



## Paper & Paperboard Testing Program

### Summary Report #2911 S - November 2017

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## **The CTS Paper & Paperboard Interlaboratory Program**

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

### **About CTS**

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

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

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

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

## Key for Web Summary Reports (Page 1 of 2)

<b>WebCode</b>	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.
<b>Lab Mean</b>	The average of the values obtained for each sample by the participant.
<b>Grand Mean</b>	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.
<b>Difference from Grand Mean</b>	The difference of the LAB MEAN from the GRAND MEAN.
<b>Between-Lab Standard Deviation</b>	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).
<b>Comparative Performance Value</b>	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.
<b>Inst Code</b>	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.
<b>Data Flag</b>	DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

<u>DATA FLAG</u>	<u>STATISTICALLY INCLUDED/EXCLUDED</u>	<u>ACTION REQUIRED</u>
<b>*</b>	<b>INCLUDED</b>	<b>CAUTION</b> - review testing procedure and monitor future results. Results fall outside 95% ellipse but within a 99% ellipse that is calculated but not drawn.
<b>X</b>	<b>EXCLUDED</b>	<b>STOP</b> - 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.
<b>M</b>	<b>EXCLUDED</b>	<b>PROCEED</b> - 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.

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### 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.

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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**

Report #2911S,  
November 2017

WebCode	Data Flag	Sample SA49			Sample SA50		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2G7Y4H		19.83	-2.03	-1.01	21.32	-1.19	-0.64
2K76KA		21.44	-0.43	-0.21	21.61	-0.90	-0.49
778RCF		20.13	-1.74	-0.86	21.77	-0.75	-0.40
7XXAUG		18.00	-3.86	-1.91	19.10	-3.42	-1.84
7YQGZY		23.69	1.83	0.91	23.56	1.05	0.57
92UQ72	X	16.94	-4.92	-2.44	16.90	-5.62	-3.03
CT3K2Q		20.96	-0.90	-0.45	22.10	-0.41	-0.22
DJB9B9		23.83	1.97	0.98	24.89	2.38	1.28
FM7YJE		20.97	-0.89	-0.44	20.83	-1.69	-0.91
JRMTN2		23.84	1.98	0.98	23.79	1.27	0.69
JVACU6		24.05	2.19	1.08	24.63	2.11	1.14
N3RAQE		23.69	1.83	0.90	23.37	0.86	0.46
NBLFJF		17.72	-4.14	-2.05	18.79	-3.73	-2.01
QCBP6T		23.95	2.09	1.03	24.64	2.13	1.15
RPDFLR		23.30	1.44	0.71	24.00	1.48	0.80
TQHKE7		22.19	0.33	0.16	23.79	1.27	0.69
TVUHW2	X	402.48	380.62	188.39	419.89	397.37	214.46
VD46K7		21.73	-0.14	-0.07	22.16	-0.35	-0.19
WFAULU		23.95	2.08	1.03	24.63	2.11	1.14
XLUARC		21.77	-0.09	-0.05	22.25	-0.27	-0.14
XX7LWU		20.35	-1.51	-0.75	20.55	-1.97	-1.06

Summary Statistics	Sample SA49	Sample SA50
<b>Grand Means</b>	21.86 psi	22.52 psi
<b>Std Dev Btwn Labs</b>	2.02 psi	1.85 psi
Statistics based on 19 of 21 reporting participants.		

**Comments on Assigned Data Flags for Test #305**

92UQ72 (X) - Data for sample SA50 are low.

TVUHW2 (X) - Extreme Data.

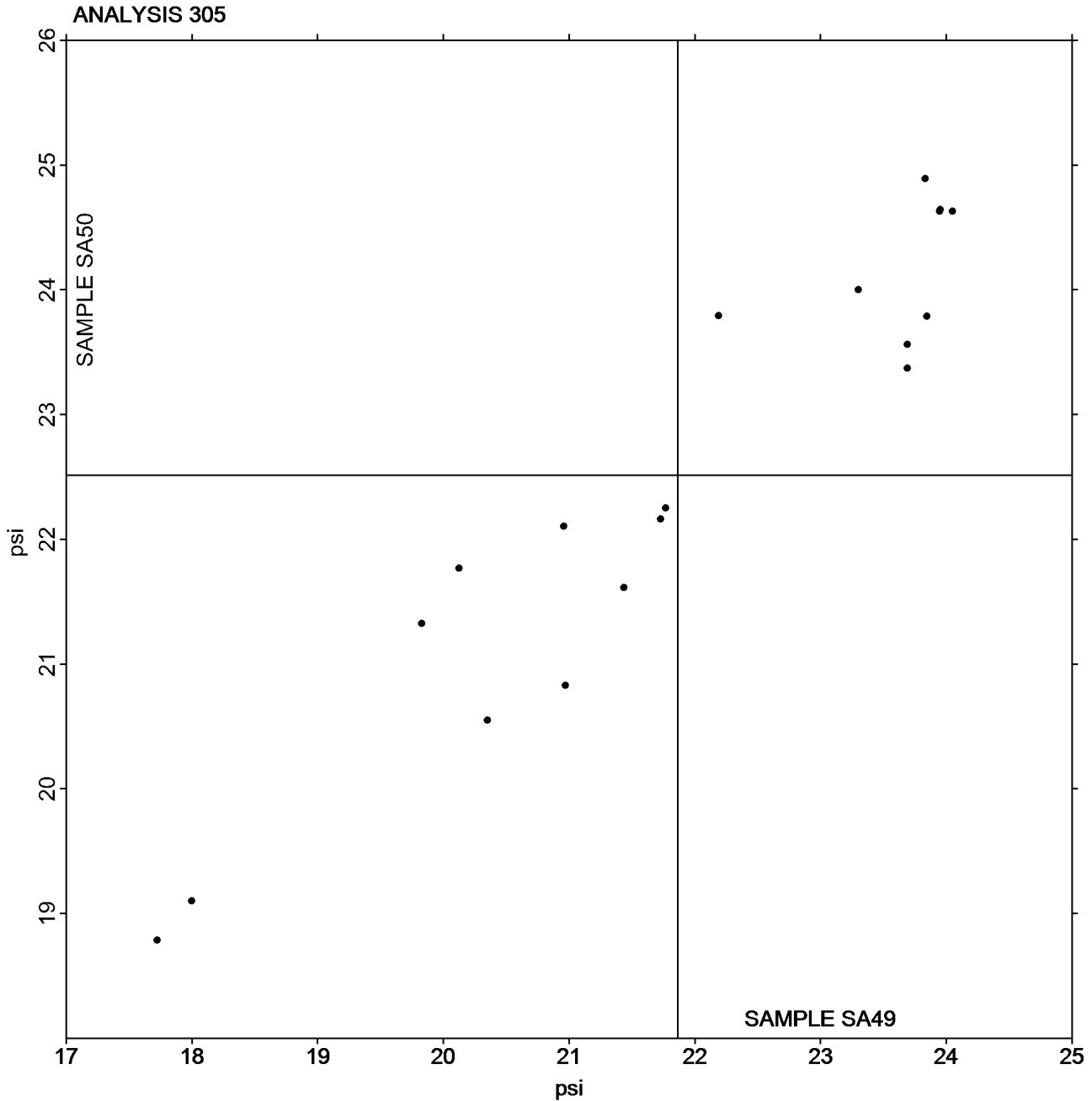


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 305**  
**Bursting Strength - Printing Papers**  
**TAPPI Official Test Method T403**

**Report #2911S,**  
**November 2017**

**Grand Mean Sample SA49 = 21.862**  
**psi**

**Grand Mean Sample SA50 = 22.515**  
**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 310**  
**Bursting Strength - Packaging Papers**  
**TAPPI Official Test Method T403**

Report #2911S,  
November 2017

WebCode	Data Flag	Sample SB49			Sample SB50		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
62XC6C		88.46	-2.03	-0.35	77.89	-6.20	-1.17
6T9NAA		84.60	-5.89	-1.03	80.90	-3.18	-0.60
7YQGZY		90.75	0.26	0.04	81.18	-2.90	-0.55
8Y2PGD		87.90	-2.59	-0.45	80.90	-3.18	-0.60
99RMQJ		87.58	-2.91	-0.51	81.00	-3.08	-0.58
9FAQZ8		88.53	-1.95	-0.34	81.08	-3.01	-0.57
BJMDPW		89.85	-0.64	-0.11	82.89	-1.19	-0.23
C7BE89		96.60	6.11	1.07	88.70	4.62	0.87
DD8GXR		88.06	-2.43	-0.42	80.81	-3.28	-0.62
FBTUCH		91.04	0.55	0.10	85.25	1.17	0.22
FEU3E8		78.60	-11.89	-2.08	71.40	-12.68	-2.40
FLALWL		83.46	-7.03	-1.23	77.24	-6.85	-1.30
H8HT3V		90.23	-0.26	-0.05	85.37	1.29	0.24
JHL7YP		91.00	0.51	0.09	85.20	1.12	0.21
JRMTN2		90.66	0.18	0.03	85.53	1.44	0.27
MBQLZQ		84.51	-5.97	-1.04	79.67	-4.41	-0.84
MDXUBV	X	104.34	13.85	2.42	101.90	17.81	3.37
N3RAQE		88.38	-2.11	-0.37	86.03	1.95	0.37
NH338Q		83.70	-6.79	-1.19	77.30	-6.78	-1.28
P4DMGV		88.20	-2.29	-0.40	80.75	-3.33	-0.63
QC8Z3G	*	81.79	-8.70	-1.52	81.54	-2.54	-0.48
QJ8K6C		92.42	1.93	0.34	85.49	1.40	0.27
QTX3JK		94.31	3.82	0.67	86.78	2.70	0.51
QVKMNP		96.00	5.51	0.96	89.60	5.52	1.04
UCX8W6	*	102.05	11.56	2.02	90.16	6.08	1.15
XX7LWU		94.52	4.03	0.70	87.80	3.72	0.70
Y63WN4		95.12	4.64	0.81	91.97	7.89	1.49
YKPJPL		96.90	6.41	1.12	91.10	7.01	1.33
Z38V2D		103.70	13.21	2.31	95.60	11.52	2.18
ZXY8NB		95.23	4.74	0.83	89.33	5.25	0.99

Summary Statistics	Sample SB49	Sample SB50
<b>Grand Means</b>	90.49 psi	84.08 psi
<b>Std Dev Btwn Labs</b>	5.73 psi	5.29 psi
Statistics based on 29 of 30 reporting participants.		

**Comments on Assigned Data Flags for Test #310**

MDXUBV (X) - Data for sample SB50 are high.



# Paper & Paperboard Interlaboratory Testing Program

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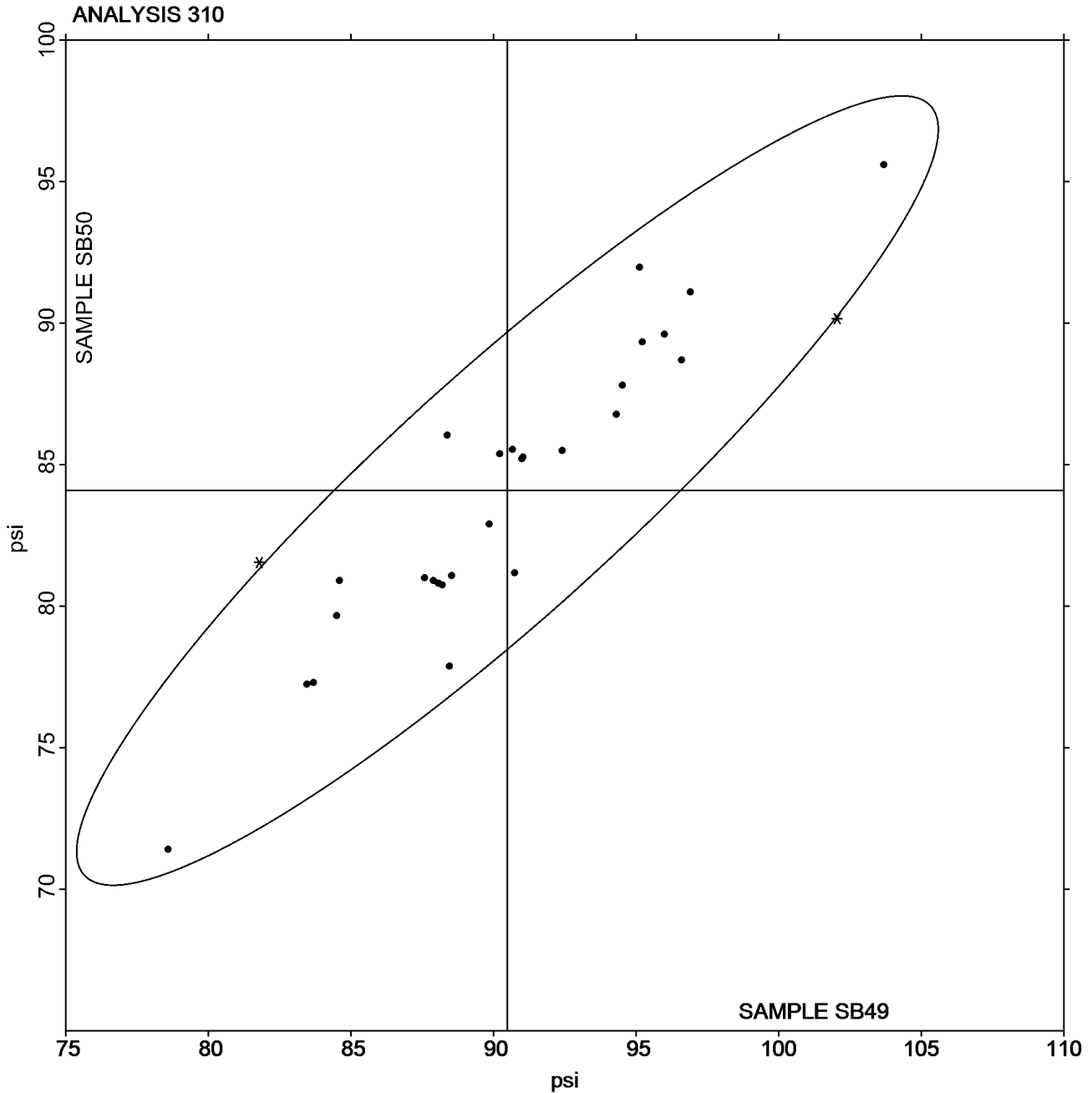
## Analysis 310

### Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

Grand Mean Sample SB49 = 90.488  
psi

Grand Mean Sample SB50 = 84.085  
psi







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

**Report #2911S,**  
**November 2017**

WebCode	Data Flag	<u>Sample SK49</u>			<u>Sample SK50</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
78HWMH		27.18	-1.99	-0.61	18.52	-1.79	-0.63
BWAKKC		34.16	4.99	1.52	24.43	4.12	1.46
DD7RR9		33.70	4.53	1.38	24.40	4.09	1.44
GYUK3E		27.44	-1.73	-0.53	18.86	-1.45	-0.51
JVACU6		26.46	-2.71	-0.83	18.50	-1.81	-0.64
LP8D86		27.51	-1.66	-0.51	18.09	-2.22	-0.78
N3RAQE		27.75	-1.42	-0.43	19.36	-0.95	-0.33

<b>Summary Statistics</b>	<u>Sample SK49</u>	<u>Sample SK50</u>
<b>Grand Means</b>	29.17 Grams	20.31 Grams
<b>Std Dev Btwn Labs</b>	3.28 Grams	2.83 Grams
Statistics based on 7 of 7 reporting participants.		



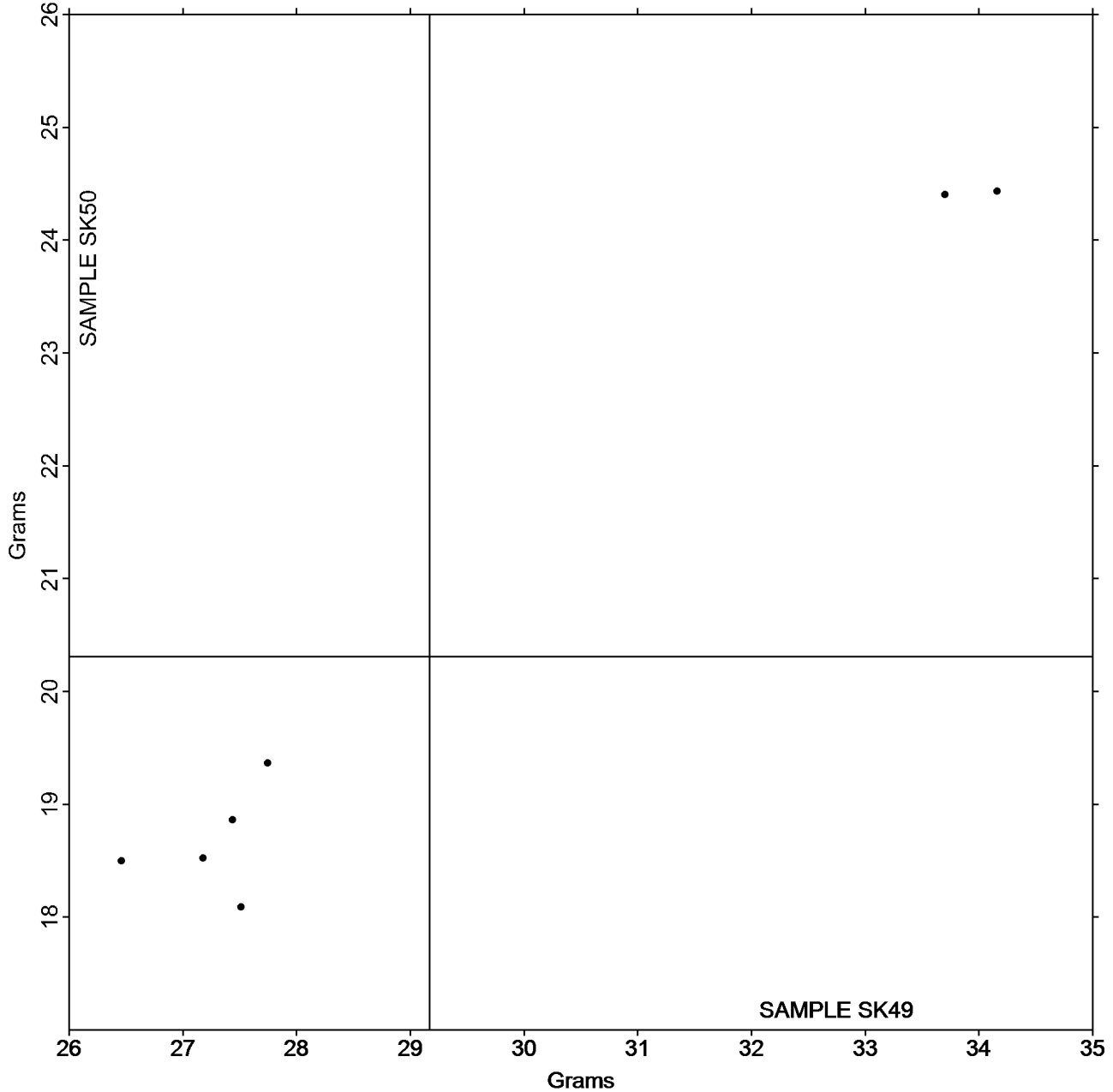
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 311**  
**Tearing Strength - Newsprint**  
**TAPPI Official Test Method T414**

**Report #2911S,**  
**November 2017**

**Grand Mean Sample SK49 = 29.171**  
**Grams**

**Grand Mean Sample SK50 = 20.310**  
**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 #2911S,  
November 2017

WebCode	Data Flag	Sample SC49			Sample SC50		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2E292A		48.26	0.24	0.08	46.58	-0.35	-0.12
2G7Y4H		45.49	-2.53	-0.87	44.03	-2.90	-0.98
2K76KA		50.36	2.34	0.81	47.60	0.66	0.22
2V4BCM	X	59.10	11.08	3.83	58.76	11.82	3.98
3GMFWQ		52.43	4.41	1.52	51.36	4.43	1.49
3X9V39		48.46	0.44	0.15	47.13	0.20	0.07
62XC6C		51.76	3.74	1.29	50.96	4.03	1.36
778RCF		51.44	3.42	1.18	50.18	3.25	1.09
7N7A2A	X	51.40	3.38	1.17	43.88	-3.05	-1.03
7XXAUG		46.96	-1.06	-0.36	46.64	-0.29	-0.10
7YQGZY		51.15	3.13	1.08	51.62	4.69	1.58
874MCW		44.28	-3.74	-1.29	42.58	-4.35	-1.47
883W7E		45.20	-2.82	-0.97	43.50	-3.43	-1.16
8Y2PGD		43.06	-4.96	-1.71	42.93	-4.00	-1.35
92UQ72		49.26	1.24	0.43	47.67	0.74	0.25
99RMQJ		51.78	3.76	1.30	51.04	4.10	1.38
9JNN79	*	51.58	3.56	1.23	48.42	1.48	0.50
BJMDPW		49.92	1.90	0.66	49.43	2.49	0.84
CT3K2Q		48.11	0.09	0.03	46.92	-0.02	-0.01
DJB NB9		47.68	-0.34	-0.12	46.16	-0.77	-0.26
EQB6LE		47.46	-0.56	-0.19	47.15	0.22	0.07
FCMM7F		52.80	4.78	1.65	50.78	3.85	1.30
FM7YJE		47.72	-0.30	-0.10	46.48	-0.45	-0.15
FRFET3		42.30	-5.72	-1.97	41.76	-5.17	-1.74
FZBE6A		49.41	1.40	0.48	46.70	-0.24	-0.08
GTNPJE		52.40	4.38	1.51	51.00	4.07	1.37
GZP2GW	X	51.44	3.42	1.18	44.14	-2.79	-0.94
H8HT3V		48.32	0.30	0.10	45.96	-0.97	-0.33
JRMTN2		44.69	-3.32	-1.15	44.27	-2.67	-0.90
N3RAQE		48.45	0.43	0.15	48.23	1.30	0.44
NBLFJF		49.38	1.36	0.47	49.40	2.47	0.83
P4DMGV		44.34	-3.68	-1.27	43.20	-3.73	-1.26
PP234X		43.58	-4.44	-1.53	42.87	-4.06	-1.37
Q76ULT		48.48	0.46	0.16	46.96	0.03	0.01
QC8Z3G		50.41	2.40	0.83	50.73	3.80	1.28
QCBP6T		44.12	-3.90	-1.35	44.19	-2.74	-0.92
QTX3JK		46.83	-1.19	-0.41	45.83	-1.10	-0.37
QVKMNP		47.60	-0.42	-0.14	45.60	-1.33	-0.45
RPDFLR		51.35	3.33	1.15	51.60	4.67	1.57
TQHKE7		48.50	0.48	0.17	47.70	0.77	0.26



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

**Report #2911S,**  
**November 2017**

WebCode	Data Flag	<u>Sample SC49</u>			<u>Sample SC50</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
TVUHW2		49.80	1.78	0.62	48.80	1.87	0.63
U46RAL	X	69.80	21.78	7.52	63.20	16.27	5.48
UQHPP9		49.20	1.18	0.41	47.52	0.59	0.20
VD46K7		48.82	0.81	0.28	47.48	0.55	0.18
WFAULU		44.77	-3.25	-1.12	43.96	-2.97	-1.00
WFNFVV		44.10	-3.92	-1.35	43.30	-3.63	-1.22
X93RPR	*	42.46	-5.56	-1.92	39.73	-7.20	-2.43
XRYBPK		46.12	-1.90	-0.65	45.28	-1.65	-0.56
YKPJPL		50.72	2.70	0.93	50.59	3.66	1.23
ZL9F48		47.48	-0.54	-0.19	47.10	0.17	0.06

<b>Summary Statistics</b>	<u>Sample SC49</u>	<u>Sample SC50</u>
<b>Grand Means</b>	48.02 Grams	46.93 Grams
<b>Std Dev Btwn Labs</b>	2.90 Grams	2.97 Grams

Statistics based on 46 of 50 reporting participants.

**Comments on Assigned Data Flags for Test #312**

- 2V4BCM (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.
- GZP2GW (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.
- 7N7A2A (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SC49.
- U46RAL (X) - Extreme Data.

**Analysis Notes:**

WFAULU - One determination removed from the Lab Mean of Sample SC49 per Grubb's Test at 1% risk (TAPPI 1205).



# Paper & Paperboard Interlaboratory Testing Program

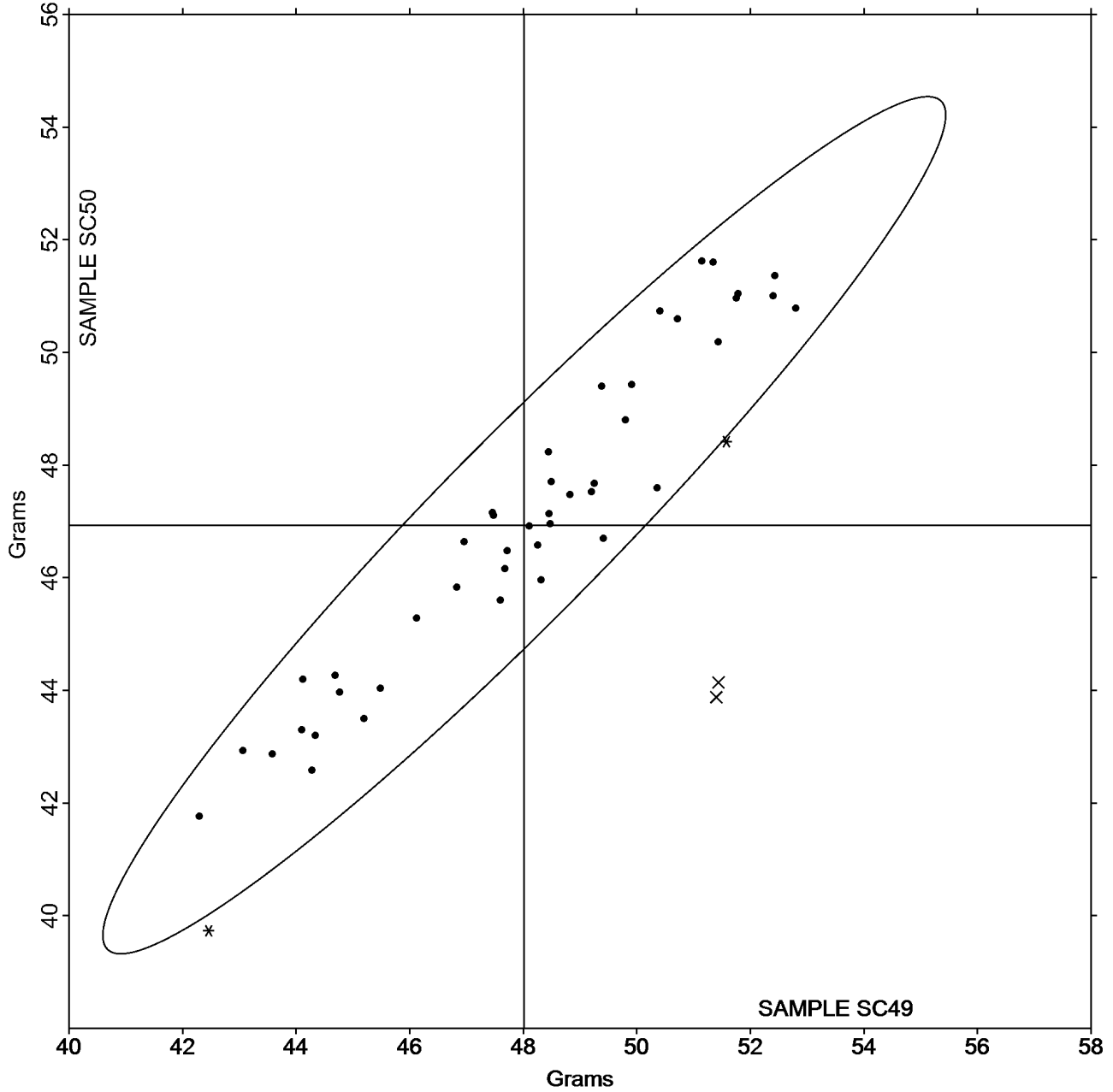
Report #2911S,  
November 2017

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

Grand Mean Sample SC49 = 48.017  
Grams

Grand Mean Sample SC50 = 46.933  
Grams

ANALYSIS 312





**Paper & Paperboard Interlaboratory Testing Program**

**Report #2911S,  
November 2017**

**Analysis 314**

**Tearing Strength - Packaging Papers**

**TAPPI Official Test Method T414**

WebCode	Data Flag	Sample SD49			Sample SD50		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4FPJP9		177.7	6.0	0.40	174.4	1.3	0.09
4YHM79		163.2	-8.5	-0.55	170.6	-2.5	-0.18
6T9NAA		180.0	8.4	0.55	172.6	-0.5	-0.04
96M2TK		170.6	-1.0	-0.07	172.5	-0.6	-0.04
9FAQZ8		151.0	-20.6	-1.35	150.6	-22.5	-1.64
9JNN79		182.3	10.7	0.70	177.8	4.7	0.34
B7VM6R		167.5	-4.1	-0.27	168.6	-4.5	-0.32
BW9TNP		193.9	22.3	1.46	194.6	21.5	1.57
C6YQT4		139.1	-32.6	-2.13	141.6	-31.5	-2.29
C7BE89		182.4	10.8	0.71	175.2	2.1	0.15
D6TVM3		171.6	0.0	0.00	180.4	7.3	0.53
DD8GXR		183.6	12.0	0.79	180.5	7.4	0.54
EQB6LE		174.7	3.1	0.20	178.8	5.7	0.42
FBTUCH		187.6	16.0	1.05	197.0	23.9	1.74
FEU3E8	X	219.1	47.5	3.11	216.1	43.0	3.14
FLALWL		178.0	6.4	0.42	178.0	4.9	0.36
FX7P3Z	X	110.7	-60.9	-3.99	119.7	-53.4	-3.90
GAWZRJ		175.7	4.1	0.27	173.6	0.6	0.04
GL7FVH		167.9	-3.7	-0.24	172.2	-0.9	-0.06
JHL7YP		170.1	-1.5	-0.10	173.7	0.6	0.04
MDXUBV		186.0	14.3	0.94	181.5	8.4	0.62
MGUPN4		145.6	-26.0	-1.70	157.2	-15.9	-1.16
MYDGVF		156.6	-15.1	-0.99	159.4	-13.7	-1.00
N3RAQE		178.3	6.7	0.44	180.3	7.2	0.53
NH338Q	X	10.5	-161.1	-10.55	10.9	-162.2	-11.83
Q98ULQ	X	124.3	-47.3	-3.10	118.8	-54.3	-3.96
QJ8K6C	X	200.7	29.1	1.90	222.2	49.1	3.58
QUAHDL		165.7	-5.9	-0.39	162.9	-10.2	-0.74
QVKMNP	X	85.4	-86.2	-5.64	94.8	-78.3	-5.71
RDLP49		201.4	29.8	1.95	198.2	25.1	1.83
UCX8W6		176.4	4.8	0.31	172.0	-1.1	-0.08
VT3WPV		160.1	-11.5	-0.75	162.3	-10.7	-0.78
WLVTUTU		205.2	33.5	2.20	206.2	33.1	2.42
XQP2XN		170.5	-1.1	-0.07	170.9	-2.2	-0.16
XUNH9W		154.1	-17.5	-1.15	157.9	-15.2	-1.11
XX7LWU		161.2	-10.4	-0.68	170.0	-3.1	-0.23
Y46LT2		179.5	7.8	0.51	182.7	9.6	0.70
Z9TUAD		148.3	-23.3	-1.52	159.4	-13.7	-1.00
ZXY8NB		157.7	-14.0	-0.91	158.2	-14.9	-1.09



Analysis 314

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

Summary Statistics	Sample SD49	Sample SD50
Grand Means	171.62 Grams	173.09 Grams
Stnd Dev Btwn Labs	15.28 Grams	13.71 Grams

Statistics based on 33 of 39 reporting participants.

**Comments on Assigned Data Flags for Test #314**

FEU3E8 (X) - Data for both samples are high. Possible Systematic Error.

Q98ULQ (X) - Data for both samples are low. Possible Systematic Error.

FX7P3Z (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of sample SD49.

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

QJ8K6C (X) - Data for sample SD50 are high. Inconsistent within the determinations of both samples.

NH338Q (X) - Extreme Data.

**Analysis Notes:**

9FAQZ8 - Data appear to be off by a factor of .25; data converted by CTS (x4).



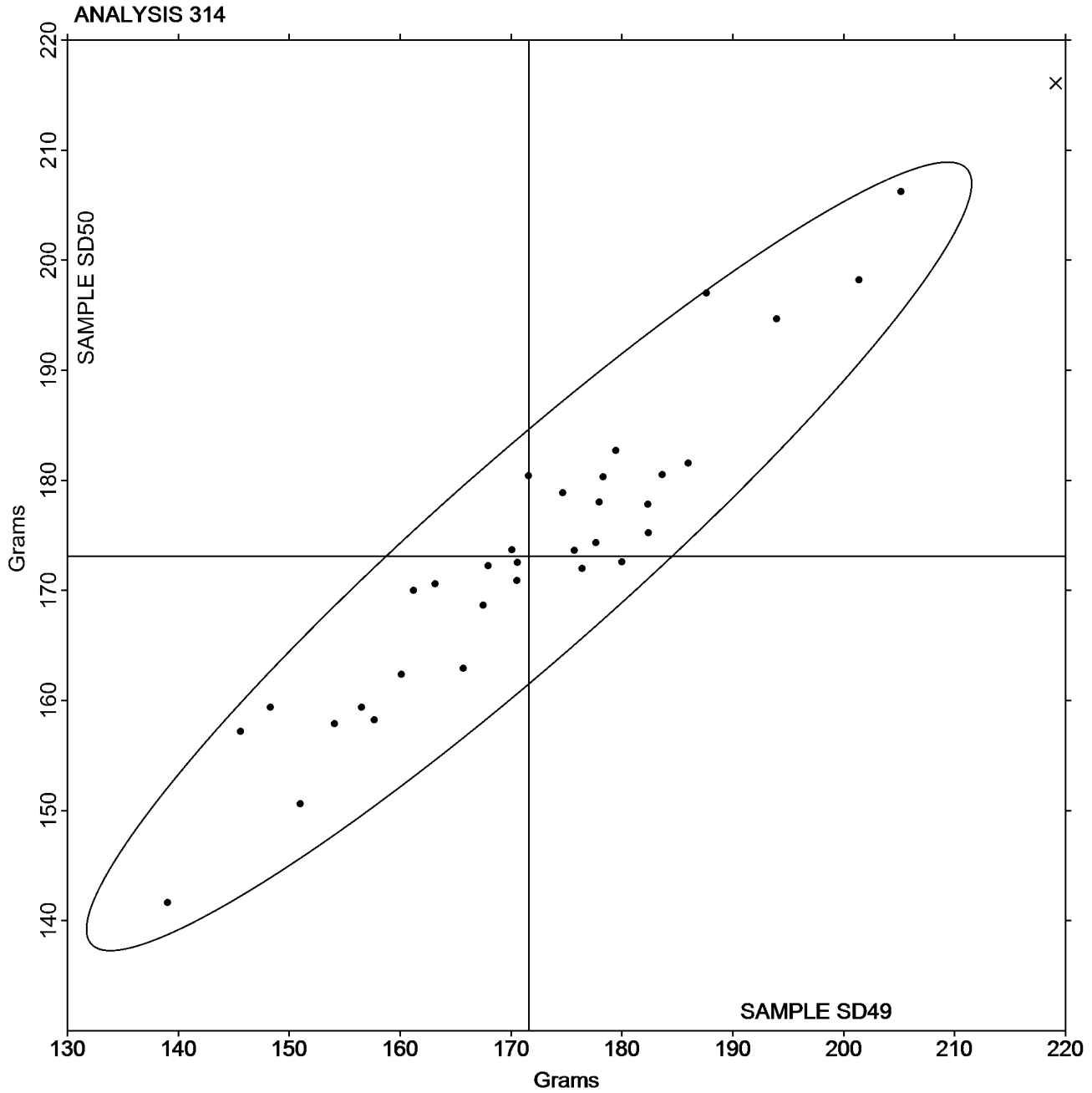
# Paper & Paperboard Interlaboratory Testing Program

Report #2911S,  
November 2017

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

Grand Mean Sample SD49 = 171.62  
Grams

Grand Mean Sample SD50 = 173.09  
Grams







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

Report #2911S,  
November 2017

WebCode	Data Flag	<u>Sample SR49</u>			<u>Sample SR50</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
76YQ6M		2.793	-0.198	-0.94	2.025	-0.168	-1.01
78HWMH		3.044	0.052	0.25	1.996	-0.197	-1.18
9JNN79		2.859	-0.133	-0.63	2.213	0.020	0.12
BWAKKC		2.960	-0.032	-0.15	2.254	0.060	0.36
DD7RR9		2.951	-0.040	-0.19	2.145	-0.048	-0.29
DMBWJP		3.510	0.518	2.46	2.609	0.416	2.49
GYUK3E		2.909	-0.083	-0.39	2.194	0.001	0.00
JRMTN2		3.017	0.025	0.12	2.196	0.003	0.02
JVACU6		3.088	0.096	0.46	2.303	0.109	0.66
LP8D86		2.654	-0.338	-1.60	1.964	-0.229	-1.38
TQHKE7		3.186	0.194	0.92	2.243	0.050	0.30
XLUARC		2.832	-0.160	-0.76	2.086	-0.108	-0.65
Z38V2D		3.088	0.096	0.46	2.286	0.093	0.56

<b>Summary Statistics</b>	<u>Sample SR49</u>	<u>Sample SR50</u>
<b>Grand Means</b>	2.99 kN/m	2.19 kN/m
<b>Std Dev Btwn Labs</b>	0.21 kN/m	0.17 kN/m
Statistics based on 13 of 13 reporting participants.		

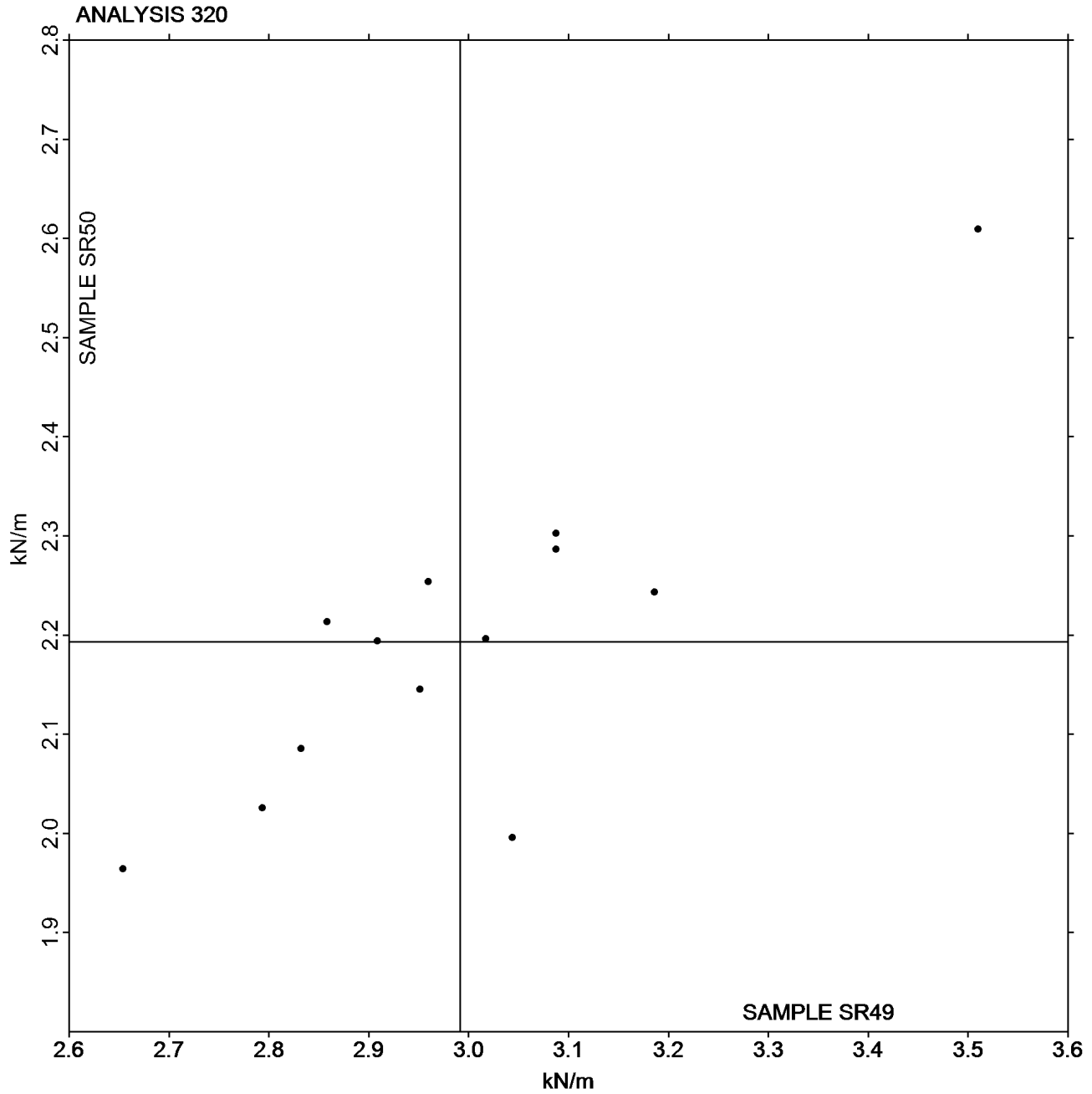


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 320**  
**Tensile Breaking Strength - Newsprint**  
**TAPPI Official Test Method T494**

**Report #2911S,**  
**November 2017**

**Grand Mean Sample SR49 = 2.9916**  
**kN/m**

**Grand Mean Sample SR50 = 2.1934**  
**kN/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 321**  
**Tensile Energy Absorption - Newsprint**  
**TAPPI Official Test Method T494**

**Report #2911S,**  
**November 2017**

WebCode	Data Flag	<u>Sample SR49</u>			<u>Sample SR50</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
76YQ6M		28.97	4.89	1.66	17.03	1.95	0.98
78HWMH		27.01	2.93	1.00	18.32	3.24	1.63
9JNN79		25.39	1.31	0.45	16.70	1.62	0.82
BWAKKC		22.90	-1.18	-0.40	15.36	0.28	0.14
DD7RR9		21.92	-2.16	-0.73	13.54	-1.54	-0.78
DMBWJP		27.73	3.65	1.24	16.96	1.89	0.95
JRMTN2		22.76	-1.33	-0.45	14.87	-0.20	-0.10
JVACU6		23.71	-0.37	-0.13	15.08	0.00	0.00
LP8D86		18.18	-5.90	-2.01	11.36	-3.72	-1.87
TQHKE7		25.01	0.93	0.32	14.67	-0.41	-0.21
XLUARC		22.54	-1.54	-0.52	12.66	-2.42	-1.22
Z38V2D		22.86	-1.22	-0.42	14.39	-0.69	-0.35

<b>Summary Statistics</b>	<u><b>Sample SR49</b></u>	<u><b>Sample SR50</b></u>
<b>Grand Means</b>	24.08 Joules/sq m	15.08 Joules/sq m
<b>Stnd Dev Btwn Labs</b>	2.94 Joules/sq m	1.98 Joules/sq m
Statistics based on 12 of 12 reporting participants.		



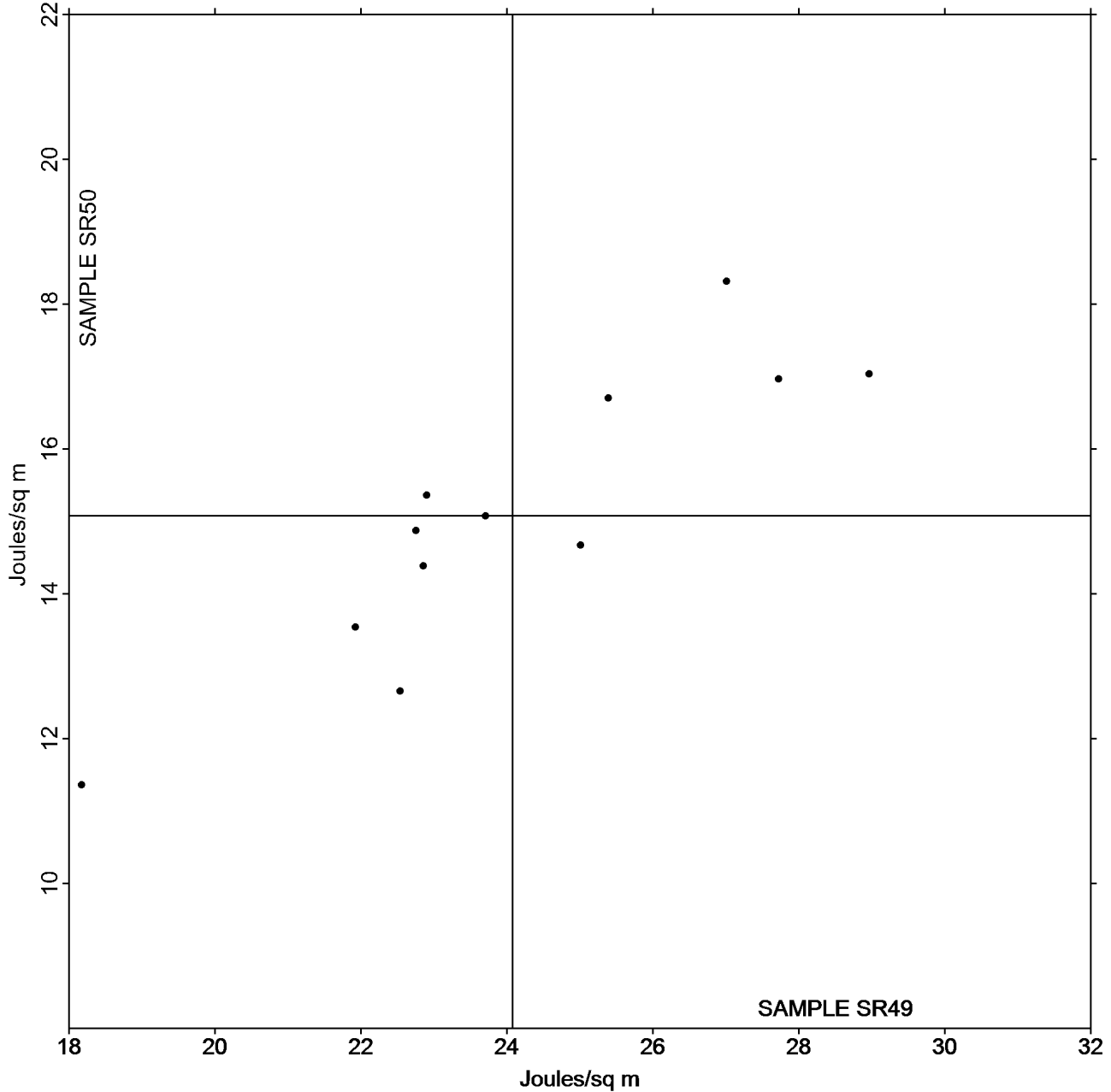
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 321**  
**Tensile Energy Absorption - Newsprint**  
**TAPPI Official Test Method T494**

**Report #2911S,**  
**November 2017**

**Grand Mean Sample SR49 = 24.081**  
**Joules/sq m**

**Grand Mean Sample SR50 = 15.077**  
**Joules/sq m**

**ANALYSIS 321**



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 #2911S,**  
**November 2017**

WebCode	Data Flag	<u>Sample SR49</u>			<u>Sample SR50</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
76YQ6M		1.873	0.515	2.52	1.659	0.483	2.25
78HWMH		1.433	0.075	0.37	1.432	0.256	1.20
9JNN79		1.225	-0.133	-0.65	1.077	-0.099	-0.46
BWAKKC		1.275	-0.083	-0.40	1.135	-0.041	-0.19
DMBWJP		1.276	-0.082	-0.40	1.056	-0.120	-0.56
JRMTN2		1.249	-0.109	-0.53	1.123	-0.053	-0.25
JVACU6		1.508	0.150	0.73	1.330	0.154	0.72
LP8D86		1.102	-0.256	-1.25	0.905	-0.271	-1.26
TQHKE7		1.420	0.062	0.30	1.100	-0.076	-0.35
XLUARC		1.324	-0.034	-0.17	1.034	-0.142	-0.66
Z38V2D		1.251	-0.106	-0.52	1.085	-0.091	-0.42

<b>Summary Statistics</b>	<u>Sample SR49</u>	<u>Sample SR50</u>
<b>Grand Means</b>	1.36 Percent	1.18 Percent
<b>Std Dev Btwn Labs</b>	0.20 Percent	0.21 Percent
Statistics based on 11 of 11 reporting participants.		

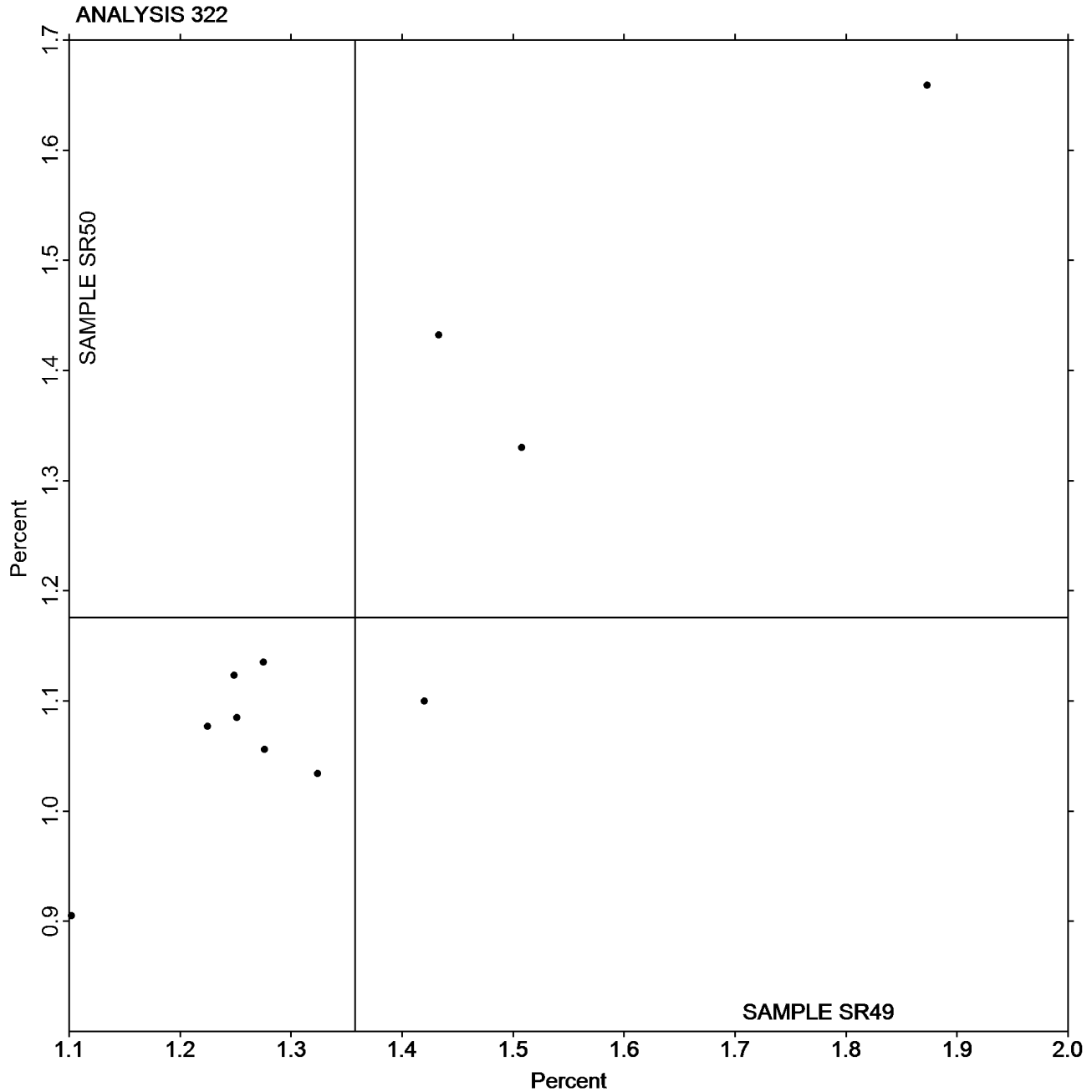


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 322**  
**Elongation to Break - Newsprint**  
**TAPPI Official Test Method T494**

**Report #2911S,**  
**November 2017**

**Grand Mean Sample SR49 = 1.3578**  
**Percent**

**Grand Mean Sample SR50 = 1.1760**  
**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 #2911S,  
November 2017**

**Analysis 325**

**Tensile Breaking Strength - Printing Papers**

**TAPPI Official Test Method T494**

WebCode	Data Flag	Sample SF49			Sample SF50			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2E292A	X	3.661	-0.649	-2.97	3.751	-0.563	-2.47	CB
2G7Y4H		4.195	-0.114	-0.52	4.234	-0.080	-0.35	IM
2K76KA		4.404	0.094	0.43	4.284	-0.030	-0.13	LH
2V4BCM		4.045	-0.265	-1.21	4.058	-0.256	-1.12	IM
3GMFWQ		4.700	0.391	1.79	4.527	0.213	0.93	LA
3X9V39		4.163	-0.147	-0.67	4.222	-0.092	-0.40	LI
4AFC2N		4.611	0.301	1.38	4.629	0.315	1.38	TP
62XC6C		4.098	-0.212	-0.97	4.135	-0.179	-0.79	DL
778RCF	X	3.671	-0.639	-2.92	3.652	-0.662	-2.90	ID
7N7A2A		4.521	0.211	0.96	4.413	0.099	0.43	TP
7TPYPU		3.893	-0.417	-1.91	3.948	-0.366	-1.60	RE
7XXAUG		4.331	0.021	0.10	4.355	0.041	0.18	LX
874MCW		4.015	-0.294	-1.35	3.912	-0.403	-1.77	TB
883W7E		4.374	0.064	0.29	4.491	0.177	0.78	TC
92UQ72		4.575	0.266	1.21	4.519	0.205	0.90	LX
AHRGEG		4.583	0.273	1.25	4.647	0.333	1.46	TN
BJMDPW		4.087	-0.223	-1.02	4.034	-0.280	-1.23	LI
BNWNHQ		4.556	0.246	1.13	4.627	0.313	1.37	LI
CHGR3E		4.653	0.343	1.57	4.608	0.294	1.29	LA
CT3K2Q		4.557	0.247	1.13	4.587	0.273	1.20	LI
DJB NB9		4.301	-0.009	-0.04	4.378	0.064	0.28	LH
FLD4YQ		4.108	-0.201	-0.92	3.955	-0.360	-1.58	TS
FM7YJE		4.098	-0.212	-0.97	4.120	-0.195	-0.85	TB
FRFET3		4.073	-0.237	-1.08	4.145	-0.169	-0.74	TF
FZBE6A		4.228	-0.082	-0.37	4.207	-0.107	-0.47	XX
GZP2GW		4.303	-0.007	-0.03	4.220	-0.094	-0.41	XX
JRMTN2		4.103	-0.207	-0.95	4.170	-0.144	-0.63	LH
MDXUBV		4.232	-0.078	-0.36	4.251	-0.063	-0.27	TB
N3RAQE		4.237	-0.073	-0.33	4.316	0.002	0.01	LH
NBLFJF		4.190	-0.120	-0.55	4.036	-0.278	-1.22	TF
P4DMGV		4.475	0.165	0.76	4.527	0.213	0.93	TF
PP234X		4.298	-0.012	-0.05	4.405	0.091	0.40	LF
Q76ULT		4.049	-0.261	-1.19	4.104	-0.210	-0.92	LE
QC8Z3G		4.158	-0.152	-0.69	4.281	-0.033	-0.14	LI
QCBP6T		4.489	0.179	0.82	4.280	-0.034	-0.15	TJ
RPDFLR		3.959	-0.351	-1.60	3.808	-0.506	-2.22	LH
TVUHW2		4.342	0.032	0.15	4.377	0.063	0.28	LH
U46RAL		4.520	0.210	0.96	4.483	0.169	0.74	XX
UCX8W6		4.129	-0.180	-0.82	4.270	-0.044	-0.20	IM
VD46K7		4.567	0.257	1.18	4.680	0.366	1.60	LI



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

**Report #2911S,**  
**November 2017**

WebCode	Data Flag	Sample SF49			Sample SF50			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
WFAULU		4.316	0.006	0.03	4.341	0.027	0.12	LA
WFNFVV		4.394	0.084	0.38	4.465	0.151	0.66	TO
X93RPR		4.357	0.047	0.22	4.425	0.111	0.49	LA
XRYBPK	X	3.795	-0.515	-2.35	4.208	-0.106	-0.46	VM
ZMEABR		4.725	0.415	1.90	4.718	0.404	1.77	XX

Summary Statistics	Sample SF49	Sample SF50
<b>Grand Means</b>	4.31 kN/m	4.31 kN/m
<b>Std Dev Btwn Labs</b>	0.22 kN/m	0.23 kN/m

Statistics based on 42 of 45 reporting participants.

**Comments on Assigned Data Flags for Test #325**

778RCF (X) - Data for both samples are low. Possible Systematic Error.

XRYBPK (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SF49.

2E292A (X) - Data for sample SF49 are low.

**Key to Instrument Codes Reported by Participants**

<b>CB</b> Chatillon DFIS 50 (Digital Gauge)/TCD 200	<b>DL</b> EMIC DL500 Universal Testing Machines
<b>ID</b> Instron 4201/4202	<b>IM</b> Instron 5500 Series
<b>LA</b> L & W Tensile - Autoline 300	<b>LE</b> L & W Tensile Tester 066
<b>LF</b> L & W Tensile/Fracture Toughness Tester SE 064	<b>LH</b> L & W Alwetron TH1 (Horizontal) SE 060/065F
<b>LI</b> L & W Tensile Tester SE 062	<b>LX</b> L & W (model not specified)
<b>RE</b> Regmed	<b>TB</b> Thwing-Albert EJA/1000
<b>TC</b> Thwing-Albert Electro-Hydraulic, Model 30LT	<b>TF</b> Thwing-Albert EJA Vantage-1
<b>TJ</b> Thwing-Albert QC II-XS	<b>TN</b> Testometric M100-1CT
<b>TO</b> Thwing-Albert QC-1000	<b>TP</b> TMI Monitor/Tensile 100 (84-21-01)
<b>TS</b> Tinius Olsen 1000	<b>VM</b> Valmet PaperLab (was Kajaani/Robotest)
<b>XX</b> Instrument make/model not specified by lab	





# Paper & Paperboard Interlaboratory Testing Program

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## Analysis 325

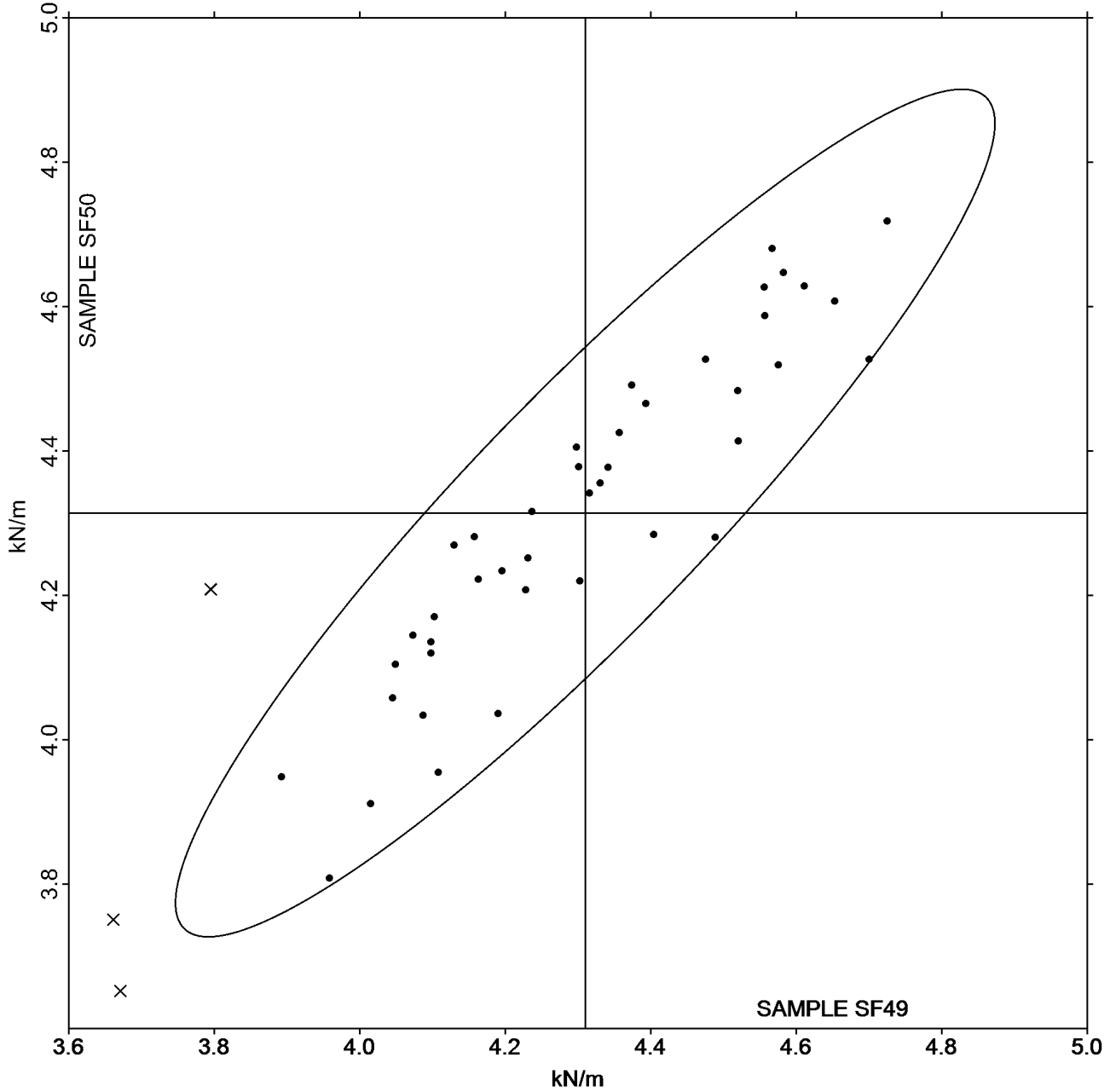
### Tensile Breaking Strength - Printing Papers

#### TAPPI Official Test Method T494

Grand Mean Sample SF49 = 4.3098  
kN/m

Grand Mean Sample SF50 = 4.3141  
kN/m

ANALYSIS 325





**Paper & Paperboard Interlaboratory Testing Program**

**Report #2911S,  
November 2017**

**Analysis 327**

**Tensile Energy Absorption - Printing Papers**

**TAPPI Official Test Method T494**

WebCode	Data Flag	Sample SF49			Sample SF50			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2G7Y4H		43.12	-0.38	-0.08	46.07	1.33	0.25	IM
2K76KA		47.78	4.27	0.89	46.99	2.25	0.43	LH
2V4BCM		48.09	4.59	0.95	49.55	4.81	0.92	IM
3GMFWQ		51.47	7.96	1.65	53.74	9.00	1.72	LA
3X9V39		38.86	-4.64	-0.96	42.62	-2.12	-0.41	LI
62XC6C		44.65	1.15	0.24	44.28	-0.46	-0.09	DL
778RCF		46.76	3.26	0.67	46.23	1.49	0.29	ID
7TPYPU		38.74	-4.76	-0.99	40.23	-4.51	-0.86	RE
7XXAUG		40.98	-2.52	-0.52	43.01	-1.73	-0.33	LX
92UQ72		47.93	4.42	0.92	47.57	2.83	0.54	LX
AHRGEG		47.92	4.42	0.92	48.98	4.24	0.81	LX
BJMDPW		40.15	-3.36	-0.70	39.90	-4.85	-0.93	LI
BNWNHQ		48.74	5.24	1.08	54.14	9.40	1.80	LI
CT3K2Q		47.25	3.74	0.78	48.97	4.23	0.81	LI
DJB9B9		42.61	-0.89	-0.19	43.20	-1.54	-0.30	LH
FM7YJE		44.45	0.94	0.20	45.22	0.48	0.09	TB
FZBE6A		36.09	-7.41	-1.54	33.11	-11.63	-2.23	XX
GZP2GW		49.74	6.24	1.29	53.40	8.66	1.66	XX
JRMTN2		40.29	-3.22	-0.67	41.18	-3.56	-0.68	LH
MDXUBV		43.92	0.42	0.09	43.99	-0.75	-0.14	TB
N3RAQE		43.83	0.32	0.07	43.97	-0.77	-0.15	LH
NBLFJF		47.95	4.45	0.92	45.41	0.67	0.13	TF
P4DMGV		47.65	4.15	0.86	48.60	3.86	0.74	TF
PP234X		34.16	-9.34	-1.93	37.91	-6.83	-1.31	LW
QC8Z3G		40.62	-2.88	-0.60	43.90	-0.84	-0.16	LI
RPDFLR		38.29	-5.21	-1.08	37.32	-7.42	-1.42	LH
UCX8W6		41.39	-2.11	-0.44	46.85	2.11	0.40	IM
VD46K7		47.86	4.35	0.90	48.80	4.06	0.78	LI
WFAULU		32.05	-11.45	-2.37	32.66	-12.08	-2.31	LA
WFNFVV		39.48	-4.03	-0.83	42.44	-2.30	-0.44	TO
X93RPR		45.78	2.28	0.47	46.70	1.96	0.38	LA

Summary Statistics	Sample SF49	Sample SF50
<b>Grand Means</b>	43.50 Joules/sq m	44.74 Joules/sq m
<b>Std Dev Btwn Labs</b>	4.83 Joules/sq m	5.22 Joules/sq m
Statistics based on 31 of 31 reporting participants.		

**Comments on Assigned Data Flags for Test #327**



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 327**  
**Tensile Energy Absorption - Printing Papers**  
**TAPPI Official Test Method T494**

**Report #2911S,**  
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**Analysis Notes:**

778RCF - Data appears to be off by a factor of 10. Data corrected by CTS.

MDXUBV - Data appear to be reported as kg-m/sq m, not J/sq m as indicated on datasheet. Units corrected by CTS.

**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)
RE	Regmed	TB	Thwing-Albert EJA/1000
TF	Thwing-Albert EJA Vantage-1	TO	Thwing-Albert QC-1000
XX	Instrument make/model not specified by lab		



# Paper & Paperboard Interlaboratory Testing Program

Report #2911S,  
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## Analysis 327

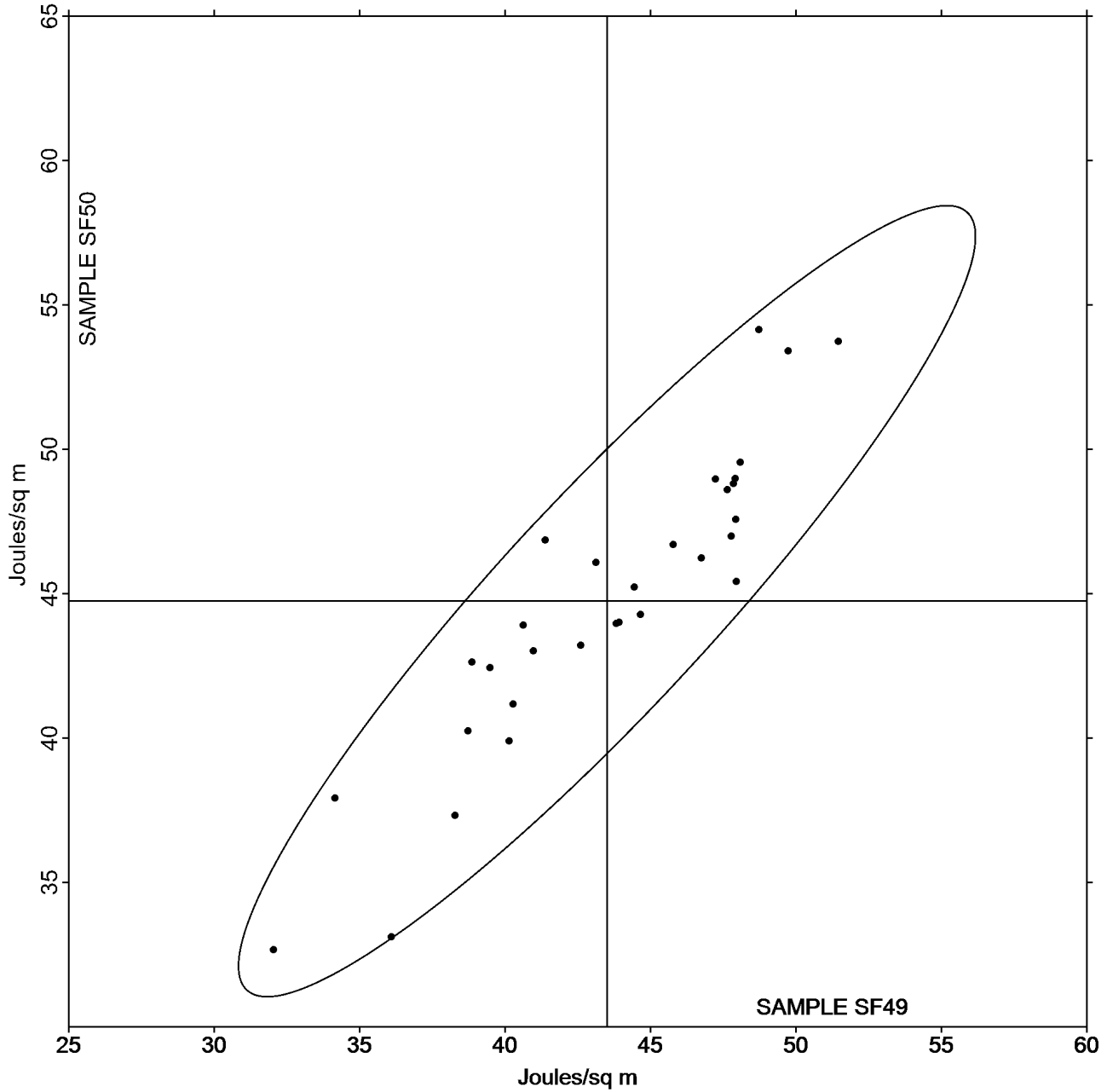
Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

Grand Mean Sample SF49 = 43.503  
Joules/sq m

Grand Mean Sample SF50 = 44.740  
Joules/sq m

ANALYSIS 327





**Paper & Paperboard Interlaboratory Testing Program**

**Report #2911S,  
November 2017**

**Analysis 328**

**Elongation to Break - Printing Papers**

**TAPPI Official Test Method T494**

WebCode	Data Flag	Sample SF49			Sample SF50			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2G7Y4H		1.619	0.052	0.34	1.707	0.105	0.82	IM
2K76KA		1.642	0.075	0.50	1.665	0.063	0.49	LH
2V4BCM	X	2.011	0.444	2.92	2.039	0.437	3.40	XX
3GMFWQ		1.533	-0.034	-0.22	1.649	0.047	0.37	LA
3X9V39		1.456	-0.111	-0.73	1.565	-0.037	-0.28	LI
62XC6C		1.771	0.204	1.35	1.763	0.161	1.25	DL
778RCF		1.753	0.187	1.23	1.730	0.128	1.00	ID
7TPYPU		1.650	0.083	0.55	1.648	0.047	0.36	RE
7XXAUG		1.453	-0.114	-0.75	1.506	-0.096	-0.74	LX
874MCW		1.422	-0.145	-0.95	1.469	-0.133	-1.03	TF
92UQ72		1.588	0.021	0.14	1.629	0.027	0.21	LX
AHRGEG		1.510	-0.057	-0.37	1.507	-0.095	-0.73	LX
BJMDPW		1.497	-0.070	-0.46	1.512	-0.090	-0.70	LI
BNWNHQ	*	1.652	0.085	0.56	1.792	0.190	1.48	LI
CT3K2Q		1.592	0.025	0.17	1.644	0.042	0.33	LI
DJB9B9		1.499	-0.068	-0.44	1.524	-0.078	-0.60	LH
FLD4YQ	X	0.128	-1.438	-9.46	0.122	-1.479	-11.49	TS
FM7YJE		1.688	0.122	0.80	1.706	0.105	0.81	TB
FRFET3		1.720	0.153	1.01	1.690	0.088	0.69	TF
FZBE6A		1.742	0.175	1.15	1.639	0.037	0.29	XX
GZP2GW		1.764	0.197	1.30	1.790	0.188	1.46	XX
JRMTN2		1.513	-0.054	-0.35	1.521	-0.081	-0.63	LH
MDXUBV		1.613	0.046	0.30	1.604	0.003	0.02	TB
N3RAQE		1.610	0.043	0.29	1.604	0.002	0.02	LH
NBLFJF		1.837	0.271	1.78	1.802	0.201	1.56	TF
P4DMGV		1.811	0.244	1.61	1.835	0.233	1.81	TF
PP234X		1.289	-0.278	-1.83	1.380	-0.222	-1.72	LX
QC8Z3G		1.504	-0.063	-0.41	1.573	-0.029	-0.22	LI
RPDFLR		1.484	-0.083	-0.54	1.478	-0.124	-0.96	LH
UCX8W6		1.563	-0.004	-0.02	1.696	0.094	0.73	IM
VD46K7		1.515	-0.052	-0.34	1.544	-0.058	-0.45	LI
WFAULU		1.416	-0.151	-0.99	1.443	-0.159	-1.23	LA
WFNFVV		1.358	-0.209	-1.37	1.432	-0.170	-1.32	TG
X93RPR		1.472	-0.095	-0.62	1.473	-0.129	-1.00	XX
XRYBPK	*	1.160	-0.407	-2.68	1.330	-0.272	-2.11	VM



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 328**  
**Elongation to Break - Printing Papers**  
**TAPPI Official Test Method T494**

**Report #2911S,**  
**November 2017**

Summary Statistics	<u>Sample SF49</u>	<u>Sample SF50</u>
<b>Grand Means</b>	1.57 Percent	1.60 Percent
<b>Std Dev Btwn Labs</b>	0.15 Percent	0.13 Percent
Statistics based on 33 of 35 reporting participants.		

**Comments on Assigned Data Flags for Test #328**

2V4BCM (X) - Data for both samples are high. Possible Systematic Error.

FLD4YQ (X) - Extreme Data.

**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)	RE	Regmed
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TG	Thwing-Albert QC	TS	Tinius Olsen 1000
VM	Valmet PaperLab (was Kajaani/Robotest)	XX	Instrument make/model not specified by lab



# Paper & Paperboard Interlaboratory Testing Program

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## Analysis 328

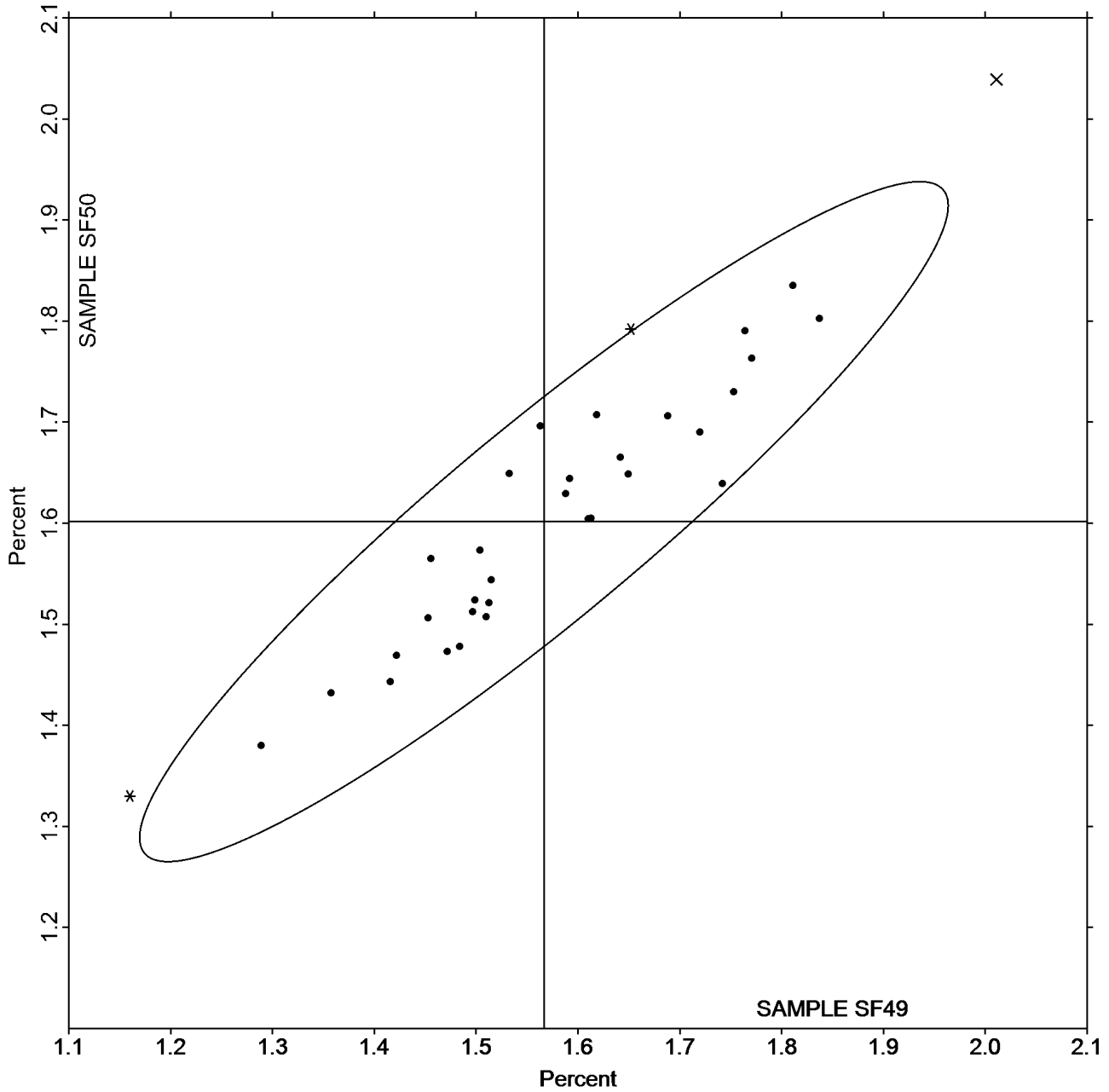
Elongation to Break - Printing Papers

TAPPI Official Test Method T494

Grand Mean Sample SF49 = 1.5666  
Percent

Grand Mean Sample SF50 = 1.6016  
Percent

ANALYSIS 328





**Paper & Paperboard Interlaboratory Testing Program**

**Report #2911S,  
November 2017**

**Analysis 330**

**Tensile Breaking Strength - Packaging Papers**

**TAPPI Official Test Method T494**

WebCode	Data Flag	Sample SE49			Sample SE50			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6MK47U		16.11	-0.29	-0.30	13.16	0.33	0.38	LI
7YQGZY		17.56	1.16	1.23	13.15	0.32	0.38	TR
882X9Y		18.56	2.16	2.28	14.75	1.92	2.26	LA
8NK38C		16.31	-0.08	-0.09	12.79	-0.05	-0.05	TB
96M2TK		14.92	-1.48	-1.56	11.23	-1.60	-1.88	IN
99RMQJ		15.93	-0.47	-0.49	12.48	-0.35	-0.41	LE
9FAQZ8		16.55	0.15	0.16	12.46	-0.37	-0.43	ID
B7VM6R		16.93	0.53	0.56	13.74	0.91	1.07	TO
BW9TNP		15.30	-1.09	-1.16	11.80	-1.03	-1.22	LE
C7BE89	*	18.54	2.14	2.26	13.76	0.92	1.09	IK
D6TVM3		17.72	1.32	1.39	13.71	0.88	1.03	LX
DJDDGR		17.20	0.81	0.85	13.15	0.32	0.38	XX
E7YPV8		17.45	1.05	1.11	13.98	1.15	1.35	TX
EQB6LE		15.00	-1.40	-1.48	12.09	-0.74	-0.87	TB
FEU3E8		15.85	-0.54	-0.57	12.16	-0.67	-0.78	LE
FLALWL		16.42	0.02	0.03	12.90	0.07	0.09	LH
FMAGLJ		15.53	-0.87	-0.92	12.16	-0.67	-0.78	TH
GAWZRJ		15.64	-0.76	-0.80	12.05	-0.79	-0.92	IF
GL7FVH		16.37	-0.03	-0.03	12.06	-0.77	-0.91	XX
GQGJWD	X	13.56	-2.84	-3.00	9.97	-2.86	-3.37	ID
MDXUBV		16.10	-0.29	-0.31	12.94	0.11	0.13	TB
MDXVDG		14.47	-1.93	-2.04	10.96	-1.87	-2.20	TT
MGUPN4		17.89	1.50	1.58	13.99	1.15	1.36	TH
MYDGVF		16.97	0.57	0.61	13.69	0.86	1.01	TO
N3RAQE		16.05	-0.35	-0.37	12.51	-0.32	-0.38	LH
NH338Q		16.00	-0.40	-0.42	12.71	-0.12	-0.15	XX
P4DMGV	*	15.75	-0.65	-0.69	13.65	0.82	0.96	TO
Q2BXZ9		14.82	-1.58	-1.67	11.59	-1.24	-1.46	TO
QTX3JK		16.08	-0.32	-0.34	12.21	-0.62	-0.74	IF
QUAHDL		17.02	0.62	0.66	13.42	0.59	0.69	LE
QVKMNP		15.53	-0.86	-0.91	12.51	-0.32	-0.38	IF
RDLP49		16.56	0.17	0.18	13.27	0.44	0.51	ID
T8PHX6		17.42	1.02	1.08	14.52	1.69	1.99	LA
T8PM98		15.94	-0.45	-0.48	12.13	-0.70	-0.83	IM
TG8BYZ	X	13.73	-2.67	-2.82	12.23	-0.60	-0.71	IM
UGR6LV		16.19	-0.20	-0.22	12.81	-0.02	-0.02	LA
UQHPP9		15.31	-1.09	-1.15	12.14	-0.69	-0.81	XX
VA4Y2U		17.43	1.03	1.09	13.31	0.48	0.56	LW
VT3WPV		17.30	0.90	0.95	13.03	0.20	0.24	LH
W8DWW7		15.78	-0.62	-0.65	12.13	-0.70	-0.83	IM





**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 330**  
**Tensile Breaking Strength - Packaging Papers**  
**TAPPI Official Test Method T494**

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WebCode	Data Flag	<u>Sample SE49</u>			<u>Sample SE50</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
WLVUTU		16.36	-0.04	-0.04	12.90	0.07	0.08	TA
XQP2XN		16.14	-0.26	-0.27	12.14	-0.69	-0.81	LE
XUNH9W		16.80	0.40	0.42	12.32	-0.52	-0.61	LW
XX7LWU		17.27	0.87	0.92	14.19	1.36	1.60	TH
Y46LT2		15.51	-0.89	-0.94	12.22	-0.61	-0.72	TK
Y4A4V7		17.00	0.61	0.64	13.80	0.97	1.14	TH
ZXY8NB		16.30	-0.10	-0.10	12.74	-0.09	-0.11	IK

<b>Summary Statistics</b>	<u><b>Sample SE49</b></u>	<u><b>Sample SE50</b></u>
<b>Grand Means</b>	16.40 kN/m	12.83 kN/m
<b>Std Dev Btwn Labs</b>	0.95 kN/m	0.85 kN/m

Statistics based on 45 of 47 reporting participants.

**Comments on Assigned Data Flags for Test #330**

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

TG8BYZ (X) - Data for sample SE49 are low. Inconsistent within the determinations of sample SE49.

**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	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
LX	L & W (model not specified)	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
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

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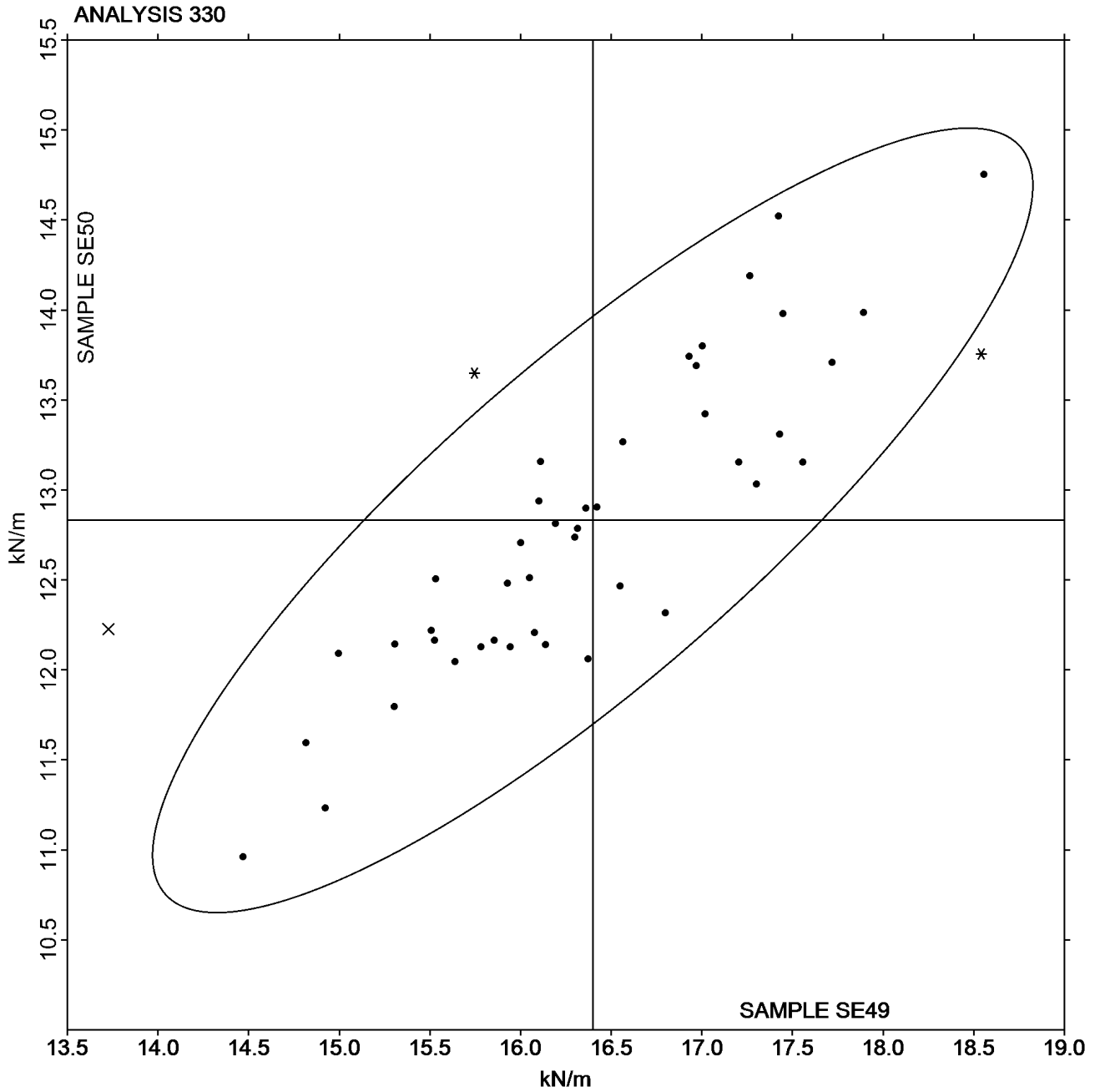
## Analysis 330

### Tensile Breaking Strength - Packaging Papers

#### TAPPI Official Test Method T494

Grand Mean Sample SE49 = 16.398  
kN/m

Grand Mean Sample SE50 = 12.831  
kN/m





# Paper & Paperboard Interlaboratory Testing Program

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## Analysis 331

### Tensile Energy Absorption - Packaging Papers

#### TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE49			Sample SE50			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
7YQGZY		213.9	26.6	1.56	175.7	6.5	0.35	TR
882X9Y		193.8	6.5	0.38	178.6	9.4	0.51	LA
8NK38C		202.1	14.8	0.87	177.6	8.4	0.46	TB
96M2TK	*	187.9	0.6	0.03	132.2	-37.0	-2.02	IN
99RMQJ		175.5	-11.8	-0.70	156.2	-13.0	-0.71	LE
9FAQZ8	*	170.2	-17.1	-1.00	198.2	29.0	1.58	ID
B7VM6R		217.7	30.4	1.78	193.4	24.2	1.32	TO
BW9TNP		168.4	-18.9	-1.11	152.3	-16.9	-0.92	LE
C7BE89	X	197.7	10.4	0.61	124.6	-44.6	-2.43	XX
D6TVM3		203.3	15.9	0.94	180.6	11.4	0.62	LX
DJDDGR		201.2	13.9	0.81	152.7	-16.5	-0.90	XX
E7YPV8		215.4	28.0	1.65	202.5	33.3	1.82	XX
FEU3E8		173.4	-14.0	-0.82	160.2	-9.0	-0.49	LE
FLALWL		168.5	-18.9	-1.11	161.7	-7.5	-0.41	LH
FMAGLJ		206.9	19.6	1.15	185.2	16.0	0.87	TH
GL7FVH		183.7	-3.6	-0.21	150.1	-19.1	-1.04	XX
GQGJWD	X	111.6	-75.8	-4.45	85.6	-83.6	-4.56	ID
MDXUBV		169.0	-18.4	-1.08	167.7	-1.5	-0.08	TB
MDXVDG	X	250.1	62.7	3.68	188.5	19.3	1.05	TT
MGUPN4		214.1	26.7	1.57	193.7	24.5	1.34	TH
MYDGVF		190.7	3.4	0.20	182.2	13.0	0.71	TO
N3RAQE		175.8	-11.5	-0.68	159.9	-9.3	-0.51	LH
NH338Q	X	254.8	67.5	3.96	236.1	66.9	3.65	XX
P4DMGV		184.6	-2.7	-0.16	176.9	7.7	0.42	TO
Q2BXZ9		190.7	3.4	0.20	170.2	1.0	0.05	TO
QTX3JK		208.5	21.2	1.24	200.0	30.8	1.68	IF
QUAHDL		202.4	15.1	0.88	181.6	12.4	0.68	LE
QVKMNP		181.7	-5.7	-0.33	156.4	-12.8	-0.70	IN
T8PHX6		195.0	7.6	0.45	177.7	8.5	0.46	LA
T8PM98		186.6	-0.7	-0.04	153.6	-15.6	-0.85	IM
TG8BYZ		163.7	-23.7	-1.39	161.4	-7.8	-0.43	IM
UGR6LV		176.5	-10.8	-0.63	174.9	5.7	0.31	LA
UQHPP9	X	312.6	125.3	7.36	281.8	112.6	6.14	XX
VA4Y2U		174.0	-13.3	-0.78	153.9	-15.3	-0.84	LW
VT3WPV		165.9	-21.4	-1.26	151.3	-17.9	-0.97	LH
W8DWW7		171.9	-15.4	-0.91	158.6	-10.6	-0.58	IM
WLVUTU		169.0	-18.3	-1.08	147.8	-21.4	-1.17	TA
XQP2XN		169.3	-18.0	-1.06	146.3	-22.9	-1.25	LE
XUNH9W		167.0	-20.3	-1.19	142.4	-26.8	-1.46	LW
XX7LWU		198.4	11.1	0.65	201.3	32.1	1.75	TH



**Paper & Paperboard Interlaboratory Testing Program**

**Report #2911S,  
November 2017**

**Analysis 331**

**Tensile Energy Absorption - Packaging Papers**

**TAPPI Official Test Method T494**

WebCode	Data Flag	Sample SE49			Sample SE50			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
Y46LT2		179.3	-8.0	-0.47	159.2	-10.0	-0.55	TK
ZXY8NB		215.4	28.1	1.65	186.1	16.9	0.92	IK

Summary Statistics	Sample SE49	Sample SE50
<b>Grand Means</b>	187.34 Joules/sq m	169.20 Joules/sq m
<b>Std Dev Btwn Labs</b>	17.03 Joules/sq m	18.33 Joules/sq m
Statistics based on 37 of 42 reporting participants.		

**Comments on Assigned Data Flags for Test #331**

UQHPP9 (X) - Extreme Data.

MDXVDG (X) - Data for sample SE49 are high.

C7BE89 (X) - Inconsistent in testing between samples.

GQGJWD (X) - Data for both samples are low. Inconsistent within the determinations of sample SE49.

NH338Q (X) - Data for both samples are high.

**Analysis Notes:**

DJDDGR - Data appear to be reported as J/sq m, not ft-lb/sq ft inch as indicated on datasheet. Units corrected by CTS.

E7YPV8 - Data appear to be reported as ft-lb/sq ft, not inch-lb/sq inch as indicated on datasheet. Units corrected by CTS.

**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	LA	L & W Autoline
LE	L & W Tensile Tester 066	LH	L & W Alwetron TH1 (Horizontal) SE 060
LW	L & W Tensile Tester SE062	LX	L & W (model not specified)
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	TR	TMI Horizontal Tensile Tester
TT	Tinius Olsen Model MHT	XX	Instrument make/model not specified by lab



# Paper & Paperboard Interlaboratory Testing Program

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## Analysis 331

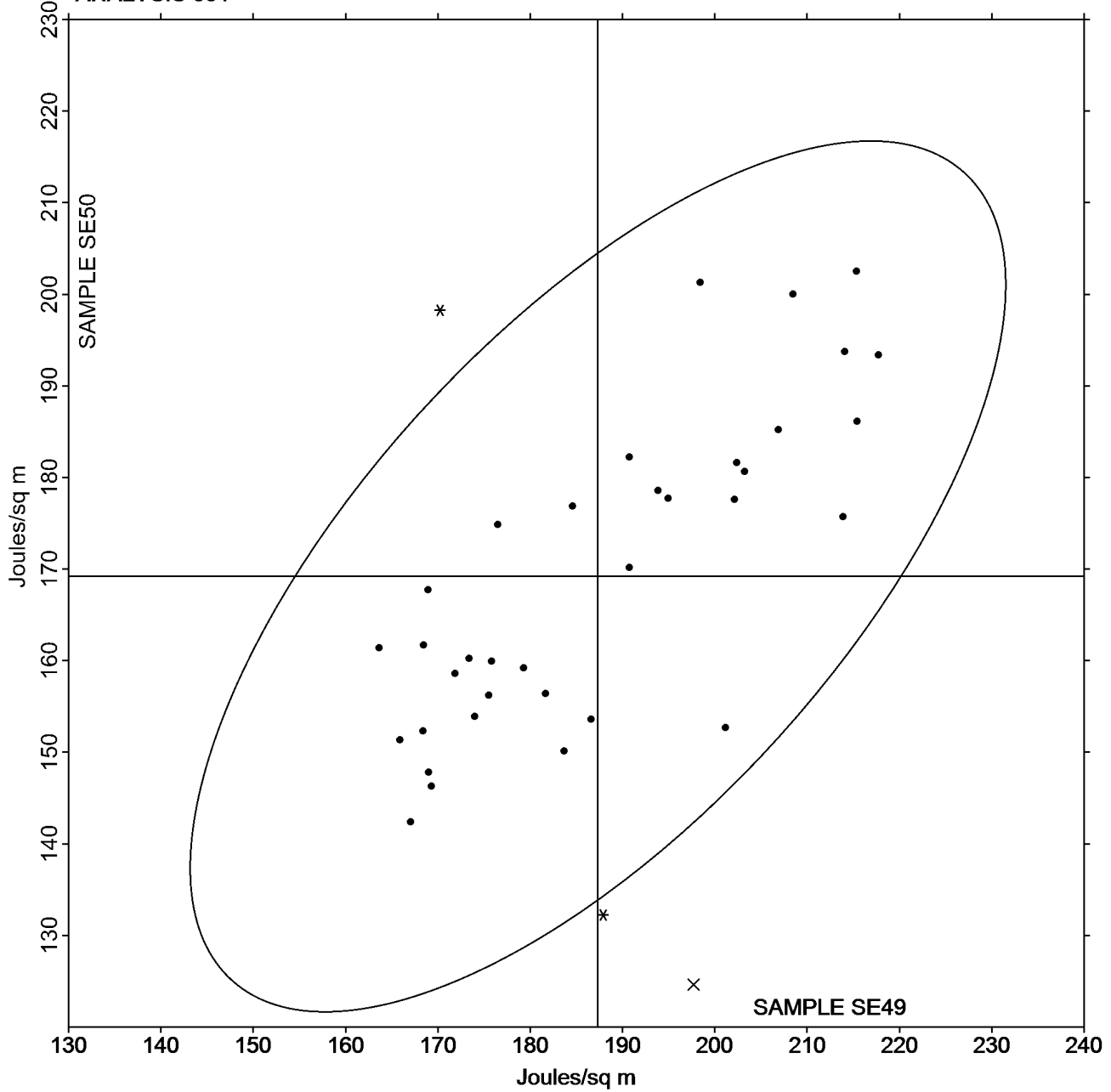
### Tensile Energy Absorption - Packaging Papers

#### TAPPI Official Test Method T494

Grand Mean Sample SE49 = 187.34  
Joules/sq m

Grand Mean Sample SE50 = 169.20  
Joules/sq m

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# Paper & Paperboard Interlaboratory Testing Program

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## Analysis 332

### Elongation to Break - Packaging Papers

#### TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE49			Sample SE50			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
7YQGZY		1.924	0.134	0.57	2.148	0.075	0.32	TR
882X9Y		1.531	-0.260	-1.11	1.828	-0.245	-1.04	LA
8NK38C		1.950	0.159	0.68	2.220	0.147	0.62	TB
96M2TK	X	2.160	0.369	1.58	2.080	0.007	0.03	IN
99RMQJ		1.649	-0.142	-0.61	1.904	-0.169	-0.72	LE
9FAQZ8		1.846	0.056	0.24	2.117	0.044	0.19	ID
B7VM6R		2.128	0.337	1.45	2.330	0.257	1.09	TO
BW9TNP		1.652	-0.139	-0.59	1.977	-0.096	-0.41	LE
C7BE89	X	1.995	0.204	0.88	1.825	-0.248	-1.05	XX
D6TVM3		1.714	-0.077	-0.33	1.999	-0.074	-0.31	LX
DJDDGR	*	2.195	0.404	1.73	2.216	0.143	0.61	XX
E7YPV8		2.100	0.309	1.33	2.441	0.368	1.56	XX
EQB6LE		1.442	-0.349	-1.50	1.837	-0.235	-1.00	TB
FEU3E8		1.613	-0.178	-0.76	1.972	-0.101	-0.43	LE
FLALWL		1.568	-0.223	-0.95	1.925	-0.148	-0.63	LH
FMAGLJ		2.243	0.452	1.94	2.567	0.494	2.09	TH
GL7FVH		1.703	-0.088	-0.38	1.912	-0.161	-0.68	XX
GQGJWD		1.542	-0.249	-1.07	1.644	-0.429	-1.82	ID
MDXUBV		1.628	-0.162	-0.70	1.992	-0.081	-0.34	TB
MDXVDG	X	3.061	1.270	5.44	3.127	1.054	4.47	TT
MGUPN4		1.967	0.176	0.76	2.301	0.228	0.97	TH
MYDGVF		1.731	-0.060	-0.26	2.057	-0.016	-0.07	TO
N3RAQE		1.663	-0.128	-0.55	1.892	-0.181	-0.77	LH
NH338Q	X	2.550	0.759	3.25	2.980	0.907	3.84	XX
P4DMGV		1.802	0.011	0.05	2.087	0.014	0.06	TO
Q2BXZ9		2.130	0.339	1.45	2.440	0.367	1.56	TO
QTX3JK		2.190	0.399	1.71	2.542	0.469	1.99	IF
QUAHDL		1.826	0.035	0.15	2.104	0.031	0.13	LE
QVKMNP		1.777	-0.013	-0.06	2.038	-0.035	-0.15	IN
RDLP49		1.768	-0.023	-0.10	2.097	0.024	0.10	ID
T8PHX6	X	16.625	14.834	63.57	13.411	11.338	48.04	XX
T8PM98		1.780	-0.011	-0.05	1.963	-0.110	-0.47	IM
TG8BYZ		1.851	0.060	0.26	2.205	0.132	0.56	IM
UGR6LV		1.393	-0.398	-1.70	1.779	-0.294	-1.24	LA
UQHPP9		1.936	0.145	0.62	2.213	0.140	0.59	XX
VA4Y2U		1.541	-0.250	-1.07	1.792	-0.281	-1.19	LW
VT3WPV		1.510	-0.281	-1.20	1.800	-0.273	-1.16	LH
W8DWW7		1.992	0.201	0.86	2.313	0.240	1.02	IM
WLVUTU		1.567	-0.224	-0.96	1.712	-0.361	-1.53	TA
XQP2XN		1.594	-0.197	-0.84	1.866	-0.207	-0.88	LE



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 332**  
**Elongation to Break - Packaging Papers**  
**TAPPI Official Test Method T494**

**Report #2911S,**  
**November 2017**

WebCode	Data Flag	<u>Sample SE49</u>			<u>Sample SE50</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
XUNH9W		1.540	-0.251	-1.07	1.797	-0.276	-1.17	LW
XX7LWU	*	1.796	0.005	0.02	2.345	0.272	1.15	TH
Y46LT2		1.830	0.039	0.17	2.074	0.001	0.01	TK
ZXY8NB		2.225	0.434	1.86	2.391	0.319	1.35	IK

<b>Summary Statistics</b>	<u>Sample SE49</u>	<u>Sample SE50</u>
<b>Grand Means</b>	1.79 Percent	2.07 Percent
<b>Std Dev Btwn Labs</b>	0.23 Percent	0.24 Percent

Statistics based on 39 of 44 reporting participants.

**Comments on Assigned Data Flags for Test #332**

- T8PHX6 (X) - Extreme Data.
- MDXVDG (X) - Data for both samples are high. Possible Systematic Error.
- C7BE89 (X) - Inconsistent in testing between samples.
- 96M2TK (X) - Inconsistent in testing between samples.
- NH338Q (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample SE50.

**Analysis Notes:**

9FAQZ8 - One determination removed from the Lab Mean of Sample SE50 per Grubb's Test at 1% risk (TAPPI 1205).

**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	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	LX	L & W (model not specified)
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	TR	TMI Horizontal Tensile Tester
TT	Tinius Olsen Model MHT	XX	Instrument make/model not specified by lab



Analysis 332

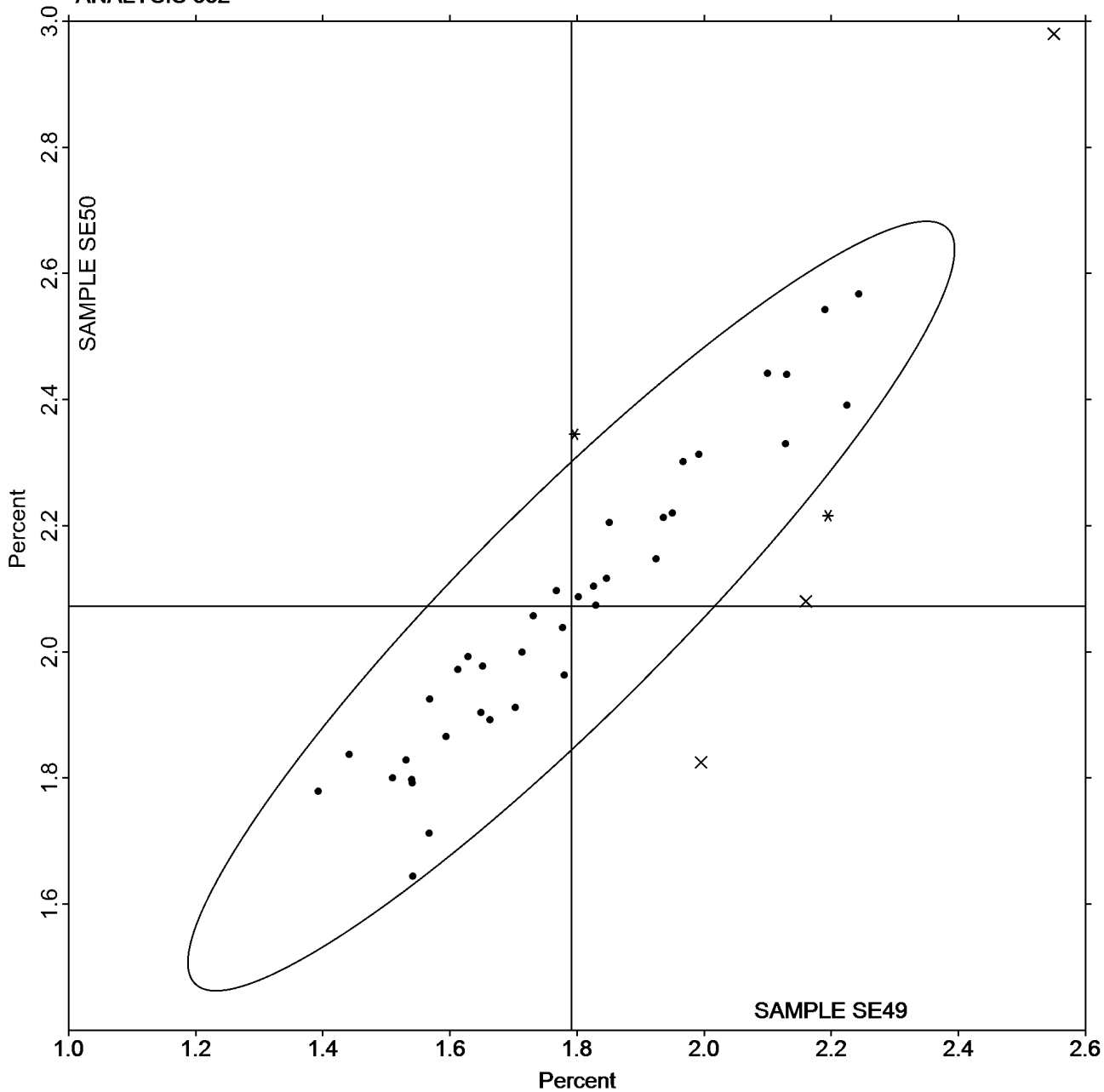
Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

Grand Mean Sample SE49 = 1.7907  
Percent

Grand Mean Sample SE50 = 2.0727  
Percent

ANALYSIS 332







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

**Report #2911S,**  
**November 2017**

WebCode	Data Flag	<u>Sample SG49</u>			<u>Sample SG50</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2G7Y4H		89.30	5.42	0.30	75.20	-5.42	-0.30	MT
3X9V39		116.10	32.22	1.76	110.10	29.48	1.65	MT
778RCF		73.70	-10.18	-0.56	66.90	-13.72	-0.77	MT
EQB6LE	X	93.60	9.72	0.53	47.10	-33.52	-1.88	MT
FMAGLJ		60.60	-23.28	-1.27	61.20	-19.42	-1.09	MT
FRFET3		69.80	-14.08	-0.77	71.90	-8.72	-0.49	MT
GYUK3E		73.50	-10.38	-0.57	73.10	-7.52	-0.42	XX
Q76ULT		82.10	-1.78	-0.10	92.30	11.68	0.66	MT
QCBP6T		73.90	-9.98	-0.55	57.70	-22.92	-1.29	MT
UQHPP9		80.60	-3.28	-0.18	84.30	3.68	0.21	MT
VA4Y2U	X	61.60	-22.28	-1.22	80.40	-0.22	-0.01	MT
VZGXN6		84.50	0.62	0.03	83.60	2.98	0.17	MT
XRYBPK		118.60	34.72	1.90	110.50	29.88	1.68	MT

<b>Summary Statistics</b>	<u>Sample SG49</u>	<u>Sample SG50</u>
<b>Grand Means</b>	83.88 Double Folds	80.62 Double Folds
<b>Std Dev Btwn Labs</b>	18.27 Double Folds	17.81 Double Folds
Statistics based on 11 of 13 reporting participants.		

**Comments on Assigned Data Flags for Test #334**

EQB6LE (X) - Inconsistent in testing between samples.

VA4Y2U (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SG50.

**Key to Instrument Codes Reported by Participants**

MT MIT - Tinius Olsen

XX Instrument make/model not specified by lab



Analysis 334

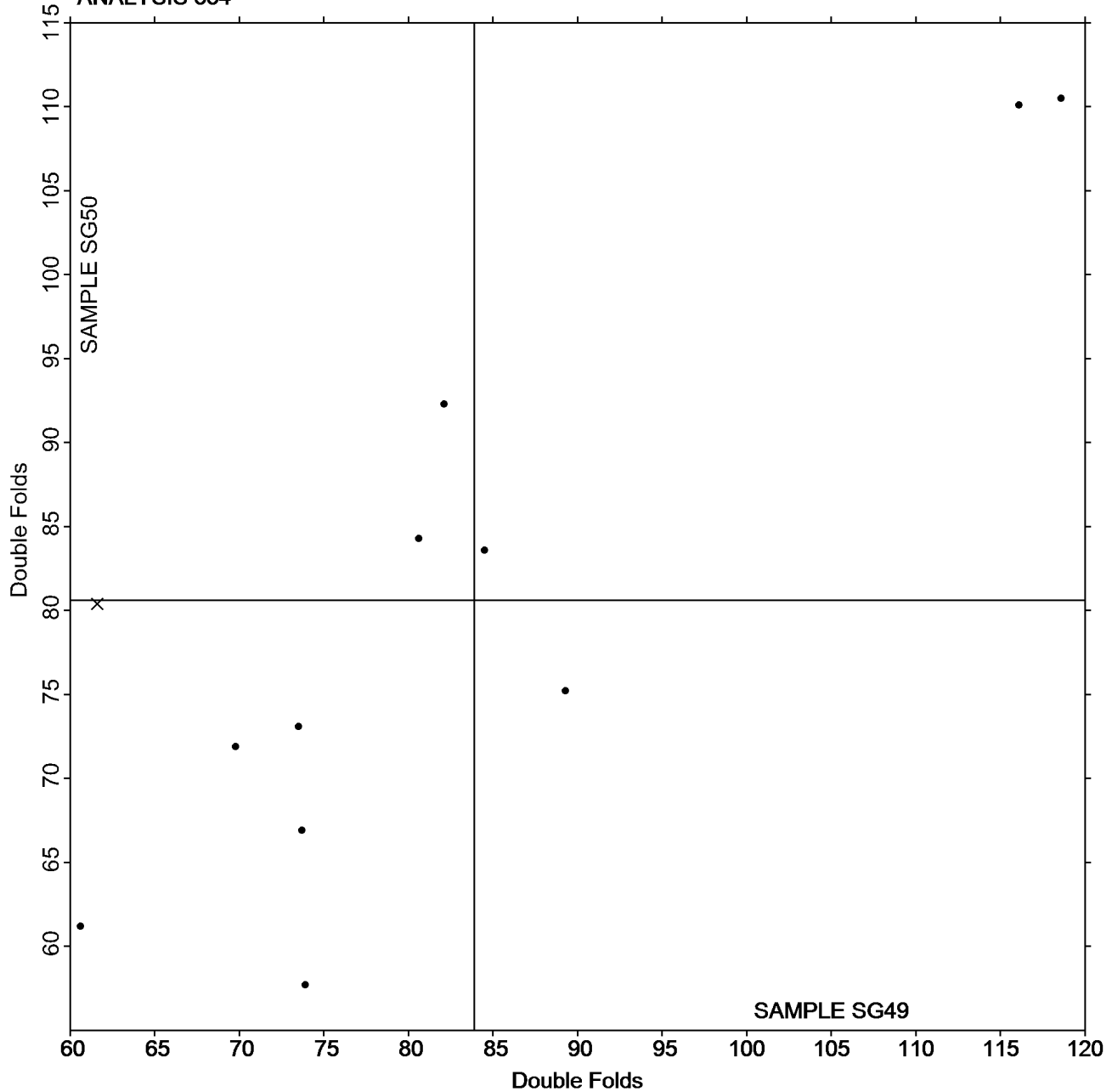
Folding Endurance (MIT) - Double Folds

TAPPI Official Test Method T511

Grand Mean Sample SG49 = 83.882  
Double Folds

Grand Mean Sample SG50 = 80.618  
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**  
**Analysis 336**  
**Bending Resistance, Gurley Type**  
**TAPPI Official Test Method T543**

Report #2911S,  
November 2017

WebCode	Data Flag	Sample SH49			Sample SH50		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2G7Y4H		149.4	-0.9	-0.07	144.3	-0.8	-0.06
6T9NAA		161.4	11.1	0.95	148.3	3.2	0.27
7XXAUG		135.1	-15.2	-1.29	128.4	-16.6	-1.39
883W7E		149.1	-1.2	-0.10	148.3	3.2	0.27
DJB9B9		149.2	-1.1	-0.09	148.7	3.7	0.31
EQB6LE		153.8	3.5	0.30	150.2	5.2	0.43
FCMM7F		130.3	-20.0	-1.70	128.1	-17.0	-1.42
FM7YJE		153.2	2.9	0.25	146.1	1.0	0.09
GTNPJE		141.2	-9.1	-0.77	137.3	-7.7	-0.65
GYUK3E		145.4	-4.9	-0.42	144.2	-0.9	-0.07
MDXUBV	X	107.4	-42.8	-3.65	102.6	-42.5	-3.55
NBLFJF		132.5	-17.7	-1.51	123.4	-21.6	-1.81
QTX3JK		174.3	24.0	2.05	169.8	24.8	2.07
TVUHW2	X	188.4	38.1	3.25	255.2	110.1	9.21
UQHPP9		153.2	2.9	0.25	148.1	3.0	0.25
WFAULU		161.2	11.0	0.93	158.2	13.1	1.10
XLUARC		152.5	2.2	0.19	139.4	-5.6	-0.47
XRYBPK		162.7	12.4	1.06	157.9	12.8	1.07

Summary Statistics	Sample SH49	Sample SH50
<b>Grand Means</b>	150.28 Gurley Units	145.05 Gurley Units
<b>Std Dev Btwn Labs</b>	11.72 Gurley Units	11.96 Gurley Units
Statistics based on 16 of 18 reporting participants.		

**Comments on Assigned Data Flags for Test #336**

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

TVUHW2 (X) - Extreme Data.



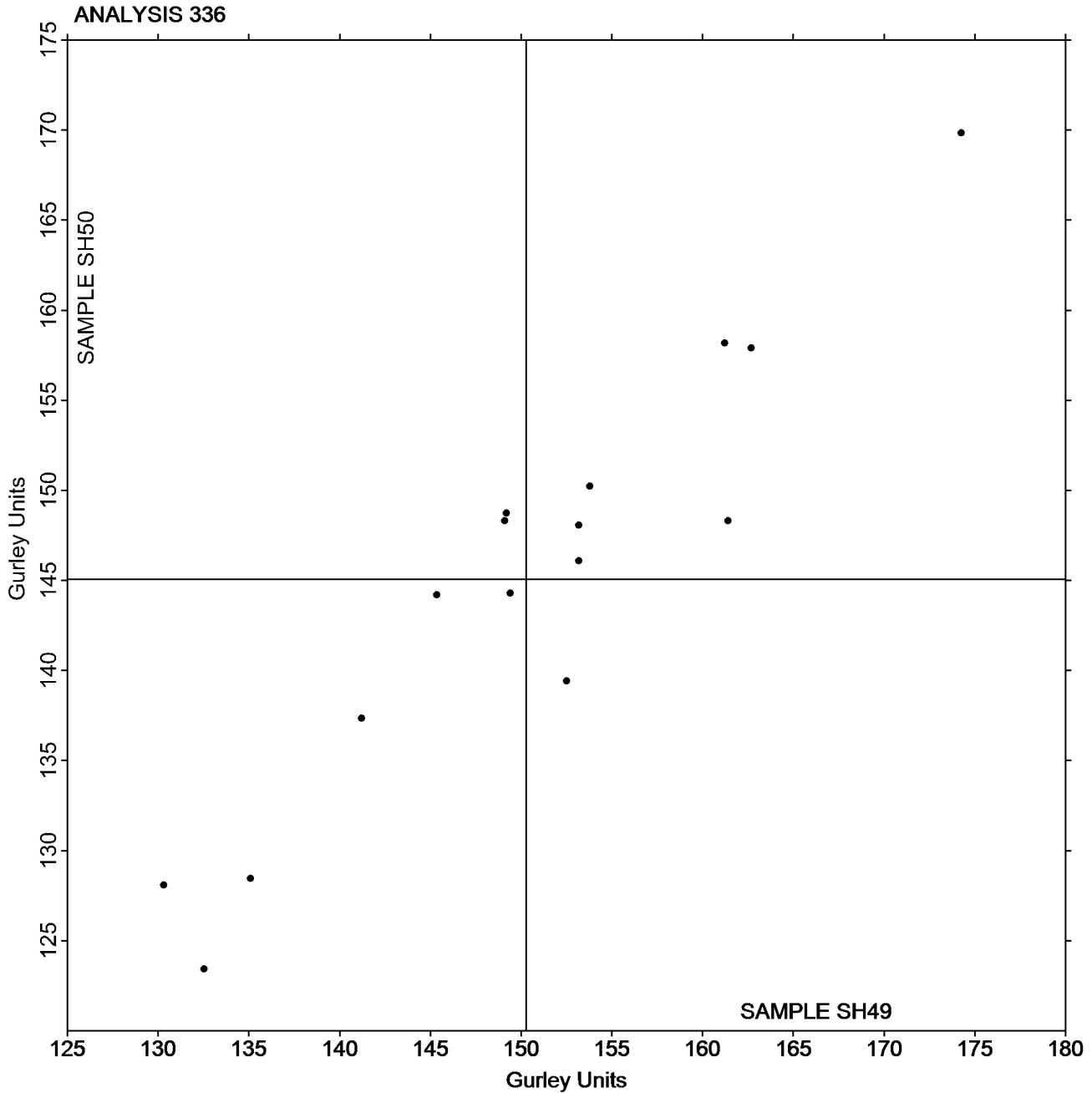
# Paper & Paperboard Interlaboratory Testing Program

Report #2911S,  
November 2017

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

Grand Mean Sample SH49 = 150.28  
Gurley Units

Grand Mean Sample SH50 = 145.05  
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 #2911S,**  
**November 2017**

WebCode	Data Flag	<u>Sample SJ49</u>			<u>Sample SJ50</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2G7Y4H		2.209	0.018	0.09	2.004	-0.127	-0.68
4AFC2N		2.263	0.072	0.36	2.221	0.090	0.49
778RCF		2.406	0.215	1.07	2.373	0.242	1.30
AHRGEG		2.299	0.108	0.54	2.138	0.007	0.04
DJB NB9		2.473	0.282	1.40	2.423	0.292	1.57
DJDDGR		1.792	-0.399	-1.99	1.811	-0.320	-1.72
FM7YJE		2.070	-0.121	-0.60	2.089	-0.042	-0.23
QCBP6T		2.303	0.112	0.56	2.090	-0.041	-0.22
QTX3JK		2.262	0.071	0.35	2.238	0.107	0.58
QVKMNP	X	3.780	1.589	7.91	3.910	1.779	9.59
U46RAL	X	1.046	-1.145	-5.70	1.019	-1.112	-5.99
XUNH9W		1.960	-0.231	-1.15	1.890	-0.241	-1.30
ZMEABR		2.066	-0.125	-0.62	2.163	0.032	0.17

<b>Summary Statistics</b>	<u>Sample SJ49</u>	<u>Sample SJ50</u>
<b>Grand Means</b>	2.19 Taber Units	2.13 Taber Units
<b>Std Dev Btwn Labs</b>	0.20 Taber Units	0.19 Taber Units
Statistics based on 11 of 13 reporting participants.		

**Comments on Assigned Data Flags for Test #338**

QVKMNP (X) - Extreme Data.

U46RAL (X) - Data for both samples are low. Possible Systematic Error.

**Analysis Notes:**

ZMEABR - One determination removed from the Lab Mean of Sample SJ49 per Grubb's Test at 1% risk (TAPPI 1205).



Analysis 338

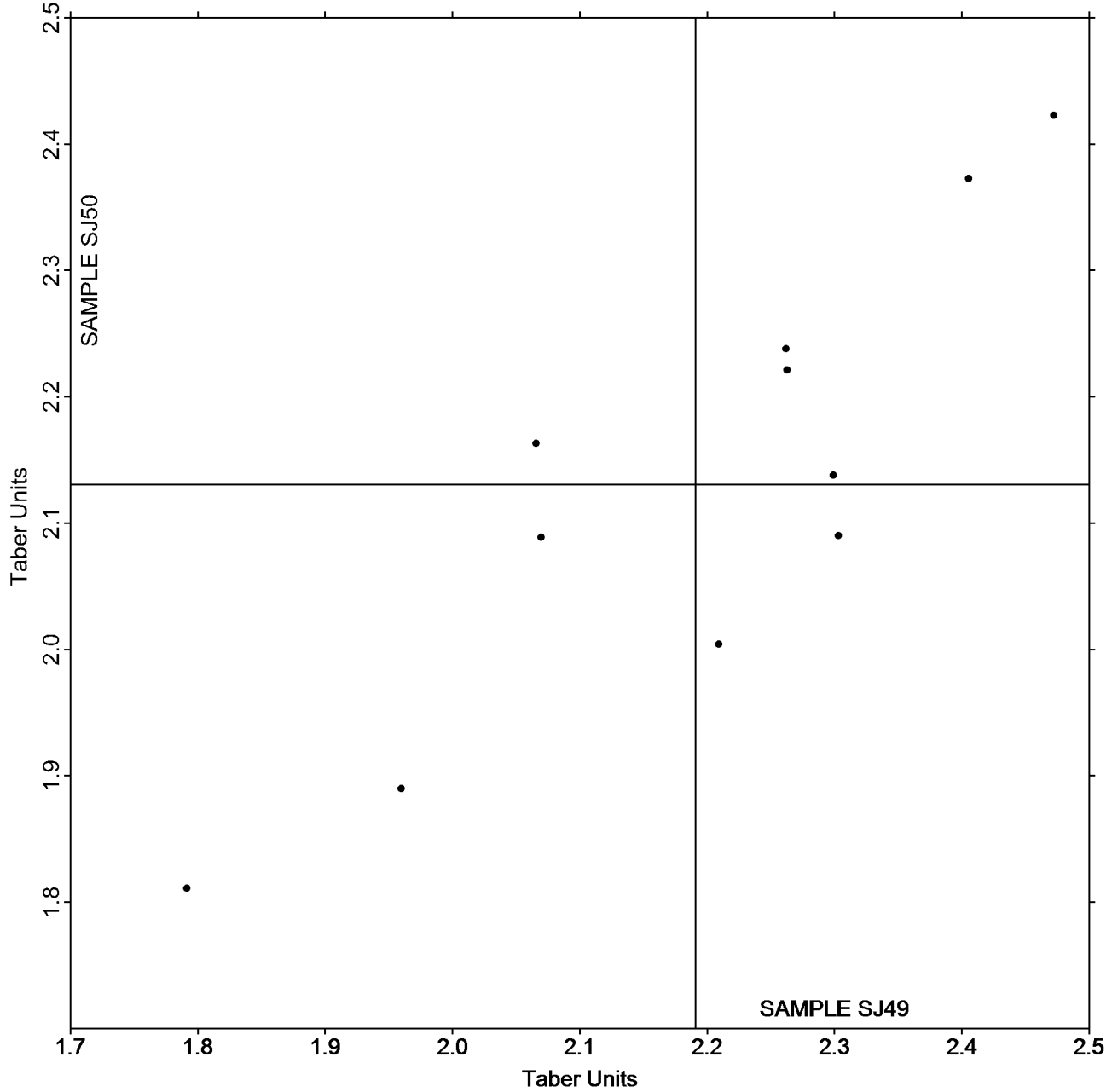
Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

Grand Mean Sample SJ49 = 2.1910  
Taber Units

Grand Mean Sample SJ50 = 2.1308  
Taber Units

ANALYSIS 338



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 #2911S,**  
**November 2017**

WebCode	Data Flag	<u>Sample SQ49</u>			<u>Sample SQ50</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2G7Y4H		111.9	0.9	0.11	110.8	-1.2	-0.16
62XC6C		105.9	-5.1	-0.65	105.6	-6.3	-0.86
6T9NAA		108.5	-2.5	-0.32	108.7	-3.3	-0.45
8NK38C		108.1	-2.9	-0.37	110.8	-1.2	-0.17
GZP2GW	X	19.1	-91.9	-11.77	19.5	-92.5	-12.56
LP8D86		99.7	-11.3	-1.44	107.8	-4.2	-0.57
UCX8W6	X	31.5	-79.5	-10.19	36.8	-75.2	-10.21
UGR6LV		101.2	-9.8	-1.25	103.1	-8.9	-1.21
VA4Y2U		120.4	9.4	1.20	120.3	8.3	1.13
WFNFVV		114.3	3.3	0.42	128.0	16.0	2.18
XLUARC		116.5	5.5	0.70	114.8	2.8	0.38
XUNH9W		123.5	12.5	1.60	110.0	-2.0	-0.27

<b>Summary Statistics</b>	<u>Sample SQ49</u>	<u>Sample SQ50</u>
<b>Grand Means</b>	110.99 Taber Units	111.98 Taber Units
<b>Stnd Dev Btwn Labs</b>	7.81 Taber Units	7.36 Taber Units
Statistics based on 10 of 12 reporting participants.		

**Comments on Assigned Data Flags for Test #339**

UCX8W6 (X) - Extreme Data.

GZP2GW (X) - Extreme Data.



# Paper & Paperboard Interlaboratory Testing Program

Report #2911S,  
November 2017

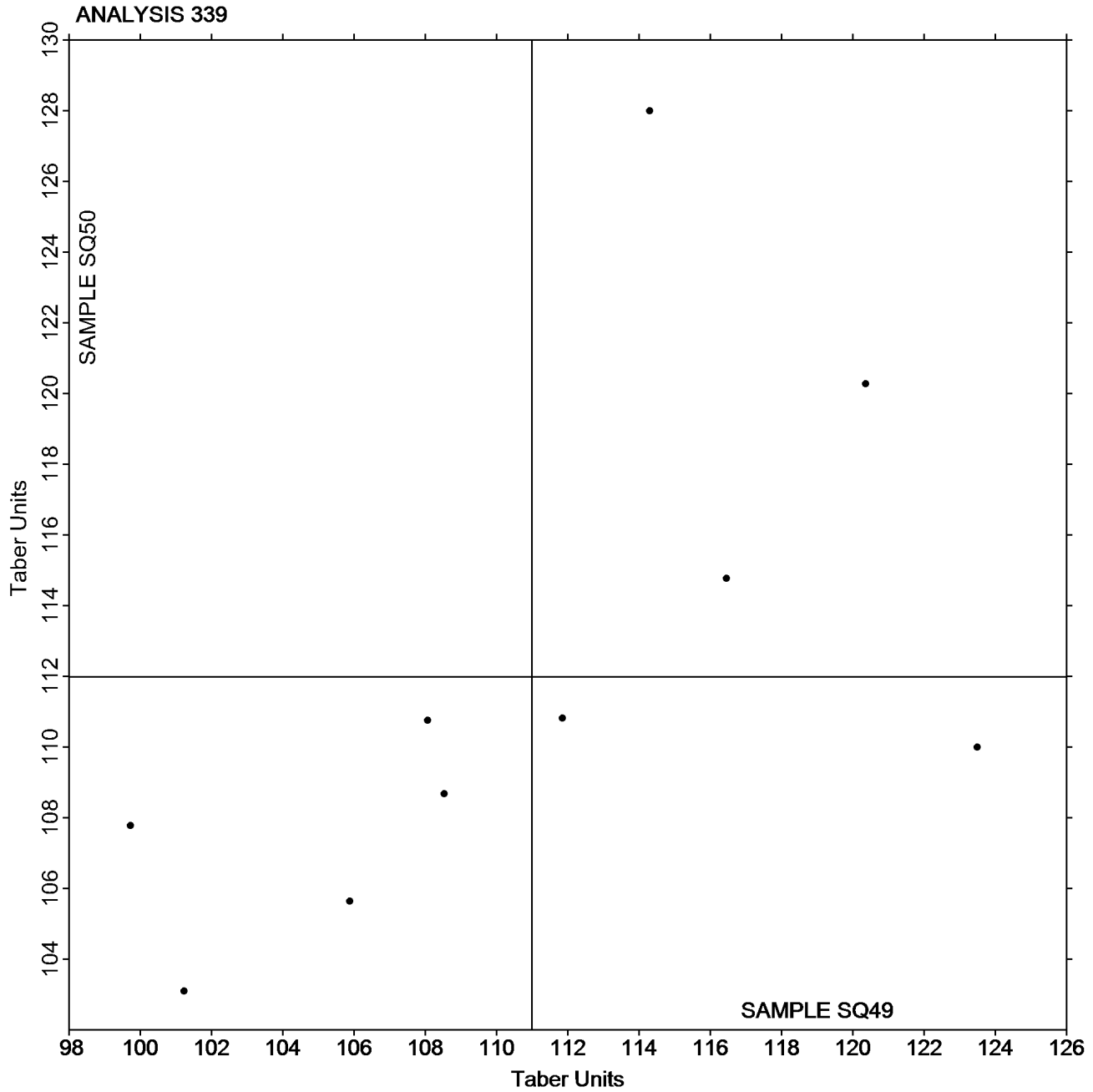
## Analysis 339

Bending Resistance, Taber Type - 10 to 100 Taber Units

TAPPI Official Test Method T489

Grand Mean Sample SQ49 = 110.99  
Taber Units

Grand Mean Sample SQ50 = 111.98  
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 #2911S,  
November 2017**

**Analysis 340**

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

**TAPPI Official Test Method T489**

WebCode	Data Flag	<u>Sample ST49</u>			<u>Sample ST50</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4YHM79		281.7	-0.2	-0.02	290.3	2.2	0.18
87RUHU		278.1	-3.8	-0.39	271.4	-16.8	-1.42
C6YQT4		283.7	1.8	0.19	288.0	-0.1	-0.01
DD8GXR		265.3	-16.6	-1.74	274.2	-14.0	-1.18
FMAGLJ		273.0	-8.9	-0.93	277.8	-10.3	-0.87
GAWZRJ		289.0	7.1	0.75	293.2	5.1	0.43
JHL7YP	X	249.2	-32.7	-3.42	268.5	-19.6	-1.66
LYHD6M		282.1	0.2	0.03	291.9	3.8	0.32
QHUZ9W		287.7	5.8	0.61	288.5	0.4	0.03
QJ8K6C		269.6	-12.2	-1.28	279.7	-8.4	-0.71
UQHPP9		281.6	-0.2	-0.03	282.4	-5.8	-0.49
VA4Y2U		295.1	13.3	1.39	311.9	23.7	2.01
WWE9XG		274.1	-7.8	-0.81	284.0	-4.1	-0.35
XLUARC		284.4	2.5	0.26	290.6	2.5	0.21
XUNH9W		280.0	-1.9	-0.19	285.0	-3.1	-0.27
Y4A4V7		302.4	20.5	2.15	313.3	25.2	2.12

<b>Summary Statistics</b>	<u>Sample ST49</u>	<u>Sample ST50</u>
<b>Grand Means</b>	281.85 Taber Units	288.14 Taber Units
<b>Std Dev Btwn Labs</b>	9.54 Taber Units	11.84 Taber Units
Statistics based on 15 of 16 reporting participants.		

**Comments on Assigned Data Flags for Test #340**

JHL7YP (X) - Data for sample ST49 are low.

**Analysis Notes:**

4YHM79 - Data appear to be reported as g-cm , not mN-m as indicated on datasheet. Units corrected by CTS.

QJ8K6C - Data appear to be reported as mN-m, not g-cm as indicated on datasheet. Units corrected by CTS.



# Paper & Paperboard Interlaboratory Testing Program

Report #2911S,  
November 2017

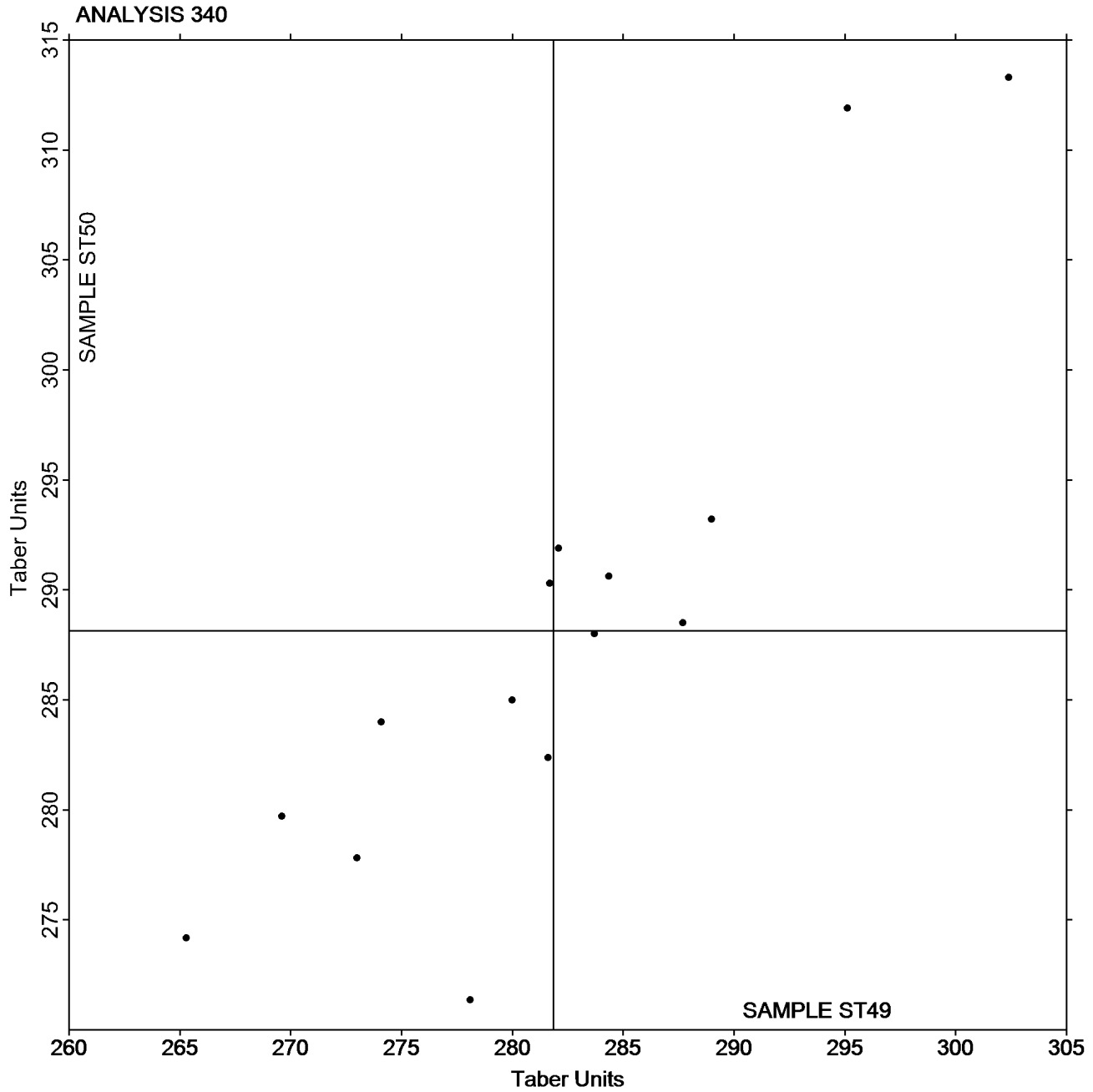
## Analysis 340

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

TAPPI Official Test Method T489

Grand Mean Sample ST49 = 281.85  
Taber Units

Grand Mean Sample ST50 = 288.14  
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 343**  
**Z-Direction Tensile**  
**TAPPI Official Test Method T541**

**Report #2911S,**  
**November 2017**

WebCode	Data Flag	Sample SM49			Sample SM50			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4FPJP9		71.00	5.67	0.85	69.60	3.61	0.60	TA
778RCF		63.66	-1.67	-0.25	60.76	-5.23	-0.87	CD
87RUHU		72.20	6.87	1.04	74.00	8.01	1.33	CA
8NK38C		78.36	13.03	1.96	75.32	9.33	1.55	TA
8PJY32		64.64	-0.69	-0.10	64.60	-1.39	-0.23	DT
9JNN79		63.40	-1.93	-0.29	61.60	-4.39	-0.73	XX
CT3K2Q		58.40	-6.94	-1.05	58.38	-7.61	-1.26	LW
DJDDGR		72.76	7.43	1.12	76.84	10.85	1.80	DT
FMAGLJ		58.06	-7.27	-1.10	62.94	-3.05	-0.51	LW
GZP2GW		61.33	-4.01	-0.60	66.85	0.86	0.14	LW
LP8D86		59.54	-5.79	-0.87	59.25	-6.74	-1.12	TZ
Q2BXZ9		58.40	-6.93	-1.05	58.80	-7.19	-1.19	TA
QJ8K6C		57.73	-7.61	-1.15	59.26	-6.73	-1.11	LX
QTX3JK		61.14	-4.19	-0.63	66.30	0.31	0.05	TL
QUAHDL		65.84	0.51	0.08	67.60	1.61	0.27	TA
VA4Y2U		75.74	10.41	1.57	71.98	5.99	0.99	LW
XECYDB		68.48	3.15	0.47	67.76	1.77	0.29	DT

Summary Statistics	Sample SM49	Sample SM50
<b>Grand Means</b>	65.33 psi	65.99 psi
<b>Std Dev Btwn Labs</b>	6.63 psi	6.03 psi
Statistics based on 17 of 17 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		

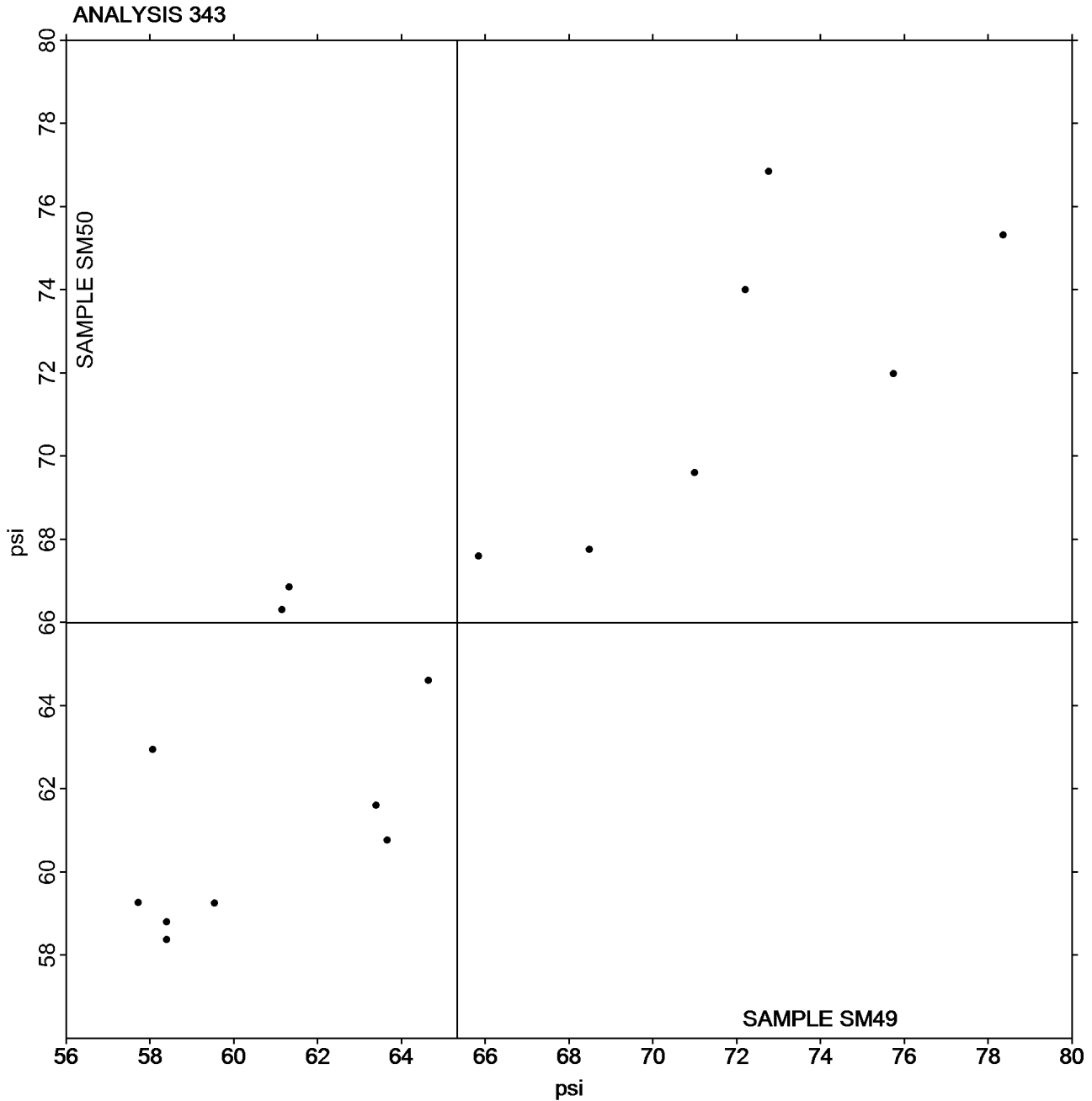


Analysis 343  
Z-Direction Tensile

TAPPI Official Test Method T541

Grand Mean Sample SM49 = 65.334  
psi

Grand Mean Sample SM50 = 65.991  
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**

**Report #2911S,**  
**November 2017**

WebCode	Data Flag	Sample SZ49			Sample SZ50			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2ABYRB		35.20	0.06	0.02	35.12	-0.20	-0.08	CD
4YHM79		35.68	0.54	0.18	34.76	-0.56	-0.22	CD
6MK47U		38.24	3.10	1.04	37.48	2.17	0.86	CH
882X9Y		36.12	0.97	0.33	36.16	0.85	0.33	TA
9PYKAH		33.38	-1.76	-0.59	34.52	-0.80	-0.32	DP
AZDYQP		31.52	-3.62	-1.22	33.86	-1.46	-0.58	LW
C6YQT4		34.56	-0.58	-0.20	35.18	-0.14	-0.05	TL
DD8GXR		32.80	-2.34	-0.79	34.80	-0.52	-0.20	TA
JHL7YP		36.00	0.86	0.29	34.00	-1.32	-0.52	CA
LYHD6M		36.80	1.66	0.56	36.40	1.08	0.43	CA
QHUZ9W		39.76	4.62	1.55	39.86	4.54	1.80	TA
UQHPP9		33.60	-1.54	-0.52	32.60	-2.72	-1.07	CA
WWE9XG		33.56	-1.58	-0.53	34.98	-0.34	-0.13	TZ
XLUARC		30.02	-5.12	-1.72	30.84	-4.48	-1.77	CA
Y63WN4		33.52	-1.62	-0.55	33.48	-1.84	-0.73	LW
ZXY8NB		41.55	6.41	2.15	41.03	5.72	2.26	PG

Summary Statistics	Sample SZ49	Sample SZ50
<b>Grand Means</b>	35.14 psi	35.32 psi
<b>Std Dev Btwn Labs</b>	2.97 psi	2.53 psi
Statistics based on 16 of 16 reporting participants.		

**Key to Instrument Codes Reported by Participants**

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

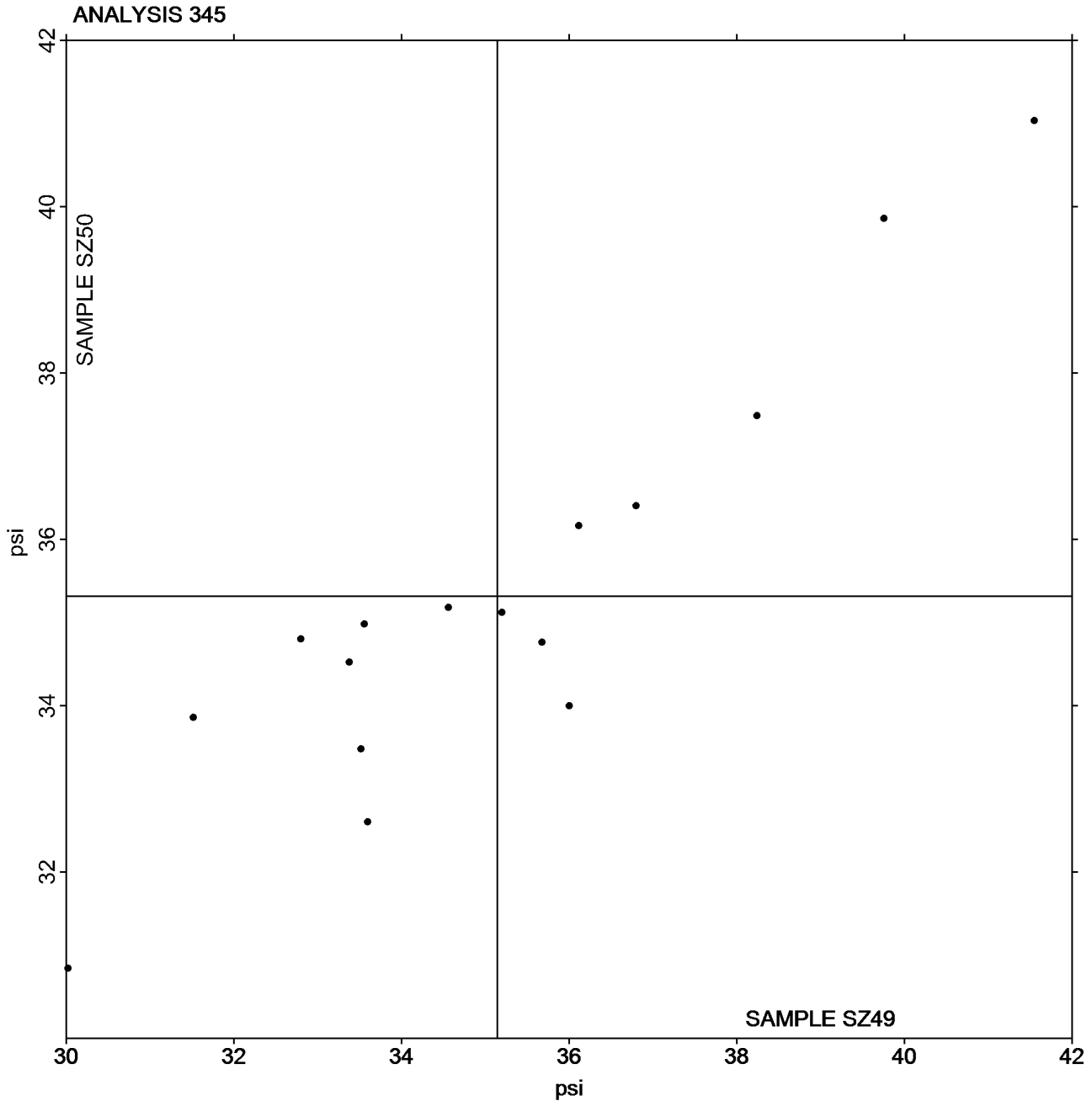


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 345**  
**Z-Direction Tensile, Recycled Paperboard**  
**TAPPI Official Test Method T541**

**Report #2911S,**  
**November 2017**

**Grand Mean Sample SZ49 = 35.144**  
psi

**Grand Mean Sample SZ50 = 35.317**  
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 #2911S,**  
**November 2017**

WebCode	Data Flag	Sample SN49			Sample SN50			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2G7Y4H		177.4	13.7	1.48	168.4	5.9	0.62	HY
4FPJP9		179.6	15.9	1.71	177.6	15.1	1.59	HY
778RCF		179.0	15.4	1.65	180.2	17.8	1.87	HY
7TPYPU		162.3	-1.4	-0.15	156.0	-6.5	-0.68	HY
7XXAUG		152.4	-11.3	-1.21	158.4	-4.1	-0.43	HY
8NK38C		169.6	5.9	0.64	172.0	9.5	1.00	HZ
B7VM6R		157.0	-6.7	-0.72	156.2	-6.3	-0.66	HZ
DD8GXR		163.4	-0.3	-0.03	159.0	-3.5	-0.36	HY
DJB NB9		155.6	-8.0	-0.87	154.5	-8.0	-0.84	KR
FMAGLJ		166.0	2.3	0.25	165.8	3.3	0.35	HZ
LP8D86		159.2	-4.5	-0.48	151.6	-10.9	-1.14	HY
MDXUBV		157.3	-6.4	-0.68	163.3	0.8	0.09	HY
MYDGVF		162.6	-1.1	-0.12	162.6	0.1	0.02	HY
NBLFJF		160.8	-2.9	-0.31	158.2	-4.3	-0.45	HY
QUAHDL		172.4	8.7	0.94	178.4	15.9	1.67	HY
UQHPP9		164.4	0.7	0.08	151.2	-11.3	-1.18	HZ
VA4Y2U		162.6	-1.1	-0.12	161.2	-1.3	-0.13	HY
XRYBPK		144.6	-19.1	-2.05	149.6	-12.9	-1.35	HY

Summary Statistics	Sample SN49	Sample SN50
<b>Grand Means</b>	163.68 1000th ft-lbs	162.45 1000th ft-lbs
<b>Std Dev Btwn Labs</b>	9.29 1000th ft-lbs	9.52 1000th ft-lbs
Statistics based on 18 of 18 reporting participants.		

**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



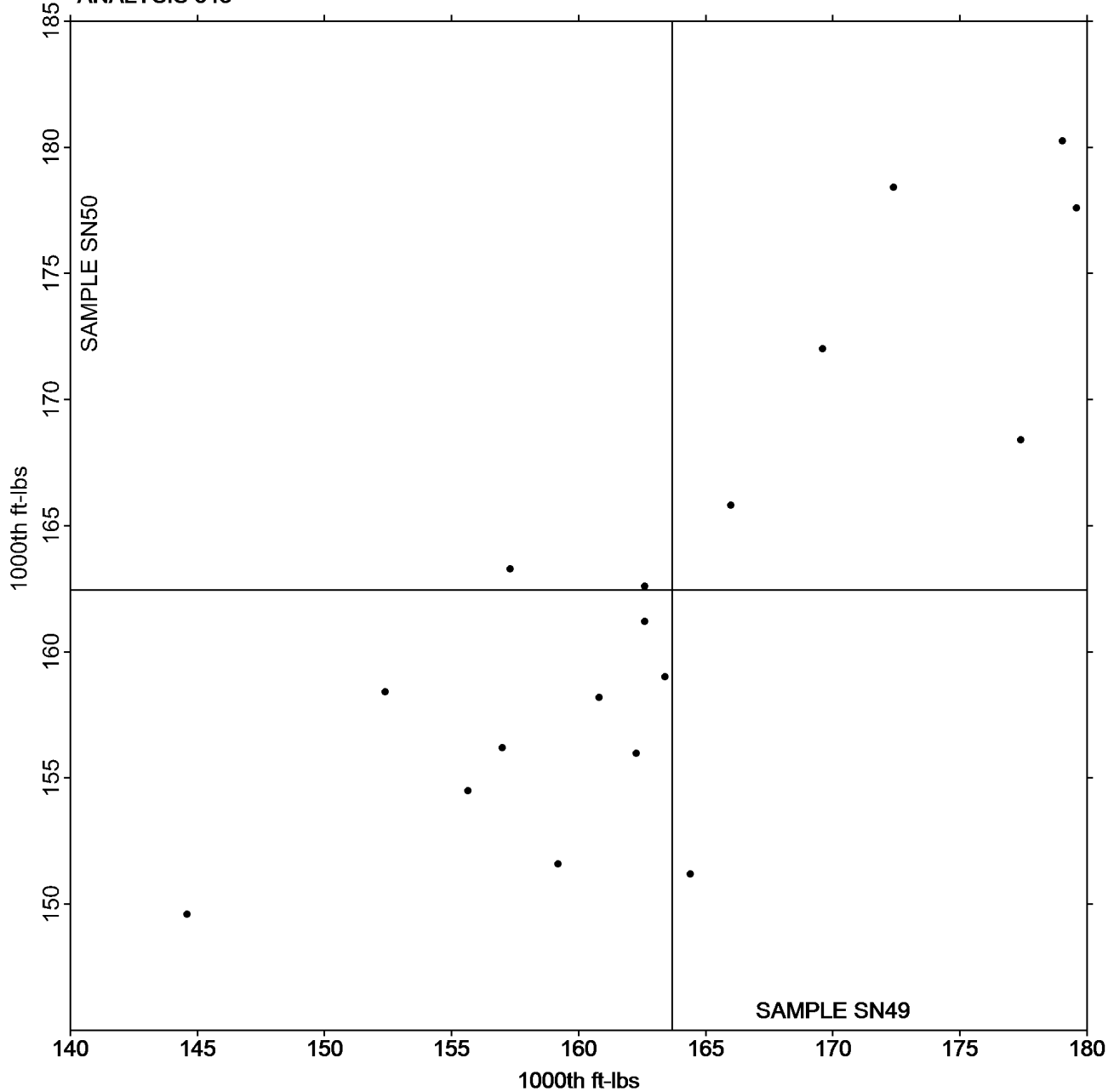
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 348**  
**Internal Bond Strength - Modified Scott Mechanics**  
**TAPPI Provisional Test Method T569**

**Report #2911S,**  
**November 2017**

**Grand Mean Sample SN49 = 163.68**  
**1000th ft-lbs**

**Grand Mean Sample SN50 = 162.45**  
**1000th ft-lbs**

**ANALYSIS 348**



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**

**Report #2911S,**  
**November 2017**

WebCode	Data Flag	<u>Sample SP49</u>			<u>Sample SP50</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6MK47U		145.2	-6.6	-0.28	164.4	13.6	0.63	TM
77RQ8R		151.6	-0.2	-0.01	163.6	12.8	0.59	SC
92UQ72		128.6	-23.2	-0.97	126.4	-24.4	-1.13	TM
JRMTN2		146.0	-5.8	-0.24	132.7	-18.1	-0.84	XX
N3RAQE		140.4	-11.4	-0.48	138.6	-12.2	-0.57	TM
NH338Q		198.0	46.2	1.94	179.0	28.2	1.31	XX
QJ8K6C		106.2	-45.6	-1.91	108.7	-42.1	-1.95	TM
X93RPR		161.2	9.4	0.39	161.0	10.2	0.47	SC
XUNH9W		173.4	21.6	0.91	172.0	21.2	0.98	XX
Y63WN4		137.2	-14.6	-0.61	135.8	-15.0	-0.70	XX
Z9TUAD		172.3	20.5	0.86	167.0	16.2	0.75	XX
ZXY8NB		161.4	9.6	0.40	160.6	9.8	0.45	TM

<b>Summary Statistics</b>	<u>Sample SP49</u>	<u>Sample SP50</u>
<b>Grand Means</b>	151.80 1000th ft-lbs	150.81 1000th ft-lbs
<b>Std Dev Btwn Labs</b>	23.82 1000th ft-lbs	21.59 1000th ft-lbs
Statistics based on 12 of 12 reporting participants.		

**Key to Instrument Codes Reported by Participants**

- SC Scott Internal Bond Tester (Manual)                      TM TMI Monitor/Internal Bond Tester  
 XX Instrument make/model not specified by lab



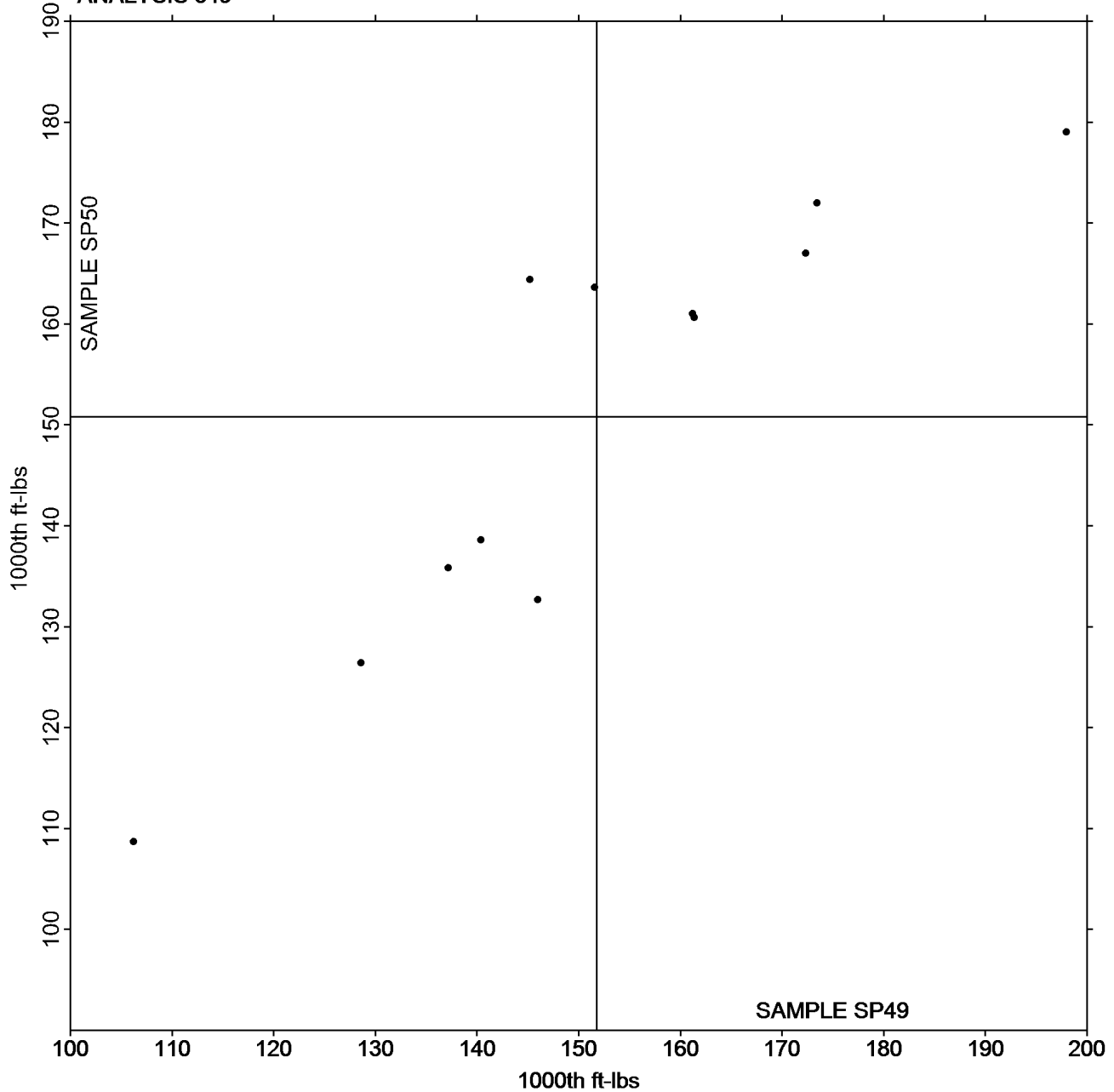
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 349**  
**Internal Bond Strength - Scott Bond Models**  
**TAPPI Provisional Test Method T569**

**Report #2911S,**  
**November 2017**

**Grand Mean Sample SP49 = 151.80**  
**1000th ft-lbs**

**Grand Mean Sample SP50 = 150.81**  
**1000th ft-lbs**

**ANALYSIS 349**



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