Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #3191 S - July 2022

Introduction to the Paper & Paperboard Interlaboratory Program

Explanation of Tables and Definitions of Terms

Analysis	Analysis Name
305	Bursting Strength - Printing Papers
310	Bursting Strength - Packaging Papers
312	Tearing Strength - Printing Papers
314	Tearing Strength - Packaging Papers
325	Tensile Breaking Strength - Printing Papers
327	Tensile Energy Absorption - Printing Papers
328	Elongation to Break - Printing Papers
330	Tensile Breaking Strength - Packaging Papers
331	Tensile Energy Absorption - Packaging Papers
332	Elongation to Break - Packaging Papers
334	Folding Endurance (MIT) - Double Folds
336	Bending Resistance, Gurley Type
338	Bending Resistance, Taber Type - 0 to 10 Units
339	Bending Resistance, Taber Type - 10 to 100 Taber Units
340	Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard
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.

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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

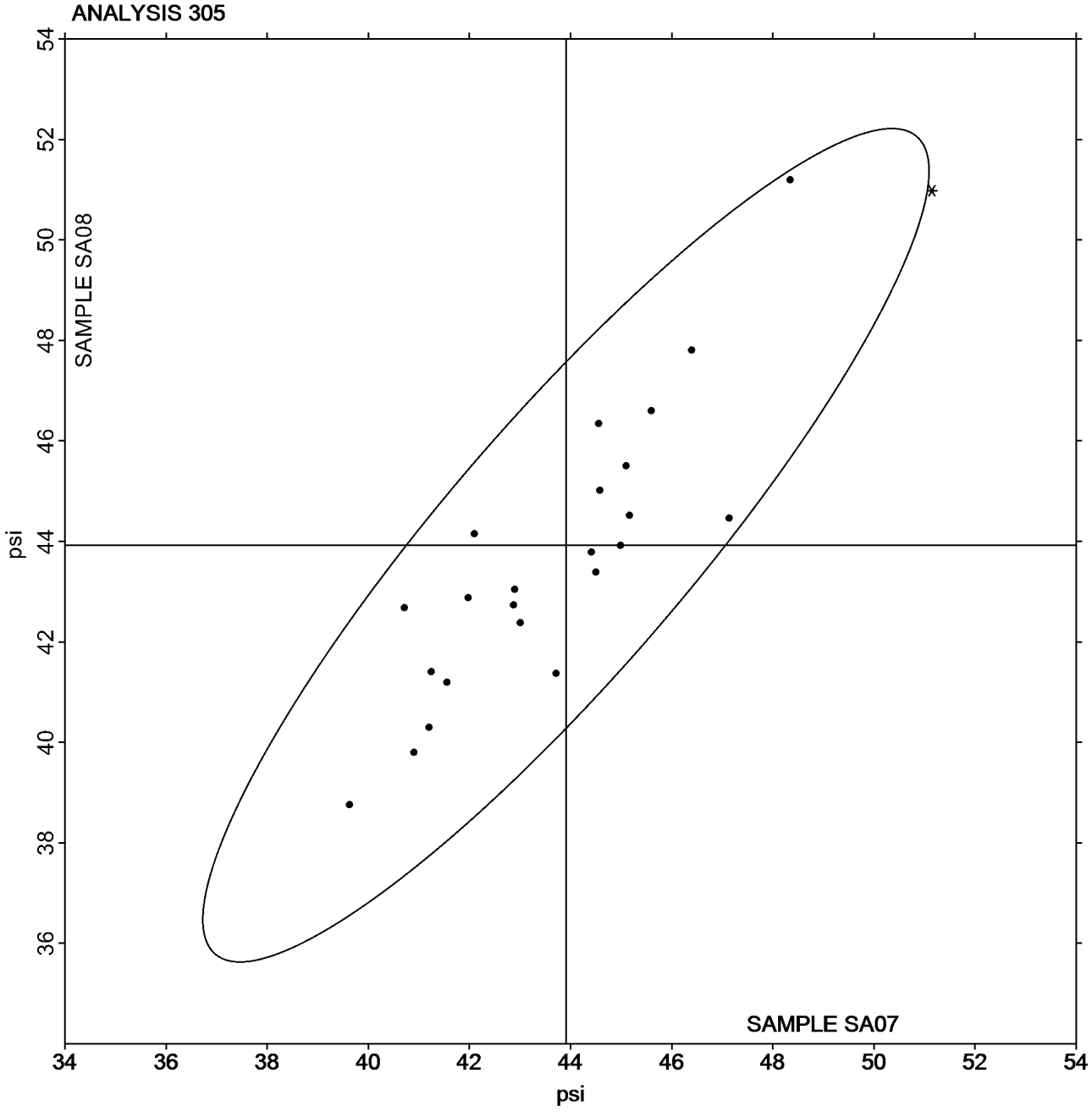
WebCode	Data Flag	Sample SA07 Lab Mean	Sample SA07 Diff from Grand Mean	Sample SA07 CPV	Sample SA08 Lab Mean	Sample SA08 Diff from Grand Mean	Sample SA08 CPV
2ZDXZL		45.60	1.69	0.63	46.60	2.68	0.87
3AZ22T		44.56	0.65	0.24	46.34	2.42	0.78
7XV83D		44.99	1.08	0.40	43.92	0.00	0.00
A4UXVT		41.55	-2.35	-0.88	41.19	-2.73	-0.88
AYZWY7		44.42	0.51	0.19	43.78	-0.14	-0.05
BACL8A		45.10	1.19	0.45	45.50	1.58	0.51
DXVKNL		43.71	-0.19	-0.07	41.37	-2.56	-0.83
EQTNHV		48.35	4.44	1.66	51.19	7.27	2.35
EYX3VG		39.63	-4.28	-1.60	38.76	-5.16	-1.67
FDGXWX		44.50	0.59	0.22	43.39	-0.53	-0.17
GFKZDM		42.90	-1.01	-0.38	43.04	-0.88	-0.29
JMU2WT		42.10	-1.80	-0.67	44.15	0.23	0.07
PCVFQW		40.72	-3.19	-1.19	42.68	-1.24	-0.40
QEXTTF		43.01	-0.90	-0.34	42.38	-1.54	-0.50
QTXB4M		41.25	-2.66	-0.99	41.40	-2.52	-0.82
TENGHN		41.97	-1.93	-0.72	42.87	-1.05	-0.34
UKURUF		44.58	0.67	0.25	45.01	1.09	0.35
V744B2	*	51.14	7.24	2.70	50.98	7.05	2.28
VJT2JQ		41.20	-2.71	-1.01	40.30	-3.62	-1.17
VXT3QZ		45.17	1.26	0.47	44.51	0.59	0.19
X48K76		47.14	3.23	1.21	44.46	0.54	0.17
Y3DWNA		40.90	-3.01	-1.12	39.80	-4.12	-1.33
YP4J6N		46.40	2.49	0.93	47.80	3.88	1.25
ZVAEL3		42.87	-1.03	-0.39	42.73	-1.19	-0.39

Summary Statistics	Sample SA07	Sample SA08
Grand Means	43.91 psi	43.92 psi
Stnd Dev Btwn Labs	2.68 psi	3.09 psi

Statistics based on 24 of 24 reporting participants.

Grand Mean Sample SA07 = 43.908 psi

Grand Mean Sample SA08 = 43.923 psi



Paper & Paperboard Interlaboratory Testing Program

Analysis 310

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

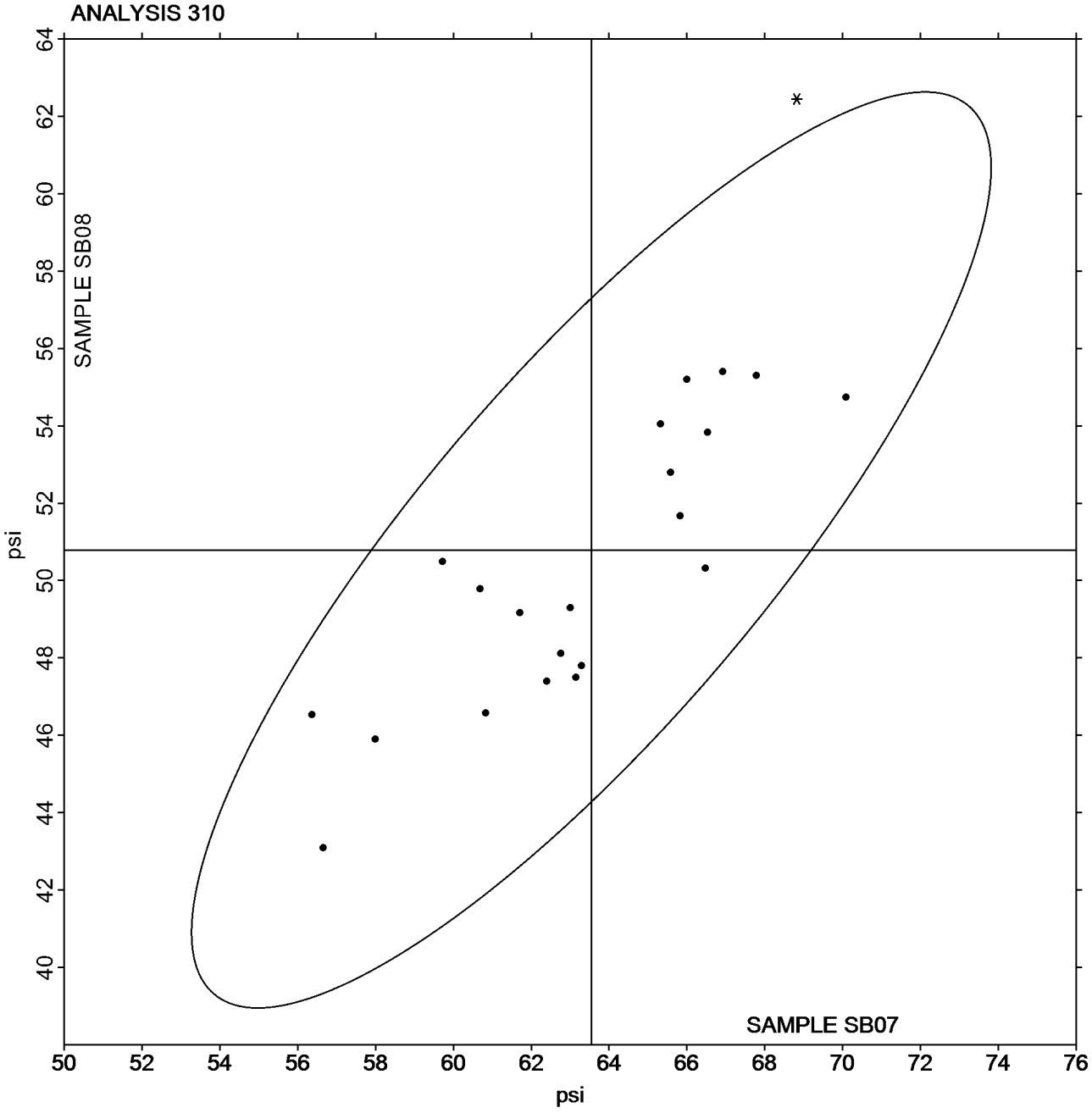
WebCode	Data Flag	Sample SB07 Lab Mean	Sample SB07 Diff from Grand Mean	Sample SB07 CPV	Sample SB08 Lab Mean	Sample SB08 Diff from Grand Mean	Sample SB08 CPV
2EZ6Y8	*	68.82	5.28	1.39	62.45	11.66	2.67
2NKEJV		66.92	3.38	0.89	55.41	4.62	1.06
3KMBB9		58.00	-5.54	-1.46	45.90	-4.89	-1.12
3V4Y78		65.32	1.78	0.47	54.05	3.26	0.75
4C72GK		56.65	-6.89	-1.82	43.09	-7.70	-1.76
972QE8		67.79	4.25	1.12	55.30	4.51	1.03
9HW4AX		63.30	-0.24	-0.06	47.80	-2.99	-0.68
CUEVQ4		62.40	-1.14	-0.30	47.40	-3.39	-0.78
DV4JKJ		62.76	-0.78	-0.21	48.11	-2.68	-0.61
FNV2YN		65.83	2.29	0.60	51.67	0.88	0.20
GFKZDM		59.73	-3.82	-1.01	50.49	-0.30	-0.07
HXZQUX		63.15	-0.39	-0.10	47.50	-3.29	-0.75
JNPLJT		66.47	2.93	0.77	50.31	-0.48	-0.11
K3HZRK		56.37	-7.17	-1.89	46.53	-4.26	-0.98
LVYR8V		66.53	2.99	0.79	53.82	3.03	0.69
QBELKF		60.68	-2.86	-0.75	49.78	-1.01	-0.23
QG42ET		65.59	2.04	0.54	52.79	2.00	0.46
RCJT6J		63.00	-0.54	-0.14	49.30	-1.49	-0.34
VJT2JQ		66.00	2.46	0.65	55.20	4.41	1.01
VQ867J		70.10	6.55	1.73	54.74	3.95	0.90
VYLQEM		61.71	-1.83	-0.48	49.17	-1.62	-0.37
WGW8TZ		60.83	-2.71	-0.72	46.57	-4.22	-0.97

Summary Statistics	Sample SB07	Sample SB08
Grand Means	63.54 psi	50.79 psi
Stnd Dev Btwn Labs	3.79 psi	4.37 psi

Statistics based on 22 of 22 reporting participants.

Grand Mean Sample SB07 = 63.544 psi

Grand Mean Sample SB08 = 50.790 psi



Paper & Paperboard Interlaboratory Testing Program

Analysis 312

Tearing Strength - Printing Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SC07 Lab Mean	Sample SC07 Diff from Grand Mean	Sample SC07 CPV	Sample SC08 Lab Mean	Sample SC08 Diff from Grand Mean	Sample SC08 CPV
2ZDXZL		63.10	-0.41	-0.10	67.20	1.59	0.39
32PWUU	X	70.93	7.42	1.74	76.97	11.35	2.76
36P9QU		63.24	-0.27	-0.06	63.40	-2.21	-0.54
3AZ22T		72.40	8.89	2.08	75.00	9.39	2.28
4BCDXP		67.20	3.69	0.86	69.35	3.74	0.91
6BMEKN		66.50	2.99	0.70	67.94	2.33	0.56
6XZ6XH		63.04	-0.47	-0.11	65.97	0.36	0.09
8H3YHK		62.00	-1.51	-0.35	63.20	-2.41	-0.59
9FTARG		56.66	-6.85	-1.60	59.00	-6.61	-1.61
9HW4AX		66.00	2.49	0.58	66.00	0.39	0.09
A4UXVT		64.78	1.27	0.30	68.88	3.27	0.79
AM7KJM		61.60	-1.91	-0.45	63.40	-2.21	-0.54
AVZL47		64.66	1.15	0.27	67.36	1.75	0.42
CUEVQ4		58.69	-4.82	-1.13	60.98	-4.63	-1.12
DV4JKJ		65.27	1.76	0.41	67.53	1.91	0.46
DXVKNL		67.86	4.35	1.02	70.43	4.81	1.17
E2QQJ4		66.60	3.09	0.72	67.14	1.53	0.37
EQTNHV		63.08	-0.43	-0.10	65.54	-0.07	-0.02
EYX3VG		68.20	4.69	1.10	71.90	6.29	1.53
FNV2YN		62.52	-0.99	-0.23	65.16	-0.45	-0.11
GFKZDM		62.49	-1.02	-0.24	64.97	-0.65	-0.16
HXZQUX		64.91	1.40	0.33	64.68	-0.93	-0.23
J8JM94		65.70	2.19	0.51	66.30	0.69	0.17
JMU2WT		67.45	3.94	0.92	69.63	4.02	0.97
JNPLJT		58.91	-4.60	-1.08	61.48	-4.13	-1.00
KJN3RE		61.34	-2.17	-0.51	63.51	-2.10	-0.51
LV2GCR		59.43	-4.08	-0.95	62.00	-3.61	-0.88
P42BWV	*	75.16	11.65	2.72	74.34	8.72	2.12
PCW7ZK		59.00	-4.51	-1.05	59.78	-5.83	-1.42
PQFWZM		57.81	-5.70	-1.33	60.32	-5.29	-1.29
QBELKF		64.12	0.61	0.14	67.79	2.18	0.53
QEXTTF		62.96	-0.55	-0.13	66.32	0.71	0.17
QG42ET		59.76	-3.75	-0.88	60.92	-4.70	-1.14
TENGHN		64.36	0.85	0.20	67.40	1.79	0.43
UKURUF	X	46.64	-16.87	-3.94	48.95	-16.66	-4.05
V744B2		60.60	-2.91	-0.68	62.03	-3.59	-0.87
WGW8TZ		72.11	8.60	2.01	72.09	6.48	1.57
WNYCQB		57.42	-6.09	-1.42	59.86	-5.75	-1.40
X48K76		54.48	-9.03	-2.11	57.48	-8.13	-1.97
YP4J6N		65.28	1.77	0.41	68.06	2.45	0.59

WebCode	Data Flag	Sample SC07 Lab Mean	Sample SC07 Diff from Grand Mean	Sample SC07 CPV	Sample SC08 Lab Mean	Sample SC08 Diff from Grand Mean	Sample SC08 CPV
Z9YA33		60.12	-3.39	-0.79	62.48	-3.13	-0.76
ZE69AL		62.12	-1.39	-0.32	64.25	-1.36	-0.33
ZVAEL3		64.97	1.46	0.34	69.11	3.49	0.85

Summary Statistics	Sample SC07	Sample SC08
Grand Means	63.51 Grams	65.61 Grams
Stnd Dev Btwn Labs	4.28 Grams	4.12 Grams

Statistics based on 41 of 43 reporting participants.

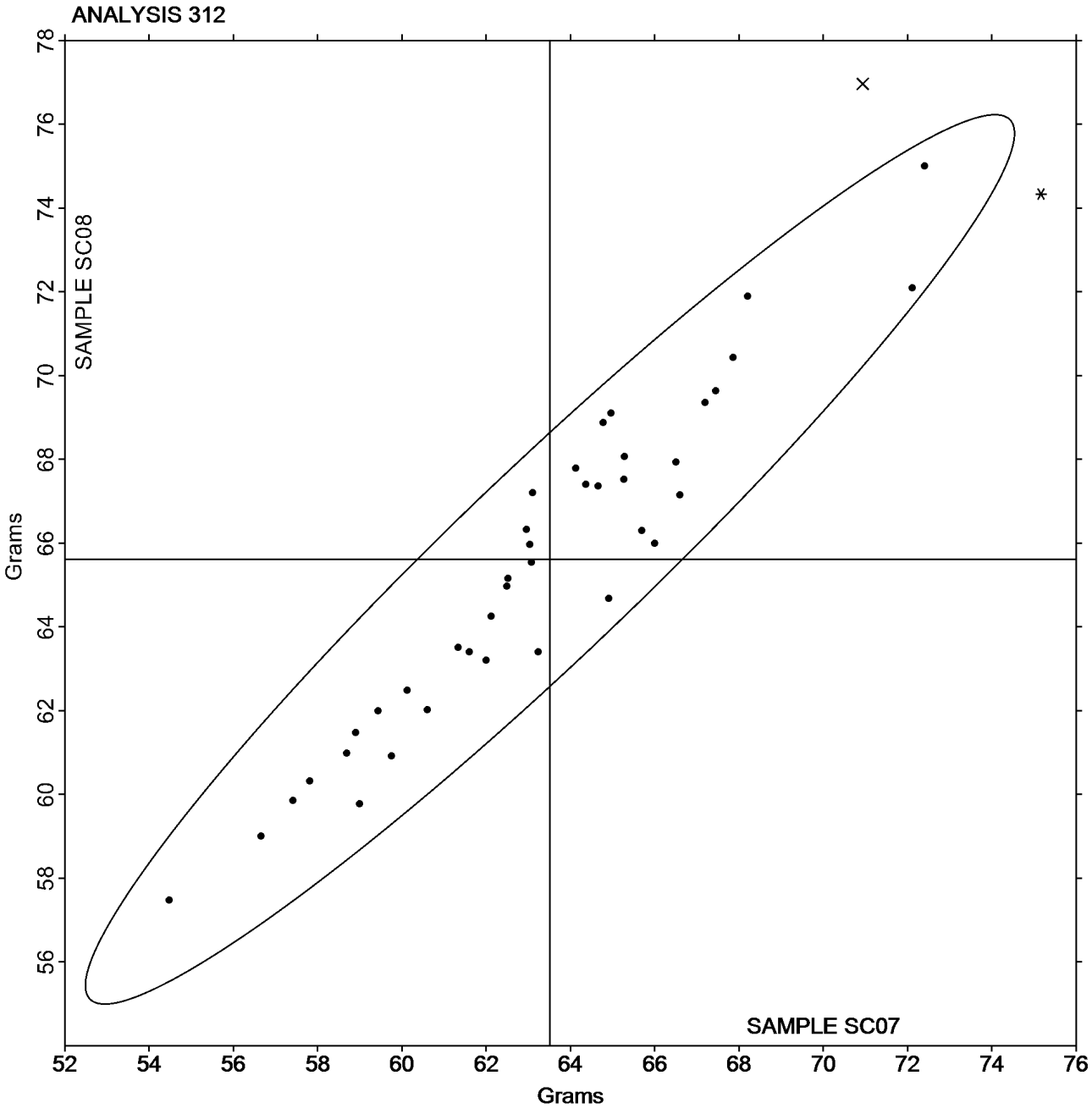
Comments on Assigned Data Flags for Test #312

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

32PWUU (X) - Data for sample SC08 are high. Inconsistent within the determinations of sample SC08.

Grand Mean Sample SC07 = 63.510 Grams

Grand Mean Sample SC08 = 65.614 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 314

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SD07 Lab Mean	Sample SD07 Diff from Grand Mean	Sample SD07 CPV	Sample SD08 Lab Mean	Sample SD08 Diff from Grand Mean	Sample SD08 CPV
26XL38		175.4	-4.4	-0.22	170.3	-7.7	-0.40
2NKEJV		215.6	35.9	1.84	203.6	25.6	1.32
3BFHZT		187.1	7.4	0.38	184.6	6.6	0.34
3KMBB9		187.7	7.9	0.41	186.1	8.1	0.42
3V4Y78		183.7	4.0	0.20	186.1	8.1	0.42
4C72GK	*	163.1	-16.6	-0.85	147.8	-30.3	-1.56
7XV83D		165.6	-14.1	-0.72	161.0	-17.0	-0.88
82U6QB	*	125.1	-54.7	-2.80	128.6	-49.4	-2.55
8ANBJC		207.3	27.6	1.41	204.4	26.4	1.36
8HJ9D7		188.7	9.0	0.46	191.1	13.0	0.67
972QE8		163.8	-16.0	-0.82	162.0	-16.1	-0.83
9HW4AX		173.6	-6.1	-0.31	182.4	4.4	0.23
AHAUEW		188.6	8.9	0.45	187.5	9.5	0.49
AKEL6N		199.8	20.1	1.03	199.6	21.6	1.12
AML43J		194.9	15.1	0.77	205.0	27.0	1.39
AYZWY7		146.0	-33.7	-1.72	152.0	-26.1	-1.35
BACL8A		173.7	-6.0	-0.31	166.7	-11.3	-0.58
BGC8WP		188.9	9.1	0.47	180.7	2.7	0.14
DV4JKJ		181.3	1.5	0.08	187.8	9.8	0.51
F89LVR		140.8	-38.9	-1.99	144.3	-33.7	-1.74
FDGXWX		177.2	-2.6	-0.13	174.3	-3.7	-0.19
GFKZDM		174.1	-5.7	-0.29	167.1	-11.0	-0.57
GX3YJK		201.9	22.2	1.13	201.6	23.6	1.22
HB3ABP		179.7	0.0	0.00	167.1	-10.9	-0.56
HPNPEN		196.3	16.6	0.85	193.8	15.8	0.82
J8JM94		182.5	2.8	0.14	178.1	0.1	0.00
JA9LTU		174.6	-5.2	-0.27	167.8	-10.2	-0.53
K3HZRK		176.8	-2.9	-0.15	171.1	-6.9	-0.36
KNHYEJ		174.4	-5.3	-0.27	172.5	-5.5	-0.28
NG92Y3		157.6	-22.2	-1.13	160.5	-17.5	-0.90
PCVFQW		208.1	28.4	1.45	212.2	34.2	1.77
QTXB4M		205.3	25.5	1.31	200.6	22.6	1.17
RGEHNC		164.2	-15.6	-0.80	161.9	-16.1	-0.83
V2TBZ3		197.3	17.5	0.90	193.7	15.7	0.81
VJT2JQ		170.4	-9.3	-0.48	176.8	-1.2	-0.06

Summary Statistics	Sample SD07	Sample SD08
Grand Means	179.74 Grams	178.02 Grams
Stnd Dev Btwn Labs	19.54 Grams	19.36 Grams

Statistics based on 35 of 35 reporting participants.

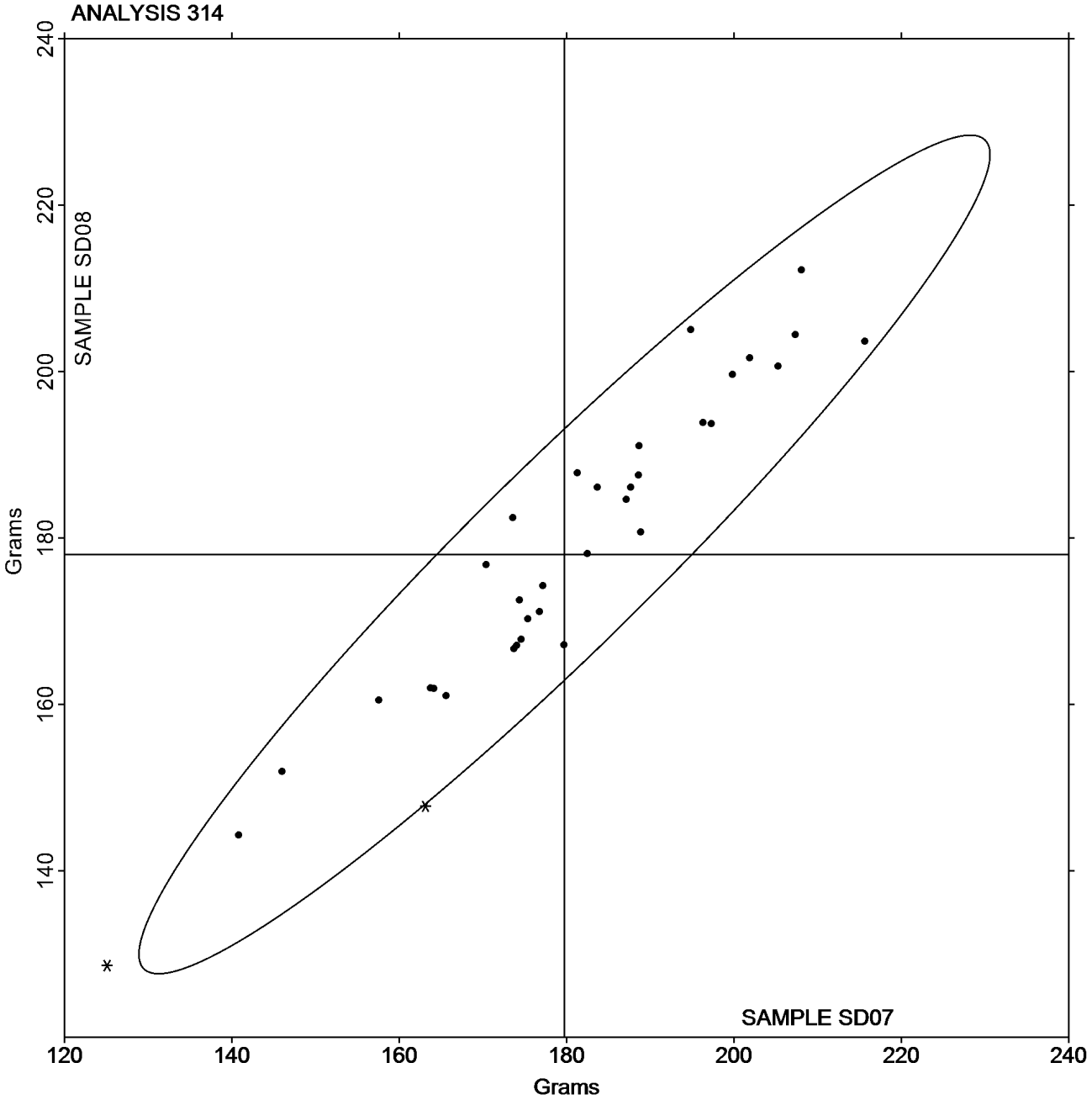
Analysis Notes:

AYZWY7 - Data appear to be off by a factor; data converted by CTS (x4). CTS will not correct the data going forward.

GX3YJK - Data appear to be reported as gf, not mN as indicated on data entry form. CTS will not correct the Units going forward.

Grand Mean Sample SD07 = 179.74 Grams

Grand Mean Sample SD08 = 178.02 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 325

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF07 Lab Mean	Sample SF07 Diff from Grand Mean	Sample SF07 CPV	Sample SF08 Lab Mean	Sample SF08 Diff from Grand Mean	Sample SF08 CPV	Instr Code
2EZ6Y8		7.088	0.287	0.92	6.920	0.135	0.42	TM
2ZDXZL		6.594	-0.207	-0.67	6.383	-0.402	-1.25	TO
32PWUU		6.263	-0.539	-1.73	6.358	-0.427	-1.33	LB
36P9QU		6.594	-0.208	-0.67	6.614	-0.172	-0.53	TF
3AZ22T		7.175	0.373	1.20	6.830	0.045	0.14	TO
4BCDXP	X	5.494	-1.308	-4.21	5.658	-1.128	-3.50	IM
6BMEKN		6.523	-0.279	-0.90	6.559	-0.226	-0.70	LJ
6XZ6XH	*	6.870	0.068	0.22	6.368	-0.418	-1.30	VM
8H3YHK		6.878	0.076	0.24	6.727	-0.058	-0.18	TC
9FTARG		6.815	0.013	0.04	7.031	0.246	0.76	LE
A4UXVT		6.945	0.143	0.46	7.220	0.435	1.35	LI
AM7KJM		7.443	0.642	2.06	7.485	0.700	2.17	LB
AML43J		6.433	-0.369	-1.19	6.445	-0.340	-1.06	LI
DXVKNL		6.877	0.075	0.24	6.783	-0.002	-0.01	LX
E2QQJ4		6.716	-0.086	-0.28	6.571	-0.215	-0.67	TO
EG38NK		6.594	-0.207	-0.67	6.468	-0.317	-0.98	ID
EQTNHV		7.046	0.244	0.79	6.963	0.178	0.55	TV
EYX3VG	X	7.896	1.094	3.52	8.096	1.311	4.07	VM
GFKZDM		6.542	-0.260	-0.84	6.696	-0.090	-0.28	LH
HXZQUX		6.672	-0.130	-0.42	6.794	0.008	0.03	TV
JMU2WT		6.823	0.021	0.07	6.795	0.010	0.03	LE
JNPLJT		6.860	0.058	0.19	6.861	0.076	0.23	LI
KHUCNK		6.508	-0.294	-0.94	6.399	-0.386	-1.20	RE
KJN3RE		7.103	0.301	0.97	7.151	0.366	1.13	LI
KNHYEJ		7.158	0.357	1.15	6.752	-0.033	-0.10	TO
LM4UH8		7.253	0.451	1.45	7.224	0.439	1.36	LC
LU67E4		6.344	-0.458	-1.47	6.328	-0.458	-1.42	ID
LV2GCR	X	1.238	-5.564	-17.89	1.299	-5.486	-17.02	TO
P42BWV		6.920	0.118	0.38	7.090	0.305	0.95	LA
PCW7ZK		6.644	-0.157	-0.51	6.788	0.003	0.01	TO
PQFWZM		7.298	0.496	1.59	7.298	0.512	1.59	LI
QEXTTF		6.562	-0.239	-0.77	6.711	-0.074	-0.23	TB
QG42ET		6.450	-0.352	-1.13	6.520	-0.265	-0.82	LH
RB9RJL		6.988	0.186	0.60	7.107	0.321	1.00	LE
TENGHN		6.589	-0.212	-0.68	6.832	0.047	0.14	LX
UKURUF		6.916	0.114	0.37	6.872	0.087	0.27	IN
UYQNCD		6.943	0.141	0.45	6.841	0.056	0.17	TV
V744B2	*	5.994	-0.807	-2.60	5.987	-0.799	-2.48	TR
WNYCQB	X	5.558	-1.243	-4.00	6.361	-0.424	-1.32	TB
X48K76		7.054	0.253	0.81	6.781	-0.004	-0.01	TJ

Paper & Paperboard Interlaboratory Testing Program

Analysis 325

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF07 Lab Mean	Sample SF07 Diff from Grand Mean	Sample SF07 CPV	Sample SF08 Lab Mean	Sample SF08 Diff from Grand Mean	Sample SF08 CPV	Instr Code
XYYZH9		7.022	0.220	0.71	7.132	0.347	1.08	FP
Y2J96E		6.932	0.130	0.42	7.133	0.348	1.08	XX
YP4J6N		6.720	-0.082	-0.26	6.794	0.009	0.03	LH
ZE69AL		7.126	0.324	1.04	6.791	0.006	0.02	XX
ZMVVXW		6.315	-0.487	-1.57	6.302	-0.483	-1.50	TV
ZVAEL3		7.084	0.282	0.91	7.280	0.495	1.53	LF

Summary Statistics	Sample SF07	Sample SF08
Grand Means	6.80 kN/m	6.79 kN/m
Stnd Dev Btwn Labs	0.31 kN/m	0.32 kN/m

Statistics based on 42 of 46 reporting participants.

Comments on Assigned Data Flags for Test #325

4BCDXP (X) - Data for both samples are low. Possible Systematic Error.

WNYCQB (X) - Data for sample SF07 are low.

LV2GCR (X) - Extreme Data.

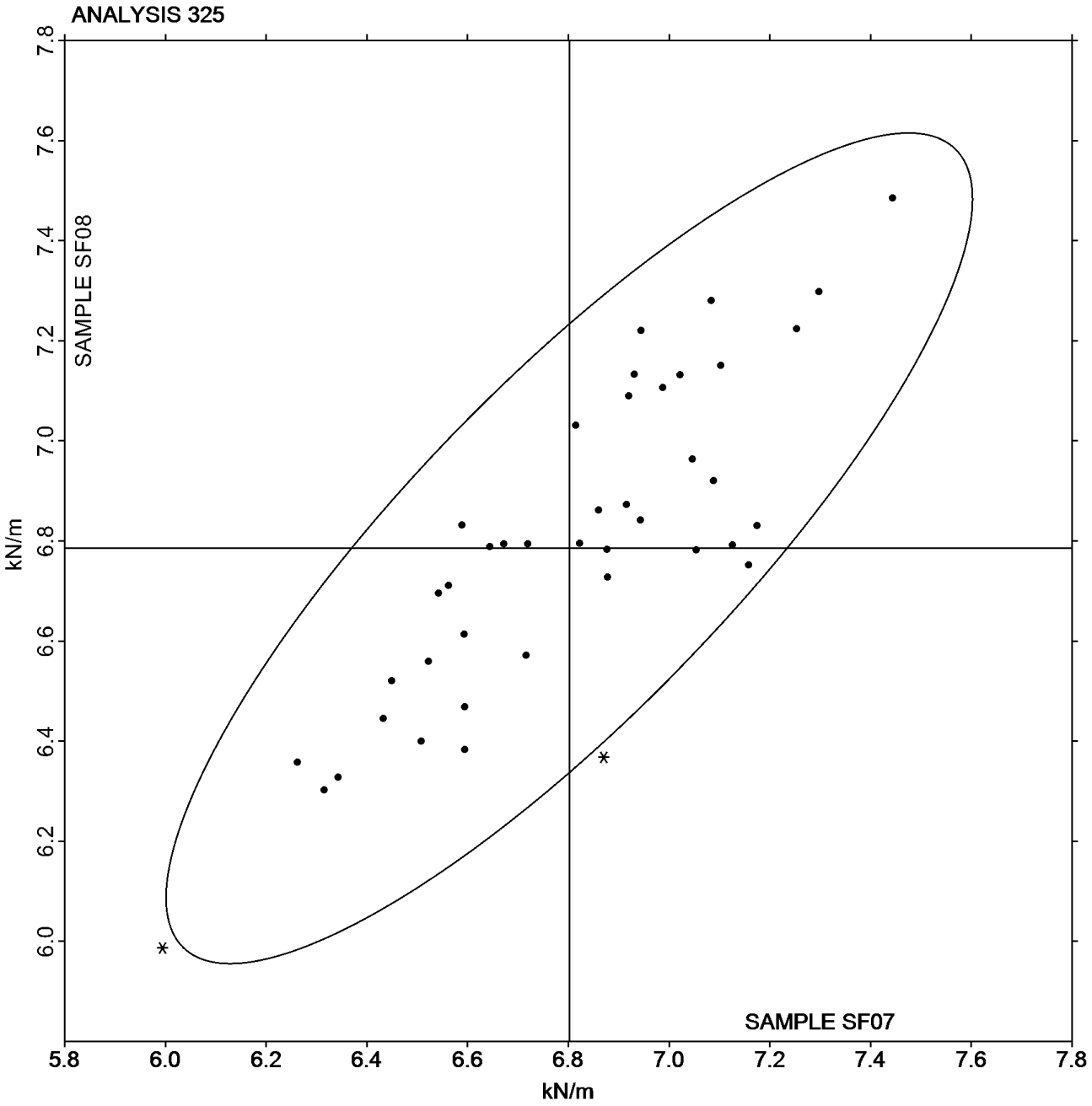
EYX3VG (X) - Data for both samples are high. Possible Systematic Error.

Key to Instrument Codes Reported by Participants

FP	Frank PTI Universal Tester TS	ID	Instron 4200 Series
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
TM	TMI Horizontal Tensile Tester	TO	Thwing-Albert QC-1000
TR	Testometric 220D	TV	Thwing-Albert Vantage NX
VM	Valmet PaperLab (was Kajaani/Robotest)	XX	Instrument make/model not specified by lab

Grand Mean Sample SF07 = 6.8018 kN/m

Grand Mean Sample SF08 = 6.7853 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF07 Lab Mean	Sample SF07 Diff from Grand Mean	Sample SF07 CPV	Sample SF08 Lab Mean	Sample SF08 Diff from Grand Mean	Sample SF08 CPV	Instr Code
2EZ6Y8		97.12	-1.30	-0.13	99.51	0.01	0.00	TM
2ZDXZL		98.27	-0.16	-0.02	88.55	-10.95	-1.21	TO
32PWUU		105.80	7.38	0.75	106.84	7.34	0.81	LB
3AZ22T		80.37	-18.06	-1.82	85.40	-14.10	-1.55	XX
4BCDXP	*	73.00	-25.43	-2.57	76.85	-22.65	-2.50	IM
6BMEKN		97.72	-0.70	-0.07	97.71	-1.79	-0.20	LJ
A4UXVT		97.59	-0.83	-0.08	104.60	5.10	0.56	LI
AM7KJM		100.87	2.44	0.25	99.62	0.12	0.01	LB
AML43J		90.13	-8.29	-0.84	91.85	-7.65	-0.84	LI
DXVKNL		98.43	0.01	0.00	98.07	-1.43	-0.16	LX
E2QQJ4		119.96	21.54	2.18	118.21	18.71	2.06	TO
EG38NK		100.87	2.45	0.25	95.59	-3.91	-0.43	ID
EQTNHV		117.49	19.07	1.93	116.77	17.27	1.90	TV
EYX3VG		105.48	7.06	0.71	99.83	0.33	0.04	VM
GFKZDM		95.44	-2.99	-0.30	97.29	-2.21	-0.24	LH
HXZQUX		90.00	-8.42	-0.85	92.97	-6.53	-0.72	TV
JMU2WT		95.76	-2.66	-0.27	99.74	0.24	0.03	LE
JNPLJT		88.80	-9.63	-0.97	88.23	-11.27	-1.24	LI
KHUCNK		100.02	1.60	0.16	99.49	-0.01	0.00	RE
KJN3RE		87.60	-10.83	-1.09	89.61	-9.89	-1.09	LI
KNHYEJ		114.14	15.71	1.59	108.81	9.31	1.03	TO
LM4UH8		105.28	6.86	0.69	109.24	9.74	1.07	LC
LU67E4		101.77	3.34	0.34	99.56	0.06	0.01	ID
LV2GCR	X	581.71	483.29	48.83	590.47	490.97	54.11	TO
P42BWV		89.01	-9.41	-0.95	96.97	-2.53	-0.28	LA
PCW7ZK		94.57	-3.86	-0.39	103.62	4.12	0.45	TO
PQFWZM		83.33	-15.09	-1.53	82.31	-17.19	-1.89	LX
QEXTTF		97.72	-0.70	-0.07	107.35	7.85	0.87	TB
QG42ET		97.61	-0.81	-0.08	100.66	1.16	0.13	LH
UKURUF		103.38	4.96	0.50	100.76	1.26	0.14	IN
UYQNCD		106.41	7.98	0.81	111.22	11.72	1.29	TV
X48K76		109.85	11.42	1.15	100.27	0.77	0.09	TQ
XYYZH9		109.38	10.96	1.11	110.82	11.32	1.25	FP
YP4J6N		91.18	-7.24	-0.73	96.51	-2.99	-0.33	LH
ZE69AL	X	138.12	39.69	4.01	128.67	29.17	3.22	XX
ZMVVXW		98.28	-0.14	-0.01	101.70	2.20	0.24	TV
ZVAEL3		102.23	3.81	0.38	105.98	6.48	0.71	LF

Paper & Paperboard Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SF07	Sample SF08
Grand Means	98.42 Joules/sq m	99.50 Joules/sq m
Stnd Dev Btwn Labs	9.90 Joules/sq m	9.07 Joules/sq m

Statistics based on 35 of 37 reporting participants.

Comments on Assigned Data Flags for Test #327

LV2GCR (X) - Extreme Data.

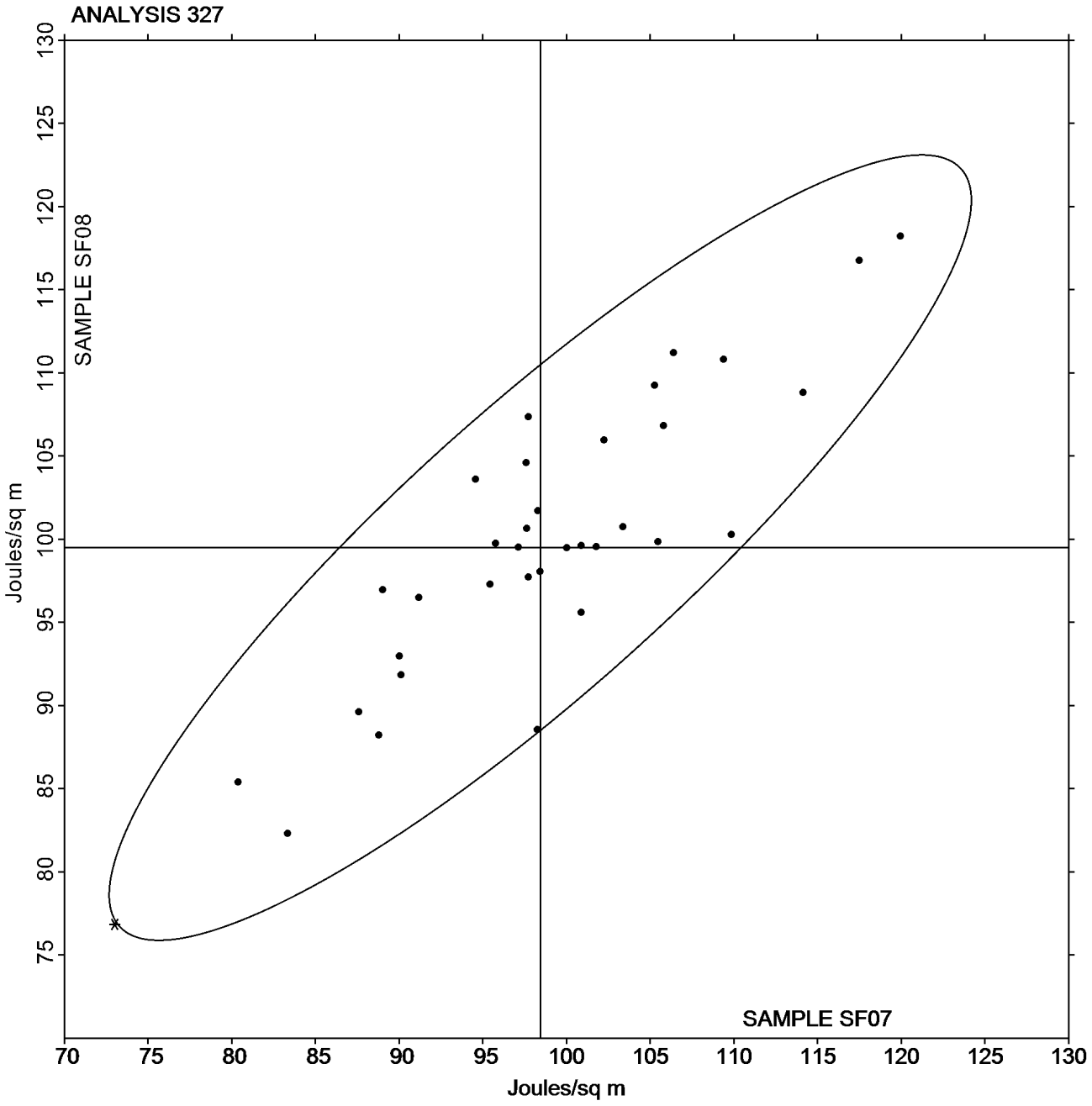
ZE69AL (X) - Data for both samples are high. Possible Systematic Error.

Key to Instrument Codes Reported by Participants

FP	Frank PTI Universal Tester TS	ID	Instron 4200 Series
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	TM	TMI Horizontal Tensile Tester
TO	Thwing-Albert QC-1000	TQ	Thwing-Albert QC 3A
TV	Thwing-Albert Vantage NX	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		

Grand Mean Sample SF07 = 98.425 Joules/sq m

Grand Mean Sample SF08 = 99.501 Joules/sq m



Paper & Paperboard Interlaboratory Testing Program

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF07 Lab Mean	Sample SF07 Diff from Grand Mean	Sample SF07 CPV	Sample SF08 Lab Mean	Sample SF08 Diff from Grand Mean	Sample SF08 CPV	Instr Code
2EZ6Y8		2.165	-0.108	-0.36	2.267	-0.046	-0.15	TM
2ZDXZL	*	2.302	0.029	0.10	2.153	-0.160	-0.52	TO
32PWUU		2.058	-0.215	-0.71	2.050	-0.263	-0.86	LB
36P9QU		2.156	-0.117	-0.38	2.325	0.012	0.04	TF
3AZ22T	*	3.097	0.824	2.71	3.145	0.832	2.71	TO
4BCDXP		2.076	-0.197	-0.65	2.146	-0.168	-0.55	IM
6BMEKN		2.282	0.009	0.03	2.253	-0.060	-0.20	LX
6XZ6XH		1.990	-0.283	-0.93	2.130	-0.183	-0.60	VM
A4UXVT		1.948	-0.325	-1.07	2.013	-0.300	-0.98	LI
AM7KJM		2.023	-0.250	-0.82	1.982	-0.331	-1.08	LB
AML43J		2.210	-0.063	-0.21	2.242	-0.071	-0.23	LI
DXVKNL		2.192	-0.081	-0.27	2.198	-0.115	-0.38	LX
E2QQJ4		3.005	0.732	2.41	3.075	0.762	2.49	TO
EG38NK		2.323	0.050	0.17	2.249	-0.065	-0.21	ID
EQTNHV		2.611	0.338	1.11	2.626	0.312	1.02	TV
EYX3VG		1.737	-0.536	-1.76	1.799	-0.514	-1.68	VM
GFKZDM		2.180	-0.093	-0.31	2.242	-0.071	-0.23	LH
HXZQUX		2.104	-0.169	-0.56	2.138	-0.175	-0.57	TV
JMU2WT		2.134	-0.139	-0.46	2.227	-0.086	-0.28	LE
JNPLJT		1.994	-0.279	-0.92	1.983	-0.330	-1.08	LI
KHUCNK		2.411	0.138	0.45	2.440	0.126	0.41	RE
KJN3RE		1.916	-0.357	-1.17	1.942	-0.371	-1.21	LI
KNHYEJ		2.541	0.268	0.88	2.542	0.229	0.75	TO
LM4UH8		2.226	-0.047	-0.15	2.316	0.003	0.01	LC
LU67E4		2.461	0.188	0.62	2.419	0.106	0.35	ID
LV2GCR		2.329	0.056	0.18	2.382	0.069	0.22	TO
P42BWV		1.830	-0.443	-1.46	1.930	-0.383	-1.25	LA
PCW7ZK		2.396	0.123	0.41	2.454	0.141	0.46	TO
PQFWZM		1.800	-0.473	-1.56	1.790	-0.523	-1.71	LI
QEXTTF		2.360	0.087	0.29	2.530	0.217	0.71	TB
QG42ET		2.250	-0.023	-0.08	2.340	0.027	0.09	LH
UKURUF		2.500	0.227	0.75	2.489	0.176	0.57	IN
UYQNCD		2.411	0.138	0.45	2.544	0.231	0.75	TV
WNYCQB	X	1.666	-0.607	-2.00	1.983	-0.330	-1.08	TF
X48K76		2.495	0.222	0.73	2.418	0.105	0.34	TJ
XYYZH9		2.467	0.194	0.64	2.503	0.190	0.62	FP
YP4J6N		2.067	-0.206	-0.68	2.161	-0.152	-0.50	LH
ZE69AL		2.947	0.674	2.22	3.013	0.700	2.28	XX
ZMVVXW		2.440	0.167	0.55	2.508	0.195	0.64	TV
ZVAEL3		2.208	-0.065	-0.21	2.255	-0.058	-0.19	LF

Paper & Paperboard Interlaboratory Testing Program

Analysis 328
Elongation to Break - Printing Papers
TAPPI Official Test Method T494

Summary Statistics	Sample SF07	Sample SF08
Grand Means	2.27 Percent	2.31 Percent
Stnd Dev Btwn Labs	0.30 Percent	0.31 Percent

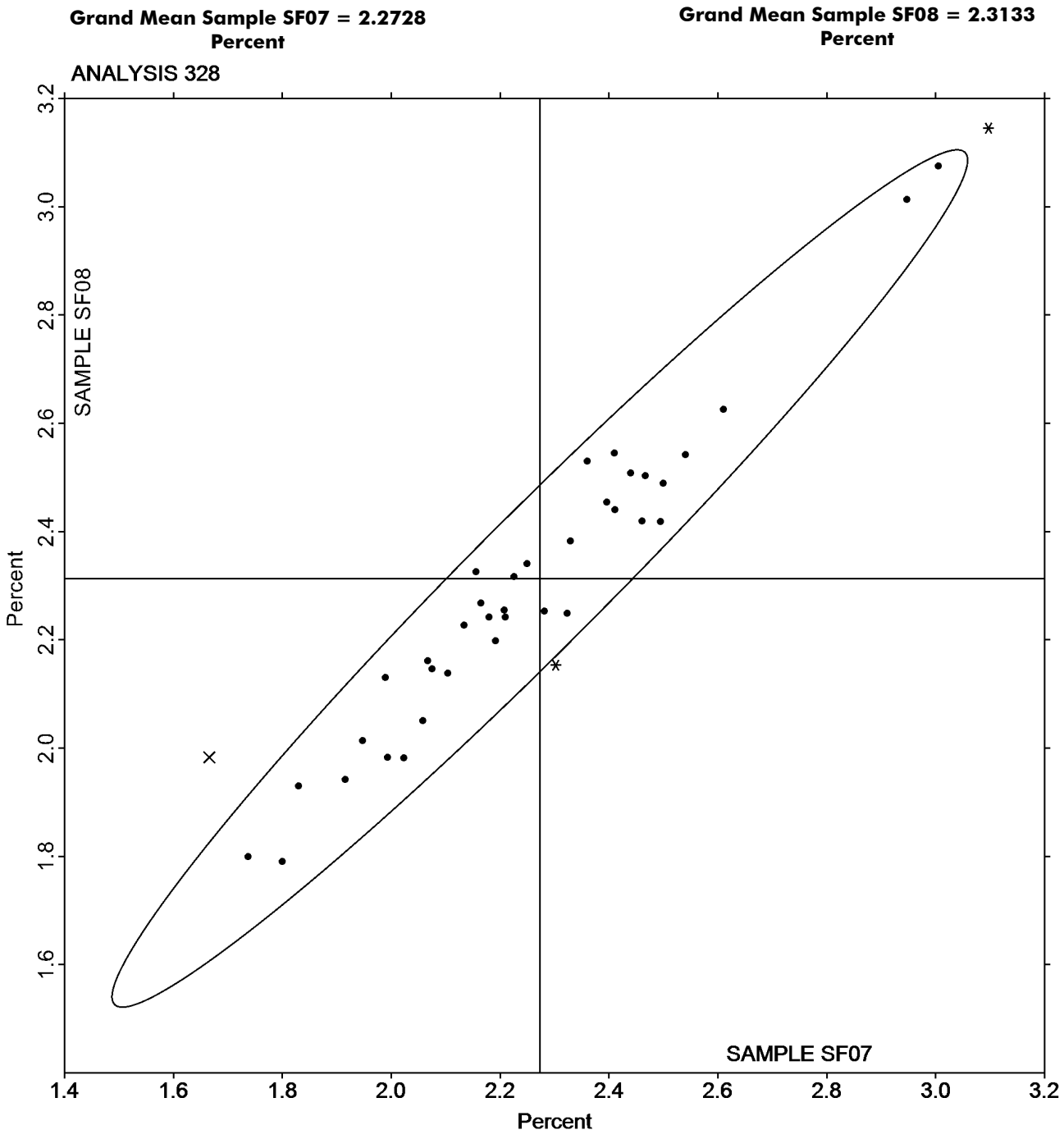
Statistics based on 39 of 40 reporting participants.

Comments on Assigned Data Flags for Test #328

WNYCQB (X) - Inconsistent in testing between 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	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
TM	TMI Horizontal Tensile Tester	TO	Thwing-Albert QC-1000
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 330

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE07 Lab Mean	Sample SE07 Diff from Grand Mean	Sample SE07 CPV	Sample SE08 Lab Mean	Sample SE08 Diff from Grand Mean	Sample SE08 CPV	Instr Code
26XL38		10.17	-0.33	-0.50	13.64	-0.15	-0.18	LW
2EZ6Y8		10.36	-0.13	-0.20	13.87	0.09	0.11	TR
2NKEJV	*	12.00	1.50	2.28	15.87	2.09	2.57	LE
2R8RQD		10.30	-0.20	-0.30	13.63	-0.15	-0.19	IR
32TGL4		10.69	0.19	0.29	14.58	0.80	0.98	DM
3BFHZT		9.17	-1.33	-2.02	12.37	-1.41	-1.74	LH
3KMBB9	X	8.20	-2.30	-3.50	10.50	-3.28	-4.05	LE
3V4ZAD		9.97	-0.52	-0.80	13.08	-0.71	-0.87	IM
4C72GK		9.75	-0.74	-1.13	12.80	-0.99	-1.22	IM
7XV83D		11.55	1.05	1.60	14.84	1.06	1.31	LA
89CCP3		9.85	-0.64	-0.98	12.90	-0.88	-1.09	TB
8HJ9D7		9.81	-0.68	-1.04	12.87	-0.92	-1.13	TK
9HW4AX		11.21	0.72	1.09	14.41	0.62	0.77	IF
AHAUEW		10.46	-0.04	-0.06	13.86	0.08	0.09	ID
AML43J		9.85	-0.65	-0.99	13.14	-0.64	-0.79	LW
AVZL47		9.46	-1.03	-1.57	12.29	-1.50	-1.85	XX
AYZWVZ		11.04	0.54	0.82	14.26	0.48	0.59	TH
AYZWY7		11.33	0.84	1.28	14.80	1.01	1.25	TO
BACL8A		10.90	0.40	0.61	14.25	0.46	0.57	LE
CYP7JX		11.65	1.16	1.76	14.90	1.12	1.38	LA
DV4JKJ		10.04	-0.46	-0.69	13.71	-0.08	-0.09	LE
FDGXWX		10.31	-0.19	-0.28	13.72	-0.07	-0.08	IF
FNXPHM	X	16.30	5.81	8.83	19.22	5.43	6.70	LA
GFKZDM		10.60	0.11	0.16	13.60	-0.19	-0.24	LH
HPNPEN		10.47	-0.03	-0.04	13.54	-0.25	-0.30	TR
HXZQUX		10.60	0.10	0.15	14.10	0.31	0.39	TO
J8JM94		9.64	-0.86	-1.31	12.89	-0.89	-1.10	TB
JA9LTU		10.24	-0.25	-0.38	13.40	-0.38	-0.47	LE
K3HZRK		10.01	-0.49	-0.74	13.36	-0.43	-0.52	TX
L6NF6H		11.41	0.91	1.39	15.31	1.52	1.88	LI
LGCPJB		10.11	-0.39	-0.59	12.91	-0.87	-1.08	MA
LM4UH8		10.88	0.38	0.58	13.82	0.04	0.05	LC
LY2T9R		11.10	0.61	0.92	14.12	0.33	0.41	TB
NG92Y3		10.33	-0.16	-0.25	13.78	-0.01	-0.01	LE
PCVFQW		10.96	0.47	0.71	13.99	0.21	0.25	LA
QBELKF		10.18	-0.31	-0.47	13.28	-0.51	-0.62	XX
RGEHNC		9.95	-0.54	-0.83	13.07	-0.71	-0.88	IF
TMGW68		10.53	0.03	0.05	13.85	0.06	0.08	LE
VJT2JQ		11.37	0.87	1.32	14.53	0.74	0.91	TH
WGW8TZ		11.11	0.61	0.93	14.85	1.06	1.31	LW

Paper & Paperboard Interlaboratory Testing Program

Analysis 330

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE07 Lab Mean	Sample SE07 Diff from Grand Mean	Sample SE07 CPV	Sample SE08 Lab Mean	Sample SE08 Diff from Grand Mean	Sample SE08 CPV	Instr Code
X6PCHB		9.69	-0.81	-1.23	12.74	-1.05	-1.29	TT
ZGRM23		10.78	0.29	0.44	14.51	0.72	0.89	TH

Summary Statistics	Sample SE07	Sample SE08
Grand Means	10.50 kN/m	13.79 kN/m
Stnd Dev Btwn Labs	0.66 kN/m	0.81 kN/m

Statistics based on 40 of 42 reporting participants.

Comments on Assigned Data Flags for Test #330

3KMBB9 (X) - Data for both samples are low.

FNXPHM (X) - Extreme Data.

Analysis Notes:

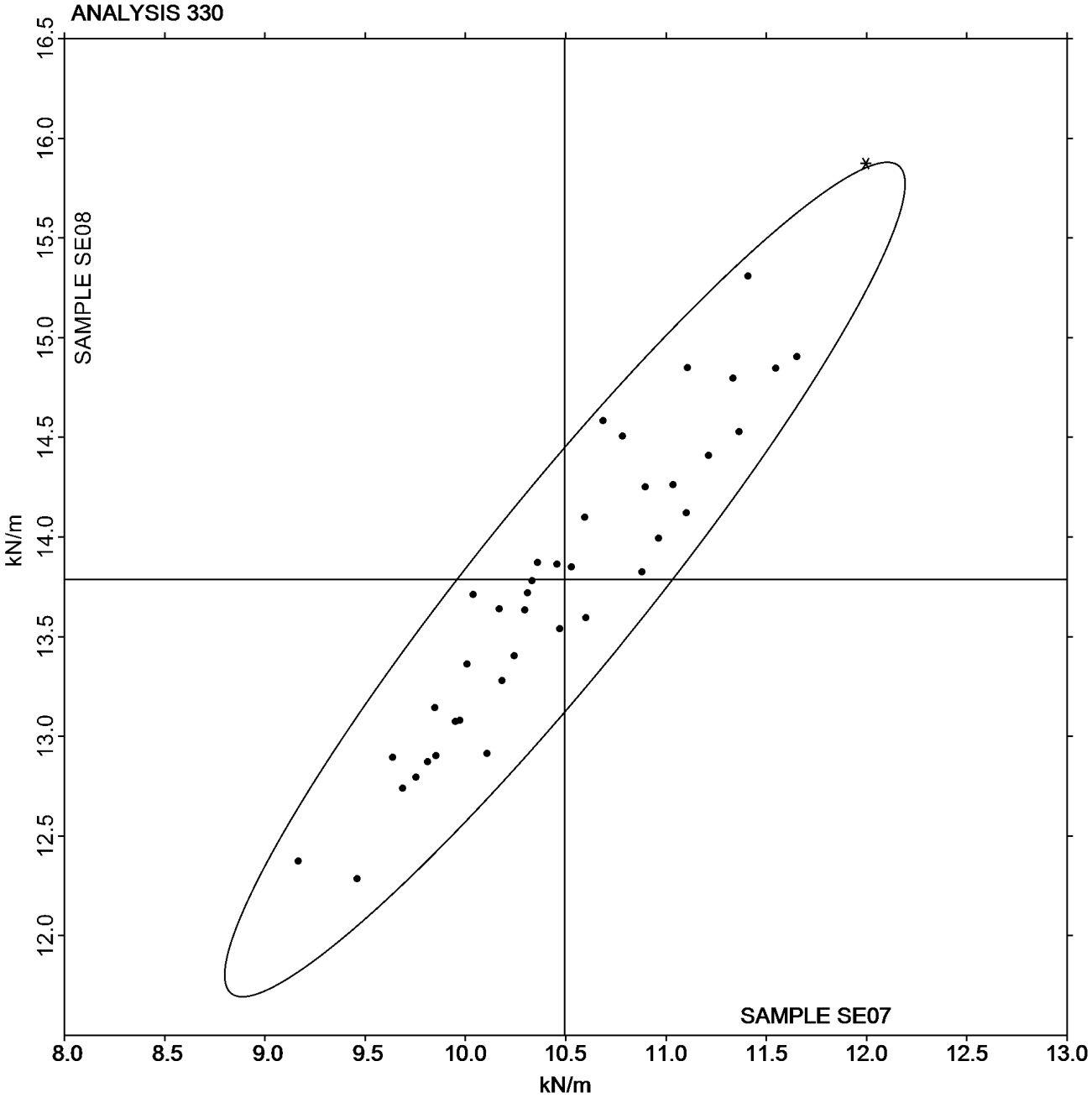
AML43J - Data appears to be transposed between samples. CTS will not correct the data going forward.

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
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 SE07 = 10.496 kN/m

Grand Mean Sample SE08 = 13.787 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE07 Lab Mean	Sample SE07 Diff from Grand Mean	Sample SE07 CPV	Sample SE08 Lab Mean	Sample SE08 Diff from Grand Mean	Sample SE08 CPV	Instr Code
26XL38		132.7	-23.9	-1.65	213.5	-30.2	-1.25	LW
2EZ6Y8		148.2	-8.4	-0.58	238.9	-4.9	-0.20	TR
2NKEJV		178.9	22.3	1.54	263.3	19.5	0.81	LE
2R8RQD		151.3	-5.3	-0.36	240.6	-3.2	-0.13	IR
32TGL4	*	190.8	34.2	2.35	313.3	69.5	2.88	DM
3BFHZT		129.3	-27.3	-1.88	209.1	-34.6	-1.44	LH
3KMBB9		132.0	-24.5	-1.69	196.3	-47.5	-1.97	LE
3V4ZAD		141.9	-14.7	-1.01	233.4	-10.4	-0.43	IM
4C72GK		157.3	0.7	0.05	256.6	12.8	0.53	IM
7XV83D		169.3	12.7	0.87	238.3	-5.5	-0.23	LA
89CCP3		144.7	-11.9	-0.82	239.5	-4.3	-0.18	TB
8HJ9D7		162.3	5.7	0.39	249.4	5.6	0.23	TK
9HW4AX		152.7	-3.8	-0.26	261.3	17.5	0.73	IN
AML43J		147.9	-8.7	-0.60	230.2	-13.5	-0.56	LW
AVZL47		149.2	-7.4	-0.51	228.1	-15.7	-0.65	XX
AYZWY7		163.9	7.3	0.50	255.7	11.9	0.49	TO
BACL8A		153.8	-2.8	-0.19	224.0	-19.8	-0.82	LE
CYP7JX		162.9	6.3	0.43	253.1	9.3	0.38	LA
DV4JKJ		144.0	-12.6	-0.87	232.9	-10.9	-0.45	LE
FDGXWX		154.6	-2.0	-0.14	246.8	3.0	0.13	IF
FNXPHM		141.1	-15.5	-1.07	214.9	-28.9	-1.20	LA
GFKZDM	X	186.0	29.4	2.03	222.9	-20.9	-0.87	LH
HPNPEN		157.2	0.6	0.04	235.0	-8.8	-0.36	TR
HXZQUX		161.1	4.5	0.31	252.2	8.4	0.35	TO
JA9LTU		152.6	-4.0	-0.27	232.9	-10.9	-0.45	LE
K3HZRK		169.0	12.4	0.86	266.8	23.0	0.95	TX
LM4UH8		167.5	10.9	0.75	250.8	7.0	0.29	LC
LY2T9R		176.5	19.9	1.37	279.5	35.8	1.48	TB
NG92Y3		144.6	-12.0	-0.83	237.0	-6.8	-0.28	LE
PCVFQW		165.5	8.9	0.61	246.6	2.8	0.12	LA
QBELKF		157.3	0.7	0.05	232.4	-11.4	-0.47	XX
TMGW68		167.7	11.1	0.77	262.7	18.9	0.78	LE
VJT2JQ		178.8	22.2	1.53	259.4	15.6	0.65	TH
WGW8TZ		147.0	-9.6	-0.66	225.5	-18.3	-0.76	LW
X6PCHB		146.9	-9.6	-0.66	211.8	-32.0	-1.33	TT
ZGRM23		180.1	23.5	1.62	300.5	56.7	2.35	TH

Paper & Paperboard Interlaboratory Testing Program

Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SE07	Sample SE08
Grand Means	156.58 Joules/sq m	243.78 Joules/sq m
Stnd Dev Btwn Labs	14.52 Joules/sq m	24.11 Joules/sq m

Statistics based on 35 of 36 reporting participants.

Comments on Assigned Data Flags for Test #331

GFKZDM (X) - Inconsistent in testing between samples.

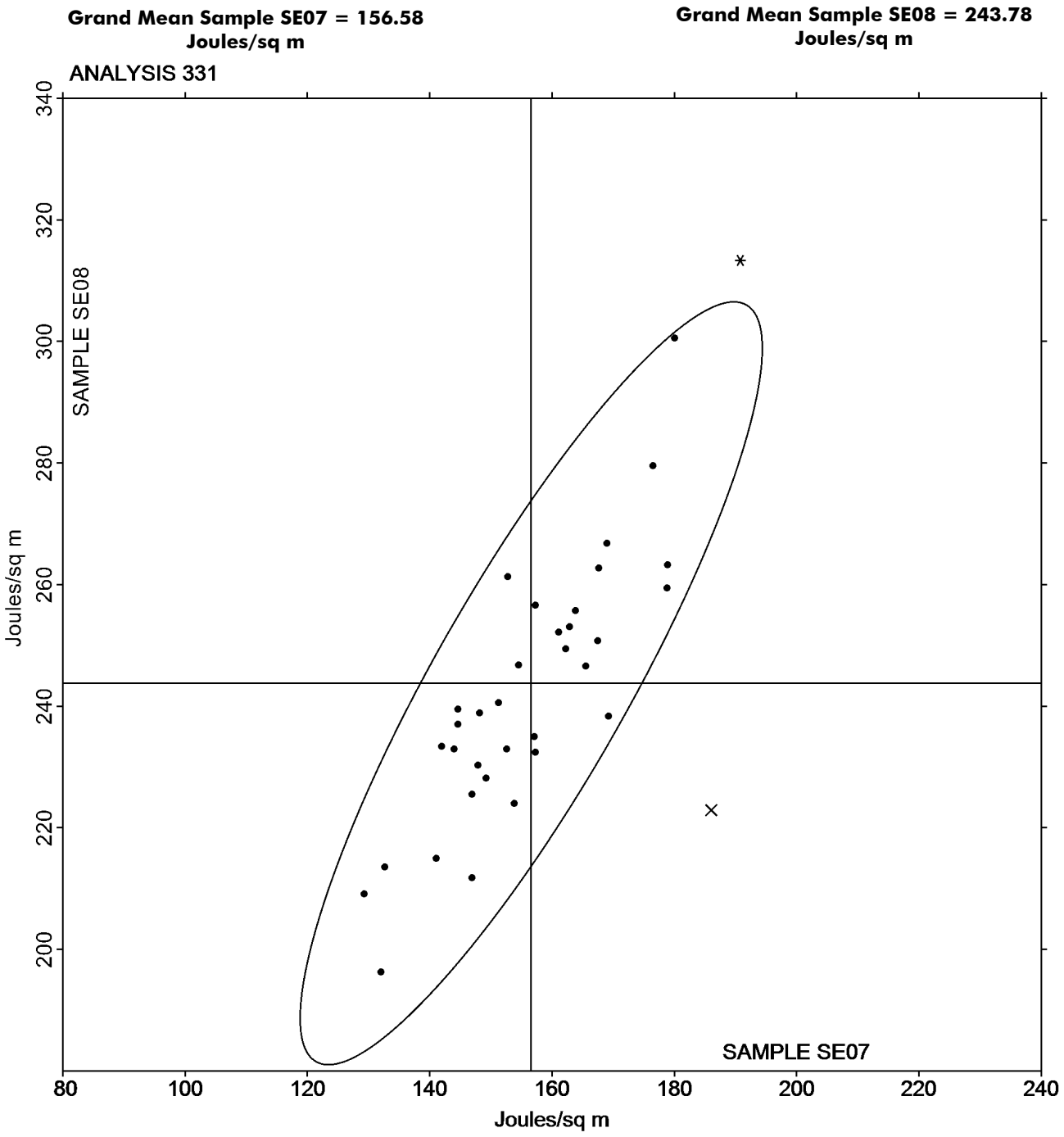
Analysis Notes:

9HW4AX - One determination removed from the Lab Mean of Sample SE08 per Grubb's Test at 1% risk (TAPPI 1205).

AML43J - Data appears to be transposed between samples. CTS will not correct the data 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 SE07 Lab Mean	Sample SE07 Diff from Grand Mean	Sample SE07 CPV	Sample SE08 Lab Mean	Sample SE08 Diff from Grand Mean	Sample SE08 CPV	Instr Code
26XL38		1.974	-0.273	-1.27	2.352	-0.314	-1.20	LW
2EZ6Y8		2.194	-0.053	-0.25	2.638	-0.028	-0.11	TR
2NKEJV		2.198	-0.049	-0.23	2.749	0.083	0.32	LE
2R8RQD		2.192	-0.055	-0.26	2.605	-0.061	-0.23	IR
32TGL4		2.705	0.458	2.12	3.215	0.549	2.11	DM
3BFHZT		2.079	-0.168	-0.78	2.460	-0.206	-0.79	LH
3KMBB9		2.355	0.108	0.50	2.753	0.087	0.33	LE
3V4ZAD		2.411	0.164	0.76	2.939	0.273	1.05	IM
4C72GK		2.416	0.168	0.78	2.984	0.319	1.22	IM
7XV83D		2.078	-0.169	-0.79	2.480	-0.186	-0.71	LA
89CCP3		2.237	-0.011	-0.05	2.795	0.129	0.49	TB
8HJ9D7		2.455	0.208	0.96	2.876	0.210	0.81	TK
9HW4AX		1.927	-0.320	-1.48	2.450	-0.216	-0.83	IN
AHAUEW		2.250	0.003	0.01	2.710	0.044	0.17	ID
AML43J		2.267	0.020	0.09	2.624	-0.042	-0.16	LW
AVZL47		2.383	0.136	0.63	2.796	0.130	0.50	XX
AYZWY7		2.321	0.074	0.34	2.819	0.153	0.59	TO
BACL8A		2.104	-0.143	-0.66	2.323	-0.343	-1.31	LE
CYP7JX		2.042	-0.205	-0.95	2.440	-0.226	-0.87	LA
DV4JKJ		2.108	-0.139	-0.65	2.497	-0.169	-0.65	LE
FDGXWX		2.248	0.001	0.00	2.687	0.021	0.08	IF
FNXPHM	*	1.610	-0.637	-2.95	1.944	-0.722	-2.77	LA
GFKZDM	X	2.476	0.229	1.06	2.529	-0.137	-0.52	LH
HPNPEN		2.299	0.052	0.24	2.687	0.021	0.08	TR
HXZQUX		2.455	0.208	0.96	2.739	0.073	0.28	TO
J8JM94		2.168	-0.079	-0.37	2.664	-0.002	-0.01	TB
JA9LTU		2.191	-0.056	-0.26	2.549	-0.117	-0.45	LE
K3HZRK		2.515	0.268	1.24	2.988	0.322	1.24	TX
LM4UH8		2.224	-0.023	-0.11	2.619	-0.047	-0.18	LC
LY2T9R		2.387	0.140	0.65	2.939	0.273	1.05	TB
NG92Y3		2.067	-0.180	-0.84	2.510	-0.156	-0.60	LE
PCVFQW		2.050	-0.197	-0.92	2.360	-0.306	-1.17	LA
QBELKF		2.244	-0.003	-0.02	2.545	-0.121	-0.46	XX
TMGW68		2.334	0.087	0.40	2.773	0.107	0.41	LE
VJT2JQ		2.600	0.353	1.63	2.948	0.282	1.08	TH
WGW8TZ		2.028	-0.219	-1.02	2.327	-0.339	-1.30	LW
X6PCHB		2.353	0.106	0.49	2.585	-0.081	-0.31	TT
ZGRM23		2.684	0.437	2.02	3.267	0.601	2.31	TH

Paper & Paperboard Interlaboratory Testing Program

Analysis 332
Elongation to Break - Packaging Papers
TAPPI Official Test Method T494

Summary Statistics	Sample SE07	Sample SE08
Grand Means	2.25 Percent	2.67 Percent
Stnd Dev Btwn Labs	0.22 Percent	0.26 Percent

Statistics based on 37 of 38 reporting participants.

Comments on Assigned Data Flags for Test #332

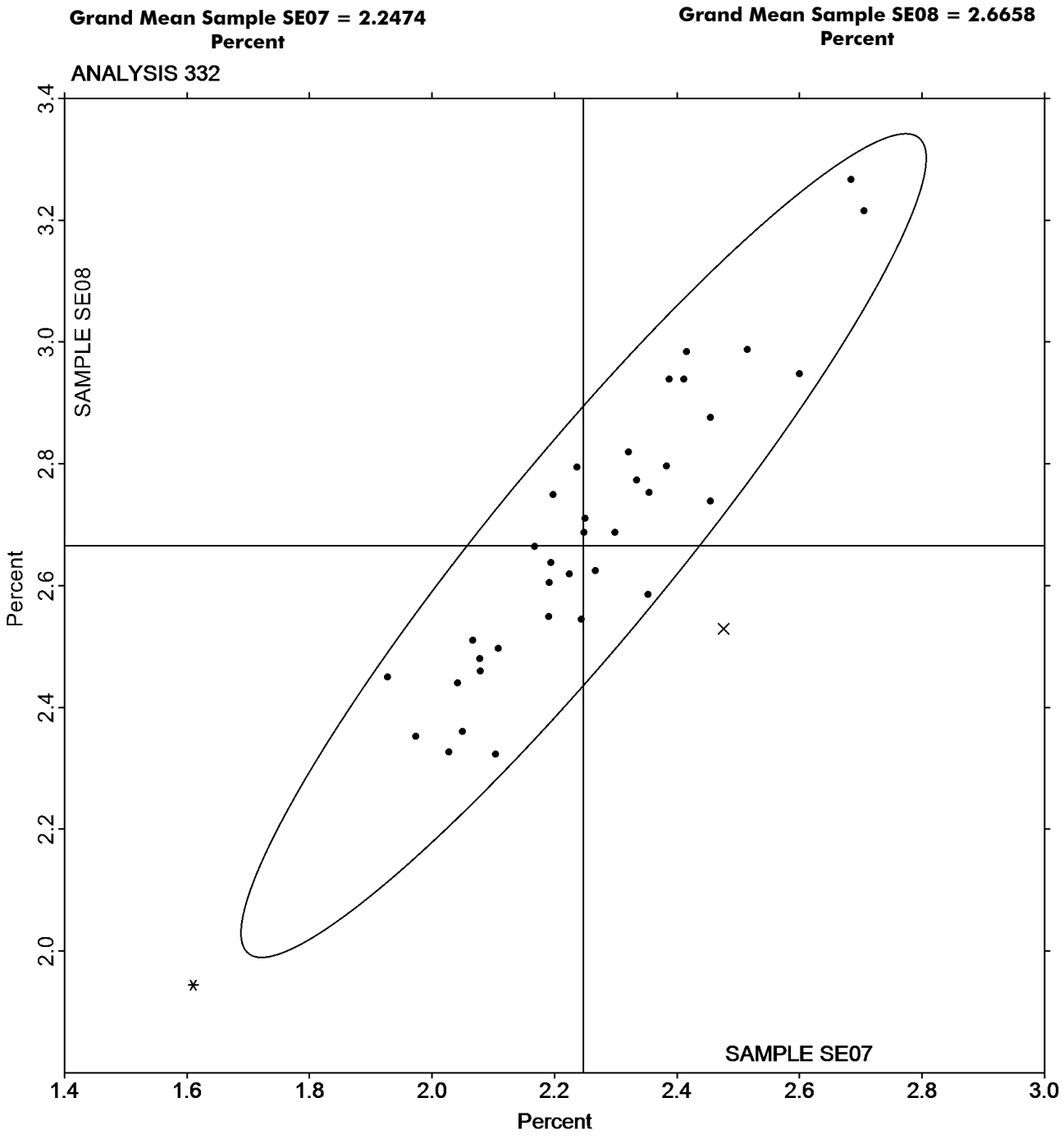
GFKZDM (X) - Inconsistent in testing between samples.

Analysis Notes:

AML43J - Data appears to be transposed between samples. CTS will not correct the data 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

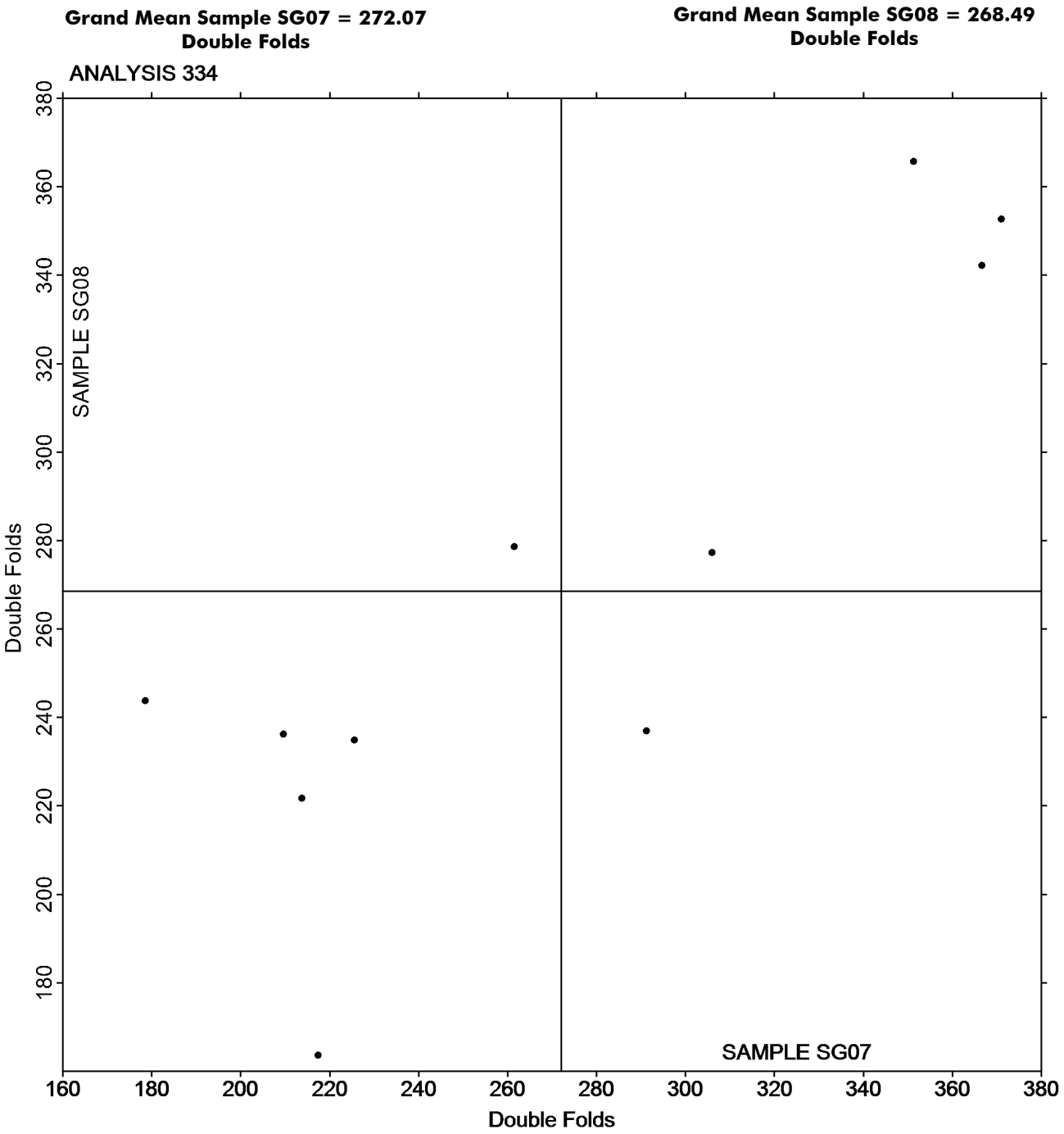
WebCode	Data Flag	Sample SG07 Lab Mean	Sample SG07 Diff from Grand Mean	Sample SG07 CPV	Sample SG08 Lab Mean	Sample SG08 Diff from Grand Mean	Sample SG08 CPV	Instr Code
36P9QU		178.6	-93.5	-1.35	243.8	-24.7	-0.39	MT
4C72GK		306.0	33.9	0.49	277.2	8.7	0.14	MT
6XZ6XH		213.8	-58.3	-0.84	221.7	-46.8	-0.75	MT
9FTARG		261.5	-10.6	-0.15	278.6	10.1	0.16	MT
AML43J		371.1	99.0	1.43	352.6	84.1	1.35	MT
EG38NK		366.7	94.6	1.37	342.2	73.7	1.18	MT
J8JM94		209.6	-62.5	-0.90	236.2	-32.3	-0.52	MT
KJN3RE		225.6	-46.5	-0.67	234.9	-33.6	-0.54	MT
UKURUF		217.4	-54.7	-0.79	163.6	-104.9	-1.68	MT
VQ867J		291.2	19.1	0.28	236.9	-31.6	-0.51	XX
ZGRM23		351.3	79.2	1.15	365.7	97.2	1.55	MT

Summary Statistics	Sample SG07	Sample SG08
Grand Means	272.07 Double Folds	268.49 Double Folds
Stnd Dev Btwn Labs	69.17 Double Folds	62.53 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

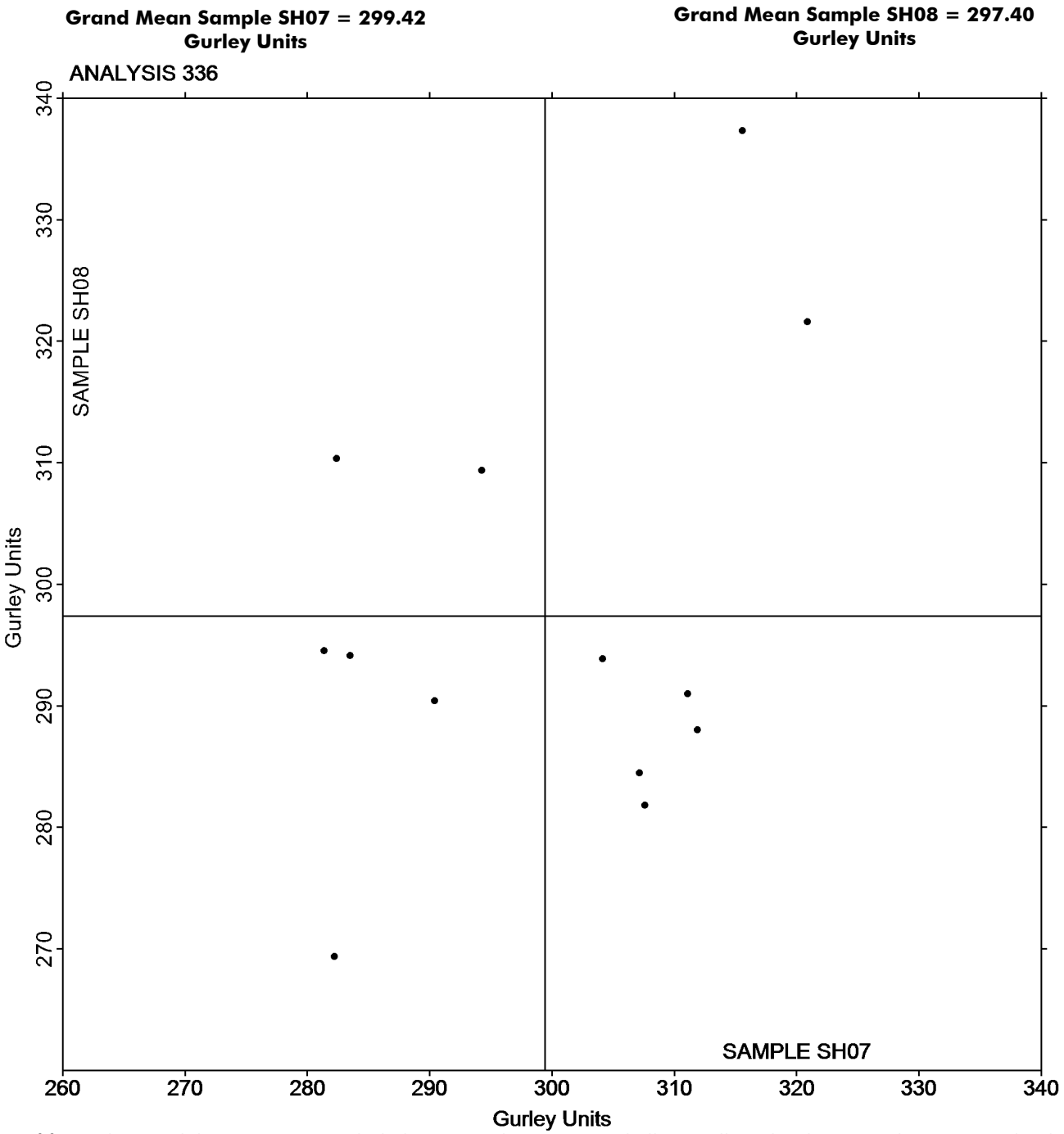
WebCode	Data Flag	Sample SH07 Lab Mean	Sample SH07 Diff from Grand Mean	Sample SH07 CPV	Sample SH08 Lab Mean	Sample SH08 Diff from Grand Mean	Sample SH08 CPV
3AZ22T		311.9	12.5	0.88	288.0	-9.4	-0.52
4C72GK		281.4	-18.0	-1.27	294.5	-2.9	-0.16
6EPDVG		304.1	4.7	0.33	293.8	-3.6	-0.20
6XZ6XH		320.9	21.5	1.51	321.6	24.2	1.34
8H3YHK		290.4	-9.0	-0.63	290.4	-7.0	-0.39
AVZL47		283.5	-15.9	-1.12	294.2	-3.3	-0.18
EG38NK		282.2	-17.2	-1.21	269.4	-28.0	-1.56
EQTNHV		307.6	8.2	0.57	281.8	-15.6	-0.87
J8JM94		311.1	11.7	0.82	291.0	-6.4	-0.36
JMU2WT		282.4	-17.0	-1.20	310.4	13.0	0.72
PCW7ZK	X	140.5	-158.9	-11.15	154.0	-143.4	-7.96
QEXTTF		307.1	7.7	0.54	284.5	-12.9	-0.72
QTXB4M		315.6	16.1	1.13	337.3	39.9	2.22
UKURUF		294.3	-5.2	-0.36	309.4	12.0	0.66

Summary Statistics	Sample SH07	Sample SH08
Grand Means	299.42 Gurley Units	297.40 Gurley Units
Stnd Dev Btwn Labs	14.25 Gurley Units	18.02 Gurley Units

Statistics based on 13 of 14 reporting participants.

Comments on Assigned Data Flags for Test #336

PCW7ZK (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 SJ07 Lab Mean	Sample SJ07 Diff from Grand Mean	Sample SJ07 CPV	Sample SJ08 Lab Mean	Sample SJ08 Diff from Grand Mean	Sample SJ08 CPV
3AZ22T		4.185	0.007	0.01	4.257	0.046	0.08
4C72GK		3.568	-0.610	-0.94	3.548	-0.663	-1.13
9HW4AX		5.070	0.892	1.37	4.760	0.549	0.93
AM7KJM		5.315	1.137	1.74	5.497	1.286	2.18
E2QQJ4		3.861	-0.317	-0.49	3.978	-0.233	-0.40
EYX3VG		3.044	-1.134	-1.74	3.275	-0.936	-1.59
JMU2WT		4.428	0.250	0.38	4.257	0.046	0.08
NG92Y3		3.640	-0.538	-0.83	4.330	0.119	0.20
QEXTTF		4.193	0.015	0.02	3.920	-0.291	-0.49
RB9RJL		4.335	0.157	0.24	4.393	0.182	0.31
Y2J96E		4.323	0.145	0.22	4.110	-0.101	-0.17

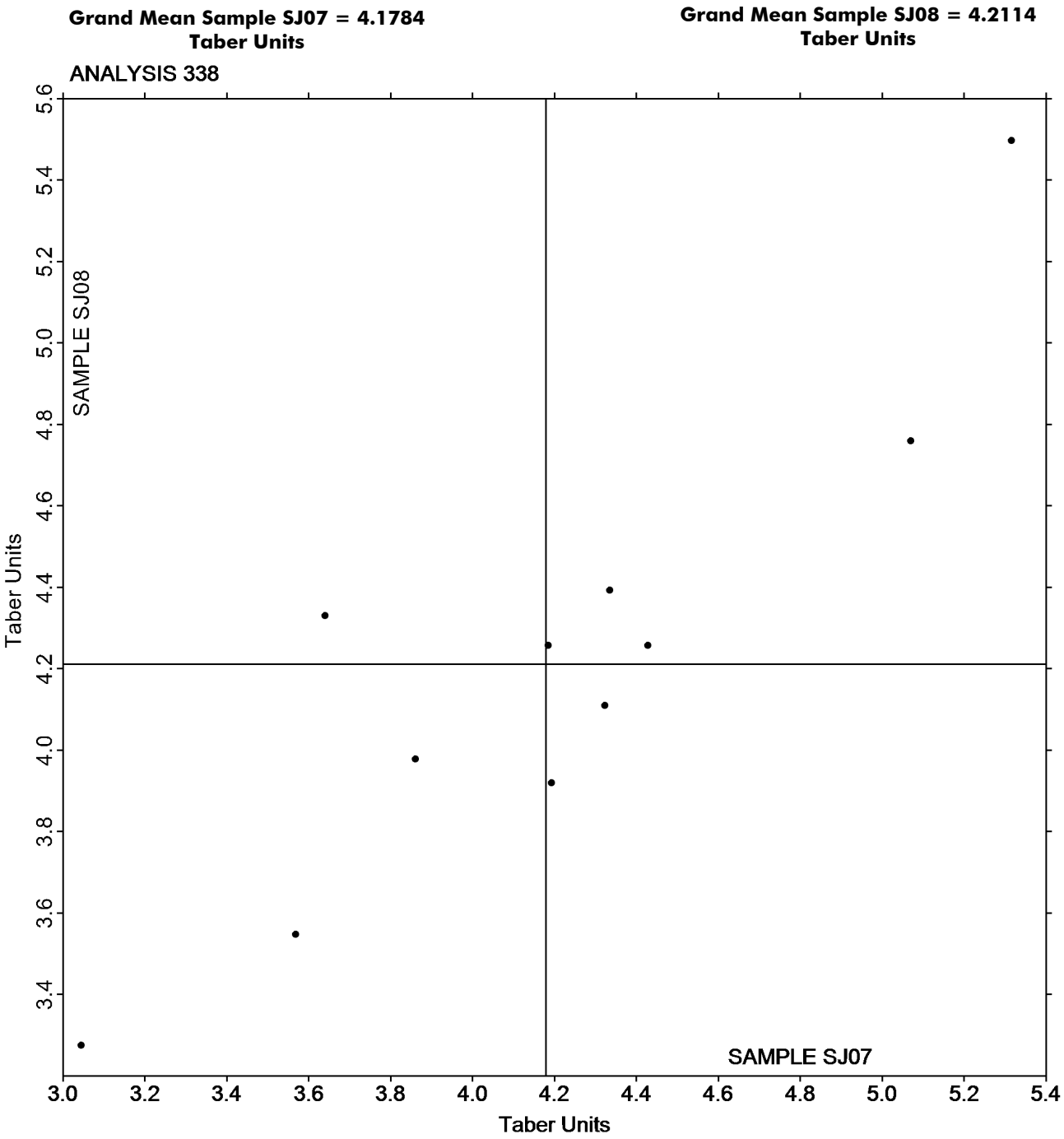
Summary Statistics	Sample SJ07	Sample SJ08
Grand Means	4.18 Taber Units	4.21 Taber Units
Stnd Dev Btwn Labs	0.65 Taber Units	0.59 Taber Units

Statistics based on 11 of 11 reporting participants.

Analysis Notes:

E2QQJ4 - Data appear to be reported as g-cm, not mN-m as indicated on data entry form. CTS will not correct the Units going forward.

EYX3VG - Data appear to be reported as g-cm, not mN-m as indicated on data entry form. CTS will not correct the Units 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

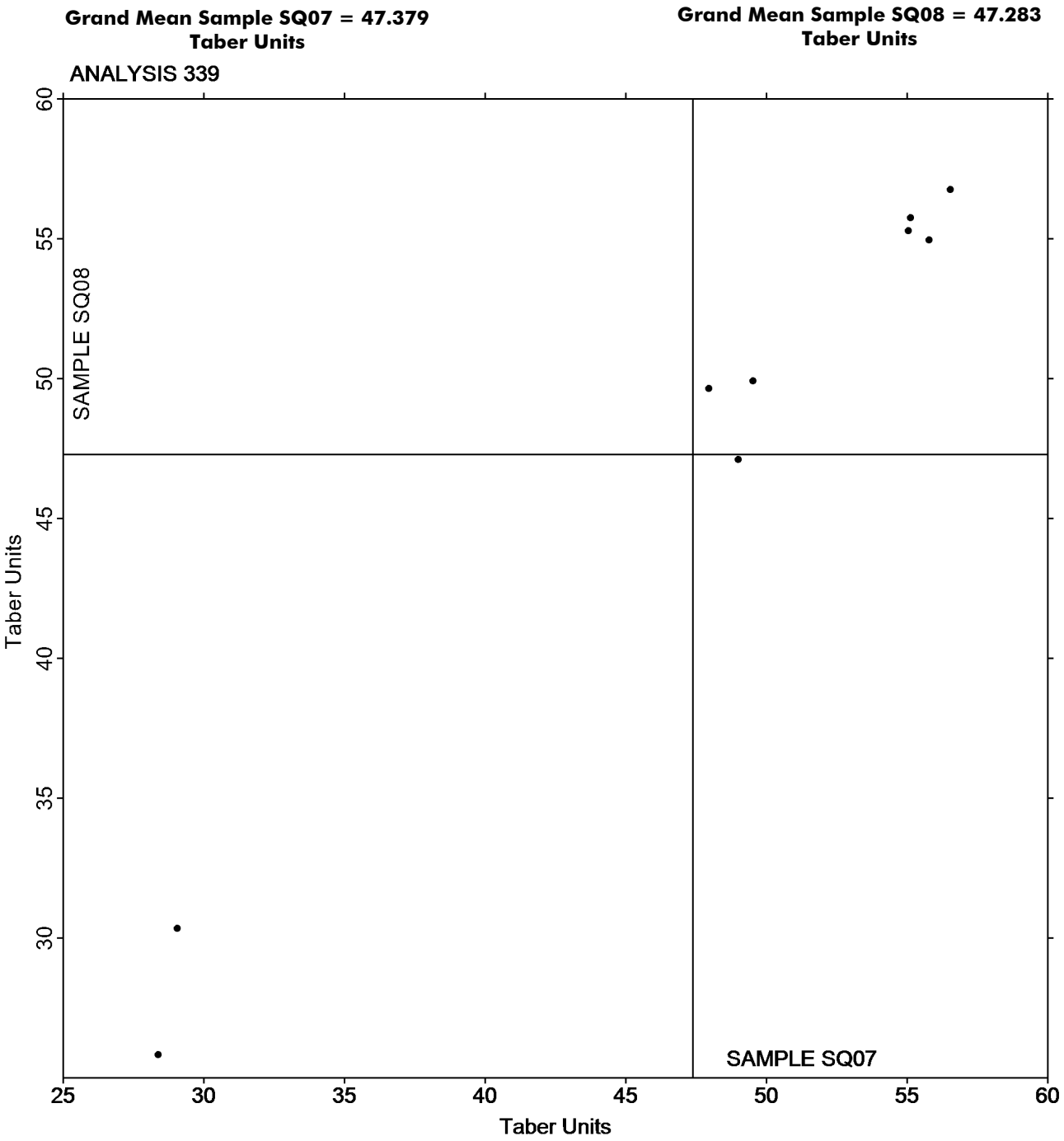
Bending Resistance, Taber Type - 10 to 100 Taber Units

TAPPI Official Test Method T489

WebCode	Data Flag	Sample SQ07 Lab Mean	Sample SQ07 Diff from Grand Mean	Sample SQ07 CPV	Sample SQ08 Lab Mean	Sample SQ08 Diff from Grand Mean	Sample SQ08 CPV
26XL38		56.55	9.17	0.83	56.75	9.47	0.83
2KJF4V		29.06	-18.32	-1.66	30.34	-16.95	-1.48
2ZDXZL		47.95	0.57	0.05	49.65	2.37	0.21
3AZ22T		49.52	2.14	0.19	49.91	2.63	0.23
AML43J		49.01	1.63	0.15	47.10	-0.18	-0.02
BGC8WP		55.78	8.40	0.76	54.95	7.67	0.67
EG38NK		55.04	7.66	0.69	55.28	8.00	0.70
LY2T9R		28.38	-19.00	-1.72	25.83	-21.45	-1.88
TMGW68		55.12	7.74	0.70	55.74	8.46	0.74

Summary Statistics	Sample SQ07	Sample SQ08
Grand Means	47.38 Taber Units	47.28 Taber Units
Stnd Dev Btwn Labs	11.05 Taber Units	11.42 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

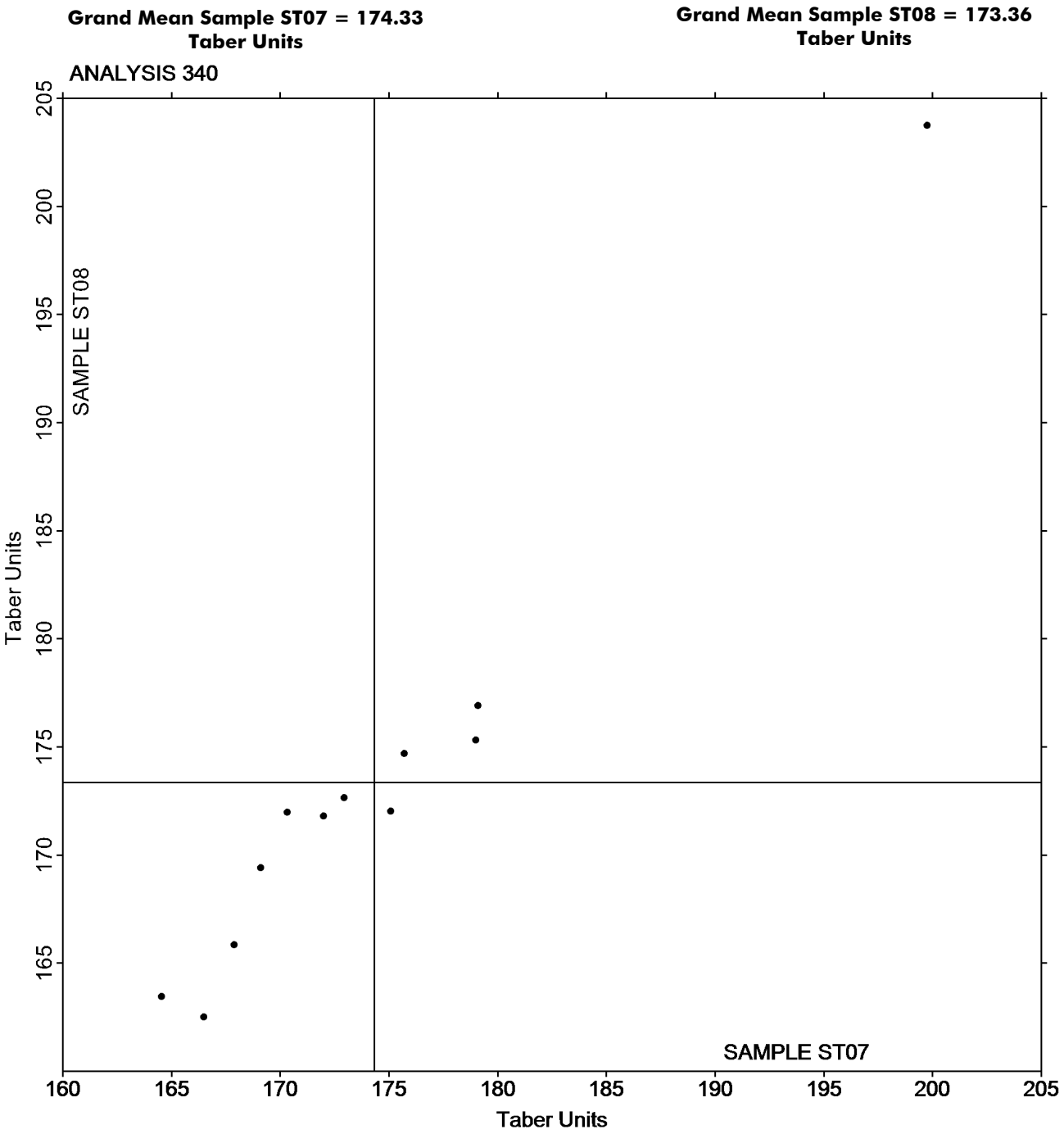
		Sample ST07			Sample ST08		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3V4Y78		179.0	4.7	0.50	175.3	1.9	0.18
972QE8	X	7.2	-167.2	-18.06	6.1	-167.2	-15.77
AML43J		167.9	-6.4	-0.70	165.9	-7.5	-0.71
AVZL47		175.1	0.8	0.08	172.0	-1.3	-0.13
AYZWVZ		199.8	25.4	2.75	203.8	30.4	2.87
EG38NK		170.3	-4.0	-0.43	172.0	-1.4	-0.13
F89LVR		179.1	4.8	0.52	176.9	3.5	0.33
GX3YJK		169.1	-5.2	-0.57	169.4	-4.0	-0.37
HPNPEN		164.6	-9.8	-1.06	163.5	-9.9	-0.93
NPMQXB		172.0	-2.3	-0.25	171.8	-1.6	-0.15
RGEHNC		175.7	1.4	0.15	174.7	1.3	0.13
ZGRM23		166.5	-7.8	-0.85	162.5	-10.9	-1.02
ZPNKMJ		173.0	-1.4	-0.15	172.7	-0.7	-0.07

Summary Statistics	Sample ST07	Sample ST08
Grand Means	174.33 Taber Units	173.36 Taber Units
Stnd Dev Btwn Labs	9.26 Taber Units	10.60 Taber Units

Statistics based on 12 of 13 reporting participants.

Comments on Assigned Data Flags for Test #340

972QE8 (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 343
Z-Direction Tensile
TAPPI Official Test Method T541

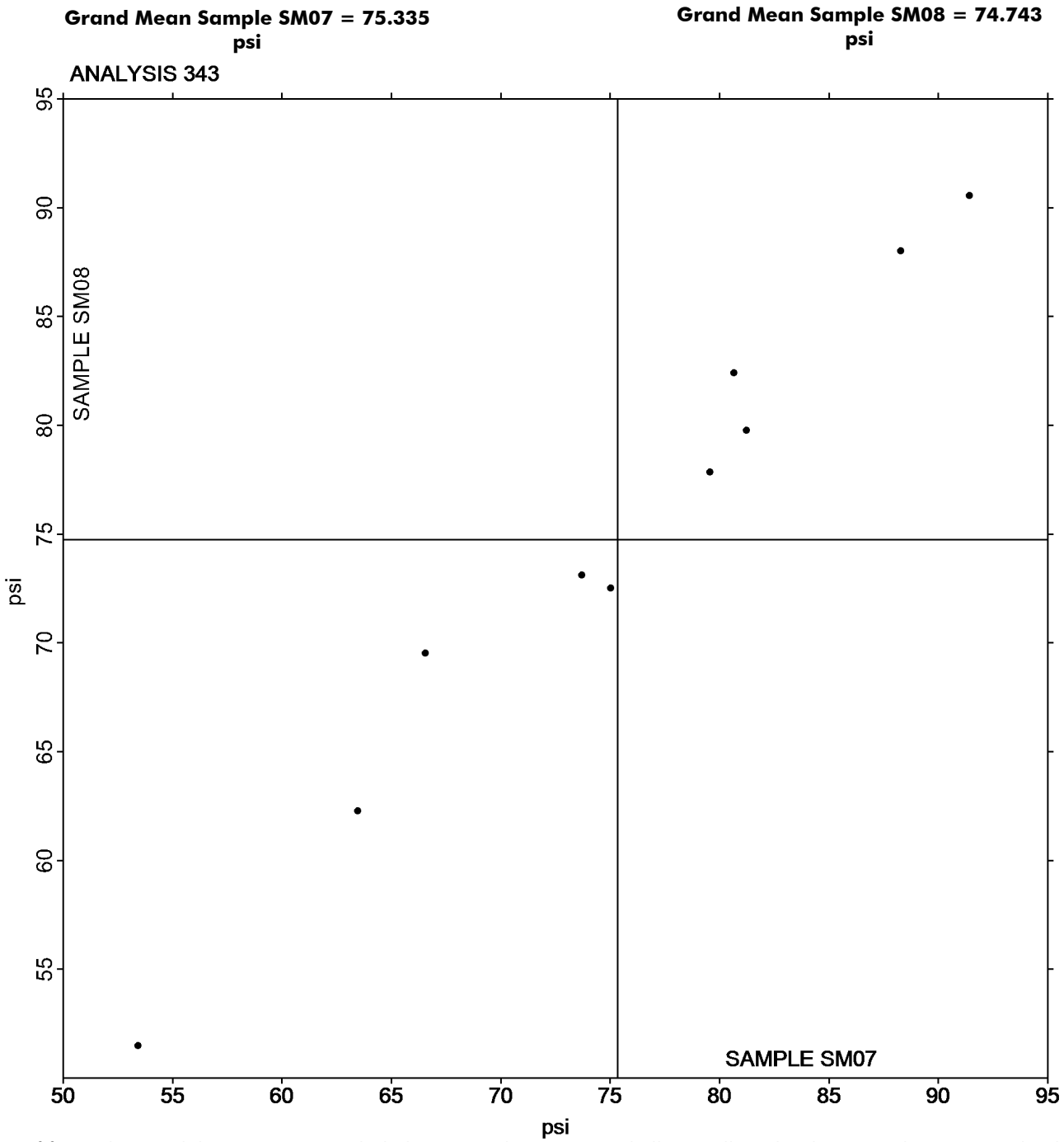
WebCode	Data Flag	Sample SM07 Lab Mean	Sample SM07 Diff from Grand Mean	Sample SM07 CPV	Sample SM08 Lab Mean	Sample SM08 Diff from Grand Mean	Sample SM08 CPV	Instr Code
4C72GK		66.56	-8.78	-0.76	69.52	-5.22	-0.44	CD
972QE8		53.42	-21.91	-1.89	51.49	-23.26	-1.97	LW
AML43J		88.28	12.94	1.12	88.00	13.26	1.12	LW
BGC8WP		81.24	5.90	0.51	79.76	5.02	0.43	CD
LY2T9R		80.66	5.32	0.46	82.40	7.66	0.65	TA
QUVLYQ		75.02	-0.32	-0.03	72.52	-2.22	-0.19	DX
T3VZQ3		63.48	-11.86	-1.02	62.26	-12.48	-1.06	DX
TMGW68		79.56	4.22	0.36	77.84	3.10	0.26	CD
ZGRM23		91.42	16.08	1.39	90.54	15.80	1.34	LW
ZVAEL3		73.71	-1.63	-0.14	73.10	-1.64	-0.14	LW

Summary Statistics	Sample SM07	Sample SM08
Grand Means	75.34 psi	74.74 psi
Stnd Dev Btwn Labs	11.58 psi	11.79 psi

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

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



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

Paper & Paperboard Interlaboratory Testing Program

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

WebCode	Data Flag	Sample SZ07 Lab Mean	Sample SZ07 Diff from Grand Mean	Sample SZ07 CPV	Sample SZ08 Lab Mean	Sample SZ08 Diff from Grand Mean	Sample SZ08 CPV	Instr Code
32PWUU		51.80	0.35	0.09	50.00	-1.43	-0.32	DT
3LGYU4		59.50	8.05	2.05	60.46	9.03	2.02	LW
3V4Y78		47.80	-3.65	-0.93	50.80	-0.63	-0.14	CA
3V4ZAD		49.00	-2.45	-0.62	47.40	-4.03	-0.90	CA
89CCP3		54.36	2.91	0.74	54.56	3.13	0.70	DP
93G4ET		52.00	0.55	0.14	53.20	1.77	0.40	CD
AML43J		45.04	-6.41	-1.63	44.00	-7.43	-1.66	LW
AVZL47		50.56	-0.89	-0.23	48.44	-2.99	-0.67	CA
CYP7JX		49.54	-1.91	-0.49	48.66	-2.77	-0.62	TA
EG38NK		51.30	-0.15	-0.04	50.12	-1.31	-0.29	CA
F89LVR		46.84	-4.61	-1.17	47.16	-4.27	-0.95	CD
GX3YJK		54.60	3.15	0.80	53.20	1.77	0.40	CD
HB3ABP		58.16	6.71	1.71	56.02	4.59	1.02	LW
K3HZRK	X	22.90	-28.55	-7.26	21.40	-30.03	-6.70	XX
L6NF6H		51.78	0.33	0.08	53.96	2.53	0.56	CH
NPMQXB		50.40	-1.05	-0.27	50.80	-0.63	-0.14	TA
RDZQXJ		45.92	-5.53	-1.41	44.38	-7.05	-1.57	TA
RGEHNC		50.44	-1.01	-0.26	50.44	-0.99	-0.22	LW
W76AEG		51.36	-0.09	-0.02	54.00	2.57	0.57	LW
Y9XA79		58.18	6.73	1.71	60.74	9.31	2.08	LW
ZPNKMJ		50.50	-0.95	-0.24	50.26	-1.17	-0.26	TA

Summary Statistics	Sample SZ07	Sample SZ08
Grand Means	51.45 psi	51.43 psi
Stnd Dev Btwn Labs	3.93 psi	4.48 psi

Statistics based on 20 of 21 reporting participants.

Comments on Assigned Data Flags for Test #345

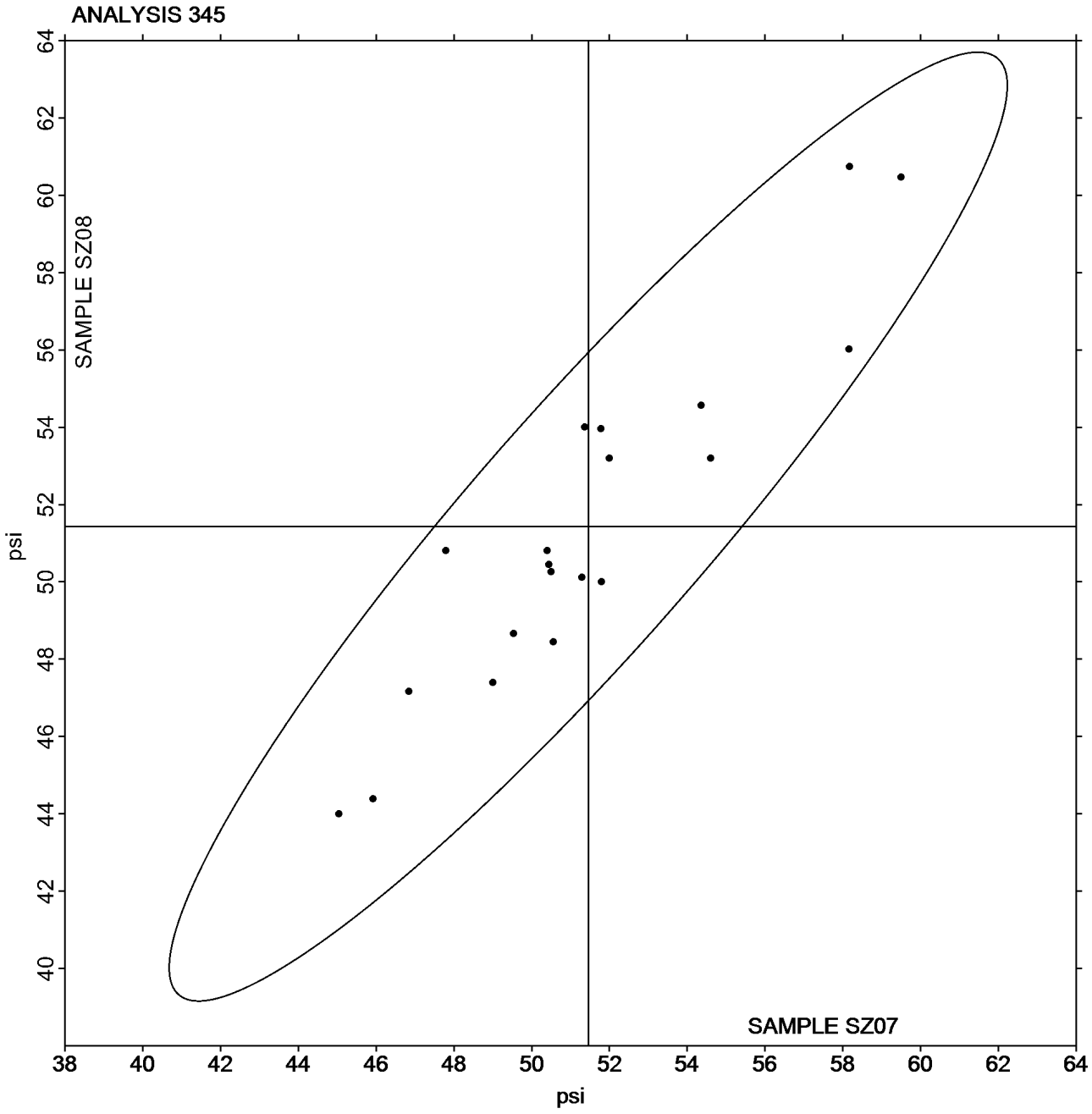
K3HZRK (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

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

Grand Mean Sample SZ07 = 51.454 psi

Grand Mean Sample SZ08 = 51.430 psi



Paper & Paperboard Interlaboratory Testing Program

Analysis 348

Internal Bond Strength - Modified Scott Mechanics

TAPPI Provisional Test Method T569

WebCode	Data Flag	Sample SN07 Lab Mean	Sample SN07 Diff from Grand Mean	Sample SN07 CPV	Sample SN08 Lab Mean	Sample SN08 Diff from Grand Mean	Sample SN08 CPV	Instr Code
3V4Y78		160.9	4.6	0.27	153.2	-0.8	-0.05	XX
6EPDVG		189.4	33.1	1.94	190.8	36.8	2.02	HY
6XZ6XH		146.4	-9.9	-0.58	133.0	-21.0	-1.15	HY
AML43J		155.2	-1.1	-0.06	153.4	-0.6	-0.03	HY
AVZL47		141.4	-14.9	-0.87	146.6	-7.4	-0.40	HZ
AYZWY7		157.8	1.5	0.09	158.2	4.2	0.23	HY
BGC8WP		163.4	7.1	0.42	160.6	6.6	0.36	HY
EQTNHV		157.0	0.7	0.04	152.8	-1.2	-0.06	HY
JMU2WT		136.0	-20.3	-1.18	137.3	-16.7	-0.91	KR
KNHYEJ		157.6	1.3	0.08	156.2	2.2	0.12	HZ
LV2GCR		155.8	-0.5	-0.03	150.6	-3.4	-0.19	HY
LY2T9R		181.4	25.1	1.47	185.4	31.4	1.72	HZ
TENGHN		166.0	9.8	0.57	165.3	11.3	0.62	HX
TMGW68		157.8	1.5	0.09	148.6	-5.4	-0.30	HY
ZGRM23		118.0	-38.3	-2.24	117.8	-36.2	-1.98	HZ

Summary Statistics	Sample SN07	Sample SN08
Grand Means	156.27 1000th ft-lbs	153.98 1000th ft-lbs
Stnd Dev Btwn Labs	17.11 1000th ft-lbs	18.25 1000th ft-lbs

Statistics based on 15 of 15 reporting participants.

Key to Instrument Codes Reported by Participants

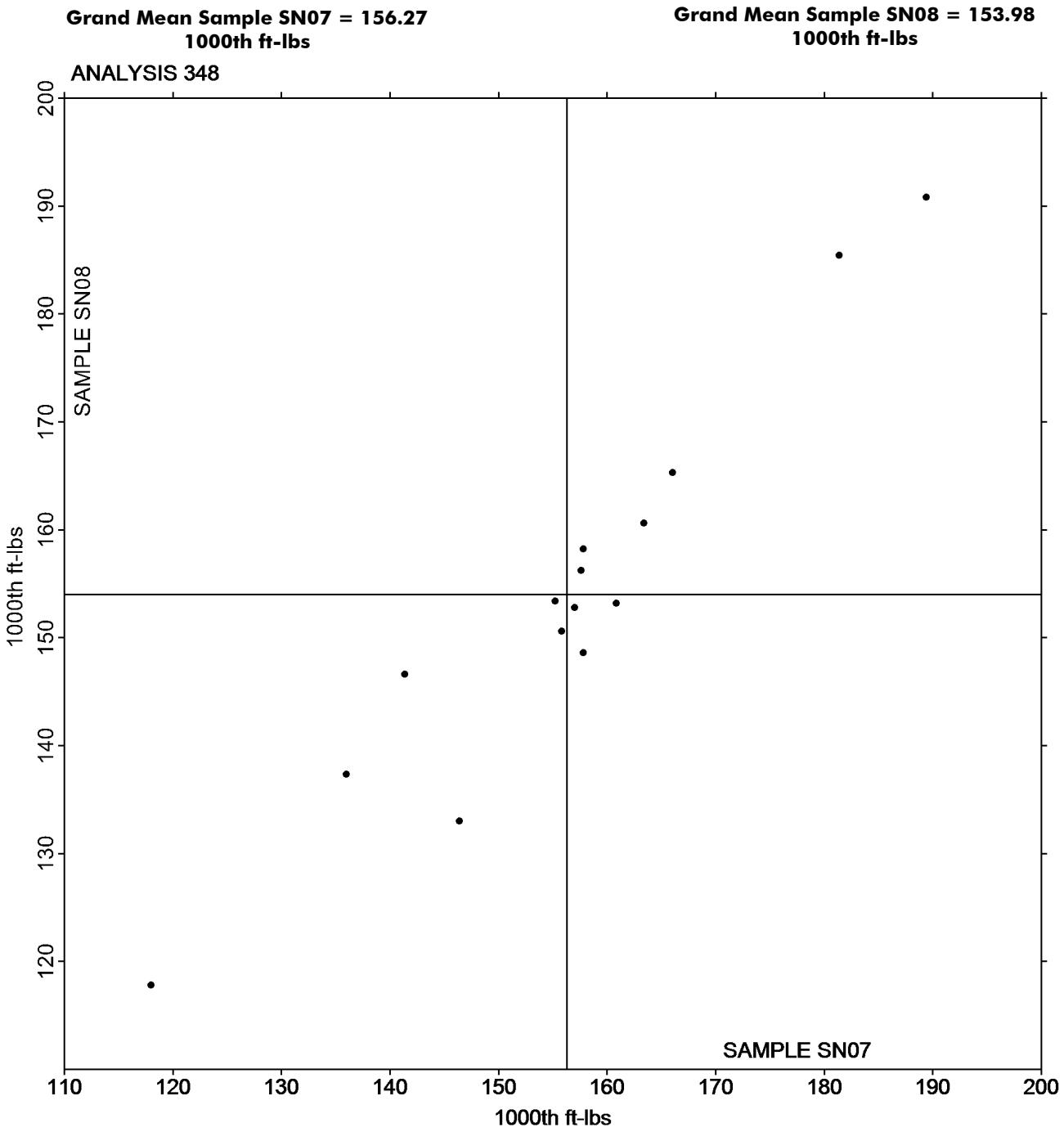
HX Huygen Internal Scott Bond Tester

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 SP07 Lab Mean	Sample SP07 Diff from Grand Mean	Sample SP07 CPV	Sample SP08 Lab Mean	Sample SP08 Diff from Grand Mean	Sample SP08 CPV	Instr Code
26XL38		181.1	38.9	1.70	180.5	36.3	1.42	XX
3AZ22T		148.2	6.0	0.26	146.9	2.6	0.10	SC
7XV83D		133.6	-8.6	-0.38	131.2	-13.1	-0.51	TM
89CCP3		109.0	-33.3	-1.45	107.1	-37.1	-1.45	TM
972QE8		103.9	-38.3	-1.67	103.9	-40.4	-1.58	TM
BACL8A		130.2	-12.0	-0.53	130.8	-13.5	-0.53	TM
E2QQJ4		144.8	2.6	0.11	145.6	1.3	0.05	SC
FC2LAM		132.2	-10.1	-0.44	132.2	-12.1	-0.47	SC
GFKZDM		136.5	-5.7	-0.25	138.0	-6.3	-0.24	TM
P42BWV		150.8	8.6	0.37	162.8	18.5	0.72	SC
PCW7ZK		137.2	-5.0	-0.22	139.4	-4.9	-0.19	TM
QEXTTF		164.5	22.3	0.97	166.6	22.4	0.87	TM
QUVLYQ		177.0	34.8	1.52	190.4	46.1	1.80	XX

Summary Statistics	Sample SP07	Sample SP08
Grand Means	142.22 1000th ft-lbs	144.26 1000th ft-lbs
Stnd Dev Btwn Labs	22.88 1000th ft-lbs	25.61 1000th ft-lbs

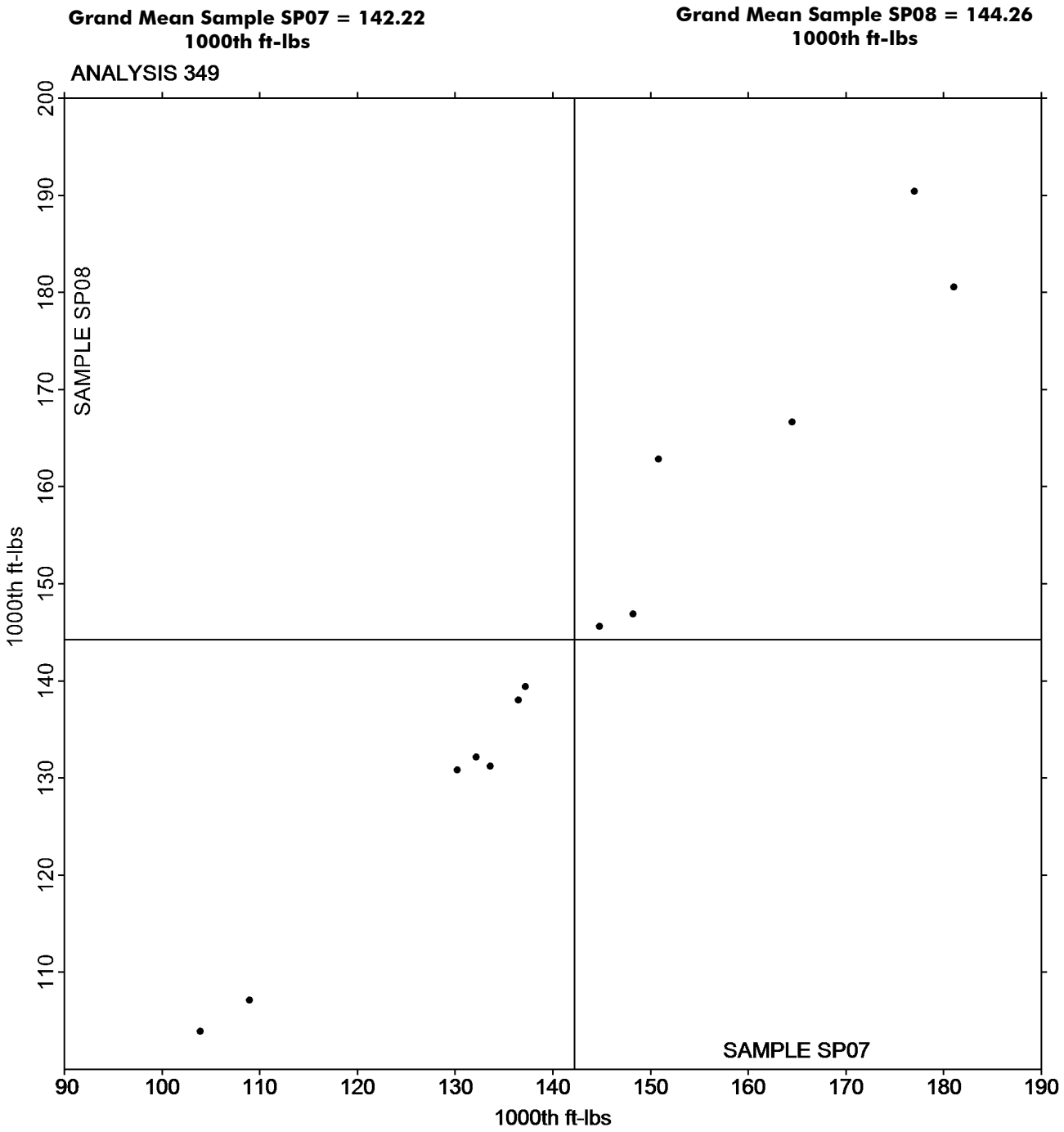
Statistics based on 13 of 13 reporting participants.

Key to Instrument Codes Reported by Participants

SC Scott Internal Bond Tester (Manual)

TM TMI Monitor/Internal Bond Tester

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-

