



## Paper & Paperboard Testing Program

### Summary Report #2921 S - January 2018

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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.

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## 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 #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SA51</u>			<u>Sample SA52</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4U9N6B		28.72	2.17	0.83	23.72	2.18	1.01
62KB9C		26.01	-0.54	-0.21	22.17	0.62	0.29
82UZKM		28.50	1.96	0.75	23.30	1.76	0.82
9MTKZJ		27.21	0.67	0.26	21.83	0.29	0.13
A4UP3M		24.13	-2.41	-0.92	19.98	-1.56	-0.73
BJ6VQQ		29.94	3.40	1.30	23.91	2.37	1.10
BX26DW		30.60	4.06	1.55	25.09	3.54	1.65
CJVHFZ		21.83	-4.72	-1.80	17.30	-4.24	-1.98
DEMKEY		28.04	1.49	0.57	22.38	0.84	0.39
GAVELD		29.00	2.46	0.94	23.80	2.26	1.05
HHLG3F		27.52	0.98	0.37	22.34	0.80	0.37
K8EGH7		28.43	1.88	0.72	23.24	1.69	0.79
L98KYK		23.80	-2.74	-1.05	19.55	-1.99	-0.93
MTUF3R		23.30	-3.24	-1.24	18.80	-2.74	-1.28
MU6BTP		27.82	1.28	0.49	22.36	0.82	0.38
NGTGJK	*	26.30	-0.24	-0.09	20.10	-1.44	-0.67
PDN7A3		24.98	-1.57	-0.60	20.10	-1.44	-0.67
UA7VXT		26.85	0.31	0.12	22.17	0.63	0.29
VGNPC3		20.97	-5.57	-2.13	17.48	-4.07	-1.89
VHNE4E		24.56	-1.98	-0.76	19.97	-1.57	-0.73
VUBX93		26.12	-0.42	-0.16	20.76	-0.79	-0.37
WLZTJZ	X	25.65	-0.89	-0.34	24.35	2.81	1.31
XALXHY		29.35	2.81	1.07	23.61	2.06	0.96

<b>Summary Statistics</b>	<u>Sample SA51</u>	<u>Sample SA52</u>
<b>Grand Means</b>	26.54 psi	21.54 psi
<b>Std Dev Btwn Labs</b>	2.61 psi	2.15 psi
Statistics based on 22 of 23 reporting participants.		

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

WLZTJZ (X) - Inconsistent in testing between samples.

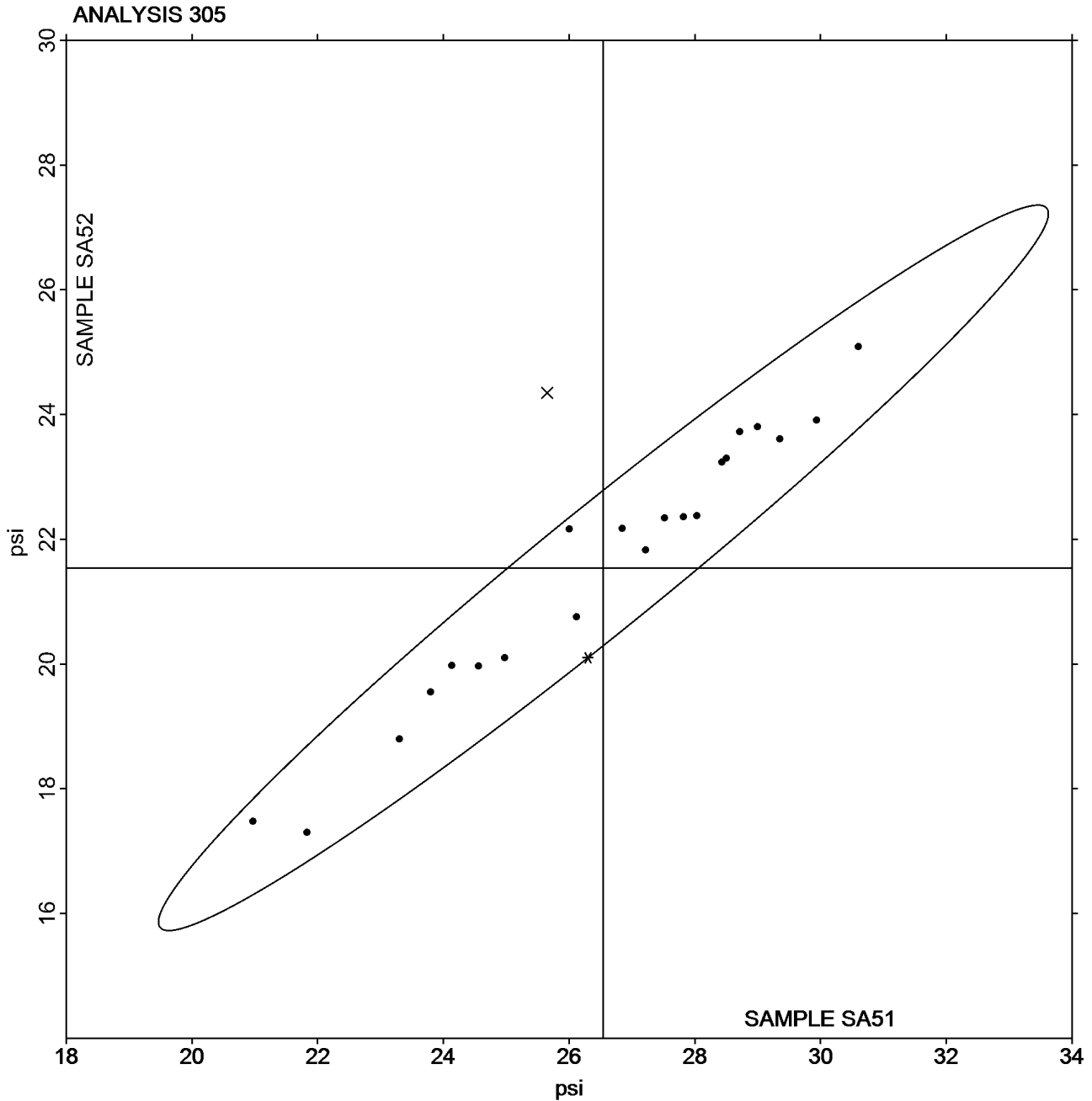


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 305**  
**Bursting Strength - Printing Papers**  
**TAPPI Official Test Method T403**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SA51 = 26.544**  
psi

**Grand Mean Sample SA52 = 21.543**  
psi





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

Report #2921S,  
January 2018

WebCode	Data Flag	Sample SB51			Sample SB52		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
62KB9C		84.42	0.16	0.03	92.37	1.43	0.33
6ETWUP	X	99.26	15.00	2.93	99.77	8.83	2.07
6PQX9F		77.48	-6.78	-1.32	90.16	-0.78	-0.18
8E4NLX		72.10	-12.16	-2.37	82.90	-8.04	-1.88
8PL4J7	*	92.20	7.94	1.55	89.00	-1.94	-0.45
AYH22P		85.65	1.39	0.27	91.19	0.25	0.06
BX26DW		85.36	1.10	0.22	92.56	1.63	0.38
CA9CPM		88.70	4.44	0.87	96.58	5.64	1.32
CZN46Z		84.00	-0.26	-0.05	90.10	-0.84	-0.20
DEMKEY		80.32	-3.94	-0.77	87.05	-3.88	-0.91
E4GX2R		88.10	3.83	0.75	92.14	1.20	0.28
EXT3E3		79.84	-4.42	-0.86	89.19	-1.75	-0.41
GJL7UR		93.75	9.49	1.85	96.90	5.96	1.40
GXK27X		89.17	4.91	0.96	91.20	0.26	0.06
J3A8UY		87.26	3.00	0.58	93.64	2.70	0.63
KMUHEW		94.00	9.74	1.90	100.10	9.16	2.15
LNZ79T	X	69.63	-14.63	-2.85	74.51	-16.43	-3.85
MBP9NP		85.65	1.38	0.27	96.02	5.08	1.19
MMHR3V		78.10	-6.16	-1.20	87.70	-3.24	-0.76
MVZ4FW		79.77	-4.49	-0.88	85.89	-5.05	-1.18
NGTGJK		84.69	0.43	0.08	95.34	4.40	1.03
NT43RJ		85.25	0.99	0.19	90.40	-0.53	-0.13
QAKT23		82.76	-1.50	-0.29	86.60	-4.34	-1.02
RJ4LRP		81.37	-2.89	-0.56	92.38	1.44	0.34
RZGXXKJ		88.76	4.50	0.88	94.13	3.19	0.75
TZNWUH		82.35	-1.91	-0.37	83.75	-7.19	-1.68
VUCP6P		83.30	-0.96	-0.19	95.10	4.16	0.97
WWW6D		78.31	-5.95	-1.16	86.33	-4.61	-1.08
XX3QDH		82.40	-1.86	-0.36	86.60	-4.34	-1.02

Summary Statistics	Sample SB51	Sample SB52
<b>Grand Means</b>	84.26 psi	90.94 psi
<b>Std Dev Btwn Labs</b>	5.13 psi	4.27 psi

Statistics based on 27 of 29 reporting participants.

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

6ETWUP (X) - Data for sample SB51 are high.

LNZ79T (X) - Data for both samples are low.

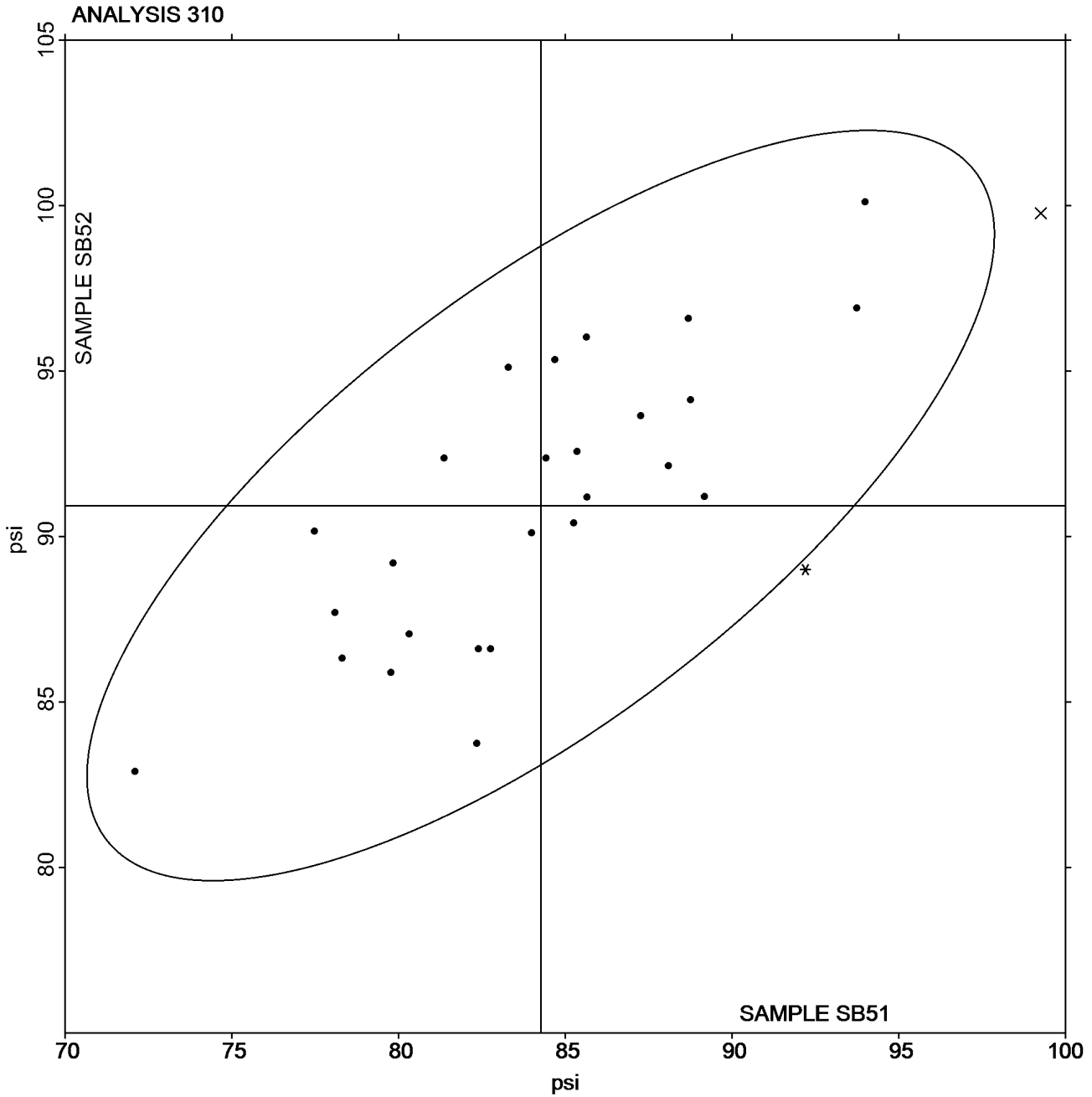


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 310**  
**Bursting Strength - Packaging Papers**  
**TAPPI Official Test Method T403**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SB51 = 84.261**  
psi

**Grand Mean Sample SB52 = 90.937**  
psi







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

**Report #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SK51</u>			<u>Sample SK52</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
62KB9C		20.92	-1.27	-0.45	20.19	-0.71	-0.23
BEVKL4		25.47	3.28	1.16	24.45	3.55	1.16
BJ6VQQ		20.08	-2.11	-0.74	18.16	-2.74	-0.90
MJLYER		26.16	3.97	1.40	25.02	4.12	1.35
MTTLFF		19.94	-2.25	-0.79	18.43	-2.47	-0.81
TGFMXR		20.57	-1.62	-0.57	19.16	-1.74	-0.57

<b>Summary Statistics</b>	<u><b>Sample SK51</b></u>	<u><b>Sample SK52</b></u>
<b>Grand Means</b>	22.19 Grams	20.90 Grams
<b>Std Dev Btwn Labs</b>	2.84 Grams	3.06 Grams
Statistics based on 6 of 6 reporting participants.		



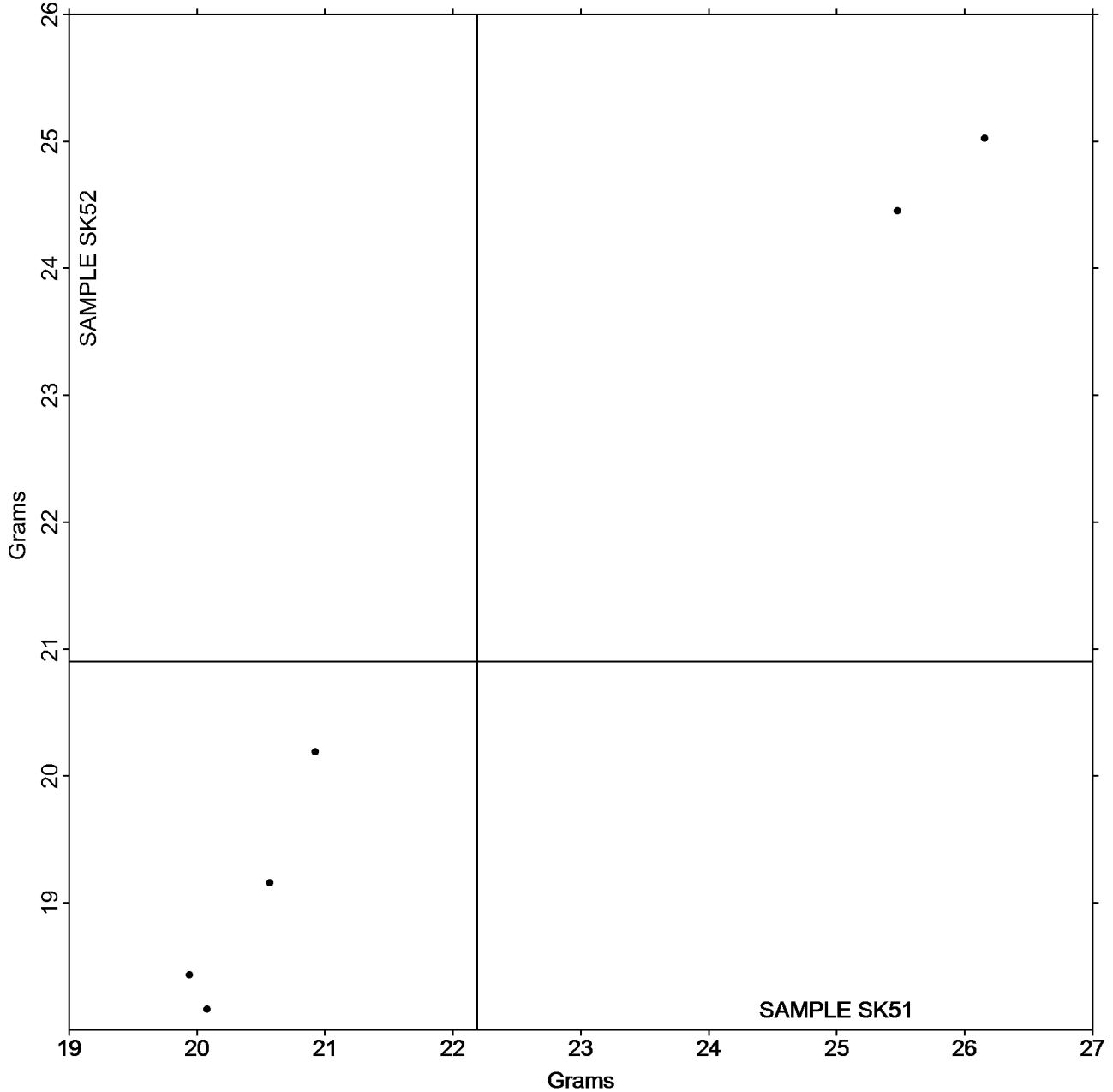
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 311**  
**Tearing Strength - Newsprint**  
**TAPPI Official Test Method T414**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SK51 = 22.191**  
**Grams**

**Grand Mean Sample SK52 = 20.903**  
**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 #2921S,  
January 2018

WebCode	Data Flag	Sample SC51			Sample SC52		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
28ZK9H	*	60.56	-1.81	-0.52	65.77	3.57	1.02
2PK9FT		54.80	-7.57	-2.19	56.70	-5.50	-1.57
33P3B2		57.42	-4.95	-1.43	55.81	-6.39	-1.83
3HYM2E		63.20	0.83	0.24	61.78	-0.42	-0.12
4U9N6B		66.15	3.78	1.09	67.76	5.56	1.59
62KB9C		64.51	2.14	0.62	64.15	1.95	0.56
6AHWL6		63.00	0.63	0.18	62.80	0.60	0.17
82UZKM		64.14	1.77	0.51	64.86	2.66	0.76
8N7VEC		61.70	-0.67	-0.19	62.00	-0.20	-0.06
8V3RZT	X	122.44	60.07	17.39	120.30	58.10	16.61
9MTKZJ		55.17	-7.20	-2.09	55.60	-6.60	-1.89
A4UP3M		61.90	-0.47	-0.14	59.23	-2.97	-0.85
AYH22P		59.75	-2.62	-0.76	61.00	-1.20	-0.34
BX26DW		62.77	0.39	0.11	61.66	-0.54	-0.15
C22NZV		64.26	1.89	0.55	62.92	0.72	0.21
CJVHFZ		65.40	3.03	0.88	63.60	1.40	0.40
CZN46Z		57.48	-4.89	-1.42	58.47	-3.73	-1.07
DEMKEY		61.55	-0.82	-0.24	63.06	0.86	0.25
F9M34C		56.40	-5.97	-1.73	57.36	-4.84	-1.38
GAVELD	X	74.78	12.41	3.59	73.80	11.60	3.32
H6ZTFW		60.40	-1.97	-0.57	63.80	1.60	0.46
HP6KC3	*	71.04	8.67	2.51	68.78	6.58	1.88
HU32MC	*	66.22	3.85	1.11	70.06	7.86	2.25
J8JEDC	X	45.16	-17.21	-4.98	46.32	-15.88	-4.54
JQYQ73		58.04	-4.33	-1.25	58.84	-3.36	-0.96
K8EGH7		64.33	1.96	0.57	62.13	-0.07	-0.02
KPGAAZ		60.62	-1.75	-0.51	59.98	-2.22	-0.63
KPXA9V		58.30	-4.07	-1.18	58.68	-3.52	-1.01
MBP9NP		65.70	3.33	0.96	65.47	3.27	0.94
MTUF3R	X	72.56	10.19	2.95	67.04	4.84	1.38
MU6BTP		65.30	2.93	0.85	64.85	2.65	0.76
N6WDFQ		63.70	1.33	0.38	62.12	-0.08	-0.02
NT43RJ		65.02	2.65	0.77	64.12	1.92	0.55
NUYGMP		65.30	2.93	0.85	65.38	3.18	0.91
PDN7A3		63.02	0.65	0.19	63.21	1.01	0.29
QAKT23		65.31	2.94	0.85	64.59	2.39	0.68
R69427		61.17	-1.20	-0.35	61.25	-0.95	-0.27
RHCP7G		61.90	-0.47	-0.14	61.72	-0.48	-0.14
RJ4LRP		65.04	2.67	0.77	63.51	1.31	0.37
TZNWUH		56.70	-5.67	-1.64	56.04	-6.16	-1.76



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

**Report #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SC51</u>			<u>Sample SC52</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
UA7VXT		64.20	1.83	0.53	64.80	2.60	0.74
V4ZK47		65.34	2.97	0.86	63.28	1.08	0.31
VGNPC3		67.11	4.74	1.37	66.23	4.03	1.15
VHNE4E		61.48	-0.89	-0.26	61.12	-1.08	-0.31
WLZTZY		63.13	0.76	0.22	62.20	0.00	0.00
WWW6D		64.81	2.44	0.71	65.45	3.25	0.93
XALXHY		58.52	-3.85	-1.12	56.24	-5.96	-1.70
ZH834V		63.90	1.53	0.44	63.68	1.48	0.42
ZYTNLZ		60.99	-1.38	-0.40	56.85	-5.35	-1.53

<b>Summary Statistics</b>	<u>Sample SC51</u>	<u>Sample SC52</u>
<b>Grand Means</b>	62.37 Grams	62.20 Grams
<b>Stnd Dev Btwn Labs</b>	3.45 Grams	3.50 Grams
Statistics based on 45 of 49 reporting participants.		

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

- J8JEDC (X) - Data for both samples are low. Possible Systematic Error.
- GAVELD (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample SC51.
- 8V3RZT (X) - Extreme Data.
- MTUF3R (X) - Data for sample SC51 are high. Inconsistent within the determinations of both samples.



# Paper & Paperboard Interlaboratory Testing Program

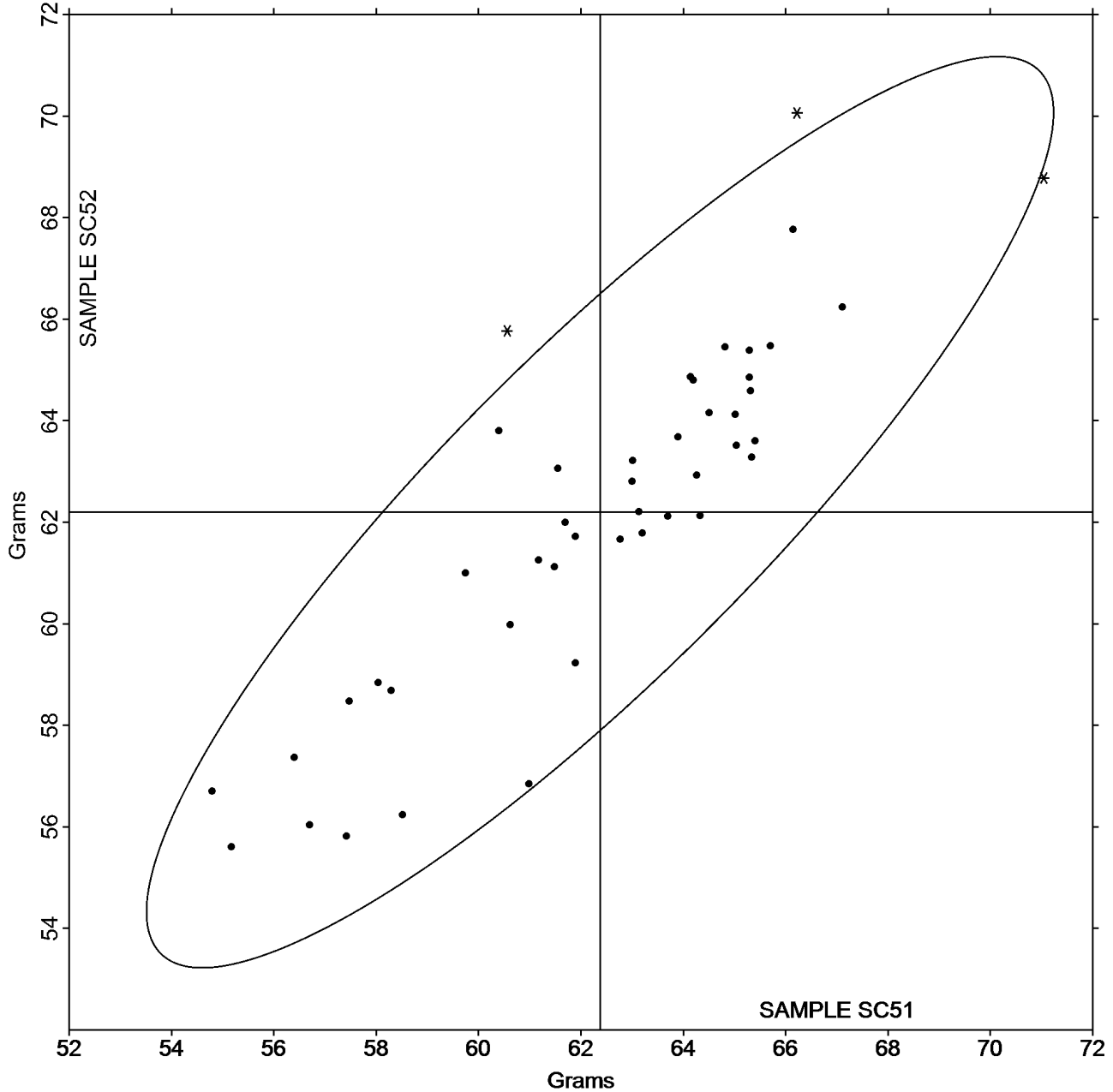
Report #2921S,  
January 2018

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

Grand Mean Sample SC51 = 62.372  
Grams

Grand Mean Sample SC52 = 62.198  
Grams

ANALYSIS 312





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

Report #2921S,  
January 2018

WebCode	Data Flag	Sample SD51			Sample SD52		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3DYPBL		178.6	-6.8	-0.38	177.1	-8.6	-0.54
62KB9C		186.0	0.6	0.03	191.7	6.0	0.38
6ETWUP		197.7	12.3	0.69	199.3	13.6	0.86
7AWF63		170.6	-14.8	-0.82	173.9	-11.8	-0.75
7DUY82		202.2	16.8	0.94	196.0	10.3	0.66
8E4NLX		199.0	13.6	0.76	194.6	8.9	0.56
8PL4J7		173.2	-12.2	-0.68	174.4	-11.3	-0.72
AGJPVA	X	139.4	-46.0	-2.57	132.8	-52.9	-3.36
BM2ETP		189.0	3.5	0.20	188.0	2.3	0.14
BRBV2D		181.6	-3.8	-0.21	182.8	-2.9	-0.19
CA9CPM		180.8	-4.6	-0.26	171.9	-13.8	-0.87
DMD4UT		196.5	11.1	0.62	197.0	11.3	0.72
E4GX2R		194.2	8.7	0.49	201.8	16.1	1.02
E6RQTL		175.4	-10.0	-0.56	164.4	-21.2	-1.35
EXT3E3		193.1	7.7	0.43	198.1	12.5	0.79
FC2KF2	*	234.0	48.6	2.71	219.3	33.6	2.14
GAVELD		192.9	7.5	0.42	196.8	11.1	0.70
GXK27X		173.8	-11.6	-0.65	162.2	-23.5	-1.49
HP6KC3		175.8	-9.6	-0.53	186.4	0.7	0.04
J2VWYZ		203.2	17.8	0.99	199.2	13.5	0.86
J3A8UY	*	220.6	35.2	1.97	200.6	14.9	0.95
JAQMTN		195.9	10.5	0.58	203.9	18.3	1.16
L724FV		174.1	-11.3	-0.63	177.7	-8.0	-0.51
L98KYK		183.6	-1.8	-0.10	182.9	-2.8	-0.17
LDJHFF		164.8	-20.6	-1.15	170.0	-15.7	-1.00
MMHR3V		199.8	14.4	0.80	202.0	16.3	1.04
MVZ4FW		182.0	-3.4	-0.19	182.6	-3.1	-0.20
NGTGJK		147.2	-38.2	-2.13	155.2	-30.5	-1.94
Q3LC8N		184.2	-1.2	-0.07	188.7	3.1	0.19
Q6ATTH		198.7	13.3	0.74	207.8	22.1	1.40
QUT7JH		168.5	-16.9	-0.94	172.6	-13.1	-0.83
RZGXXJ		182.8	-2.6	-0.15	184.9	-0.8	-0.05
T23C8J		176.3	-9.1	-0.51	174.7	-11.0	-0.70
TCZ23Y		170.8	-14.7	-0.82	163.4	-22.3	-1.42
UYGR3F		164.7	-20.7	-1.16	177.6	-8.1	-0.51
VUCP6P		195.9	10.5	0.59	194.0	8.3	0.53
XLVLJ9		208.6	23.2	1.30	204.8	19.1	1.21
XX3QDH	X	22.7	-162.7	-9.09	20.7	-165.0	-10.48
YH8MAJ		144.0	-41.4	-2.31	152.0	-33.7	-2.14



**Paper & Paperboard Interlaboratory Testing Program**

**Report #2921S,  
January 2018**

**Analysis 314**

**Tearing Strength - Packaging Papers**

**TAPPI Official Test Method T414**

<b>Summary Statistics</b>	<u><b>Sample SD51</b></u>	<u><b>Sample SD52</b></u>
<b>Grand Means</b>	185.41 Grams	185.67 Grams
<b>Stnd Dev Btwn Labs</b>	17.90 Grams	15.75 Grams

Statistics based on 37 of 39 reporting participants.

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

AGJPVA (X) - Data for sample SD52 are low.

XX3QDH (X) - Extreme Data.



# Paper & Paperboard Interlaboratory Testing Program

Report #2921S,  
January 2018

## Analysis 314

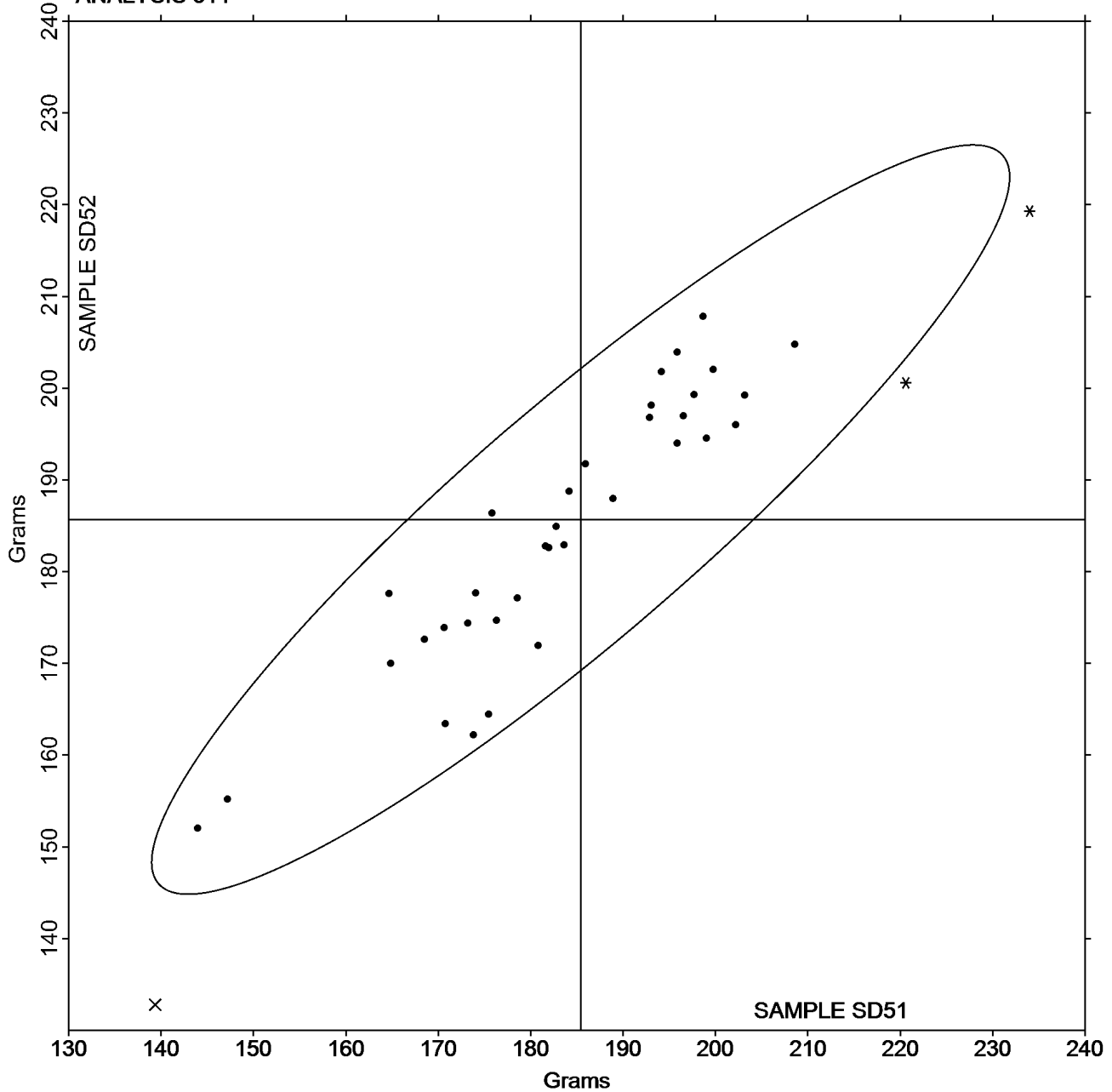
Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

Grand Mean Sample SD51 = 185.41  
Grams

Grand Mean Sample SD52 = 185.67  
Grams

ANALYSIS 314







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

**Report #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SR51</u>			<u>Sample SR52</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
BEVKL4		2.091	-0.036	-0.34	2.241	0.034	0.40
BJ6VQQ		2.327	0.200	1.88	2.284	0.077	0.90
DEMKEY		2.091	-0.036	-0.34	2.206	-0.001	-0.01
HHLG3F		1.985	-0.142	-1.33	2.074	-0.133	-1.56
HP6KC3		2.178	0.051	0.48	2.223	0.016	0.18
KMUHEW		2.219	0.092	0.87	2.249	0.042	0.50
MJLYER		2.094	-0.033	-0.31	2.263	0.056	0.65
MTTLFF		2.115	-0.012	-0.11	2.206	-0.001	-0.01
TCJUXH		1.962	-0.165	-1.54	2.023	-0.185	-2.16
TGFMXR		2.102	-0.025	-0.23	2.208	0.001	0.02
UA7VXT		2.232	0.105	0.98	2.301	0.094	1.10

<b>Summary Statistics</b>	<u><b>Sample SR51</b></u>	<u><b>Sample SR52</b></u>
<b>Grand Means</b>	2.13 kN/m	2.21 kN/m
<b>Std Dev Btwn Labs</b>	0.11 kN/m	0.09 kN/m

Statistics based on 11 of 11 reporting participants.



# Paper & Paperboard Interlaboratory Testing Program

Report #2921S,  
January 2018

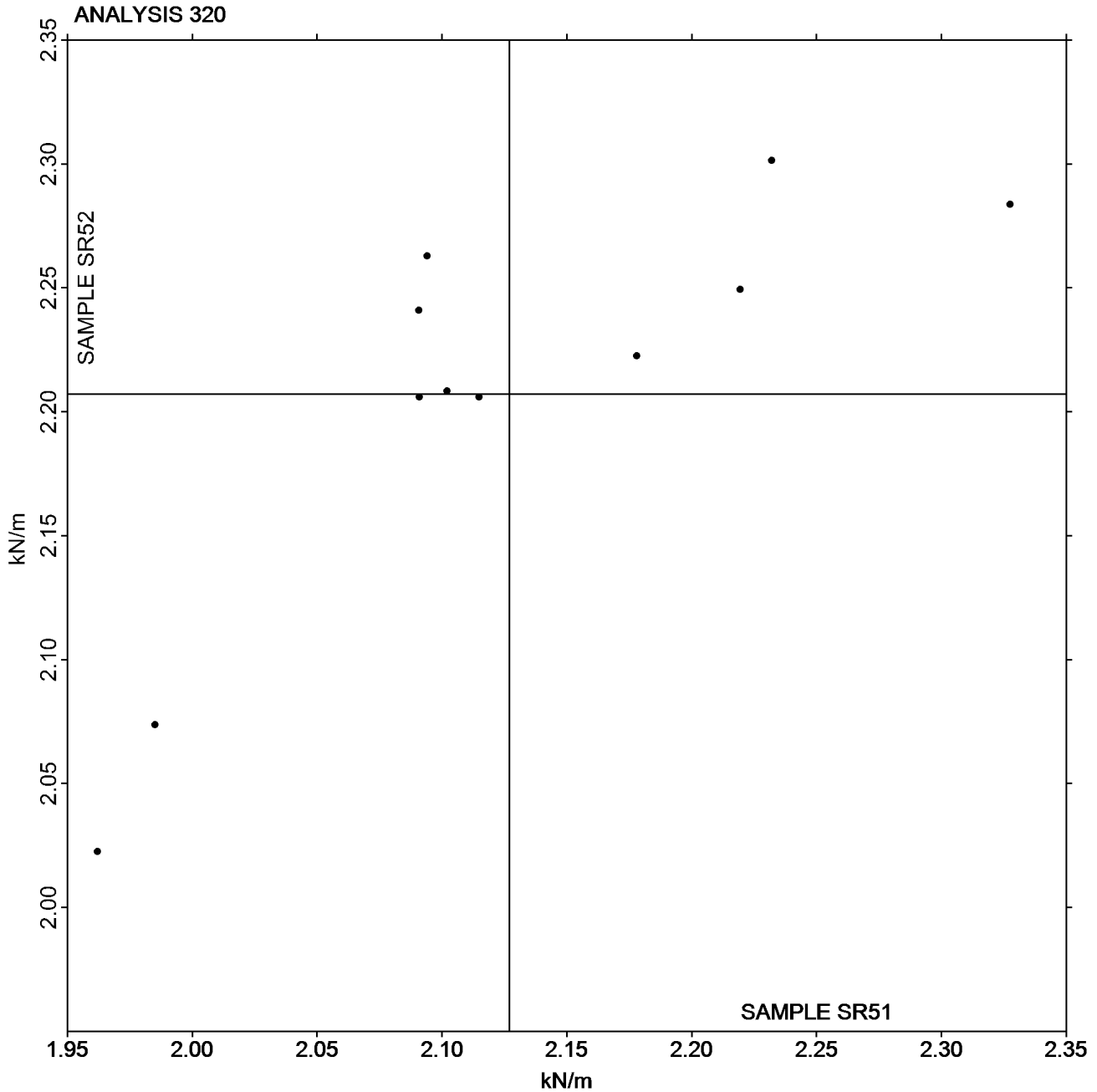
## Analysis 320

### Tensile Breaking Strength - Newsprint

#### TAPPI Official Test Method T494

Grand Mean Sample SR51 = 2.1270  
kN/m

Grand Mean Sample SR52 = 2.2070  
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 #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SR51</u>			<u>Sample SR52</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
BEVKL4		12.83	-1.09	-0.76	15.68	0.79	0.42
BJ6VQQ		15.83	1.91	1.34	14.29	-0.60	-0.32
DEMKEY		13.09	-0.83	-0.58	14.93	0.04	0.02
HHLG3F		11.82	-2.11	-1.48	12.97	-1.92	-1.01
HP6KC3		15.50	1.58	1.10	16.32	1.43	0.75
KMUHEW		13.87	-0.06	-0.04	14.21	-0.68	-0.36
MJLYER		13.23	-0.70	-0.49	15.65	0.76	0.40
MTTLFF		14.63	0.70	0.49	15.61	0.72	0.38
TCJUXH		15.76	1.84	1.29	18.10	3.21	1.68
UA7VXT		12.68	-1.24	-0.87	11.14	-3.75	-1.97

<b>Summary Statistics</b>	<u><b>Sample SR51</b></u>	<u><b>Sample SR52</b></u>
<b>Grand Means</b>	13.92 Joules/sq m	14.89 Joules/sq m
<b>Std Dev Btwn Labs</b>	1.43 Joules/sq m	1.90 Joules/sq m
Statistics based on 10 of 10 reporting participants.		



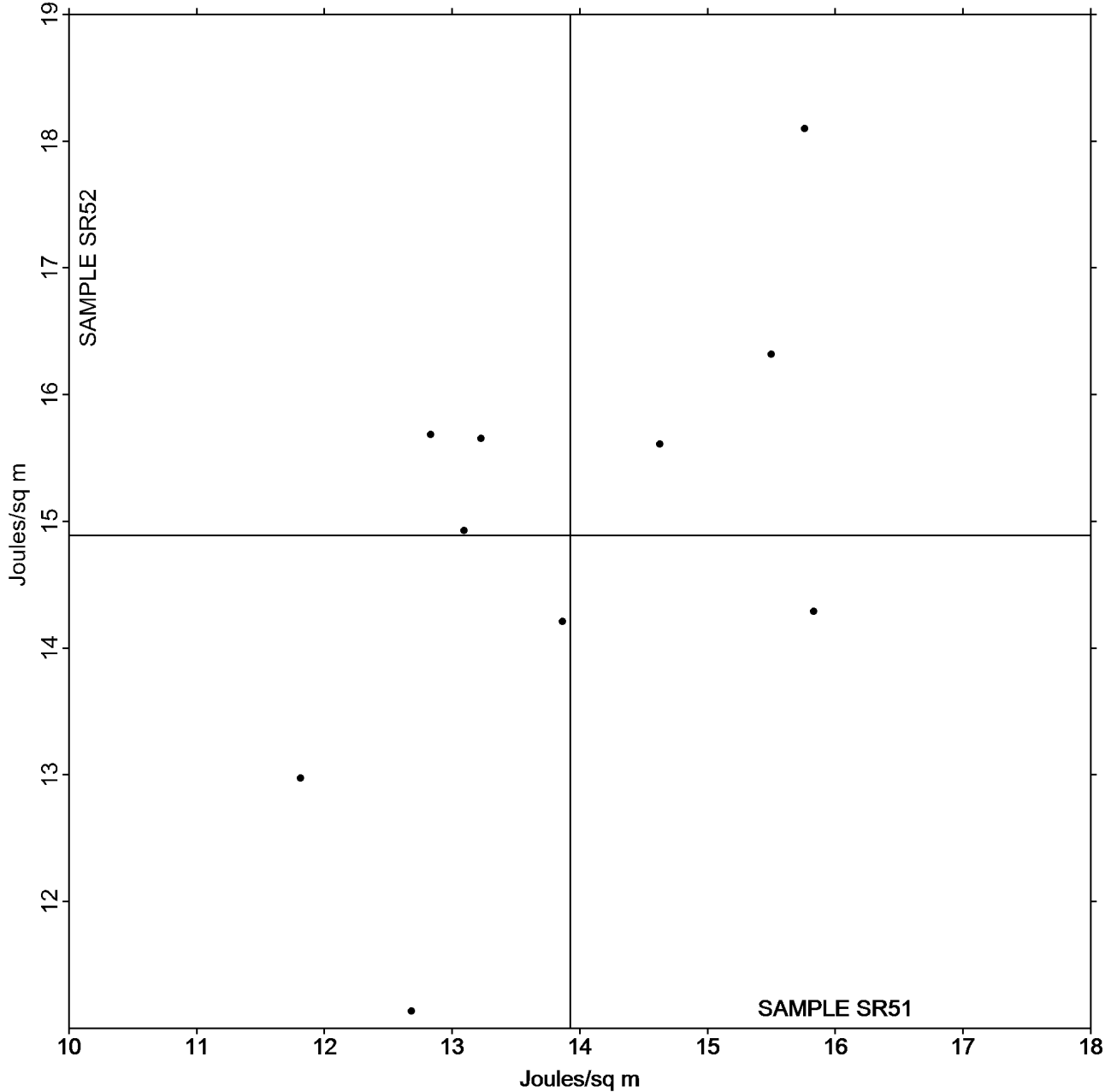
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 321**  
**Tensile Energy Absorption - Newsprint**  
**TAPPI Official Test Method T494**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SR51 = 13.924**  
**Joules/sq m**

**Grand Mean Sample SR52 = 14.890**  
**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 #2921S,  
January 2018

WebCode	Data Flag	<u>Sample SR51</u>			<u>Sample SR52</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
BJ6VQQ		1.385	0.272	2.35	1.269	0.139	2.08
DEMKEY		1.049	-0.064	-0.55	1.113	-0.017	-0.25
HHLG3F		1.043	-0.070	-0.61	1.077	-0.052	-0.78
HP6KC3		1.031	-0.082	-0.71	1.059	-0.071	-1.05
KMUHEW		1.073	-0.040	-0.34	1.083	-0.047	-0.70
MJLYER		1.069	-0.044	-0.38	1.157	0.027	0.41
MTTLFF		1.133	0.020	0.17	1.159	0.029	0.44
TCJUXH	X	1.440	0.327	2.83	1.523	0.393	5.88
UA7VXT		1.120	0.007	0.06	1.120	-0.010	-0.14

<b>Summary Statistics</b>	<u>Sample SR51</u>	<u>Sample SR52</u>
<b>Grand Means</b>	1.11 Percent	1.13 Percent
<b>Stnd Dev Btwn Labs</b>	0.12 Percent	0.07 Percent
Statistics based on 8 of 9 reporting participants.		

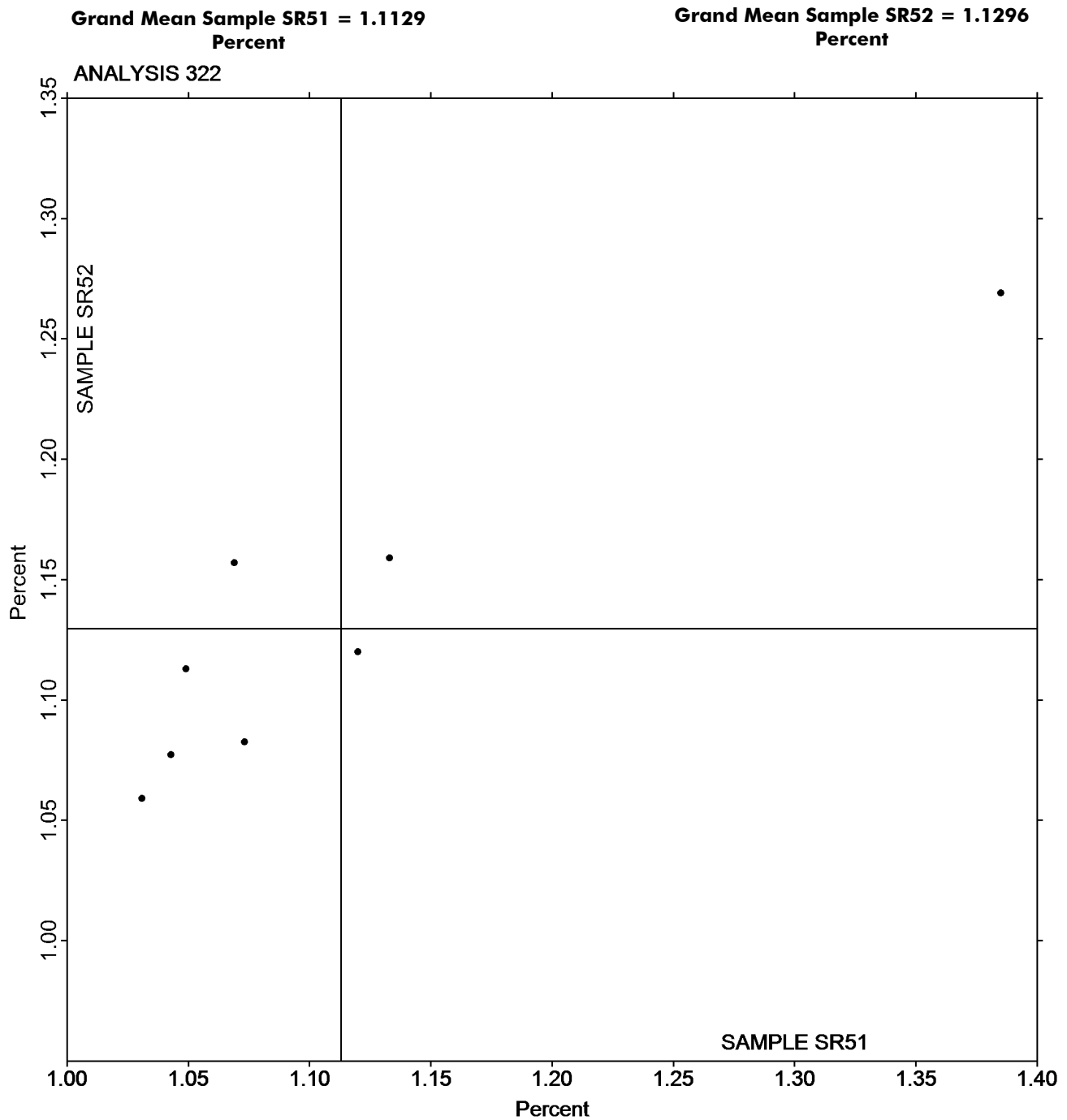
**Comments on Assigned Data Flags for Test #322**

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



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

**Report #2921S,**  
**January 2018**



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

**Report #2921S,**  
**January 2018**

WebCode	Data Flag	Sample SF51			Sample SF52			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
28ZK9H	*	6.668	-0.135	-0.34	7.296	0.429	1.07	TP
2PK9FT		6.993	0.190	0.48	7.084	0.217	0.54	TO
33P3B2		7.037	0.235	0.59	7.147	0.279	0.70	LF
3HYM2E		6.958	0.155	0.39	6.963	0.096	0.24	LA
4U9N6B		6.958	0.155	0.39	6.948	0.081	0.20	LH
62KB9C		6.640	-0.162	-0.41	6.702	-0.165	-0.41	LH
6ETWUP		6.715	-0.088	-0.22	6.666	-0.202	-0.50	TB
6YXGN6		7.464	0.661	1.67	7.334	0.467	1.17	XX
82UZKM		6.493	-0.310	-0.78	6.607	-0.260	-0.65	LH
8N7VEC		6.466	-0.337	-0.85	6.910	0.043	0.11	XX
8V3RZT		7.170	0.367	0.93	7.296	0.429	1.07	TJ
A4UP3M		6.832	0.030	0.08	6.841	-0.026	-0.07	IM
BHRJNF		7.422	0.619	1.56	7.177	0.310	0.77	LI
CJVHFZ		6.569	-0.234	-0.59	6.678	-0.189	-0.47	LH
CKUJNC		6.222	-0.580	-1.46	6.450	-0.417	-1.04	RE
CZN46Z		7.052	0.250	0.63	7.087	0.220	0.55	TF
DEMKEY		6.548	-0.255	-0.64	6.698	-0.169	-0.42	LH
GGGC7U		6.737	-0.065	-0.16	6.655	-0.212	-0.53	IN
H6EEVZ		7.139	0.336	0.85	7.465	0.598	1.49	TN
H6ZTFW		6.891	0.088	0.22	6.891	0.024	0.06	TC
HJDHZQ		6.758	-0.045	-0.11	6.923	0.056	0.14	LA
HU32MC		7.257	0.455	1.15	7.485	0.618	1.54	LA
J8JEDC		7.679	0.877	2.21	7.674	0.807	2.01	VM
JQWXAF		6.038	-0.764	-1.93	6.085	-0.782	-1.95	CB
JQYQ73		6.381	-0.422	-1.06	6.793	-0.075	-0.19	TF
K8EGH7		7.167	0.364	0.92	6.907	0.040	0.10	LI
KPGAAZ		6.779	-0.023	-0.06	6.811	-0.057	-0.14	TO
KPXA9V		6.564	-0.239	-0.60	6.551	-0.316	-0.79	TB
M4AENM		6.802	-0.001	0.00	6.555	-0.312	-0.78	TP
MTUF3R		6.393	-0.410	-1.03	6.387	-0.481	-1.20	LX
MU6BTP	X	10.871	4.068	10.26	10.976	4.109	10.25	LH
NT43RJ		6.566	-0.237	-0.60	6.379	-0.488	-1.22	LI
NUYGMP		5.940	-0.863	-2.18	6.120	-0.747	-1.86	ID
PDN7A3		7.094	0.291	0.73	7.622	0.755	1.88	LI
R69427		7.100	0.297	0.75	7.147	0.280	0.70	LI
V4ZK47		5.850	-0.953	-2.40	6.015	-0.852	-2.13	IM
VGNPC3		7.137	0.334	0.84	6.980	0.113	0.28	LX
VHNE4E		6.524	-0.279	-0.70	6.745	-0.122	-0.31	TB
VUBX93		7.051	0.248	0.63	7.327	0.459	1.15	LH
WLZTZJ		6.748	-0.054	-0.14	6.804	-0.063	-0.16	TO



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

**Report #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SF51</u>			<u>Sample SF52</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
WWW6D		6.695	-0.108	-0.27	6.660	-0.207	-0.52	LI
XALXHY		7.362	0.560	1.41	7.401	0.534	1.33	TJ
ZH834V		6.677	-0.126	-0.32	6.603	-0.264	-0.66	LE
ZYTNLZ	*	6.978	0.175	0.44	6.423	-0.445	-1.11	XX

<b>Summary Statistics</b>	<u>Sample SF51</u>	<u>Sample SF52</u>
<b>Grand Means</b>	6.80 kN/m	6.87 kN/m
<b>Std Dev Btwn Labs</b>	0.40 kN/m	0.40 kN/m

Statistics based on 43 of 44 reporting participants.

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

MU6BTP (X) - Extreme Data.

**Key to Instrument Codes Reported by Participants**

<b>CB</b> Chatillon DFIS 50 (Digital Gauge)/TCD 200	<b>ID</b> Instron 4201/4202
<b>IM</b> Instron 5500 Series	<b>IN</b> Instron 3340 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>VM</b> Valmet PaperLab (was Kajaani/Robotest)	<b>XX</b> Instrument make/model not specified by lab





# Paper & Paperboard Interlaboratory Testing Program

Report #2921S,  
January 2018

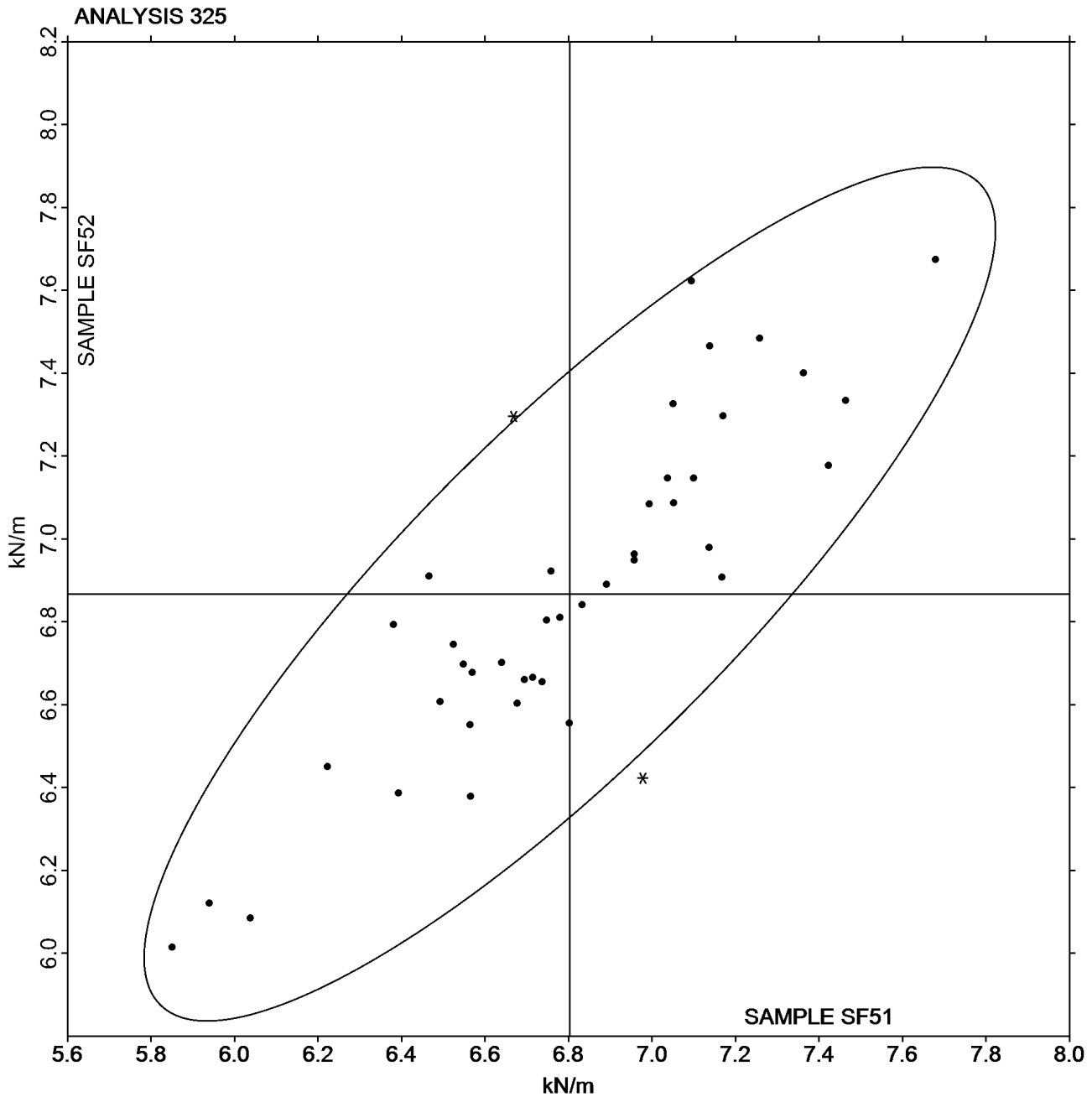
## Analysis 325

### Tensile Breaking Strength - Printing Papers

#### TAPPI Official Test Method T494

Grand Mean Sample SF51 = 6.8027  
kN/m

Grand Mean Sample SF52 = 6.8672  
kN/m





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

**Report #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SF51</u>			<u>Sample SF52</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2PK9FT		90.11	-4.26	-0.54	92.21	-3.14	-0.40	TO
33P3B2	*	70.14	-24.23	-3.09	73.17	-22.18	-2.82	LW
3HYM2E		100.73	6.36	0.81	99.30	3.95	0.50	LA
4U9N6B		97.28	2.91	0.37	92.45	-2.91	-0.37	LH
62KB9C		94.66	0.29	0.04	97.02	1.67	0.21	LH
6ETWUP		91.82	-2.55	-0.32	88.02	-7.34	-0.93	TB
82UZKM		84.85	-9.52	-1.21	88.38	-6.97	-0.89	LH
8V3RZT	X	57.98	-36.39	-4.64	62.61	-32.75	-4.16	TJ
A4UP3M		101.24	6.87	0.88	100.04	4.69	0.60	IM
BHRJNF		110.32	15.95	2.03	99.25	3.89	0.49	LI
CKUJNC		87.89	-6.48	-0.83	96.05	0.70	0.09	RE
CZN46Z		93.27	-1.10	-0.14	87.99	-7.37	-0.94	TF
DEMKEY		86.75	-7.62	-0.97	91.57	-3.79	-0.48	LH
H6EEVZ		97.20	2.83	0.36	94.35	-1.00	-0.13	LX
HU32MC		101.26	6.89	0.88	102.78	7.43	0.94	LA
K8EGH7		101.29	6.92	0.88	97.46	2.11	0.27	LI
KPGAAZ		98.51	4.14	0.53	99.97	4.61	0.59	TO
MTUF3R		87.39	-6.98	-0.89	87.74	-7.62	-0.97	LX
MU6BTP	X	153.50	59.13	7.54	153.27	57.92	7.36	LH
NT43RJ		88.82	-5.55	-0.71	83.41	-11.95	-1.52	LI
NUYGMP	X	56.72	-37.65	-4.80	57.93	-37.42	-4.76	ID
PDN7A3		96.19	1.81	0.23	106.56	11.20	1.42	LI
R69427		89.46	-4.91	-0.63	90.39	-4.96	-0.63	LI
V4ZK47		94.53	0.15	0.02	107.72	12.36	1.57	IM
VGNPC3		99.77	5.40	0.69	97.84	2.48	0.32	LX
VHNE4E		95.95	1.58	0.20	105.50	10.14	1.29	TB
VUBX93		97.13	2.76	0.35	103.47	8.11	1.03	LH
WWW6D		92.15	-2.22	-0.28	94.23	-1.12	-0.14	LI
ZYTNLZ		104.95	10.57	1.35	102.36	7.01	0.89	XX

<b>Summary Statistics</b>	<u><b>Sample SF51</b></u>	<u><b>Sample SF52</b></u>
<b>Grand Means</b>	94.37 Joules/sq m	95.35 Joules/sq m
<b>Std Dev Btwn Labs</b>	7.84 Joules/sq m	7.87 Joules/sq m
Statistics based on 26 of 29 reporting participants.		

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

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

MU6BTP (X) - Extreme Data.

8V3RZT (X) - Data for both samples are low. Possible Systematic Error.



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

**Report #2921S,**  
**January 2018**

**Analysis Notes:**

δETWUP - 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**

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
TJ	Thwing-Albert QC II-XS	TO	Thwing-Albert QC-1000
XX	Instrument make/model not specified by lab		



# Paper & Paperboard Interlaboratory Testing Program

Report #2921S,  
January 2018

## Analysis 327

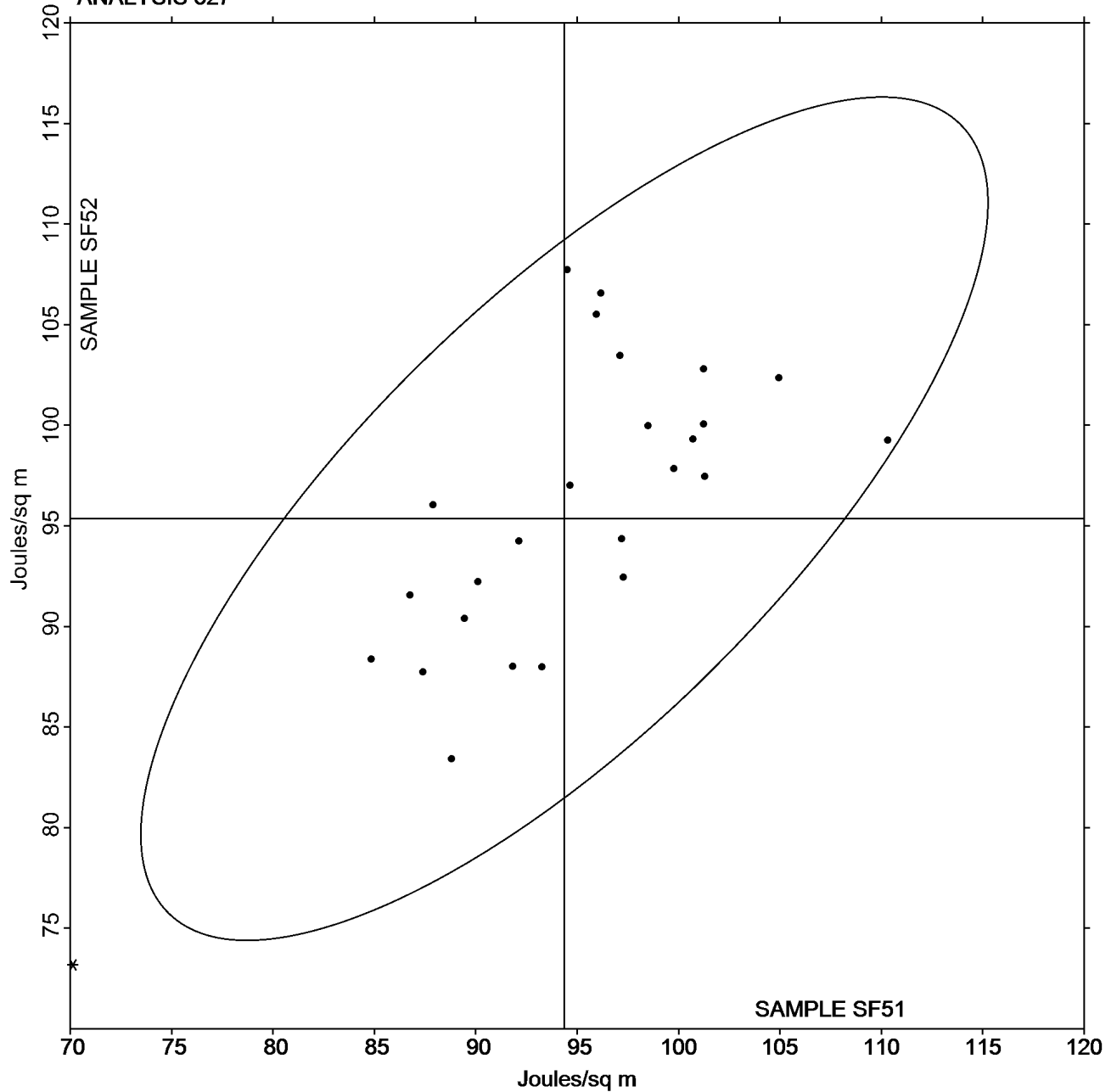
Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

Grand Mean Sample SF51 = 94.371  
Joules/sq m

Grand Mean Sample SF52 = 95.354  
Joules/sq m

ANALYSIS 327





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

Report #2921S,  
January 2018

WebCode	Data Flag	Sample SF51			Sample SF52			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2PK9FT		1.960	-0.165	-0.83	1.979	-0.153	-0.71	TG
33P3B2	*	1.601	-0.524	-2.64	1.629	-0.503	-2.32	LX
3HYM2E		1.975	-0.150	-0.75	1.974	-0.158	-0.73	XX
4U9N6B		2.124	-0.001	0.00	2.023	-0.109	-0.50	LH
62KB9C		2.161	0.036	0.18	2.190	0.058	0.27	LH
6ETWUP		2.109	-0.016	-0.08	2.037	-0.095	-0.44	TB
82UZKM		2.001	-0.124	-0.62	2.041	-0.091	-0.42	LH
8V3RZT	X	1.250	-0.875	-4.41	1.341	-0.791	-3.65	TJ
A4UP3M		2.266	0.142	0.72	2.288	0.156	0.72	IM
BHRJNF		2.277	0.152	0.77	2.113	-0.019	-0.09	LI
CKUJNC		2.320	0.196	0.99	2.358	0.226	1.05	RE
CZN46Z		2.165	0.040	0.20	2.049	-0.083	-0.38	TF
DEMKEY		2.016	-0.109	-0.55	2.081	-0.051	-0.23	LH
GGGC7U		2.292	0.167	0.84	2.297	0.165	0.76	IN
H6EEVZ	*	2.365	0.240	1.21	2.133	0.001	0.01	LX
HU32MC		1.943	-0.182	-0.92	1.908	-0.224	-1.03	LA
J8JEDC		1.690	-0.435	-2.19	1.678	-0.454	-2.10	VM
JQYQ73		2.260	0.135	0.68	2.360	0.228	1.05	TF
K8EGH7		2.149	0.024	0.12	2.137	0.005	0.02	LI
KPGA AZ		2.107	-0.018	-0.09	2.111	-0.021	-0.10	TO
KPXA9V		2.040	-0.085	-0.43	2.130	-0.002	-0.01	TF
MTUF3R		2.086	-0.039	-0.19	2.093	-0.039	-0.18	LX
MU6BTP		2.192	0.067	0.34	2.175	0.043	0.20	LH
NT43RJ		2.055	-0.070	-0.35	1.989	-0.143	-0.66	LI
NUYGMP		2.527	0.402	2.03	2.510	0.379	1.75	ID
PDN7A3		1.912	-0.213	-1.07	1.972	-0.160	-0.74	LI
R69427		1.956	-0.169	-0.85	1.968	-0.164	-0.76	LI
V4ZK47	*	2.506	0.382	1.92	2.680	0.548	2.53	XX
VGNPC3		2.145	0.020	0.10	2.149	0.017	0.08	LX
VHNE4E		2.298	0.173	0.87	2.439	0.307	1.42	TB
VUBX93		2.107	-0.018	-0.09	2.150	0.018	0.08	LH
WWW6D		2.099	-0.026	-0.13	2.161	0.029	0.13	LI
ZYTNLZ		2.284	0.159	0.80	2.417	0.285	1.32	XX

Summary Statistics	Sample SF51	Sample SF52
<b>Grand Means</b>	2.12 Percent	2.13 Percent
<b>Std Dev Btwn Labs</b>	0.20 Percent	0.22 Percent

Statistics based on 32 of 33 reporting participants.



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

**Report #2921S,**  
**January 2018**

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

8V3RZT (X) - Data for both samples are low. Possible Systematic Error.

**Key to Instrument Codes Reported by Participants**

ID	Instron 4201	IM	Instron 5500
IN	Instron 3340 Series	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	TJ	Thwing-Albert QC II-XS
TO	Thwing-Albert QC-1000	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		



Paper & Paperboard Interlaboratory Testing Program

Report #2921S,  
January 2018

Analysis 328

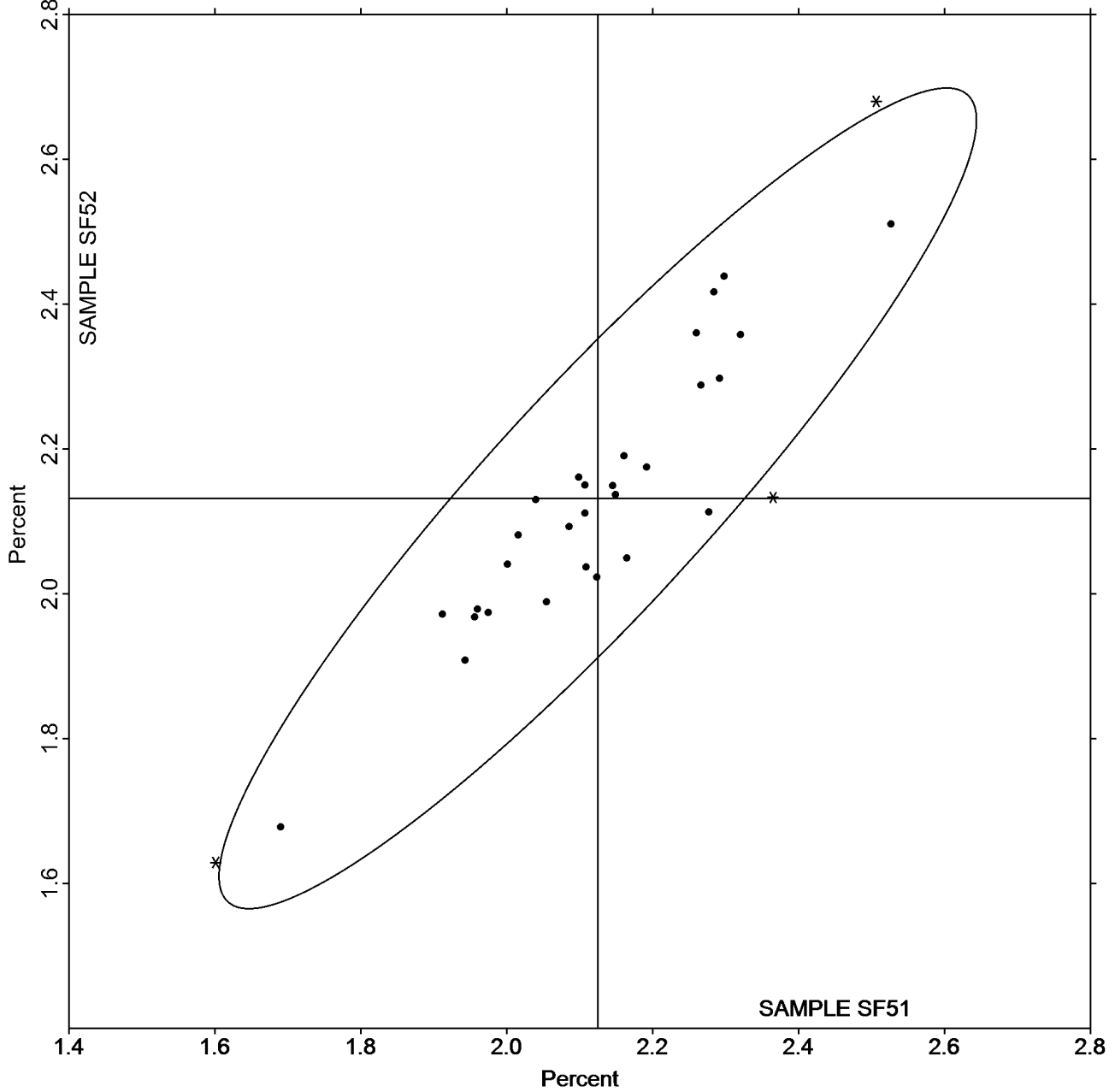
Elongation to Break - Printing Papers

TAPPI Official Test Method T494

Grand Mean Sample SF51 = 2.1246  
Percent

Grand Mean Sample SF52 = 2.1319  
Percent

ANALYSIS 328





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

**Report #2921S,**  
**January 2018**

WebCode	Data Flag	Sample SE51			Sample SE52			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2RN8QK		9.404	0.080	0.11	9.667	0.320	0.47	TO
3C7H9A		9.201	-0.123	-0.18	9.178	-0.170	-0.25	TB
3DYPBL	X	8.534	-0.791	-1.13	7.592	-1.755	-2.56	IF
62KB9C		9.020	-0.304	-0.44	8.921	-0.426	-0.62	LH
6ETWUP		8.918	-0.406	-0.58	8.903	-0.444	-0.65	TB
7AWF63		9.736	0.411	0.59	9.621	0.274	0.40	TO
7DUY82		8.417	-0.908	-1.30	8.259	-1.088	-1.59	TK
7LMJ32		10.052	0.728	1.04	10.140	0.793	1.16	TH
8E4NLX		8.474	-0.850	-1.22	9.070	-0.277	-0.40	LE
8PL4J7		10.552	1.227	1.76	10.526	1.179	1.72	IK
A728ZH		9.456	0.131	0.19	9.657	0.310	0.45	LW
AYH22P		8.546	-0.778	-1.12	8.774	-0.573	-0.84	IF
BRBV2D		9.765	0.441	0.63	9.600	0.253	0.37	ID
BX26DW		9.694	0.370	0.53	9.975	0.628	0.92	TR
C22NZV		8.453	-0.871	-1.25	8.480	-0.867	-1.26	XX
CA9CPM		8.962	-0.362	-0.52	8.925	-0.422	-0.62	IK
CZN46Z		9.396	0.071	0.10	9.280	-0.067	-0.10	TO
DMD4UT		8.681	-0.643	-0.92	8.824	-0.523	-0.76	XX
E4GX2R		9.127	-0.198	-0.28	9.310	-0.037	-0.05	LH
E6RQTL		9.721	0.397	0.57	9.939	0.592	0.86	LE
EHXV7T		8.933	-0.391	-0.56	8.940	-0.407	-0.59	IM
FC2KF2		9.650	0.326	0.47	10.063	0.716	1.04	TA
G8BKMR		10.540	1.216	1.74	10.648	1.301	1.90	LA
GAVELD		8.662	-0.663	-0.95	8.605	-0.742	-1.08	TA
GXK27X		8.958	-0.366	-0.53	9.109	-0.238	-0.35	TP
J2VWYZ		9.551	0.227	0.33	9.526	0.179	0.26	LX
J3A8UY		11.044	1.719	2.46	10.947	1.600	2.33	LA
J4HFWR		8.369	-0.955	-1.37	8.488	-0.859	-1.25	IP
JAQMTN		9.142	-0.183	-0.26	8.747	-0.600	-0.87	IM
L68JNP		8.961	-0.363	-0.52	8.858	-0.489	-0.71	TH
LU2H6Q	X	8.063	-1.262	-1.81	7.401	-1.946	-2.84	IN
MVZ4FW	*	8.237	-1.088	-1.56	8.825	-0.522	-0.76	ID
NGTGJK		10.635	1.310	1.88	10.645	1.298	1.89	TH
PVLNYX	*	10.841	1.516	2.17	10.362	1.015	1.48	LI
Q6ATTH		9.275	-0.049	-0.07	9.295	-0.052	-0.08	TR
QAKT23		8.726	-0.598	-0.86	8.590	-0.757	-1.10	LE
QEWXEN		9.245	-0.079	-0.11	9.148	-0.199	-0.29	TT
T23C8J		9.124	-0.200	-0.29	9.019	-0.328	-0.48	LE
TCGDJJ		10.282	0.957	1.37	10.041	0.694	1.01	TX
TCZ23Y		9.485	0.161	0.23	9.488	0.141	0.21	LH





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

**Report #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SE51</u>			<u>Sample SE52</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
UYGR3F		9.383	0.059	0.08	9.183	-0.164	-0.24	LW
VEFB6W		8.796	-0.528	-0.76	8.415	-0.932	-1.36	LA
WNZ26T	X	0.152	-9.173	-13.15	0.170	-9.177	-13.38	DW
XLVLJ9		8.583	-0.742	-1.06	8.333	-1.014	-1.48	LE
XX3QDH		9.233	-0.092	-0.13	9.832	0.485	0.71	XX
YH8MAJ		9.721	0.397	0.57	9.767	0.420	0.61	TH

<b>Summary Statistics</b>	<u>Sample SE51</u>	<u>Sample SE52</u>
<b>Grand Means</b>	9.32 kN/m	9.35 kN/m
<b>Std Dev Btw Labs</b>	0.70 kN/m	0.69 kN/m

Statistics based on 43 of 46 reporting participants.

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

WNZ26T (X) - Extreme Data.

3DYPBL (X) - Inconsistent in testing between samples.

LU2H6Q (X) - Data for sample SE52 are low. Inconsistent within the determinations of both samples.

**Key to Instrument Codes Reported by Participants**

DW	Dongguan Walter W-304 Tester	ID	Instron 4201
IF	Instron 3340 Series	IK	Instron 4400 Series
IM	Instron 5500 Series	IN	Instron 3360 Series
IP	Instron 4206	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
TP	TMI Monitor/Tensile 100 (84-21-01)	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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January 2018

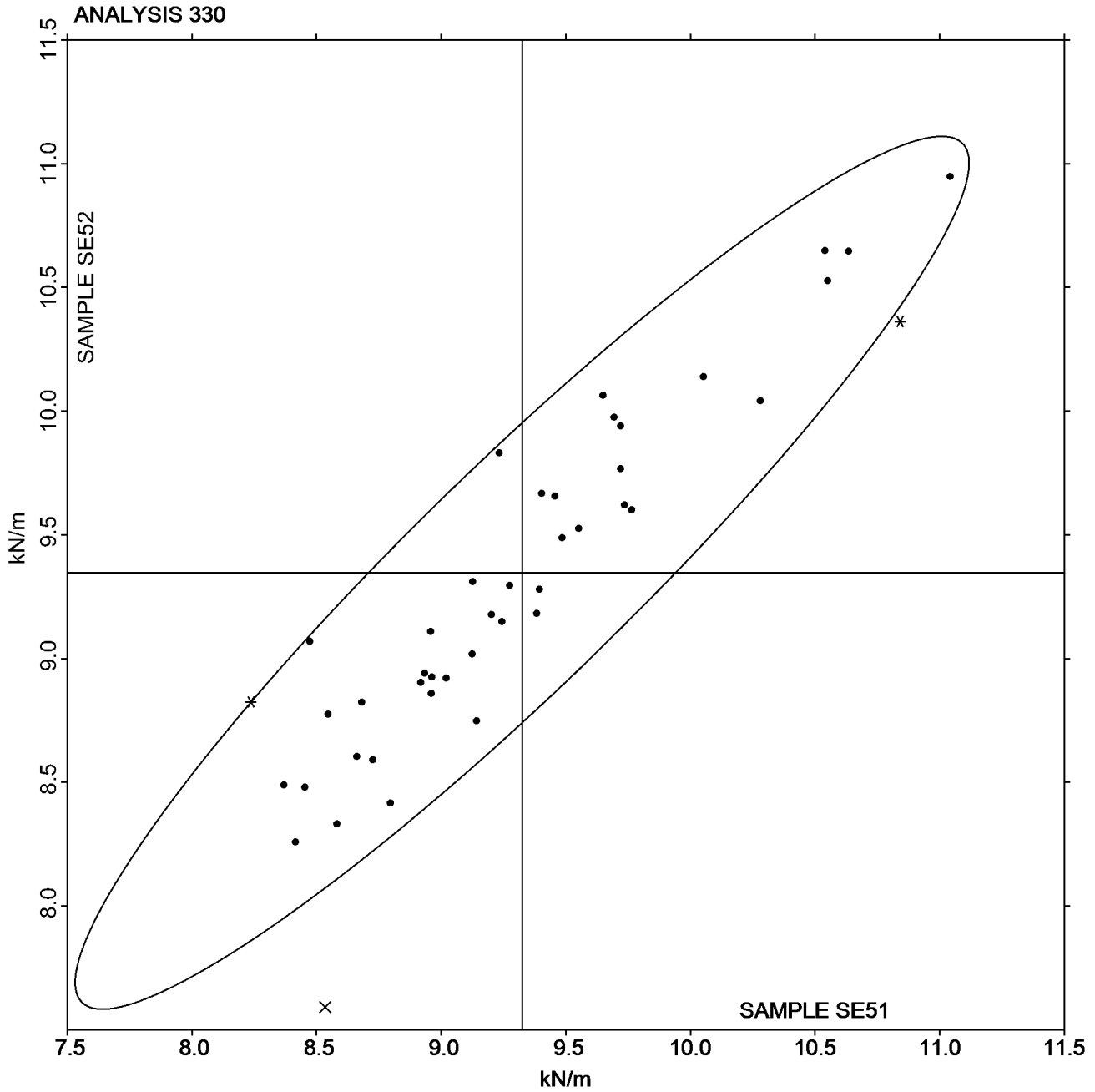
## Analysis 330

### Tensile Breaking Strength - Packaging Papers

#### TAPPI Official Test Method T494

Grand Mean Sample SE51 = 9.3245  
kN/m

Grand Mean Sample SE52 = 9.3470  
kN/m





# Paper & Paperboard Interlaboratory Testing Program

Report #2921S,  
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## Analysis 331

### Tensile Energy Absorption - Packaging Papers

#### TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE51			Sample SE52			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2RN8QK		114.1	5.3	0.45	118.8	9.9	0.74	TO
3C7H9A		117.9	9.0	0.78	118.1	9.1	0.68	TB
62KB9C		102.5	-6.3	-0.54	101.3	-7.6	-0.57	LH
6ETWUP		102.2	-6.7	-0.57	97.3	-11.7	-0.87	TB
7AWF63		115.9	7.1	0.61	111.4	2.5	0.18	TO
7DUY82		98.8	-10.1	-0.87	96.0	-12.9	-0.97	TK
8E4NLX		95.3	-13.5	-1.16	112.5	3.6	0.27	LE
8PL4J7		97.6	-11.3	-0.97	94.5	-14.4	-1.08	XX
A728ZH		96.4	-12.4	-1.06	98.8	-10.1	-0.76	LW
AYH22P		99.9	-8.9	-0.77	115.1	6.2	0.46	IF
BX26DW		110.4	1.5	0.13	113.2	4.3	0.32	TR
C22NZV		103.3	-5.6	-0.48	104.7	-4.2	-0.32	XX
CA9CPM		127.3	18.4	1.58	126.6	17.7	1.32	IK
CZN46Z		110.9	2.1	0.18	114.7	5.8	0.43	TO
DMD4UT		97.6	-11.2	-0.96	99.9	-9.0	-0.68	XX
E4GX2R		106.5	-2.3	-0.20	109.8	0.9	0.06	LH
E6RQTL		115.4	6.6	0.56	124.8	15.9	1.19	LE
EHXV7T		108.7	-0.1	-0.01	112.1	3.2	0.24	IM
FC2KF2		95.9	-12.9	-1.11	106.8	-2.1	-0.16	TA
G8BKMR		119.3	10.4	0.89	123.1	14.2	1.06	LA
GXK27X		120.6	11.7	1.01	130.3	21.4	1.60	TP
J3A8UY		117.0	8.2	0.70	120.9	11.9	0.89	LA
J4HFWR		94.9	-13.9	-1.20	93.2	-15.8	-1.18	IP
JAQMTN		113.2	4.4	0.38	101.2	-7.8	-0.58	IM
L68JNP		114.7	5.8	0.50	117.9	9.0	0.67	TH
LU2H6Q	*	109.1	0.3	0.02	86.3	-22.6	-1.69	IN
MVZ4FW		95.1	-13.7	-1.18	99.9	-9.1	-0.68	ID
NGTGJK		109.7	0.9	0.08	109.6	0.7	0.05	TH
Q6ATTH	X	1.8	-107.0	-9.19	1.8	-107.1	-8.00	TR
QAKT23		98.6	-10.2	-0.88	92.5	-16.4	-1.23	LE
QEWXEN		106.8	-2.0	-0.17	104.3	-4.6	-0.34	TT
T23C8J		99.3	-9.6	-0.82	96.1	-12.8	-0.96	LE
TCGDJJ		132.8	23.9	2.05	124.3	15.3	1.15	XX
TCZ23Y		90.5	-18.4	-1.58	89.5	-19.4	-1.45	LH
UYGR3F		105.3	-3.6	-0.31	95.5	-13.5	-1.01	LW
VEFB6W		121.5	12.7	1.09	110.0	1.0	0.08	LA
WNZ26T	X	67.9	-40.9	-3.51	84.9	-24.0	-1.80	DW
XLVLJ9		102.0	-6.8	-0.59	95.4	-13.5	-1.01	LE
XX3QDH	*	137.2	28.3	2.43	147.7	38.8	2.90	XX
YH8MAJ		131.8	23.0	1.97	125.2	16.3	1.22	TH



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 331**  
**Tensile Energy Absorption - Packaging Papers**  
**TAPPI Official Test Method T494**

**Report #2921S,**  
**January 2018**

Summary Statistics	<u>Sample SE51</u>	<u>Sample SE52</u>
<b>Grand Means</b>	108.84 Joules/sq m	108.93 Joules/sq m
<b>Std Dev Btwn Labs</b>	11.65 Joules/sq m	13.38 Joules/sq m
Statistics based on 38 of 40 reporting participants.		

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

Q6ATTH (X) - Extreme Data.

WNZ26T (X) - Data for sample SE51 are low.

**Analysis Notes:**

6ETWUP - Data appear to be reported as kg-m/sq m, not J/sq m as indicated on datasheet. Units corrected by CTS.

8E4NLX - One determination removed from the Lab Mean of Sample SE51 per Grubb's Test at 1% risk (TAPPI 1205).

Q6ATTH - Data appears to be transposed between Analysis 331 (TEA) and Analysis 332 (% elongation).

TCGDJJ - 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**

DW	Dongguan Walter W-304 Tester	ID	Instron 4201
IF	Instron 3340 Series	IK	Instron 4400 Series
IM	Instron 5500 Series	IN	Instron 3360 Series
IP	Instron 4206	LA	L & W Autoline
LE	L & W Tensile Tester 066	LH	L & W Alwetron TH1 (Horizontal) SE 060
LW	L & W Tensile Tester SE062	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)	TR	TMI Horizontal Tensile Tester
TT	Tinius Olsen Model MHT	XX	Instrument make/model not specified by lab



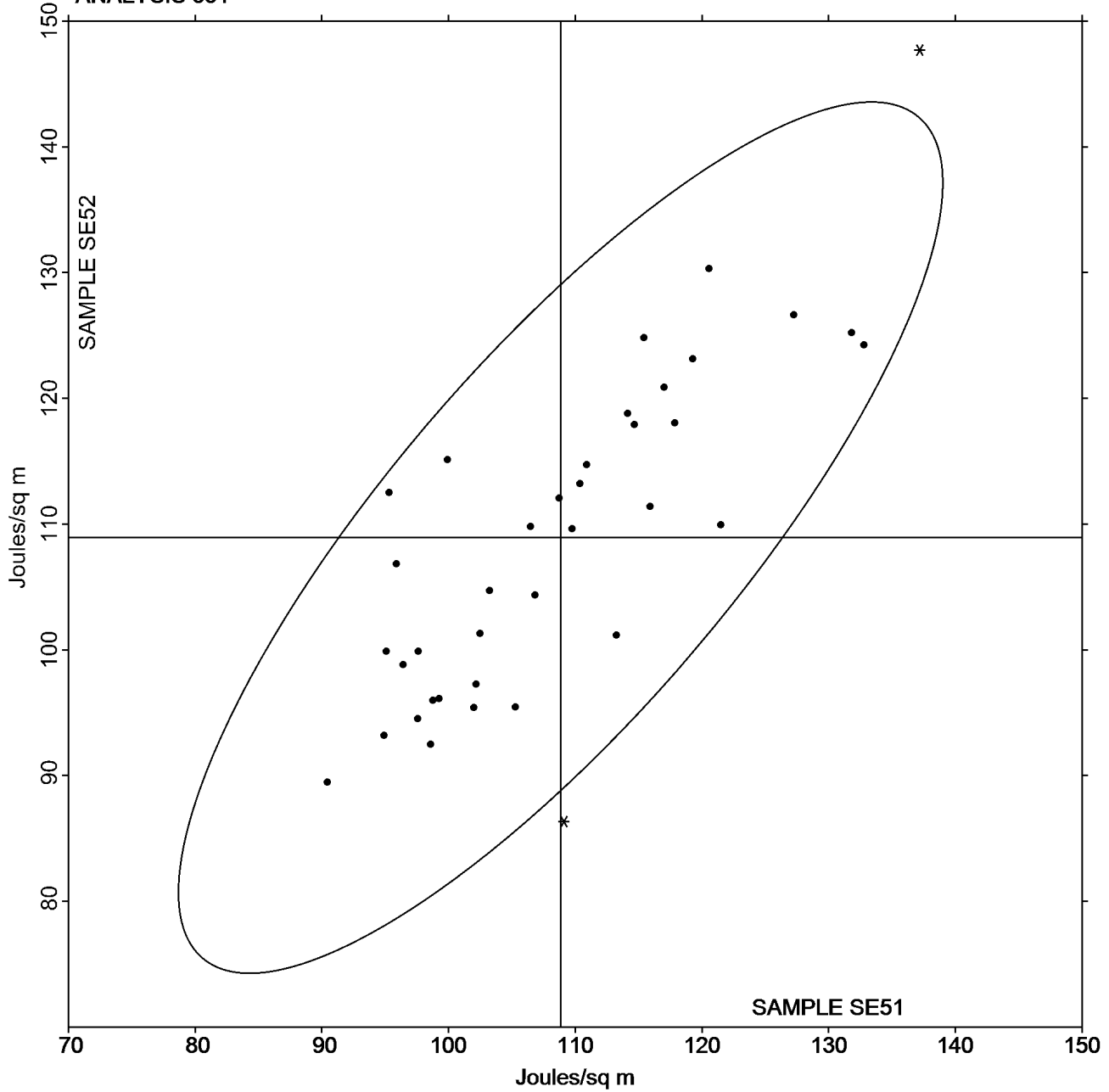
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 331**  
**Tensile Energy Absorption - Packaging Papers**  
**TAPPI Official Test Method T494**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SE51 = 108.84**  
**Joules/sq m**

**Grand Mean Sample SE52 = 108.93**  
**Joules/sq m**

**ANALYSIS 331**





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

Report #2921S,  
January 2018

WebCode	Data Flag	Sample SE51			Sample SE52			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2RN8QK	X	2.340	0.481	2.22	2.150	0.285	1.13	TO
3C7H9A		1.980	0.121	0.56	1.975	0.110	0.44	TB
62KB9C		1.775	-0.084	-0.39	1.728	-0.137	-0.54	LH
6ETWUP		1.745	-0.114	-0.53	1.670	-0.195	-0.77	TB
7AWF63		1.849	-0.010	-0.05	1.824	-0.041	-0.16	TO
7DUY82		1.842	-0.017	-0.08	1.825	-0.040	-0.16	TK
8E4NLX		1.674	-0.185	-0.85	1.823	-0.042	-0.17	LE
8PL4J7		1.674	-0.185	-0.85	1.654	-0.211	-0.84	XX
A728ZH		1.572	-0.287	-1.33	1.579	-0.286	-1.13	LW
AYH22P		2.012	0.153	0.71	2.178	0.313	1.24	IF
BRBV2D		1.831	-0.028	-0.13	1.790	-0.075	-0.30	ID
BX26DW		1.799	-0.060	-0.28	1.804	-0.061	-0.24	TR
C22NZV		1.939	0.080	0.37	1.963	0.098	0.39	XX
CA9CPM		2.190	0.331	1.53	2.192	0.327	1.30	IK
CZN46Z		1.889	0.030	0.14	1.967	0.102	0.40	TO
DMD4UT		1.708	-0.151	-0.70	1.719	-0.146	-0.58	XX
E4GX2R		1.756	-0.103	-0.48	1.777	-0.088	-0.35	LH
E6RQTL		1.814	-0.045	-0.21	1.909	0.044	0.17	LE
EHXV7T		2.109	0.250	1.16	2.149	0.284	1.13	IM
FC2KF2		1.624	-0.235	-1.09	1.721	-0.144	-0.57	TA
G8BKMR		1.694	-0.165	-0.76	1.707	-0.158	-0.63	LA
GAVELD		1.702	-0.157	-0.72	1.657	-0.208	-0.82	TB
GXK27X	*	2.318	0.459	2.12	2.496	0.631	2.50	TP
J3A8UY		1.615	-0.244	-1.13	1.659	-0.206	-0.82	LA
J4HFWR		1.869	0.010	0.05	1.838	-0.027	-0.11	IP
JAQMTN		1.876	0.017	0.08	1.761	-0.104	-0.41	IM
L68JNP		2.205	0.346	1.60	2.255	0.390	1.55	TH
LU2H6Q	X	2.220	0.361	1.67	1.870	0.005	0.02	IN
MVZ4FW		1.745	-0.114	-0.52	1.739	-0.126	-0.50	ID
NGTGJK		1.773	-0.086	-0.40	1.786	-0.079	-0.31	TH
Q6ATTH	X	105.761	103.902	480.04	105.630	103.765	411.28	TR
QAKT23		1.690	-0.169	-0.78	1.615	-0.250	-0.99	LE
QEWXEN		1.972	0.113	0.52	1.970	0.105	0.42	TT
T23C8J		1.656	-0.203	-0.94	1.581	-0.284	-1.13	LE
TCGDJJ		2.100	0.241	1.11	2.063	0.198	0.79	XX
TCZ23Y		1.478	-0.381	-1.76	1.466	-0.399	-1.58	LH
UYGR3F		1.722	-0.137	-0.63	1.609	-0.256	-1.01	LW
VEFB6W		1.743	-0.116	-0.54	1.641	-0.224	-0.89	LA
WNZ26T	*	2.196	0.337	1.56	2.413	0.548	2.17	DW
XLVLJ9		1.792	-0.067	-0.31	1.726	-0.139	-0.55	LE



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

**Report #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SE51</u>			<u>Sample SE52</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
XX3QDH	*	2.420	0.561	2.59	2.440	0.575	2.28	XX
YH8MAJ		2.148	0.289	1.34	2.062	0.197	0.78	TH

<b>Summary Statistics</b>	<u>Sample SE51</u>	<u>Sample SE52</u>
<b>Grand Means</b>	1.86 Percent	1.86 Percent
<b>Std Dev Btwn Labs</b>	0.22 Percent	0.25 Percent

Statistics based on 39 of 42 reporting participants.

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

Q6ATTH (X) - Extreme Data.

2RN8QK (X) - Inconsistent in testing between samples.

LU2H6Q (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.

**Analysis Notes:**

Q6ATTH - Data appears to be transposed between Analysis 331 (TEA) and Analysis 332 (% elongation).

**Key to Instrument Codes Reported by Participants**

DW	Dongguan Walter W-304 Tester	ID	Instron 4201
IF	Instron 3340 Series	IK	Instron 4400 Series
IM	Instron 5500 Series	IN	Instron 3360 Series
IP	Instron 4206	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	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)	TR	TMI Horizontal Tensile Tester
TT	Tinius Olsen Model MHT	XX	Instrument make/model not specified by lab



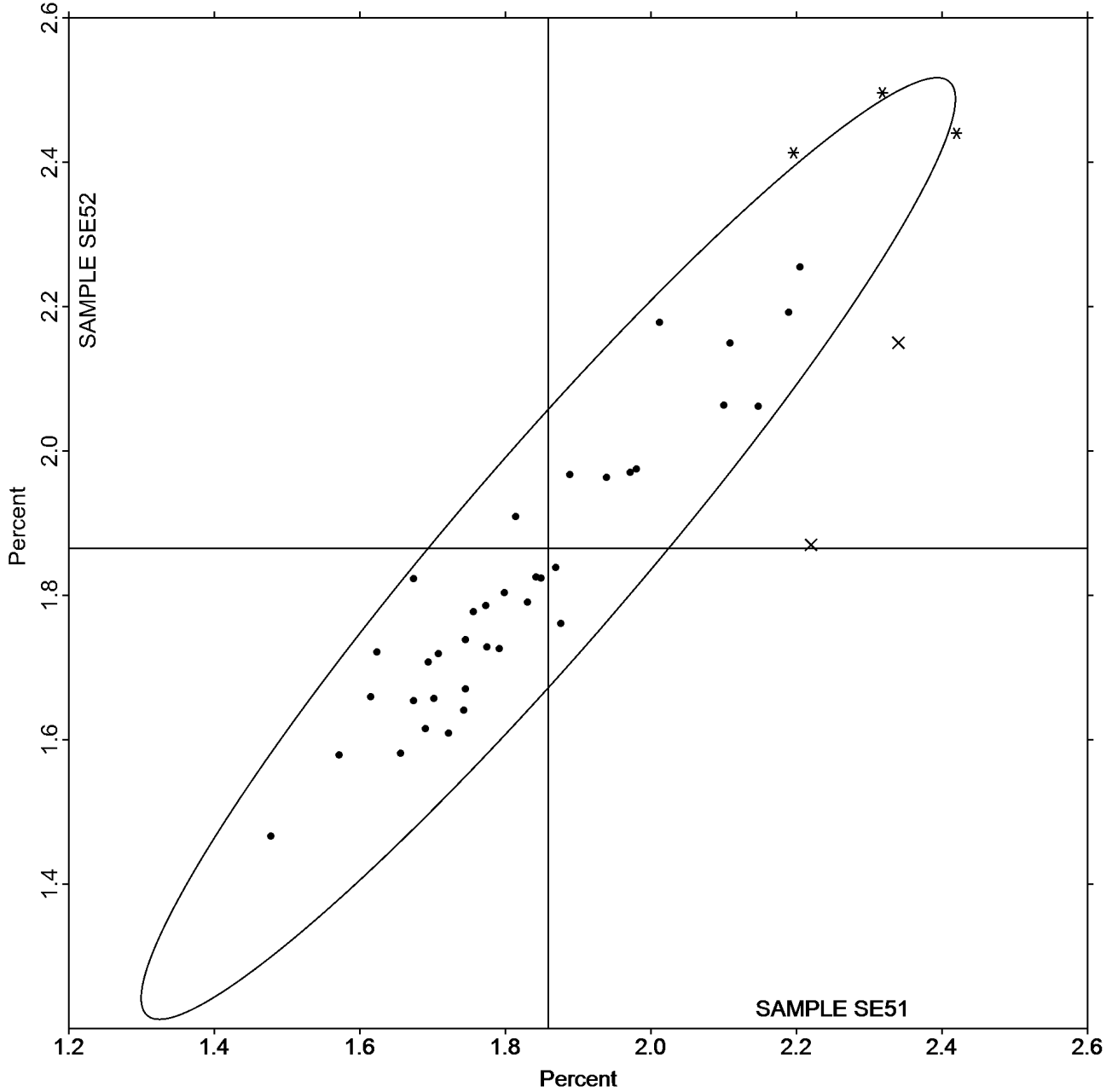
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 332**  
**Elongation to Break - Packaging Papers**  
**TAPPI Official Test Method T494**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SE51 = 1.8589**  
**Percent**

**Grand Mean Sample SE52 = 1.8649**  
**Percent**

**ANALYSIS 332**









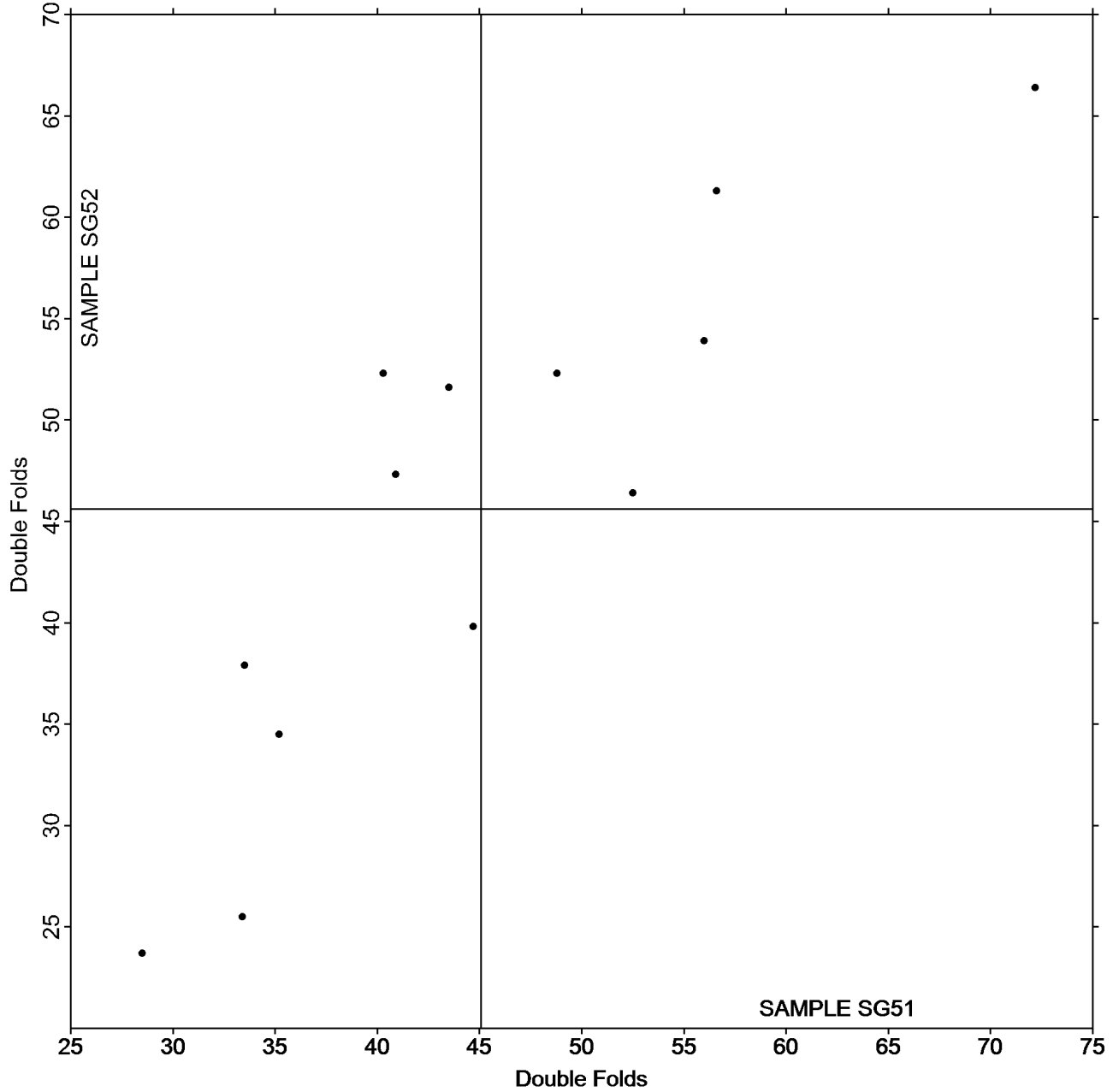
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 334**  
**Folding Endurance (MIT) - Double Folds**  
**TAPPI Official Test Method T511**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SG51 = 45.085**  
**Double Folds**

**Grand Mean Sample SG52 = 45.608**  
**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 #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SH51</u>			<u>Sample SH52</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4U9N6B		312.0	11.4	0.44	311.2	18.9	0.81
6AHWL6		278.0	-22.6	-0.88	272.4	-19.8	-0.85
6ETWUP		253.7	-46.9	-1.82	249.3	-42.9	-1.84
9MTKZJ		345.8	45.2	1.75	325.8	33.5	1.44
A4UP3M		299.3	-1.3	-0.05	297.5	5.2	0.22
AYH22P		341.9	41.3	1.60	320.8	28.5	1.22
C22NZV	X	172.1	-128.5	-4.99	157.6	-134.6	-5.77
CJVHFZ	X	328.5	27.9	1.08	616.8	324.5	13.91
GAVELD	X	131.7	-168.9	-6.55	277.4	-14.9	-0.64
H6ZTFW		286.5	-14.1	-0.55	274.0	-18.3	-0.78
HHLG3F		305.4	4.8	0.19	277.8	-14.4	-0.62
J8JEDC	X	422.5	121.9	4.73	405.3	113.0	4.85
KPGAAZ		290.8	-9.8	-0.38	283.6	-8.7	-0.37
L98KYK		325.5	24.9	0.97	303.5	11.2	0.48
MMHR3V		324.9	24.3	0.94	327.6	35.3	1.51
MU6BTP		277.5	-23.1	-0.90	267.2	-25.0	-1.07
TGFMXR		290.7	-9.9	-0.38	305.4	13.1	0.56
VHNE4E		276.9	-23.6	-0.92	275.8	-16.4	-0.70
WLZTZJ		300.0	-0.6	-0.02	292.0	-0.2	-0.01

<b>Summary Statistics</b>	<u>Sample SH51</u>	<u>Sample SH52</u>
<b>Grand Means</b>	300.59 Gurley Units	292.26 Gurley Units
<b>Std Dev Btwn Labs</b>	25.78 Gurley Units	23.33 Gurley Units
Statistics based on 15 of 19 reporting participants.		

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

- C22NZV (X) - Data for both samples are low. Possible Systematic Error.
- J8JEDC (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.
- GAVELD (X) - Extreme Data for Sample SH51.
- CJVHFZ (X) - Extreme Data for Sample SH52.



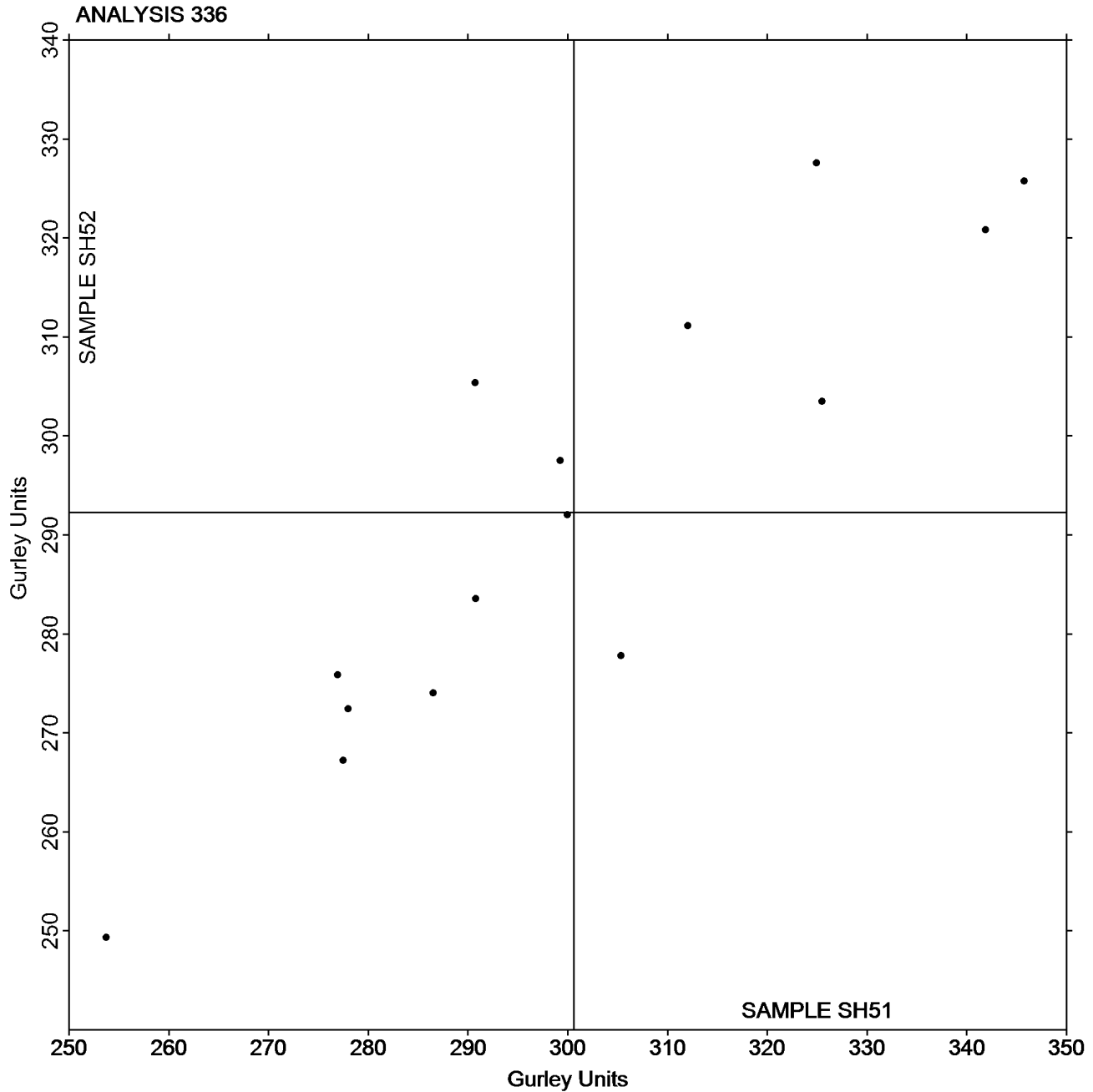
# Paper & Paperboard Interlaboratory Testing Program

Report #2921S,  
January 2018

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

Grand Mean Sample SH51 = 300.59  
Gurley Units

Grand Mean Sample SH52 = 292.26  
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 #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SJ51</u>			<u>Sample SJ52</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4U9N6B		4.255	0.145	0.33	3.916	-0.177	-0.37
6YXGN6		3.723	-0.387	-0.89	3.901	-0.192	-0.40
8N7VEC		4.018	-0.092	-0.21	4.024	-0.069	-0.14
8V3RZT		4.576	0.466	1.07	4.753	0.660	1.39
A4UP3M		4.199	0.089	0.20	3.987	-0.106	-0.22
AYH22P		4.170	0.060	0.14	4.259	0.166	0.35
H6EEVZ		3.249	-0.861	-1.98	3.497	-0.596	-1.26
M4AENM		4.163	0.053	0.12	4.021	-0.072	-0.15
TGFMXR		4.925	0.815	1.87	5.090	0.997	2.10
UYGR3F		3.830	-0.280	-0.64	3.500	-0.593	-1.25
VHNE4E		4.101	-0.009	-0.02	4.073	-0.020	-0.04
XALXHY	<b>X</b>	4.788	0.678	1.56	4.069	-0.024	-0.05

<b>Summary Statistics</b>	<u>Sample SJ51</u>	<u>Sample SJ52</u>
<b>Grand Means</b>	4.11 Taber Units	4.09 Taber Units
<b>Std Dev Btwn Labs</b>	0.44 Taber Units	0.47 Taber Units

Statistics based on 11 of 12 reporting participants.

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

XALXHY (X) - Inconsistent in testing between samples.

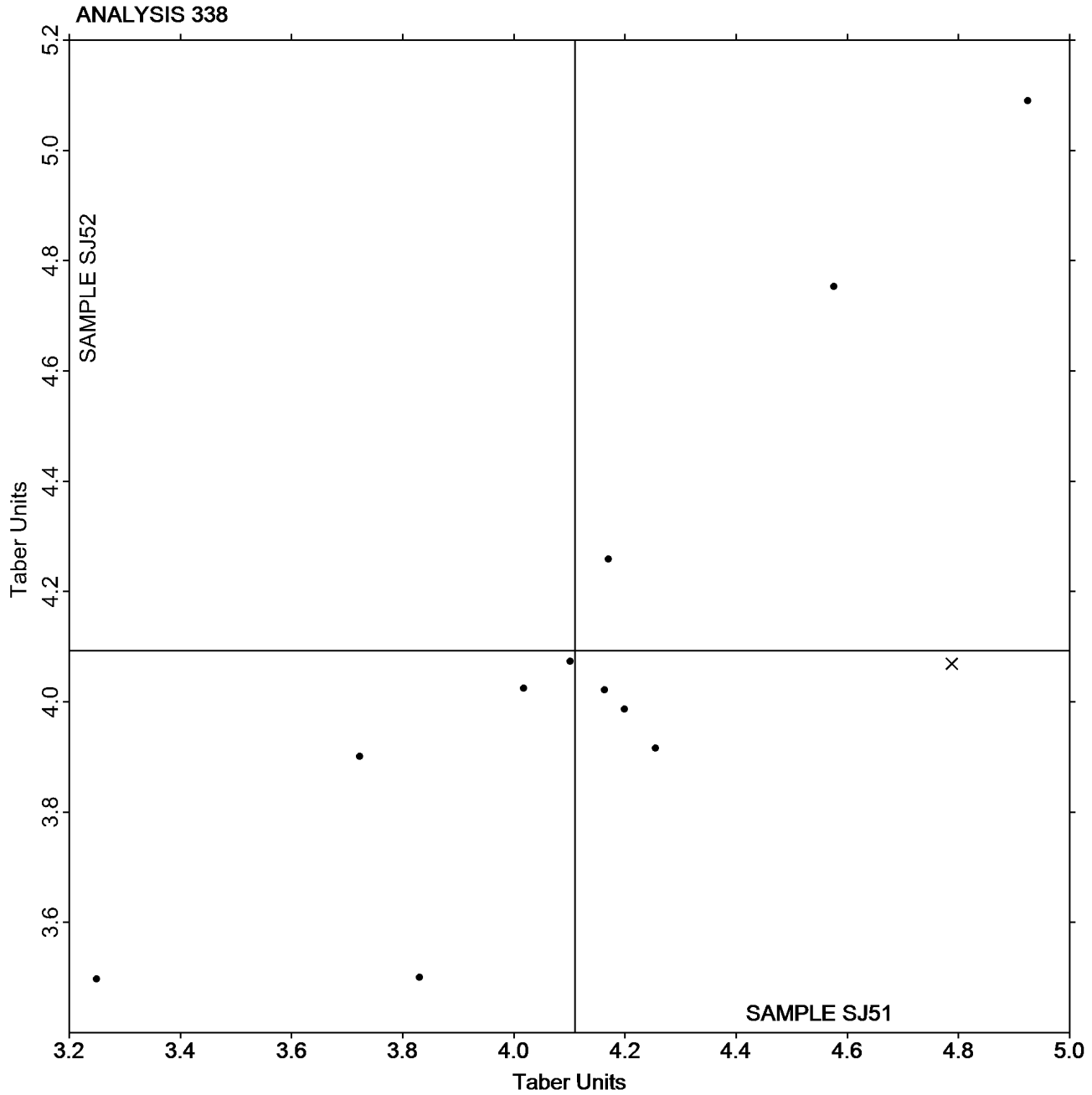


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 338**  
**Bending Resistance, Taber Type - 0 to 10 Units**  
**TAPPI Official Test Method T566**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SJ51 = 4.1099**  
**Taber Units**

**Grand Mean Sample SJ52 = 4.0928**  
**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 #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SQ51</u>			<u>Sample SQ52</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2PK9FT		34.00	-1.47	-0.61	34.20	-0.45	-0.20
3C7H9A		36.26	0.79	0.33	32.44	-2.21	-0.96
6PQX9F		32.86	-2.61	-1.08	33.08	-1.57	-0.68
A4UP3M		36.62	1.15	0.48	35.65	1.00	0.43
A728ZH		38.52	3.05	1.26	37.98	3.33	1.44
E6RQTL		39.28	3.81	1.57	37.85	3.20	1.38
HHLG3F		35.54	0.07	0.03	35.64	0.99	0.43
MMHR3V		33.61	-1.86	-0.77	33.73	-0.92	-0.40
UYGR3F	<b>X</b>	53.25	17.78	7.34	58.00	23.35	10.09
ZYTNLZ		32.52	-2.95	-1.22	31.31	-3.34	-1.44

<b>Summary Statistics</b>	<u>Sample SQ51</u>	<u>Sample SQ52</u>
<b>Grand Means</b>	35.47 Taber Units	34.65 Taber Units
<b>Std Dev Btwn Labs</b>	2.42 Taber Units	2.31 Taber Units
	Statistics based on 9 of 10 reporting participants.	

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

UYGR3F (X) - Extreme Data.



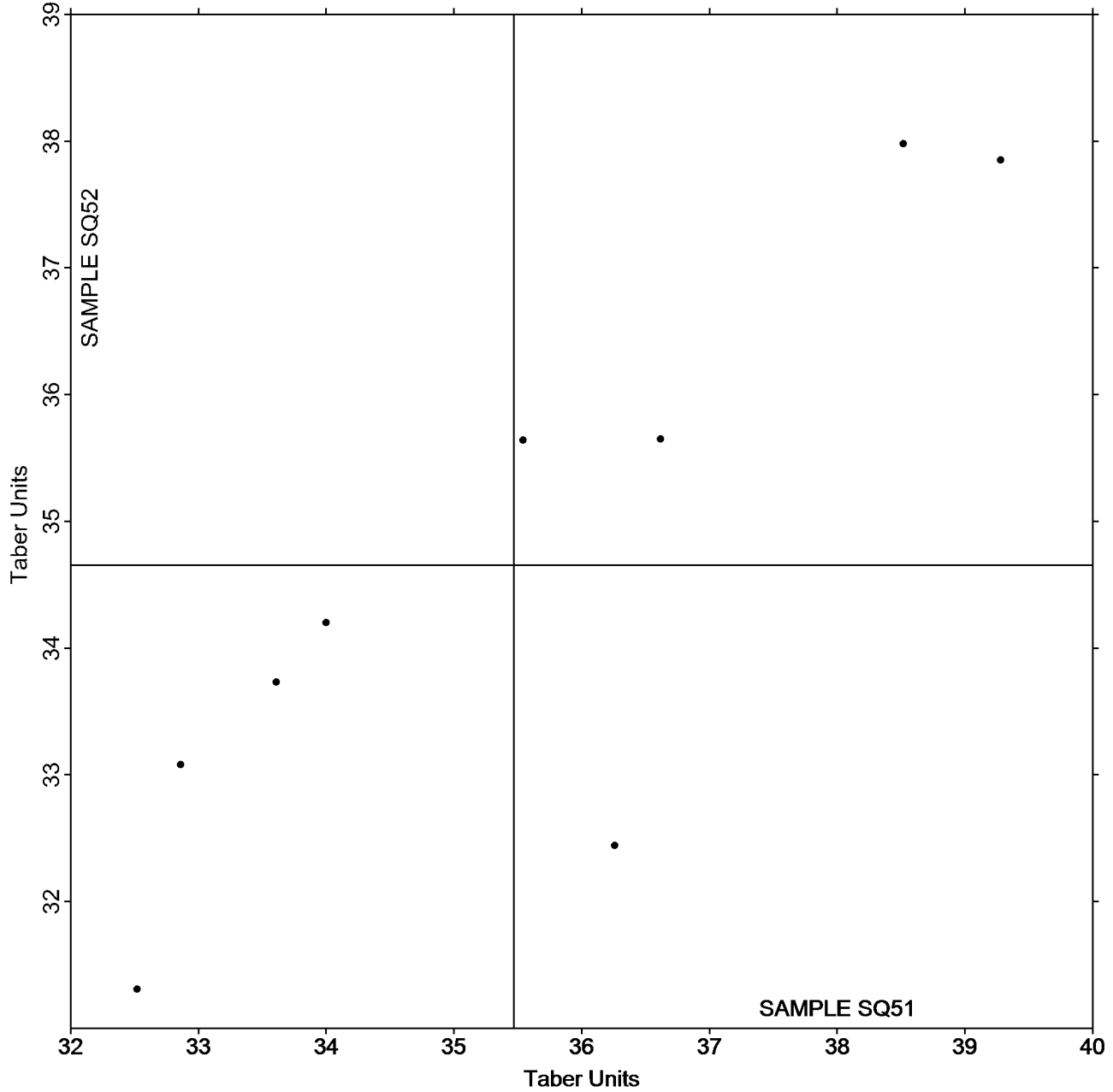
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 339**  
**Bending Resistance, Taber Type - 10 to 100 Taber Units**  
**TAPPI Official Test Method T489**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SQ51 = 35.468**  
**Taber Units**

**Grand Mean Sample SQ52 = 34.653**  
**Taber Units**

**ANALYSIS 339**



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 #2921S,  
January 2018**

**Analysis 340**

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

**TAPPI Official Test Method T489**

WebCode	Data Flag	<u>Sample ST51</u>			<u>Sample ST52</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3DYPBL		291.2	-1.5	-0.09	297.5	12.0	0.70
6HPMUA		291.1	-1.6	-0.10	277.3	-8.2	-0.48
7LMJ32		331.0	38.3	2.41	327.0	41.5	2.42
A728ZH		311.7	19.0	1.19	302.0	16.5	0.96
AGJPVA		282.7	-10.0	-0.63	267.9	-17.6	-1.03
C22NZV		278.8	-13.9	-0.87	274.1	-11.4	-0.66
EXT3E3		278.3	-14.4	-0.91	271.3	-14.2	-0.83
GXK27X		276.8	-15.9	-1.00	274.9	-10.6	-0.62
HHLG3F		294.3	1.6	0.10	286.9	1.3	0.08
L68JNP		308.8	16.1	1.01	313.1	27.6	1.61
LDJHFF		297.4	4.7	0.30	291.2	5.7	0.33
Q6ATTH		267.2	-25.5	-1.60	257.7	-27.8	-1.62
QUT7JH		293.6	0.9	0.06	280.6	-4.9	-0.29
UYGR3F		282.5	-10.2	-0.64	280.0	-5.5	-0.32
VUCP6P	*	312.2	19.5	1.23	277.2	-8.3	-0.48
XB9WCM		286.9	-5.8	-0.37	282.4	-3.1	-0.18
YT947F		291.5	-1.2	-0.07	292.5	7.0	0.41

<b>Summary Statistics</b>	<u><b>Sample ST51</b></u>	<u><b>Sample ST52</b></u>
<b>Grand Means</b>	292.70 Taber Units	285.50 Taber Units
<b>Std Dev Btwn Labs</b>	15.89 Taber Units	17.16 Taber Units
Statistics based on 17 of 17 reporting participants.		



# Paper & Paperboard Interlaboratory Testing Program

Report #2921S,  
January 2018

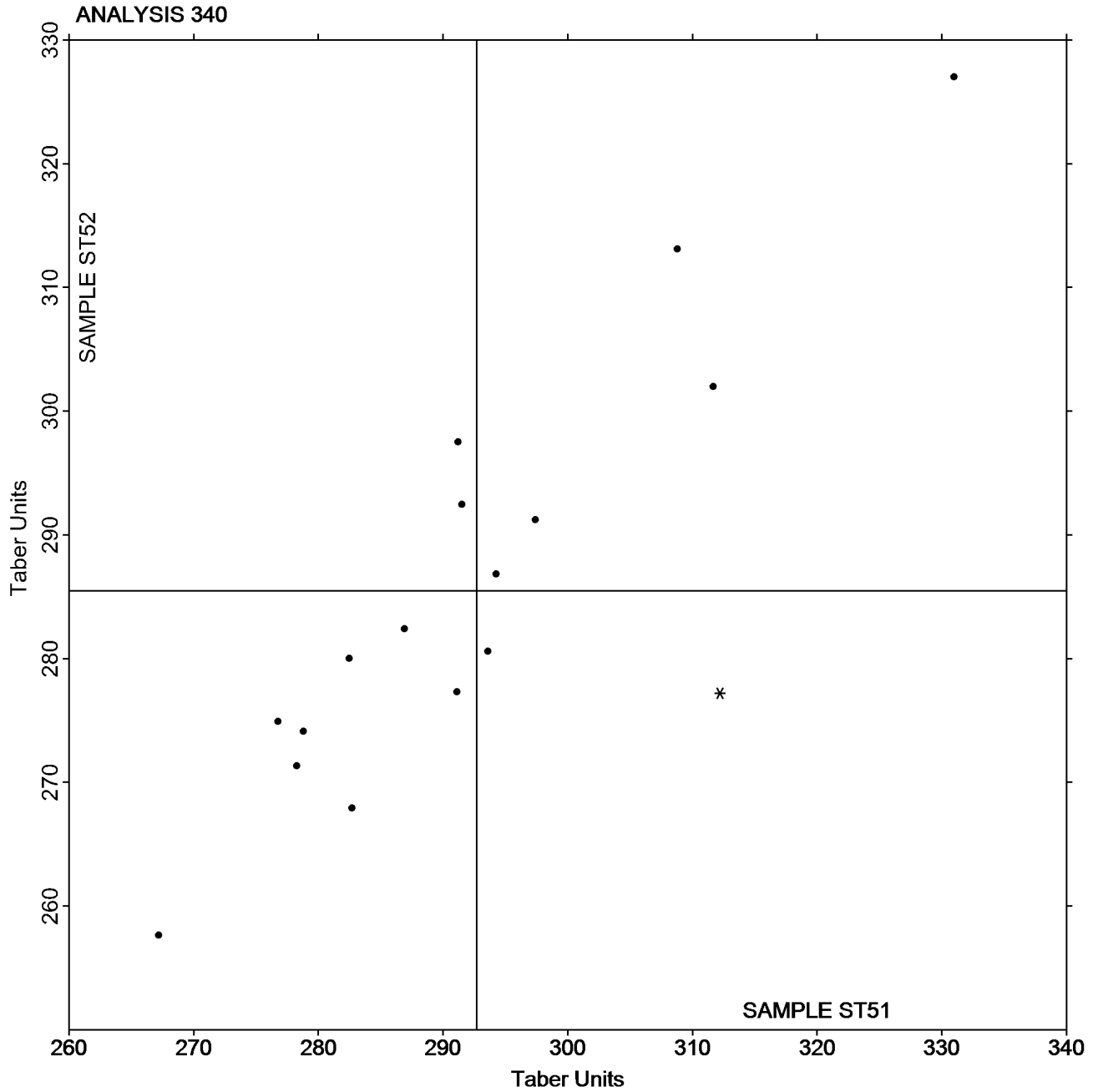
## Analysis 340

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

TAPPI Official Test Method T489

Grand Mean Sample ST51 = 292.70  
Taber Units

Grand Mean Sample ST52 = 285.50  
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 #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SM51</u>			<u>Sample SM52</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2RN8QK		68.00	-1.00	-0.20	66.20	-2.76	-0.54	TA
3C7H9A		65.50	-3.50	-0.70	66.44	-2.52	-0.49	TA
7E69PZ		76.64	7.64	1.53	77.70	8.74	1.70	DX
A4UP3M		62.22	-6.78	-1.35	63.56	-5.40	-1.05	TZ
A728ZH		73.58	4.58	0.92	72.52	3.56	0.69	LW
AYH22P		73.35	4.35	0.87	73.80	4.84	0.94	TL
BM2ETP		73.34	4.34	0.87	74.44	5.48	1.07	TA
E6RQTL		69.66	0.66	0.13	66.86	-2.10	-0.41	TA
GXK27X		61.12	-7.88	-1.57	62.69	-6.27	-1.22	LX
HP6KC3		68.00	-1.00	-0.20	68.00	-0.96	-0.19	XX
K8EGH7		61.35	-7.65	-1.53	61.26	-7.69	-1.50	LW
L68JNP		66.14	-2.86	-0.57	64.32	-4.64	-0.90	LW
P39EJ8		74.82	5.82	1.16	75.68	6.72	1.31	DX
QUT7JH		72.20	3.20	0.64	72.40	3.44	0.67	CA
ZYTNLZ		69.04	0.05	0.01	68.48	-0.48	-0.09	LW

<b>Summary Statistics</b>	<u>Sample SM51</u>	<u>Sample SM52</u>
<b>Grand Means</b>	69.00 psi	68.96 psi
<b>Std Dev Btwn Labs</b>	5.01 psi	5.13 psi

Statistics based on 15 of 15 reporting participants.

**Key to Instrument Codes Reported by Participants**

CA	CSI CS-163	DX	Dek-Tron XP2 Series
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

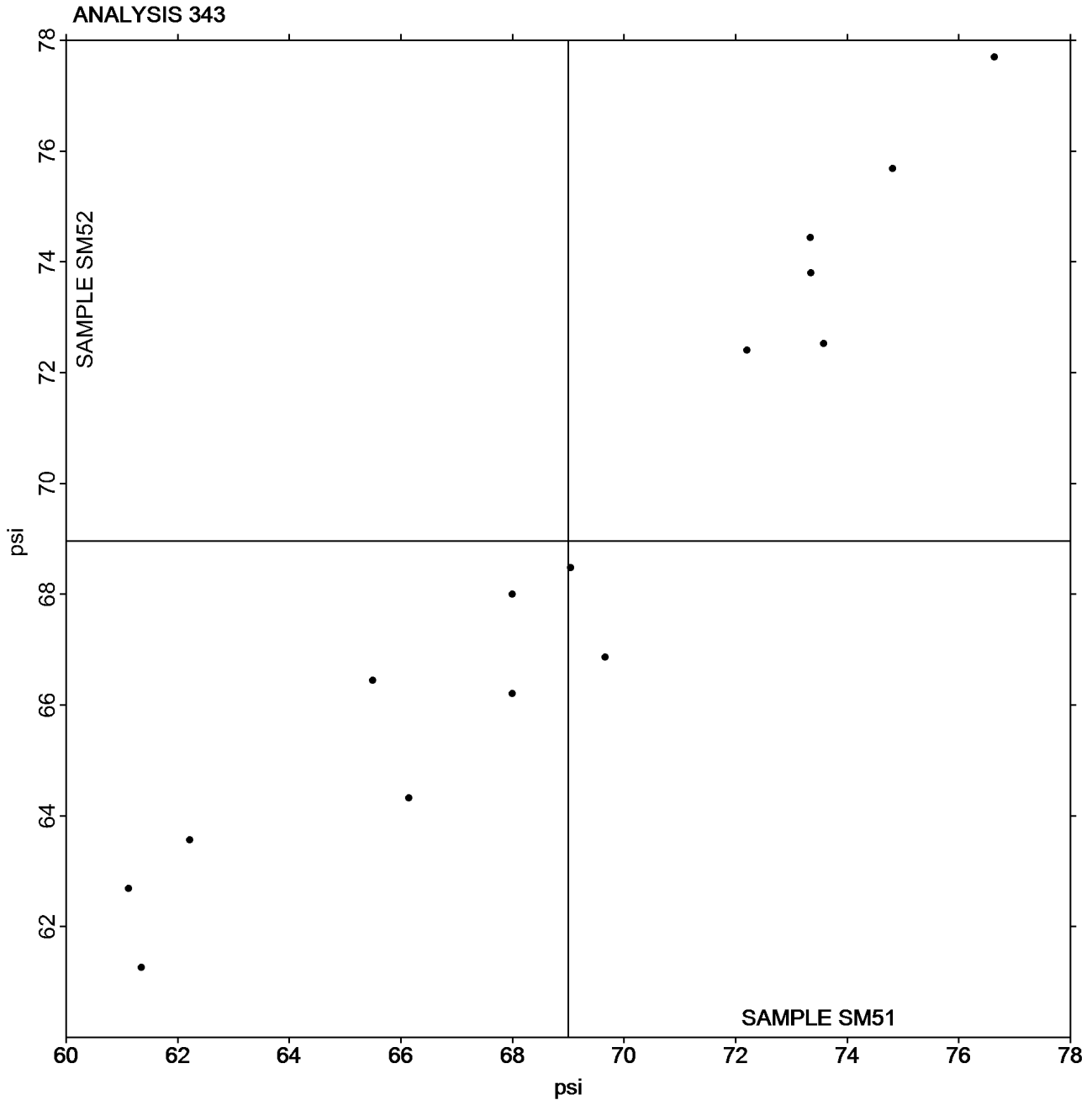
Report #2921S,  
January 2018

## Analysis 343 Z-Direction Tensile

TAPPI Official Test Method T541

Grand Mean Sample SM51 = 68.997  
psi

Grand Mean Sample SM52 = 68.956  
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 #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SZ51</u>			<u>Sample SZ52</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6HPMUA		36.86	1.55	0.52	36.06	0.62	0.20	TZ
8RQVHY		29.32	-5.99	-1.99	31.84	-3.60	-1.16	LW
AGJPVA		33.94	-1.37	-0.45	32.02	-3.42	-1.11	TL
BW7L8P		35.74	0.43	0.14	35.56	0.12	0.04	CD
C22NZV		34.04	-1.27	-0.42	34.28	-1.16	-0.38	CA
CA9CPM		41.55	6.24	2.08	42.58	7.14	2.31	PG
EXT3E3		35.44	0.13	0.04	34.46	-0.98	-0.32	TA
G8BKMR		36.77	1.46	0.49	36.21	0.76	0.25	TA
GJL7UR		33.46	-1.85	-0.61	32.20	-3.24	-1.05	LW
HHLG3F		33.08	-2.23	-0.74	32.44	-3.00	-0.97	CA
LDJHFF		35.32	0.01	0.00	36.78	1.34	0.43	CD
PVLNYX		36.86	1.55	0.52	36.42	0.98	0.32	CH
VUCP6P		31.20	-4.11	-1.37	32.80	-2.64	-0.85	LW
XB9WCM		37.20	1.89	0.63	38.40	2.96	0.95	CA
YT947F		38.80	3.49	1.16	39.60	4.16	1.34	TA

<b>Summary Statistics</b>	<u><b>Sample SZ51</b></u>	<u><b>Sample SZ52</b></u>
<b>Grand Means</b>	35.31 psi	35.44 psi
<b>Std Dev Btwn Labs</b>	3.01 psi	3.10 psi
<small>Statistics based on 15 of 15 reporting participants.</small>		

**Key to Instrument Codes Reported by Participants**

CA	CSI CS-163	CD	CSI CS-163D
CH	Chatillon Ametek	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

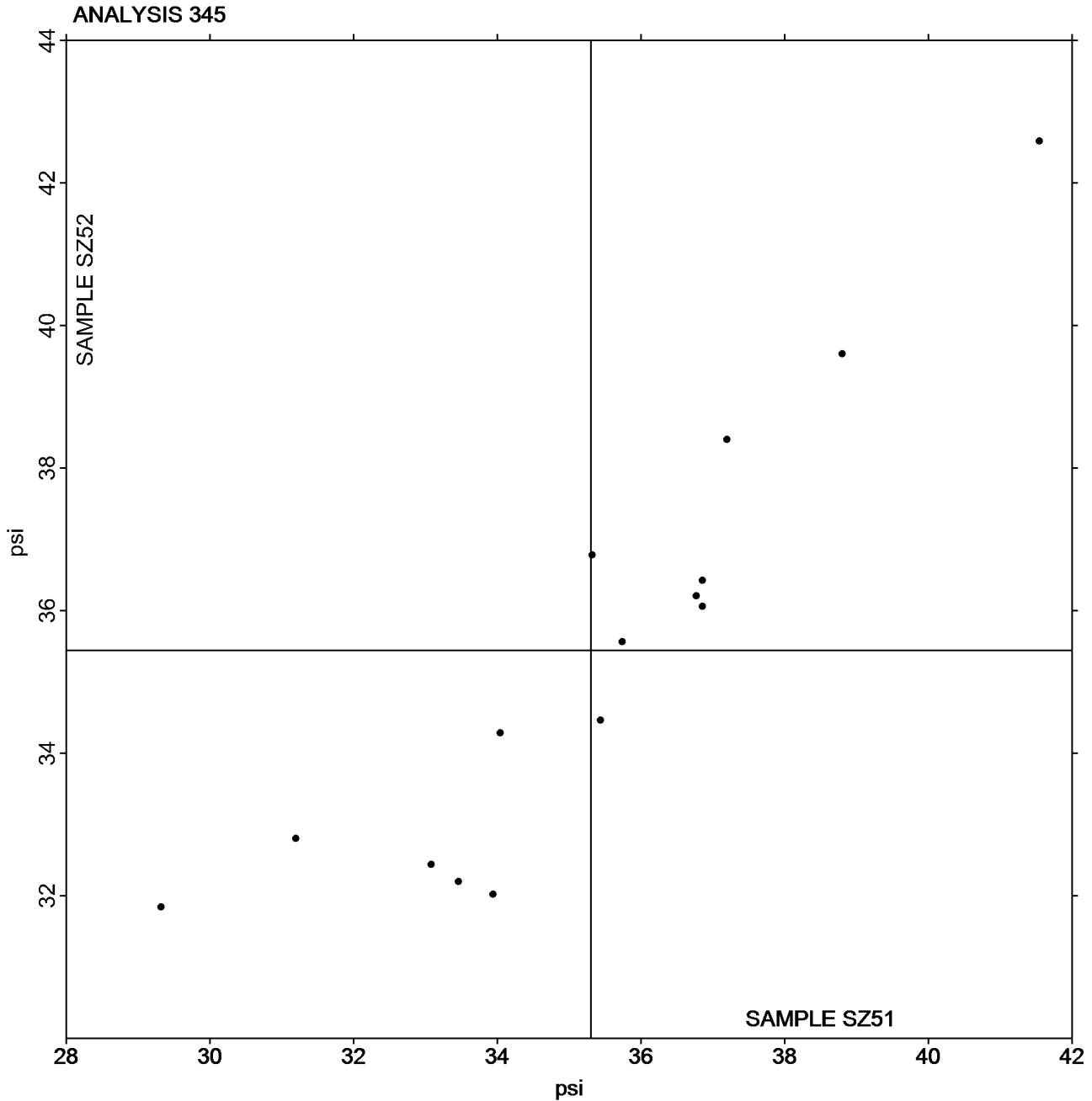


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 345**  
**Z-Direction Tensile, Recycled Paperboard**  
**TAPPI Official Test Method T541**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SZ51 = 35.305**  
psi

**Grand Mean Sample SZ52 = 35.443**  
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 #2921S,**  
**January 2018**

WebCode	Data Flag	Sample SN51			Sample SN52			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3C7H9A		82.80	-10.30	-1.90	89.00	-4.67	-0.87	HZ
4U9N6B		88.72	-4.38	-0.81	89.32	-4.35	-0.81	KR
6ETWUP		91.60	-1.50	-0.28	93.58	-0.09	-0.02	HY
6PQX9F	X	71.80	-21.31	-3.93	70.60	-23.08	-4.30	TM
7AWF63		89.00	-4.10	-0.76	91.20	-2.47	-0.46	HY
A4UP3M		98.20	5.10	0.94	95.20	1.53	0.28	HY
A728ZH		95.00	1.90	0.35	96.60	2.93	0.55	HY
BM2ETP		102.00	8.90	1.64	101.20	7.53	1.40	HY
C22NZV		97.84	4.74	0.87	95.24	1.57	0.29	HZ
CKUJNC		100.04	6.94	1.28	101.20	7.53	1.40	HY
E6RQTL		95.20	2.10	0.39	99.40	5.73	1.07	HY
EXT3E3		91.40	-1.70	-0.31	89.80	-3.87	-0.72	HY
J8JEDC		89.20	-3.90	-0.72	87.80	-5.87	-1.09	HY
L68JNP		90.40	-2.70	-0.50	89.60	-4.07	-0.76	HZ
L724FV		99.60	6.50	1.20	100.80	7.13	1.33	HZ
MTUF3R		92.24	-0.86	-0.16	95.44	1.77	0.33	HY
WLZTJZ		86.40	-6.70	-1.24	83.40	-10.27	-1.91	HY

Summary Statistics	Sample SN51	Sample SN52
<b>Grand Means</b>	93.10 1000th ft-lbs	93.67 1000th ft-lbs
<b>Std Dev Btwn Labs</b>	5.43 1000th ft-lbs	5.37 1000th ft-lbs
Statistics based on 16 of 17 reporting participants.		

**Comments on Assigned Data Flags for Test #348**

6PQX9F (X) - Data for both samples are low. Possible Systematic Error.

**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	TM	TMI Internal Bond Tester



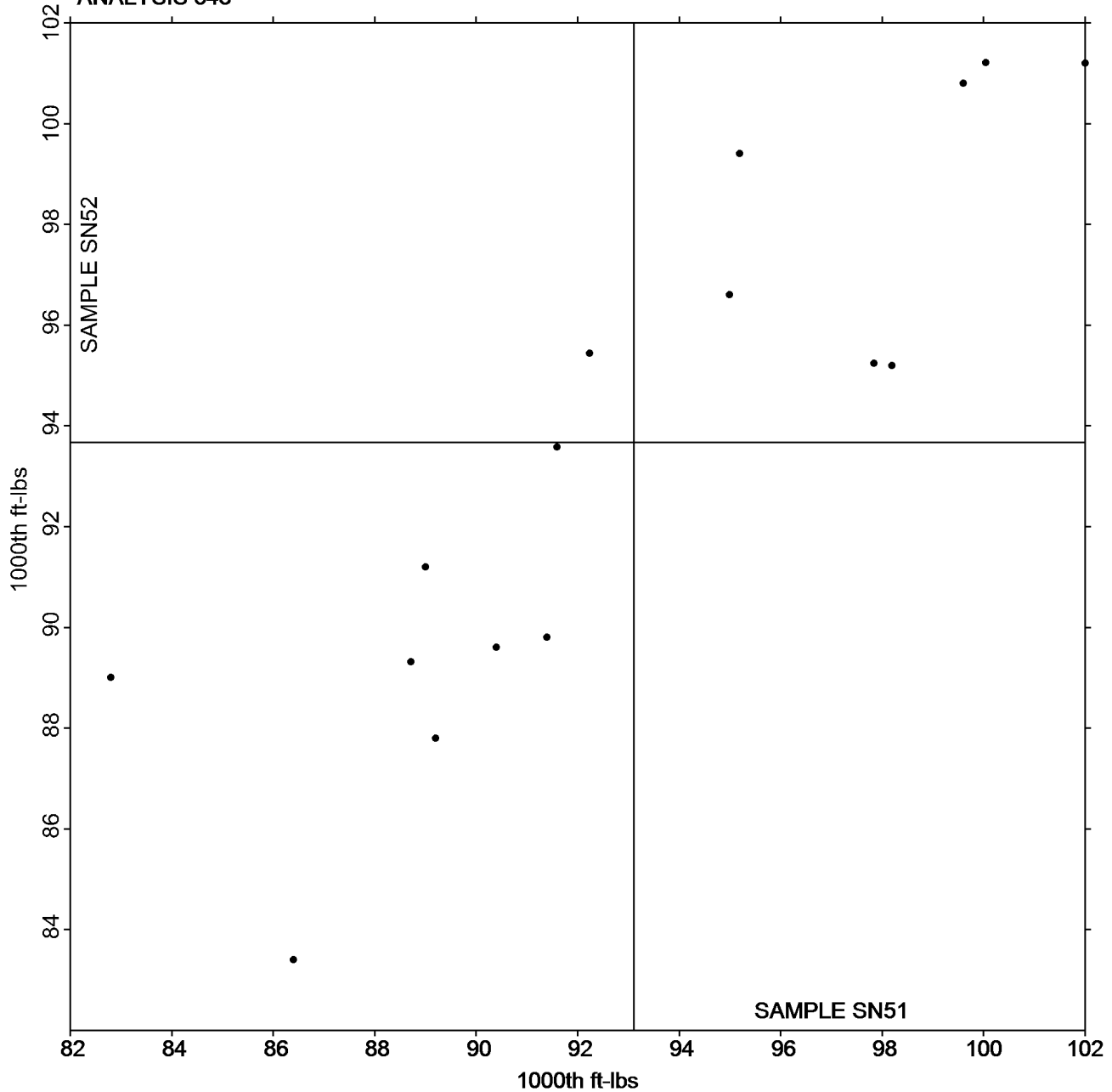
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 348**  
**Internal Bond Strength - Modified Scott Mechanics**  
**TAPPI Provisional Test Method T569**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SN51 = 93.103**  
**1000th ft-lbs**

**Grand Mean Sample SN52 = 93.674**  
**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 #2921S,**  
**January 2018**

WebCode	Data Flag	<u>Sample SP51</u>			<u>Sample SP52</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3DYPBL		97.80	13.90	1.34	99.00	15.21	1.38	TM
3HYM2E		89.60	5.70	0.55	89.20	5.41	0.49	SC
62KB9C		73.57	-10.34	-1.00	74.33	-9.46	-0.86	TM
7E69PZ		65.40	-18.50	-1.79	65.92	-17.87	-1.63	TM
CA9CPM		92.20	8.30	0.80	94.00	10.21	0.93	TM
DEMKEY		78.42	-5.48	-0.53	77.94	-5.84	-0.53	XX
GJL7UR		93.60	9.70	0.94	94.20	10.41	0.95	XX
GXK27X		68.24	-15.67	-1.51	64.72	-19.07	-1.74	TM
PVLNYX		87.00	3.10	0.30	84.80	1.01	0.09	TM
Q3LC8N		84.32	0.42	0.04	84.66	0.87	0.08	XX
UYGR3F		85.68	1.78	0.17	86.66	2.87	0.26	XX
VGNPC3	<b>X</b>	0.07	-83.84	-8.11	0.07	-83.72	-7.62	TM
XX3QDH		91.00	7.10	0.69	90.00	6.21	0.57	XX

<b>Summary Statistics</b>	<u>Sample SP51</u>	<u>Sample SP52</u>
<b>Grand Means</b>	83.90 1000th ft-lbs	83.79 1000th ft-lbs
<b>Stnd Dev Btwn Labs</b>	10.34 1000th ft-lbs	10.99 1000th ft-lbs
	Statistics based on 12 of 13 reporting participants.	

**Comments on Assigned Data Flags for Test #349**

VGNPC3 (X) - Extreme Data.

**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



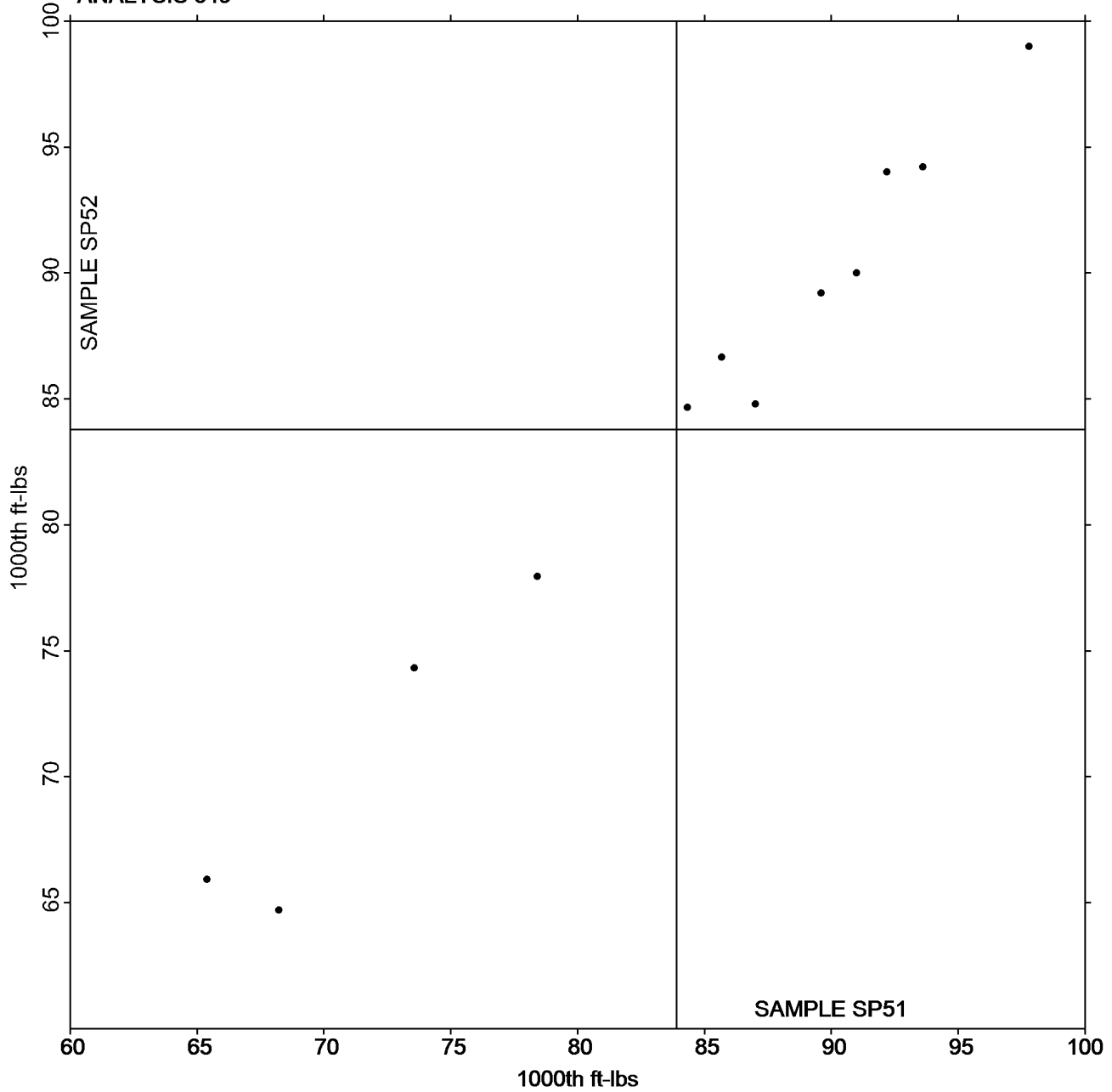
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 349**  
**Internal Bond Strength - Scott Bond Models**  
**TAPPI Provisional Test Method T569**

**Report #2921S,**  
**January 2018**

**Grand Mean Sample SP51 = 83.902**  
**1000th ft-lbs**

**Grand Mean Sample SP52 = 83.786**  
**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.