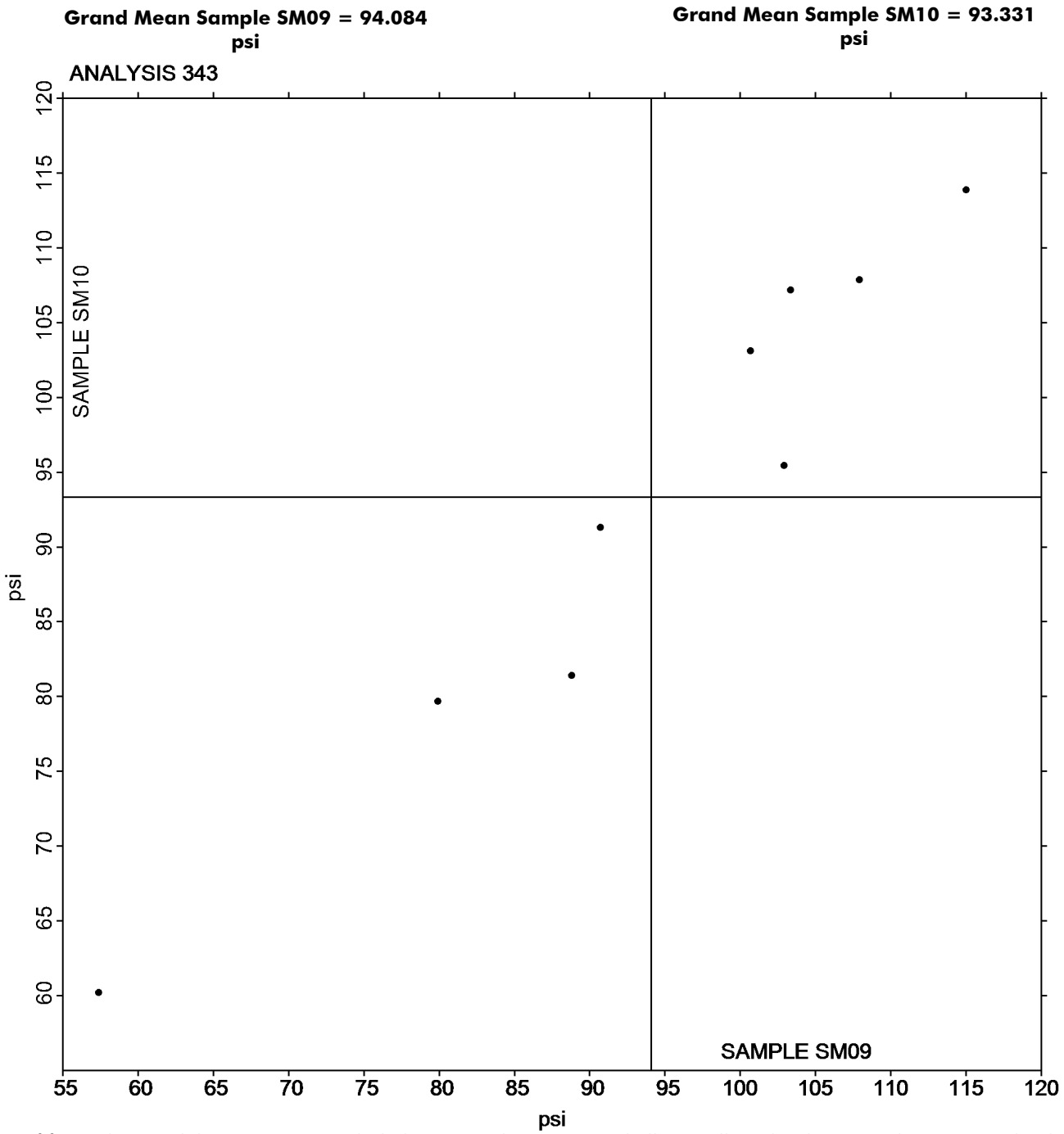
Statistics based on 9 of 9 reporting participants.

Key to Instrument Codes Reported by Participants

CD CSI CS-163D

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

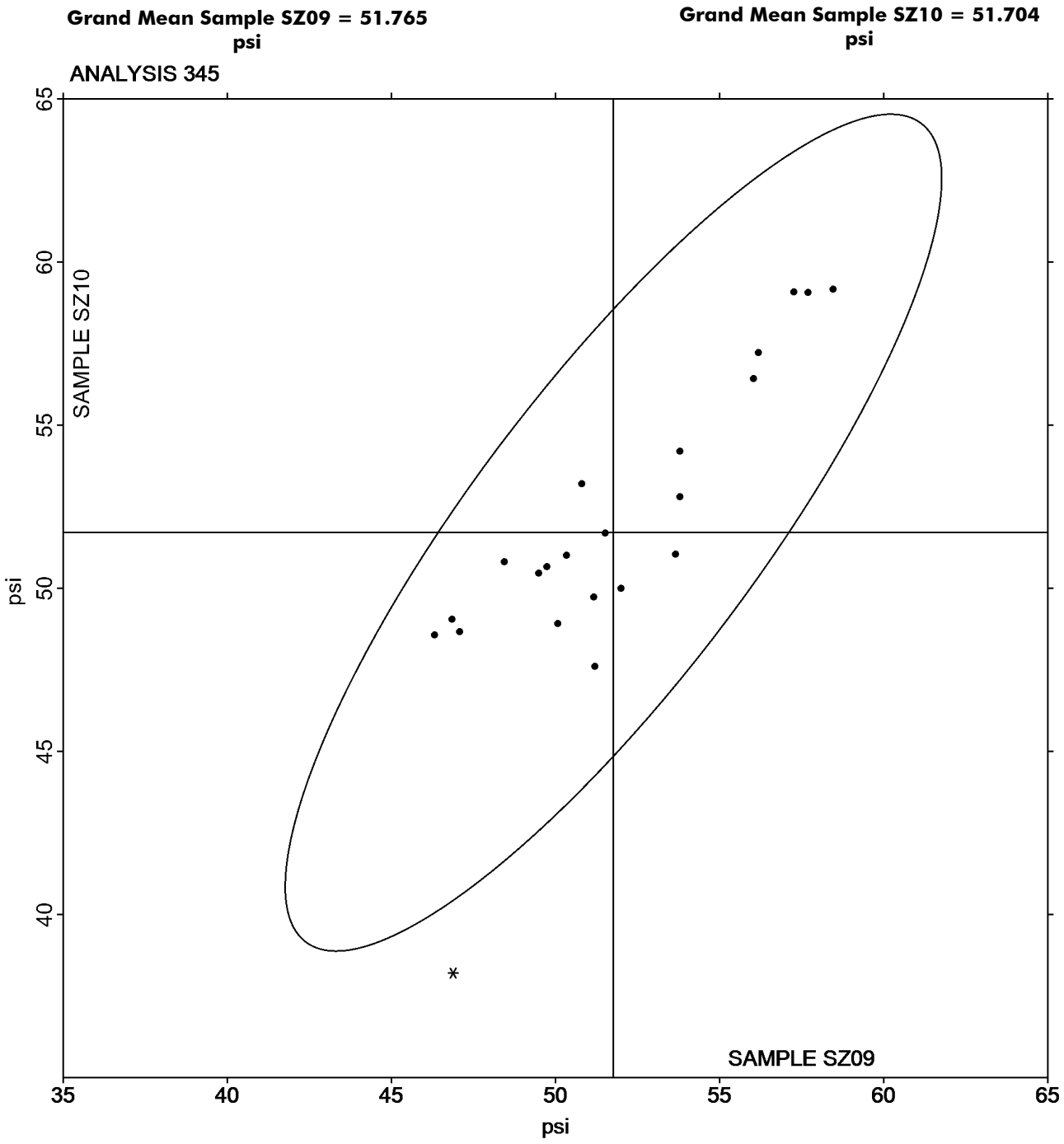
WebCode	Data Flag	Sample SZ09 Lab Mean	Sample SZ09 Diff from Grand Mean	Sample SZ09 CPV	Sample SZ10 Lab Mean	Sample SZ10 Diff from Grand Mean	Sample SZ10 CPV	Instr Code
4PRT76		53.66	1.89	0.51	51.04	-0.66	-0.14	CA
4REMQD		58.46	6.69	1.81	59.16	7.46	1.57	LW
8NKZLE		46.32	-5.45	-1.47	48.56	-3.14	-0.66	LW
9NZNET		53.80	2.03	0.55	52.80	1.10	0.23	CD
9YKVDH		49.50	-2.27	-0.61	50.46	-1.24	-0.26	TA
CWXH33		57.26	5.49	1.49	59.08	7.38	1.56	TA
EHG662		48.44	-3.33	-0.90	50.80	-0.90	-0.19	CA
FEAD6Y	*	46.88	-4.89	-1.32	38.20	-13.50	-2.85	XX
FF34EK		53.80	2.03	0.55	54.20	2.50	0.53	CA
FTA8HU		46.86	-4.91	-1.33	49.04	-2.66	-0.56	TA
KCKT6W		52.00	0.23	0.06	50.00	-1.70	-0.36	CA
KWWFTP		50.08	-1.69	-0.46	48.92	-2.78	-0.59	TA
MDD4FP		51.17	-0.59	-0.16	49.73	-1.97	-0.42	CH
PD2D4N		49.74	-2.03	-0.55	50.66	-1.04	-0.22	LW
PMDDVE		47.08	-4.69	-1.27	48.66	-3.04	-0.64	LW
QA2MEN		51.20	-0.57	-0.15	47.60	-4.10	-0.87	CA
QBBRQQ		56.04	4.27	1.16	56.42	4.72	1.00	LW
VBXN7M		57.70	5.93	1.61	59.06	7.36	1.55	LW
WMMQHN		56.18	4.41	1.20	57.22	5.52	1.16	DP
X9Z3JA		50.80	-0.97	-0.26	53.20	1.50	0.32	DT
XGV8CB		50.34	-1.43	-0.39	51.00	-0.70	-0.15	TA
Z6RVUE		51.52	-0.25	-0.07	51.68	-0.02	-0.01	CD

Summary Statistics	Sample SZ09	Sample SZ10
Grand Means	51.77 psi	51.70 psi
Stnd Dev Btwn Labs	3.69 psi	4.74 psi

Statistics based on 22 of 22 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



Paper & Paperboard Interlaboratory Testing Program

Analysis 348

Internal Bond Strength - Modified Scott Mechanics

TAPPI Provisional Test Method T569

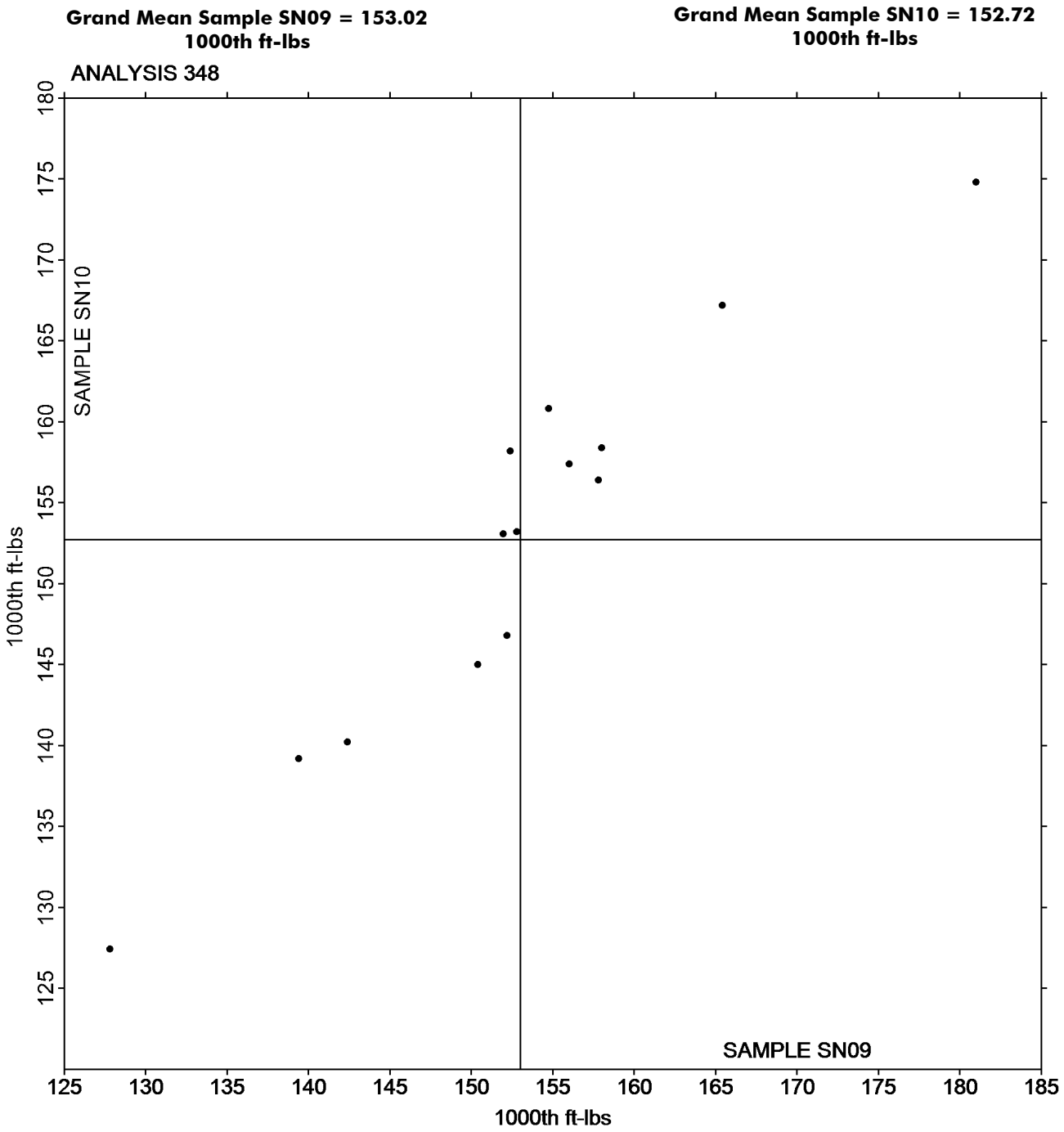
WebCode	Data Flag	Sample SN09 Lab Mean	Sample SN09 Diff from Grand Mean	Sample SN09 CPV	Sample SN10 Lab Mean	Sample SN10 Diff from Grand Mean	Sample SN10 CPV	Instr Code
8BGJR7		152.2	-0.8	-0.07	146.8	-5.9	-0.49	HZ
9F6JLR		150.4	-2.6	-0.21	145.0	-7.7	-0.63	HY
C8HRPB		181.0	28.0	2.29	174.8	22.1	1.81	HZ
EHG662		152.0	-1.1	-0.09	153.1	0.4	0.03	HZ
FX2EZ3		152.8	-0.2	-0.02	153.2	0.5	0.04	HY
GDANK3		127.8	-25.2	-2.07	127.4	-25.3	-2.07	KR
KCKT6W		154.8	1.7	0.14	160.8	8.1	0.66	XX
L6JXMN		142.4	-10.6	-0.87	140.2	-12.5	-1.03	HZ
LJKAF3		152.4	-0.6	-0.05	158.2	5.5	0.45	HY
PMDDVE		158.0	5.0	0.41	158.4	5.7	0.47	HY
VNLTDJ		157.8	4.8	0.39	156.4	3.7	0.30	HY
WEX6A4		156.0	3.0	0.24	157.4	4.7	0.38	HY
WHVLNJ		165.4	12.4	1.01	167.2	14.5	1.19	HX
WNYR22		139.4	-13.6	-1.12	139.2	-13.5	-1.11	HY

Summary Statistics	Sample SN09	Sample SN10
Grand Means	153.02 1000th ft-lbs	152.72 1000th ft-lbs
Stnd Dev Btwn Labs	12.21 1000th ft-lbs	12.20 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 SP09 Lab Mean	Sample SP09 Diff from Grand Mean	Sample SP09 CPV	Sample SP10 Lab Mean	Sample SP10 Diff from Grand Mean	Sample SP10 CPV	Instr Code
3BRRVP		136.6	-4.6	-0.23	135.6	-5.7	-0.27	TM
76V33B		148.3	7.1	0.35	138.3	-3.1	-0.14	TM
BHNGPZ		124.7	-16.5	-0.81	127.0	-14.3	-0.67	SC
CV6RTG		146.8	5.6	0.27	146.4	5.1	0.24	SC
EA4DE4		179.0	37.8	1.85	171.0	29.6	1.38	SC
JDM4LA		126.8	-14.4	-0.70	124.0	-17.3	-0.81	TM
MDD4FP		170.2	29.0	1.42	171.0	29.7	1.39	TM
P3N9WR		107.0	-34.2	-1.67	101.6	-39.7	-1.86	TM
PUFF6K		148.8	7.6	0.37	160.2	18.9	0.88	TM
QR44J2		150.6	9.4	0.46	156.8	15.5	0.72	SC
WBW2HH		147.1	5.9	0.29	152.0	10.6	0.50	TM
WMMQHN		112.8	-28.4	-1.39	111.8	-29.5	-1.38	TM
WX92M9		137.0	-4.2	-0.21	141.8	0.5	0.02	SC

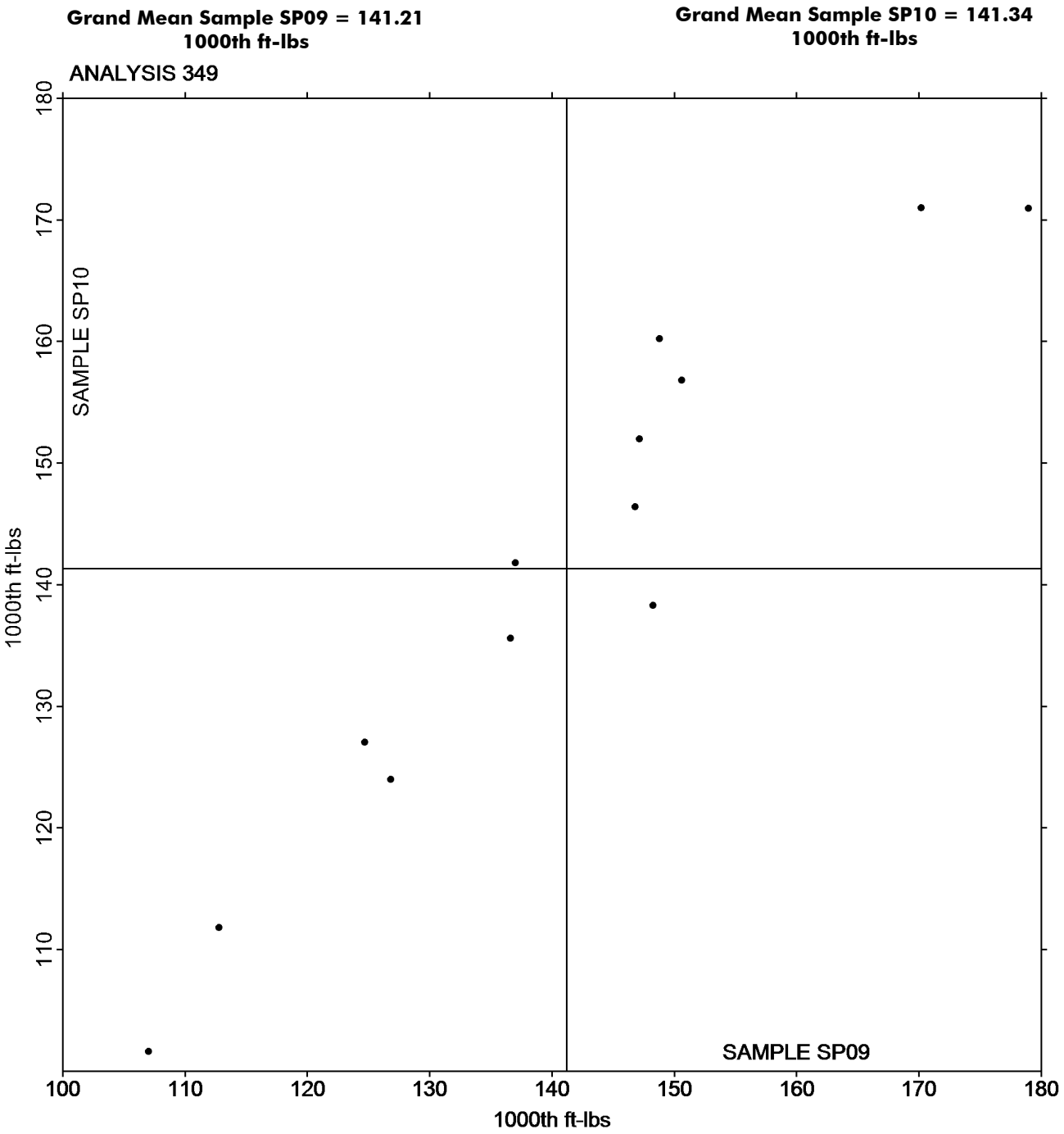
Summary Statistics	Sample SP09	Sample SP10
Grand Means	141.21 1000th ft-lbs	141.34 1000th ft-lbs
Stnd Dev Btwn Labs	20.47 1000th ft-lbs	21.39 1000th ft-lbs

Statistics based on 13 of 13 reporting participants.

Key to Instrument Codes Reported by Participants

SC Scott Internal Bond Tester (Manual)

TM TMI Monitor/Internal Bond Tester



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-

