Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #3151 S - November 2021

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

The CTS Paper & Paperboard Interlaboratory Program

In 1969, the National Bureau of Standards (now designated the National Institute for Standards and Technology) and the Technical Association of the Pulp and Paper Industry (TAPPI) developed an interlaboratory program for paper and paperboard testing. Since 1971, Collaborative Testing Services has operated the Collaborative Reference Program for Paper and Paperboard. With hundreds of organizations from around the world participating in these tests, this program has become one of the largest of its kind. The program allows laboratories to compare the performance of their testing with that of other participating laboratories, and provides a realistic picture of the state of paper testing.

About CTS

Founded in 1971, Collaborative Testing Services, Inc. (CTS) is a privately - owned company that specializes in interlaboratory tests for a variety of industrial sectors: rubber, plastics, fasteners and metals, CKPG, paper, color and wine, as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality assurance objectives. Labs from the U.S., as well as more than 80 countries, currently participate in CTS programs.

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

Collaborative Testing Services, Inc.
21331 Gentry Drive
Sterling, Virginia 20166 USA
+1-571-434-1925
FAX #: +1-571-434-1937
paper@cts-interlab.com

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

Key for Web Summary Reports (Page 1 of 2)

WebCode — Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Paper Report published on the CTS 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

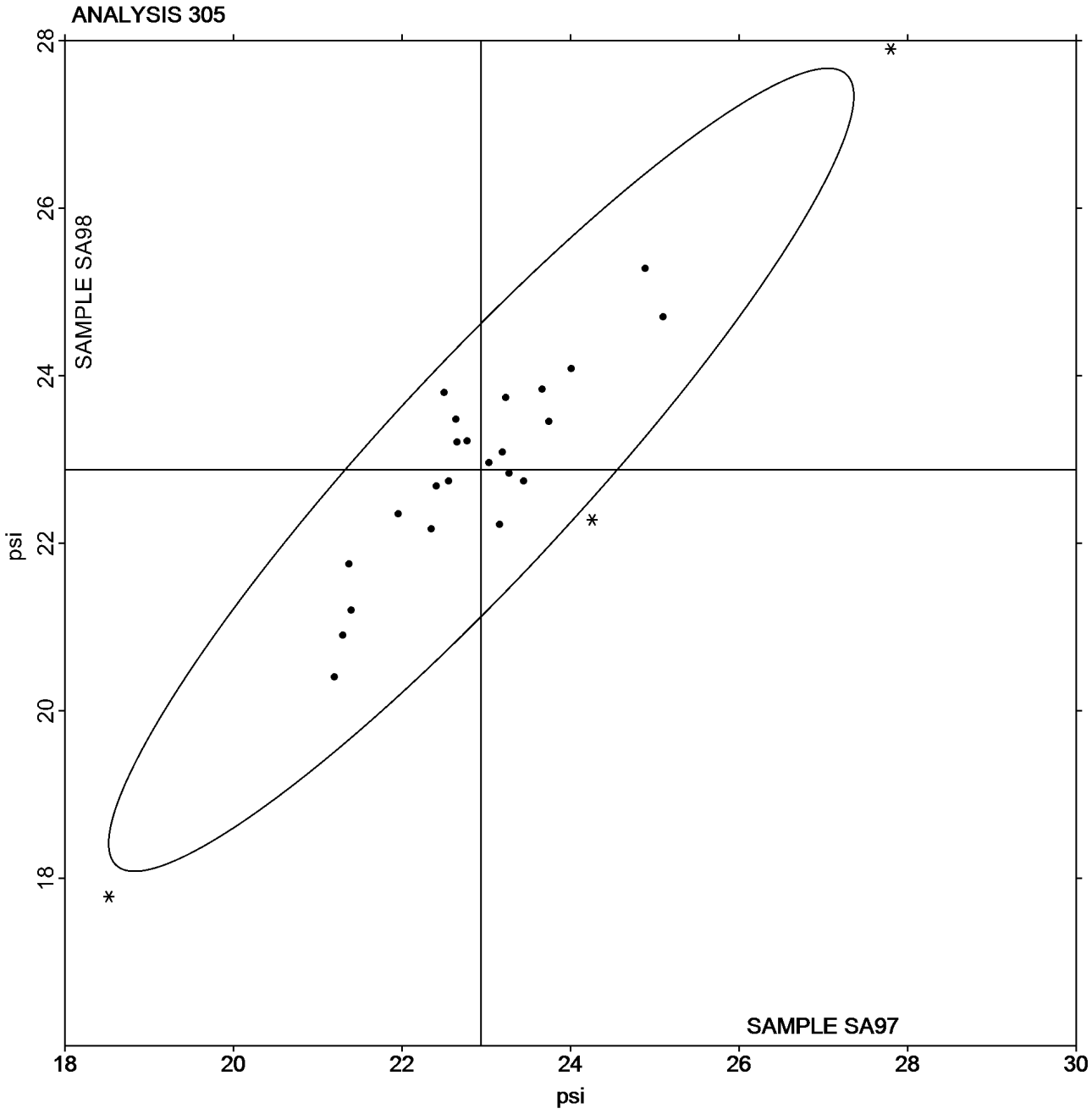
WebCode	Data Flag	Sample SA97 Lab Mean	Sample SA97 Diff from Grand Mean	Sample SA97 CPV	Sample SA98 Lab Mean	Sample SA98 Diff from Grand Mean	Sample SA98 CPV
2UNVTC		24.89	1.95	1.17	25.28	2.41	1.34
323YE6		22.78	-0.16	-0.10	23.22	0.35	0.19
78W9B8		24.01	1.07	0.64	24.08	1.20	0.67
79NBXM		22.66	-0.28	-0.17	23.21	0.33	0.18
7CMMUM		23.16	0.22	0.13	22.22	-0.66	-0.36
7CQ399	*	27.80	4.86	2.93	27.90	5.02	2.79
7PHQ7U		21.40	-1.54	-0.93	21.20	-1.68	-0.93
9FXGMP		22.35	-0.59	-0.36	22.17	-0.71	-0.39
AMF8MP		21.30	-1.64	-0.99	20.90	-1.98	-1.10
BY4VTA		21.37	-1.57	-0.95	21.75	-1.13	-0.63
C8DGJN		23.19	0.25	0.15	23.09	0.21	0.12
FZPN4U		23.03	0.09	0.06	22.96	0.08	0.05
GHXEDA		22.50	-0.44	-0.26	23.80	0.92	0.51
HRYCHP		22.41	-0.53	-0.32	22.68	-0.20	-0.11
KDA7FK		23.23	0.29	0.17	23.74	0.86	0.48
NUA6ZK		23.67	0.73	0.44	23.84	0.96	0.53
RTKBPK		25.10	2.16	1.30	24.70	1.82	1.01
U8FCGC		23.74	0.80	0.48	23.45	0.58	0.32
UTCTXY		23.45	0.51	0.31	22.74	-0.14	-0.08
VXLDGP		23.27	0.33	0.20	22.83	-0.05	-0.03
W9HR2M	*	18.52	-4.42	-2.66	17.78	-5.09	-2.83
XZJTKX	*	24.26	1.32	0.79	22.28	-0.60	-0.33
Y4HGL6		21.20	-1.74	-1.05	20.40	-2.48	-1.38
YJQHBZ		22.56	-0.38	-0.23	22.74	-0.14	-0.08
YTG2RU		22.64	-0.30	-0.18	23.48	0.60	0.33
ZURVF8		21.96	-0.98	-0.59	22.35	-0.53	-0.29

Summary Statistics	Sample SA97	Sample SA98
Grand Means	22.94 psi	22.88 psi
Stnd Dev Btwn Labs	1.66 psi	1.80 psi

Statistics based on 26 of 26 reporting participants.

Grand Mean Sample SA97 = 22.940 psi

Grand Mean Sample SA98 = 22.877 psi



Paper & Paperboard Interlaboratory Testing Program

Analysis 310
Bursting Strength - Packaging Papers
TAPPI Official Test Method T403

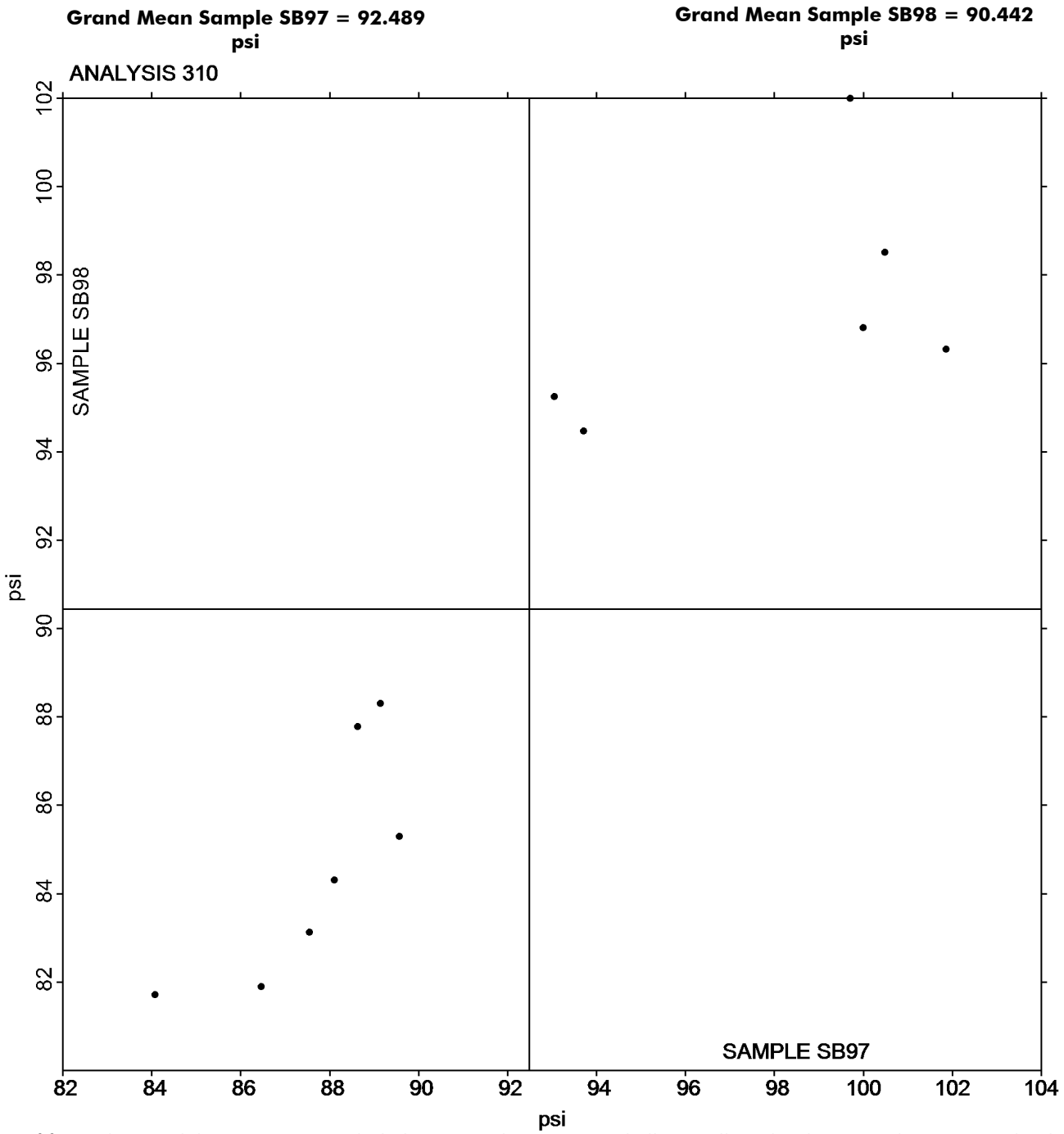
WebCode	Data Flag	Sample SB97 Lab Mean	Sample SB97 Diff from Grand Mean	Sample SB97 CPV	Sample SB98 Lab Mean	Sample SB98 Diff from Grand Mean	Sample SB98 CPV
4CFPAR	X	641.71	549.22	89.96	664.27	573.83	81.71
A2BNCN		93.72	1.23	0.20	94.47	4.03	0.57
AE3C8M		89.15	-3.34	-0.55	88.30	-2.14	-0.31
B4FQJ6		88.11	-4.38	-0.72	84.30	-6.14	-0.87
C9862K		93.05	0.56	0.09	95.25	4.81	0.68
J7WQFX		100.00	7.51	1.23	96.80	6.36	0.91
NRGGGN		84.07	-8.42	-1.38	81.71	-8.73	-1.24
NXPMBA		99.70	7.21	1.18	102.00	11.56	1.65
PVW7GR		101.86	9.37	1.53	96.32	5.88	0.84
TALFRM		89.58	-2.91	-0.48	85.30	-5.14	-0.73
U8FCGC		87.55	-4.94	-0.81	83.12	-7.32	-1.04
X7PH7C		86.47	-6.02	-0.99	81.89	-8.55	-1.22
Y8W2LY		100.48	7.99	1.31	98.51	8.07	1.15
YTG2RU		88.63	-3.86	-0.63	87.77	-2.67	-0.38

Summary Statistics	Sample SB97	Sample SB98
Grand Means	92.49 psi	90.44 psi
Stnd Dev Btwn Labs	6.11 psi	7.02 psi

Statistics based on 13 of 14 reporting participants.

Comments on Assigned Data Flags for Test #310

4CFPAR (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 312

Tearing Strength - Printing Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SC97 Lab Mean	Sample SC97 Diff from Grand Mean	Sample SC97 CPV	Sample SC98 Lab Mean	Sample SC98 Diff from Grand Mean	Sample SC98 CPV
2UNVTC		41.30	-5.09	-1.14	41.02	-5.61	-1.17
78W9B8		50.83	4.44	0.99	52.03	5.40	1.12
79NBXM		51.34	4.95	1.10	50.77	4.15	0.86
7CMMUM		51.39	5.00	1.12	50.87	4.25	0.88
7CQ399		47.90	1.51	0.34	47.80	1.17	0.24
A3NBU3		47.64	1.25	0.28	48.29	1.66	0.35
AE3C8M		40.71	-5.68	-1.27	40.85	-5.78	-1.20
AWKE2P		42.26	-4.13	-0.92	42.50	-4.13	-0.86
AZKKP9		47.02	0.62	0.14	49.08	2.45	0.51
BKNN34		47.30	0.91	0.20	47.00	0.37	0.08
BQAKMK	X	62.58	16.19	3.61	62.28	15.65	3.26
BY4VTA	X	55.40	9.01	2.01	48.40	1.77	0.37
C9862K		42.11	-4.28	-0.96	42.77	-3.86	-0.80
CET9TM		42.80	-3.59	-0.80	42.06	-4.57	-0.95
D68AZW		50.16	3.77	0.84	50.10	3.47	0.72
DM7L9X	*	58.16	11.77	2.63	57.96	11.34	2.36
DU6BP2		42.26	-4.13	-0.92	41.72	-4.91	-1.02
FZPN4U		44.75	-1.64	-0.37	45.03	-1.60	-0.33
GHXEDA		46.60	0.21	0.05	46.00	-0.63	-0.13
GQV3B2		42.90	-3.49	-0.78	44.20	-2.43	-0.50
H2N33W		42.20	-4.19	-0.94	40.60	-6.03	-1.25
HRYCHP		43.94	-2.45	-0.55	44.66	-1.97	-0.41
J7WQFX		52.20	5.81	1.30	54.20	7.57	1.58
K9HYWC		43.92	-2.47	-0.55	43.42	-3.21	-0.67
KZNRE7		44.44	-1.95	-0.44	44.50	-2.13	-0.44
L39T3R	*	45.60	-0.79	-0.18	42.80	-3.83	-0.80
LQCRHA		51.10	4.71	1.05	51.59	4.96	1.03
MHH7PG		48.20	1.81	0.40	46.20	-0.43	-0.09
N2PR9N		38.12	-8.27	-1.85	37.80	-8.83	-1.84
NMAQEH		44.30	-2.09	-0.47	45.70	-0.93	-0.19
PAE2NB		53.28	6.89	1.54	55.84	9.21	1.92
PVW7GR		43.73	-2.66	-0.59	42.43	-4.20	-0.87
RTKBPK		47.68	1.29	0.29	49.09	2.46	0.51
RUYFNH		49.44	3.05	0.68	51.05	4.42	0.92
TALFRM		47.38	0.98	0.22	47.64	1.01	0.21
TTL69Q		46.43	0.04	0.01	46.78	0.15	0.03
U8FCGC		43.13	-3.26	-0.73	43.92	-2.71	-0.56
UTCTXY		45.24	-1.15	-0.26	46.68	0.06	0.01
UX6WPH		49.88	3.49	0.78	50.36	3.74	0.78
W9HR2M		48.65	2.25	0.50	47.66	1.03	0.22

Paper & Paperboard Interlaboratory Testing Program

Analysis 312

Tearing Strength - Printing Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SC97 Lab Mean	Sample SC97 Diff from Grand Mean	Sample SC97 CPV	Sample SC98 Lab Mean	Sample SC98 Diff from Grand Mean	Sample SC98 CPV
WENKVH	*	33.83	-12.56	-2.80	33.05	-13.58	-2.83
XZJTKX		46.56	0.17	0.04	48.04	1.41	0.29
Y8W2LY		54.46	8.07	1.80	53.86	7.23	1.50
YJQHBZ		46.66	0.27	0.06	48.06	1.43	0.30
YTG2RU		47.87	1.47	0.33	48.74	2.12	0.44
ZRKQU7		48.00	1.61	0.36	47.62	0.99	0.21
ZU8FZ6		40.40	-5.99	-1.34	41.50	-5.13	-1.07
ZURVF8		50.01	3.62	0.81	50.99	4.36	0.91

Summary Statistics	Sample SC97	Sample SC98
Grand Means	46.39 Grams	46.63 Grams
Stnd Dev Btwn Labs	4.48 Grams	4.81 Grams

Statistics based on 46 of 48 reporting participants.

Comments on Assigned Data Flags for Test #312

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

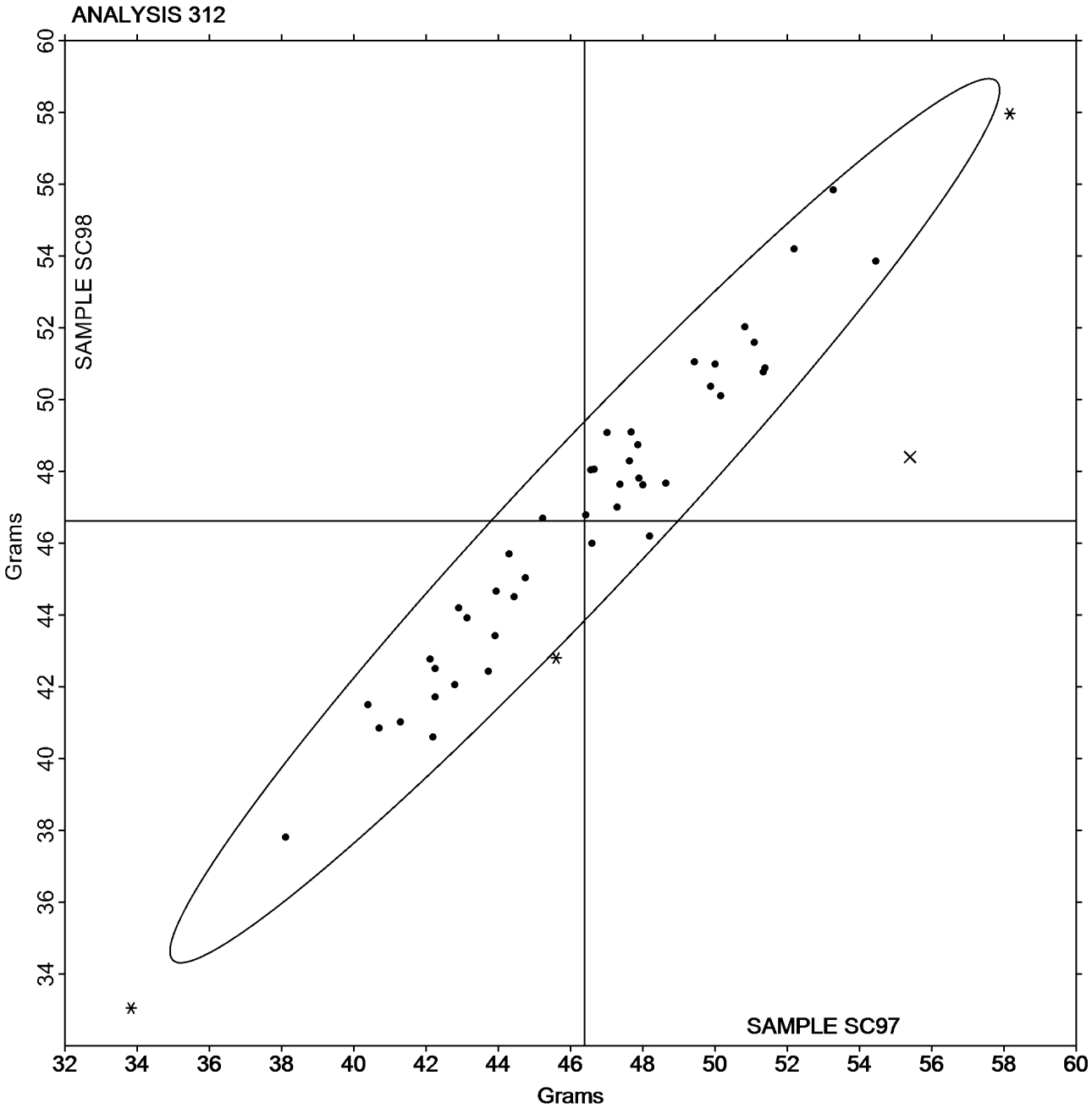
BY4VTA (X) - Inconsistent in testing between samples.

Analysis Notes:

AZKKP9 - Data appear to be off by a factor; data converted by CTS (x.5). CTS will not correct the data going forward.

Grand Mean Sample SC97 = 46.393 Grams

Grand Mean Sample SC98 = 46.627 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 314

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SD97 Lab Mean	Sample SD97 Diff from Grand Mean	Sample SD97 CPV	Sample SD98 Lab Mean	Sample SD98 Diff from Grand Mean	Sample SD98 CPV
2C6ZE4		181.3	8.9	0.56	206.1	0.2	0.01
323YE6		150.2	-22.2	-1.38	184.8	-21.1	-1.14
4CFPAR	X	14.5	-157.9	-9.80	17.1	-188.8	-10.19
6L4WQW		150.2	-22.1	-1.37	189.8	-16.1	-0.87
6URU9P		150.0	-22.4	-1.39	178.4	-27.6	-1.49
7D27KC		138.3	-34.1	-2.12	178.0	-27.9	-1.51
96HKQY		176.1	3.7	0.23	195.8	-10.2	-0.55
9BJ3FB		161.5	-10.9	-0.68	186.9	-19.1	-1.03
A2BNCN		162.0	-10.4	-0.65	179.8	-26.2	-1.41
B4FQJ6		163.6	-8.8	-0.54	198.0	-7.9	-0.43
BE2VTP		170.5	-1.9	-0.12	193.9	-12.0	-0.65
BKNN34		168.5	-3.9	-0.24	210.4	4.5	0.24
C8DGJN		148.1	-24.3	-1.51	185.7	-20.2	-1.09
CBCTEN		174.0	1.7	0.10	204.9	-1.1	-0.06
CK4BVH		184.8	12.4	0.77	223.2	17.3	0.93
DYY6M3	X	79.2	-93.2	-5.79	108.3	-97.6	-5.27
E9FAAT		186.1	13.7	0.85	216.8	10.9	0.59
HPWE8W		178.5	6.1	0.38	222.3	16.3	0.88
J7WQFX		192.8	20.4	1.27	230.0	24.1	1.30
JBPV4A		169.9	-2.5	-0.15	201.3	-4.6	-0.25
JHE9BP		180.7	8.3	0.52	216.8	10.8	0.59
KDA7FK		182.0	9.6	0.60	227.0	21.1	1.14
L3BJ8N		185.6	13.2	0.82	220.0	14.1	0.76
MD3R6G		169.8	-2.6	-0.16	204.1	-1.9	-0.10
NRGGGN		174.8	2.4	0.15	205.3	-0.6	-0.03
NUA6ZK		177.5	5.1	0.32	203.3	-2.6	-0.14
T79D6R		181.0	8.7	0.54	208.8	2.9	0.16
T8FYAJ		161.1	-11.2	-0.70	202.0	-3.9	-0.21
TALFRM	M	186.9	14.5	0.90	No data reported for this sample		
TJWENJ		173.7	1.3	0.08	208.8	2.9	0.16
TPERHC		152.1	-20.3	-1.26	179.0	-26.9	-1.45
UPGWGK		179.2	6.8	0.42	230.5	24.6	1.33
X7PH7C	*	215.2	42.8	2.66	256.6	50.7	2.74
Y4HGL6		198.2	25.9	1.61	230.2	24.3	1.31
YTG2RU		178.7	6.3	0.39	211.0	5.1	0.27

Summary Statistics	Sample SD97	Sample SD98
Grand Means	172.37 Grams	205.92 Grams
Stnd Dev Btwn Labs	16.10 Grams	18.53 Grams

Statistics based on 32 of 35 reporting participants.

Comments on Assigned Data Flags for Test #314

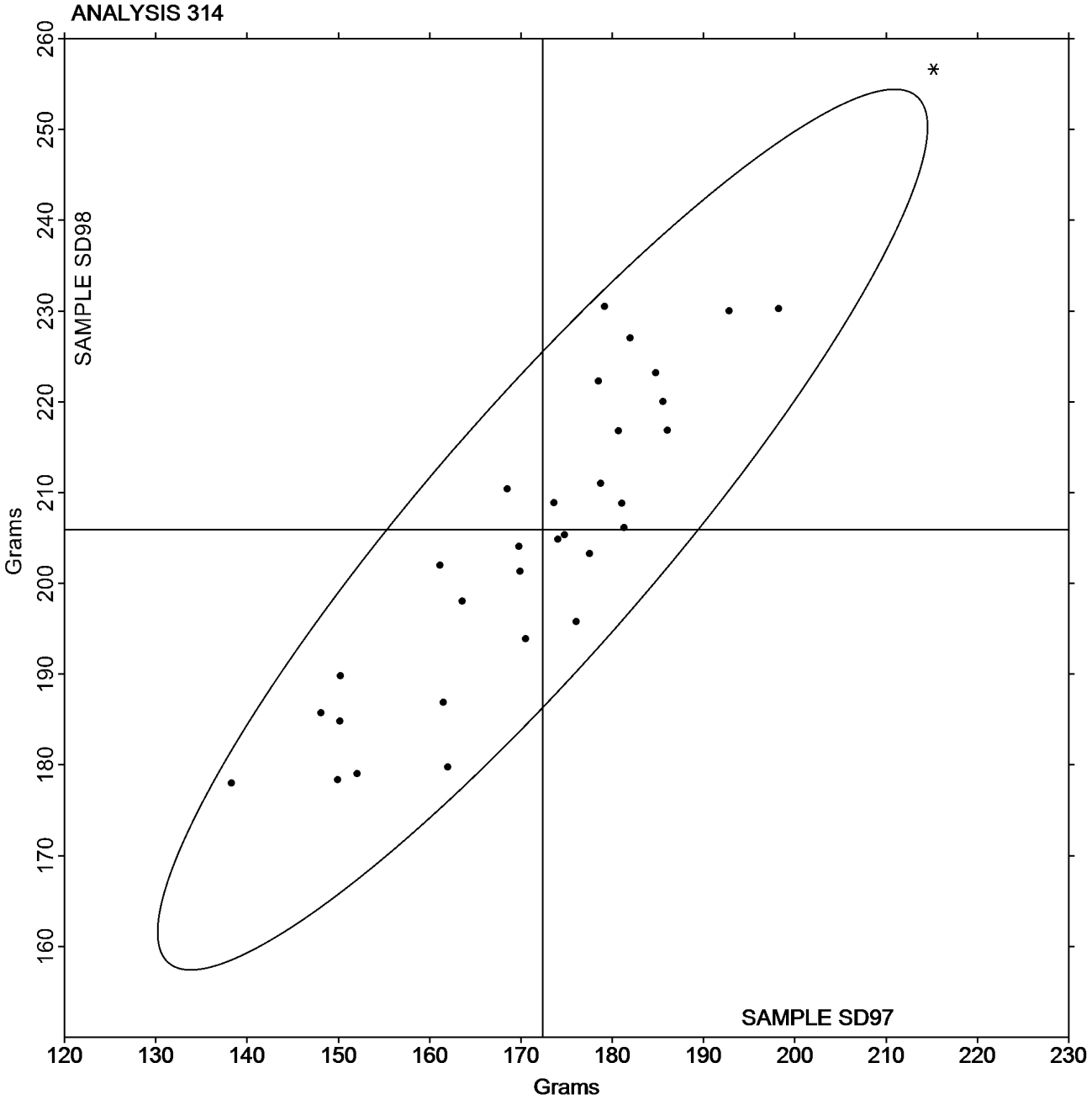
DYY6M3 (X) - Data for both samples are low. Possible Systematic Error.

TALFRM (M) - Participant did not submit data for sample SD98.

4CFPAR (X) - Extreme Data.

Grand Mean Sample SD97 = 172.37 Grams

Grand Mean Sample SD98 = 205.92 Grams



Paper & Paperboard Interlaboratory Testing Program

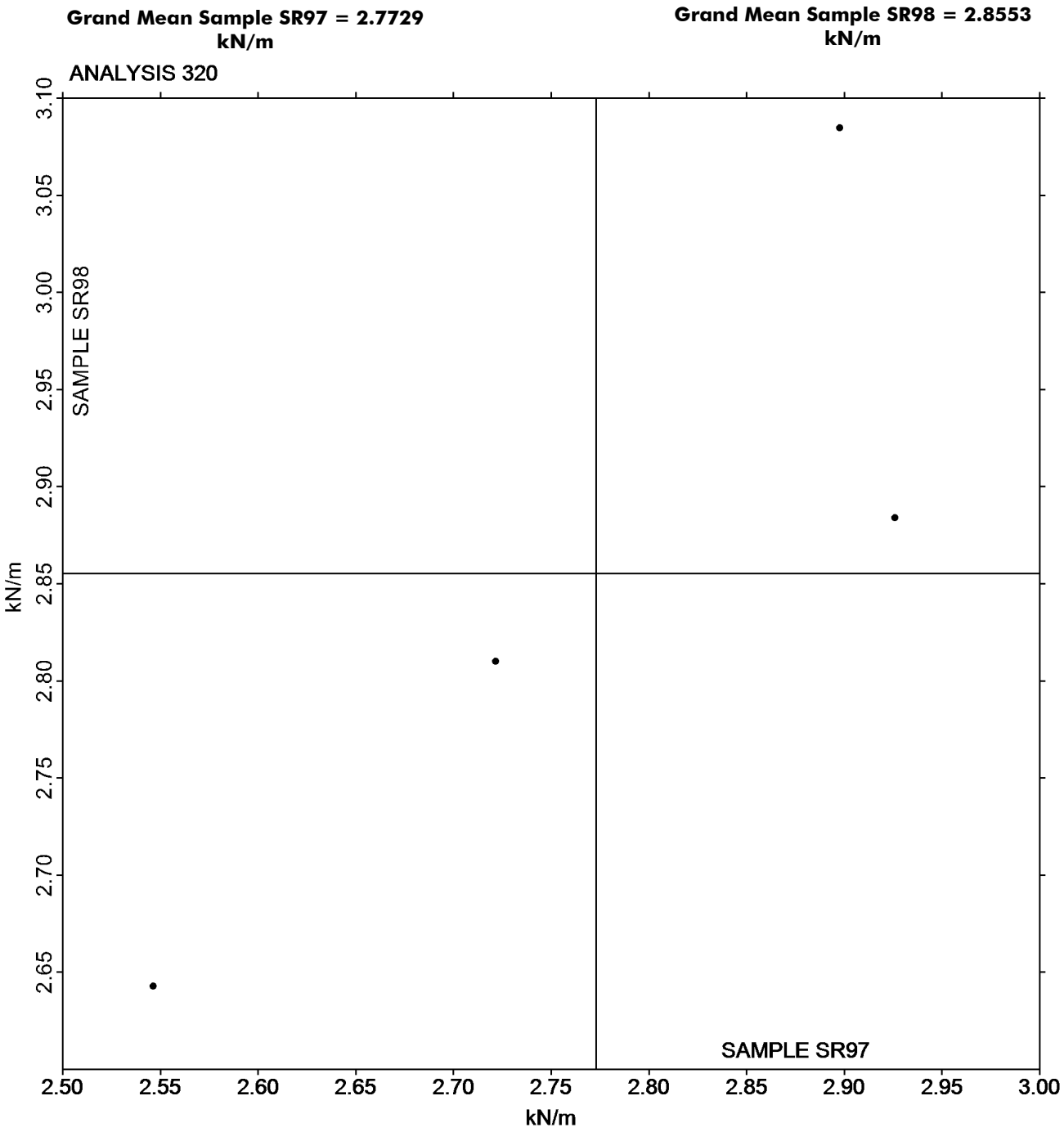
Analysis 320
Tensile Breaking Strength - Newsprint
TAPPI Official Test Method T494

WebCode	Data Flag	Sample SR97 Lab Mean	Sample SR97 Diff from Grand Mean	Sample SR97 CPV	Sample SR98 Lab Mean	Sample SR98 Diff from Grand Mean	Sample SR98 CPV
GHXEDA		2.898	0.125	0.71	3.085	0.229	1.25
JBPV4A		2.546	-0.227	-1.29	2.643	-0.213	-1.16
U8FCGC		2.926	0.153	0.87	2.884	0.029	0.16
V9NL8N		2.722	-0.051	-0.29	2.810	-0.045	-0.25

Summary Statistics	Sample SR97	Sample SR98
Grand Means	2.77 kN/m	2.86 kN/m
Stnd Dev Btwn Labs	0.18 kN/m	0.18 kN/m

Statistics based on 4 of 4 reporting participants.

Because the population of this test is extremely low, this test has been discontinued 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 321

Tensile Energy Absorption - Newsprint

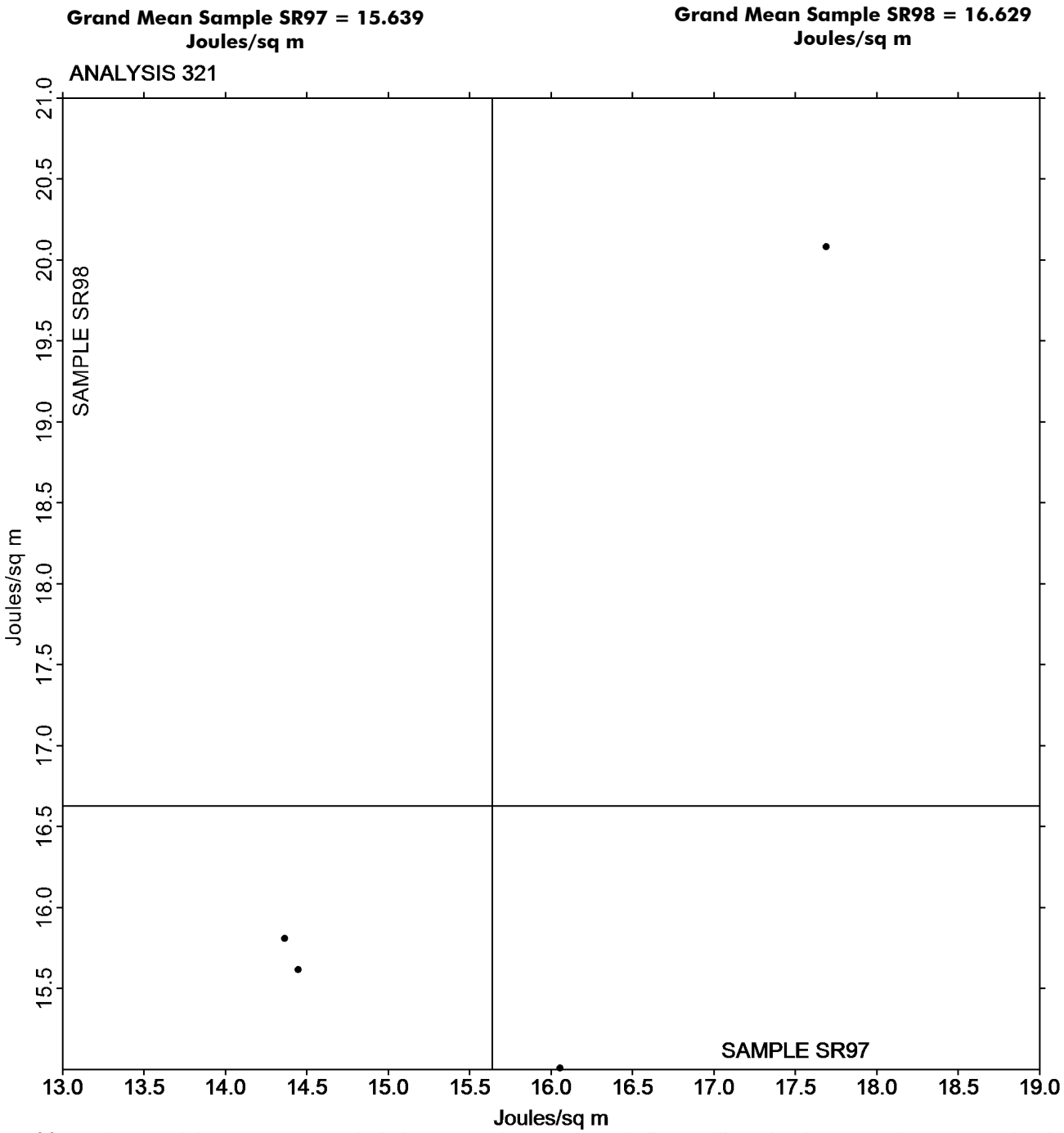
TAPPI Official Test Method T494

WebCode	Data Flag	Sample SR97 Lab Mean	Sample SR97 Diff from Grand Mean	Sample SR97 CPV	Sample SR98 Lab Mean	Sample SR98 Diff from Grand Mean	Sample SR98 CPV
GHXEDA		17.69	2.05	1.30	20.08	3.45	1.48
JBPV4A		14.45	-1.19	-0.76	15.62	-1.01	-0.44
U8FCGC		16.06	0.42	0.27	15.01	-1.62	-0.70
V9NL8N		14.36	-1.28	-0.81	15.81	-0.82	-0.35

Summary Statistics	Sample SR97	Sample SR98
Grand Means	15.64 Joules/sq m	16.63 Joules/sq m
Stnd Dev Btwn Labs	1.57 Joules/sq m	2.33 Joules/sq m

Statistics based on 4 of 4 reporting participants.

Because the population of this test is extremely low, this test has been discontinued 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

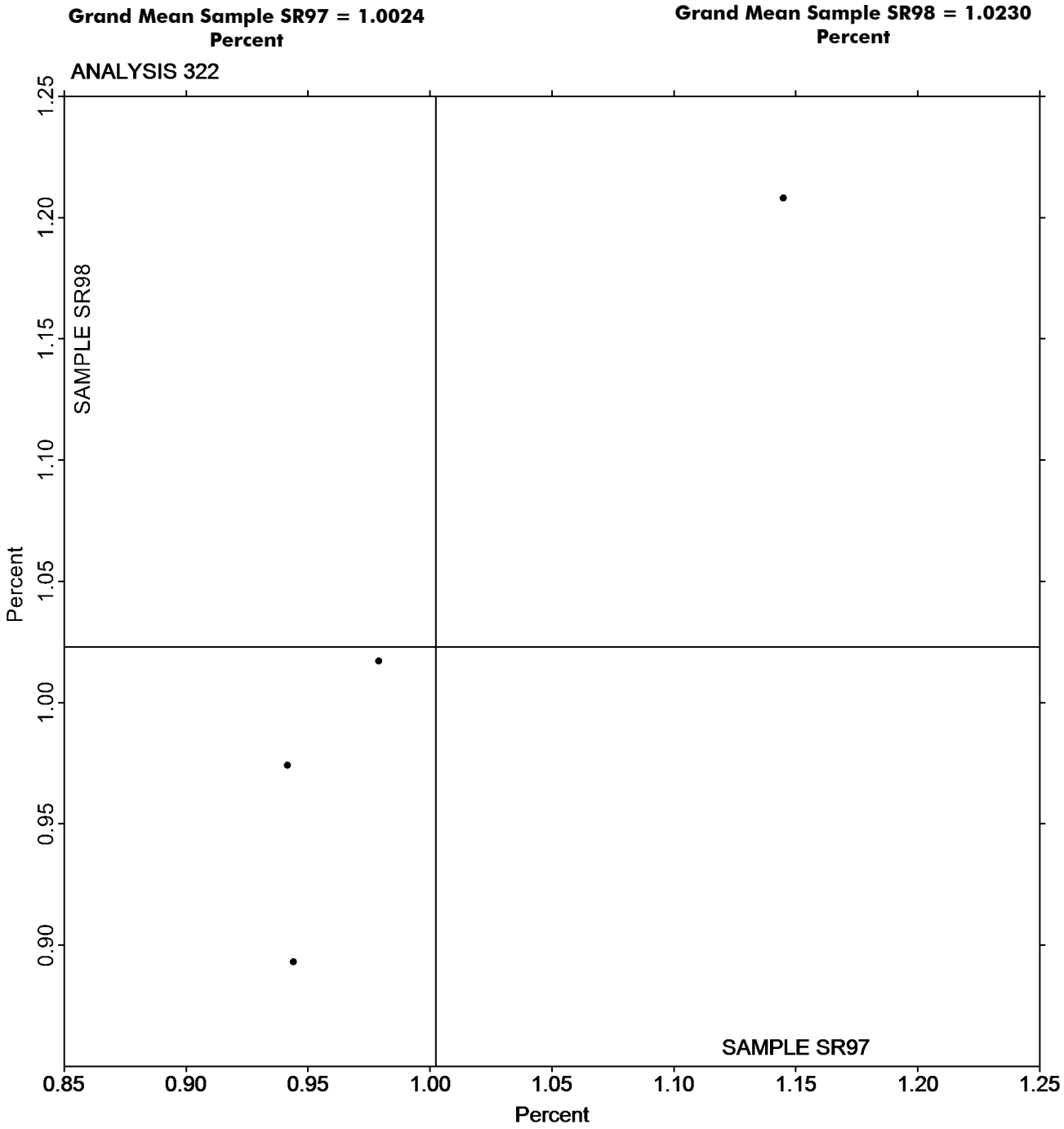
Analysis 322
Elongation to Break - Newsprint
TAPPI Official Test Method T494

WebCode	Data Flag	Sample SR97 Lab Mean	Sample SR97 Diff from Grand Mean	Sample SR97 CPV	Sample SR98 Lab Mean	Sample SR98 Diff from Grand Mean	Sample SR98 CPV
GHXEDA		1.145	0.143	1.48	1.208	0.185	1.38
JBPV4A		0.979	-0.023	-0.24	1.017	-0.006	-0.05
U8FCGC		0.944	-0.058	-0.60	0.893	-0.130	-0.97
V9NL8N		0.942	-0.061	-0.63	0.974	-0.049	-0.37

Summary Statistics	Sample SR97	Sample SR98
Grand Means	1.00 Percent	1.02 Percent
Stnd Dev Btwn Labs	0.10 Percent	0.13 Percent

Statistics based on 4 of 4 reporting participants.

Because the population of this test is extremely low, this test has been discontinued going forward.



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

WebCode	Data Flag	Sample SF97 Lab Mean	Sample SF97 Diff from Grand Mean	Sample SF97 CPV	Sample SF98 Lab Mean	Sample SF98 Diff from Grand Mean	Sample SF98 CPV	Instr Code
2UNVTC		4.692	0.402	1.15	4.739	0.451	1.32	TJ
78W9B8		3.833	-0.457	-1.31	4.014	-0.274	-0.80	TP
79NBXM		4.525	0.235	0.68	4.445	0.157	0.46	LI
7CMMUM		3.910	-0.380	-1.09	4.102	-0.186	-0.54	LF
7CQ399		4.151	-0.139	-0.40	4.099	-0.189	-0.55	TO
7PHQ7U		4.234	-0.056	-0.16	4.171	-0.117	-0.34	IN
A3NBU3		3.983	-0.307	-0.88	3.823	-0.465	-1.36	LE
AWKE2P		4.043	-0.247	-0.71	4.018	-0.270	-0.79	TB
AZKKP9		3.801	-0.489	-1.40	3.717	-0.571	-1.66	TJ
BQAKMK		4.838	0.548	1.57	4.933	0.645	1.88	LH
BY4VTA		4.265	-0.024	-0.07	4.321	0.033	0.10	TO
C9862K		4.688	0.398	1.14	4.715	0.427	1.25	TF
CET9TM	X	3.758	-0.531	-1.53	4.257	-0.031	-0.09	TO
DM7L9X		3.855	-0.434	-1.25	3.938	-0.350	-1.02	IM
DU6BP2		4.109	-0.181	-0.52	4.181	-0.107	-0.31	TF
FZPN4U		4.445	0.156	0.45	4.326	0.038	0.11	LB
GQV3B2		4.175	-0.114	-0.33	4.197	-0.091	-0.26	FP
H2N33W		4.903	0.613	1.76	4.774	0.486	1.42	LB
HRYCHP		4.180	-0.109	-0.31	4.067	-0.221	-0.64	TB
K9HYWC		4.406	0.117	0.33	4.355	0.068	0.20	TO
KMYRKJ		4.841	0.551	1.58	4.774	0.486	1.42	XX
L39T3R	X	4.378	0.089	0.25	3.940	-0.348	-1.01	VM
LQUZ76		3.508	-0.781	-2.24	3.483	-0.805	-2.35	RE
MMELKJ		3.599	-0.691	-1.98	3.733	-0.555	-1.62	ID
N2PR9N		4.790	0.500	1.44	4.783	0.495	1.44	LJ
NMAQEH		4.629	0.339	0.97	4.537	0.249	0.73	TC
PAE2NB		4.399	0.109	0.31	4.387	0.099	0.29	LA
RFX4RJ		4.552	0.262	0.75	4.656	0.368	1.07	LC
RTKBPK		4.241	-0.048	-0.14	4.121	-0.167	-0.49	LH
RUYFNH		4.475	0.185	0.53	4.591	0.303	0.88	LB
TJWENJ		3.945	-0.345	-0.99	3.975	-0.313	-0.91	LI
TTL69Q		4.430	0.140	0.40	4.484	0.196	0.57	LI
U8FCGC		4.173	-0.117	-0.33	4.236	-0.052	-0.15	LH
UX6WPH		4.281	-0.009	-0.03	4.259	-0.029	-0.08	TO
UZD8JZ		4.340	0.050	0.14	4.224	-0.064	-0.19	FP
WENKVH		3.855	-0.435	-1.25	3.794	-0.494	-1.44	TP
WXH7T3		4.372	0.082	0.24	4.453	0.165	0.48	TV
XZJTKX		4.097	-0.192	-0.55	4.178	-0.110	-0.32	LX
YJQHBZ		4.279	-0.010	-0.03	4.265	-0.023	-0.07	TF
YTG2RU		4.180	-0.109	-0.31	4.085	-0.203	-0.59	LH

Paper & Paperboard Interlaboratory Testing Program

Analysis 325

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF97 Lab Mean	Sample SF97 Diff from Grand Mean	Sample SF97 CPV	Sample SF98 Lab Mean	Sample SF98 Diff from Grand Mean	Sample SF98 CPV	Instr Code
ZRKQU7		4.906	0.616	1.77	4.871	0.583	1.70	XX
ZU8FZ6		4.591	0.301	0.86	4.578	0.290	0.84	LI
ZURVF8		4.357	0.067	0.19	4.400	0.112	0.33	LH

Summary Statistics	Sample SF97	Sample SF98
Grand Means	4.29 kN/m	4.29 kN/m
Stnd Dev Btwn Labs	0.35 kN/m	0.34 kN/m

Statistics based on 41 of 43 reporting participants.

Comments on Assigned Data Flags for Test #325

CET9TM (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SF97.

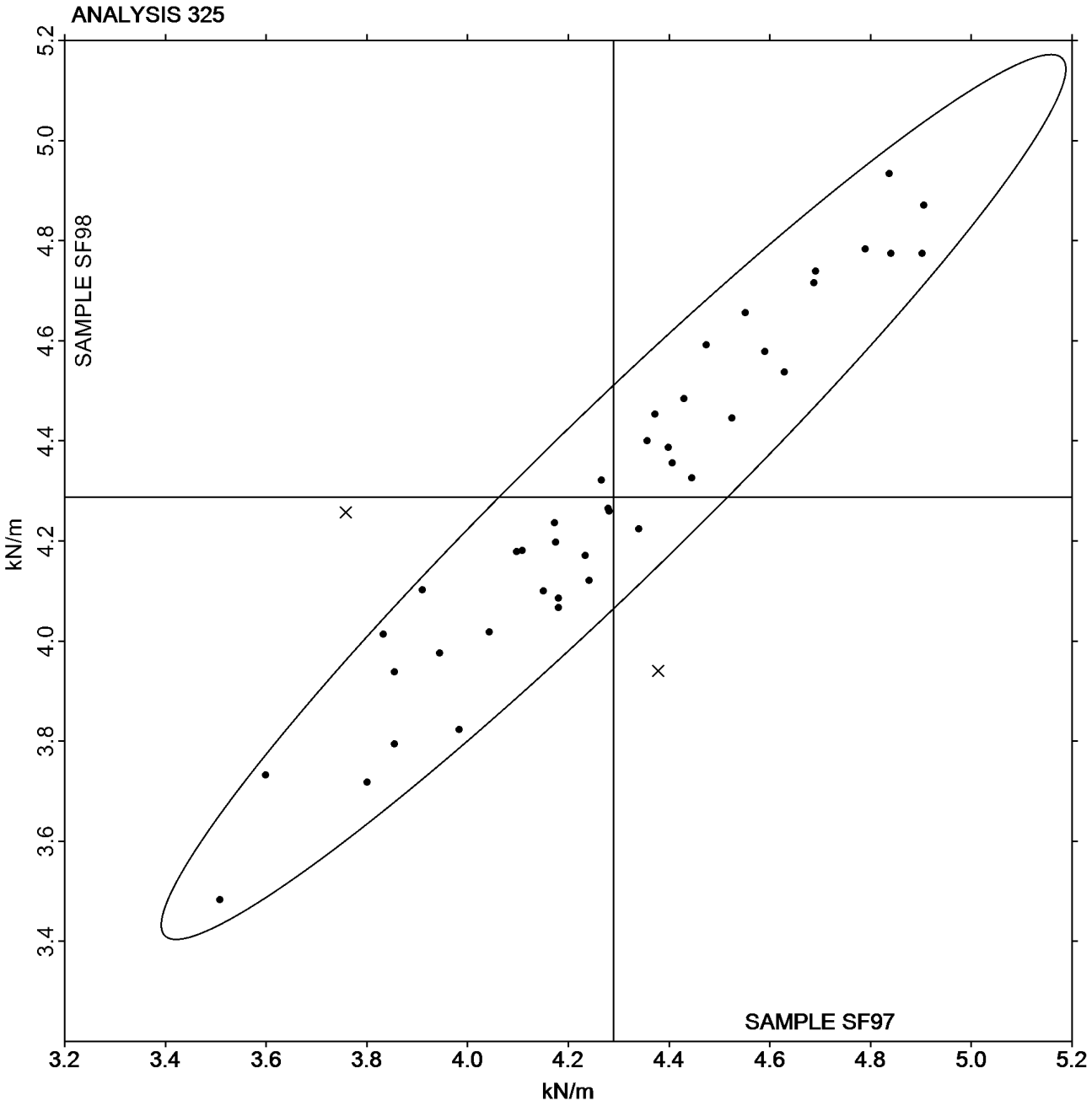
L39T3R (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.

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)	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	TP	TMI Monitor/Tensile 100 (84-21-01)
TV	Thwing-Albert Vantage NX	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		

Grand Mean Sample SF97 = 4.2896 kN/m

Grand Mean Sample SF98 = 4.2879 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF97 Lab Mean	Sample SF97 Diff from Grand Mean	Sample SF97 CPV	Sample SF98 Lab Mean	Sample SF98 Diff from Grand Mean	Sample SF98 CPV	Instr Code
78W9B8		45.84	1.25	0.17	44.02	0.16	0.02	TP
79NBXM		50.53	5.94	0.83	48.92	5.06	0.79	LI
7CMMUM		43.61	-0.98	-0.14	44.91	1.05	0.17	LF
7CQ399		42.88	-1.71	-0.24	38.66	-5.20	-0.82	TO
7PHQ7U		46.87	2.28	0.32	46.18	2.32	0.36	IN
AZKKP9		35.99	-8.60	-1.20	33.06	-10.80	-1.69	TJ
BQAKMK		44.39	-0.20	-0.03	45.34	1.49	0.23	LH
BY4VTA		51.84	7.25	1.01	52.36	8.51	1.33	TO
C9862K		43.42	-1.17	-0.16	42.17	-1.68	-0.26	TF
CET9TM		40.02	-4.57	-0.64	46.63	2.77	0.43	TX
DM7L9X		42.49	-2.10	-0.29	43.35	-0.51	-0.08	IM
FZPN4U		33.36	-11.23	-1.57	30.66	-13.20	-2.07	LB
GQV3B2	*	64.78	20.18	2.82	56.48	12.62	1.98	FP
H2N33W		48.44	3.85	0.54	45.47	1.61	0.25	LB
HRYCHP		47.81	3.22	0.45	42.03	-1.83	-0.29	TB
K9HYWC		48.31	3.72	0.52	47.43	3.57	0.56	TO
LQUZ76		30.88	-13.71	-1.92	28.97	-14.89	-2.34	RE
MMELKJ		34.04	-10.55	-1.47	39.75	-4.11	-0.65	ID
N2PR9N	X	8.67	-35.92	-5.02	8.47	-35.39	-5.55	LJ
PAE2NB		49.06	4.47	0.62	48.58	4.72	0.74	LA
RFX4RJ		48.74	4.15	0.58	50.08	6.22	0.98	LC
RTKBPK		43.30	-1.29	-0.18	39.53	-4.32	-0.68	LH
RUYFNH		32.02	-12.57	-1.76	34.95	-8.91	-1.40	LB
TJWENJ		44.60	0.01	0.00	42.12	-1.74	-0.27	LI
TTL69Q		41.04	-3.55	-0.50	43.08	-0.77	-0.12	LI
U8FCGC		40.34	-4.25	-0.59	40.71	-3.14	-0.49	LH
UX6WPH		43.64	-0.95	-0.13	42.61	-1.24	-0.20	TO
UZD8JZ		54.26	9.67	1.35	54.21	10.35	1.62	FP
WXH7T3	X	357.36	312.77	43.72	352.46	308.60	48.42	TV
XZJTKX		37.64	-6.95	-0.97	44.04	0.19	0.03	LX
YJQHBZ		51.79	7.19	1.01	50.63	6.77	1.06	TF
YTG2RU		45.27	0.68	0.10	41.96	-1.90	-0.30	LH
ZRKQU7		55.00	10.41	1.46	52.93	9.07	1.42	XX
ZU8FZ6		40.44	-4.15	-0.58	38.72	-5.14	-0.81	LX
ZURVF8		48.87	4.28	0.60	46.77	2.91	0.46	LH

Paper & Paperboard Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SF97	Sample SF98
Grand Means	44.59 Joules/sq m	43.86 Joules/sq m
Stnd Dev Btwn Labs	7.15 Joules/sq m	6.37 Joules/sq m

Statistics based on 33 of 35 reporting participants.

Comments on Assigned Data Flags for Test #327

N2PR9N (X) - Data for both samples are low. Possible Systematic Error.

WXH7T3 (X) - Extreme Data.

Analysis Notes:

MMELKJ - Data appear to be reported as ft-lb/sq ft, not inch-lb/sq inch as indicated on data entry form. CTS will not correct the Units going forward.

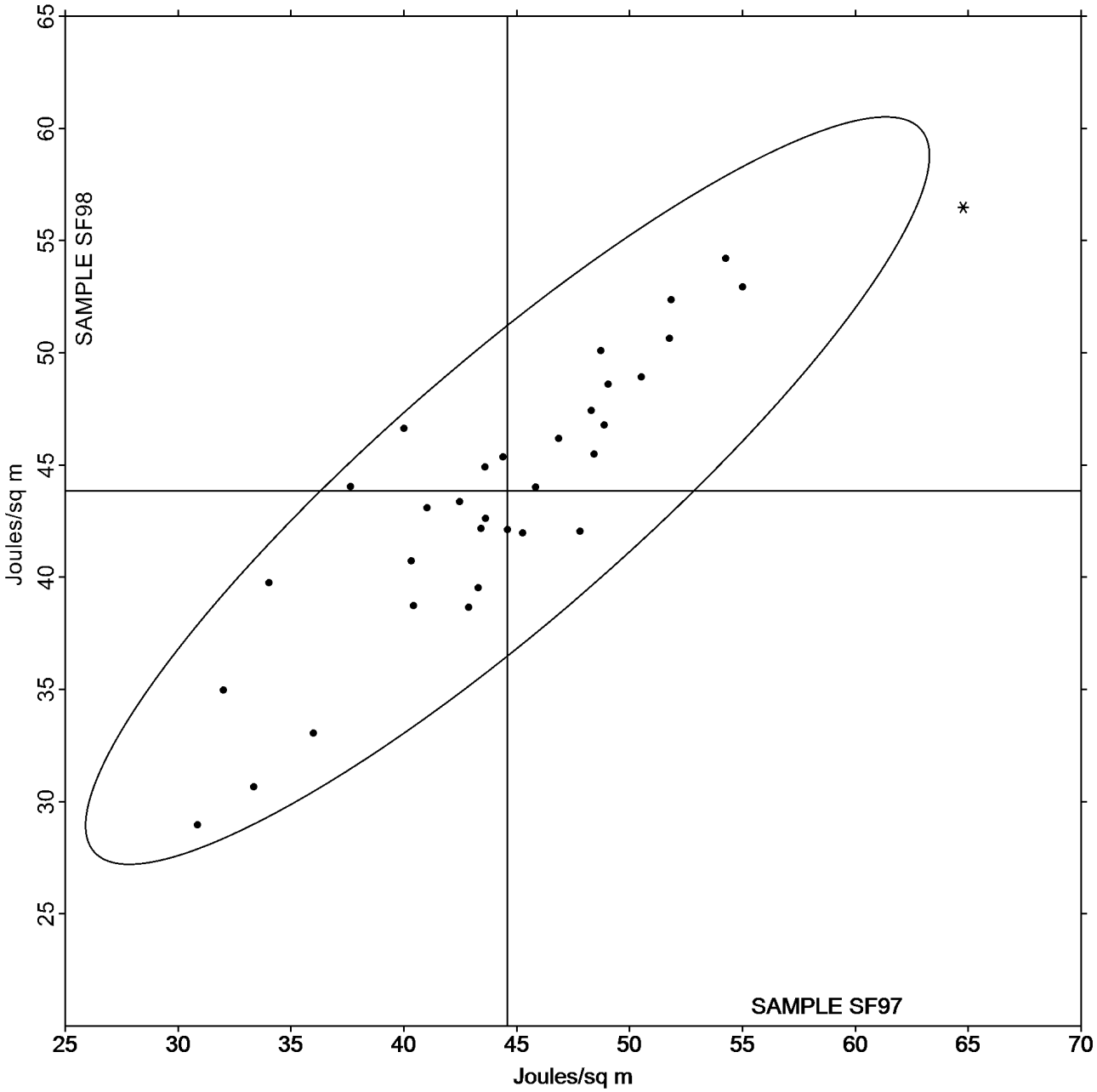
ZURVF8 - Data appears to be transposed between Analysis 327 (T.E.A.) and Analysis 328 (% Elongation). CTS will not correct going forward.

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	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	TP	TMI Monitor/Tensile 100 (84-21-01)
TV	Thwing-Albert Vantage NX	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		

Grand Mean Sample SF97 = 44.591 Joules/sq m

Grand Mean Sample SF98 = 43.858 Joules/sq m



Paper & Paperboard Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF97 Lab Mean	Sample SF97 Diff from Grand Mean	Sample SF97 CPV	Sample SF98 Lab Mean	Sample SF98 Diff from Grand Mean	Sample SF98 CPV	Instr Code
78W9B8	*	2.546	0.863	3.15	2.364	0.721	2.97	TP
79NBXM		1.602	-0.081	-0.29	1.581	-0.061	-0.25	LI
7CMMUM		1.691	0.008	0.03	1.672	0.030	0.12	LF
7CQ399		1.533	-0.150	-0.55	1.403	-0.239	-0.99	TO
7PHQ7U		1.805	0.122	0.45	1.809	0.167	0.69	IN
AWKE2P		1.475	-0.208	-0.76	1.416	-0.226	-0.93	TF
AZKKP9		1.545	-0.138	-0.50	1.469	-0.173	-0.71	TJ
BQAKMK		1.457	-0.226	-0.82	1.448	-0.194	-0.80	LH
BY4VTA		2.172	0.489	1.78	2.061	0.419	1.73	TO
C9862K		1.611	-0.072	-0.26	1.569	-0.073	-0.30	TF
CET9TM		1.906	0.223	0.81	1.875	0.233	0.96	TX
DM7L9X		1.711	0.028	0.10	1.707	0.065	0.27	IM
DU6BP2		1.515	-0.168	-0.61	1.596	-0.046	-0.19	TF
FZPN4U		1.441	-0.242	-0.88	1.372	-0.270	-1.11	LB
GQV3B2	*	2.427	0.744	2.71	2.232	0.590	2.43	FP
H2N33W		1.502	-0.181	-0.66	1.442	-0.200	-0.83	LB
HRYCHP		1.808	0.125	0.46	1.649	0.007	0.03	TB
K9HYWC		1.804	0.121	0.44	1.754	0.112	0.46	TO
L39T3R		1.390	-0.293	-1.07	1.480	-0.162	-0.67	VM
LQUZ76		1.445	-0.238	-0.87	1.384	-0.258	-1.06	RE
MMELKJ	X	1.784	0.102	0.37	1.965	0.322	1.33	ID
N2PR9N		1.385	-0.298	-1.08	1.349	-0.293	-1.21	LJ
PAE2NB		1.577	-0.106	-0.38	1.573	-0.069	-0.29	LA
RFX4RJ		1.617	-0.066	-0.24	1.614	-0.028	-0.12	LC
RTKBPK		1.574	-0.109	-0.40	1.489	-0.153	-0.63	LH
RUYFNH		1.422	-0.261	-0.95	1.506	-0.136	-0.56	XX
TJWENJ		1.763	0.080	0.29	1.666	0.024	0.10	LI
TTL69Q		1.456	-0.227	-0.83	1.506	-0.136	-0.56	LI
U8FCGC		1.484	-0.199	-0.72	1.487	-0.155	-0.64	LH
UX6WPH		1.913	0.230	0.84	1.850	0.208	0.86	TO
UZD8JZ		1.924	0.241	0.88	1.966	0.324	1.33	FP
WXH7T3	X	0.297	-1.385	-5.05	0.298	-1.344	-5.54	TV
XZJTKX		1.591	-0.092	-0.33	1.600	-0.042	-0.17	LX
YJQHBZ		2.028	0.346	1.26	1.977	0.335	1.38	TF
YTG2RU		1.647	-0.036	-0.13	1.572	-0.070	-0.29	LH
ZRKQU7		1.688	0.005	0.02	1.684	0.042	0.17	XX
ZU8FZ6		1.419	-0.264	-0.96	1.367	-0.275	-1.14	LI
ZURVF8		1.699	0.016	0.06	1.635	-0.007	-0.03	LH

Paper & Paperboard Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SF97	Sample SF98
Grand Means	1.68 Percent	1.64 Percent
Stnd Dev Btwn Labs	0.27 Percent	0.24 Percent

Statistics based on 36 of 38 reporting participants.

Comments on Assigned Data Flags for Test #328

MMELKJ (X) - Inconsistent in testing between samples.

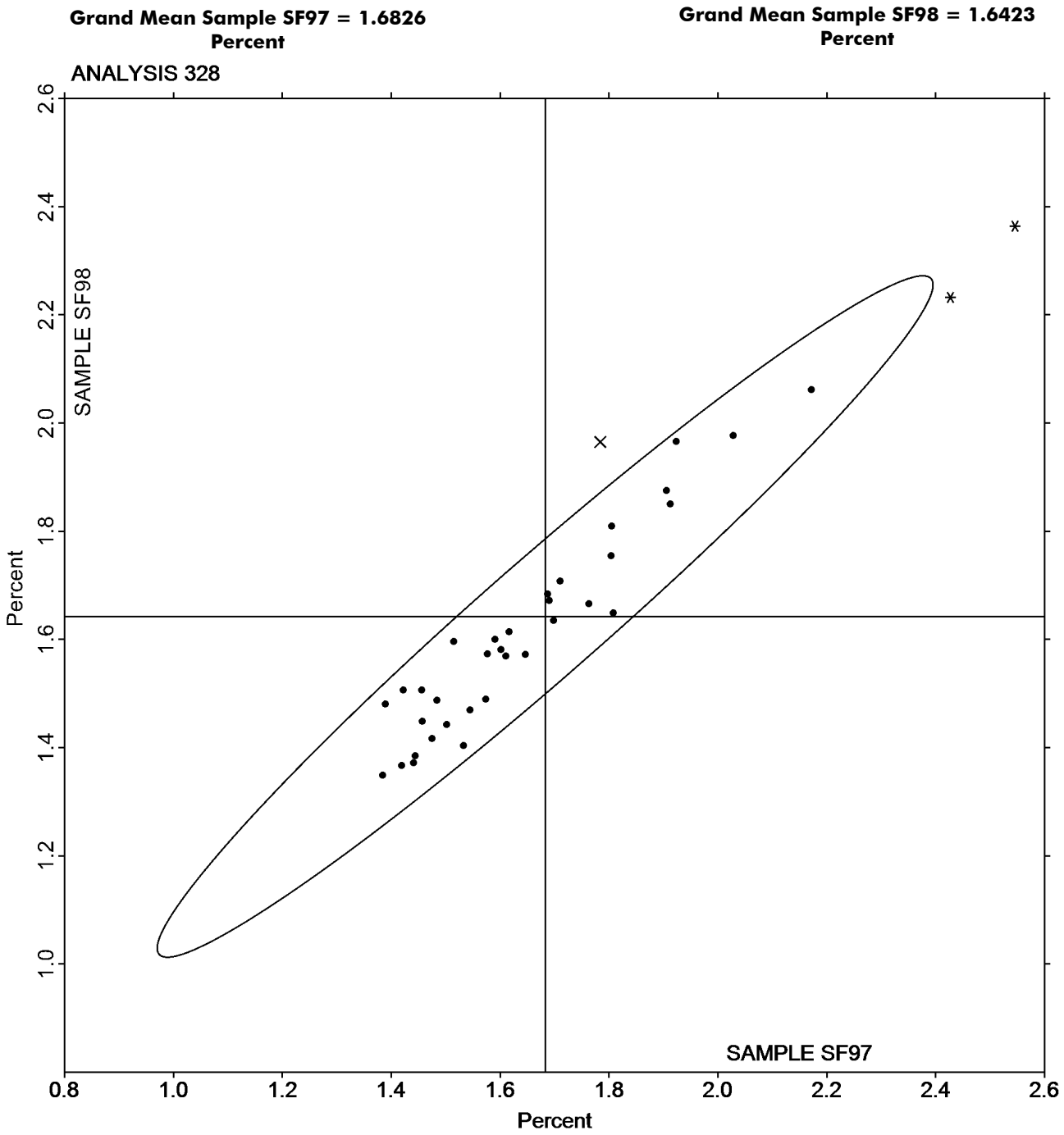
WXH7T3 (X) - Data for both samples are low. Possible Systematic Error.

Analysis Notes:

ZURVF8 - Data appears to be transposed between Analysis 327 (T.E.A.) and Analysis 328 (% Elongation). CTS will not correct going forward.

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	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	TP	TMI Monitor/Tensile 100 (84-21-01)
TV	Thwing-Albert Vantage NX	TX	Thwing-Albert (model not specified)
VM	Valmet PaperLab (was Kajaani/Robotest)	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program

Analysis 330

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE97 Lab Mean	Sample SE97 Diff from Grand Mean	Sample SE97 CPV	Sample SE98 Lab Mean	Sample SE98 Diff from Grand Mean	Sample SE98 CPV	Instr Code
2C6ZE4		7.467	-0.447	-0.79	13.76	-0.81	-0.81	LE
323YE6		8.131	0.217	0.39	13.73	-0.84	-0.85	TO
6URU9P		8.420	0.506	0.90	14.49	-0.08	-0.08	IF
8L98CQ	X	1.166	-6.748	-11.98	2.69	-11.88	-11.95	TB
96HKQY		8.023	0.109	0.19	14.81	0.24	0.24	LE
B4FQJ6		7.098	-0.817	-1.45	13.69	-0.88	-0.89	TX
BE2VTP		7.860	-0.054	-0.10	14.19	-0.38	-0.38	LW
BKNN34		8.296	0.382	0.68	14.16	-0.41	-0.41	TB
C28X4W		7.986	0.072	0.13	14.40	-0.17	-0.17	IM
C8DGJN		8.023	0.109	0.19	14.60	0.03	0.03	LA
C9862K		8.185	0.271	0.48	14.52	-0.05	-0.05	TO
CBCTEN		7.800	-0.114	-0.20	14.42	-0.15	-0.15	LE
CK4BVH		7.605	-0.310	-0.55	14.49	-0.08	-0.08	ID
CVKVEE	X	13.980	6.066	10.77	20.30	5.73	5.77	LA
D68AZW		7.237	-0.677	-1.20	13.34	-1.23	-1.24	XX
E9FAAT		7.097	-0.817	-1.45	14.10	-0.47	-0.47	TR
EMEZAC	*	7.881	-0.034	-0.06	13.01	-1.56	-1.57	TH
FD8KZH		8.508	0.593	1.05	15.75	1.18	1.18	TH
FE4YNB		8.198	0.283	0.50	14.86	0.29	0.29	TH
GWZ2LR		7.618	-0.296	-0.53	14.23	-0.34	-0.34	IR
HX7T8D		8.597	0.683	1.21	15.95	1.38	1.39	DM
J7WQFX		8.029	0.115	0.20	14.75	0.18	0.18	IF
JHE9BP		7.303	-0.612	-1.09	13.64	-0.93	-0.94	TK
KDA7FK		9.037	1.122	1.99	17.09	2.52	2.54	LA
L3BJ8N		7.485	-0.429	-0.76	13.86	-0.71	-0.72	LH
MD3R6G		7.816	-0.098	-0.17	14.69	0.12	0.12	LE
NRGGGN		7.240	-0.674	-1.20	13.97	-0.60	-0.61	IM
NUA6ZK		7.706	-0.208	-0.37	14.34	-0.23	-0.23	IF
NXPMBA	X	9.052	1.137	2.02	13.66	-0.91	-0.91	IK
PVW7GR		8.564	0.649	1.15	15.57	1.00	1.00	IF
RFX4RJ		8.649	0.735	1.30	15.51	0.94	0.95	LC
RGBHD8		7.086	-0.828	-1.47	12.97	-1.60	-1.61	TT
TALFRM		7.759	-0.155	-0.28	14.12	-0.45	-0.45	XX
TJWENJ		7.470	-0.444	-0.79	14.78	0.21	0.21	LW
TKNHBY		8.954	1.040	1.85	17.05	2.49	2.50	LA
TPERHC		6.998	-0.916	-1.63	13.10	-1.47	-1.48	IM
U8VF8W		8.730	0.815	1.45	16.13	1.57	1.57	LI
Y8W2LY		8.432	0.518	0.92	15.22	0.65	0.66	TR
YBL7MJ		8.350	0.436	0.77	15.62	1.05	1.06	LE
YTG2RU		7.189	-0.725	-1.29	14.17	-0.40	-0.40	LH

Paper & Paperboard Interlaboratory Testing Program

Analysis 330
Tensile Breaking Strength - Packaging Papers
TAPPI Official Test Method T494

Summary Statistics	Sample SE97	Sample SE98
Grand Means	7.91 kN/m	14.57 kN/m
Stnd Dev Btwn Labs	0.56 kN/m	0.99 kN/m

Statistics based on 37 of 40 reporting participants.

Comments on Assigned Data Flags for Test #330

CVKVEE (X) - Extreme Data.

NXPMBA (X) - Inconsistent in testing between samples.

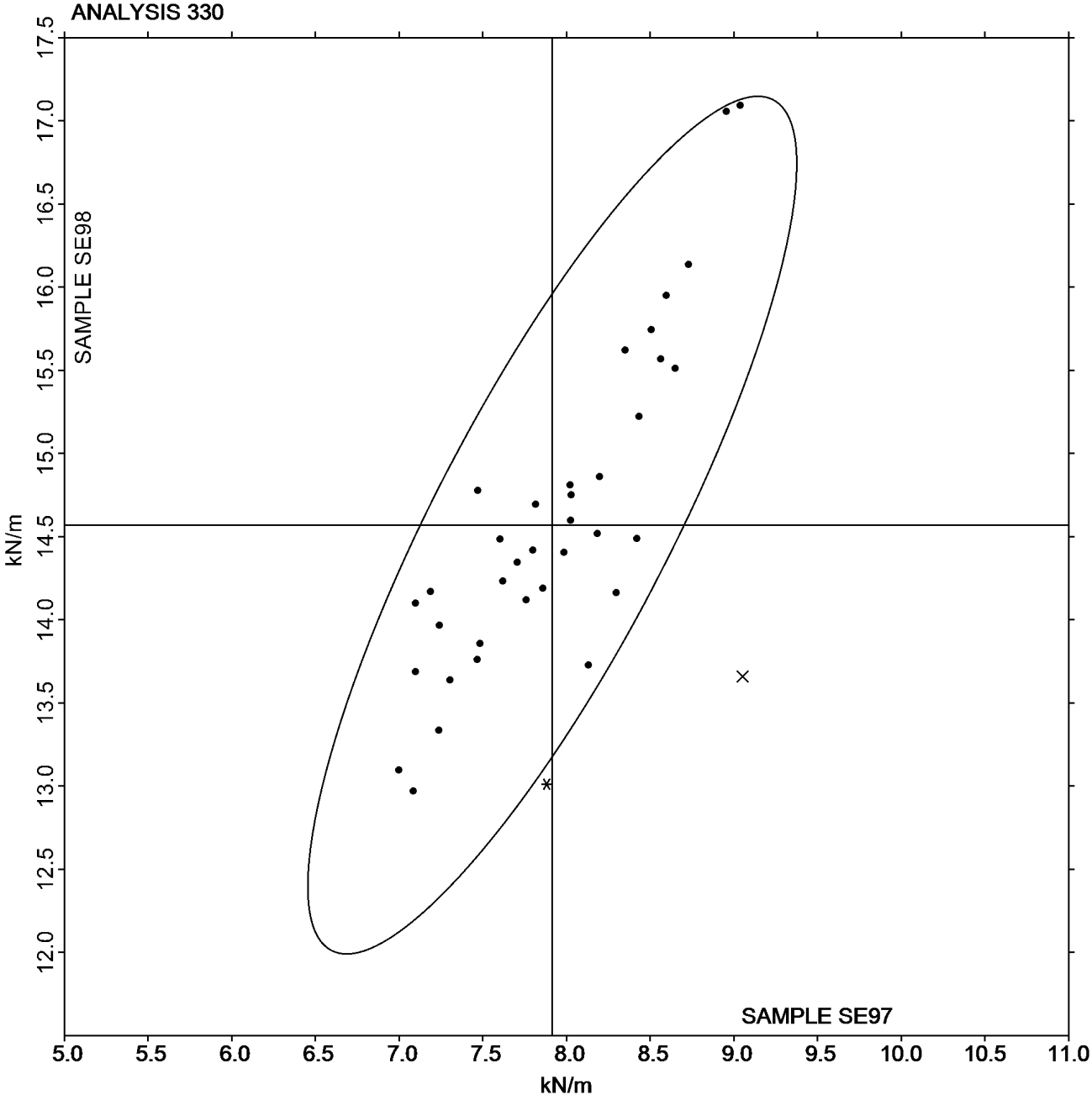
8L98CQ (X) - Extreme Data.

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
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 SE97 = 7.9143 kN/m

Grand Mean Sample SE98 = 14.570 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE97 Lab Mean	Sample SE97 Diff from Grand Mean	Sample SE97 CPV	Sample SE98 Lab Mean	Sample SE98 Diff from Grand Mean	Sample SE98 CPV	Instr Code
2C6ZE4		70.07	-8.36	-0.88	187.5	-14.4	-0.56	LE
323YE6		79.26	0.84	0.09	162.7	-39.2	-1.54	TO
8L98CQ	X	709.23	630.81	66.48	1,234.6	1,032.8	40.52	TB
96HKQY		73.22	-5.21	-0.55	185.1	-16.8	-0.66	LE
B4FQJ6		73.20	-5.22	-0.55	204.9	3.0	0.12	TX
BE2VTP		73.11	-5.32	-0.56	184.6	-17.3	-0.68	LW
C28X4W		81.42	2.99	0.32	190.7	-11.2	-0.44	IM
C8DGJN		99.38	20.96	2.21	225.8	23.9	0.94	LA
C9862K		74.43	-4.00	-0.42	205.0	3.2	0.12	TO
CBCTEN		70.33	-8.10	-0.85	198.2	-3.7	-0.15	LE
CVKVEE		80.94	2.51	0.26	196.4	-5.4	-0.21	LA
D68AZW		77.08	-1.34	-0.14	200.5	-1.4	-0.06	XX
E9FAAT		72.74	-5.69	-0.60	193.6	-8.2	-0.32	TR
EMEZAC	*	83.33	4.90	0.52	158.6	-43.2	-1.70	TH
FE4YNB		91.36	12.93	1.36	246.1	44.2	1.73	TH
GWZ2LR		71.26	-7.16	-0.76	208.8	6.9	0.27	IR
HX7T8D		93.86	15.43	1.63	262.0	60.1	2.36	DM
J7WQFX		75.87	-2.55	-0.27	178.8	-23.1	-0.91	IN
JHE9BP		77.76	-0.67	-0.07	211.1	9.3	0.36	TK
KDA7FK		86.96	8.53	0.90	212.2	10.3	0.41	LA
L3BJ8N		77.26	-1.17	-0.12	193.1	-8.8	-0.35	LH
MD3R6G		79.33	0.91	0.10	203.3	1.4	0.06	LE
NRGGGN		75.88	-2.55	-0.27	223.4	21.5	0.84	IM
NUA6ZK		78.37	-0.06	-0.01	211.9	10.1	0.39	IF
NXPMBA	X	77.59	-0.84	-0.09	116.0	-85.9	-3.37	XX
PVW7GR		84.30	5.87	0.62	222.0	20.1	0.79	IF
RFX4RJ		93.70	15.27	1.61	218.4	16.5	0.65	LC
RGBHD8	X	115.74	37.31	3.93	155.7	-46.2	-1.81	TT
TALFRM		81.94	3.51	0.37	204.7	2.8	0.11	XX
TJWENJ		68.78	-9.65	-1.02	196.7	-5.2	-0.20	LW
TKNHBY		81.87	3.44	0.36	220.3	18.5	0.72	LA
TPERHC		75.67	-2.76	-0.29	200.4	-1.5	-0.06	IM
Y8W2LY	*	49.70	-28.73	-3.03	123.7	-78.2	-3.07	TR
YBL7MJ		90.48	12.05	1.27	232.6	30.7	1.21	LE
YTG2RU		66.80	-11.63	-1.23	197.2	-4.7	-0.19	LH

Paper & Paperboard Interlaboratory Testing Program

Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SE97	Sample SE98
Grand Means	78.43 Joules/sq m	201.88 Joules/sq m
Stnd Dev Btwn Labs	9.49 Joules/sq m	25.49 Joules/sq m

Statistics based on 32 of 35 reporting participants.

Comments on Assigned Data Flags for Test #331

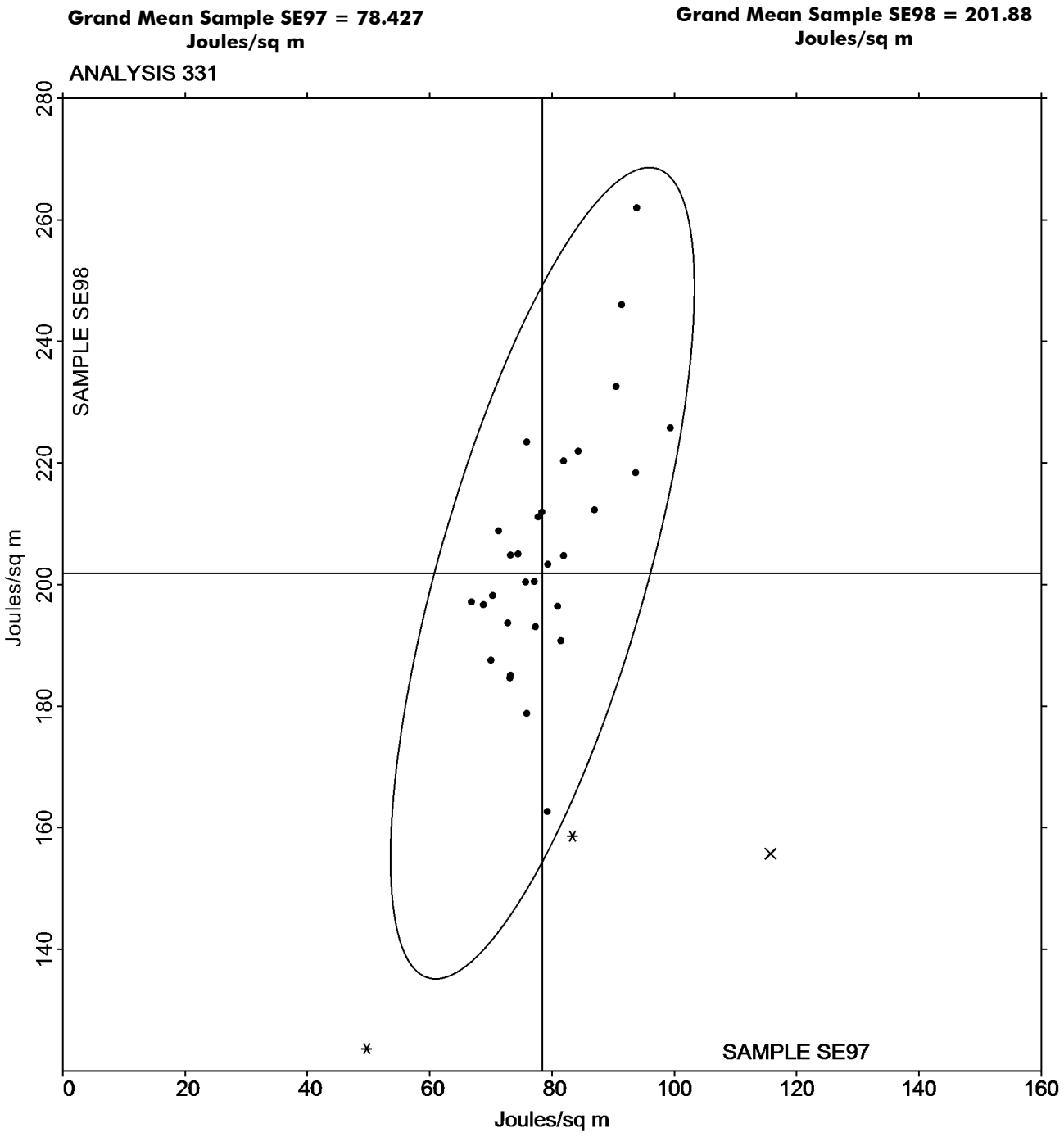
RGBHD8 (X) - Data for sample SE97 are high. Inconsistent within the determinations of sample SE97.

NXPMBA (X) - Data for sample SE98 are low.

8L98CQ (X) - Extreme Data.

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 SE97 Lab Mean	Sample SE97 Diff from Grand Mean	Sample SE97 CPV	Sample SE98 Lab Mean	Sample SE98 Diff from Grand Mean	Sample SE98 CPV	Instr Code
2C6ZE4		1.429	-0.168	-1.13	2.075	-0.130	-0.54	LE
323YE6		1.667	0.070	0.47	2.008	-0.197	-0.82	TO
8L98CQ		1.759	0.162	1.09	2.369	0.164	0.68	TB
96HKQY		1.420	-0.177	-1.19	1.934	-0.271	-1.13	LE
B4FQJ6		1.608	0.011	0.07	2.332	0.127	0.53	TX
BE2VTP		1.433	-0.164	-1.10	2.002	-0.203	-0.85	LW
BKNN34	X	2.734	1.137	7.64	3.645	1.440	6.00	TB
C28X4W		1.827	0.230	1.55	2.338	0.133	0.55	IM
C8DGJN		1.857	0.260	1.75	2.620	0.415	1.73	LA
C9862K		1.510	-0.087	-0.58	2.212	0.007	0.03	TO
CBCTEN		1.422	-0.175	-1.18	2.091	-0.114	-0.48	LE
CK4BVH		1.610	0.013	0.09	2.330	0.125	0.52	ID
CVKVEE		1.550	-0.047	-0.32	1.899	-0.306	-1.28	LA
D68AZW		1.731	0.134	0.90	2.398	0.193	0.80	XX
E9FAAT		1.618	0.021	0.14	2.164	-0.041	-0.17	TR
EMEZAC		1.670	0.073	0.49	1.960	-0.245	-1.02	TH
FE4YNB	*	2.058	0.461	3.10	2.920	0.715	2.98	TH
GWZ2LR		1.443	-0.154	-1.03	2.241	0.036	0.15	IR
HX7T8D		1.786	0.189	1.27	2.600	0.395	1.64	DM
J7WQFX		1.493	-0.104	-0.70	1.939	-0.267	-1.11	IN
JHE9BP		1.636	0.039	0.26	2.396	0.191	0.79	TK
KDA7FK		1.488	-0.109	-0.73	1.834	-0.371	-1.55	LA
L3BJ8N		1.551	-0.046	-0.31	2.120	-0.085	-0.35	LH
MD3R6G		1.536	-0.061	-0.41	2.102	-0.103	-0.43	LE
NRGGGN		1.621	0.024	0.16	2.460	0.255	1.06	IM
NUA6ZK		1.571	-0.026	-0.17	2.268	0.063	0.26	IF
NXPMBA		1.658	0.061	0.41	1.891	-0.314	-1.31	XX
PVW7GR		1.581	-0.016	-0.11	2.298	0.093	0.39	IF
RFX4RJ		1.594	-0.003	-0.02	2.090	-0.115	-0.48	LC
RGBHD8	X	2.759	1.162	7.81	2.005	-0.200	-0.83	TT
TALFRM		1.592	-0.005	-0.03	2.200	-0.005	-0.02	XX
TJWENJ		1.443	-0.154	-1.03	2.063	-0.142	-0.59	LW
TKNHBY		1.394	-0.203	-1.36	1.949	-0.256	-1.07	LA
TPERHC		1.697	0.100	0.67	2.450	0.245	1.02	IM
Y8W2LY	X	0.907	-0.690	-4.64	1.268	-0.937	-3.90	TR
YBL7MJ		1.655	0.058	0.39	2.288	0.083	0.34	LE
YTG2RU		1.390	-0.207	-1.39	2.136	-0.069	-0.29	LH

Summary Statistics	Sample SE97	Sample SE98
Grand Means	1.60 Percent	2.21 Percent
Stnd Dev Btwn Labs	0.15 Percent	0.24 Percent

Statistics based on 34 of 37 reporting participants.

Comments on Assigned Data Flags for Test #332

BKNN34 (X) - Extreme Data.

Y8W2LY (X) - Data for both samples are low.

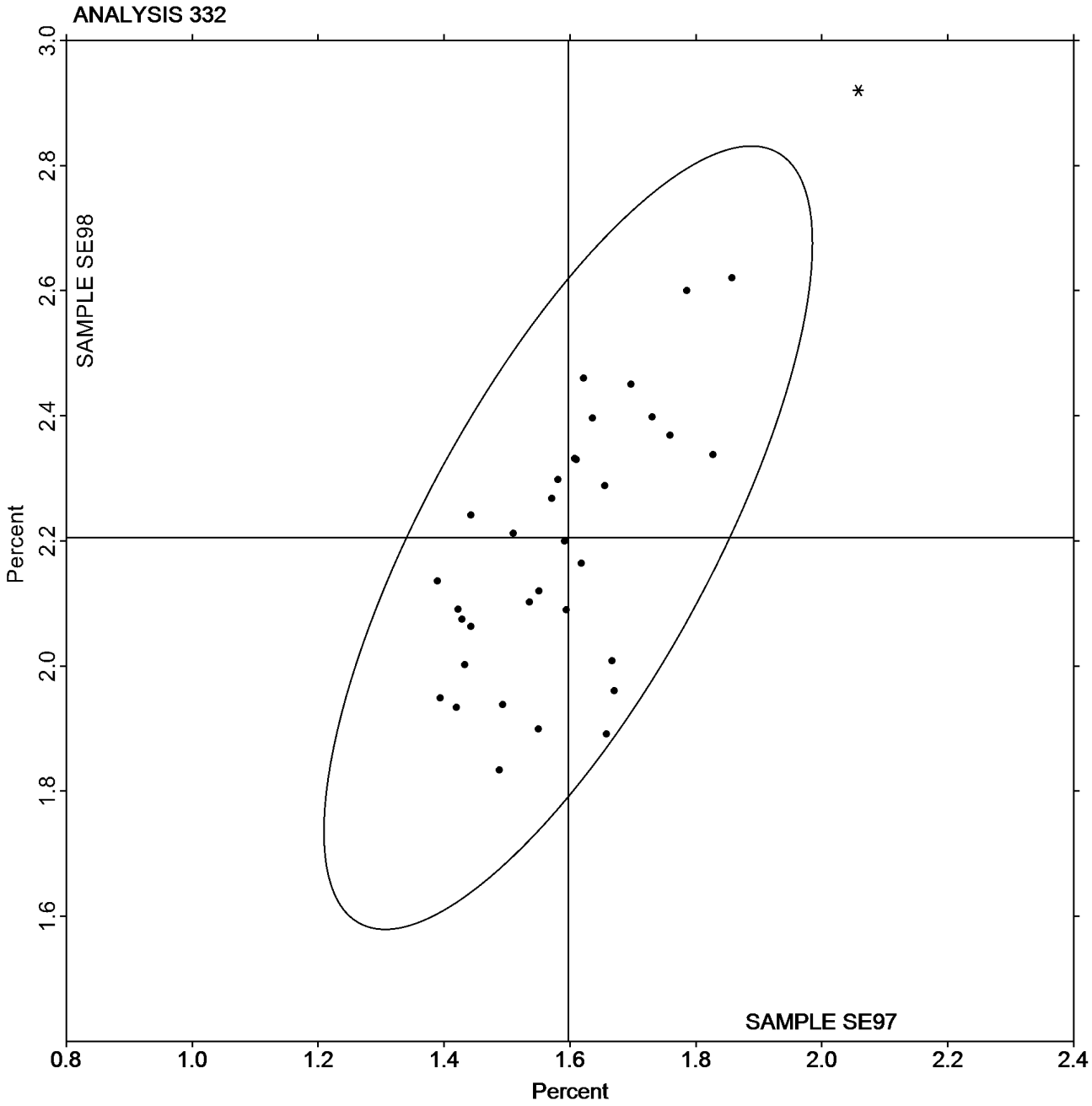
RGBHD8 (X) - Extreme Data for Sample SE97.

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		

Grand Mean Sample SE97 = 1.5970 Percent

Grand Mean Sample SE98 = 2.2052 Percent



Paper & Paperboard Interlaboratory Testing Program

Analysis 334

Folding Endurance (MIT) - Double Folds

TAPPI Official Test Method T511

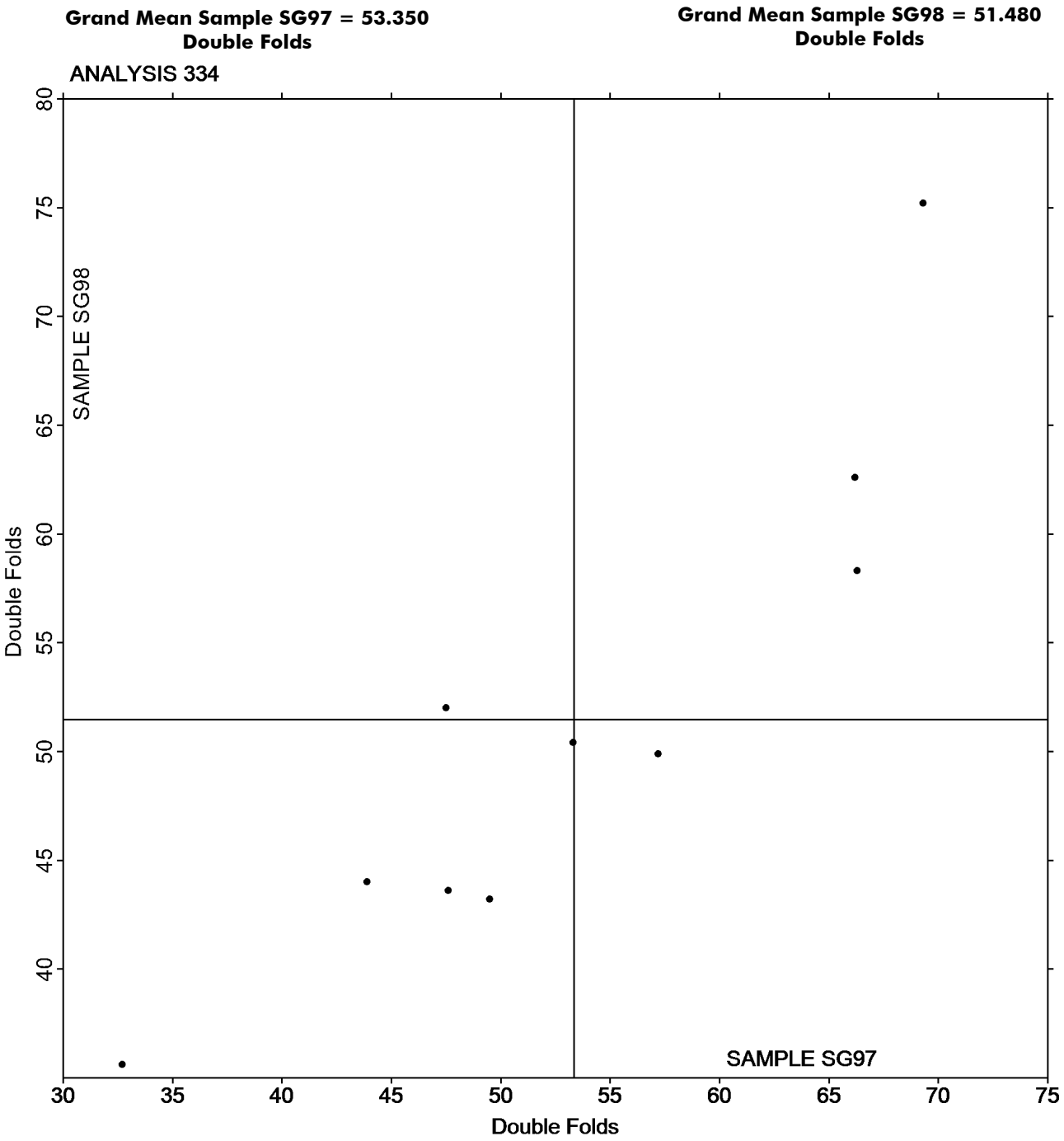
WebCode	Data Flag	Sample SG97 Lab Mean	Sample SG97 Diff from Grand Mean	Sample SG97 CPV	Sample SG98 Lab Mean	Sample SG98 Diff from Grand Mean	Sample SG98 CPV	Instr Code
7PHQ7U		47.60	-5.75	-0.50	43.60	-7.88	-0.69	MT
A3NBU3		66.20	12.85	1.11	62.60	11.12	0.97	MT
BKNN34		69.30	15.95	1.38	75.20	23.72	2.08	MT
D68AZW		53.30	-0.05	0.00	50.40	-1.08	-0.09	MT
DU6BP2		49.50	-3.85	-0.33	43.20	-8.28	-0.72	MT
FE4YNB		43.90	-9.45	-0.82	44.00	-7.48	-0.65	MT
L39T3R		32.70	-20.65	-1.79	35.60	-15.88	-1.39	MT
NRGGGN		47.50	-5.85	-0.51	52.00	0.52	0.05	MT
TJWENJ		57.20	3.85	0.33	49.90	-1.58	-0.14	MT
TTL69Q		66.30	12.95	1.12	58.30	6.82	0.60	MT

Summary Statistics	Sample SG97	Sample SG98
Grand Means	53.35 Double Folds	51.48 Double Folds
Stnd Dev Btwn Labs	11.55 Double Folds	11.43 Double Folds

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

MT MIT - Tinius Olsen



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 SH97 Lab Mean	Sample SH97 Diff from Grand Mean	Sample SH97 CPV	Sample SH98 Lab Mean	Sample SH98 Diff from Grand Mean	Sample SH98 CPV
2UNVTC		160.4	13.3	1.25	151.5	4.2	0.44
78W9B8		134.7	-12.4	-1.17	147.6	0.3	0.03
7PHQ7U		147.2	0.1	0.01	158.7	11.4	1.20
BKNN34		140.9	-6.2	-0.59	137.7	-9.6	-1.01
BQAKMK	X	0.6	-146.5	-13.81	0.6	-146.6	-15.37
BY4VTA		125.0	-22.1	-2.09	125.2	-22.1	-2.32
CET9TM	X	5.6	-141.5	-13.33	5.9	-141.4	-14.82
D68AZW		153.8	6.7	0.63	151.4	4.1	0.43
FZPN4U	X	12.8	-134.3	-12.66	12.8	-134.5	-14.10
HRYCHP		150.1	3.0	0.28	150.1	2.8	0.29
L39T3R		160.3	13.2	1.24	162.4	15.1	1.58
NMAQEH		147.0	-0.1	-0.01	148.8	1.5	0.16
NRGGGN		146.5	-0.6	-0.05	152.7	5.4	0.57
V9NL8N		143.4	-3.7	-0.35	142.5	-4.8	-0.50
Y4HGL6		145.5	-1.6	-0.15	147.3	0.0	0.00
YJQHBZ		140.1	-7.1	-0.66	135.6	-11.6	-1.22
ZURVF8		164.7	17.6	1.66	150.5	3.2	0.34

Summary Statistics	Sample SH97	Sample SH98
Grand Means	147.11 Gurley Units	147.29 Gurley Units
Stnd Dev Btwn Labs	10.61 Gurley Units	9.54 Gurley Units

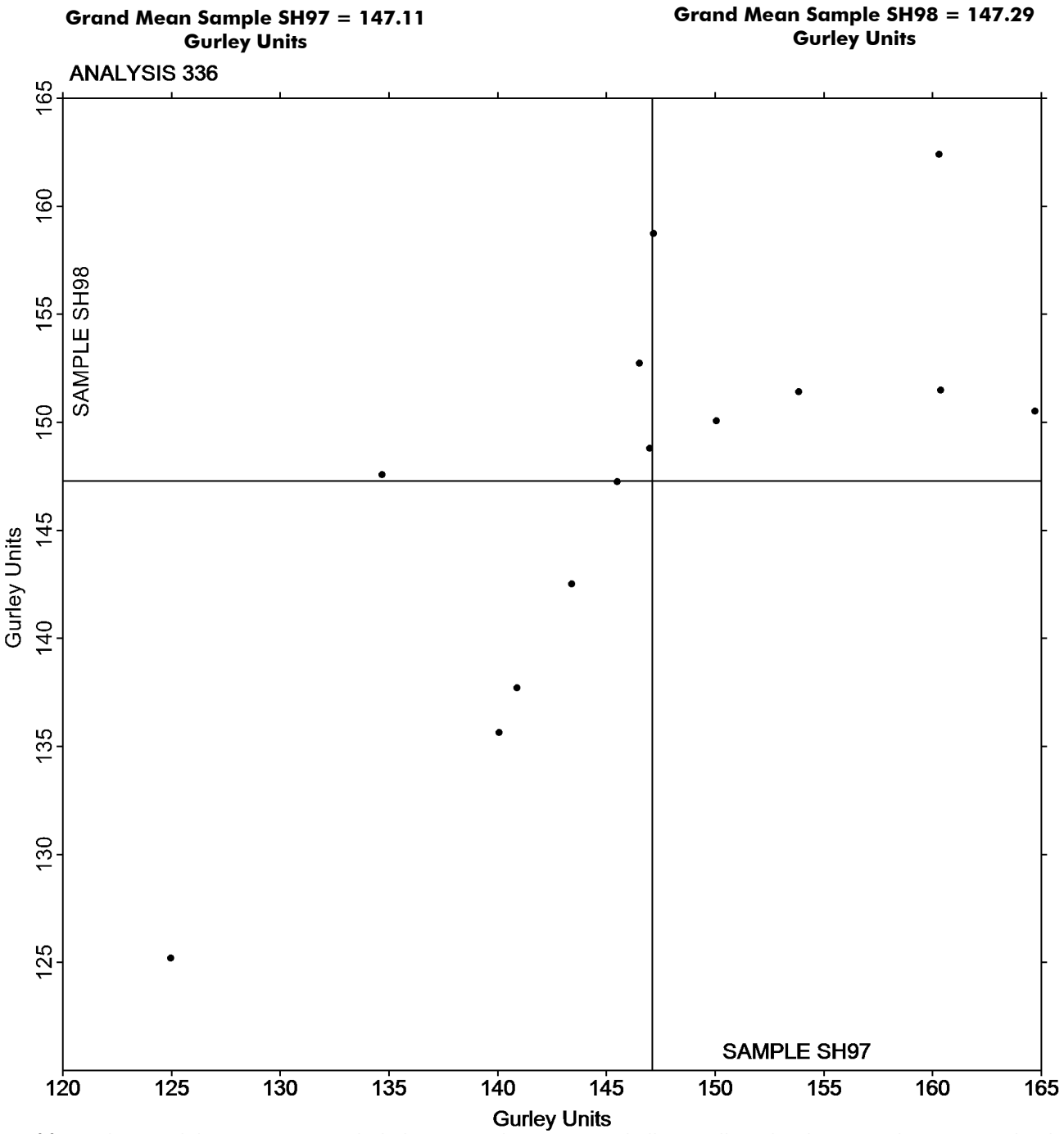
Statistics based on 14 of 17 reporting participants.

Comments on Assigned Data Flags for Test #336

CET9TM (X) - Extreme Data.

FZPN4U (X) - Extreme Data.

BQAKMK (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

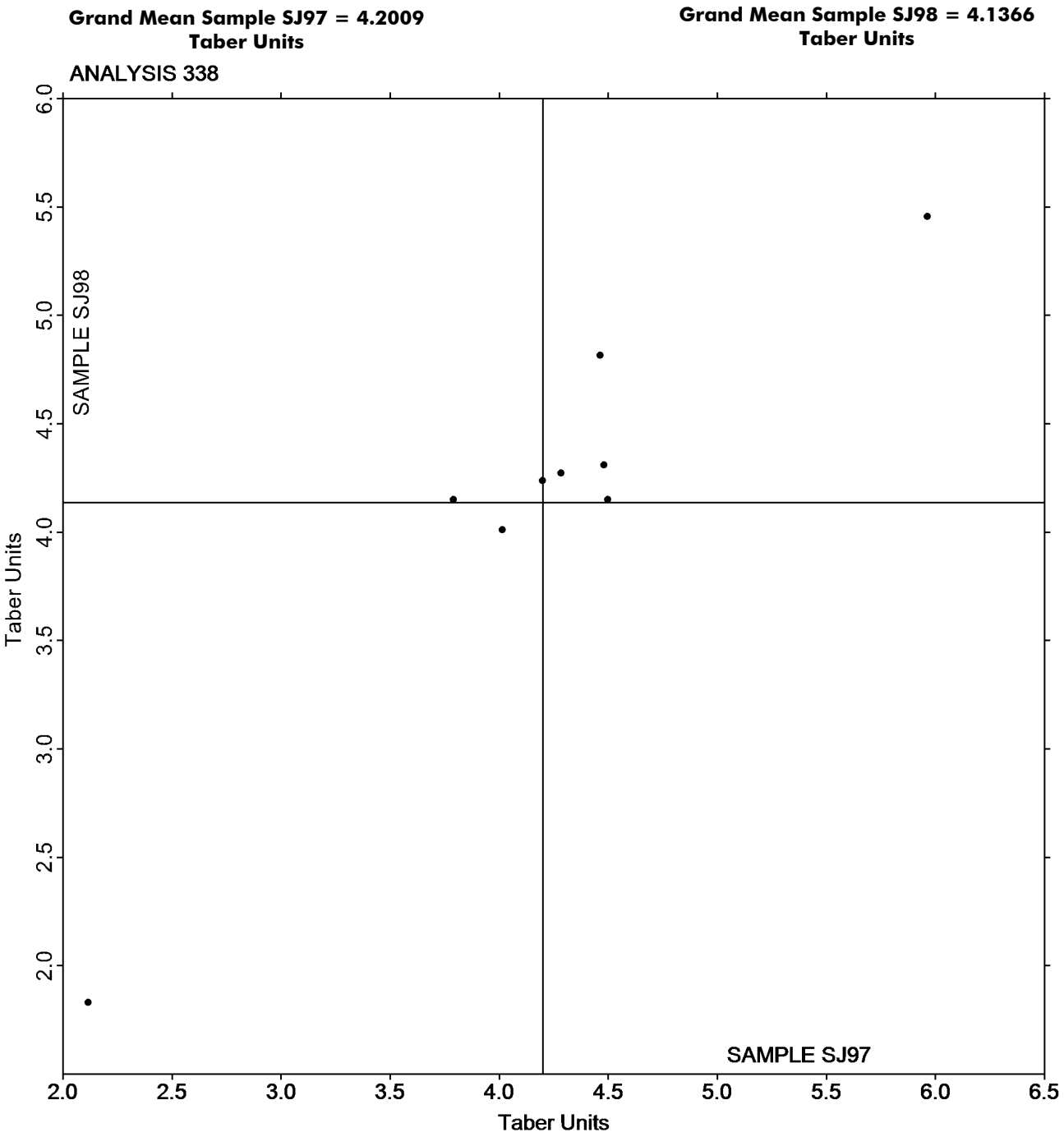
Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

WebCode	Data Flag	Sample SJ97 Lab Mean	Sample SJ97 Diff from Grand Mean	Sample SJ97 CPV	Sample SJ98 Lab Mean	Sample SJ98 Diff from Grand Mean	Sample SJ98 CPV
2UNVTC		4.200	-0.001	0.00	4.237	0.100	0.10
96HKQY		3.790	-0.411	-0.41	4.150	0.013	0.01
BY4VTA		2.115	-2.086	-2.10	1.830	-2.307	-2.37
H2N33W		5.964	1.763	1.77	5.455	1.318	1.35
HRYCHP		4.284	0.083	0.08	4.271	0.135	0.14
J7WQFX		4.480	0.279	0.28	4.310	0.173	0.18
KMYRKJ		4.498	0.297	0.30	4.151	0.014	0.01
PVW7GR		4.463	0.262	0.26	4.815	0.678	0.70
ZURVF8		4.015	-0.186	-0.19	4.010	-0.127	-0.13

Summary Statistics	Sample SJ97	Sample SJ98
Grand Means	4.20 Taber Units	4.14 Taber Units
Stnd Dev Btwn Labs	0.99 Taber Units	0.97 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 339

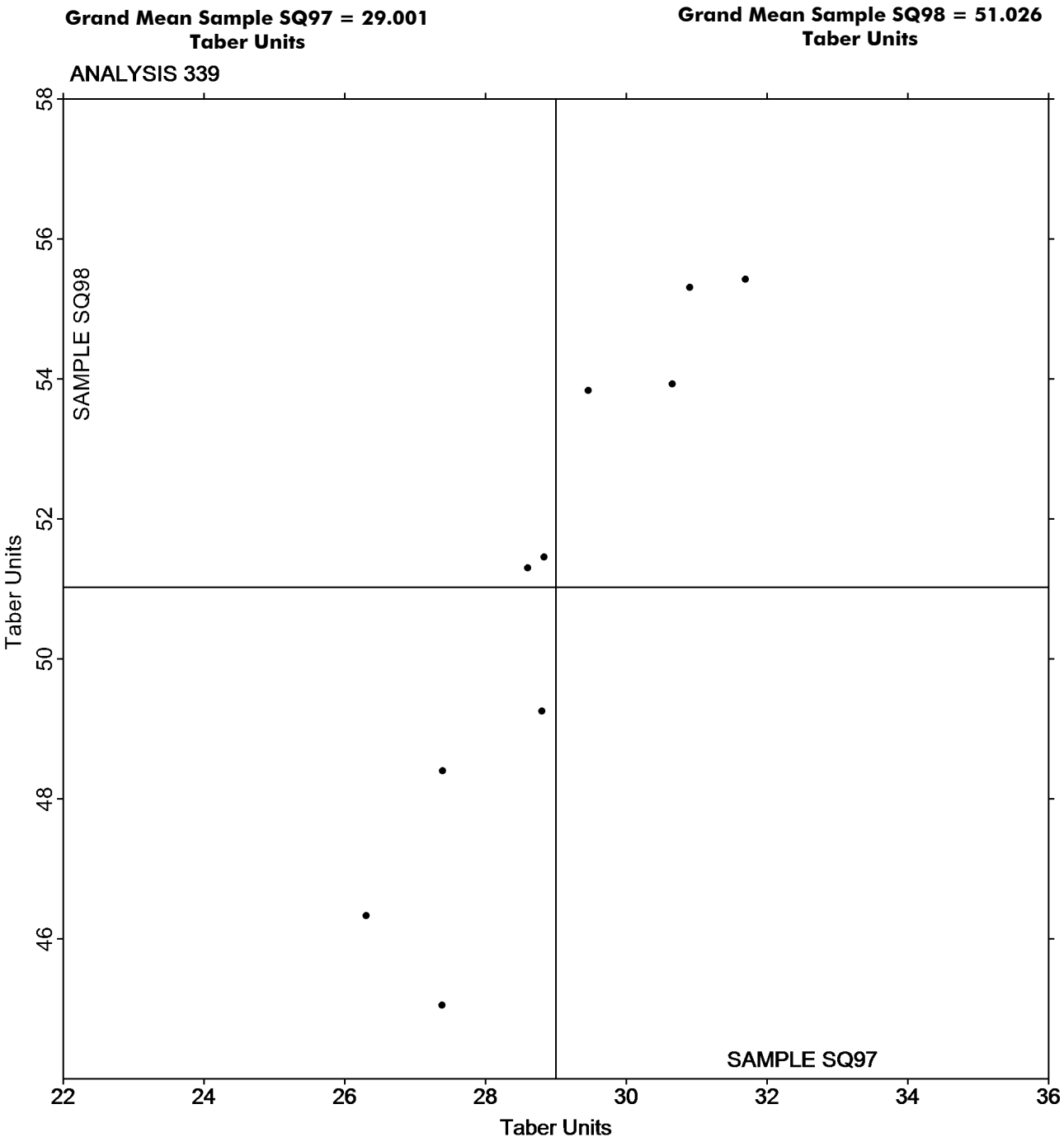
Bending Resistance, Taber Type - 10 to 100 Taber Units

TAPPI Official Test Method T489

WebCode	Data Flag	Sample SQ97 Lab Mean	Sample SQ97 Diff from Grand Mean	Sample SQ97 CPV	Sample SQ98 Lab Mean	Sample SQ98 Diff from Grand Mean	Sample SQ98 CPV
7CQ399		28.60	-0.40	-0.23	51.30	0.27	0.07
8L98CQ		27.39	-1.61	-0.94	48.40	-2.63	-0.71
BE2VTP		28.80	-0.20	-0.12	49.25	-1.78	-0.48
GQV3B2		26.31	-2.70	-1.57	46.33	-4.70	-1.28
LQCRHA		30.65	1.65	0.96	53.92	2.90	0.79
T79D6R		31.69	2.69	1.57	55.42	4.39	1.19
TJWENJ		28.83	-0.17	-0.10	51.45	0.42	0.12
V9NL8N		29.46	0.46	0.27	53.83	2.80	0.76
WENKVH		27.38	-1.62	-0.94	45.05	-5.98	-1.62
YBL7MJ		30.90	1.90	1.11	55.31	4.28	1.16

Summary Statistics	Sample SQ97	Sample SQ98
Grand Means	29.00 Taber Units	51.03 Taber Units
Stnd Dev Btwn Labs	1.72 Taber Units	3.68 Taber Units

Statistics based on 10 of 10 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

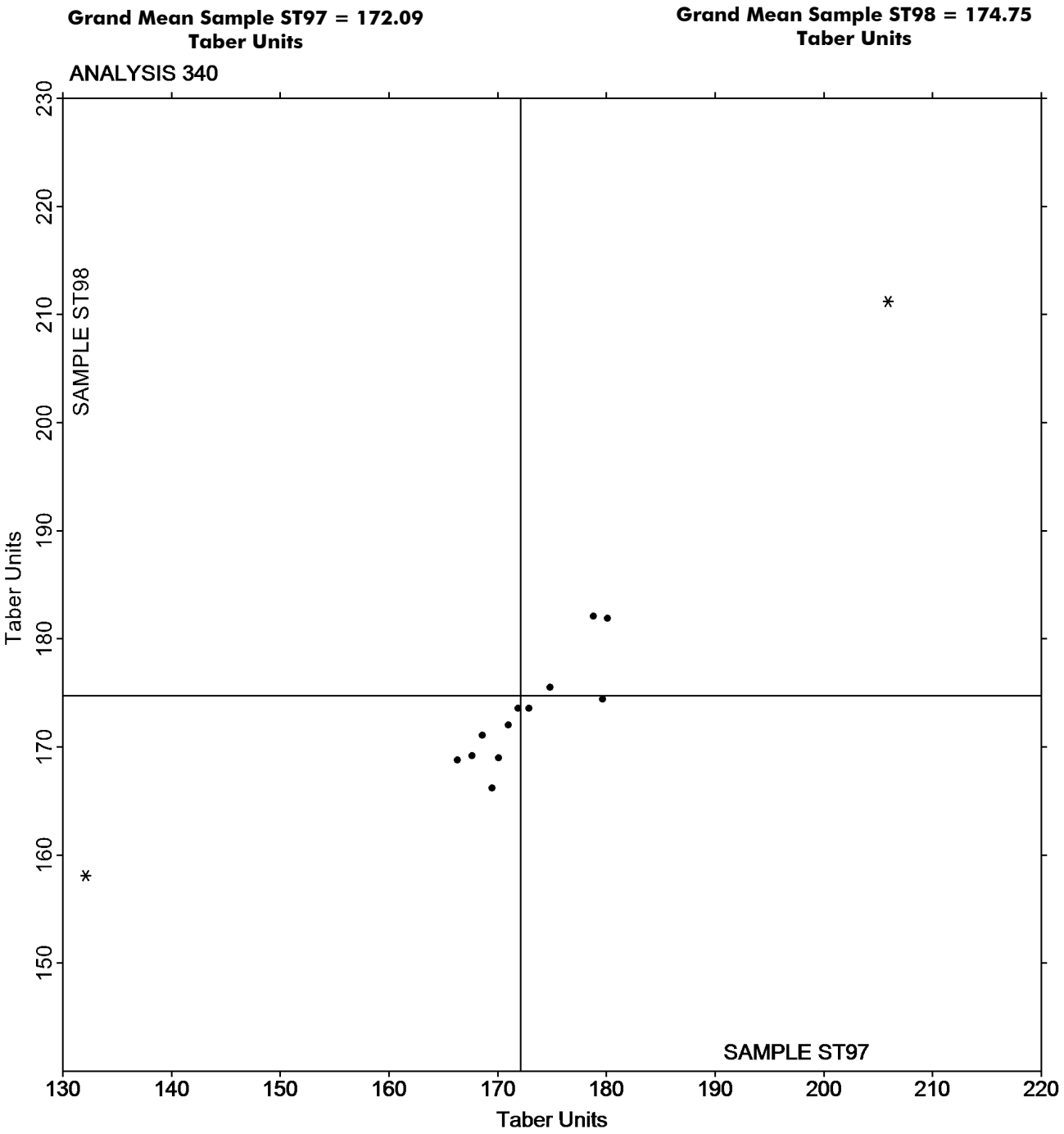
Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard

TAPPI Official Test Method T489

WebCode	Data Flag	Sample ST97 Lab Mean	Sample ST97 Diff from Grand Mean	Sample ST97 CPV	Sample ST98 Lab Mean	Sample ST98 Diff from Grand Mean	Sample ST98 CPV
4CFPAR		169.5	-2.6	-0.17	166.2	-8.6	-0.71
6URU9P		180.1	8.0	0.53	181.9	7.1	0.59
7D27KC		178.8	6.7	0.44	182.1	7.3	0.61
A2BNCN		167.6	-4.5	-0.29	169.2	-5.6	-0.46
BDKNJ2		172.9	0.8	0.05	173.6	-1.2	-0.10
C8UNN7		171.0	-1.1	-0.07	172.0	-2.8	-0.23
D3CV37	*	132.1	-40.0	-2.64	158.1	-16.7	-1.37
D68AZW		168.6	-3.5	-0.23	171.1	-3.7	-0.30
DYY6M3		179.7	7.6	0.50	174.4	-0.4	-0.03
E9FAAT		166.3	-5.8	-0.38	168.8	-6.0	-0.49
FD8KZH	*	205.9	33.8	2.23	211.2	36.4	3.01
FE4YNB		170.1	-2.0	-0.13	169.0	-5.8	-0.47
TJWENJ		171.9	-0.2	-0.01	173.5	-1.2	-0.10
V9NL8N		174.8	2.7	0.18	175.5	0.8	0.06

Summary Statistics	Sample ST97	Sample ST98
Grand Means	172.09 Taber Units	174.75 Taber Units
Stnd Dev Btwn Labs	15.18 Taber Units	12.12 Taber Units

Statistics based on 14 of 14 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

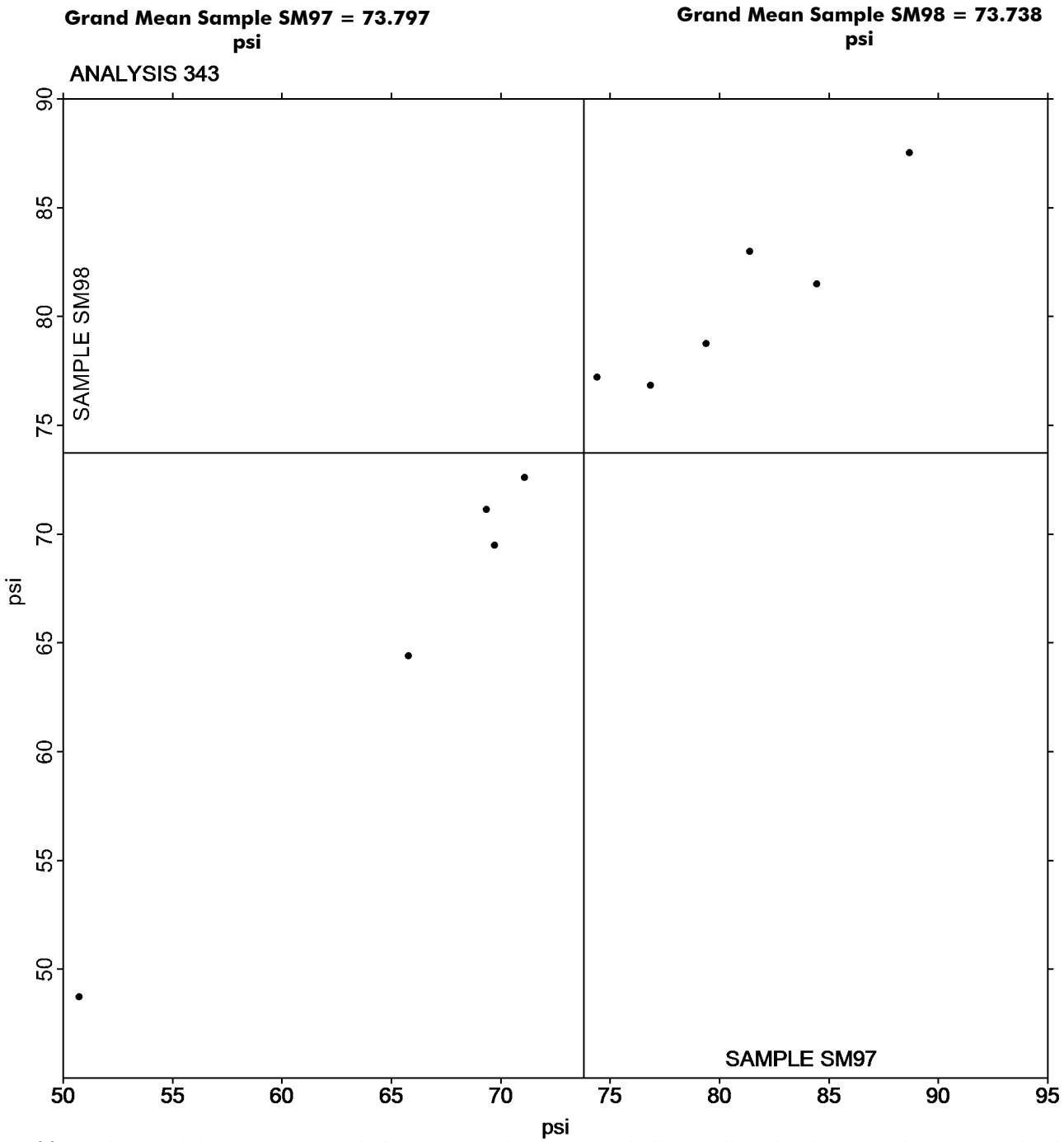
WebCode	Data Flag	Sample SM97 Lab Mean	Sample SM97 Diff from Grand Mean	Sample SM97 CPV	Sample SM98 Lab Mean	Sample SM98 Diff from Grand Mean	Sample SM98 CPV	Instr Code
4CFPAR		50.72	-23.07	-2.23	48.72	-25.01	-2.36	LW
7CMMUM		65.79	-8.01	-0.77	64.40	-9.34	-0.88	LW
8L98CQ		84.44	10.64	1.03	81.50	7.76	0.73	TA
EMEZAC		74.40	0.60	0.06	77.20	3.46	0.33	TA
FE4YNB		81.38	7.58	0.73	82.98	9.24	0.87	LW
GQV3B2		69.34	-4.46	-0.43	71.12	-2.61	-0.25	LW
NRGGGN		69.72	-4.08	-0.39	69.48	-4.26	-0.40	CD
PVW7GR		88.68	14.88	1.44	87.51	13.77	1.30	TL
T79D6R		76.84	3.04	0.29	76.84	3.10	0.29	CD
TJWENJ		79.38	5.58	0.54	78.76	5.02	0.47	LW
YBL7MJ		71.08	-2.72	-0.26	72.60	-1.14	-0.11	CD

Summary Statistics	Sample SM97	Sample SM98
Grand Means	73.80 psi	73.74 psi
Stnd Dev Btwn Labs	10.36 psi	10.59 psi

Statistics based on 11 of 11 reporting participants.

Key to Instrument Codes Reported by Participants

CD	CSI CS-163D	LW	L & W ZD Tensile Tester
TA	Thwing-Albert Tensile Tester	TL	TMI Lab Master



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

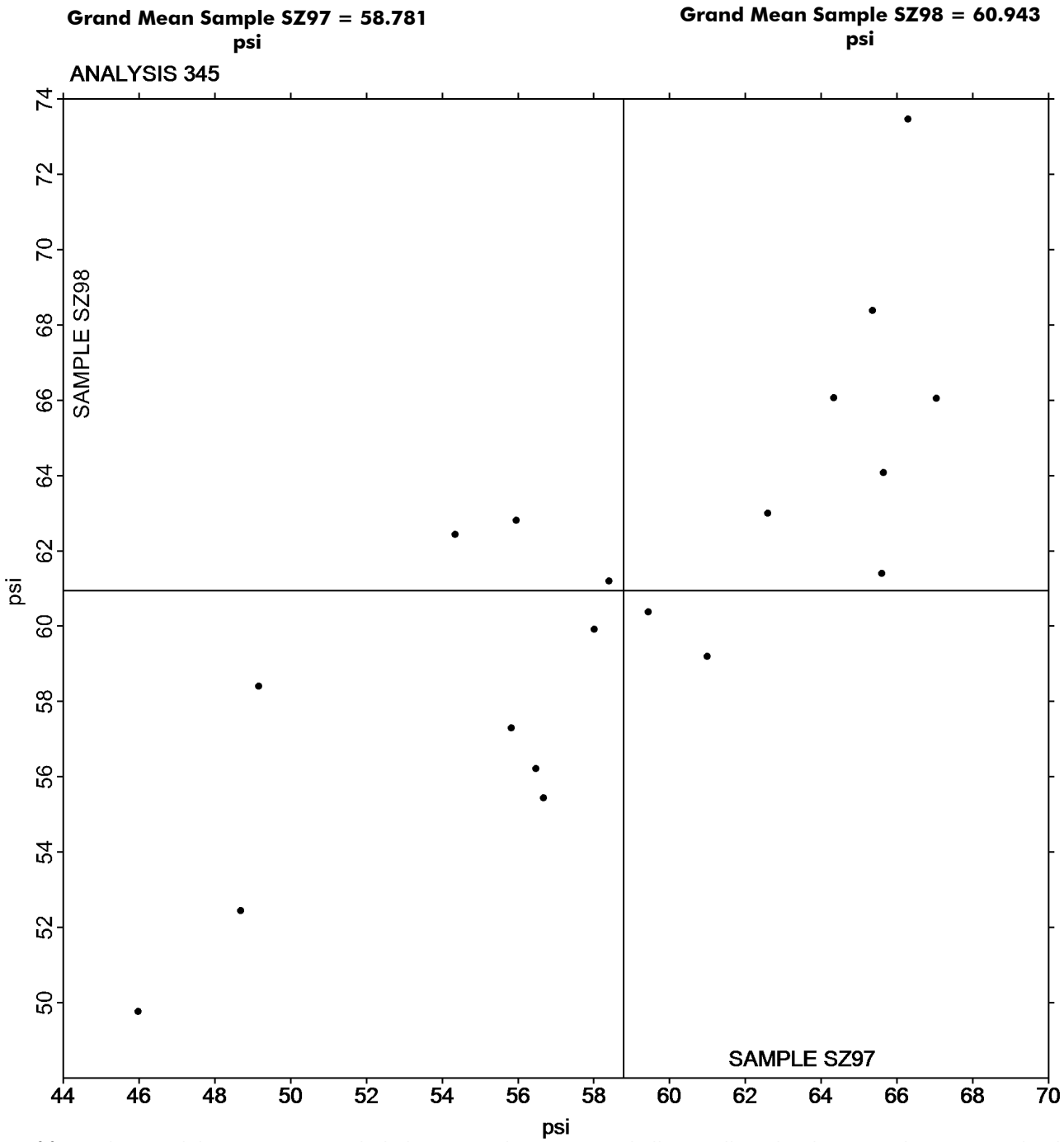
WebCode	Data Flag	Sample SZ97 Lab Mean	Sample SZ97 Diff from Grand Mean	Sample SZ97 CPV	Sample SZ98 Lab Mean	Sample SZ98 Diff from Grand Mean	Sample SZ98 CPV	Instr Code
3RTU2E		58.40	-0.38	-0.06	61.20	0.26	0.05	CA
6L4WQW		66.30	7.52	1.19	73.46	12.52	2.25	LW
6URU9P		55.82	-2.96	-0.47	57.30	-3.64	-0.65	LW
7D27KC		48.68	-10.10	-1.60	52.44	-8.50	-1.53	CA
9MYLK2		64.34	5.56	0.88	66.06	5.12	0.92	DP
A2BNCN		65.60	6.82	1.08	61.40	0.46	0.08	CA
B4FQJ6		45.98	-12.80	-2.03	49.76	-11.18	-2.01	XX
BDKNJ2		67.04	8.26	1.31	66.04	5.10	0.92	TA
C28X4W		61.00	2.22	0.35	59.20	-1.74	-0.31	CA
C8UNN7		62.60	3.82	0.60	63.00	2.06	0.37	TA
D3CV37		56.68	-2.10	-0.33	55.44	-5.50	-0.99	CA
D68AZW		65.64	6.86	1.09	64.08	3.14	0.56	CA
DYY6M3		49.16	-9.62	-1.52	58.40	-2.54	-0.46	CD
QZB4NE		59.44	0.66	0.10	60.38	-0.56	-0.10	LW
TJWENJ		56.48	-2.30	-0.36	56.22	-4.72	-0.85	LW
TKNHBY		55.96	-2.82	-0.45	62.80	1.86	0.33	TA
U8VF8W		54.34	-4.44	-0.70	62.43	1.49	0.27	CH
UM7EXF		58.02	-0.76	-0.12	59.92	-1.02	-0.18	DP
V9NL8N		65.36	6.58	1.04	68.38	7.44	1.34	CA

Summary Statistics	Sample SZ97	Sample SZ98
Grand Means	58.78 psi	60.94 psi
Stnd Dev Btwn Labs	6.31 psi	5.57 psi

Statistics based on 19 of 19 reporting participants.

Key to Instrument Codes Reported by Participants

CA	CSI CS-163	CD	CSI CS-163D
CH	Chatillon Ametek	DP	Dek-Tron XP Series
LW	L & W ZD Tensile Tester	TA	Thwing-Albert Tensile 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 348

Internal Bond Strength - Modified Scott Mechanics

TAPPI Provisional Test Method T569

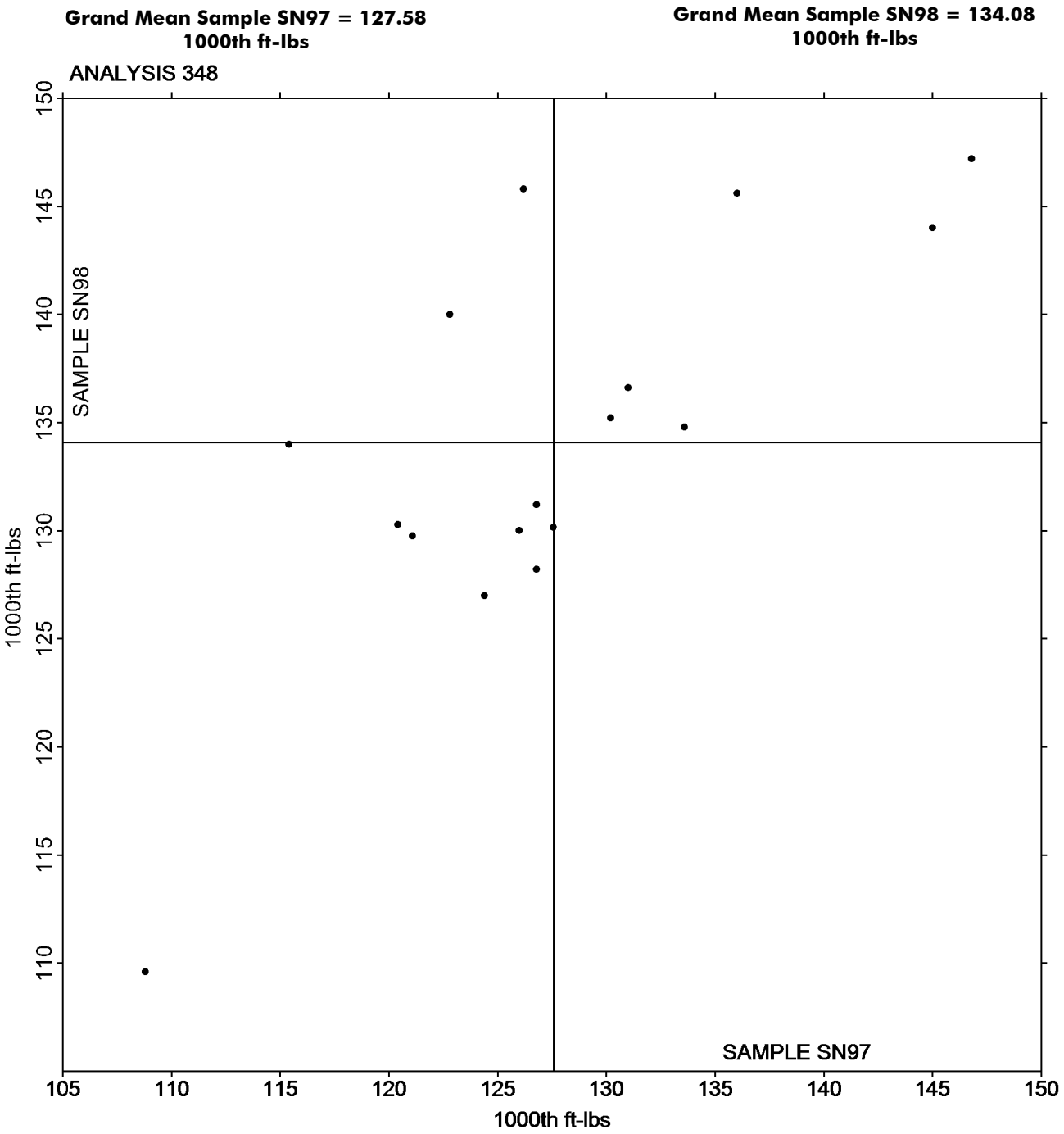
WebCode	Data Flag	Sample SN97 Lab Mean	Sample SN97 Diff from Grand Mean	Sample SN97 CPV	Sample SN98 Lab Mean	Sample SN98 Diff from Grand Mean	Sample SN98 CPV	Instr Code
323YE6		130.2	2.6	0.28	135.2	1.1	0.12	HY
78W9B8		126.8	-0.8	-0.08	131.2	-2.9	-0.31	HZ
8L98CQ		131.0	3.4	0.36	136.6	2.5	0.27	HZ
9MYLK2		108.8	-18.8	-1.98	109.6	-24.5	-2.67	XX
A2BNCN		120.4	-7.2	-0.76	130.3	-3.8	-0.42	XX
BQAKMK		145.0	17.4	1.84	144.0	9.9	1.08	HZ
D68AZW		126.2	-1.4	-0.15	145.8	11.7	1.28	HZ
FE4YNB		115.4	-12.2	-1.29	134.0	-0.1	-0.01	HZ
JBPV4A		126.0	-1.6	-0.17	130.0	-4.1	-0.45	HZ
K9HYWC		122.8	-4.8	-0.51	140.0	5.9	0.65	HY
L39T3R		126.8	-0.8	-0.08	128.2	-5.9	-0.64	HY
T79D6R		136.0	8.4	0.89	145.6	11.5	1.26	HY
TJWENJ		133.6	6.0	0.64	134.8	0.7	0.08	HY
XZJTKX		121.1	-6.5	-0.69	129.8	-4.3	-0.47	HX
YBL7MJ		146.8	19.2	2.03	147.2	13.1	1.43	HY
YJQHBZ		124.4	-3.2	-0.34	127.0	-7.1	-0.77	HY
ZURVF8		127.6	0.0	0.00	130.2	-3.9	-0.43	KR

Summary Statistics	Sample SN97	Sample SN98
Grand Means	127.58 1000th ft-lbs	134.08 1000th ft-lbs
Stnd Dev Btwn Labs	9.46 1000th ft-lbs	9.16 1000th ft-lbs

Statistics based on 17 of 17 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

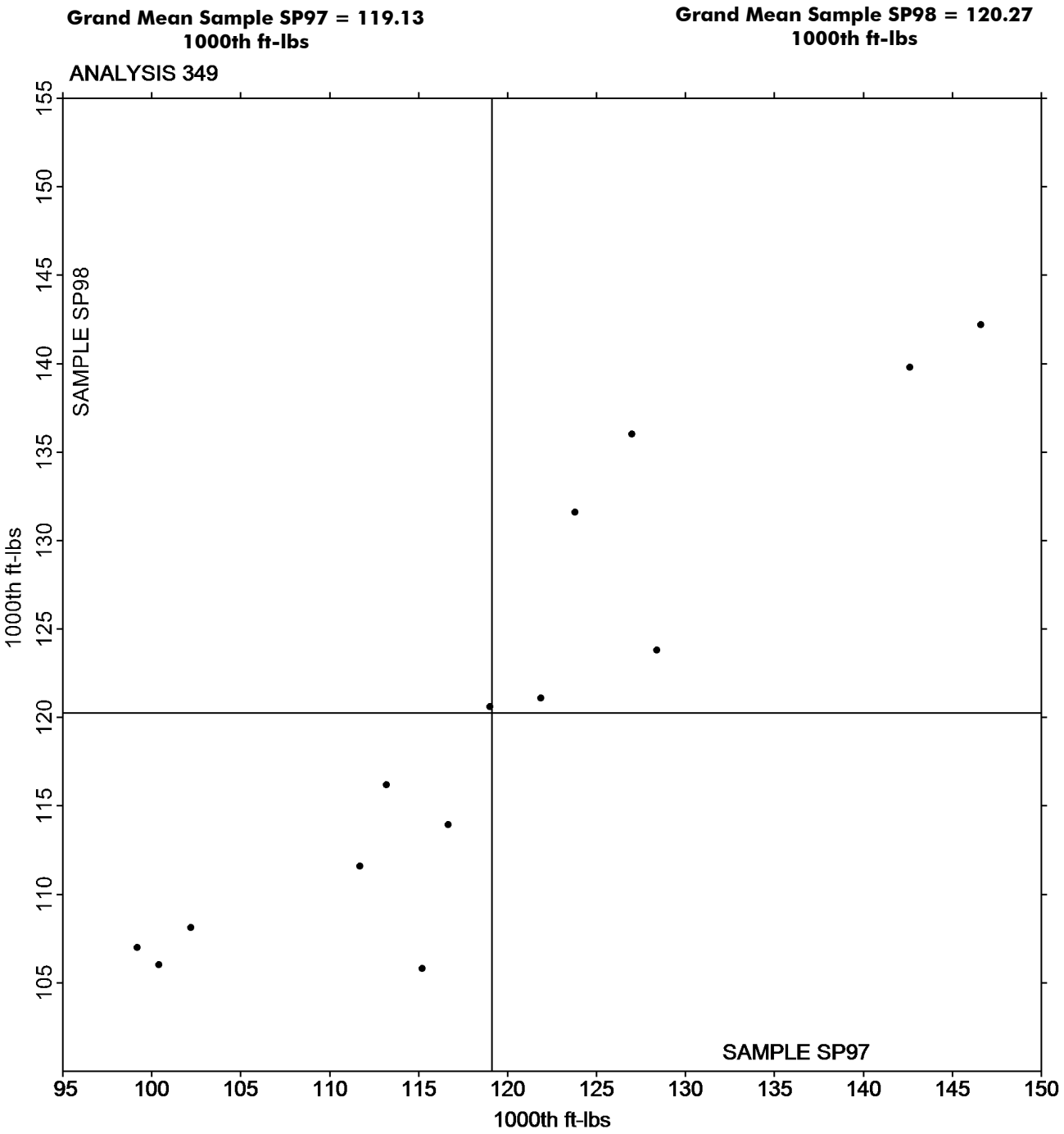
WebCode	Data Flag	Sample SP97 Lab Mean	Sample SP97 Diff from Grand Mean	Sample SP97 CPV	Sample SP98 Lab Mean	Sample SP98 Diff from Grand Mean	Sample SP98 CPV	Instr Code
34NT8Y		146.6	27.5	1.93	142.2	21.9	1.72	XX
4CFPAR		100.4	-18.7	-1.32	106.0	-14.2	-1.12	TM
BE2VTP		121.9	2.7	0.19	121.1	0.8	0.06	XX
BY4VTA		111.7	-7.4	-0.52	111.6	-8.7	-0.68	SC
C8DGJN		99.2	-19.9	-1.40	107.0	-13.3	-1.04	TM
CBCTEN		127.0	7.9	0.55	136.0	15.7	1.23	SC
CET9TM		128.4	9.3	0.65	123.8	3.5	0.28	TM
HRYCHP		142.6	23.5	1.65	139.8	19.5	1.53	TM
PAE2NB		123.8	4.7	0.33	131.6	11.3	0.89	SC
U8FCGC		102.2	-16.9	-1.19	108.1	-12.2	-0.95	XX
U8VF8W		115.2	-3.9	-0.28	105.8	-14.5	-1.13	TM
UX6WPH		113.2	-5.9	-0.42	116.2	-4.1	-0.32	SC
V7XMMX		119.0	-0.1	-0.01	120.6	0.3	0.03	SC
YTG2RU		116.7	-2.5	-0.17	113.9	-6.3	-0.50	TM

Summary Statistics	Sample SP97	Sample SP98
Grand Means	119.13 1000th ft-lbs	120.27 1000th ft-lbs
Stnd Dev Btwn Labs	14.22 1000th ft-lbs	12.77 1000th ft-lbs

Statistics based on 14 of 14 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-

