Paper & Paperboard Interlaboratory Testing Program

Summary Report #281S - March 2016

Introduction to the Paper & Paperboard Interlaboratory Program

Explanation of Tables and Definitions of Terms

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305	Bursting Strength - Printing Papers
310	Bursting Strength - Packaging Papers
311	Tearing Strength - Newsprint
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
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331	Tensile Energy Absorption - Packaging Papers
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334	Folding Endurance (MIT) - Double Folds
336	Bending Resistance, Gurley Type
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The CTS Paper & Paperboard Interlaboratory Fiberboard Program

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

About CTS

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

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

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

WebCode　　　　　Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Paper Report published on the CTS web site. The WebCode for each analysis can be found in the Performance Analysis Report mailed to each participant. In addition, the WebCodes can be found on the data sheets.

Lab Mean　　　　　The average of the values obtained for each sample by the participant.

Grand Mean　　　　The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.

Difference from
Grand Mean　　　　The difference of the LAB MEAN from the GRAND MEAN.

Between-Lab　　　　An indication of the precision of measurement between the laboratories.
Standard Deviation　The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).

Comparative　　　　An indication of how well a laboratory's results agree with the other
Performance Value　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

Report #281S

Analysis 305
Bursting Strength - Printing Papers
TAPPI Official Test Method T403

March 2016

		Sample SA29				Sample SA30		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV		Lab Mean	Diff from Grand Mean	CPV
3HL3KP		32.95	6.79	2.19		26.55	5.50	1.96
4ED94W		24.96	-1.20	-0.39		19.55	-1.50	-0.53
4EVF3M	*	29.90	3.74	1.20		20.60	-0.45	-0.16
4GLCZT		23.33	-2.83	-0.91		18.75	-2.30	-0.82
4N3UAU		27.37	1.21	0.39		22.92	1.88	0.67
6ZQFRV		25.66	-0.51	-0.16		19.83	-1.22	-0.44
9MCFUR		26.12	-0.04	-0.01		21.27	0.22	0.08
ATV8BK		22.85	-3.32	-1.07		17.12	-3.93	-1.40
CBQ8LG		25.51	-0.65	-0.21		20.68	-0.37	-0.13
CDU7VN		25.55	-0.61	-0.20		19.45	-1.60	-0.57
DRU4HK		27.50	1.34	0.43		20.10	-0.95	-0.34
FA366H		28.32	2.15	0.69		24.82	3.78	1.35
FY3HDL		22.55	-3.61	-1.16		19.45	-1.60	-0.57
GQ722M		25.37	-0.79	-0.26		20.70	-0.35	-0.12
K2WWRD		19.90	-6.26	-2.02		14.40	-6.65	-2.37
KFWVFA		29.17	3.01	0.97		22.07	1.02	0.37
KW23UC		27.09	0.93	0.30		22.47	1.42	0.51
KZ2EPC		23.35	-2.82	-0.91		19.51	-1.53	-0.55
LGMGL7		24.28	-1.88	-0.61		21.77	0.72	0.26
NB6VP6		23.64	-2.52	-0.81		19.87	-1.18	-0.42
Q3483X		25.10	-1.06	-0.34		19.80	-1.25	-0.44
QAMNE8		24.59	-1.58	-0.51		19.76	-1.29	-0.46
QZ2AR6		29.13	2.97	0.96		25.20	4.15	1.48
RBHF4Y		23.70	-2.46	-0.79		18.10	-2.95	-1.05
RK4UQ2		28.01	1.85	0.60		23.36	2.31	0.83
RU9RQX		28.27	2.10	0.68		23.63	2.58	0.92
W9ULDY		25.49	-0.67	-0.22		20.89	-0.16	-0.06
X2NFRT	*	35.24	9.08	2.93		28.72	7.67	2.74
X7LVMV		24.50	-1.67	-0.54		20.00	-1.05	-0.37
X8C4MY		27.65	1.49	0.48		21.87	0.82	0.29
ZRWGET		24.05	-2.11	-0.68		19.25	-1.80	-0.64

Summary Statistics

	Sample SA29	**Sample SA30**
Grand Means	26.165 psi	21.047 psi
SD Btwn Labs	3.103 psi	2.802 psi

Statistics based on 31 of 31 reporting participants

Paper & Paperboard Interlaboratory Testing Program
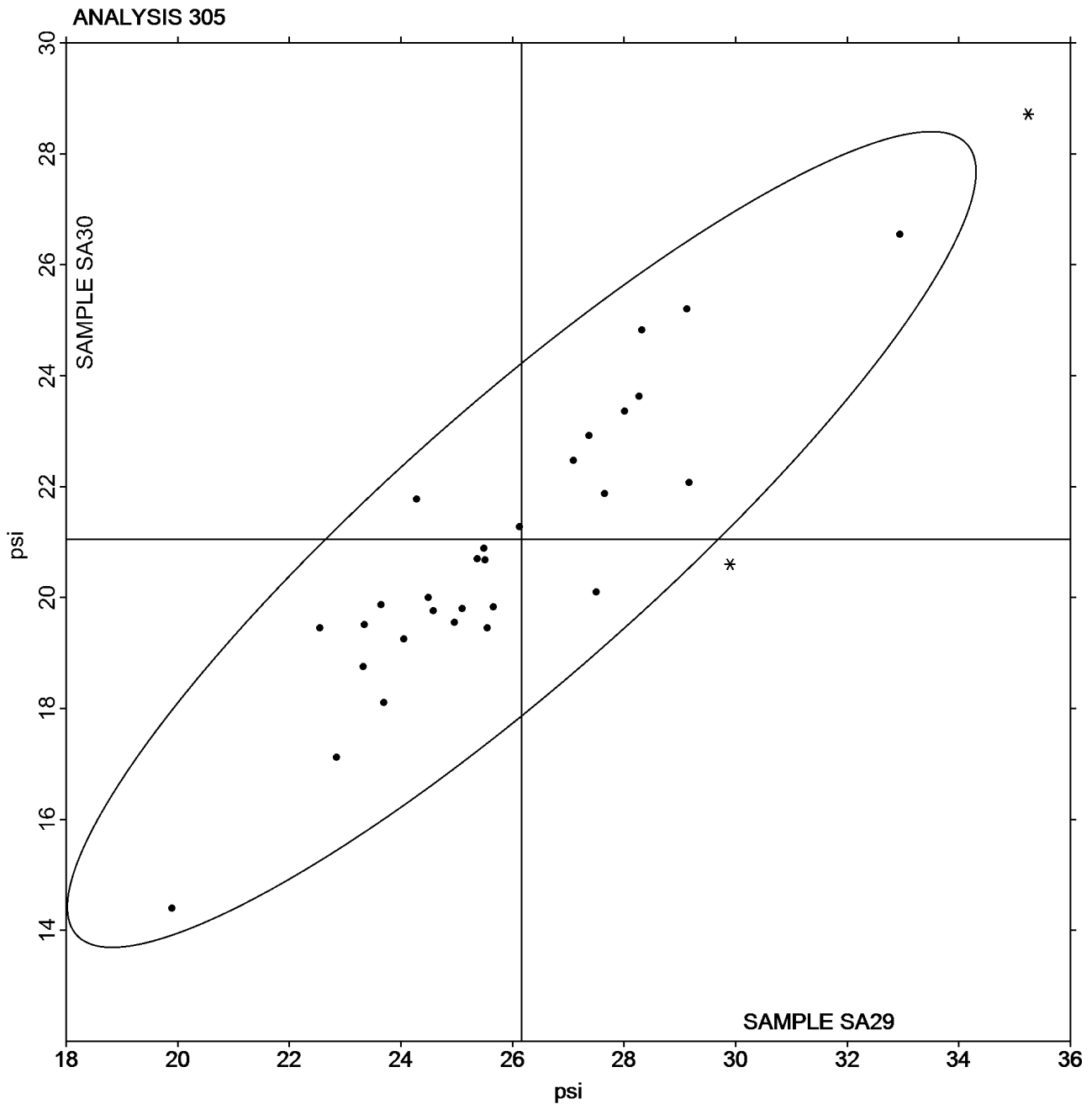**Analysis 305**
Bursting Strength - Printing Papers
TAPPI Official Test Method T403

Report #281S
March 2016

Grand Mean Sample **SA29** = 26.165 psi

Grand Mean Sample **SA30** = 21.047 psi

ANALYSIS 305

Paper & Paperboard Interlaboratory Testing Program
Analysis 310
Bursting Strength - Packaging Papers
TAPPI Official Test Method T403

Report #281S

March 2016

WebCode	Data Flag	Sample SB29 Lab Mean	Diff from Grand Mean	CPV	Sample SB30 Lab Mean	Diff from Grand Mean	CPV
4N3UAU		86.96	0.05	0.01	90.54	1.15	0.26
6J6TKK		83.30	-3.61	-0.68	86.95	-2.44	-0.56
82B8RQ		92.80	5.89	1.11	92.80	3.41	0.77
86BHNQ		91.61	4.69	0.88	92.93	3.53	0.80
AKLJXL		92.65	5.74	1.08	94.91	5.52	1.25
B6N4WH		77.00	-9.91	-1.86	78.23	-11.17	-2.54
CP8FCM		86.75	-0.16	-0.03	87.90	-1.49	-0.34
EQUTRB		83.90	-3.01	-0.57	88.11	-1.28	-0.29
FED98E		84.35	-2.56	-0.48	87.56	-1.83	-0.42
FJTQBG		89.59	2.68	0.50	93.49	4.10	0.93
G9NAUB		80.40	-6.51	-1.22	85.60	-3.79	-0.86
GBD8RG		84.27	-2.65	-0.50	83.65	-5.74	-1.31
GGXCFB		82.70	-4.21	-0.79	88.65	-0.74	-0.17
H2LB67		95.11	8.20	1.54	98.51	9.12	2.07
HGE7FC		87.71	0.79	0.15	83.94	-5.46	-1.24
HRRAFF		84.39	-2.52	-0.47	87.65	-1.74	-0.40
J77ZU9		85.43	-1.49	-0.28	87.84	-1.56	-0.35
KW23UC		85.20	-1.72	-0.32	91.20	1.81	0.41
Q3483X		91.63	4.72	0.89	94.41	5.02	1.14
QCWE4B		79.88	-7.03	-1.32	88.54	-0.85	-0.19
QTYB3Z		95.93	9.02	1.70	96.06	6.67	1.52
QUVQDC		83.16	-3.75	-0.71	90.39	1.00	0.23
QZ2AR6		93.89	6.98	1.31	89.10	-0.30	-0.07
RZHZ32		87.10	0.19	0.03	90.50	1.11	0.25
T236AX		88.70	1.79	0.34	91.00	1.61	0.37
WBKW4R		76.00	-10.91	-2.05	81.51	-7.88	-1.79
WG8JYX		89.19	2.27	0.43	91.58	2.18	0.50
YLWWWQ		94.00	7.09	1.33	89.50	0.11	0.02

Summary Statistics

	Sample SB29	**Sample SB30**
Grand Means	86.914 psi	89.395 psi
SD Btwn Labs	5.319 psi	4.398 psi

Statistics based on 28 of 28 reporting participants

Paper & Paperboard Interlaboratory Testing Program
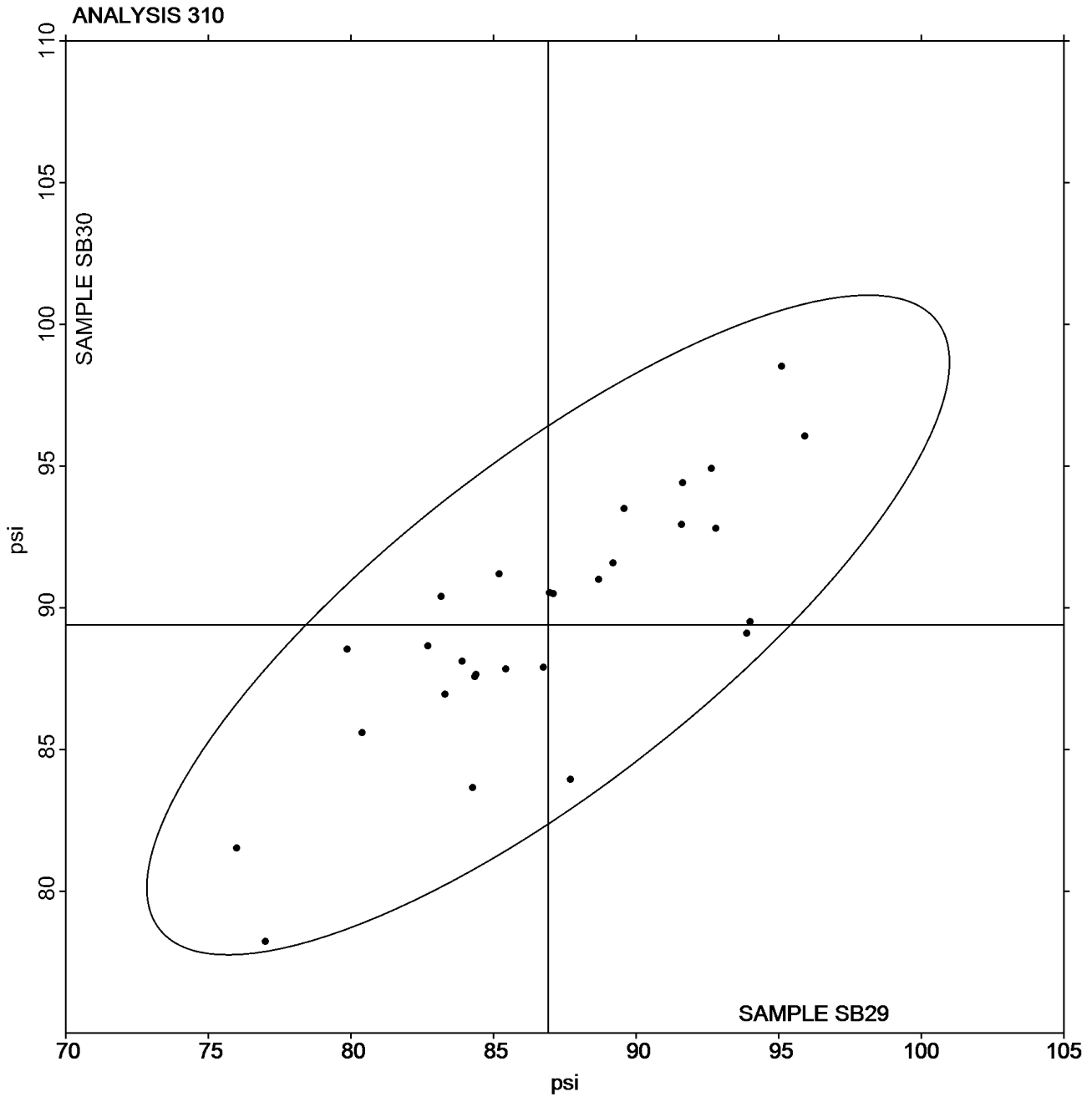**Analysis 310**
Bursting Strength - Packaging Papers
TAPPI Official Test Method T403

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Grand Mean Sample **SB29** = 86.914 psi

Grand Mean Sample **SB30** = 89.395 psi

ANALYSIS 310

Paper & Paperboard Interlaboratory Testing Program

Report #281S

Analysis 311
Tearing Strength - Newsprint
TAPPI Official Test Method T414

March 2016

WebCode	Data Flag	Sample SK29			Sample SK30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4N3UAU		25.55	-1.43	-1.45	27.13	-0.89	-1.43
DZ4VLN		27.78	0.80	0.81	28.58	0.55	0.88
EFVTMJ	X	34.20	7.22	7.33	34.04	6.01	9.64
ETKPPG		27.43	0.45	0.46	28.24	0.21	0.34
KFWVFA		27.16	0.18	0.18	28.16	0.13	0.21
PMDXN8	X	35.29	8.31	8.44	35.10	7.07	11.35

Summary Statistics

	Sample SK29	**Sample SK30**
Grand Means	26.981 Grams	28.029 Grams
SD Btwn Labs	0.985 Grams	0.623 Grams

Statistics based on 4 of 6 reporting participants

Comments on Assigned Data Flags for Test #311

PMDXN8 (X) - Extreme Data.

EFVTMJ (X) - Extreme Data.

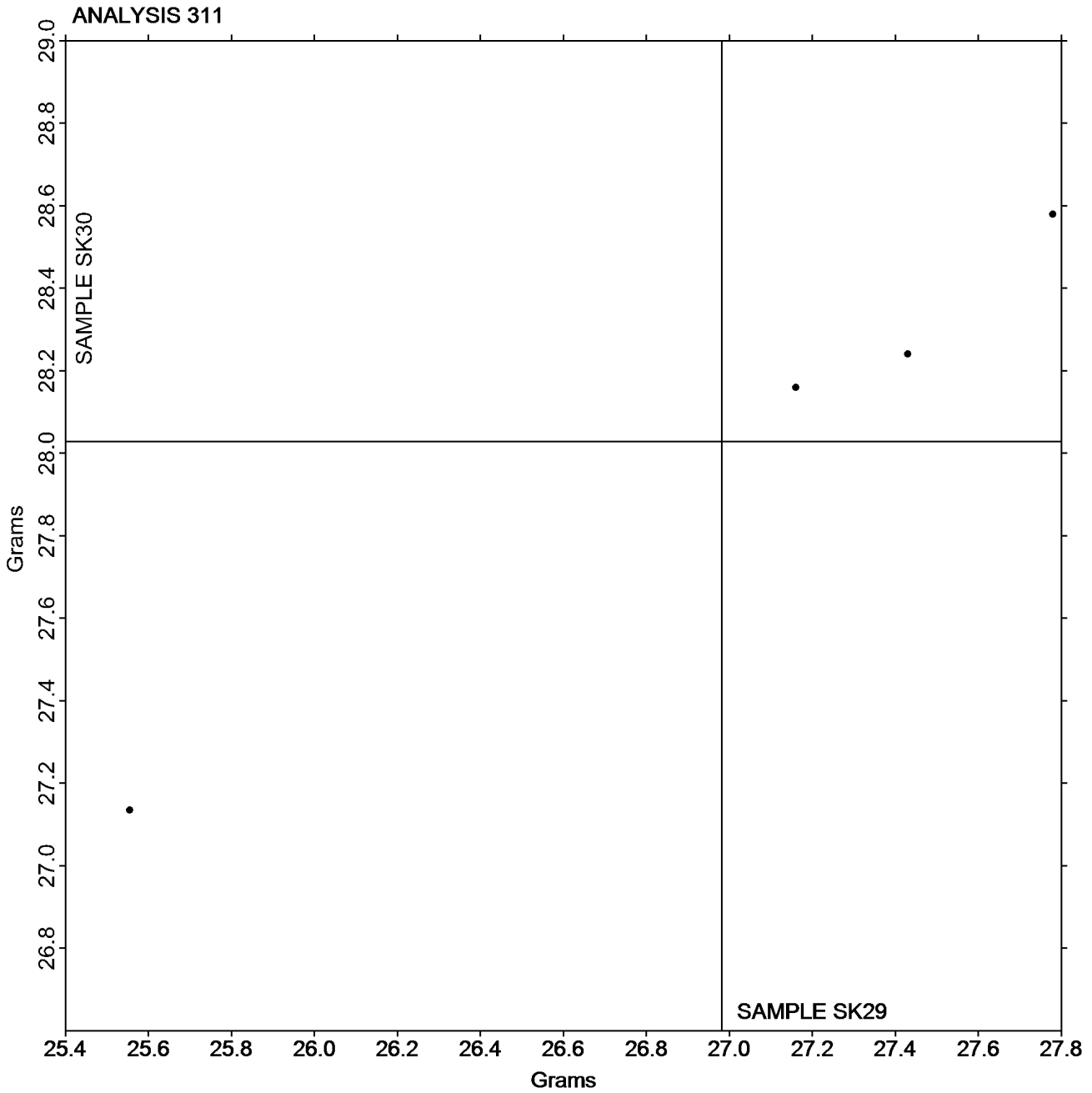**Paper & Paperboard Interlaboratory Testing Program**
Analysis 311
Tearing Strength - Newsprint
TAPPI Official Test Method T414

Report #281S
March 2016

Grand Mean Sample **SK29** = 26.981 Grams   Grand Mean Sample **SK30** = 28.029 Grams

ANALYSIS 311

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

Report #281S

March 2016

WebCode	Data Flag	Sample SC29			Sample SC30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2P6W7M		45.36	-3.65	-0.95	45.33	-3.81	-0.95
39VGER		48.74	-0.27	-0.07	47.50	-1.64	-0.41
3HL3KP		44.28	-4.73	-1.23	43.48	-5.66	-1.41
4ED94W		49.95	0.94	0.24	50.18	1.04	0.26
4GLCZT		55.93	6.92	1.80	55.93	6.79	1.69
4MR7UP	*	49.02	0.01	0.00	53.12	3.98	0.99
4N3UAU		48.43	-0.58	-0.15	49.00	-0.14	-0.04
6J6TKK		44.79	-4.22	-1.10	44.08	-5.06	-1.26
6ZQFRV		48.88	-0.13	-0.03	50.36	1.23	0.30
7M6EVN		52.89	3.88	1.01	51.77	2.63	0.65
86BHNQ		48.14	-0.87	-0.23	48.55	-0.59	-0.15
8WMHFT		42.98	-6.03	-1.57	42.56	-6.58	-1.64
9MCFUR		50.62	1.61	0.42	50.90	1.76	0.44
AD6XWU		45.20	-3.81	-0.99	44.20	-4.94	-1.23
AEFZJT		48.36	-0.65	-0.17	49.88	0.74	0.18
ATV8BK		50.90	1.89	0.49	52.04	2.90	0.72
B6N4WH		46.48	-2.53	-0.66	43.72	-5.42	-1.35
CBQ8LG		53.90	4.89	1.27	51.11	1.97	0.49
CEQJHG		48.50	-0.51	-0.13	51.00	1.86	0.46
CGEX7Q		54.94	5.93	1.54	53.84	4.70	1.17
CPQ9YH		44.10	-4.91	-1.28	45.10	-4.04	-1.00
CRC3RC		42.79	-6.22	-1.62	42.02	-7.12	-1.77
DRU4HK		48.28	-0.73	-0.19	49.70	0.56	0.14
EA87RD		55.97	6.96	1.81	57.01	7.87	1.96
EJAM4G		53.05	4.04	1.05	50.16	1.02	0.25
FA366H	X	42.52	-6.49	-1.69	56.82	7.68	1.91
FED98E		52.08	3.07	0.80	51.61	2.47	0.61
FJTQBG		48.01	-1.00	-0.26	48.11	-1.03	-0.26
GGXCFB		42.70	-6.31	-1.64	42.09	-7.05	-1.75
GQ722M		49.32	0.31	0.08	50.20	1.06	0.26
H2LB67		52.60	3.59	0.94	52.60	3.46	0.86
HGE7FC		54.05	5.04	1.31	52.93	3.80	0.94
J77ZU9		51.14	2.13	0.56	52.59	3.45	0.86
K2WWRD		52.39	3.38	0.88	51.51	2.37	0.59
KCTZV8	X	53.36	4.35	1.13	50.86	1.72	0.43
KW23UC		48.19	-0.81	-0.21	48.46	-0.68	-0.17
KZ2EPC		54.18	5.17	1.35	53.46	4.32	1.08
LWZPLA		56.28	7.27	1.89	54.21	5.07	1.26
MM4AAB		45.52	-3.49	-0.91	48.42	-0.72	-0.18
NB6VP6		45.27	-3.74	-0.97	44.73	-4.41	-1.10

Paper & Paperboard Interlaboratory Testing Program

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Analysis 312
Tearing Strength - Printing Papers
TAPPI Official Test Method T414

March 2016

WebCode	Data Flag	Sample SC29			Sample SC30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
P92AR7		48.42	-0.59	-0.15	47.98	-1.16	-0.29
QAMNE8		47.51	-1.50	-0.39	50.31	1.17	0.29
QTYB3Z		45.19	-3.82	-0.99	44.88	-4.26	-1.06
QZ2AR6	X	54.22	5.21	1.36	52.03	2.89	0.72
RBHF4Y		47.92	-1.09	-0.28	47.60	-1.54	-0.38
U4N9HV		44.17	-4.84	-1.26	42.22	-6.92	-1.72
U4TPFU		54.96	5.96	1.55	54.67	5.53	1.38
UJ3GHY		47.93	-1.08	-0.28	48.62	-0.52	-0.13
W9ULDY		54.93	5.92	1.54	55.22	6.08	1.51
WKN6R6		46.50	-2.51	-0.65	47.70	-1.44	-0.36
X2NFRT		52.40	3.39	0.88	55.80	6.66	1.66
X7LVMV		48.80	-0.21	-0.05	50.16	1.02	0.25
X8C4MY		48.50	-0.51	-0.13	48.30	-0.84	-0.21
XY4MYY		44.90	-4.11	-1.07	45.50	-3.64	-0.91
XZTXPR		42.88	-6.13	-1.59	41.64	-7.50	-1.87
XZY62Z		48.16	-0.85	-0.22	50.28	1.14	0.28
YLWWWQ	X	44.00	-5.01	-1.30	46.60	-2.54	-0.63

Summary Statistics

	Sample SC29	Sample SC30
Grand Means	49.007 Grams	49.139 Grams
SD Btwn Labs	3.842 Grams	4.019 Grams
		Statistics based on 53 of 57 reporting participants

Comments on Assigned Data Flags for Test #312

FA366H (X) - Inconsistent in testing between samples.

KCTZV8 (X) - Data appear to be off by a factor of .5. Corrected by CTS (x2).

YLWWWQ (X) - Data appear to be off by a factor of .5. Corrected by CTS (x2).

QZ2AR6 (X) - Data appear to be off by a factor of 2. Corrected by CTS (x.5).

Paper & Paperboard Interlaboratory Testing Program
Analysis 312
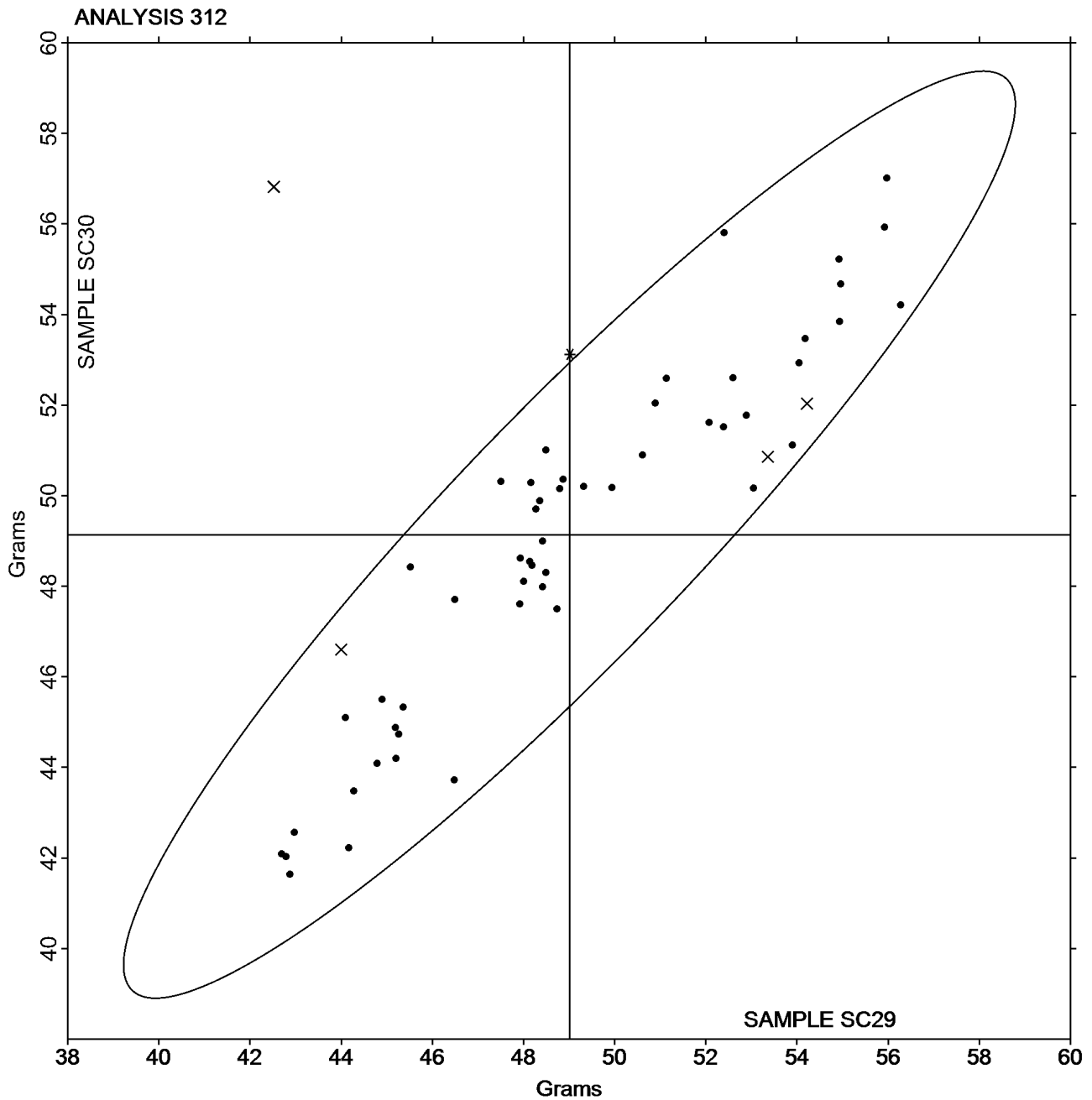**Tearing Strength - Printing Papers**
TAPPI Official Test Method T414

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Grand Mean Sample **SC29** = 49.007 Grams

Grand Mean Sample **SC30** = 49.139 Grams

ANALYSIS 312

SAMPLE SC30

Grams

SAMPLE SC29

Grams

Paper & Paperboard Interlaboratory Testing Program

Report #281S

Analysis 314
Tearing Strength - Packaging Papers
TAPPI Official Test Method T414

March 2016

WebCode	Data Flag	Sample SD29			Sample SD30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4N3UAU		185.0	4.1	0.25	205.0	-10.5	-0.40
4R29WK		173.2	-7.7	-0.48	222.8	7.3	0.28
82WKHN		174.9	-6.1	-0.37	211.5	-4.0	-0.15
8GA8QK	X	157.5	-23.5	-1.44	189.5	-26.0	-1.00
9NQ24U		163.5	-17.5	-1.08	207.0	-8.5	-0.33
ADJK9G		200.2	19.3	1.19	221.0	5.5	0.21
ATCEHM		170.7	-10.2	-0.63	199.3	-16.2	-0.62
AWFYMM		181.1	0.1	0.01	194.3	-21.2	-0.81
BYJ6LT		159.6	-21.3	-1.31	197.0	-18.5	-0.71
CDU7VN		166.4	-14.5	-0.90	207.2	-8.3	-0.32
CP8FCM		170.0	-10.9	-0.67	202.6	-12.9	-0.49
D6XPJP		190.1	9.2	0.57	220.3	4.8	0.18
DRU4HK		190.4	9.4	0.58	225.6	10.1	0.39
EQUTRB	*	200.7	19.8	1.22	295.3	79.8	3.06
FY3HDL		197.4	16.4	1.01	208.8	-6.7	-0.26
G8P6DG		157.4	-23.5	-1.45	189.9	-25.6	-0.98
G9NAUB		169.2	-11.7	-0.72	176.8	-38.7	-1.48
GPALRB	X	157.4	-23.5	-1.45	188.8	-26.7	-1.02
HRRAFF		170.4	-10.5	-0.65	203.2	-12.3	-0.47
JLKWHH		184.3	3.3	0.21	226.8	11.3	0.43
KUB7W7	X	244.9	64.0	3.94	250.1	34.6	1.33
LC7YH4	*	222.4	41.5	2.55	273.0	57.5	2.20
P3R7PB		172.9	-8.0	-0.49	209.8	-5.7	-0.22
PE3LM4		191.0	10.1	0.62	237.3	21.8	0.84
PJJ4Q7		170.8	-10.1	-0.62	204.5	-11.0	-0.42
Q3483X		166.8	-14.1	-0.87	222.4	6.9	0.26
QCWE4B		168.0	-12.9	-0.80	214.8	-0.7	-0.03
RZHZ32	X	233.8	52.9	3.26	191.0	-24.5	-0.94
T236AX		167.4	-13.5	-0.83	208.1	-7.4	-0.28
U4TPFU		177.2	-3.7	-0.23	219.3	3.8	0.15
VUJK44		199.2	18.2	1.12	245.1	29.6	1.14
VUXA4V		216.0	35.1	2.16	223.3	7.8	0.30
WBKW4R		204.0	23.1	1.42	256.8	41.3	1.58
WG8JYX		180.7	-0.3	-0.02	211.1	-4.4	-0.17
YLWWWQ	*	182.0	1.1	0.07	155.2	-60.3	-2.31
ZGQWQQ		167.1	-13.8	-0.85	200.6	-14.9	-0.57

Paper & Paperboard Interlaboratory Testing Program
Analysis 314
Tearing Strength - Packaging Papers
TAPPI Official Test Method T414

Report #281S

March 2016

	Summary Statistics	
Sample SD29		**Sample SD30**
Grand Means	180.93 Grams	215.49 Grams
SD Btwn Labs	16.23 Grams	26.09 Grams
		Statistics based on 32 of 36 reporting participants

Comments on Assigned Data Flags for Test #314

GPALRB (X) - Data appear to be off by a factor of .5. Corrected by CTS (x2).

8GA8QK (X) - Data appear to be off by a factor of .25. Corrected by CTS (x4).

RZHZ32 (X) - Data for sample SD29 are high.

KUB7W7 (X) - Data for sample SD29 are high.

Paper & Paperboard Interlaboratory Testing Program
Analysis 314
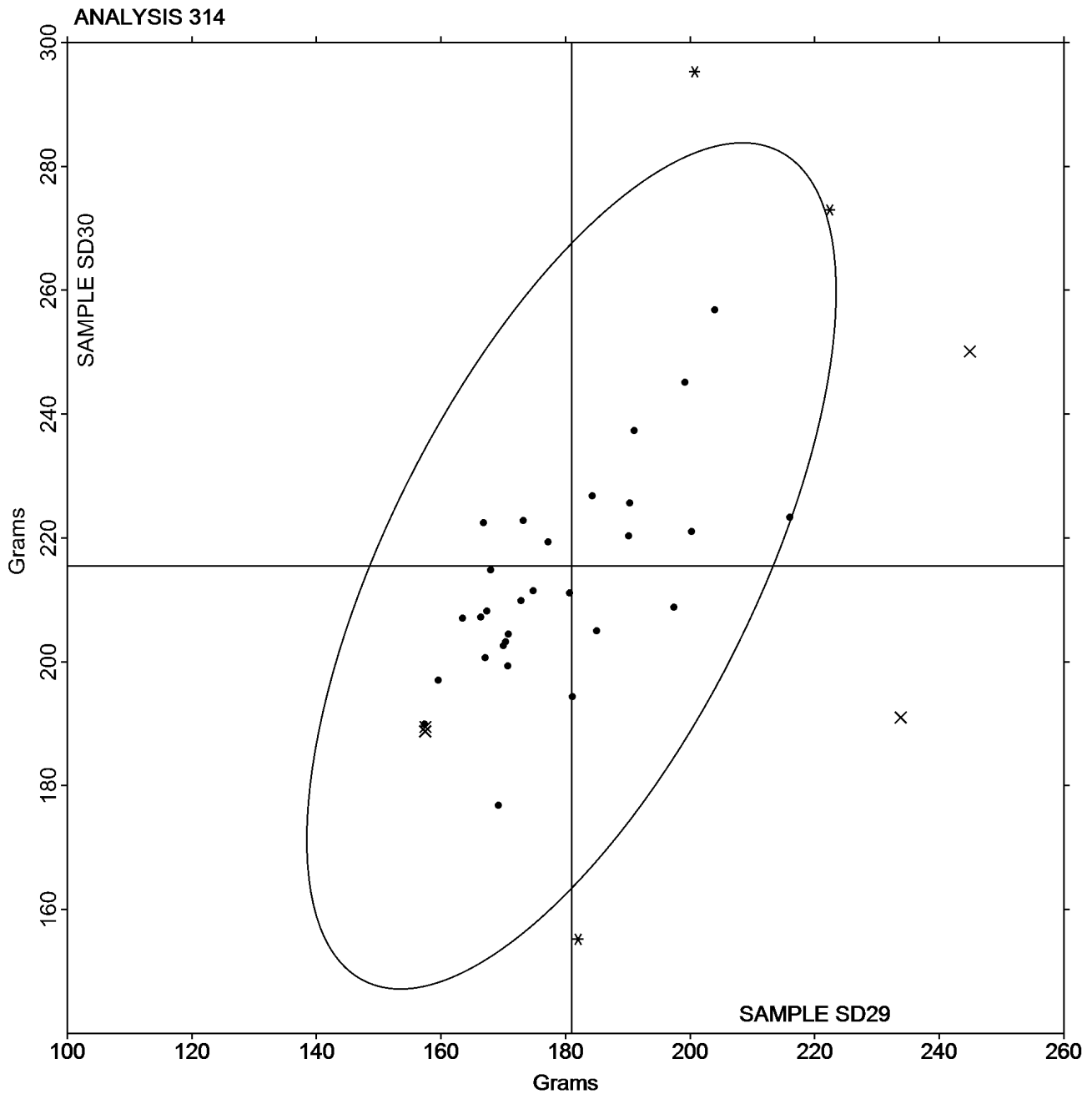**Tearing Strength - Packaging Papers**
TAPPI Official Test Method T414

Report #281S
March 2016

Grand Mean Sample **SD29** = 180.93 Grams   Grand Mean Sample **SD30** = 215.49 Grams

Paper & Paperboard Interlaboratory Testing Program
Analysis 320
Tensile Breaking Strength - Newsprint
TAPPI Official Test Method T494

Report #281S
March 2016

		Sample SR29				Sample SR30		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV		Lab Mean	Diff from Grand Mean	CPV
3MRVEL		2.443	-0.265	-1.97		2.612	-0.299	-1.79
82B8RQ		2.727	0.019	0.14		3.054	0.143	0.85
DZ4VLN		2.649	-0.060	-0.44		2.711	-0.200	-1.19
EFVTMJ		2.730	0.022	0.16		2.906	-0.006	-0.03
ETKPPG		2.700	-0.008	-0.06		2.797	-0.114	-0.68
GF3UDA		3.003	0.295	2.19		3.249	0.338	2.02
KFWVFA		2.791	0.083	0.61		3.025	0.114	0.68
KW23UC		2.559	-0.149	-1.11		2.815	-0.096	-0.57
LGMGL7		2.587	-0.121	-0.90		2.832	-0.079	-0.47
PMDXN8		2.724	0.016	0.12		2.949	0.038	0.23
RK4UQ2		2.753	0.045	0.33		2.918	0.006	0.04
U4TPFU		2.732	0.024	0.18		2.894	-0.017	-0.10
X8C4MY		2.808	0.100	0.74		3.083	0.172	1.03

Summary Statistics

	Sample SR29		**Sample SR30**	
Grand Means	2.7082	kN/m	2.9111	kN/m
SD Btwn Labs	0.1349	kN/m	0.1676	kN/m

Statistics based on 13 of 13 reporting participants

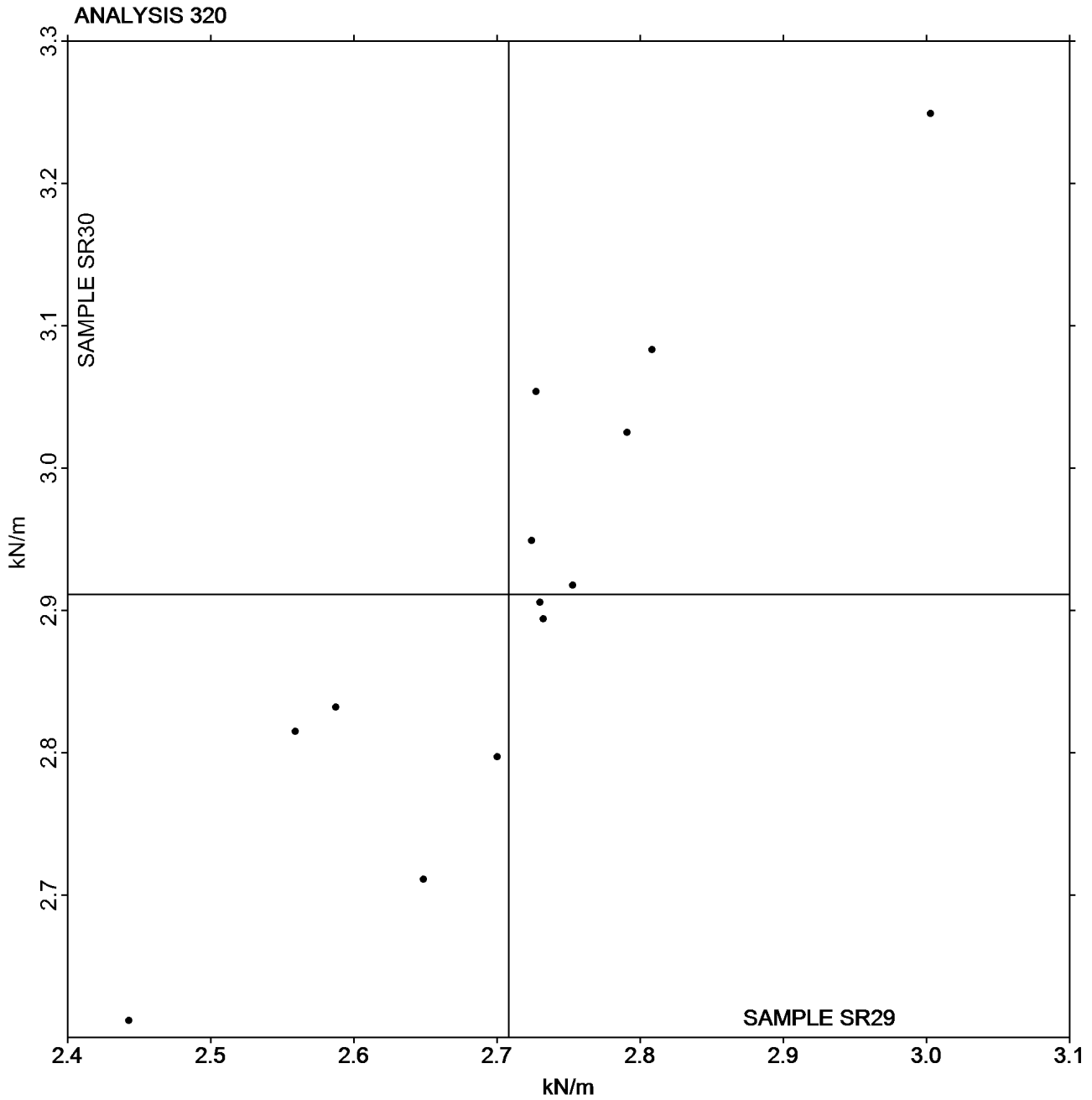**Paper & Paperboard Interlaboratory Testing Program**
Analysis 320
Tensile Breaking Strength - Newsprint
TAPPI Official Test Method T494

Report #281S
March 2016

Grand Mean Sample **SR29** = 2.7082 kN/m   Grand Mean Sample **SR30** = 2.9111 kN/m

ANALYSIS 320

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

Paper & Paperboard Interlaboratory Testing Program

Report #281S

Analysis 321
Tensile Energy Absorption - Newsprint
TAPPI Official Test Method T494

March 2016

WebCode	Data Flag	Sample SR29			Sample SR30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3MRVEL		18.62	-0.44	-0.27	23.55	-0.23	-0.15
82B8RQ		17.68	-1.38	-0.85	23.93	0.14	0.09
EFVTMJ		17.08	-1.99	-1.22	20.89	-2.90	-1.82
ETKPPG		20.34	1.28	0.78	24.07	0.29	0.18
GF3UDA		20.78	1.71	1.05	26.22	2.44	1.53
KFWVFA		19.21	0.14	0.09	25.10	1.31	0.82
KW23UC		17.86	-1.21	-0.74	23.20	-0.59	-0.37
LGMGL7		17.85	-1.22	-0.75	23.80	0.01	0.01
PMDXN8		16.83	-2.23	-1.37	20.82	-2.97	-1.87
RK4UQ2		20.15	1.09	0.67	24.14	0.36	0.22
U4TPFU		21.70	2.63	1.62	24.94	1.15	0.73
X8C4MY		20.68	1.61	0.99	24.78	0.99	0.63

Summary Statistics	Sample SR29	Sample SR30
Grand Means	19.065 Joules/sq m	23.787 Joules/sq m
SD Btwn Labs	1.631 Joules/sq m	1.590 Joules/sq m

Statistics based on 12 of 12 reporting participants

Paper & Paperboard Interlaboratory Testing Program
Analysis 321
Tensile Energy Absorption - Newsprint
TAPPI Official Test Method T494

Report #281S
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Grand Mean Sample **SR29** = 19.065 Joules/sq m   Grand Mean Sample **SR30** = 23.787 Joules/sq m
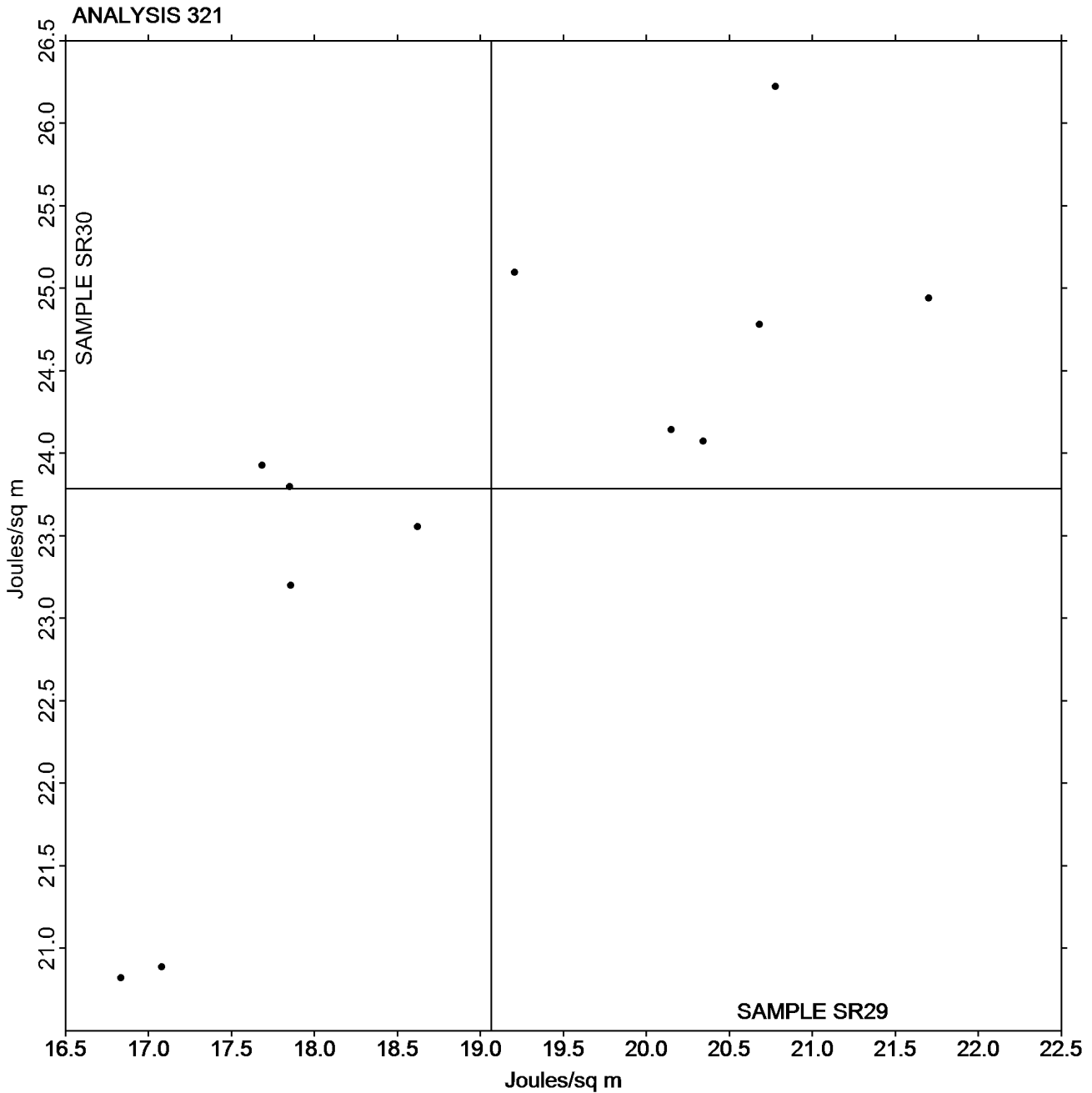
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Paper & Paperboard Interlaboratory Testing Program

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

Report #281S

March 2016

WebCode	Data Flag	Sample SR29			Sample SR30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3MRVEL	X	1.663	0.482	5.22	1.685	0.342	3.03
82B8RQ		1.104	-0.077	-0.83	1.302	-0.041	-0.36
ETKPPG		1.235	0.054	0.59	1.386	0.043	0.38
GF3UDA		1.100	-0.081	-0.87	1.261	-0.082	-0.73
KFWVFA		1.346	0.165	1.79	1.574	0.231	2.05
KW23UC		1.151	-0.030	-0.32	1.329	-0.014	-0.13
LGMGL7		1.159	-0.022	-0.24	1.377	0.034	0.30
PMDXN8		1.058	-0.123	-1.33	1.191	-0.152	-1.35
RK4UQ2		1.262	0.081	0.88	1.372	0.029	0.26
U4TPFU		1.124	-0.057	-0.61	1.209	-0.134	-1.19
X8C4MY		1.270	0.089	0.96	1.430	0.087	0.77

Summary Statistics

	Sample SR29	**Sample SR30**
Grand Means	1.1808 Percent	1.3431 Percent
SD Btwn Labs	0.0925 Percent	0.1127 Percent

Statistics based on 10 of 11 reporting participants

Comments on Assigned Data Flags for Test #322

3MRVEL (X) - Data for both samples are high.

Paper & Paperboard Interlaboratory Testing Program
Analysis 322
Elongation to Break - Newsprint
TAPPI Official Test Method T494

Report #281S
March 2016

Grand Mean Sample **SR29** = 1.1808 Percent   Grand Mean Sample **SR30** = 1.3431 Percent

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

Paper & Paperboard Interlaboratory Testing Program

Report #281S

Analysis 325
Tensile Breaking Strength - Printing Papers
TAPPI Official Test Method T494

March 2016

WebCode	Data Flag	Sample SF29 Lab Mean	Diff from Grand Mean	CPV	Sample SF30 Lab Mean	Diff from Grand Mean	CPV	Instr Code
2P6W7M		5.002	0.196	0.64	4.966	0.167	0.51	TP
39VGER		4.831	0.025	0.08	4.681	-0.117	-0.36	TB
3HL3KP		4.919	0.113	0.37	4.855	0.056	0.17	TO
4ED94W		4.567	-0.239	-0.78	4.696	-0.102	-0.31	LI
4GLCZT		4.266	-0.540	-1.76	4.220	-0.579	-1.77	LH
4MR7UP		4.778	-0.028	-0.09	4.688	-0.110	-0.34	LI
4N3UAU		4.953	0.147	0.48	4.809	0.010	0.03	LH
6J6TKK		5.259	0.453	1.48	5.261	0.463	1.41	TX
6ZQFRV		4.916	0.110	0.36	4.835	0.037	0.11	LH
7M6EVN	*	5.327	0.521	1.70	5.571	0.773	2.36	LA
8T7ZDQ	*	4.263	-0.543	-1.77	4.493	-0.305	-0.93	RE
8WMHFT		4.960	0.154	0.50	4.991	0.193	0.59	LF
9MCFUR		4.837	0.031	0.10	4.894	0.096	0.29	TI
ATV8BK		4.560	-0.246	-0.80	4.708	-0.090	-0.27	TF
CEQJHG		4.688	-0.118	-0.39	4.570	-0.228	-0.70	TF
CGEX7Q		4.763	-0.043	-0.14	4.809	0.011	0.03	MR
CPQ9YH	*	4.962	0.156	0.51	5.248	0.449	1.37	TO
CQ3XEN		4.678	-0.128	-0.42	4.667	-0.131	-0.40	LH
CRC3RC		4.974	0.168	0.55	4.930	0.132	0.40	LA
EA87RD		4.722	-0.084	-0.28	4.564	-0.234	-0.71	XX
EJAM4G	X	3.928	-0.878	-2.87	4.200	-0.598	-1.82	IM
FA366H		5.119	0.313	1.02	4.933	0.135	0.41	TJ
FED98E		4.891	0.085	0.28	4.713	-0.085	-0.26	LI
FGJQ7A		5.088	0.282	0.92	5.123	0.324	0.99	XX
FJTQBG		4.760	-0.046	-0.15	4.829	0.031	0.10	XX
GBD8RG		4.909	0.103	0.34	4.968	0.170	0.52	TB
GQ722M		4.754	-0.052	-0.17	4.767	-0.031	-0.09	TB
H2LB67		4.603	-0.203	-0.66	4.536	-0.262	-0.80	DL
J77ZU9		4.609	-0.197	-0.64	4.619	-0.179	-0.55	LI
K2WWRD		4.560	-0.246	-0.80	4.718	-0.080	-0.24	LH
KCTZV8		5.477	0.671	2.19	5.573	0.775	2.37	TJ
KW23UC		4.442	-0.364	-1.19	4.488	-0.310	-0.95	LH
KZ2EPC		4.162	-0.644	-2.10	4.047	-0.751	-2.29	ID
LWZPLA		4.367	-0.439	-1.43	4.469	-0.329	-1.01	XX
MM4AAB	X	5.153	0.347	1.13	5.704	0.906	2.76	TJ
NB6VP6		5.377	0.571	1.86	5.322	0.524	1.60	LX
P92AR7		5.190	0.384	1.25	5.161	0.363	1.11	TB
QAMNE8		4.573	-0.233	-0.76	4.295	-0.503	-1.53	IM
QCWE4B		4.773	-0.033	-0.11	4.768	-0.030	-0.09	IM
RBHF4Y		4.743	-0.063	-0.20	4.700	-0.098	-0.30	LX

Paper & Paperboard Interlaboratory Testing Program
Analysis 325
Tensile Breaking Strength - Printing Papers
TAPPI Official Test Method T494

Report #281S

March 2016

WebCode	Data Flag	Sample SF29 Lab Mean	Sample SF29 Diff from Grand Mean	Sample SF29 CPV	Sample SF30 Lab Mean	Sample SF30 Diff from Grand Mean	Sample SF30 CPV	Instr Code
RU9RQX		4.210	-0.596	-1.95	4.282	-0.516	-1.57	XX
U4N9HV	X	4.753	-0.053	-0.17	5.498	0.700	2.14	XX
UJ3GHY		4.476	-0.330	-1.08	4.284	-0.515	-1.57	CB
VB2TVR		5.012	0.206	0.67	4.897	0.098	0.30	LA
W9ULDY		4.406	-0.400	-1.31	4.451	-0.347	-1.06	LA
WCVYPQ		4.935	0.129	0.42	4.949	0.151	0.46	TP
WKN6R6		4.853	0.047	0.15	4.867	0.069	0.21	TI
X2NFRT		4.722	-0.084	-0.28	4.620	-0.178	-0.54	LH
X7LVMV		5.046	0.240	0.78	5.067	0.269	0.82	LH
XY4MYY		5.067	0.261	0.85	5.132	0.334	1.02	TC
XZTXPR		5.283	0.477	1.56	5.285	0.487	1.49	LH
XZY62Z		4.862	0.056	0.18	4.790	-0.008	-0.02	LE

Summary Statistics

	Sample SF29		Sample SF30	
Grand Means	4.8060	kN/m	4.7981	kN/m
SD Btwn Labs	0.3060	kN/m	0.3277	kN/m

Statistics based on 49 of 52 reporting participants

Comments on Assigned Data Flags for Test #325

MM4AAB (X) - Inconsistent in testing between samples. Data for sample SF30 are high.

EJAM4G (X) - Inconsistent in testing between samples. Data for sample SF29 are low.

U4N9HV (X) - Inconsistent in testing between samples.

Key to Instrument Codes Reported by Participants

|			
CB	Chatillon DFIS 50 (Digital Gauge)/TCD 200	DL	EMIC DL500 Universal Testing Machines
ID	Instron 4201/4202	IM	Instron 5500 Series
LA	L & W Tensile - Autoline 300	LE	L & W Tensile Tester 066
LF	L & W Tensile/Fracture Toughness Tester SE 064	LH	L & W Alwetron TH1 (Horizontal) SE 060/065F
LI	L & W Tensile Tester SE 062	LX	L & W (model not specified)
MR	MTS Alliance RT series	RE	Regmed
TB	Thwing-Albert EJA/1000	TC	Thwing-Albert Electro-Hydraulic, Model 30LT
TF	Thwing-Albert EJA Vantage-1	TI	Thwing-Albert QC II
TJ	Thwing-Albert QC II-XS	TO	Thwing-Albert QC-1000
TP	TMI Monitor/Tensile 100 (84-21-01)	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		

Paper & Paperboard Interlaboratory Testing Program
Analysis 325
Tensile Breaking Strength - Printing Papers
TAPPI Official Test Method T494

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Grand Mean Sample **SF29** = 4.8060 kN/m   Grand Mean Sample **SF30** = 4.7981 kN/m
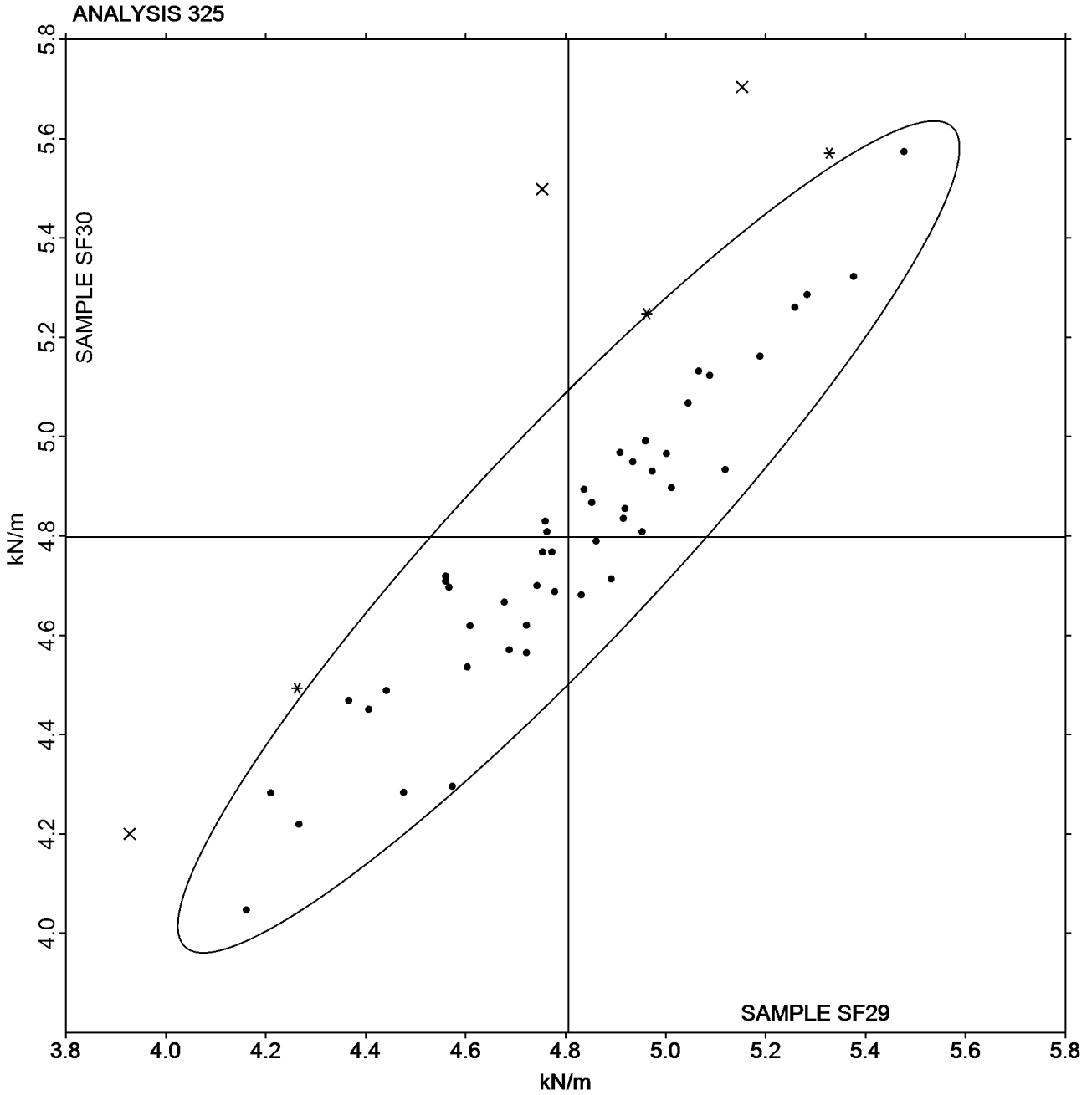
ANALYSIS 325

SAMPLE SF30

kN/m

SAMPLE SF29

kN/m

Paper & Paperboard Interlaboratory Testing Program

Report #281S

Analysis 327
Tensile Energy Absorption - Printing Papers
TAPPI Official Test Method T494

March 2016

WebCode	Data Flag	Sample SF29			Sample SF30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3HL3KP		84.94	17.34	2.23	78.52	11.24	1.65	TO
4ED94W		62.06	-5.54	-0.71	65.83	-1.44	-0.21	LI
4GLCZT		64.39	-3.21	-0.41	63.52	-3.76	-0.55	LH
4MR7UP		68.67	1.07	0.14	66.02	-1.26	-0.18	LI
4N3UAU		68.37	0.77	0.10	62.63	-4.65	-0.68	LH
6J6TKK		67.66	0.06	0.01	67.48	0.21	0.03	TA
6ZQFRV		63.02	-4.58	-0.59	64.21	-3.06	-0.45	LH
7M6EVN		77.63	10.04	1.29	73.67	6.39	0.94	LA
8T7ZDQ		60.93	-6.67	-0.86	66.18	-1.10	-0.16	RE
8WMHFT		53.94	-13.66	-1.76	53.65	-13.63	-2.00	LW
9MCFUR		69.20	1.60	0.21	68.85	1.58	0.23	LH
ATV8BK		68.63	1.03	0.13	71.80	4.53	0.66	TF
CGEX7Q		61.99	-5.60	-0.72	59.85	-7.43	-1.09	MR
CPQ9YH		59.82	-7.78	-1.00	67.17	-0.11	-0.02	TO
CQ3XEN		65.44	-2.16	-0.28	66.70	-0.58	-0.09	LH
CRC3RC		70.96	3.36	0.43	68.65	1.37	0.20	LA
EA87RD		79.50	11.90	1.53	73.08	5.80	0.85	XX
EJAM4G		54.89	-12.71	-1.64	58.71	-8.57	-1.26	IM
FED98E		70.10	2.50	0.32	67.92	0.64	0.09	LI
FGJQ7A		70.93	3.33	0.43	73.27	5.99	0.88	LX
FJTQBG		72.79	5.19	0.67	71.96	4.68	0.69	XX
GQ722M		71.82	4.22	0.54	73.97	6.70	0.98	TB
H2LB67		69.10	1.50	0.19	64.17	-3.11	-0.46	DL
J77ZU9		61.74	-5.86	-0.76	65.42	-1.86	-0.27	LI
K2WWRD		63.78	-3.82	-0.49	68.14	0.86	0.13	LH
KCTZV8		77.74	10.14	1.31	80.41	13.14	1.93	TJ
KW23UC		63.67	-3.93	-0.51	62.23	-5.05	-0.74	LH
KZ2EPC		61.70	-5.90	-0.76	57.88	-9.40	-1.38	ID
LWZPLA		56.13	-11.47	-1.48	55.76	-11.51	-1.69	XX
NB6VP6		74.21	6.61	0.85	73.44	6.17	0.91	LX
P92AR7		79.14	11.54	1.49	78.07	10.79	1.59	TB
QAMNE8		83.93	16.33	2.10	78.27	11.00	1.61	IM
QCWE4B		67.32	-0.28	-0.04	67.79	0.51	0.08	IM
RBHF4Y		68.07	0.47	0.06	63.30	-3.98	-0.58	LX
RU9RQX		63.94	-3.66	-0.47	63.25	-4.02	-0.59	XX
W9ULDY		51.18	-16.42	-2.12	51.02	-16.26	-2.39	LA
WKN6R6		67.72	0.12	0.02	71.07	3.80	0.56	TI
X7LVMV		74.30	6.71	0.86	74.15	6.87	1.01	LH
XZTXPR		65.01	-2.59	-0.33	65.81	-1.47	-0.22	LH

Paper & Paperboard Interlaboratory Testing Program
Analysis 327
Tensile Energy Absorption - Printing Papers
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Summary Statistics

	Sample SF29	**Sample SF30**
Grand Means	67.598 Joules/sq m	67.277 Joules/sq m
SD Btwn Labs	7.759 Joules/sq m	6.809 Joules/sq m

Statistics based on 39 of 39 reporting participants

Key to Instrument Codes Reported by Participants

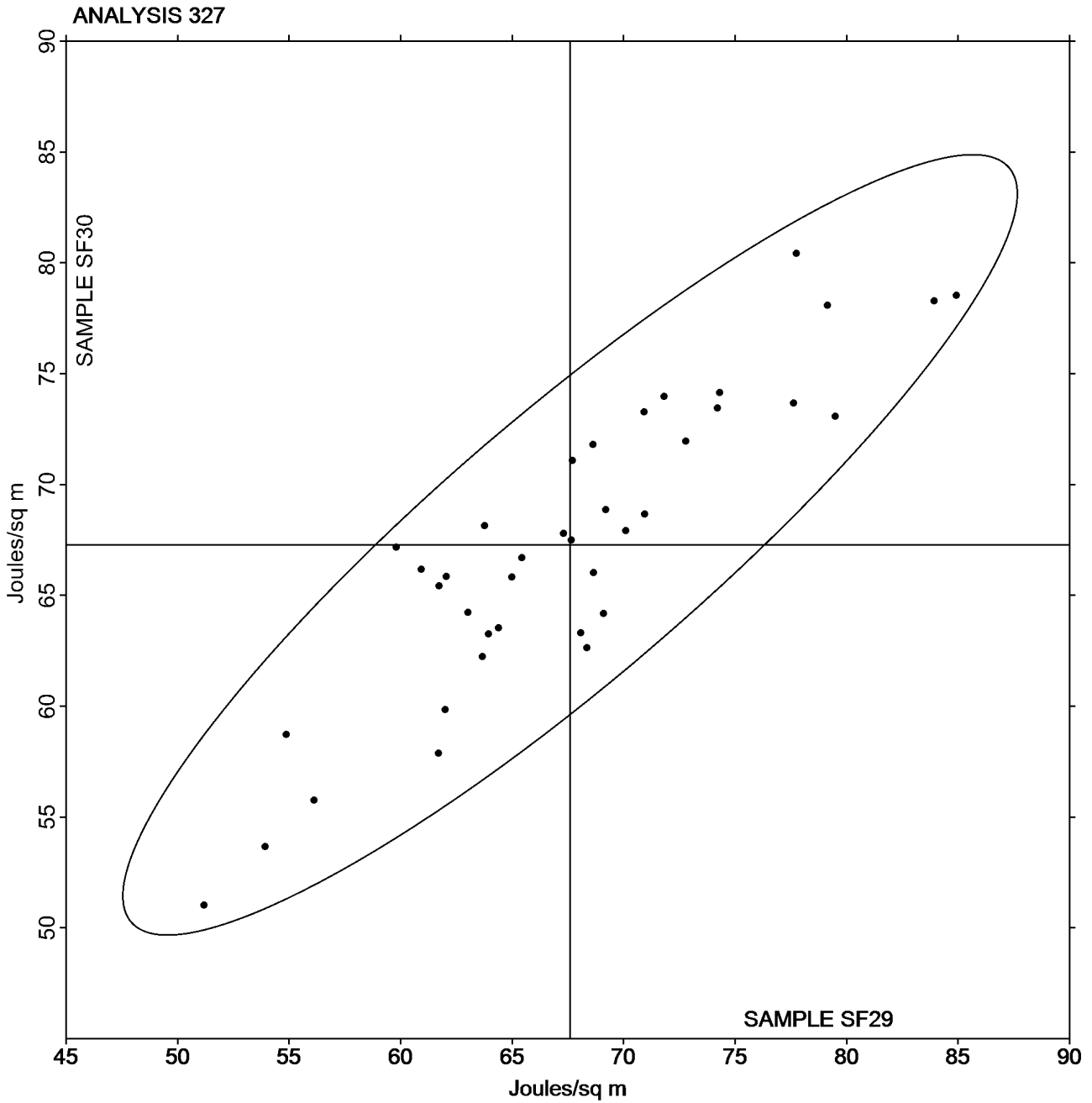|			
DL	EMIC DL500 Universal Testing Machines	ID	Instron 4201
IM	Instron 5500 Series	LA	L & W Tensile - Autoline 300
LH	L & W Alwetron TH1 (Horizontal) SE 060	LI	L & W Tensile Tester SE 062
LW	L & W Tensile Tester SE 064	LX	L & W (model not specified)
MR	MTS Alliance RT series	RE	Regmed
TA	Thwing-Albert	TB	Thwing-Albert EJA/1000
TF	Thwing-Albert EJA Vantage-1	TI	Thwing-Albert QC II
TJ	Thwing-Albert QC II-XS	TO	Thwing-Albert QC-1000
XX	Instrument make/model not specified by lab		

Paper & Paperboard Interlaboratory Testing Program
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Grand Mean Sample **SF29** = 67.598 Joules/sq m   Grand Mean Sample **SF30** = 67.277 Joules/sq m

ANALYSIS 327

SAMPLE SF30

Joules/sq m

SAMPLE SF29

Joules/sq m

Paper & Paperboard Interlaboratory Testing Program
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WebCode	Data Flag	Sample SF29 Lab Mean	Diff from Grand Mean	CPV	Sample SF30 Lab Mean	Diff from Grand Mean	CPV	Instr Code
39VGER		2.190	0.049	0.25	2.110	-0.006	-0.03	TF
3HL3KP	X	2.910	0.769	3.92	2.736	0.620	3.34	TO
4ED94W		1.998	-0.143	-0.73	2.066	-0.050	-0.27	LI
4GLCZT		2.227	0.086	0.44	2.212	0.096	0.52	LH
4MR7UP		2.149	0.008	0.04	2.101	-0.015	-0.08	LI
4N3UAU		2.048	-0.093	-0.47	1.933	-0.183	-0.98	LH
6J6TKK		2.158	0.017	0.09	2.054	-0.062	-0.33	TX
6ZQFRV		1.797	-0.344	-1.75	1.858	-0.258	-1.39	LH
7M6EVN	*	2.036	-0.105	-0.53	1.816	-0.300	-1.61	LA
8T7ZDQ		2.251	0.110	0.56	2.293	0.177	0.95	RE
8WMHFT		1.670	-0.471	-2.40	1.654	-0.462	-2.48	LX
9MCFUR		2.119	-0.022	-0.11	2.081	-0.035	-0.19	LH
ATV8BK		2.229	0.088	0.45	2.287	0.171	0.92	TF
CEQJHG		2.410	0.269	1.37	2.270	0.154	0.83	TF
CGEX7Q		1.990	-0.151	-0.77	1.897	-0.219	-1.18	MR
CPQ9YH		1.789	-0.352	-1.80	1.891	-0.225	-1.21	TG
CQ3XEN		2.083	-0.058	-0.30	2.134	0.018	0.10	LH
CRC3RC		1.959	-0.182	-0.93	1.912	-0.204	-1.10	XX
EA87RD		2.540	0.399	2.04	2.376	0.260	1.40	XX
EJAM4G		2.311	0.170	0.87	2.395	0.279	1.50	XX
FED98E		2.117	-0.024	-0.12	2.123	0.007	0.04	LI
FGJQ7A		1.976	-0.165	-0.84	2.002	-0.114	-0.61	LX
FJTQBG		2.262	0.121	0.62	2.264	0.148	0.80	XX
GBD8RG		2.099	-0.042	-0.21	2.007	-0.108	-0.58	TB
GQ722M		2.324	0.183	0.93	2.379	0.264	1.42	TB
H2LB67		2.446	0.305	1.56	2.344	0.228	1.23	DL
J77ZU9		1.981	-0.160	-0.82	2.089	-0.027	-0.14	LI
K2WWRD		2.069	-0.072	-0.37	2.139	0.023	0.13	LH
KCTZV8		2.204	0.063	0.32	2.206	0.090	0.49	TJ
KW23UC		2.113	-0.028	-0.14	2.047	-0.069	-0.37	LH
KZ2EPC		2.188	0.047	0.24	2.121	0.005	0.03	ID
LWZPLA		2.446	0.305	1.56	2.366	0.250	1.35	XX
MM4AAB	X	2.099	-0.042	-0.21	1.778	-0.338	-1.82	LH
NB6VP6		2.093	-0.048	-0.24	2.087	-0.029	-0.15	LX
P92AR7		2.262	0.121	0.62	2.203	0.088	0.47	TB
QAMNE8	*	2.637	0.496	2.53	2.605	0.489	2.63	IM
QCWE4B		2.099	-0.042	-0.21	2.116	0.000	0.00	IM
RBHF4Y		2.105	-0.036	-0.18	1.968	-0.148	-0.79	LX
RU9RQX		2.255	0.114	0.58	2.190	0.074	0.40	XX
W9ULDY		2.046	-0.095	-0.48	2.022	-0.094	-0.50	LA

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		Sample SF29			Sample SF30			
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	Instr Code
WKN6R6		2.109	-0.032	-0.16	2.109	-0.007	-0.04	TI
X7LVMV		2.153	0.012	0.06	2.146	0.030	0.16	LH
XZTXPR		1.838	-0.303	-1.55	1.868	-0.248	-1.33	LH

Summary Statistics

	Sample SF29		**Sample SF30**	
Grand Means	2.1408	Percent	2.1156	Percent
SD Btwn Labs	0.1960	Percent	0.1859	Percent

Statistics based on 41 of 43 reporting participants

Comments on Assigned Data Flags for Test #328

MM4AAB (X) - Inconsistent in testing between samples.

3HL3KP (X) - Data for both samples are high. Possible Systematic Error.

Key to Instrument Codes Reported by Participants

|			
DL	EMIC DL500 Universal Testing Machines	ID	Instron 4201
IM	Instron 5500	LA	L & W Tensile - Autoline 300
LH	L & W Alwetron TH1 (Horizontal) SE 060	LI	L & W Tensile Tester SE 062
LX	L & W (model not specified)	MR	MTS Alliance RT series
RE	Regmed	TB	Thwing-Albert EJA/1000
TF	Thwing-Albert EJA Vantage-1	TG	Thwing-Albert QC
TI	Thwing-Albert QC II	TJ	Thwing-Albert QC II-XS
TO	Thwing-Albert QC-1000	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		

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Grand Mean Sample **SF29** = 2.1408 Percent   Grand Mean Sample **SF30** = 2.1156 Percent
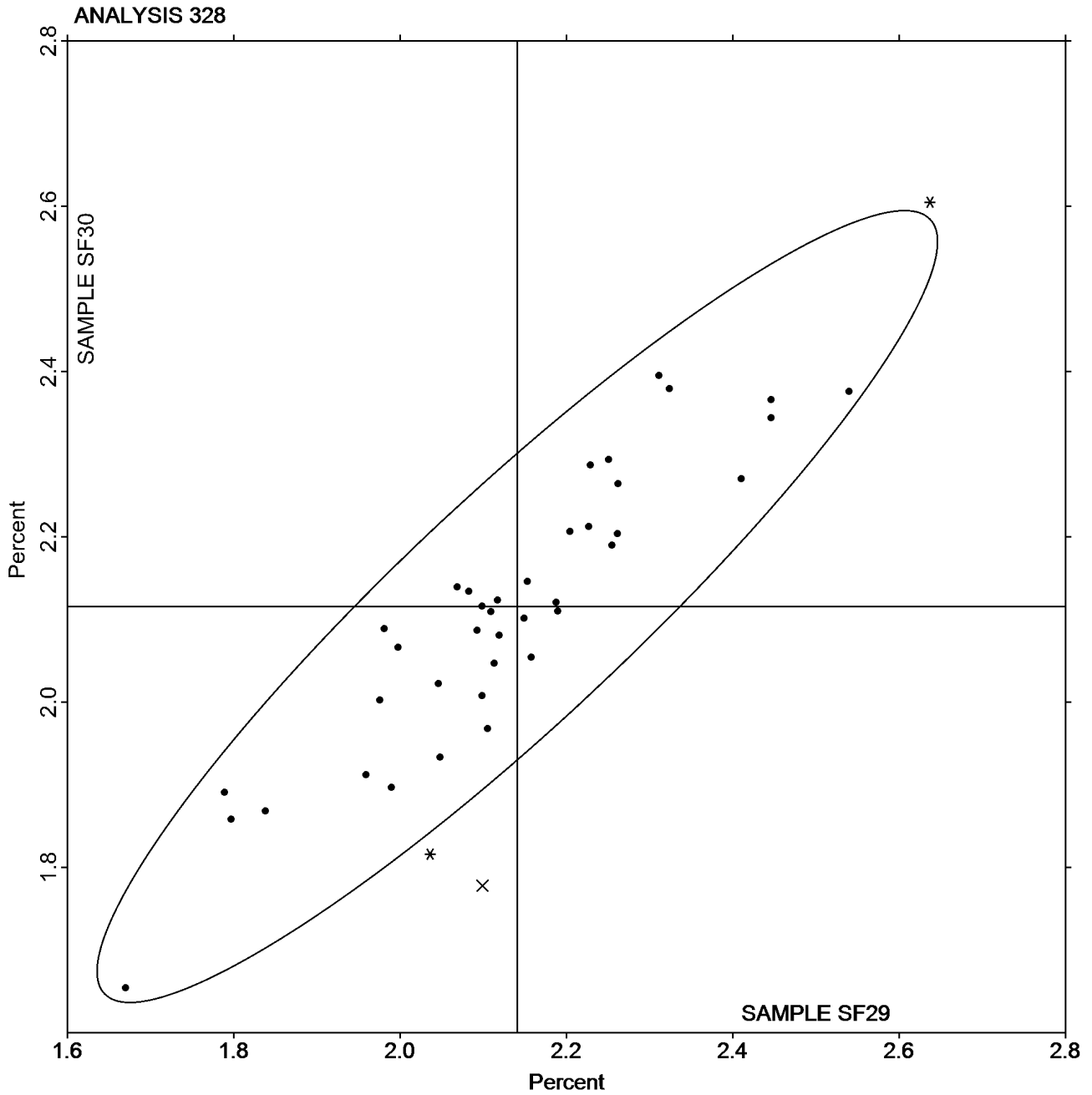
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		Sample SE29			Sample SE30			
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	Instr Code
4N3UAU		9.124	0.030	0.04	12.92	0.24	0.29	LH
4R29WK		10.126	1.032	1.52	13.57	0.89	1.07	TH
6EVPHP	X	5.245	-3.849	-5.67	7.48	-5.20	-6.25	LA
6J6TKK		8.825	-0.269	-0.40	13.05	0.37	0.44	TO
82WKHN		8.668	-0.426	-0.63	11.70	-0.98	-1.18	ID
9NQ24U		9.879	0.785	1.16	13.12	0.44	0.53	TO
9UWKJL		9.375	0.281	0.41	12.54	-0.14	-0.17	TA
AEFZJT		8.629	-0.465	-0.69	11.91	-0.77	-0.93	XX
AKLJXL		9.443	0.349	0.51	13.47	0.79	0.95	XX
ATCEHM		9.190	0.096	0.14	12.83	0.15	0.18	LE
AWFYMM		9.382	0.288	0.42	12.96	0.28	0.34	IF
BYJ6LT		9.210	0.116	0.17	12.49	-0.19	-0.23	LW
CDU7VN		9.107	0.013	0.02	11.78	-0.90	-1.09	TK
D6XPJP		8.236	-0.858	-1.26	11.92	-0.76	-0.92	SA
D79EZF		9.435	0.341	0.50	12.80	0.11	0.14	TH
DP48LE		9.185	0.092	0.13	11.88	-0.80	-0.96	TB
DRU4HK		8.687	-0.407	-0.60	12.03	-0.65	-0.79	TB
EQUTRB		10.318	1.225	1.80	14.24	1.56	1.87	LA
G8P6DG		10.191	1.097	1.62	13.83	1.15	1.38	TO
G9NAUB		9.473	0.379	0.56	13.40	0.72	0.87	IK
GAXBYH	X	1.895	-7.199	-10.61	2.56	-10.12	-12.17	LA
GN44TF		8.910	-0.184	-0.27	11.71	-0.97	-1.17	LW
GZC7RH		8.579	-0.514	-0.76	12.35	-0.33	-0.40	IM
H88D3B	X	72.640	63.546	93.65	88.27	75.59	90.89	XX
HDXMCA	*	7.713	-1.381	-2.04	12.17	-0.52	-0.62	IM
HGE7FC		8.512	-0.582	-0.86	11.90	-0.78	-0.94	LE
HGXY8A		8.118	-0.976	-1.44	12.02	-0.66	-0.80	ID
HQKXYE		8.868	-0.226	-0.33	12.53	-0.15	-0.18	LI
HRRAFF		7.556	-1.538	-2.27	11.14	-1.54	-1.85	IX
JLKWHH		8.534	-0.560	-0.82	12.16	-0.52	-0.63	XX
KUB7W7		8.230	-0.864	-1.27	12.02	-0.66	-0.80	TP
LC7YH4		9.651	0.557	0.82	13.34	0.66	0.80	TA
P3R7PB		9.927	0.833	1.23	13.12	0.44	0.53	TP
PE3LM4		9.299	0.205	0.30	13.95	1.27	1.52	LA
PJJ4Q7		8.871	-0.223	-0.33	12.17	-0.51	-0.62	LH
Q3483X		9.950	0.856	1.26	14.34	1.66	2.00	TH
QTYB3Z		8.861	-0.232	-0.34	12.73	0.05	0.06	IF
QZ2AR6		9.314	0.220	0.32	14.02	1.34	1.61	TT
T236AX		8.716	-0.378	-0.56	12.38	-0.30	-0.36	IK
UKTPH3		9.772	0.678	1.00	13.40	0.72	0.86	TO

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WebCode	Data Flag	Sample SE29			Sample SE30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
VUJK44		8.551	-0.542	-0.80	11.69	-0.99	-1.19	LE
VUXA4V	X	15.020	5.926	8.73	21.25	8.57	10.30	LE
X36DJT		10.042	0.949	1.40	13.78	1.10	1.32	TX
YLWWWQ		10.021	0.927	1.37	13.23	0.54	0.65	IF
ZGQWQQ		8.368	-0.726	-1.07	11.34	-1.34	-1.61	IN

Summary Statistics

	Sample SE29	Sample SE30
Grand Means	9.0939 kN/m	12.681 kN/m
SD Btwn Labs	0.6786 kN/m	0.832 kN/m

Statistics based on 41 of 45 reporting participants

Comments on Assigned Data Flags for Test #330

GAXBYH (X) - Extreme data.

6EVPHP (X) - Extreme data.

VUXA4V (X) - Extreme data.

H88D3B (X) - Extreme data.

Key to Instrument Codes Reported by Participants

ID	Instron 4201	IF	Instron 3340 Series
IK	Instron 4400 Series	IM	Instron 5500 Series
IN	Instron 3360 Series	IX	Instron (model not specified)
LA	L & W Autoline	LE	L & W Tensile Tester 066
LH	L & W Alwetron TH1 (Horizontal) SE 060	LI	LLoyds Instruments
LW	L & W Tensile Tester SE062	SA	Shimadzu Autograph AG 2000 A
TA	Thwing-Albert Tensile Tester	TB	Thwing-Albert EJA/1000
TH	Thwing-Albert QC-3A	TK	Thwing-Albert Model 37-4
TO	Thwing-Albert QC-1000	TP	TMI Monitor/Tensile 100 (84-21-01)
TT	Tinius Olsen Model MHT	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		

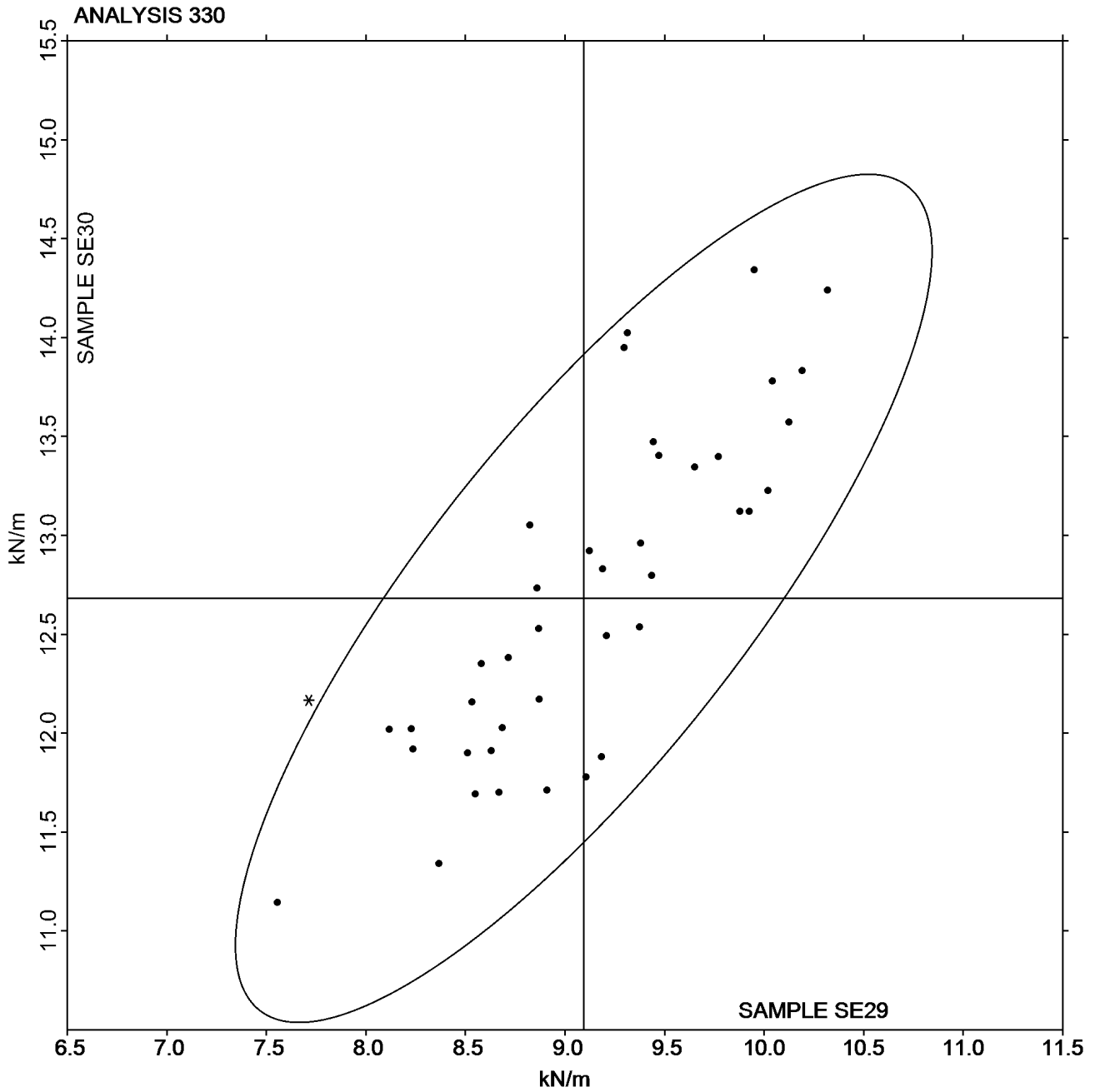# Paper & Paperboard Interlaboratory Testing Program
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Grand Mean Sample **SE29** = 9.0939 kN/m   Grand Mean Sample **SE30** = 12.681 kN/m

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WebCode	Data Flag	Sample SE29 Lab Mean	Sample SE29 Diff from Grand Mean	Sample SE29 CPV	Sample SE30 Lab Mean	Sample SE30 Diff from Grand Mean	Sample SE30 CPV	Instr Code
4N3UAU		99.5	-7.9	-0.56	165.4	-6.8	-0.29	LH
4R29WK		127.1	19.6	1.39	182.6	10.5	0.45	TH
6EVPHP		122.3	14.9	1.06	190.0	17.8	0.77	LA
6J6TKK		108.4	1.0	0.07	193.5	21.3	0.92	TO
9NQ24U		118.2	10.8	0.77	167.0	-5.1	-0.22	TO
AEFZJT		107.9	0.4	0.03	174.0	1.8	0.08	XX
AKLJXL		136.5	29.1	2.06	228.1	55.9	2.41	XX
ATCEHM		96.0	-11.4	-0.81	153.0	-19.2	-0.83	LE
BYJ6LT		102.0	-5.5	-0.39	153.8	-18.4	-0.79	LW
CDU7VN	*	66.1	-41.3	-2.93	107.8	-64.4	-2.78	XX
D6XPJP		96.4	-11.0	-0.78	160.2	-12.0	-0.52	SA
D79EZF		121.0	13.6	0.96	175.2	3.1	0.13	TH
DP48LE		96.8	-10.6	-0.75	173.6	1.4	0.06	TB
EQUTRB		117.4	9.9	0.71	188.3	16.1	0.70	LA
G8P6DG		119.4	12.0	0.85	191.5	19.3	0.83	TO
G9NAUB		102.8	-4.6	-0.33	155.8	-16.3	-0.70	XX
GAXBYH		108.9	1.5	0.11	162.4	-9.8	-0.42	LA
GN44TF		106.9	-0.5	-0.04	143.4	-28.8	-1.24	LW
GZC7RH		98.1	-9.3	-0.66	166.1	-6.1	-0.26	IM
H88D3B		115.2	7.7	0.55	176.7	4.5	0.20	XX
HDXMCA	*	78.7	-28.7	-2.04	160.8	-11.4	-0.49	IM
HGE7FC		99.9	-7.5	-0.53	153.5	-18.7	-0.81	LE
HGXY8A		87.7	-19.7	-1.40	153.1	-19.1	-0.82	ID
HRRAFF	*	84.7	-22.8	-1.61	174.1	1.9	0.08	IX
JLKWHH		99.6	-7.8	-0.55	154.3	-17.9	-0.77	XX
KUB7W7		108.9	1.5	0.11	192.0	19.8	0.85	TP
LC7YH4		114.2	6.8	0.48	169.6	-2.6	-0.11	TA
PE3LM4		117.8	10.3	0.73	191.5	19.4	0.83	LA
PJJ4Q7		96.5	-10.9	-0.77	143.9	-28.3	-1.22	LH
Q3483X		114.8	7.4	0.53	201.4	29.2	1.26	TH
QTYB3Z		112.4	5.0	0.35	186.2	14.0	0.60	IF
QZ2AR6		120.1	12.7	0.90	214.6	42.4	1.83	TT
T236AX		125.2	17.8	1.26	206.5	34.3	1.48	IK
UKTPH3		110.6	3.2	0.23	164.3	-7.8	-0.34	XX
VUJK44		102.7	-4.7	-0.34	156.4	-15.7	-0.68	LW
VUXA4V	X	186.1	78.7	5.58	289.7	117.5	5.07	LE
X36DJT		124.5	17.1	1.22	205.6	33.5	1.44	XX
YLWWWQ		105.4	-2.0	-0.14	150.5	-21.7	-0.94	IN
ZGQWQQ		111.2	3.8	0.27	156.2	-16.0	-0.69	IN

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Summary Statistics

	Sample SE29	**Sample SE30**
Grand Means	107.41 Joules/sq m	172.17 Joules/sq m
SD Btwn Labs	14.09 Joules/sq m	23.19 Joules/sq m

Statistics based on 38 of 39 reporting participants

Comments on Assigned Data Flags for Test #331

VUXA4V (X) - Data for both samples are high.

Key to Instrument Codes Reported by Participants

|			
ID	Instron 4201	IF	Instron 3340 Series
IK	Instron 4400 Series	IM	Instron 5500 Series
IN	Instron 3360 Series	IX	Instron (model not specified)
LA	L & W Autoline	LE	L & W Tensile Tester 066
LH	L & W Alwetron TH1 (Horizontal) SE 060	LW	L & W Tensile Tester SE062
SA	Shimadzu Autograph AG 2000 A	TA	Thwing-Albert Tensile Tester
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TO	Thwing-Albert QC-1000	TP	TMI Monitor/Tensile 100 (84-21-01)
TT	Tinius Olsen Model MHT	XX	Instrument make/model not specified by lab

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Grand Mean Sample **SE29** = 107.41 Joules/sq m   Grand Mean Sample **SE30** = 172.17 Joules/sq m
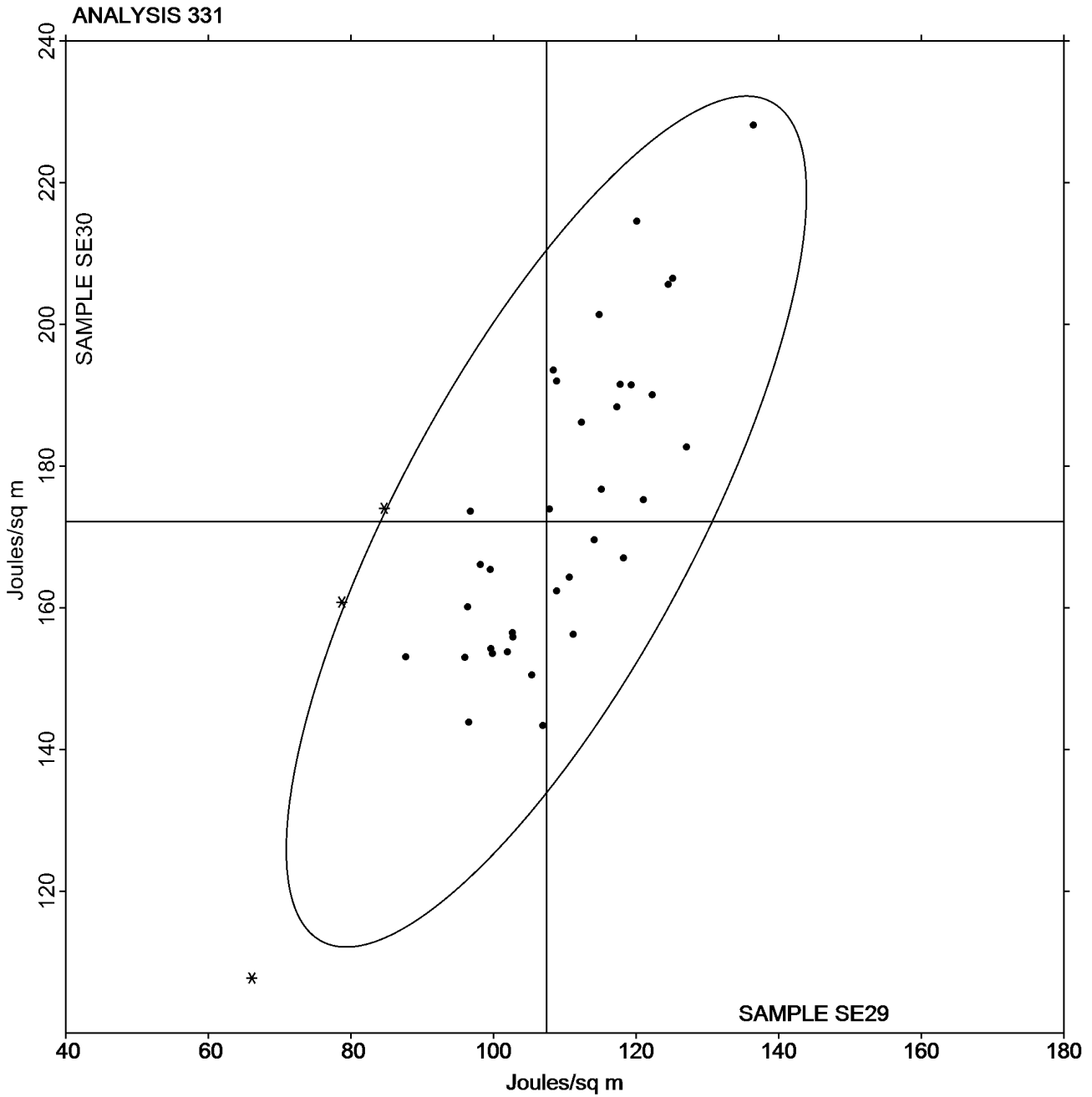
ANALYSIS 331

SAMPLE SE30

Joules/sq m

SAMPLE SE29

Joules/sq m

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Elongation to Break - Packaging Papers
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WebCode	Data Flag	Sample SE29 Lab Mean	Sample SE29 Diff from Grand Mean	Sample SE29 CPV	Sample SE30 Lab Mean	Sample SE30 Diff from Grand Mean	Sample SE30 CPV	Instr Code
4N3UAU		1.663	-0.231	-1.06	2.006	-0.170	-0.61	LH
4R29WK		2.027	0.133	0.61	2.244	0.068	0.24	TH
6EVPHP		1.757	-0.137	-0.63	1.953	-0.223	-0.80	LA
6J6TKK		1.961	0.067	0.31	2.347	0.171	0.61	TO
82WKHN		1.879	-0.015	-0.07	2.068	-0.108	-0.39	ID
9NQ24U		1.849	-0.045	-0.21	2.045	-0.131	-0.47	TO
AEFZJT		1.956	0.062	0.28	2.309	0.133	0.47	XX
AKLJXL		2.225	0.331	1.52	2.642	0.466	1.67	XX
ATCEHM		1.600	-0.294	-1.35	1.835	-0.341	-1.22	LE
BYJ6LT		1.710	-0.184	-0.85	1.916	-0.260	-0.93	LW
CDU7VN		2.179	0.285	1.31	2.707	0.531	1.90	XX
D6XPJP		1.800	-0.094	-0.43	2.111	-0.065	-0.23	SA
D79EZF		2.219	0.325	1.49	2.432	0.256	0.92	TH
DP48LE		1.716	-0.178	-0.82	2.126	-0.050	-0.18	TB
DRU4HK		1.895	0.001	0.00	2.151	-0.025	-0.09	TB
EQUTRB		1.709	-0.185	-0.85	1.985	-0.191	-0.69	LA
G8P6DG		1.856	-0.038	-0.18	2.194	0.018	0.06	TO
G9NAUB	*	1.320	-0.574	-2.64	1.510	-0.666	-2.39	XX
GAXBYH		1.772	-0.122	-0.56	1.946	-0.230	-0.83	XX
GN44TF		1.800	-0.094	-0.43	1.864	-0.312	-1.12	LW
GZC7RH		2.017	0.123	0.56	2.373	0.197	0.70	IM
H88D3B		2.096	0.202	0.93	2.547	0.371	1.33	XX
HDXMCA	*	1.703	-0.191	-0.88	2.190	0.014	0.05	IM
HGE7FC		1.760	-0.134	-0.62	1.953	-0.223	-0.80	LE
HGXY8A		1.808	-0.086	-0.40	2.169	-0.007	-0.03	ID
HRRAFF	X	1.947	0.053	0.24	2.798	0.621	2.23	IX
JLKWHH		1.769	-0.125	-0.58	1.967	-0.209	-0.75	XX
KUB7W7		2.430	0.536	2.46	2.820	0.644	2.31	TP
LC7YH4		1.887	-0.007	-0.03	2.108	-0.068	-0.25	TA
PE3LM4		1.845	-0.049	-0.23	2.037	-0.139	-0.50	LA
PJJ4Q7		1.652	-0.242	-1.11	1.809	-0.367	-1.32	LH
Q3483X		1.952	0.058	0.27	2.189	0.013	0.04	TH
QTYB3Z		2.074	0.180	0.83	2.357	0.181	0.65	IF
QZ2AR6		2.032	0.138	0.63	2.456	0.279	1.00	XX
T236AX		2.304	0.410	1.88	2.730	0.554	1.98	IK
UKTPH3		1.930	0.036	0.16	2.100	-0.076	-0.27	XX
VUJK44		1.808	-0.086	-0.40	2.030	-0.146	-0.52	LW
VUXA4V		1.868	-0.026	-0.12	2.162	-0.014	-0.05	LE
X36DJT		2.095	0.201	0.92	2.470	0.294	1.05	XX
YLWWWQ		1.655	-0.239	-1.10	1.872	-0.304	-1.09	IN

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March 2016

| WebCode | Data Flag | Sample SE29 | | | Sample SE30 | | | Instr Code |
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
ZGQWQQ		2.190	0.296	1.36	2.330	0.154	0.55	IN

Summary Statistics

	Sample SE29	Sample SE30
Grand Means	1.8942 Percent	2.1765 Percent
SD Btwn Labs	0.2175 Percent	0.2791 Percent

Statistics based on 40 of 41 reporting participants

Comments on Assigned Data Flags for Test #332

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

Key to Instrument Codes Reported by Participants

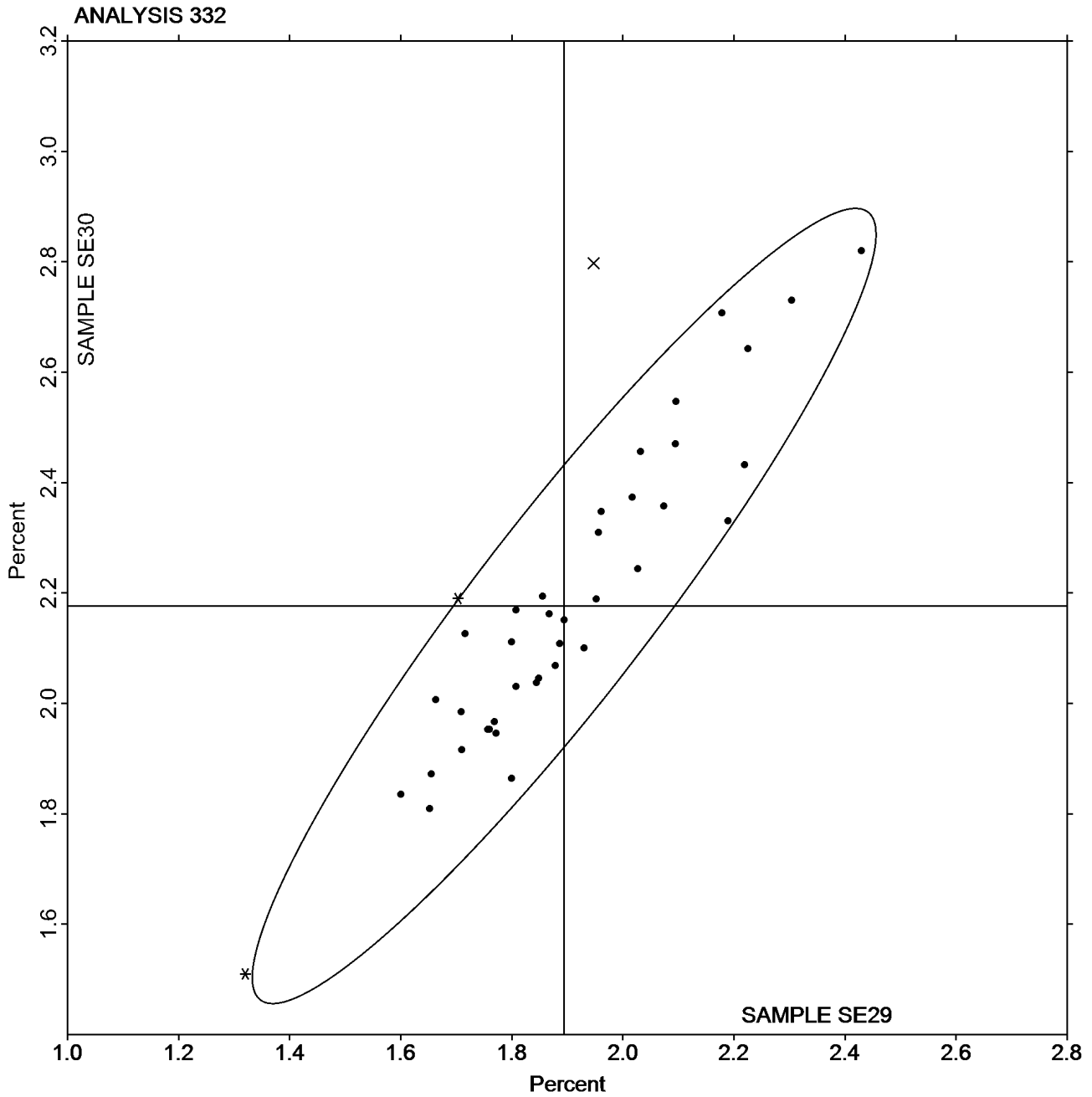|			
ID	Instron 4201	IF	Instron 3340 Series
IK	Instron 4400 Series	IM	Instron 5500 Series
IN	Instron 3360 Series	IX	Instron (model not specified)
LA	L & W Autoline 300	LE	L & W Tensile Tester 066
LH	L & W Alwetron TH1 (Horizontal) SE 060	LW	L & W Tensile Tester SE062
SA	Shimadzu Autograph AG 2000 A	TA	Thwing-Albert Tensile Tester
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TO	Thwing-Albert QC-1000	TP	TMI Monitor/Tensile 100 (84-21-01)
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

Report #281S

March 2016

Grand Mean Sample **SE29** = 1.8942 Percent   Grand Mean Sample **SE30** = 2.1765 Percent

Paper & Paperboard Interlaboratory Testing Program

Report #281S

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

March 2016

		Sample SG29			Sample SG30			
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	Instr Code
4EVF3M		12.90	0.52	0.14	55.70	12.49	1.12	MT
4MR7UP		14.90	2.52	0.67	60.80	17.59	1.58	MT
AEFZJT		12.10	-0.28	-0.07	40.10	-3.11	-0.28	MT
CDU7VN		8.60	-3.78	-1.00	34.30	-8.91	-0.80	MT
CEQJHG		15.40	3.02	0.80	43.20	-0.01	0.00	MT
D79EZF		13.70	1.32	0.35	46.20	2.99	0.27	XX
DRU4HK		11.20	-1.18	-0.31	37.90	-5.31	-0.48	MT
DZ4VLN		11.50	-0.88	-0.23	43.30	0.09	0.01	XX
E6CKFG		6.10	-6.28	-1.66	29.10	-14.11	-1.27	XX
FA366H		9.40	-2.98	-0.79	38.90	-4.31	-0.39	XX
GN44TF		9.90	-2.48	-0.66	37.70	-5.51	-0.50	MT
KZ2EPC	*	20.50	8.12	2.15	39.50	-3.71	-0.33	MT
MM4AAB		7.80	-4.58	-1.21	23.80	-19.41	-1.75	MT
QAMNE8		15.80	3.42	0.91	60.80	17.59	1.58	MT
XZY62Z		15.90	3.52	0.93	56.90	13.69	1.23	MT

Summary Statistics

	Sample SG29	**Sample SG30**
Grand Means	12.380 Double Folds	43.213 Double Folds
SD Btwn Labs	3.775 Double Folds	11.107 Double Folds

Statistics based on 15 of 15 reporting participants

Key to Instrument Codes Reported by Participants

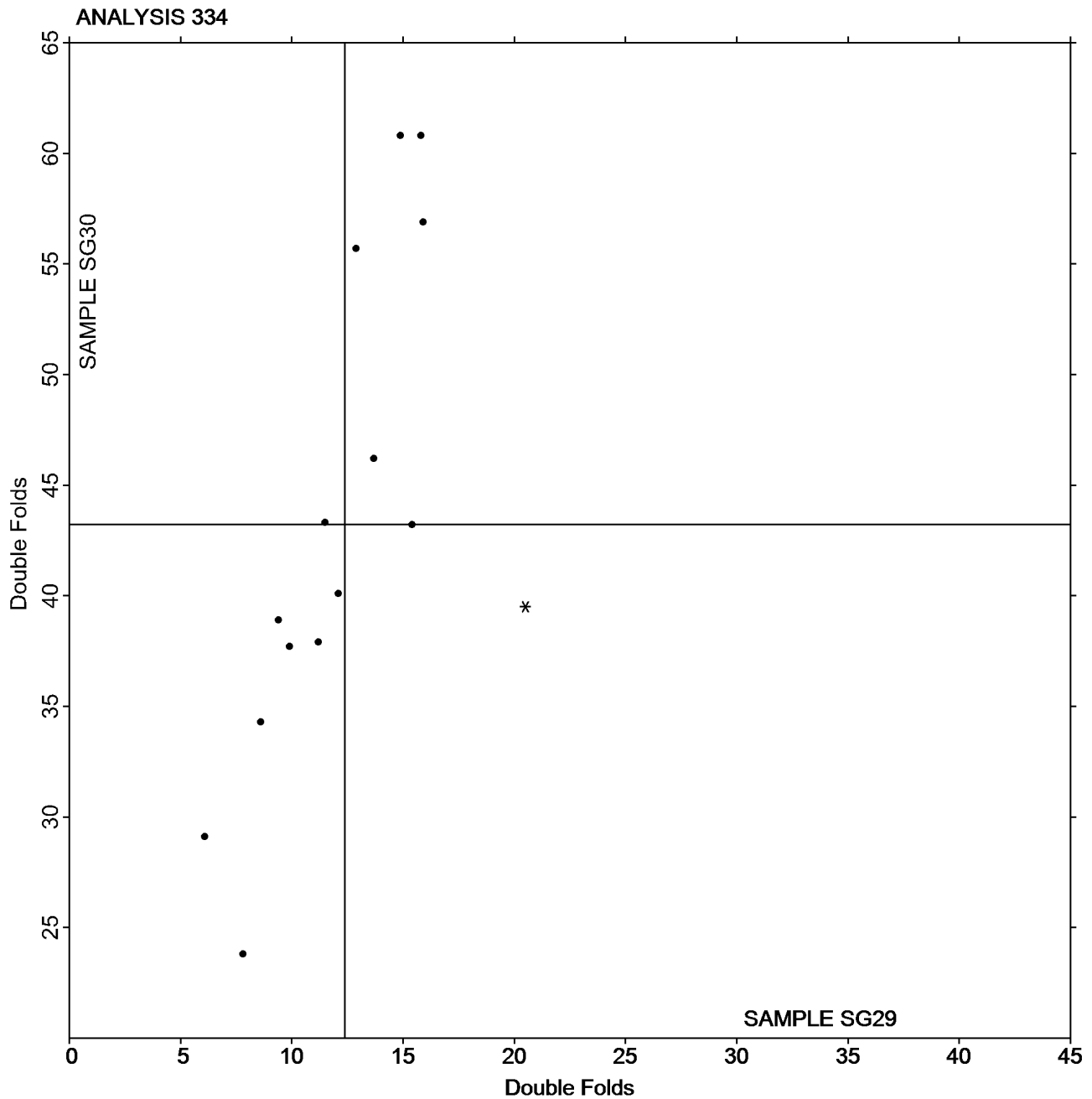|			
MT	MIT - Tinius Olsen	XX	Instrument make/model not specified by lab

Paper & Paperboard Interlaboratory Testing Program
Analysis 334
Folding Endurance (MIT) - Double Folds
TAPPI Official Test Method T511

Report #281S
March 2016

Grand Mean Sample **SG29** = 12.380 Double Folds   Grand Mean Sample **SG30** = 43.213 Double Folds

ANALYSIS 334

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

Paper & Paperboard Interlaboratory Testing Program

Report #281S

Analysis 336
Bending Resistance, Gurley Type
TAPPI Official Test Method T543

March 2016

WebCode	Data Flag	Sample SH29			Sample SH30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3HL3KP		115.7	-13.1	-1.78	117.9	-12.4	-1.90
4GLCZT		122.8	-6.0	-0.81	132.5	2.3	0.35
9MCFUR		121.5	-7.2	-0.98	131.2	0.9	0.14
AD6XWU		121.2	-7.6	-1.02	121.5	-8.8	-1.34
AEFZJT		133.2	4.4	0.60	139.7	9.5	1.46
ATV8BK		123.2	-5.6	-0.75	124.7	-5.6	-0.85
CGEX7Q		129.8	1.0	0.14	132.5	2.2	0.34
CP8FCM		124.5	-4.2	-0.57	123.4	-6.8	-1.05
DRU4HK		138.1	9.3	1.26	132.8	2.5	0.38
DZ4VLN		135.6	6.8	0.92	134.7	4.4	0.68
FY3HDL	X	164.8	36.0	4.88	147.0	16.7	2.57
GBD8RG	X	97.9	-30.9	-4.18	96.0	-34.2	-5.25
LGMGL7		126.1	-2.7	-0.36	125.2	-5.0	-0.77
MM4AAB		133.4	4.6	0.63	136.1	5.8	0.90
QAMNE8		121.4	-7.3	-0.99	121.7	-8.6	-1.32
QTYB3Z	X	164.9	36.1	4.90	161.8	31.5	4.84
W9ULDY		136.2	7.5	1.01	134.8	4.6	0.70
X2NFRT		134.3	5.5	0.75	136.5	6.3	0.96
XY4MYY		129.8	1.0	0.14	131.8	1.5	0.23
XZTXPR		142.2	13.5	1.83	137.3	7.1	1.09

Summary Statistics

	Sample SH29	Sample SH30
Grand Means	128.77 Gurley Units	130.25 Gurley Units
SD Btwn Labs	7.38 Gurley Units	6.52 Gurley Units

Statistics based on 17 of 20 reporting participants

Comments on Assigned Data Flags for Test #336

FY3HDL (X) - Data for both samples are high. Inconsistent within the determinations for Sample SH29.

GBD8RG (X) - Data for both samples are low.

QTYB3Z (X) - Data for both samples are high. Inconsistent within the determinations for SH29.
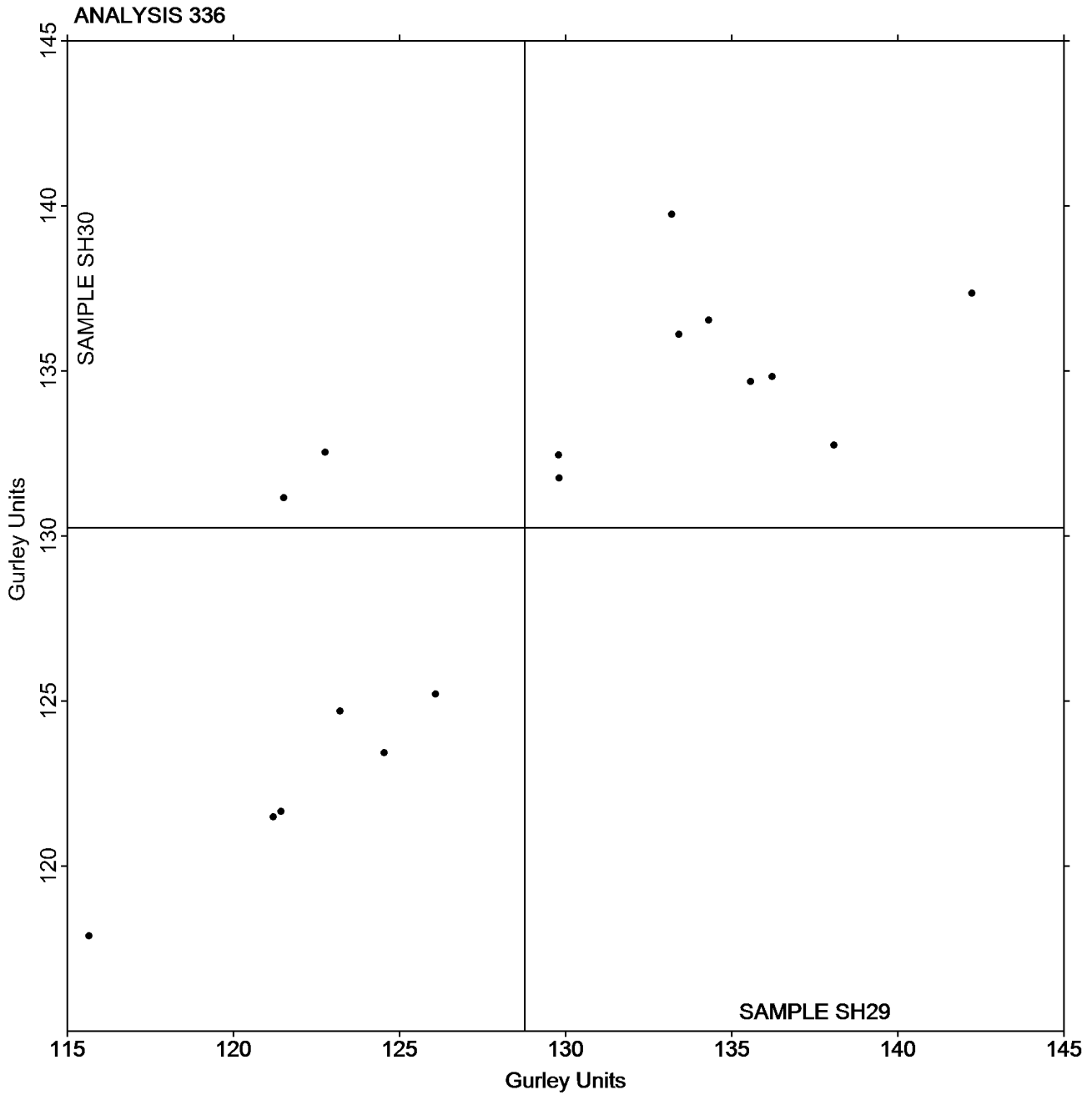
Paper & Paperboard Interlaboratory Testing Program
Analysis 336
Bending Resistance, Gurley Type
TAPPI Official Test Method T543

Report #281S
March 2016

Grand Mean Sample **SH29** = 128.77 Gurley Units   Grand Mean Sample **SH30** = 130.25 Gurley Units

If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.
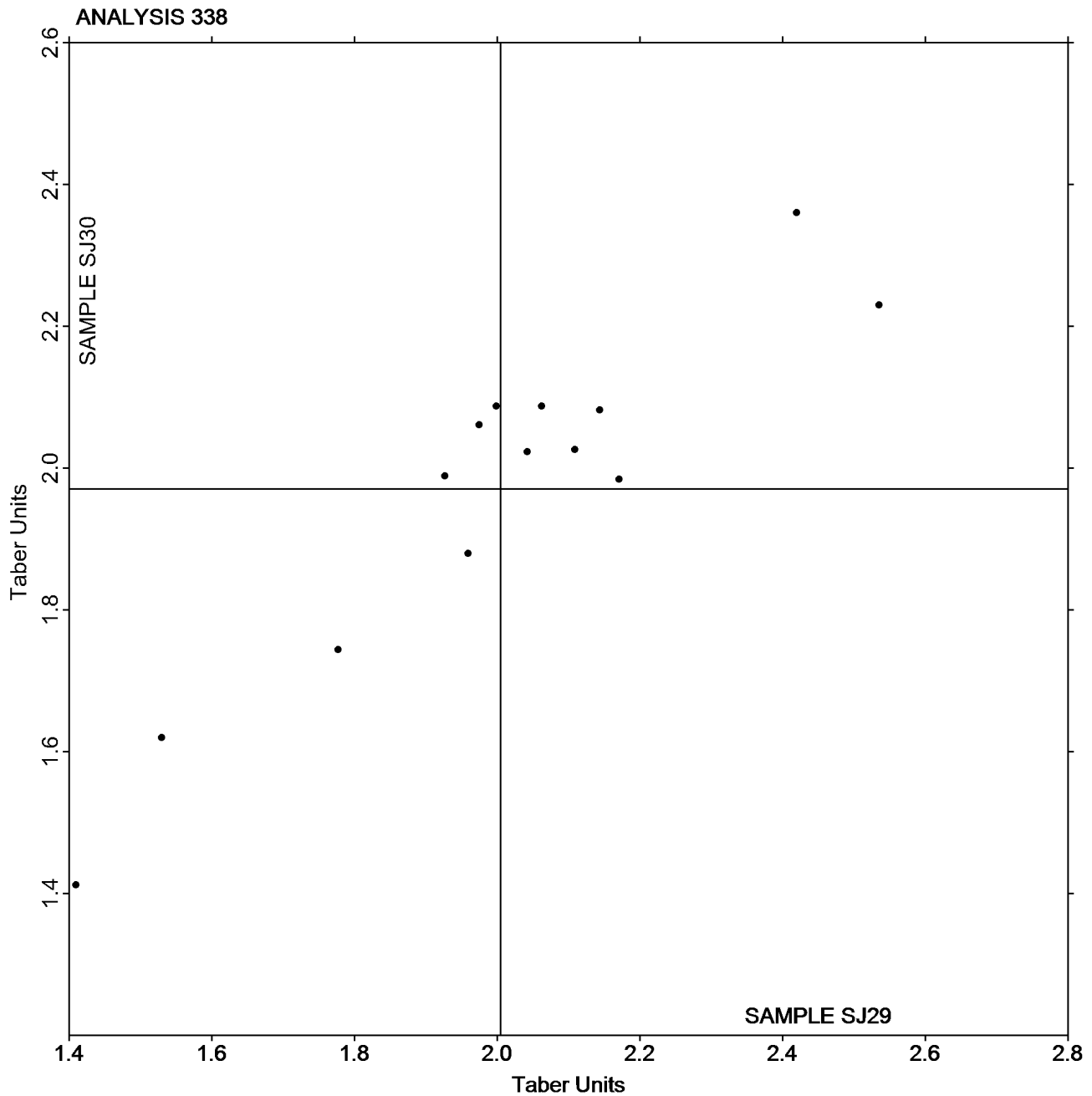
Paper & Paperboard Interlaboratory Testing Program
Analysis 338
Bending Resistance, Taber Type - 0 to 10 Units
TAPPI Official Test Method T566

Report #281S
March 2016

		Sample SJ29			Sample SJ30		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
7M6EVN		2.171	0.167	0.56	1.984	0.014	0.06
9MCFUR		2.063	0.058	0.20	2.088	0.117	0.48
BYJ6LT		1.530	-0.474	-1.59	1.620	-0.350	-1.44
DZ4VLN		2.535	0.531	1.78	2.230	0.260	1.07
FA366H		2.109	0.105	0.35	2.026	0.056	0.23
FGJQ7A		1.410	-0.594	-1.99	1.412	-0.558	-2.30
GBD8RG		1.777	-0.227	-0.76	1.744	-0.226	-0.93
GQ722M		1.959	-0.045	-0.15	1.880	-0.091	-0.37
KCTZV8		2.144	0.140	0.47	2.082	0.112	0.46
KZ2EPC		1.999	-0.005	-0.02	2.087	0.117	0.48
QAMNE8		2.042	0.038	0.13	2.023	0.053	0.22
QTYB3Z		1.927	-0.077	-0.26	1.989	0.019	0.08
WCVYPQ		1.975	-0.029	-0.10	2.061	0.091	0.37
YLWWWQ		2.420	0.416	1.39	2.360	0.390	1.60

Summary Statistics

	Sample SJ29	**Sample SJ30**
Grand Means	2.0043 Taber Units	1.9704 Taber Units
SD Btwn Labs	0.2982 Taber Units	0.2430 Taber Units

Statistics based on 14 of 14 reporting participants

Paper & Paperboard Interlaboratory Testing Program
Analysis 338
Bending Resistance, Taber Type - 0 to 10 Units
TAPPI Official Test Method T566

Report #281S
March 2016

Grand Mean Sample **SJ29** = 2.0043 Taber Units   Grand Mean Sample **SJ30** = 1.9704 Taber Units

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

Paper & Paperboard Interlaboratory Testing Program
Analysis 339
Bending Resistance, Taber Type - 10 to 100 Taber Units
TAPPI Official Test Method T489

Report #281S

March 2016

WebCode	Data Flag	Sample SQ29			Sample SQ30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2P6W7M		20.24	0.65	0.49	33.23	-0.10	-0.06
6EVPHP	X	28.15	8.56	6.52	39.93	6.60	4.04
BYJ6LT		18.45	-1.14	-0.87	32.45	-0.88	-0.54
CP8FCM		17.44	-2.15	-1.64	31.80	-1.53	-0.94
CPQ9YH		19.45	-0.14	-0.11	32.70	-0.63	-0.39
DP48LE		20.69	1.10	0.84	34.38	1.05	0.64
EA87RD		17.54	-2.05	-1.56	30.38	-2.95	-1.81
GN44TF		20.16	0.57	0.43	33.52	0.19	0.12
H2LB67		18.01	-1.58	-1.20	31.29	-2.04	-1.25
LGMGL7		21.05	1.45	1.11	35.03	1.70	1.04
QAMNE8		20.27	0.68	0.52	35.52	2.19	1.34
QCWE4B		20.70	1.11	0.84	34.10	0.77	0.47
RK4UQ2		19.60	0.00	0.00	33.08	-0.25	-0.15
VUXA4V		21.10	1.51	1.15	35.80	2.47	1.51

Summary Statistics

	Sample SQ29	Sample SQ30
Grand Means	19.592 Taber Units	33.329 Taber Units
SD Btwn Labs	1.313 Taber Units	1.633 Taber Units

Statistics based on 13 of 14 reporting participants

Comments on Assigned Data Flags for Test #339
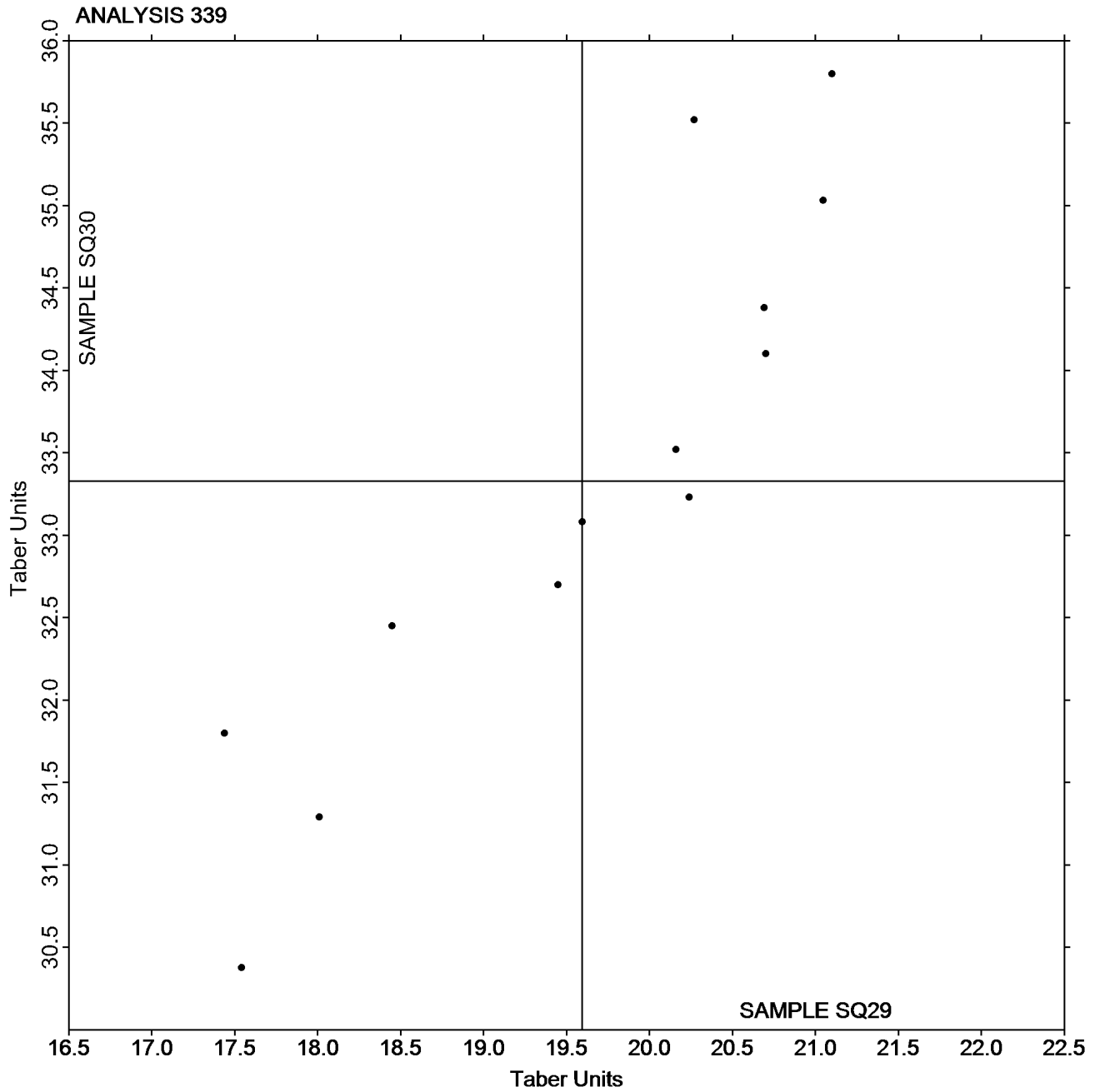
6EVPHP (X) - Extreme data.

Paper & Paperboard Interlaboratory Testing Program
Analysis 339
Bending Resistance, Taber Type - 10 to 100 Taber Units
TAPPI Official Test Method T489

Report #281S
March 2016

Grand Mean Sample **SQ29** = 19.592 Taber Units   Grand Mean Sample **SQ30** = 33.329 Taber Units

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

Paper & Paperboard Interlaboratory Testing Program

Report #281S

Analysis 340

March 2016

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

TAPPI Official Test Method T489

		Sample ST29			Sample ST30		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4UQTLN		289.7	9.1	0.68	240.6	0.8	0.06
8GA8QK		282.2	1.6	0.12	247.3	7.5	0.56
AEFZJT		275.7	-4.9	-0.36	231.7	-8.1	-0.61
AWFYMM		289.6	9.0	0.67	243.8	4.0	0.30
BYJ6LT		272.0	-8.6	-0.64	230.8	-9.0	-0.68
D6XPJP		274.9	-5.7	-0.43	226.3	-13.5	-1.01
D79EZF		300.3	19.7	1.47	250.4	10.6	0.80
GN44TF		296.7	16.1	1.20	249.0	9.2	0.69
GPALRB		288.2	7.6	0.57	257.1	17.3	1.30
KUB7W7		261.3	-19.3	-1.44	254.6	14.8	1.11
LGMGL7		287.5	6.9	0.51	246.7	6.9	0.52
RZHZ32		275.8	-4.8	-0.36	227.9	-11.9	-0.89
WG8JYX		254.0	-26.6	-1.99	211.1	-28.7	-2.16
ZP87MZ	**X**	114.0	-166.6	-12.43	90.8	-149.0	-11.17

Summary Statistics

	Sample ST29	**Sample ST30**
Grand Means	280.60 Taber Units	239.79 Taber Units
SD Btwn Labs	13.40 Taber Units	13.33 Taber Units
		Statistics based on 13 of 14 reporting participants

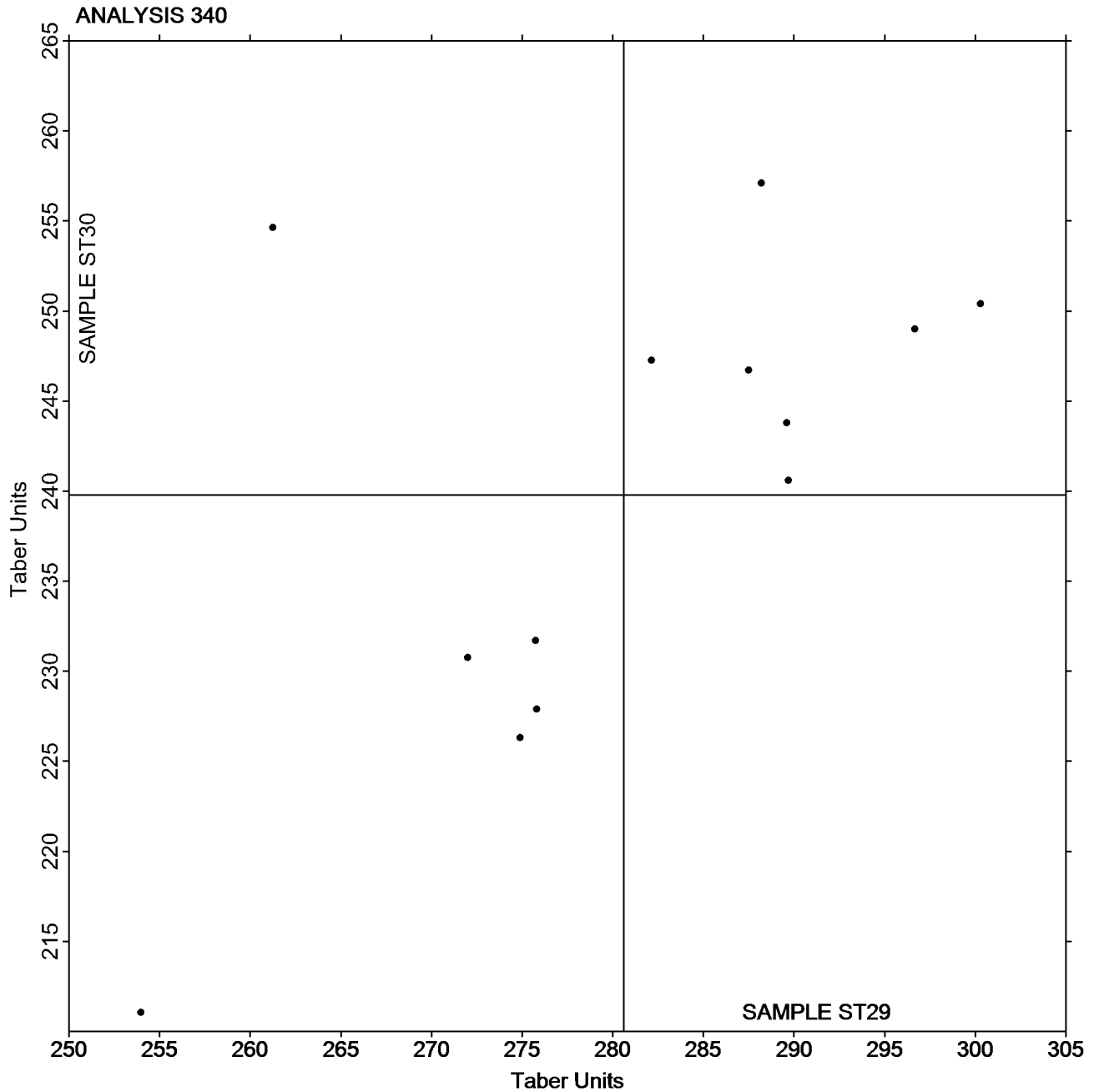## Comments on Assigned Data Flags for Test #340

ZP87MZ (X) - Extreme data.

Paper & Paperboard Interlaboratory Testing Program
Analysis 340
nding Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboc
TAPPI Official Test Method T489

Report #281S

March 2016

Grand Mean Sample **ST29** = 280.60 Taber Units   Grand Mean Sample **ST30** = 239.79 Taber Units

ANALYSIS 340

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

Paper & Paperboard Interlaboratory Testing Program

Report #281S

Analysis 343
Z-Direction Tensile
TAPPI Official Test Method T541

March 2016

WebCode	Data Flag	Sample SM29 Lab Mean	Sample SM29 Diff from Grand Mean	Sample SM29 CPV	Sample SM30 Lab Mean	Sample SM30 Diff from Grand Mean	Sample SM30 CPV	Instr Code
4ED94W		60.42	-6.27	-0.87	83.40	-11.67	-0.98	LW
ADJK9G		71.68	4.98	0.69	111.80	16.74	1.40	TA
AKLJXL		55.92	-10.78	-1.49	79.84	-15.22	-1.27	DT
D79EZF		70.36	3.66	0.51	98.54	3.48	0.29	LW
DP48LE		76.88	10.18	1.41	102.23	7.16	0.60	TA
EA87RD		68.29	1.59	0.22	110.89	15.82	1.32	LW
GN44TF		68.48	1.78	0.25	101.20	6.14	0.51	LW
KUB7W7		55.06	-11.64	-1.61	83.80	-11.26	-0.94	LX
KZ2EPC		61.24	-5.46	-0.76	96.94	1.88	0.16	CD
M8CEZ7		67.40	0.70	0.10	79.40	-15.66	-1.31	DT
QAMNE8		59.90	-6.80	-0.94	87.13	-7.94	-0.66	TZ
QTYB3Z		77.90	11.20	1.55	100.21	5.14	0.43	TL
RK4UQ2		60.00	-6.70	-0.93	83.64	-11.42	-0.95	TZ
T3YMCZ		62.58	-4.12	-0.57	80.14	-14.92	-1.25	XX
U4TPFU		64.40	-2.30	-0.32	98.00	2.94	0.25	XX
UKTPH3		71.60	4.90	0.68	94.60	-0.46	-0.04	TA
VUXA4V		69.82	3.12	0.43	100.30	5.24	0.44	TA
ZP87MZ		78.64	11.94	1.66	119.08	24.02	2.01	CA

Summary Statistics

	Sample SM29	**Sample SM30**
Grand Means	66.698 psi	95.063 psi
SD Btwn Labs	7.211 psi	11.957 psi

Statistics based on 18 of 18 reporting participants

Key to Instrument Codes Reported by Participants

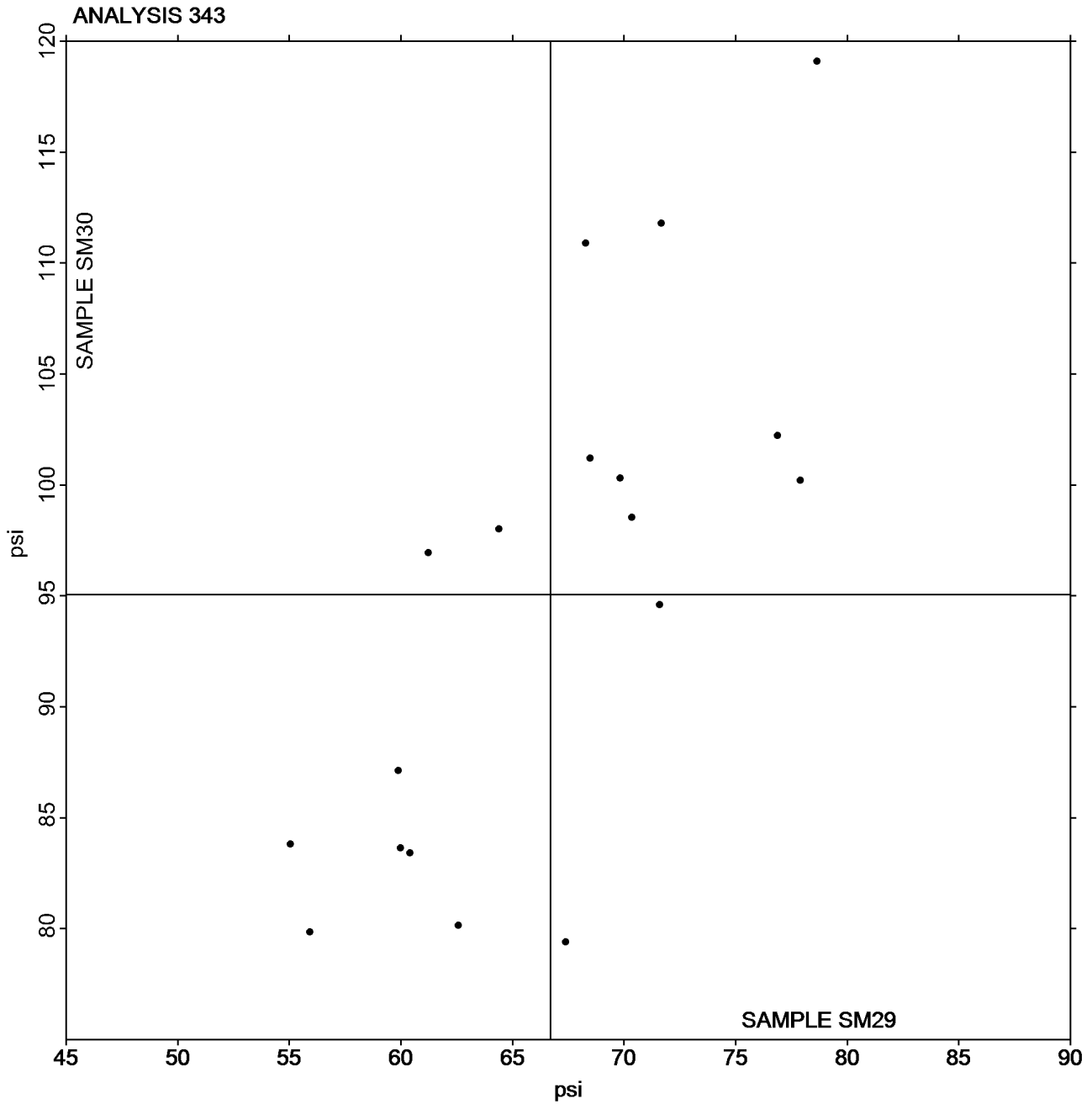|			
CA	CSI CS-163	CD	CSI CS-163D
DT	Dek-Tron DCS-163A ZDT Tester	LW	L & W ZD Tensile Tester
LX	L & W (model not specified)	TA	Thwing-Albert Tensile Tester
TL	TMI Lab Master	TZ	TMI Monitor/ZDT Tester
XX	Instrument make/model not specified by lab		

Paper & Paperboard Interlaboratory Testing Program
Analysis 343
Z-Direction Tensile
TAPPI Official Test Method T541

Report #281S
March 2016

Grand Mean Sample **SM29** = 66.698 psi   Grand Mean Sample **SM30** = 95.063 psi

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

Paper & Paperboard Interlaboratory Testing Program
Analysis 345
Z-Direction Tensile, Recycled Paperboard
TAPPI Official Test Method T541

WebCode	Data Flag	Sample SZ29 Lab Mean	Diff from Grand Mean	CPV	Sample SZ30 Lab Mean	Diff from Grand Mean	CPV	Instr Code
4UQTLN		37.20	2.45	0.73	38.40	-1.35	-0.53	CA
AEFZJT		32.80	-1.95	-0.58	41.76	2.01	0.79	CA
G28PTJ		32.30	-2.45	-0.73	37.62	-2.13	-0.84	LW
GPALRB		37.84	3.09	0.92	44.36	4.61	1.82	TL
HNUM8L		35.26	0.51	0.15	37.64	-2.11	-0.83	LW
HQKXYE		30.90	-3.85	-1.15	39.72	-0.03	-0.01	CH
LGMGL7		35.46	0.71	0.21	40.82	1.07	0.42	CA
PE3LM4		31.76	-3.00	-0.89	38.97	-0.78	-0.31	TA
QUVQDC		33.50	-1.25	-0.37	43.92	4.17	1.64	LW
RZHZ32		34.80	0.05	0.01	41.40	1.65	0.65	CA
T236AX	X	45.46	10.71	3.19	51.49	11.74	4.63	PG
UT8NXY		34.26	-0.49	-0.15	38.10	-1.65	-0.65	DP
WG8JYX		32.18	-2.57	-0.77	36.14	-3.61	-1.42	TL
XPFN9U		43.54	8.79	2.61	37.86	-1.89	-0.74	TL

Summary Statistics

	Sample SZ29	Sample SZ30
Grand Means	34.754 psi	39.747 psi
SD Btwn Labs	3.361 psi	2.538 psi

Statistics based on 13 of 14 reporting participants

Comments on Assigned Data Flags for Test #345

T236AX (X) - Data for both samples are high.

Key to Instrument Codes Reported by Participants

|			
CA	CSI CS-163	CH	Chatillon Ametek
DP	Dek-Tron XP Series	LW	L & W ZD Tensile Tester
PG	Perkins Model A Mullen Tester	TA	Thwing-Albert Tensile Tester
TL	TMI Lab Master		

Paper & Paperboard Interlaboratory Testing Program
Analysis 345
Z-Direction Tensile, Recycled Paperboard
TAPPI Official Test Method T541

Report #281S
March 2016

Grand Mean Sample **SZ29** = 34.754 psi   Grand Mean Sample **SZ30** = 39.747 psi
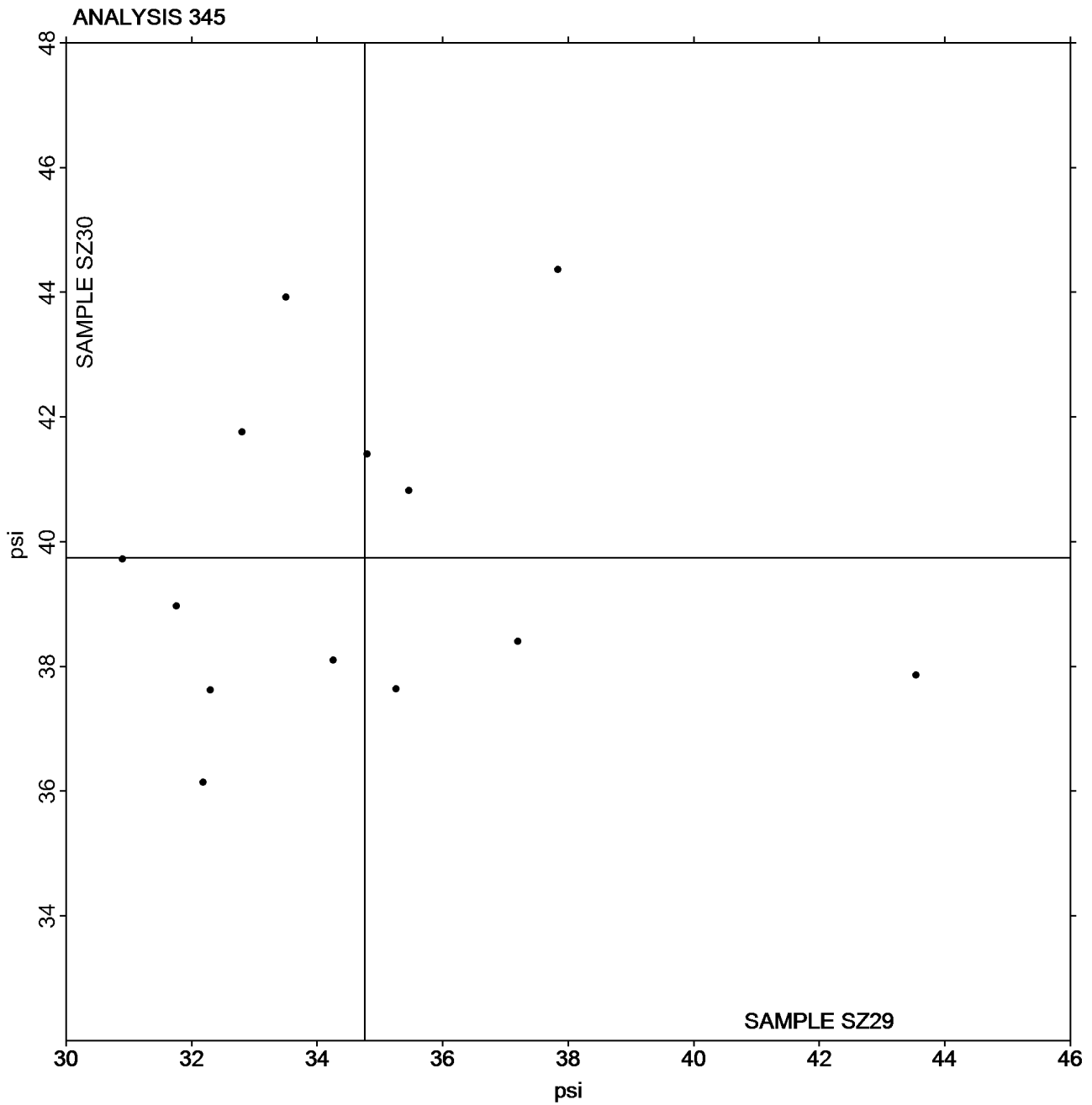
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Paper & Paperboard Interlaboratory Testing Program
Analysis 348
Internal Bond Strength - Modified Scott Mechanics
TAPPI Provisional Test Method T569

Report #281S

March 2016

WebCode	Data Flag	Sample SN29			Sample SN30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3HL3KP		102.2	1.7	0.21	159.2	10.8	0.87	HY
7TT2QU	X	87.8	-12.7	-1.65	205.4	57.0	4.59	XX
9MCFUR		93.1	-7.5	-0.97	131.0	-17.4	-1.40	KR
9NQ24U		101.8	1.3	0.16	150.6	2.2	0.17	HY
ADJK9G		108.8	8.3	1.07	159.6	11.2	0.90	HY
AEFZJT		104.6	4.1	0.52	146.4	-2.0	-0.16	HZ
ATV8BK		99.6	-0.9	-0.12	141.0	-7.4	-0.60	HY
D79EZF	*	93.0	-7.5	-0.98	115.2	-33.2	-2.68	HZ
DP48LE		95.8	-4.7	-0.61	147.2	-1.2	-0.10	HZ
G8P6DG		111.4	10.9	1.40	147.4	-1.0	-0.08	HZ
GBD8RG		102.0	1.5	0.19	140.9	-7.6	-0.61	HY
GN44TF		101.0	0.5	0.06	156.4	8.0	0.64	HY
KZ2EPC		106.4	5.9	0.76	155.4	7.0	0.56	HY
MM4AAB		96.6	-3.9	-0.51	142.4	-6.0	-0.49	HY
QAMNE8		95.4	-5.1	-0.67	152.4	4.0	0.32	HY
RBHF4Y		106.0	5.5	0.71	151.2	2.8	0.22	HY
RK4UQ2	*	77.1	-23.4	-3.03	135.5	-13.0	-1.04	HY
VUXA4V		108.0	7.5	0.96	162.4	14.0	1.12	HY
WG8JYX		103.8	3.3	0.42	158.4	10.0	0.80	HZ
XZTXPR		103.8	3.2	0.42	167.7	19.2	1.55	HZ

Summary Statistics

	Sample SN29	Sample SN30
Grand Means	100.54 1000th ft-lbs	148.44 1000th ft-lbs
SD Btwn Labs	7.73 1000th ft-lbs	12.42 1000th ft-lbs

Statistics based on 19 of 20 reporting participants

Comments on Assigned Data Flags for Test #348

7TT2QU (X) - Data for sample SN30 are high. Inconsistent within the determinations of sample SN30.

Key to Instrument Codes Reported by Participants

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

Paper & Paperboard Interlaboratory Testing Program
Analysis 348
Internal Bond Strength - Modified Scott Mechanics
TAPPI Provisional Test Method T569

Report #281S

March 2016

Grand Mean Sample **SN29** = 100.54 1000th ft-lbs   Grand Mean Sample **SN30** = 148.44 1000th ft-lbs
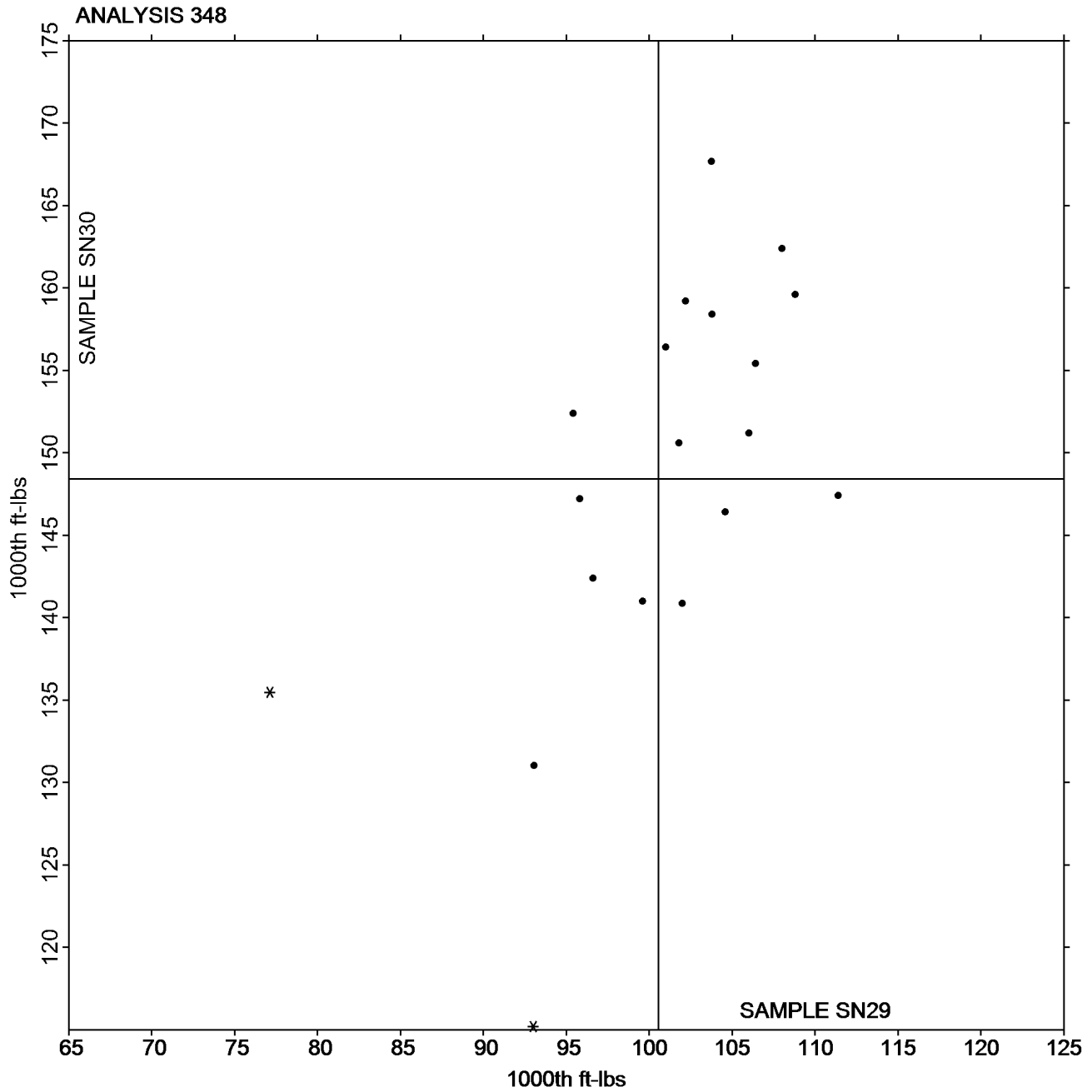
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Paper & Paperboard Interlaboratory Testing Program
Analysis 349
Internal Bond Strength - Scott Bond Models
TAPPI Provisional Test Method T569

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WebCode	Data Flag	Sample SP29			Sample SP30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4N3UAU		97.21	4.30	0.48	129.6	-11.4	-0.48	TM
AKLJXL	X	101.00	8.10	0.91	126.6	-14.4	-0.60	XX
BKYRYK		88.00	-4.90	-0.55	138.0	-3.0	-0.13	SC
BYJ6LT		96.46	3.56	0.40	174.7	33.6	1.40	XX
CRC3RC		102.60	9.70	1.09	141.0	0.0	0.00	SC
FF9QAF	X	98.60	5.70	0.64	142.0	1.0	0.04	XX
HQKXYE		94.80	1.90	0.21	145.4	4.4	0.18	TM
KUB7W7		73.95	-18.96	-2.13	100.0	-41.0	-1.71	TM
KW23UC		95.84	2.93	0.33	141.7	0.7	0.03	XX
QUVQDC		83.80	-9.10	-1.03	114.8	-26.2	-1.09	XX
T236AX		93.20	0.30	0.03	145.6	4.6	0.19	TM
ZRWGET		103.20	10.30	1.16	179.6	38.6	1.61	SC

Summary Statistics

	Sample SP29	**Sample SP30**
Grand Means	92.905 1000th ft-lbs	141.04 1000th ft-lbs
SD Btwn Labs	8.880 1000th ft-lbs	23.97 1000th ft-lbs

Statistics based on 10 of 12 reporting participants

Comments on Assigned Data Flags for Test #349

AKLJXL (X) - Data appear to be off by a factor of .001. Data corrected by CTS (x1000).

FF9QAF (X) - Data appear to be off by a factor of .001. Data corrected by CTS (x1000).

Key to Instrument Codes Reported by Participants

SC Scott Internal Bond Tester (Manual)

TM TMI Monitor/Internal Bond Tester
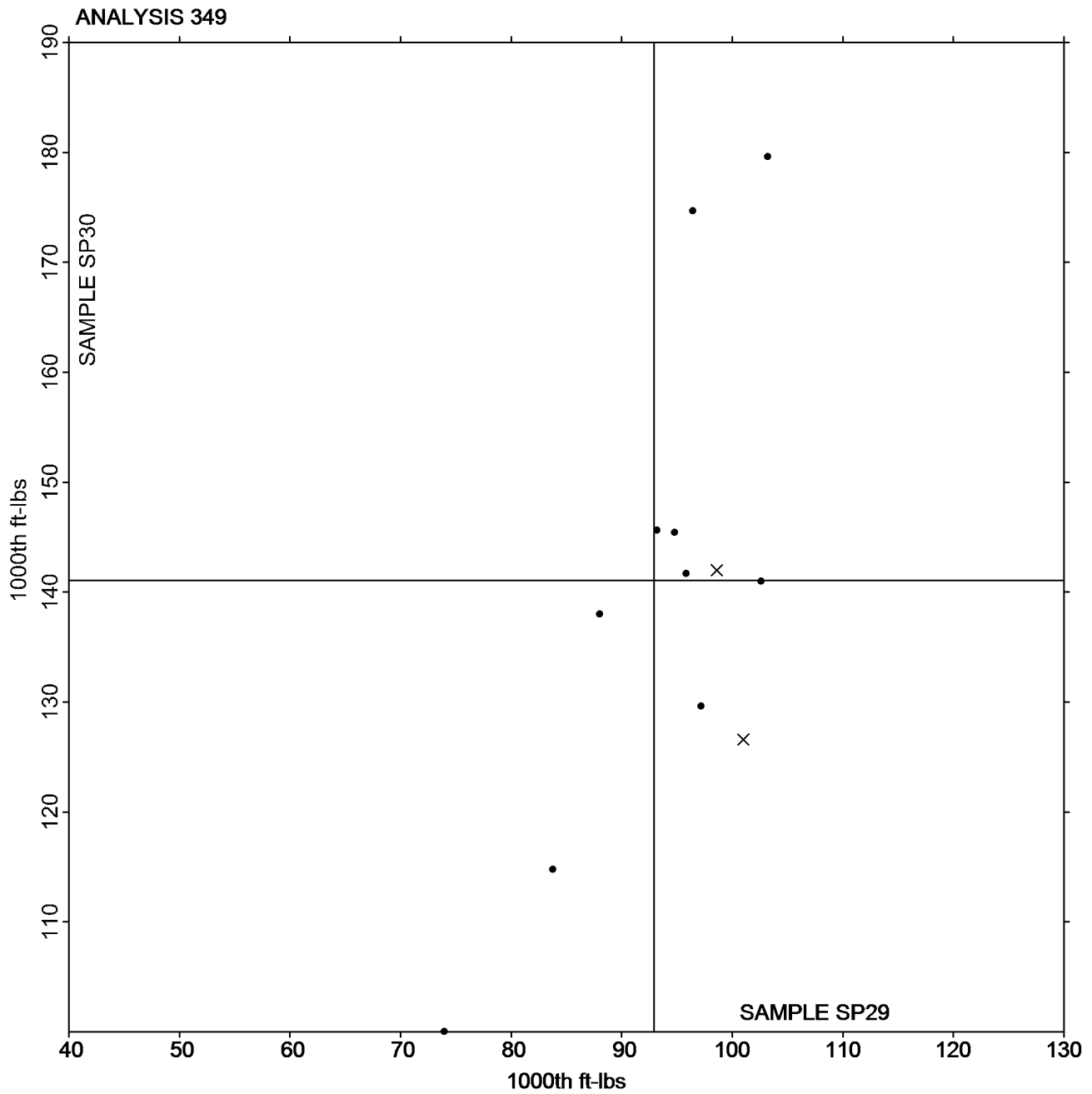
XX Instrument make/model not specified by lab

Paper & Paperboard Interlaboratory Testing Program
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Grand Mean Sample **SP29** = 92.905 1000th ft-lbs   Grand Mean Sample **SP30** = 141.04 1000th ft-lbs

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