



Paper & Paperboard Testing Program

Summary Report #3021 S - September 2019

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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)

WebCode	Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Paper Report published on the CTS Website. The WebCode for each analysis can be found on the datasheets and in the Performance Analysis Report mailed to each participant.
Lab Mean	The average of the values obtained for each sample by the participant.
Grand Mean	The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.
Difference from Grand Mean	The difference of the LAB MEAN from the GRAND MEAN.
Between-Lab Standard Deviation	An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).
Comparative Performance Value	An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa). The critical value for each CPV will vary depending on the number of labs participating in a test.
Inst Code	A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section), if instruments are tracked.
Data Flag	DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

<u>DATA FLAG</u>	<u>STATISTICALLY INCLUDED/EXCLUDED</u>	<u>ACTION REQUIRED</u>
*	INCLUDED	CAUTION - review testing procedure and monitor future results. Results fall outside 95% ellipse but within a 99% ellipse that is calculated but not drawn.
X	EXCLUDED	STOP - immediate review of data and/or testing procedure is required. Results fall outside the 99% ellipse. See specific notes following each table for more information on why the data is excluded.
M	EXCLUDED	PROCEED - lab was unable to report data for at least one sample.

Graph - For each laboratory, the LAB MEAN for the first sample (x-axis) is plotted against the LAB MEAN for the second sample (y-axis) with each point representing a laboratory. The horizontal and vertical cross-hairs are the GRAND MEANS for each sample. When 20 or more laboratories are in the statistics, an ellipse is also drawn so that 95% of the time a randomly selected laboratory will be included inside the ellipse. Plotted data flags are explained on the previous page.

Common Problems Highlighted in Footnotes

1. **Extreme data** - The laboratory's results for one or both samples are so inconsistent with those of the other participants that the lab mean(s) fall outside the plot. The participant is advised to immediately review his data and/or testing procedure.
2. **Systematic bias** - The laboratory's results are either consistently high or low for both samples when compared to the other participants (the plotted point falls near the top or bottom of the ellipse). This indicates that the participant is performing the test with a constant bias. Causes of systematic errors include improper calibration, the particular make/model of equipment or a modification to the testing procedure.
3. **Inconsistency in testing between samples/sample sets** - The laboratory's results indicate that there are differences in the way the two samples tested (the plotted point falls to the side of the ellipse). This type of error may be attributed to the analyst deviating from the procedure when testing one of the samples or a material interaction occurrence with the instrument or room conditions. The inconsistency is reflected in the CPVs for the two samples, such as a +1.5 CPV for sample A and a -2.2 CPV for sample B. CTS also will specify if the laboratory's data for one sample are high/low compared to the other participants. If this inconsistency is slight, the lab's plotted point will be an * that falls on the edge of the ellipse.
4. **Inconsistency in testing within a sample** - The laboratory's within-lab standard deviation for a specified sample is high when compared to the other participants, often causing the lab's plotted point to fall outside of the ellipse.

Labs flagged with an * are not typically included in the footnotes of a data table. These labs may locate their position in the control ellipse and use the definitions above to help identify the type of testing error. An * should serve as a caution flag, a "yellow light", to a lab. If this error is repeated in future rounds, a lab may need to stop and review its testing procedures. The initial data flag is not cause for alarm. Interlaboratory tests conducted at regular intervals permit a lab to recognize trends in testing.



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

Report #3021S,
September 2019

WebCode	Data Flag	Sample SA71			Sample SA72		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2GLRM8		38.50	-6.37	-1.42	38.40	-5.67	-1.35
2HVRQT		40.80	-4.07	-0.91	40.30	-3.77	-0.90
4ZMPWD		45.43	0.55	0.12	46.84	2.77	0.66
7QBA4B		45.84	0.97	0.21	44.74	0.67	0.16
7YJ29Y		50.85	5.98	1.33	46.60	2.53	0.60
AB4JDE		43.63	-1.25	-0.28	43.24	-0.83	-0.20
AJGB3C		41.92	-2.96	-0.66	38.67	-5.40	-1.29
C4G9E4		48.30	3.43	0.76	46.20	2.13	0.51
E4AYGN		42.16	-2.71	-0.60	41.93	-2.14	-0.51
EERKLH	*	57.95	13.08	2.91	56.56	12.49	2.98
EQ4RHH		45.32	0.45	0.10	43.22	-0.85	-0.20
F3EKQP		44.51	-0.37	-0.08	44.64	0.57	0.14
GCXDGC		47.49	2.62	0.58	45.85	1.78	0.42
GYNTXJ		40.74	-4.13	-0.92	40.46	-3.61	-0.86
KTQFKK		41.25	-3.63	-0.81	40.32	-3.74	-0.89
NQ8WQP	*	50.70	5.83	1.30	53.20	9.13	2.18
Q4P7QZ		41.41	-3.46	-0.77	41.55	-2.51	-0.60
QC464B		43.95	-0.93	-0.21	45.82	1.75	0.42
RDP993		41.26	-3.61	-0.80	42.29	-1.77	-0.42
RTLFW		42.51	-2.36	-0.53	42.87	-1.19	-0.28
UEE2FQ		47.78	2.91	0.65	46.07	2.00	0.48
VC9Y7E		50.87	6.00	1.33	45.21	1.15	0.27
WGCGJX		40.25	-4.62	-1.03	41.21	-2.86	-0.68
Z9QPLV		43.52	-1.35	-0.30	41.43	-2.64	-0.63

Summary Statistics	Sample SA71	Sample SA72
Grand Means	44.87 psi	44.07 psi
Std Dev Btwn Labs	4.50 psi	4.20 psi
Statistics based on 24 of 24 reporting participants.		



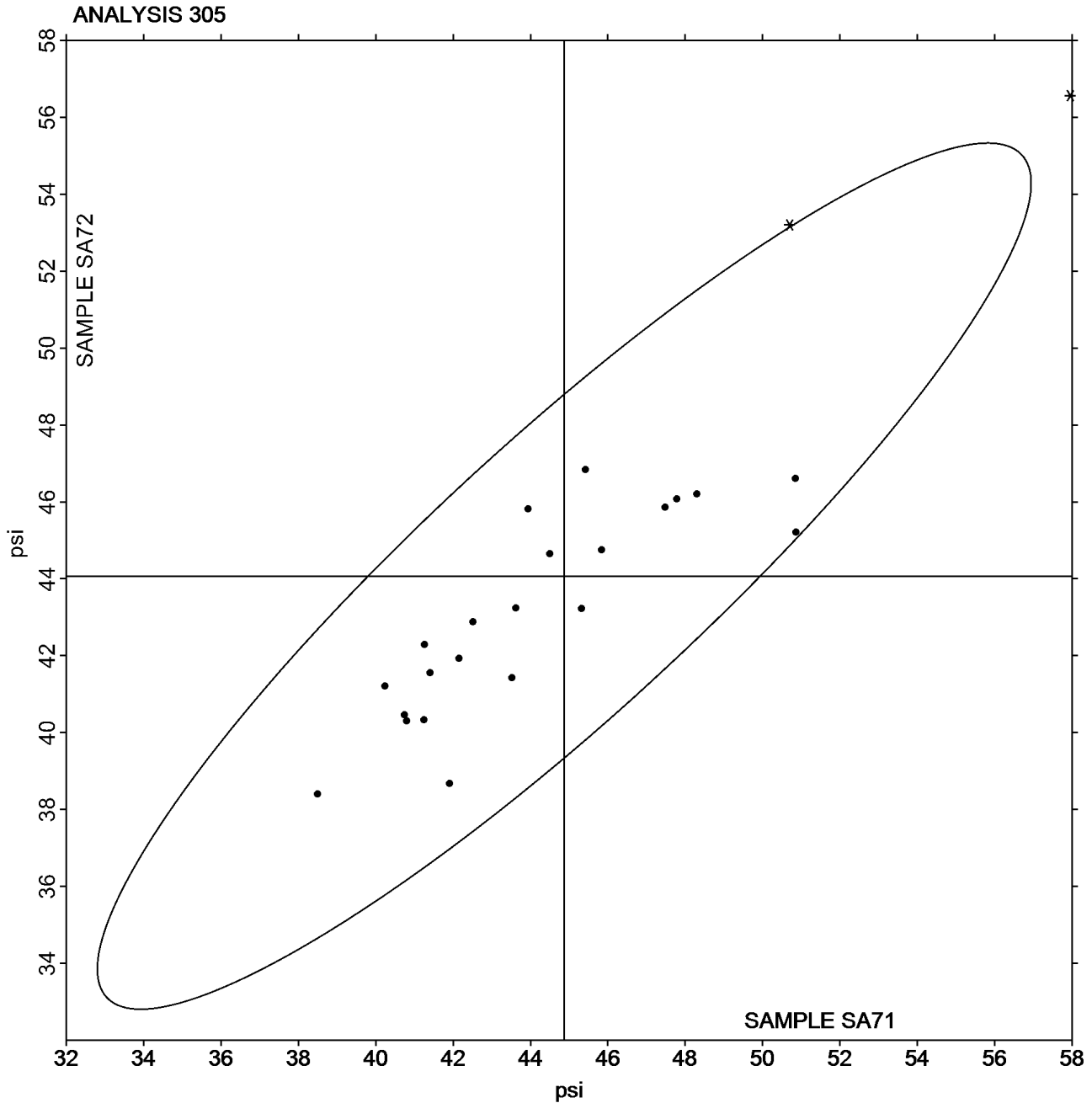
Paper & Paperboard Interlaboratory Testing Program

Report #3021S,
September 2019

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

Grand Mean Sample SA71 = 44.872
psi

Grand Mean Sample SA72 = 44.068
psi





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

Report #3021S,
September 2019

WebCode	Data Flag	Sample SB71			Sample SB72		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2ER43Q		67.36	9.02	1.49	65.65	7.51	1.27
2GLRM8		62.30	3.95	0.65	60.61	2.47	0.42
2QNAYA		49.80	-8.54	-1.41	49.30	-8.84	-1.50
4WKT8J		58.06	-0.28	-0.05	57.72	-0.42	-0.07
7XVAJM		49.95	-8.39	-1.38	49.50	-8.64	-1.47
8AKL97		58.12	-0.22	-0.04	56.81	-1.33	-0.23
A83EZU		62.44	4.10	0.68	64.54	6.40	1.09
AX2Q9W		61.74	3.40	0.56	60.70	2.56	0.43
CHDMEX	*	69.50	11.16	1.84	64.30	6.16	1.05
CHWENH	X	46.40	-11.94	-1.97	59.00	0.86	0.15
CRK8V9		61.57	3.23	0.53	60.51	2.37	0.40
DBX4WJ		60.40	2.06	0.34	63.70	5.56	0.94
EERKLH		69.39	11.05	1.82	69.06	10.92	1.85
JBVPQC		54.72	-3.62	-0.60	57.51	-0.63	-0.11
KL97VN		57.50	-0.84	-0.14	56.20	-1.94	-0.33
PPVGWN		71.61	13.27	2.19	73.06	14.92	2.53
QC464B		54.87	-3.47	-0.57	57.30	-0.83	-0.14
RTLFWH		55.19	-3.15	-0.52	56.13	-2.01	-0.34
TP3QJ7		63.53	5.18	0.85	62.88	4.74	0.80
TR6RJ3		48.85	-9.49	-1.56	49.20	-8.94	-1.52
UYMCE3		50.60	-7.74	-1.28	51.92	-6.22	-1.05
UZCTCG		54.85	-3.49	-0.58	57.35	-0.79	-0.13
VPBRBW		54.81	-3.53	-0.58	51.58	-6.56	-1.11
VWUVHY		54.72	-3.62	-0.60	52.49	-5.65	-0.96
X7BFHD		50.60	-7.74	-1.28	51.80	-6.34	-1.08
Y386YJ		57.66	-0.68	-0.11	60.34	2.20	0.37
YMEDDH		58.17	-0.18	-0.03	56.08	-2.06	-0.35
YP6CU2		60.75	2.41	0.40	58.60	0.46	0.08
YVQAHN		55.81	-2.53	-0.42	56.94	-1.20	-0.20
Z9QPLV		57.07	-1.28	-0.21	54.26	-3.88	-0.66

Summary Statistics	Sample SB71	Sample SB72
Grand Means	58.34 psi	58.14 psi
Std Dev Btwn Labs	6.07 psi	5.89 psi
Statistics based on 29 of 30 reporting participants.		

Comments on Assigned Data Flags for Test #310

CHWENH (X) - Inconsistent in testing between samples.



Paper & Paperboard Interlaboratory Testing Program

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Analysis 310

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

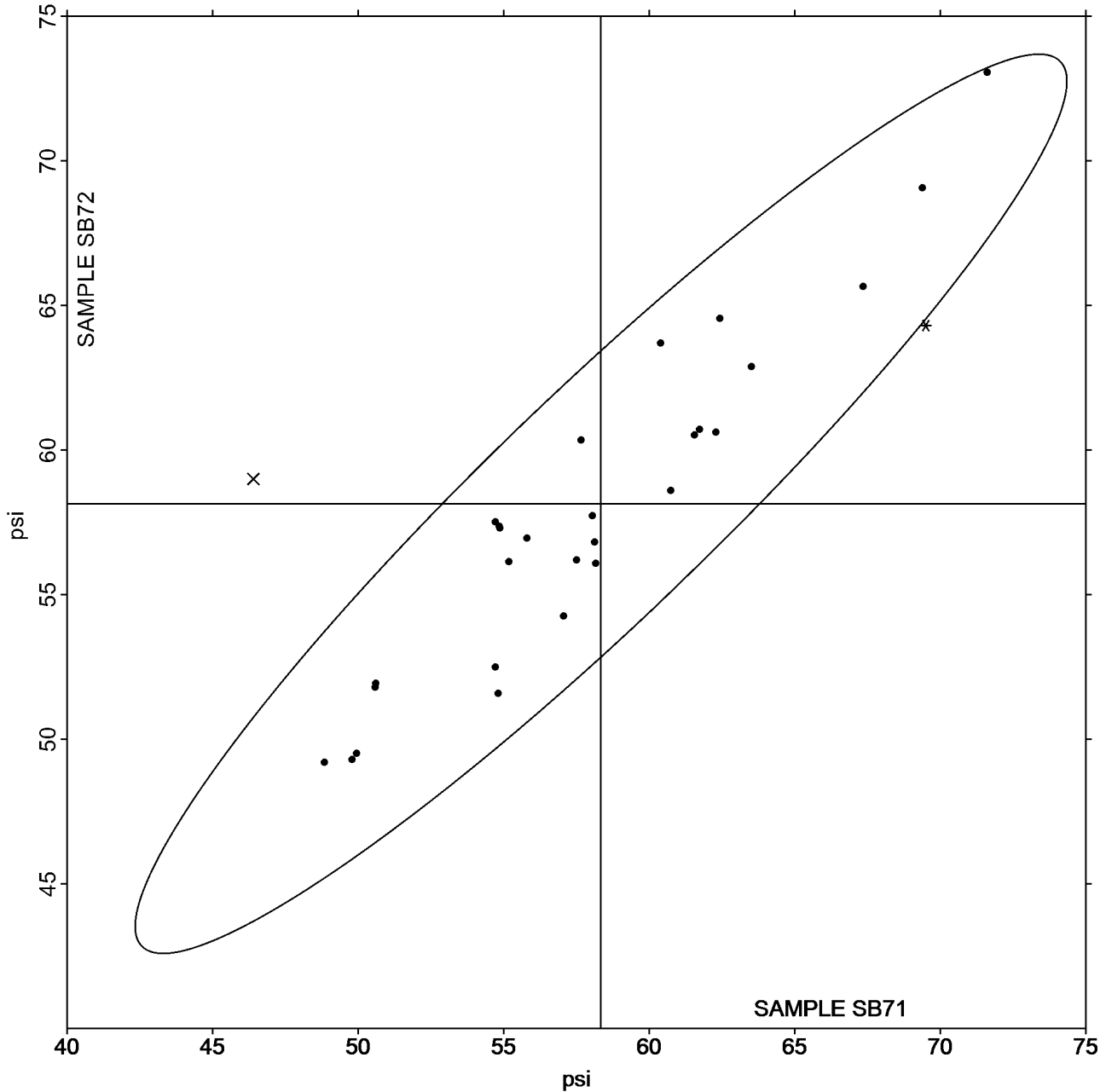
Grand Mean Sample SB71 = 58.343

psi

Grand Mean Sample SB72 = 58.139

psi

ANALYSIS 310





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

Report #3021S,
September 2019

WebCode	Data Flag	<u>Sample SK71</u>			<u>Sample SK72</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2HVRQT		21.00	-4.65	-0.69	21.29	-4.40	-0.65
LMYMRG		32.27	6.63	0.99	32.19	6.50	0.96
UEE2FQ		20.42	-5.23	-0.78	20.17	-5.52	-0.81
WX6A97		33.67	8.03	1.20	33.98	8.28	1.22
Z9QPLV		20.86	-4.78	-0.71	20.84	-4.85	-0.71

Summary Statistics	<u>Sample SK71</u>	<u>Sample SK72</u>
Grand Means	25.65 Grams	25.69 Grams
Std Dev Btwn Labs	6.71 Grams	6.79 Grams
Statistics based on 5 of 5 reporting participants.		



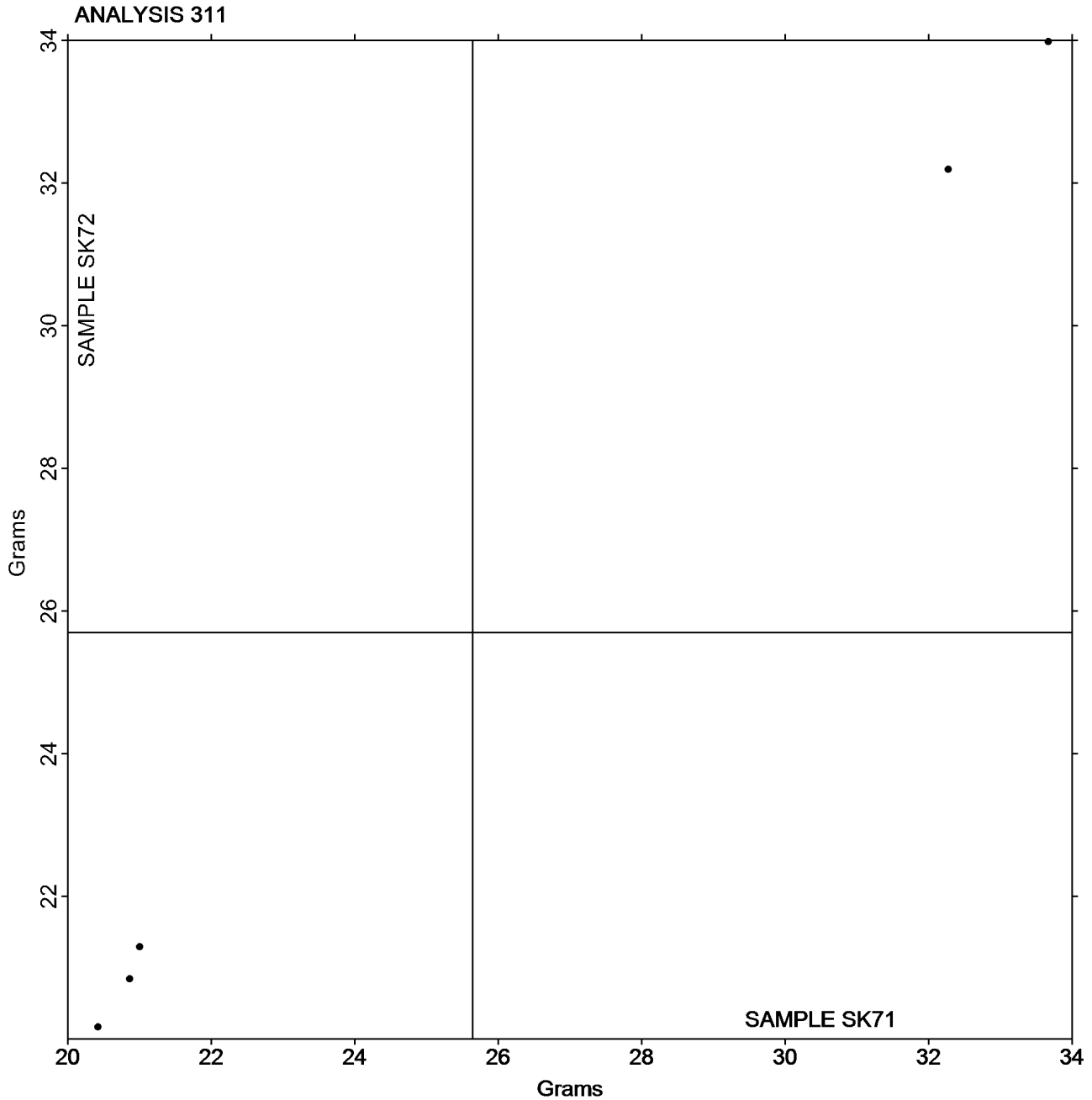
Paper & Paperboard Interlaboratory Testing Program

Report #3021S,
September 2019

Analysis 311 Tearing Strength - Newsprint TAPPI Official Test Method T414

Grand Mean Sample SK71 = 25.646
Grams

Grand Mean Sample SK72 = 25.695
Grams



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 #3021S,
September 2019

WebCode	Data Flag	Sample SC71			Sample SC72		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2A2MWR		67.80	2.43	0.75	68.40	3.12	0.85
2GKUDC	X	77.78	12.41	3.84	81.35	16.07	4.39
2QNAYA		67.32	1.95	0.60	66.42	1.14	0.31
2U78NL	*	74.85	9.49	2.93	76.57	11.28	3.08
4ZMPWD		61.06	-4.31	-1.33	60.14	-5.14	-1.40
7QBA4B		65.51	0.14	0.04	68.32	3.04	0.83
823FCY		60.30	-5.07	-1.57	59.00	-6.28	-1.72
84DZHN		67.80	2.43	0.75	65.20	-0.08	-0.02
8AKL97		69.64	4.27	1.32	69.59	4.30	1.18
8AX9QK		62.00	-3.37	-1.04	61.38	-3.90	-1.07
8GFQ38		61.10	-4.27	-1.32	64.10	-1.18	-0.32
AJGB3C		66.96	1.60	0.49	65.95	0.66	0.18
BH42P6		67.75	2.38	0.74	64.89	-0.39	-0.11
C4G9E4		65.56	0.19	0.06	65.19	-0.09	-0.03
C798UM		63.66	-1.71	-0.53	63.04	-2.24	-0.61
CHDMEX		60.16	-5.21	-1.61	58.74	-6.54	-1.79
CHWENH		71.40	6.03	1.87	74.20	8.92	2.44
CRK8V9		63.31	-2.05	-0.63	63.58	-1.70	-0.46
E4AYGN		69.54	4.17	1.29	69.47	4.19	1.14
EERKLH		66.11	0.74	0.23	66.60	1.31	0.36
EGVDKM		68.74	3.37	1.04	67.98	2.70	0.74
EREU6G		63.47	-1.90	-0.59	63.24	-2.04	-0.56
F3EKQP		65.80	0.43	0.13	67.40	2.12	0.58
FHKYQJ		67.26	1.89	0.59	64.78	-0.50	-0.14
GBWM3G		70.12	4.76	1.47	70.54	5.26	1.44
GCXDGC		62.64	-2.73	-0.84	65.38	0.10	0.03
GDMP86	X	81.62	16.25	5.02	81.51	16.23	4.43
GK9Z3K		59.84	-5.53	-1.71	60.68	-4.60	-1.26
GYNTXJ		63.00	-2.37	-0.73	63.76	-1.52	-0.42
HHGZM2	*	68.62	3.25	1.01	64.33	-0.95	-0.26
J23EEV		64.66	-0.71	-0.22	64.56	-0.72	-0.20
JBVPQC		65.71	0.35	0.11	66.15	0.87	0.24
KTQFKK		66.12	0.75	0.23	65.74	0.46	0.13
LJVWJG	X	77.06	11.70	3.62	74.46	9.18	2.51
NQ8WQP		63.50	-1.87	-0.58	62.10	-3.18	-0.87
PEUWUV		66.05	0.68	0.21	67.84	2.56	0.70
QC464B		61.93	-3.44	-1.06	62.92	-2.37	-0.65
QRVQ2Y		65.00	-0.37	-0.11	66.09	0.81	0.22
RDP993		66.92	1.56	0.48	67.14	1.86	0.51
RHLV4B		64.20	-1.17	-0.36	64.80	-0.48	-0.13



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

Report #3021S,
September 2019

WebCode	Data Flag	<u>Sample SC71</u>			<u>Sample SC72</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
RTLFWH	X	45.76	-19.61	-6.06	45.32	-19.96	-5.45
UZCTCG		64.20	-1.17	-0.36	63.35	-1.93	-0.53
V4VA3Z		58.48	-6.89	-2.13	56.58	-8.70	-2.38
VC9Y7E		65.80	0.43	0.13	67.80	2.52	0.69
VJB7QA		62.98	-2.39	-0.74	62.05	-3.23	-0.88
VWUVHY		66.81	1.45	0.45	66.36	1.08	0.30
WGCGJX		66.85	1.49	0.46	67.13	1.85	0.50
XMV7ER		65.24	-0.12	-0.04	65.42	0.14	0.04
Y386YJ		66.24	0.87	0.27	62.55	-2.73	-0.75
Z9QPLV		64.78	-0.58	-0.18	65.54	0.26	0.07

Summary Statistics	<u>Sample SC71</u>	<u>Sample SC72</u>
Grand Means	65.37 Grams	65.28 Grams
Std Dev Btwn Labs	3.24 Grams	3.66 Grams
Statistics based on 46 of 50 reporting participants.		

Comments on Assigned Data Flags for Test #312

- 2GKUUDC (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample SC71.
- LJWWJG (X) - Data for sample SC71 are high.
- GDMP86 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample SC71.
- RTLFWH (X) - Extreme Data.

Analysis Notes:

GBWM3G - One determination removed from the Lab Mean of Sample SC72 per Grubb's Test at 1% risk (TAPPI 1205).



Paper & Paperboard Interlaboratory Testing Program

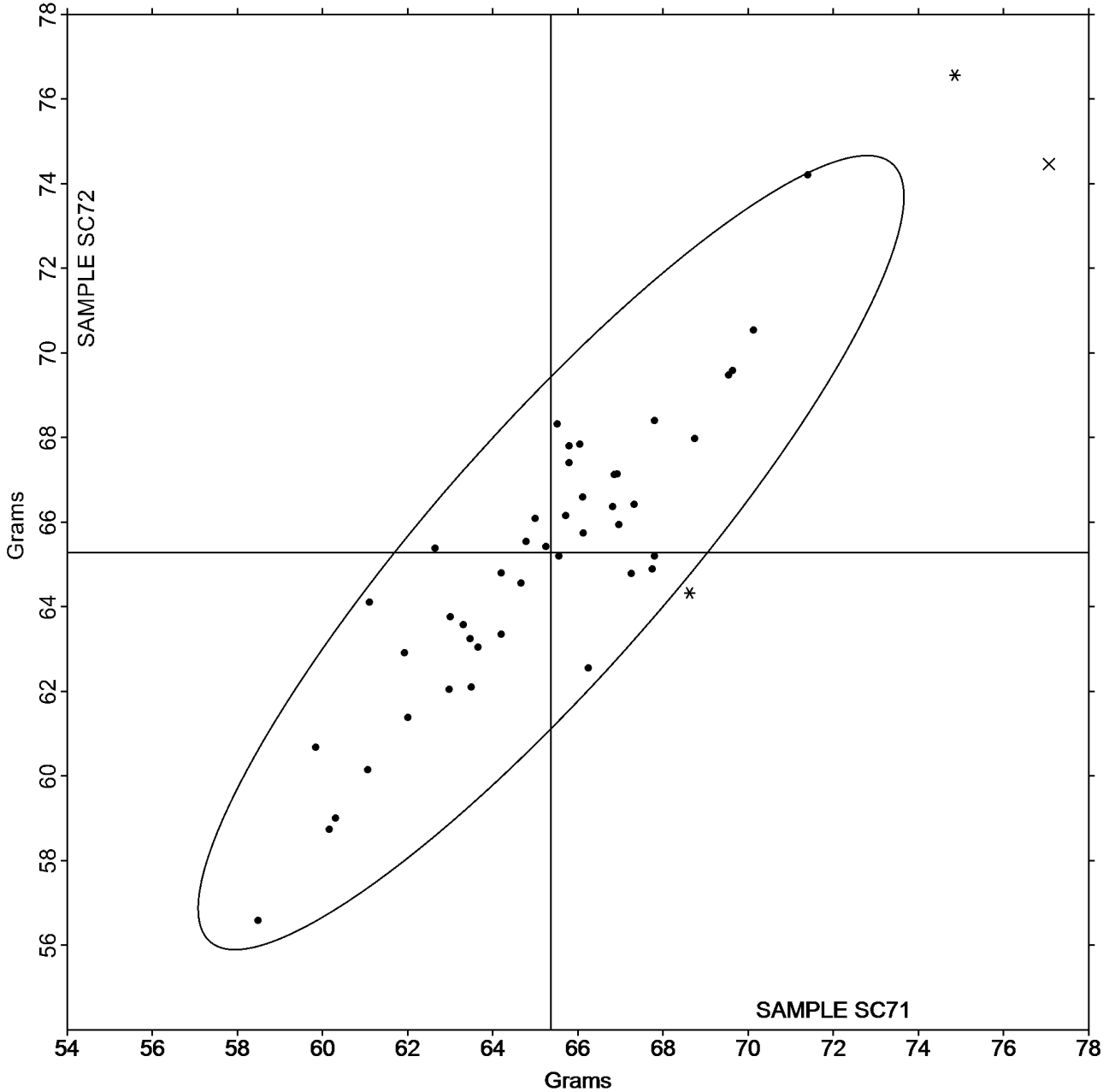
Report #3021S,
September 2019

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

Grand Mean Sample SC71 = 65.365
Grams

Grand Mean Sample SC72 = 65.282
Grams

ANALYSIS 312





Paper & Paperboard Interlaboratory Testing Program

Report #3021S,
September 2019

Analysis 314

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample SD71			Sample SD72		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29P2XQ		226.0	40.1	1.86	245.0	26.1	1.16
2GLRM8		156.4	-29.5	-1.36	195.2	-23.8	-1.06
3RUW6M		214.6	28.7	1.33	253.0	34.0	1.52
4WKT8J	*	215.3	29.4	1.36	277.7	58.7	2.62
6CVUGE	M	171.8	-14.0	-0.65	No data reported for this sample		
6NNA7F	X	817.9	632.0	29.25	870.4	651.4	29.05
7XVAJM		205.4	19.5	0.90	244.4	25.4	1.13
7ZEEZX		175.5	-10.4	-0.48	223.8	4.8	0.22
84XU4X		195.4	9.5	0.44	245.6	26.6	1.19
9KF4GJ		179.3	-6.6	-0.30	204.8	-14.2	-0.63
9W8QME		202.0	16.1	0.75	225.1	6.1	0.27
A64XUR	X	389.3	203.4	9.41	419.0	200.0	8.92
A83EZU		197.3	11.4	0.53	224.1	5.1	0.23
AMXQEP		166.9	-19.0	-0.88	199.2	-19.8	-0.88
AX2Q9W		188.0	2.1	0.10	217.2	-1.7	-0.08
B6F2TB		175.6	-10.3	-0.48	218.8	-0.2	-0.01
CAFZG7		167.9	-18.0	-0.83	202.6	-16.3	-0.73
CALC3G		138.6	-47.3	-2.19	177.3	-41.7	-1.86
CHWENH	*	240.4	54.5	2.52	247.2	28.2	1.26
EREU6G		167.6	-18.3	-0.85	193.8	-25.2	-1.12
ERFKJC		180.7	-5.2	-0.24	201.3	-17.7	-0.79
G4DJVE		157.3	-28.6	-1.32	188.0	-31.0	-1.38
GNRU7D		191.8	5.9	0.27	220.6	1.6	0.07
KQZG42		185.3	-0.5	-0.02	228.3	9.3	0.41
LPPX6		181.1	-4.8	-0.22	217.8	-1.2	-0.05
M76HYE		178.6	-7.3	-0.34	211.7	-7.3	-0.33
MH6X3X		220.1	34.2	1.58	258.0	39.0	1.74
MN9UUA		188.0	2.2	0.10	241.0	22.0	0.98
MTYBZ9		178.8	-7.1	-0.33	205.6	-13.4	-0.60
NBHKG4		208.5	22.7	1.05	233.9	14.9	0.67
NQ8WQP		194.3	8.4	0.39	216.9	-2.1	-0.09
Q3VH4X		173.9	-11.9	-0.55	219.4	0.5	0.02
QTC2J4		165.3	-20.6	-0.95	212.7	-6.3	-0.28
RTLFW		147.3	-38.6	-1.79	167.1	-51.9	-2.31
TFAMAG		194.7	8.8	0.41	235.4	16.4	0.73
TR6RJ3		192.9	7.0	0.32	228.0	9.0	0.40
VPBRBW		171.6	-14.3	-0.66	203.0	-16.0	-0.71
YMEDDH		201.4	15.5	0.72	224.9	5.9	0.26
YP6CU2		172.5	-13.4	-0.62	205.3	-13.7	-0.61
YVQAHN		157.2	-28.7	-1.33	189.1	-29.8	-1.33



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

Report #3021S,
September 2019

WebCode	Data Flag	<u>Sample SD71</u>			<u>Sample SD72</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
Z9QPLV		192.5	6.6	0.31	219.4	0.4	0.02
ZQ64YK		201.9	16.0	0.74	219.1	0.1	0.01
ZQPM4Q		187.2	1.3	0.06	218.0	-1.0	-0.05

Summary Statistics	<u>Sample SD71</u>	<u>Sample SD72</u>
Grand Means	185.87 Grams	218.98 Grams
Std Dev Btwn Labs	21.61 Grams	22.42 Grams
Statistics based on 40 of 43 reporting participants.		

Comments on Assigned Data Flags for Test #314

- 6NNA7F (X) - Extreme Data.
- 6CVUGE (M) - Participant did not submit data for sample .
- A64XUR (X) - Extreme Data.

Analysis Notes:

- 6NNA7F - Data possibly off by a factor of 4.



Paper & Paperboard Interlaboratory Testing Program

Report #3021S,
September 2019

Analysis 314

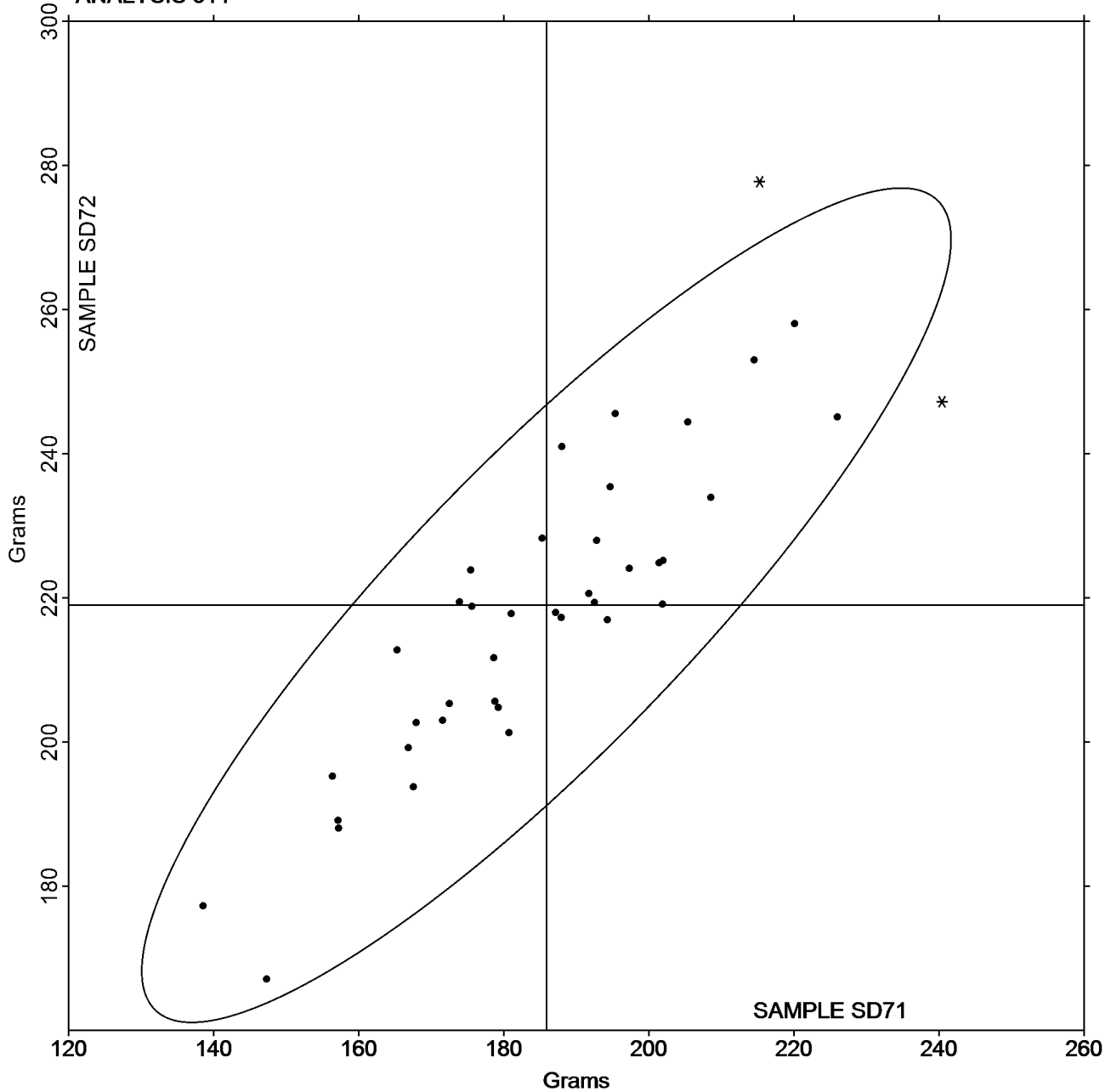
Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

Grand Mean Sample SD71 = 185.87
Grams

Grand Mean Sample SD72 = 218.98
Grams

ANALYSIS 314





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

Report #3021S,
September 2019

WebCode	Data Flag	<u>Sample SR71</u>			<u>Sample SR72</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2HVRQT	X	20.356	18.234	396.01	22.446	20.354	433.26
AB4JDE		2.052	-0.071	-1.54	2.081	-0.011	-0.24
DBX4WJ		2.176	0.054	1.16	2.139	0.047	1.00
EREU6G		2.176	0.054	1.16	2.089	-0.003	-0.07
GCXDGC		2.122	-0.001	-0.01	2.049	-0.043	-0.92
LMYMRG		2.062	-0.060	-1.31	2.023	-0.069	-1.47
PEUWUV		2.111	-0.011	-0.25	2.103	0.011	0.23
QC464B		2.101	-0.021	-0.47	2.076	-0.016	-0.34
UEE2FQ		2.164	0.042	0.90	2.183	0.091	1.94
WX6A97		2.139	0.016	0.35	2.086	-0.006	-0.12

Summary Statistics	<u>Sample SR71</u>	<u>Sample SR72</u>
Grand Means	2.12 kN/m	2.09 kN/m
Std Dev Btwn Labs	0.05 kN/m	0.05 kN/m

Statistics based on 9 of 10 reporting participants.

Comments on Assigned Data Flags for Test #320

2HVRQT (X) - Extreme Data.

Analysis Notes:

2HVRQT - Data possibly off by a factor of 10.



Paper & Paperboard Interlaboratory Testing Program

Report #3021S,
September 2019

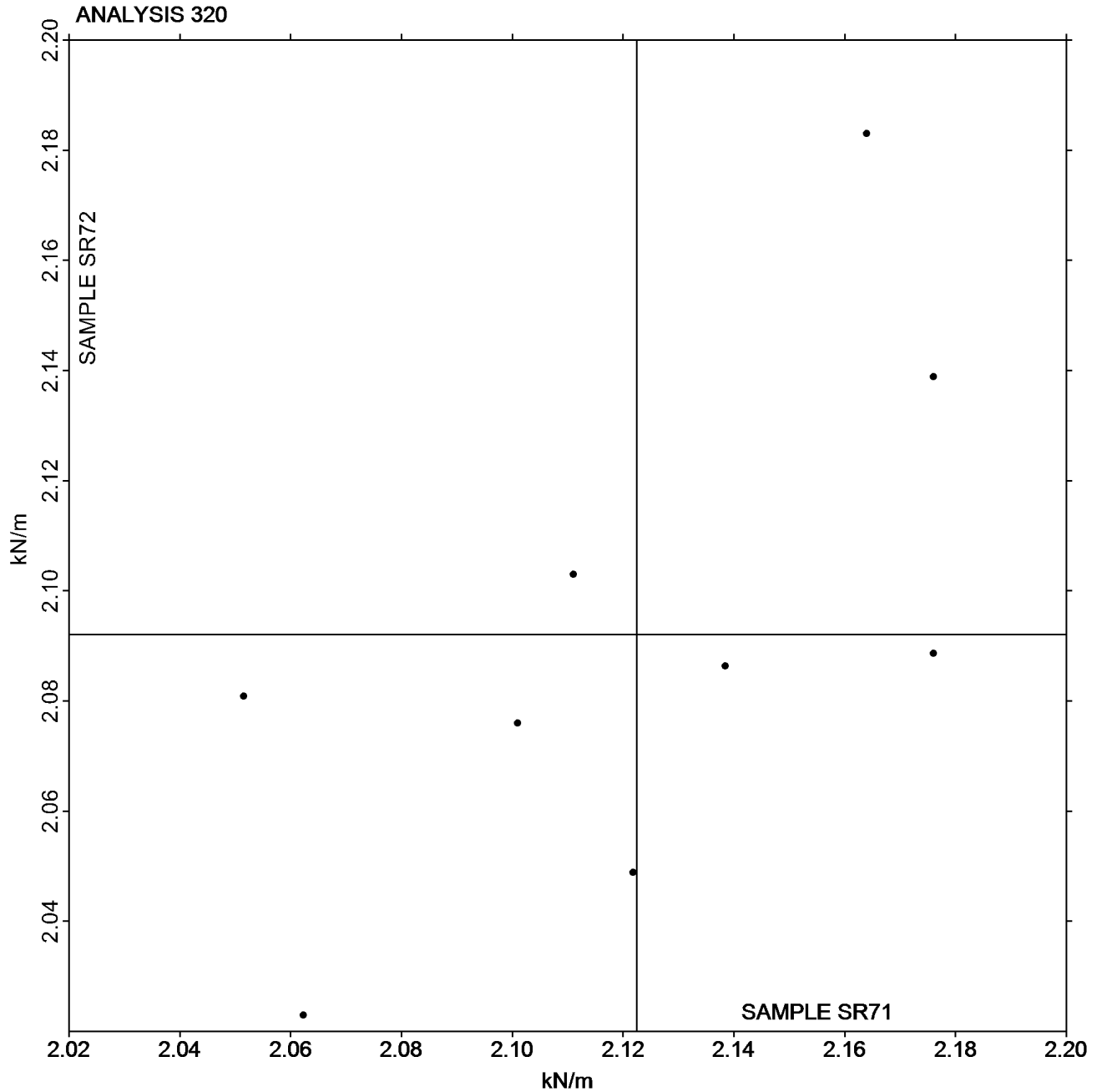
Analysis 320

Tensile Breaking Strength - Newsprint

TAPPI Official Test Method T494

Grand Mean Sample SR71 = 2.1225
kN/m

Grand Mean Sample SR72 = 2.0920
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 #3021S,
September 2019

WebCode	Data Flag	<u>Sample SR71</u>			<u>Sample SR72</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2HVRQT		14.64	0.94	0.63	14.07	0.78	0.55
AB4JDE		12.88	-0.82	-0.55	13.32	0.03	0.02
DBX4WJ		14.63	0.92	0.62	14.49	1.20	0.85
EREU6G		15.00	1.30	0.87	12.61	-0.68	-0.48
GCXDGC		15.59	1.88	1.26	15.60	2.31	1.63
LMYMRG		11.30	-2.40	-1.61	11.06	-2.23	-1.57
PEUWUV		14.67	0.97	0.65	13.71	0.42	0.30
QC464B		12.12	-1.58	-1.06	12.14	-1.15	-0.82
UEE2FQ		14.21	0.51	0.34	14.26	0.97	0.69
WX6A97		11.99	-1.72	-1.15	11.63	-1.66	-1.17

Summary Statistics	<u>Sample SR71</u>	<u>Sample SR72</u>
Grand Means	13.70 Joules/sq m	13.29 Joules/sq m
Std Dev Btwn Labs	1.49 Joules/sq m	1.42 Joules/sq m
Statistics based on 10 of 10 reporting participants.		

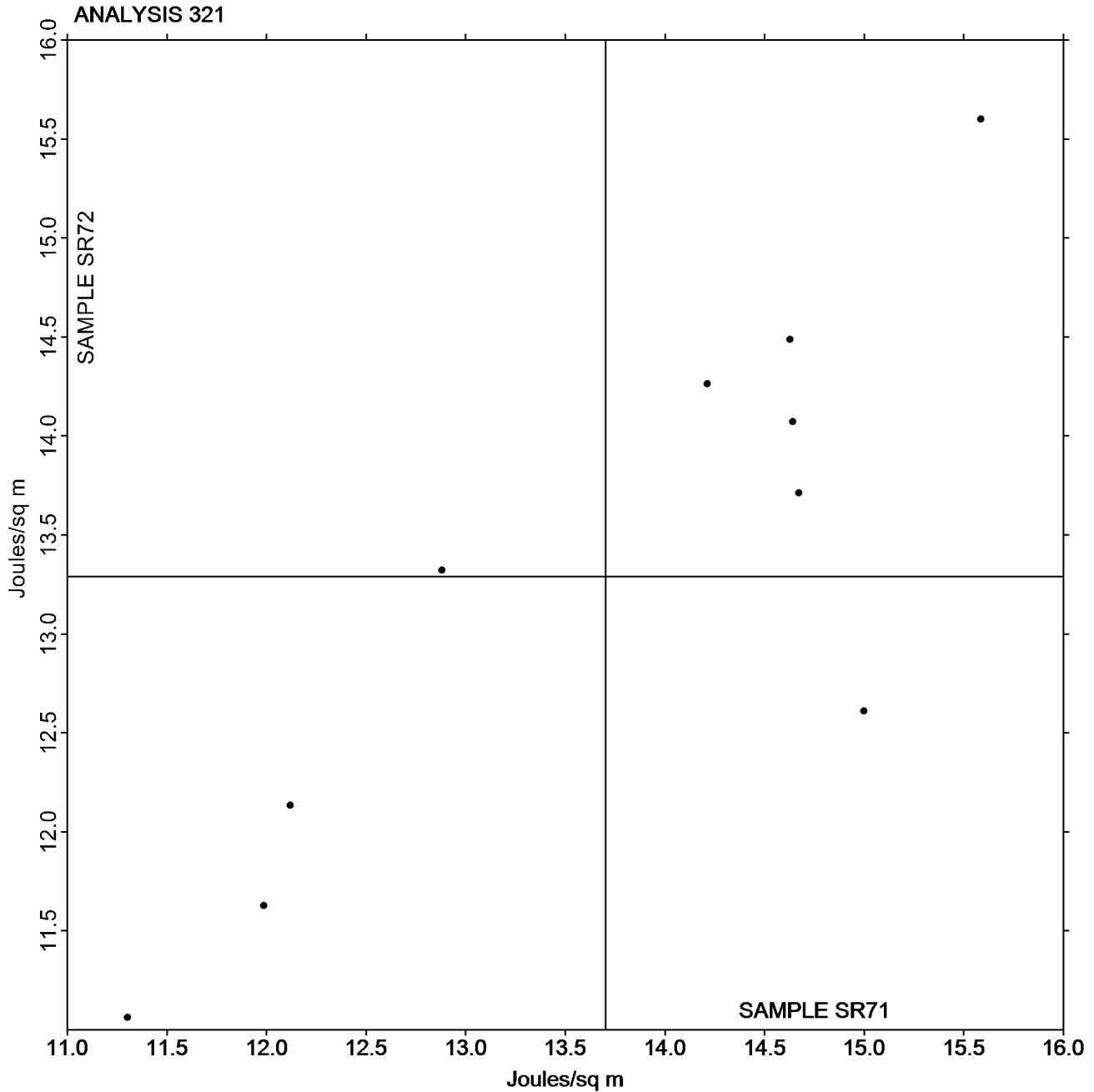


Paper & Paperboard Interlaboratory Testing Program
Analysis 321
Tensile Energy Absorption - Newsprint
TAPPI Official Test Method T494

Report #3021S,
September 2019

Grand Mean Sample SR71 = 13.703
Joules/sq m

Grand Mean Sample SR72 = 13.289
Joules/sq m



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



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

Report #3021S,
September 2019

WebCode	Data Flag	<u>Sample SR71</u>			<u>Sample SR72</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2HVRQT		1.420	0.284	1.72	1.258	0.166	1.21
AB4JDE		1.067	-0.070	-0.42	1.082	-0.010	-0.08
DBX4WJ		1.139	0.002	0.01	1.140	0.048	0.35
EREU6G		1.000	-0.136	-0.83	0.899	-0.193	-1.40
GCXDGC		1.122	-0.014	-0.09	1.069	-0.023	-0.17
PEUWUV		1.137	0.001	0.00	1.084	-0.008	-0.06
QC464B		0.982	-0.154	-0.94	0.986	-0.106	-0.77
UEE2FQ		1.386	0.250	1.52	1.334	0.242	1.76
WX6A97		0.975	-0.161	-0.98	0.976	-0.116	-0.84

Summary Statistics	<u>Sample SR71</u>	<u>Sample SR72</u>
Grand Means	1.14 Percent	1.09 Percent
Stnd Dev Btwn Labs	0.16 Percent	0.14 Percent
Statistics based on 9 of 9 reporting participants.		



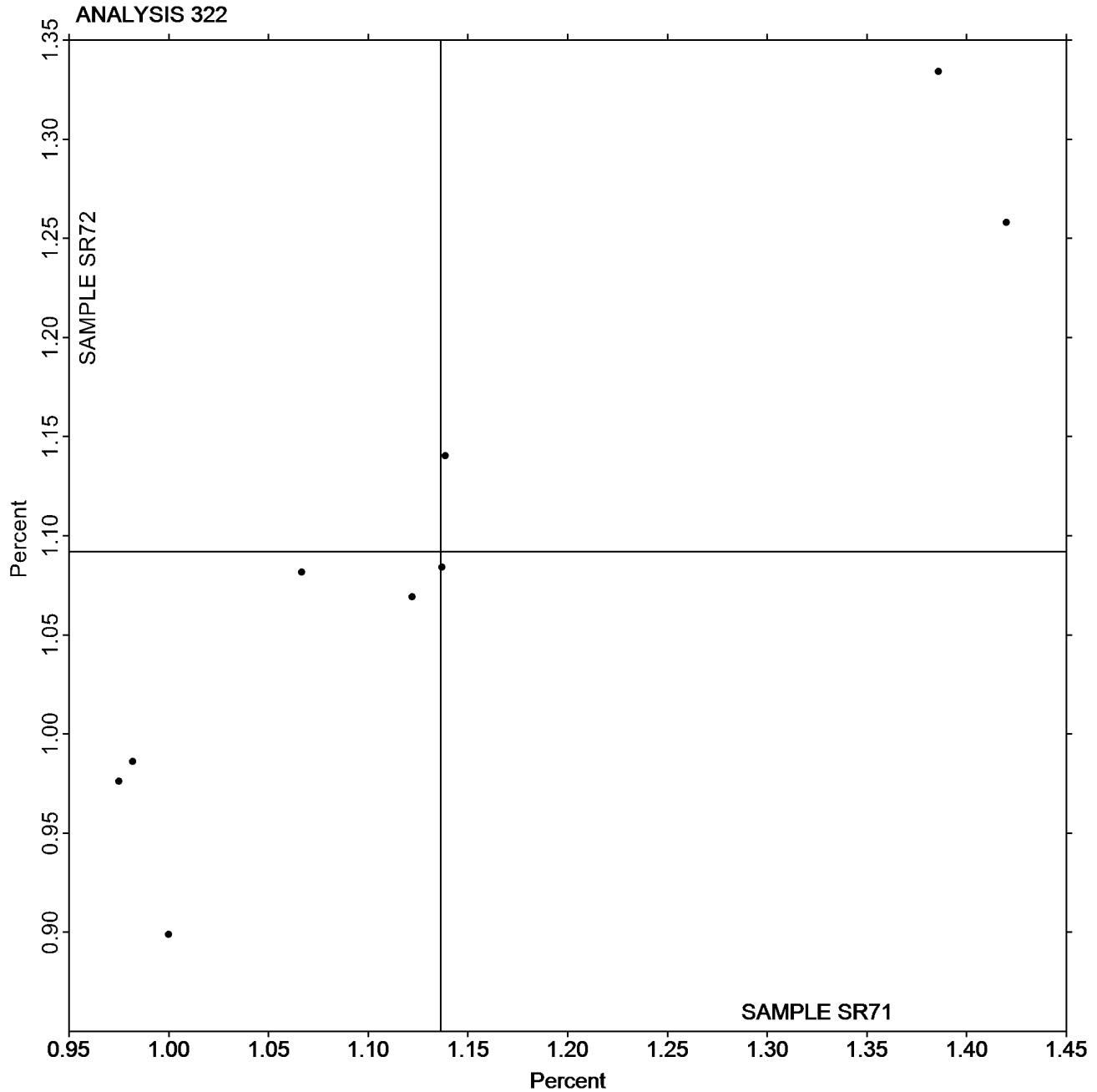
Paper & Paperboard Interlaboratory Testing Program

Report #3021S,
September 2019

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

Grand Mean Sample SR71 = 1.1364
Percent

Grand Mean Sample SR72 = 1.0920
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 #3021S,
September 2019**

Analysis 325

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF71			Sample SF72			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2GKUDC	*	7.703	0.944	2.58	7.794	1.050	2.71	LB
2U78NL		6.762	0.004	0.01	6.652	-0.092	-0.24	XX
4ZMPWD		6.925	0.166	0.45	6.676	-0.068	-0.18	TJ
7QBA4B		7.142	0.384	1.05	7.028	0.284	0.73	TP
823FCY		6.518	-0.240	-0.66	6.606	-0.138	-0.36	TB
84DZHN		7.277	0.518	1.41	7.473	0.729	1.88	XX
8AX9QK		6.814	0.056	0.15	7.017	0.273	0.71	TO
8GFQ38		6.618	-0.141	-0.38	6.761	0.017	0.04	TO
AJGB3C		6.188	-0.571	-1.56	6.086	-0.658	-1.70	LA
BH42P6		6.825	0.066	0.18	6.709	-0.035	-0.09	VM
C4G9E4		6.782	0.023	0.06	6.774	0.030	0.08	LH
CHDMEX		7.256	0.497	1.35	7.236	0.492	1.27	TO
CRK8V9		6.520	-0.239	-0.65	6.470	-0.273	-0.71	LH
E4AYGN		6.545	-0.214	-0.58	6.950	0.206	0.53	LH
EGVDKM		6.074	-0.685	-1.87	6.010	-0.734	-1.89	ID
EQ4RHH		6.322	-0.437	-1.19	6.242	-0.502	-1.29	DL
F3EKQP		6.674	-0.085	-0.23	6.650	-0.093	-0.24	LX
FUHUZ8		6.728	-0.031	-0.08	6.964	0.220	0.57	LX
GBWM3G		6.226	-0.533	-1.45	6.392	-0.352	-0.91	TO
GDMP86		6.989	0.231	0.63	7.159	0.415	1.07	LA
GK9Z3K		7.291	0.532	1.45	7.320	0.576	1.49	LH
GYNTXJ		6.596	-0.163	-0.44	6.459	-0.285	-0.73	TB
HHGZM2	*	5.844	-0.915	-2.49	5.577	-1.167	-3.01	IM
J23EEV		6.850	0.091	0.25	6.758	0.014	0.04	LE
KTQFKK		6.969	0.211	0.57	6.808	0.064	0.16	TF
L6HLT9		7.029	0.270	0.74	6.873	0.129	0.33	FP
LJVWJG		6.390	-0.368	-1.00	6.562	-0.182	-0.47	XX
PHT9QV		6.727	-0.032	-0.09	6.366	-0.378	-0.97	XX
Q4P7QZ		7.242	0.483	1.32	7.052	0.308	0.79	LH
QC464B		6.333	-0.426	-1.16	6.646	-0.098	-0.25	LH
QRVQ2Y		6.977	0.218	0.60	7.124	0.380	0.98	LI
RDP993		7.330	0.571	1.56	7.185	0.441	1.14	LF
RHLV4B		7.093	0.335	0.91	6.904	0.160	0.41	TC
RJGJHZ		6.887	0.128	0.35	6.654	-0.090	-0.23	RE
RTLFWH		6.964	0.205	0.56	6.919	0.175	0.45	TM
UZCTCG		6.656	-0.102	-0.28	6.460	-0.284	-0.73	TF
V4VA3Z		6.607	-0.152	-0.41	6.688	-0.056	-0.14	TF
VC9Y7E		6.623	-0.136	-0.37	6.706	-0.038	-0.10	LH
VJB7QA		6.747	-0.012	-0.03	6.732	-0.012	-0.03	LI
VLALXC		6.602	-0.156	-0.43	6.313	-0.431	-1.11	XX



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

Report #3021S,
September 2019

WebCode	Data Flag	Sample SF71			Sample SF72			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
VWUVHY		6.668	-0.091	-0.25	6.851	0.107	0.28	LH
WGCGJX		7.131	0.372	1.02	6.969	0.225	0.58	LI
XMV7ER		6.348	-0.411	-1.12	6.578	-0.166	-0.43	DM
Z9QPLV		6.819	0.060	0.16	6.717	-0.027	-0.07	LH
ZQ64YK		6.529	-0.230	-0.63	6.604	-0.140	-0.36	XX

Summary Statistics	Sample SF71	Sample SF72
Grand Means	6.76 kN/m	6.74 kN/m
Std Dev Btwn Labs	0.37 kN/m	0.39 kN/m

Statistics based on 45 of 45 reporting participants.

Analysis Notes:

CRK8V9 - One determination removed from the Lab Mean of Sample SF71 per Grubb's Test at 1% risk (TAPPI 1205).

Key to Instrument Codes Reported by Participants

DL	EMIC DL500 Universal Testing Machines	DM	IDM Horizontal Tensile Tester
FP	Frank PTI Universal Tester TS	ID	Instron 4200 Series
IM	Instron 5500 Series	LA	L & W Tensile - Autoline 300
LB	L & W Tensile - Autoline 400	LE	L & W Tensile Tester 066
LF	L & W Tensile/Fracture Toughness Tester SE 064	LH	L & W Alwetron TH1 (Horizontal) SE 060/065F
LI	L & W Tensile Tester SE 062	LX	L & W (model not specified)
RE	Regmed	TB	Thwing-Albert EJA/1000
TC	Thwing-Albert Electro-Hydraulic, Model 30LT	TF	Thwing-Albert EJA Vantage-1
TJ	Thwing-Albert QC II-XS	TM	TMI Horizontal Tensile Tester
TO	Thwing-Albert QC-1000	TP	TMI Monitor/Tensile 100 (84-21-01)
VM	Valmet PaperLab (was Kajaani/Robotest)	XX	Instrument make/model not specified by lab

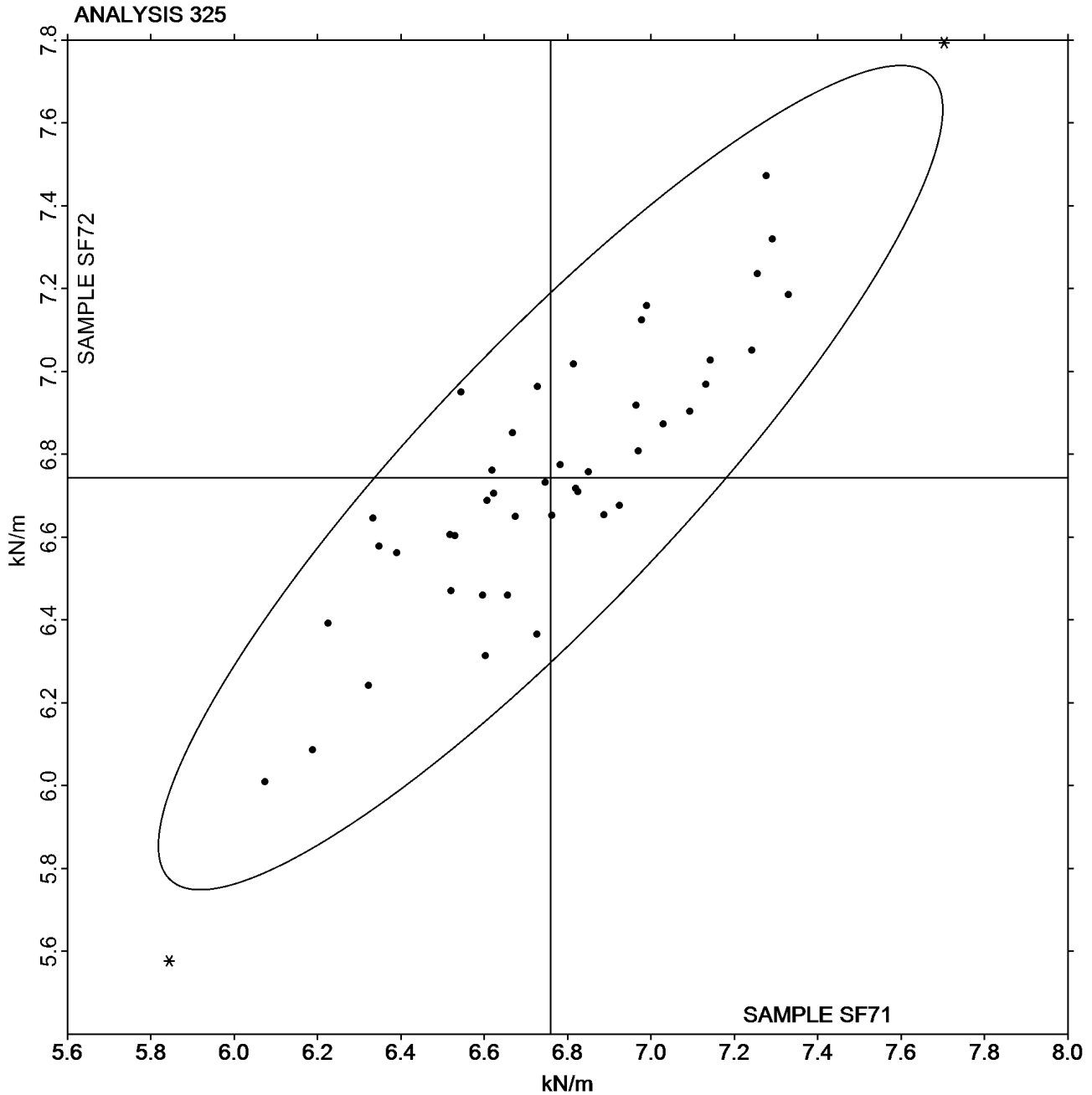


Paper & Paperboard Interlaboratory Testing Program
Analysis 325
Tensile Breaking Strength - Printing Papers
TAPPI Official Test Method T494

Report #3021S,
September 2019

Grand Mean Sample SF71 = 6.7586
kN/m

Grand Mean Sample SF72 = 6.7439
kN/m





Paper & Paperboard Interlaboratory Testing Program

**Report #3021S,
September 2019**

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	<u>Sample SF71</u>			<u>Sample SF72</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2U78NL		75.54	-19.67	-1.80	74.90	-20.45	-1.89	XX
7QBA4B		91.92	-3.29	-0.30	93.80	-1.55	-0.14	TP
8AX9QK		95.88	0.67	0.06	104.93	9.58	0.88	TO
8GFQ38		88.72	-6.49	-0.59	95.35	0.00	0.00	TO
AJGB3C		72.41	-22.80	-2.08	67.95	-27.40	-2.53	LA
C4G9E4		91.47	-3.74	-0.34	91.93	-3.42	-0.32	LH
CHDMEX		111.35	16.14	1.48	110.18	14.83	1.37	TO
CRK8V9		91.58	-3.63	-0.33	94.93	-0.42	-0.04	LH
E4AYGN		87.09	-8.12	-0.74	97.18	1.83	0.17	LH
EGVDKM		86.95	-8.26	-0.76	87.48	-7.87	-0.73	ID
EQ4RHH		100.88	5.67	0.52	95.83	0.48	0.04	DL
F3EKQP		94.13	-1.08	-0.10	93.87	-1.48	-0.14	LX
FUHUZ8		92.87	-2.34	-0.21	98.17	2.82	0.26	LX
GBWM3G		106.10	10.89	1.00	110.91	15.56	1.44	TO
GDMP86		103.14	7.93	0.73	104.98	9.63	0.89	LA
GK9Z3K		97.78	2.57	0.23	100.04	4.69	0.43	LH
GYNTXJ		105.78	10.57	0.97	103.11	7.76	0.72	TB
HHGZM2	*	74.82	-20.39	-1.86	67.71	-27.64	-2.55	IM
KTQFKK		121.12	25.91	2.37	114.74	19.39	1.79	TF
L6HLT9		108.73	13.52	1.24	107.48	12.13	1.12	FP
LJVWJG		89.03	-6.18	-0.56	96.45	1.10	0.10	XX
PHT9QV	*	114.88	19.67	1.80	101.85	6.50	0.60	XX
Q4P7QZ		98.11	2.90	0.27	99.13	3.77	0.35	LH
QC464B		83.75	-11.46	-1.05	91.08	-4.27	-0.39	LH
QRVQ2Y		90.03	-5.18	-0.47	91.40	-3.96	-0.36	LI
RDP993		105.19	9.98	0.91	103.73	8.38	0.77	LF
RJGJHZ		89.11	-6.10	-0.56	80.07	-15.29	-1.41	RE
RTLFWH		100.78	5.57	0.51	97.39	2.04	0.19	TM
UZCTCG		98.31	3.10	0.28	92.74	-2.61	-0.24	TF
VJB7QA		83.20	-12.01	-1.10	85.52	-9.83	-0.91	LI
VWUVHY		99.61	4.40	0.40	101.02	5.67	0.52	LH
WGCGJX		97.75	2.53	0.23	94.85	-0.50	-0.05	LI
Z9QPLV		91.58	-3.63	-0.33	89.67	-5.68	-0.52	LH
ZQ64YK		97.56	2.35	0.21	101.54	6.19	0.57	XX

Summary Statistics	<u>Sample SF71</u>	<u>Sample SF72</u>
Grand Means	95.21 Joules/sq m	95.35 Joules/sq m
Std Dev Btwn Labs	10.94 Joules/sq m	10.85 Joules/sq m
Statistics based on 34 of 34 reporting participants.		



Analysis Notes:

FUHUZ8 - Data appear to be reported as J/sq m, not ft-lb/sq ft as indicated on data entry form. CTS will not correct the Units going forward.

Key to Instrument Codes Reported by Participants

DL	EMIC DL500 Universal Testing Machines	FP	Frank PTI Universal Tester TS
ID	Instron 4200 Series	IM	Instron 5500 Series
LA	L & W Tensile - Autoline 300	LF	L & W Tensile/Fracture Toughness Tester SE 064
LH	L & W Alwetron TH1 (Horizontal) SE 060/065F	LI	L & W Tensile Tester SE 062
LX	L & W (model not specified)	RE	Regmed
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TM	TMI Horizontal Tensile Tester	TO	Thwing-Albert QC-1000
TP	TMI Monitor/Tensile 100 (84-21-01)	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program

Report #3021S,
September 2019

Analysis 327

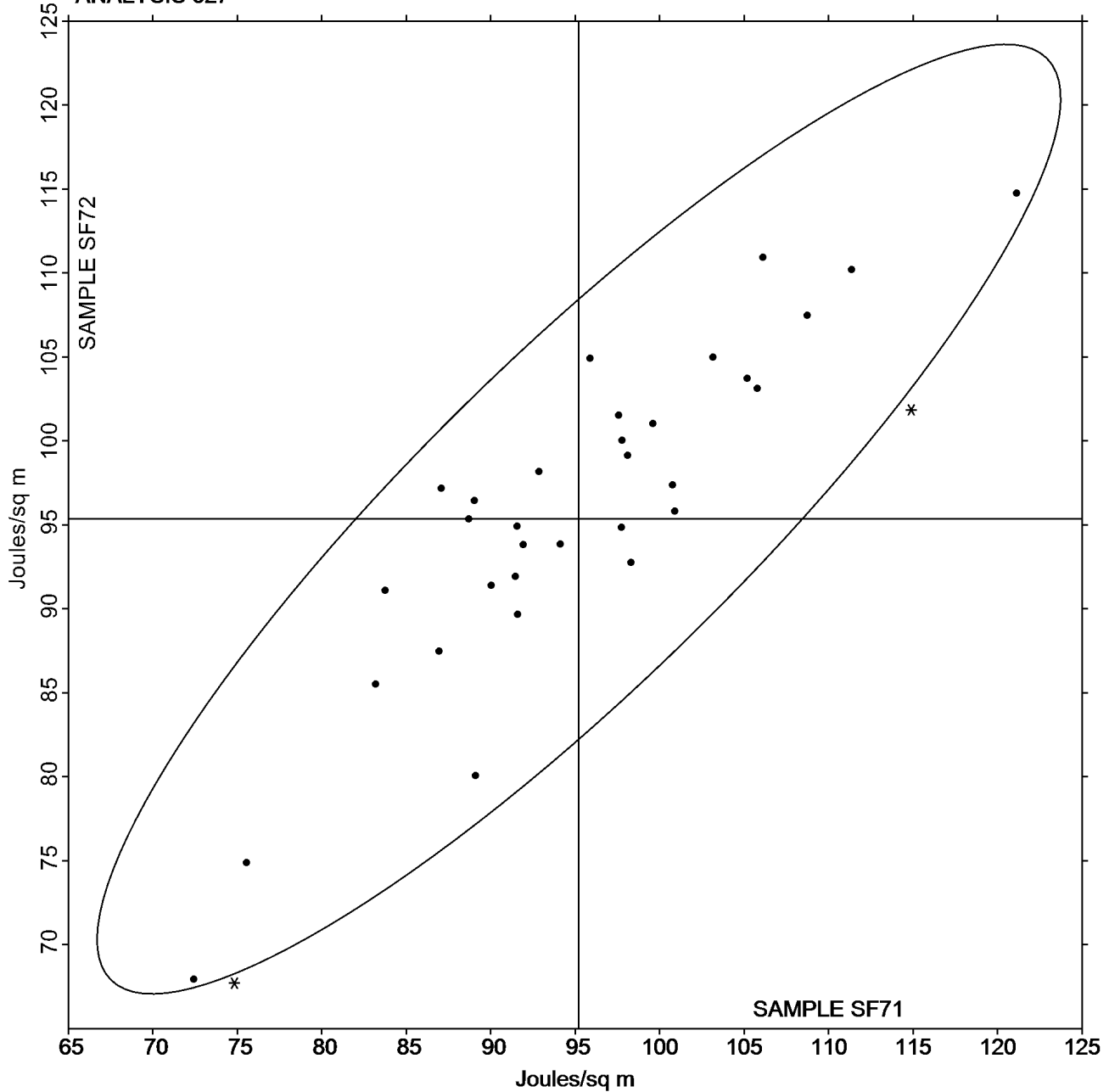
Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

Grand Mean Sample SF71 = 95.210
Joules/sq m

Grand Mean Sample SF72 = 95.350
Joules/sq m

ANALYSIS 327





Paper & Paperboard Interlaboratory Testing Program

**Report #3021S,
September 2019**

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF71			Sample SF72			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2U78NL		2.153	-0.063	-0.28	2.129	-0.095	-0.42	XX
7QBA4B		2.126	-0.090	-0.40	2.165	-0.059	-0.26	TP
823FCY		2.174	-0.042	-0.19	2.347	0.123	0.55	TF
8AX9QK		2.034	-0.182	-0.80	2.143	-0.081	-0.36	TO
8GFQ38		2.023	-0.193	-0.85	2.125	-0.099	-0.44	TO
AJGB3C		2.108	-0.108	-0.48	2.018	-0.206	-0.91	LA
BH42P6		2.360	0.144	0.63	2.240	0.016	0.07	VM
C4G9E4		2.054	-0.162	-0.71	2.065	-0.159	-0.70	LH
CHDMEX		2.441	0.225	0.99	2.404	0.180	0.80	TO
CRK8V9		2.205	-0.011	-0.05	2.295	0.071	0.32	LH
E4AYGN		2.008	-0.208	-0.92	2.118	-0.106	-0.47	LH
EGVDKM		2.231	0.015	0.07	2.262	0.039	0.17	ID
EQ4RHH		2.561	0.345	1.52	2.467	0.243	1.08	DL
F3EKQP		2.141	-0.075	-0.33	2.138	-0.086	-0.38	LX
FUHUZ8		2.434	0.218	0.96	2.507	0.283	1.25	LX
GBWM3G	*	2.851	0.635	2.79	2.919	0.695	3.08	TO
GDMP86		2.083	-0.133	-0.59	2.074	-0.150	-0.66	XX
GK9Z3K		2.049	-0.167	-0.74	2.089	-0.135	-0.60	LH
GYNTXJ		2.494	0.278	1.22	2.482	0.259	1.15	TB
HHGZM2		2.038	-0.178	-0.78	1.961	-0.262	-1.16	IM
KTQFKK	*	2.863	0.647	2.84	2.787	0.563	2.49	TF
L6HLT9		2.398	0.182	0.80	2.454	0.230	1.02	FP
LJVWJG		2.140	-0.076	-0.34	2.236	0.012	0.05	XX
PHT9QV		2.281	0.065	0.28	2.135	-0.089	-0.39	XX
Q4P7QZ		2.055	-0.161	-0.71	2.137	-0.087	-0.38	LH
QC464B		1.994	-0.222	-0.98	2.074	-0.150	-0.66	LH
QRVQ2Y		2.009	-0.207	-0.91	1.986	-0.238	-1.05	LI
RDP993		2.207	-0.009	-0.04	2.193	-0.031	-0.14	LF
RJGJHZ		2.110	-0.106	-0.47	1.949	-0.274	-1.21	RE
RTLFWH		2.304	0.088	0.39	2.262	0.038	0.17	TM
UZCTCG		2.367	0.151	0.66	2.292	0.068	0.30	TF
V4VA3Z		2.094	-0.122	-0.54	2.175	-0.049	-0.22	TF
VJB7QA		1.954	-0.262	-1.15	1.999	-0.225	-0.99	LI
VWUVHY		2.254	0.038	0.17	2.226	0.002	0.01	LH
WGCGJX		1.908	-0.308	-1.36	1.892	-0.332	-1.47	LI
Z9QPLV		2.034	-0.182	-0.80	1.985	-0.239	-1.06	LH
ZQ64YK		2.460	0.244	1.07	2.542	0.318	1.41	XX



Paper & Paperboard Interlaboratory Testing Program

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Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SF71	Sample SF72
Grand Means	2.22 Percent	2.22 Percent
Stnd Dev Btwn Labs	0.23 Percent	0.23 Percent

Statistics based on 37 of 37 reporting participants.

Key to Instrument Codes Reported by Participants

DL	EMIC DL500 Universal Testing Machines	FP	Frank PTI Universal Tester TS
ID	Instron 4200 Series	IM	Instron 5500 Series
LA	L & W Tensile - Autoline 300	LF	L & W Tensile/Fracture Toughness Tester SE 064
LH	L & W Alwetron TH1 (Horizontal) SE 060/065F	LI	L & W Tensile Tester SE 062
LX	L & W (model not specified)	RE	Regmed
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TM	TMI Horizontal Tensile Tester	TO	Thwing-Albert QC-1000
TP	TMI Monitor/Tensile 100 (84-21-01)	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		



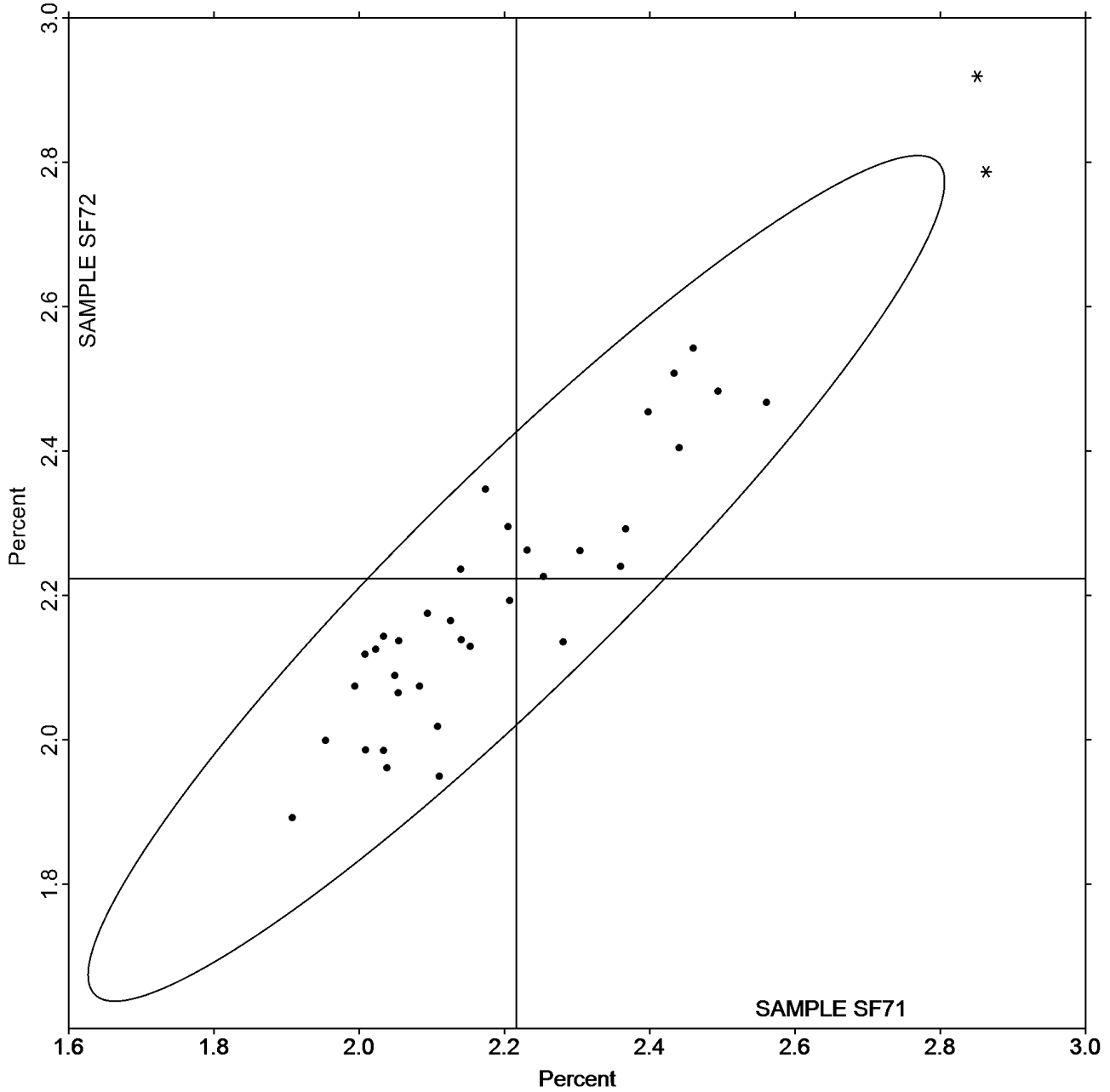
Paper & Paperboard Interlaboratory Testing Program
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Grand Mean Sample SF71 = 2.2162
Percent

Grand Mean Sample SF72 = 2.2236
Percent

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Analysis 330

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE71			Sample SE72			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
29P2XQ	X	13.48	-0.79	-0.75	13.35	-2.52	-2.47	IM
2GLRM8		16.40	2.12	2.00	17.48	1.61	1.58	TH
3RUW6M	*	11.41	-2.86	-2.70	13.53	-2.34	-2.30	IK
3VCCGZ		15.59	1.32	1.24	16.04	0.17	0.17	TX
4WKT8J		15.79	1.52	1.43	17.55	1.69	1.66	LA
6CVUGE		14.08	-0.19	-0.18	15.61	-0.25	-0.25	IN
6NNA7F	*	13.66	-0.62	-0.58	14.15	-1.71	-1.68	IN
6T29JU		14.98	0.70	0.67	16.79	0.93	0.91	TH
6YL9XL		15.12	0.85	0.80	17.45	1.58	1.55	LE
7ZEEZX		14.67	0.40	0.38	16.49	0.62	0.61	LW
84XU4X		13.64	-0.63	-0.59	15.11	-0.76	-0.74	LE
8AKL97		13.91	-0.36	-0.34	15.85	-0.02	-0.02	LE
8J7PHQ		14.15	-0.12	-0.11	15.81	-0.06	-0.06	TH
9KF4GJ		13.51	-0.76	-0.72	15.60	-0.27	-0.26	IF
9W8QME		13.60	-0.67	-0.64	14.55	-1.32	-1.29	TA
A64XUR	X	8.56	-5.72	-5.39	9.40	-6.47	-6.35	TR
AMXQEP		15.02	0.75	0.71	16.83	0.96	0.94	TO
B84LLL		13.25	-1.02	-0.96	15.42	-0.44	-0.43	IM
BVPFMD		12.92	-1.35	-1.28	14.83	-1.03	-1.01	IF
CAFZG7		11.99	-2.28	-2.15	13.29	-2.57	-2.53	IN
CHWENH		15.02	0.75	0.71	16.95	1.09	1.07	IF
EERKLH		12.97	-1.30	-1.23	15.21	-0.66	-0.65	TR
ERFKJC		15.42	1.14	1.08	16.60	0.73	0.72	LW
FHKYQJ		13.37	-0.91	-0.86	15.31	-0.55	-0.54	XX
GMBVTF		13.98	-0.29	-0.27	16.06	0.20	0.19	IM
GNRU7D		13.92	-0.35	-0.33	15.64	-0.22	-0.22	IF
GXTE7K		14.40	0.12	0.12	16.30	0.44	0.43	TH
HVJPGG		16.23	1.96	1.85	17.81	1.95	1.91	LA
KAT237		15.10	0.83	0.78	15.80	-0.07	-0.07	IK
KQZG42		14.04	-0.23	-0.22	15.98	0.11	0.11	LH
KW9MZ8		13.35	-0.92	-0.87	15.02	-0.85	-0.83	IR
M76HYE		14.06	-0.21	-0.20	15.32	-0.55	-0.54	LE
MN9UUA		13.56	-0.71	-0.67	15.69	-0.18	-0.18	TK
MTYBZ9		16.38	2.11	1.99	17.67	1.80	1.77	LX
MWWWM6		13.83	-0.44	-0.42	15.00	-0.87	-0.85	IK
NBHKG4		15.36	1.08	1.02	17.14	1.27	1.25	ID
NQ8WQP		13.36	-0.92	-0.86	15.29	-0.57	-0.56	TA
NRMRV6		15.87	1.60	1.51	17.62	1.75	1.72	XX
PHT9QV		13.12	-1.15	-1.09	15.30	-0.56	-0.55	LA
PPVGWN		13.65	-0.62	-0.58	15.32	-0.55	-0.54	TB



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Tensile Breaking Strength - Packaging Papers
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WebCode	Data Flag	<u>Sample SE71</u>			<u>Sample SE72</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
QBQMWY		13.88	-0.39	-0.37	14.79	-1.08	-1.06	IF
QHRVKE		14.20	-0.07	-0.07	15.20	-0.67	-0.65	TT
QTC2J4		15.03	0.75	0.71	16.43	0.56	0.55	TO
RTLFWH		14.66	0.39	0.37	15.91	0.04	0.04	XX
TFAMAG		13.14	-1.13	-1.07	14.81	-1.05	-1.03	IM
TR6RJ3		14.29	0.01	0.01	16.42	0.55	0.54	LH
TXEUNJ		15.26	0.99	0.93	16.83	0.96	0.94	TB
UZCTCG		13.91	-0.36	-0.34	14.75	-1.12	-1.10	TO
VBVL44		16.10	1.82	1.72	17.16	1.29	1.27	LA
VPBRBW		14.21	-0.06	-0.06	15.84	-0.02	-0.02	ID
X7BFHD		14.52	0.25	0.23	15.29	-0.57	-0.56	IK
Y386YJ		14.20	-0.07	-0.07	15.90	0.04	0.04	IF
YMEDDH		14.10	-0.17	-0.16	15.81	-0.06	-0.06	IM
Z9QPLV		14.96	0.69	0.65	16.46	0.59	0.58	LH
ZQ64YK		13.28	-0.99	-0.93	15.89	0.02	0.02	LW

Summary Statistics	<u>Sample SE71</u>	<u>Sample SE72</u>
Grand Means	14.27 kN/m	15.87 kN/m
Std Dev Btwn Labs	1.06 kN/m	1.02 kN/m

Statistics based on 53 of 55 reporting participants.

Comments on Assigned Data Flags for Test #330

- A64XUR (X) - Extreme Data.
- 29P2XQ (X) - Inconsistent in testing between samples.

Analysis Notes:

- GNRU7D - Data appears to be data for Analysis 330 Tensile but submitted as 331 TEA. Data Switched by CTS
- X7BFHD - Data appears to be transposed between samples. Data Switched by CTS.



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Tensile Breaking Strength - Packaging Papers
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Key to Instrument Codes Reported by Participants

ID	Instron 4200 Series	IF	Instron 3340 Series
IK	Instron 4400 Series	IM	Instron 5500 Series
IN	Instron 3360 Series	IR	Instron 5900 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
TX	Thwing-Albert (model not specified)	XX	Instrument make/model not specified by lab

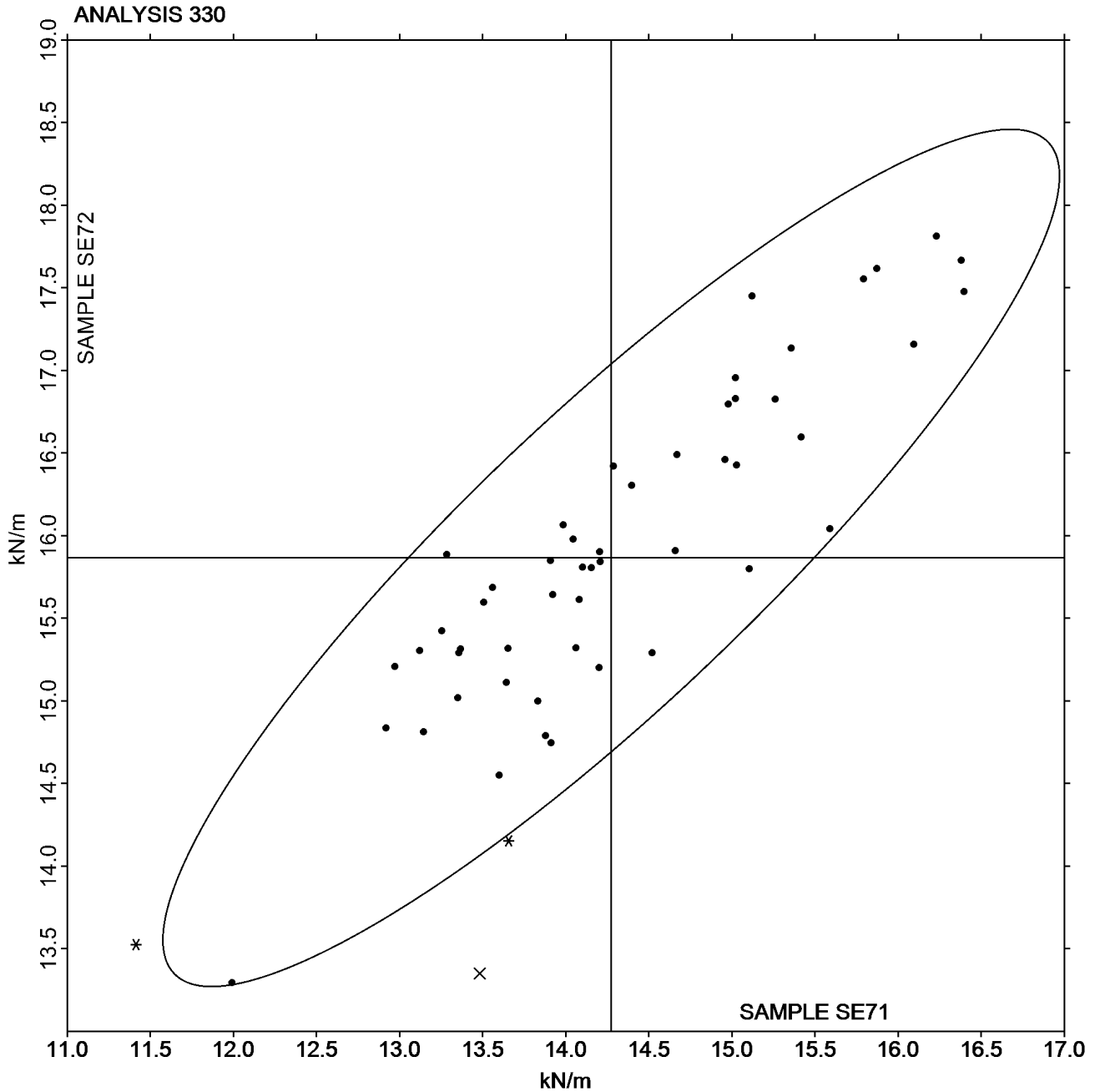


Paper & Paperboard Interlaboratory Testing Program
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Grand Mean Sample SE71 = 14.272
kN/m

Grand Mean Sample SE72 = 15.866
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 SE71			Sample SE72			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3VCCGZ	X	276.6	59.3	1.60	177.3	-2.6	-0.08	XX
4WKT8J		223.9	6.6	0.18	182.2	2.3	0.07	LA
6CVUGE		193.4	-23.9	-0.64	138.8	-41.2	-1.30	IN
6NNA7F		237.4	20.1	0.54	196.5	16.5	0.52	IN
6T29JU		285.2	67.9	1.83	240.0	60.0	1.90	TH
6YL9XL		230.6	13.3	0.36	207.7	27.8	0.88	LE
7ZEEZX		214.3	-3.0	-0.08	160.2	-19.7	-0.62	LW
84XU4X		206.1	-11.2	-0.30	161.5	-18.4	-0.58	LE
8AKL97		205.2	-12.1	-0.33	165.7	-14.2	-0.45	LE
9KF4GJ		201.0	-16.3	-0.44	174.6	-5.3	-0.17	IF
9W8QME		194.9	-22.4	-0.60	137.1	-42.9	-1.36	TA
A64XUR		127.8	-89.5	-2.41	101.3	-78.6	-2.48	TR
AMXQEP		210.9	-6.5	-0.17	179.8	-0.1	0.00	TO
B84LLL		210.1	-7.2	-0.19	186.3	6.4	0.20	IM
BVPFMD		242.4	25.1	0.68	216.3	36.3	1.15	IF
CAFZG7		182.6	-34.7	-0.93	147.7	-32.3	-1.02	IN
CHWENH		190.0	-27.4	-0.74	157.5	-22.5	-0.71	IN
EERKLH		163.2	-54.1	-1.45	158.7	-21.2	-0.67	TR
ERFKJC		216.5	-0.9	-0.02	158.8	-21.2	-0.67	LW
FHKYQJ		216.1	-1.3	-0.03	200.9	21.0	0.66	XX
GMBVTF		219.0	1.6	0.04	195.4	15.4	0.49	IM
GXTE7K		237.9	20.6	0.55	211.0	31.1	0.98	TH
HVJPGG		234.6	17.3	0.46	183.6	3.7	0.12	LA
KQZG42		188.9	-28.4	-0.76	157.6	-22.4	-0.71	LH
M76HYE		200.9	-16.4	-0.44	156.8	-23.1	-0.73	LE
MN9UUA		208.8	-8.5	-0.23	183.7	3.8	0.12	TK
MTYBZ9		262.1	44.8	1.20	206.1	26.2	0.83	LX
NRMRV6	*	325.0	107.7	2.90	253.6	73.6	2.33	XX
PHT9QV		216.4	-0.9	-0.02	193.3	13.3	0.42	LA
PPVGWN		211.2	-6.2	-0.17	172.2	-7.8	-0.25	TB
QBQMWY		281.7	64.4	1.73	215.2	35.2	1.11	IF
QHRVKE		185.0	-32.3	-0.87	135.7	-44.3	-1.40	TT
QTC2J4		224.1	6.8	0.18	185.3	5.4	0.17	TO
RTLFWH		213.3	-4.0	-0.11	179.7	-0.2	-0.01	XX
TFAMAG		283.5	66.2	1.78	235.7	55.8	1.76	IM
TR6RJ3		204.9	-12.4	-0.33	180.0	0.0	0.00	LH
TXEUNJ		250.5	33.2	0.89	203.8	23.9	0.75	TB
UZCTCG		227.2	9.9	0.27	178.8	-1.2	-0.04	TO
VBVL44	*	116.0	-101.3	-2.73	98.0	-81.9	-2.59	LA
VPBRBW		224.3	7.0	0.19	177.4	-2.5	-0.08	ID



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WebCode	Data Flag	Sample SE71			Sample SE72			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
X7BFHD		191.4	-25.9	-0.70	177.2	-2.7	-0.09	XX
Y386YJ		245.9	28.6	0.77	205.0	25.0	0.79	IF
YMEDDH		238.9	21.6	0.58	203.4	23.4	0.74	IM
Z9QPLV		214.4	-2.9	-0.08	174.1	-5.8	-0.18	LH
ZQ64YK		204.6	-12.8	-0.34	183.7	3.7	0.12	LW

Summary Statistics	Sample SE71	Sample SE72
Grand Means	217.32 Joules/sq m	179.95 Joules/sq m
Std Dev Btwn Labs	37.17 Joules/sq m	31.64 Joules/sq m

Statistics based on 44 of 45 reporting participants.

Comments on Assigned Data Flags for Test #331

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

Analysis Notes:

X7BFHD - Data appears to be transposed between samples. Data Switched by CTS.

Key to Instrument Codes Reported by Participants

ID	Instron 4200 series	IF	Instron 3340 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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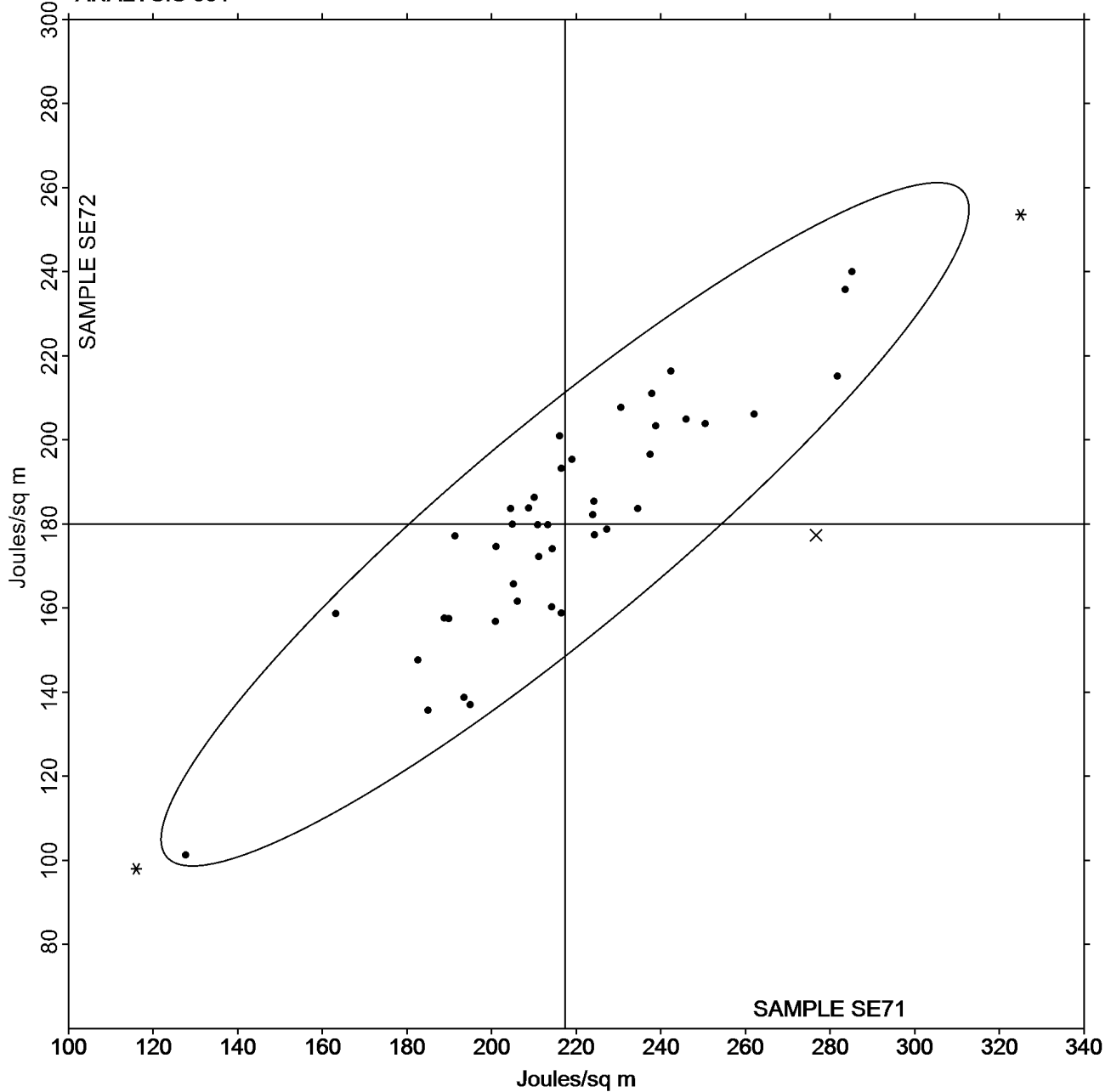
Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

Grand Mean Sample SE71 = 217.32
Joules/sq m

Grand Mean Sample SE72 = 179.95
Joules/sq m

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WebCode	Data Flag	Sample SE71			Sample SE72			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
29P2XQ		2.720	0.445	1.24	2.050	0.293	1.02	IR
3VCCGZ	*	2.740	0.465	1.30	1.817	0.060	0.21	XX
4WKT8J		1.976	-0.299	-0.83	1.548	-0.209	-0.72	LA
6CVUGE		1.589	-0.685	-1.91	1.108	-0.649	-2.25	IN
6NNA7F		1.973	-0.302	-0.84	1.560	-0.197	-0.68	IN
6T29JU		3.017	0.742	2.07	2.400	0.643	2.23	TH
6YL9XL		2.282	0.007	0.02	1.839	0.082	0.28	LE
7ZEEZX		2.177	-0.098	-0.27	1.510	-0.247	-0.86	LW
84XU4X		2.213	-0.062	-0.17	1.608	-0.149	-0.52	LE
8AKL97		2.164	-0.111	-0.31	1.585	-0.172	-0.60	LE
9KF4GJ		1.880	-0.395	-1.10	1.632	-0.125	-0.43	IF
9W8QME		2.163	-0.112	-0.31	1.520	-0.237	-0.82	TA
A64XUR		2.291	0.016	0.05	1.731	-0.026	-0.09	TR
AMXQEP		2.288	0.013	0.04	1.800	0.043	0.15	TO
B84LLL		2.623	0.348	0.97	2.131	0.374	1.30	IM
BVPFMD		2.154	-0.120	-0.34	1.728	-0.029	-0.10	IF
CAFZG7		1.489	-0.786	-2.19	1.200	-0.557	-1.93	IN
CHWENH		1.883	-0.392	-1.09	1.444	-0.313	-1.09	IN
EERKLH		1.619	-0.656	-1.83	1.377	-0.380	-1.32	TR
ERFKJC		2.093	-0.182	-0.51	1.483	-0.274	-0.95	LW
FHKYQJ		2.475	0.200	0.56	2.067	0.310	1.08	XX
GMBVTF		2.314	0.039	0.11	1.843	0.086	0.30	IM
GXTE7K		2.550	0.275	0.77	2.030	0.273	0.95	TH
HVJPGG		2.069	-0.206	-0.57	1.515	-0.242	-0.84	LA
KQZG42		2.000	-0.275	-0.76	1.513	-0.244	-0.85	LH
KW9MZ8		2.610	0.335	0.93	2.010	0.253	0.88	IR
M76HYE		2.118	-0.157	-0.44	1.546	-0.211	-0.73	LE
MN9UUA		2.333	0.058	0.16	1.832	0.075	0.26	TK
MTYBZ9		2.341	0.066	0.18	1.738	-0.019	-0.07	LX
NBHKG4		2.161	-0.114	-0.32	1.717	-0.040	-0.14	ID
NQ8WQP		1.970	-0.305	-0.85	1.590	-0.167	-0.58	TB
NRMRV6		3.068	0.793	2.21	2.252	0.495	1.72	XX
PHT9QV		2.063	-0.212	-0.59	1.601	-0.156	-0.54	LA
PPVGWN		2.286	0.012	0.03	1.707	-0.050	-0.17	TB
QBQMWY		2.295	0.020	0.06	1.720	-0.037	-0.13	IF
QHRVKE		2.058	-0.217	-0.60	1.518	-0.239	-0.83	TT
QTC2J4		2.429	0.154	0.43	2.044	0.287	1.00	TO
RTLFWH		2.294	0.020	0.05	1.854	0.097	0.34	XX
TFAMAG	*	3.340	1.065	2.97	2.640	0.883	3.06	IN
TR6RJ3		2.116	-0.159	-0.44	1.649	-0.108	-0.37	LH



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WebCode	Data Flag	Sample SE71			Sample SE72			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
TXEUNJ		2.464	0.189	0.53	1.894	0.137	0.48	TB
UZCTCG		2.509	0.234	0.65	1.883	0.126	0.44	TO
VBVL44		1.987	-0.288	-0.80	1.582	-0.175	-0.61	XX
VPBRBW		2.383	0.109	0.30	1.761	0.004	0.01	ID
X7BFHD	*	2.110	-0.165	-0.46	1.950	0.193	0.67	XX
Y386YJ		2.832	0.557	1.55	2.198	0.441	1.53	IF
YMEDDH		2.548	0.274	0.76	1.996	0.239	0.83	IM
Z9QPLV		2.113	-0.162	-0.45	1.639	-0.118	-0.41	LH
ZQ64YK		2.285	0.010	0.03	1.733	-0.024	-0.08	LW

Summary Statistics	Sample SE71	Sample SE72
Grand Means	2.27 Percent	1.76 Percent
Std Dev Btw Labs	0.36 Percent	0.29 Percent
Statistics based on 49 of 49 reporting participants.		

Analysis Notes:

X7BFHD - Data appears to be transposed between samples. Data Switched by CTS.

Key to Instrument Codes Reported by Participants

ID	Instron 4200 Series	IF	Instron 3340 Series
IM	Instron 5500 Series	IN	Instron 3360 Series
IR	Instron 5900 Series	LA	L & W Autoline 300
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

Report #3021S,
September 2019

Analysis 332

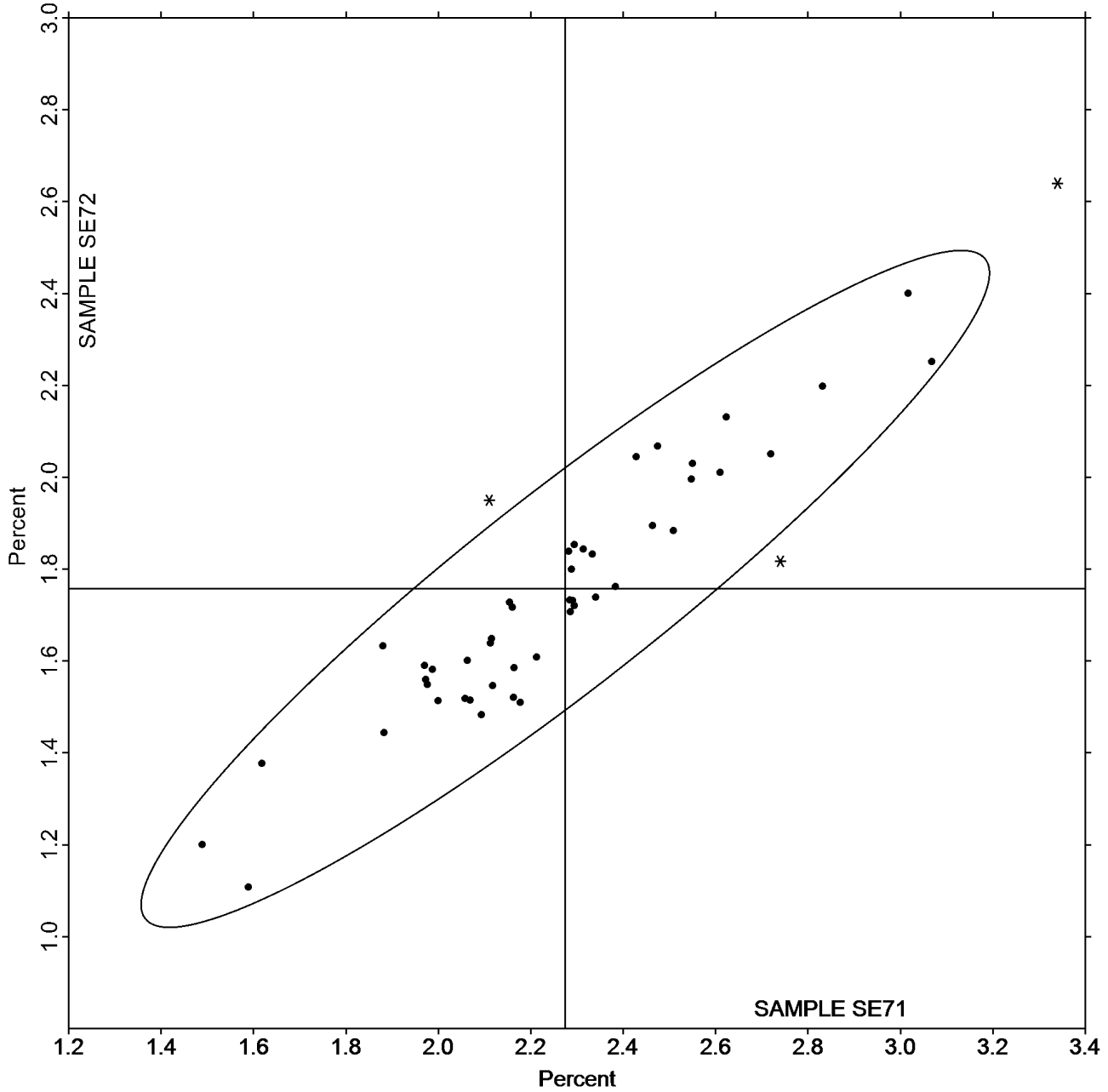
Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

Grand Mean Sample SE71 = 2.2746
Percent

Grand Mean Sample SE72 = 1.7570
Percent

ANALYSIS 332





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

Report #3021S,
September 2019

WebCode	Data Flag	<u>Sample SG71</u>			<u>Sample SG72</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2HVRQT		223.4	-17.8	-0.32	218.0	-5.3	-0.12	MT
4ZMPWD		145.2	-96.0	-1.75	148.9	-74.4	-1.76	MT
6T29JU		262.0	20.8	0.38	255.5	32.2	0.76	MT
993UYL		241.8	0.6	0.01	270.5	47.2	1.12	MT
BH42P6		172.8	-68.4	-1.25	178.6	-44.7	-1.05	MT
EERKLH		311.5	70.3	1.28	171.5	-51.8	-1.22	MT
FHKYQJ		325.6	84.4	1.54	273.7	50.4	1.19	MT
J23EEV		291.4	50.2	0.92	285.1	61.8	1.46	MT
NQ8WQP		187.6	-53.6	-0.98	192.3	-31.0	-0.73	MT
QRVQ2Y		213.9	-27.3	-0.50	211.1	-12.2	-0.29	MT
V4VA3Z		210.8	-30.4	-0.55	222.7	-0.6	-0.01	MT
YMEDDH		273.8	32.6	0.59	228.1	4.8	0.11	MT
ZQ64YK		275.8	34.6	0.63	246.4	23.1	0.55	MT

Summary Statistics	<u>Sample SG71</u>	<u>Sample SG72</u>
Grand Means	241.20 Double Folds	223.26 Double Folds
Stnd Dev Btwn Labs	54.80 Double Folds	42.36 Double Folds
Statistics based on 13 of 13 reporting participants.		

Key to Instrument Codes Reported by Participants

MT MIT - Tinius Olsen



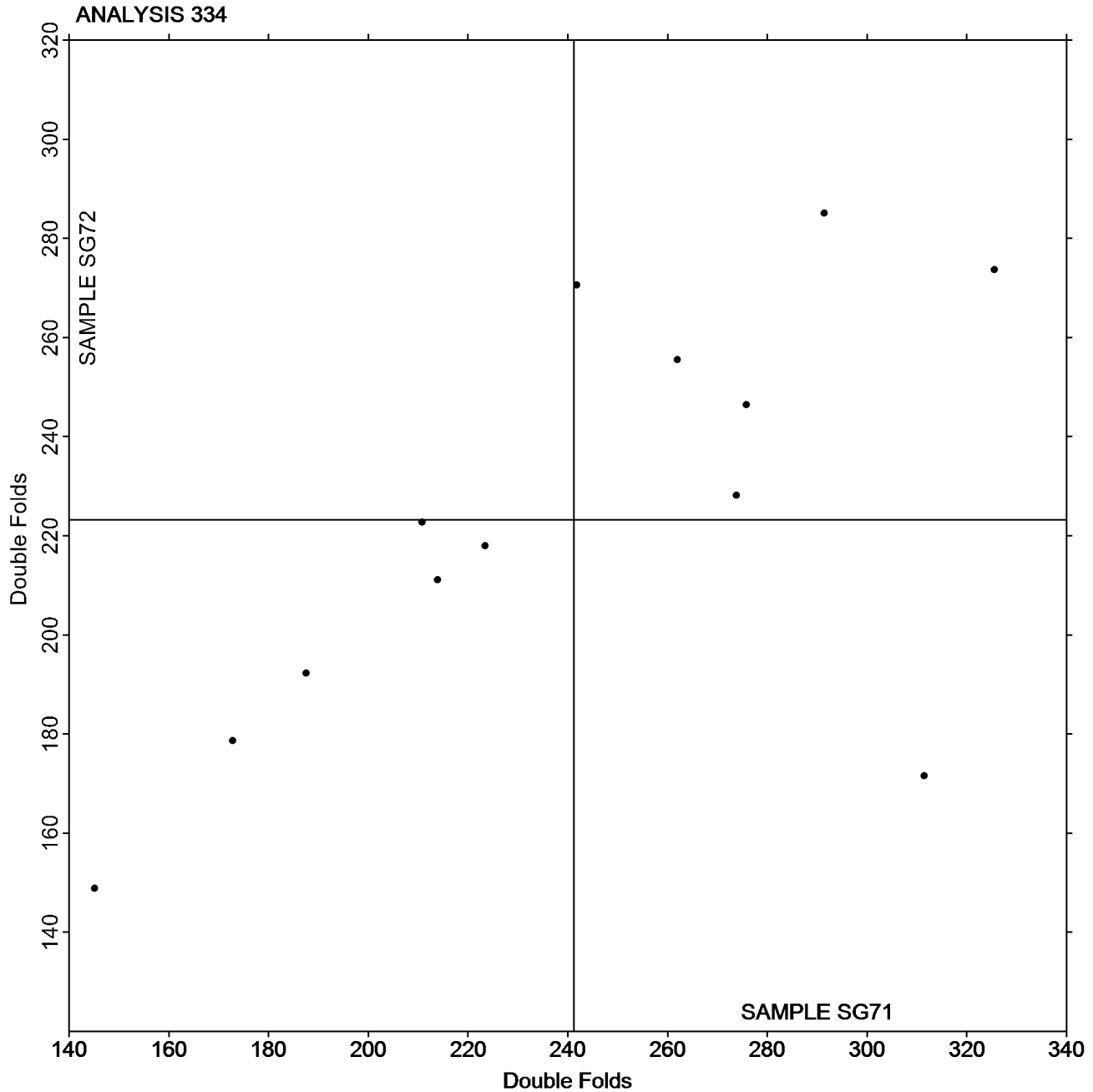
Analysis 334

Folding Endurance (MIT) - Double Folds

TAPPI Official Test Method T511

Grand Mean Sample SG71 = 241.20
Double Folds

Grand Mean Sample SG72 = 223.26
Double Folds



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 #3021S,
September 2019

WebCode	Data Flag	<u>Sample SH71</u>			<u>Sample SH72</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2A2MWR		134.6	-8.9	-0.67	137.5	-6.3	-0.45
2HVRQT		140.5	-3.0	-0.23	132.9	-11.0	-0.78
7QBA4B		142.2	-1.3	-0.09	140.9	-2.9	-0.21
7XVAJM		145.0	1.5	0.11	147.0	3.1	0.22
8AX9QK		144.0	0.5	0.04	143.7	-0.1	-0.01
AB4JDE		136.3	-7.2	-0.54	138.1	-5.8	-0.41
AJGB3C		156.8	13.3	0.99	156.2	12.4	0.88
BH42P6		169.6	26.1	1.94	171.6	27.7	1.97
CHDMEX		138.1	-5.4	-0.40	138.3	-5.6	-0.39
E4AYGN		154.5	11.0	0.82	160.7	16.9	1.20
FHKYQJ		151.4	7.9	0.59	152.1	8.2	0.58
GK9Z3K		111.4	-32.1	-2.39	109.2	-34.6	-2.45
GYNTXJ		141.2	-2.3	-0.17	149.0	5.1	0.36
KTQFKK	X	276.7	133.2	9.92	273.3	129.5	9.18
NQ8WQP		145.5	2.0	0.15	142.9	-1.0	-0.07
PPVGWN		122.1	-21.4	-1.59	123.0	-20.9	-1.48
RHLV4B		146.3	2.8	0.21	147.0	3.1	0.22
VC9Y7E	X	133.7	-9.8	-0.73	157.7	13.8	0.98
Y386YJ		162.1	18.6	1.38	157.6	13.8	0.98
YMEDDH		141.4	-2.1	-0.16	141.6	-2.2	-0.16

Summary Statistics	<u>Sample SH71</u>	<u>Sample SH72</u>
Grand Means	143.50 Gurley Units	143.85 Gurley Units
Std Dev Btwn Labs	13.43 Gurley Units	14.11 Gurley Units
Statistics based on 18 of 20 reporting participants.		

Comments on Assigned Data Flags for Test #336

KTQFKK (X) - Extreme Data.

VC9Y7E (X) - Inconsistent in testing between samples.



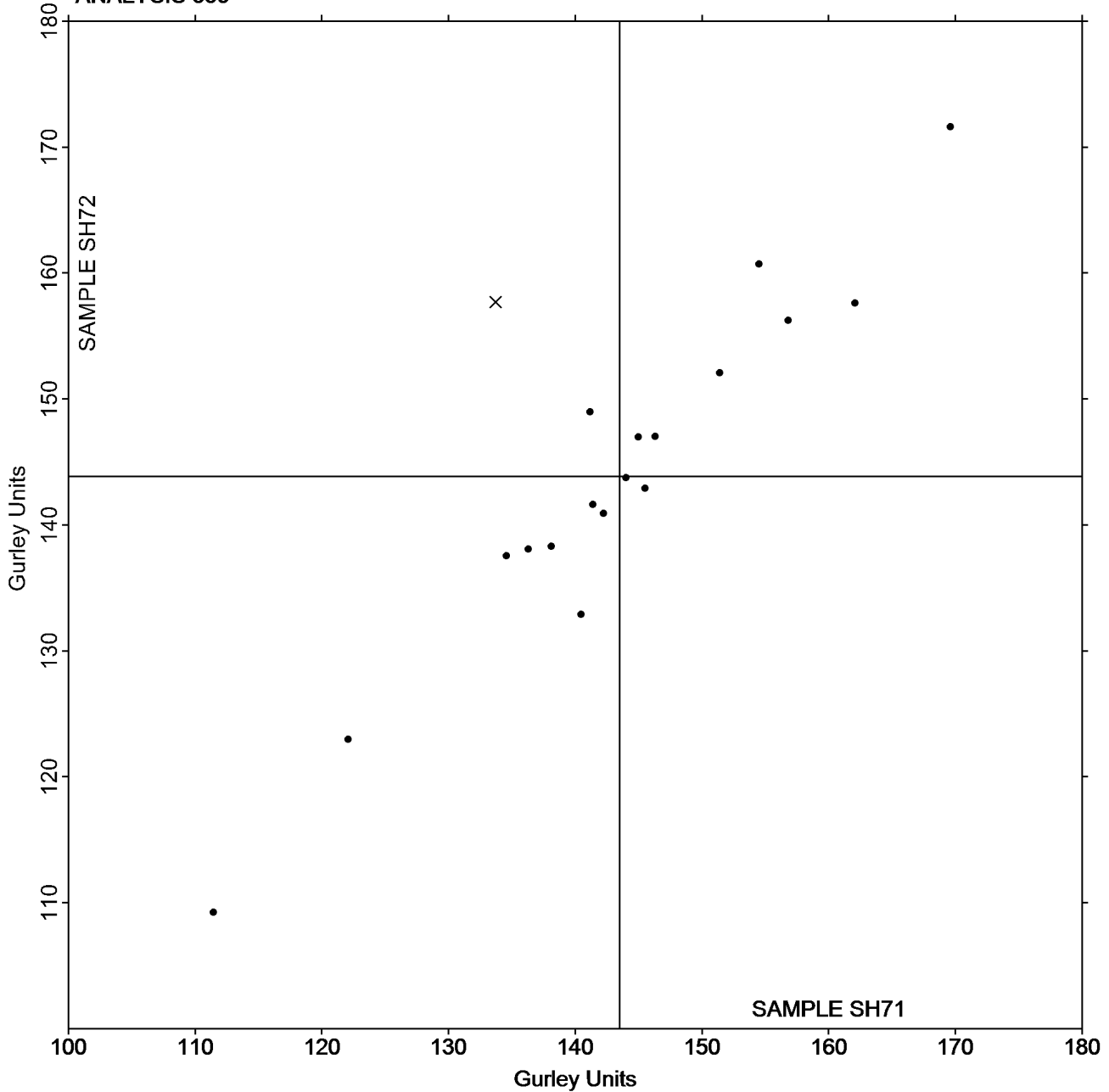
Paper & Paperboard Interlaboratory Testing Program
Analysis 336
Bending Resistance, Gurley Type
TAPPI Official Test Method T543

Report #3021S,
September 2019

Grand Mean Sample SH71 = 143.50
Gurley Units

Grand Mean Sample SH72 = 143.85
Gurley Units

ANALYSIS 336



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 #3021S,
September 2019

WebCode	Data Flag	<u>Sample SJ71</u>			<u>Sample SJ72</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2GKUDC		2.060	-1.583	-1.82	1.790	-1.824	-1.94
4ZMPWD		3.832	0.189	0.22	3.972	0.358	0.38
84DZHN		2.100	-1.543	-1.77	2.030	-1.584	-1.69
CHWENH		5.130	1.487	1.71	5.150	1.536	1.64
E4AYGN		4.091	0.448	0.51	4.031	0.417	0.44
ERFKJC		3.210	-0.433	-0.50	3.190	-0.424	-0.45
FUHUZ8		3.645	0.002	0.00	3.676	0.062	0.07
GBWM3G		4.223	0.580	0.67	4.266	0.652	0.69
GYNTXJ		3.946	0.303	0.35	3.842	0.227	0.24
VLALXC		3.423	-0.220	-0.25	3.320	-0.294	-0.31
Y386YJ		3.846	0.203	0.23	3.889	0.275	0.29
YMEDDH		4.209	0.566	0.65	4.217	0.603	0.64

Summary Statistics	<u>Sample SJ71</u>	<u>Sample SJ72</u>
Grand Means	3.64 Taber Units	3.61 Taber Units
Stnd Dev Btwn Labs	0.87 Taber Units	0.94 Taber Units

Statistics based on 12 of 12 reporting participants.

Analysis Notes:

Y386YJ - Data appear to be reported as g-cm, not mN-m as indicated on data entry form. CTS will not correct the Units going forward.



Paper & Paperboard Interlaboratory Testing Program

Report #3021S,
September 2019

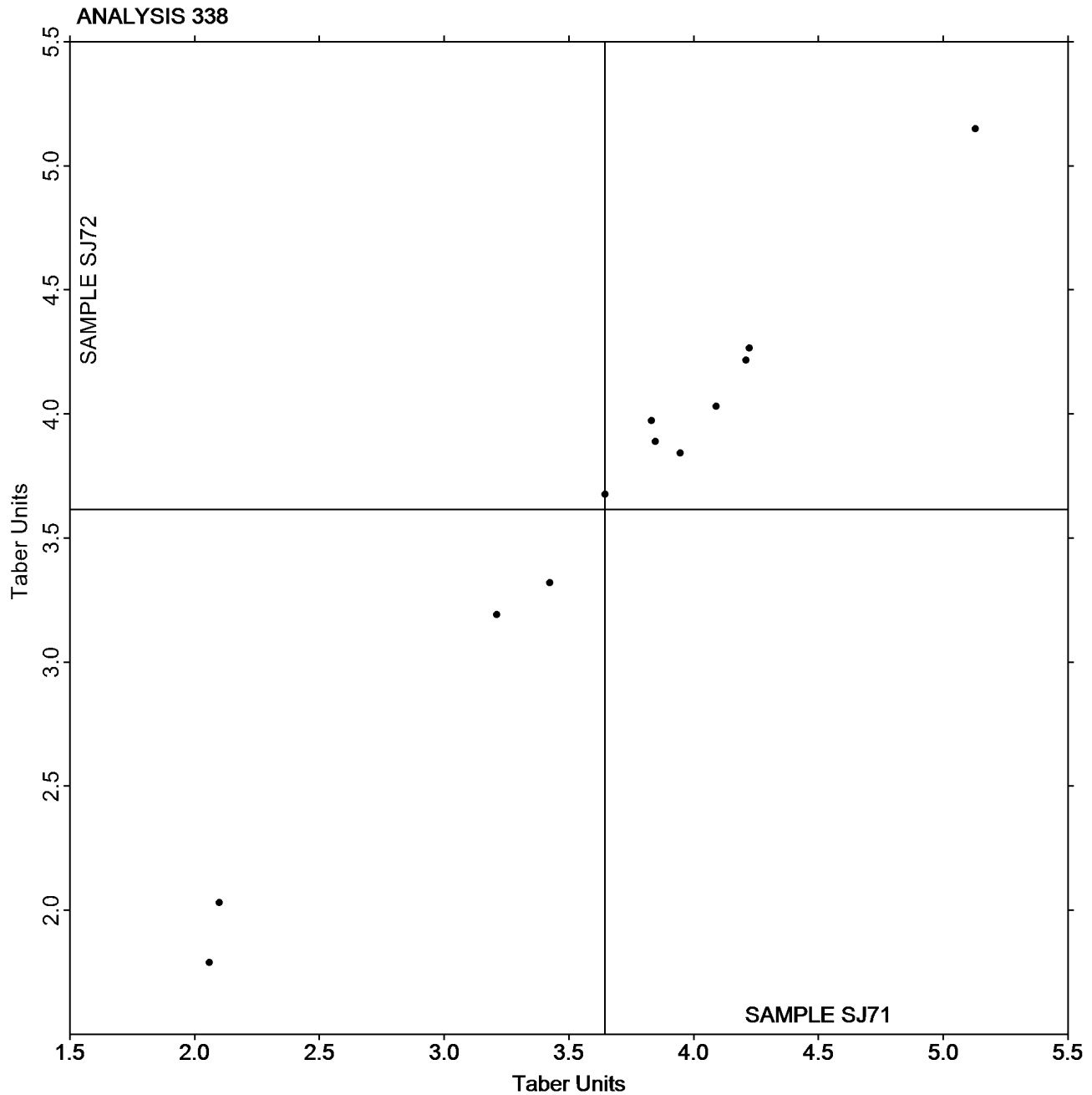
Analysis 338

Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

Grand Mean Sample SJ71 = 3.6429
Taber Units

Grand Mean Sample SJ72 = 3.6144
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 #3021S,
September 2019

WebCode	Data Flag	<u>Sample SQ71</u>			<u>Sample SQ72</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6YL9XL		24.87	3.53	0.90	45.41	4.53	0.92
7XVAJM		20.24	-1.10	-0.28	38.38	-2.50	-0.51
8GFQ38		22.25	0.91	0.23	41.15	0.27	0.05
AB4JDE		22.56	1.22	0.31	41.36	0.48	0.10
ERFKJC		18.60	-2.74	-0.70	35.55	-5.33	-1.08
PHT9QV		19.23	-2.11	-0.54	38.21	-2.67	-0.54
RTLFW		13.20	-8.14	-2.09	32.40	-8.48	-1.72
TXEUNJ		27.65	6.31	1.62	49.32	8.44	1.71
YMEDDH		23.01	1.67	0.43	43.27	2.39	0.48
ZQ64YK		21.82	0.48	0.12	43.76	2.88	0.58

Summary Statistics	<u>Sample SQ71</u>	<u>Sample SQ72</u>
Grand Means	21.34 Taber Units	40.88 Taber Units
Std Dev Btwn Labs	3.90 Taber Units	4.94 Taber Units
Statistics based on 10 of 10 reporting participants.		



Paper & Paperboard Interlaboratory Testing Program

Report #3021S,
September 2019

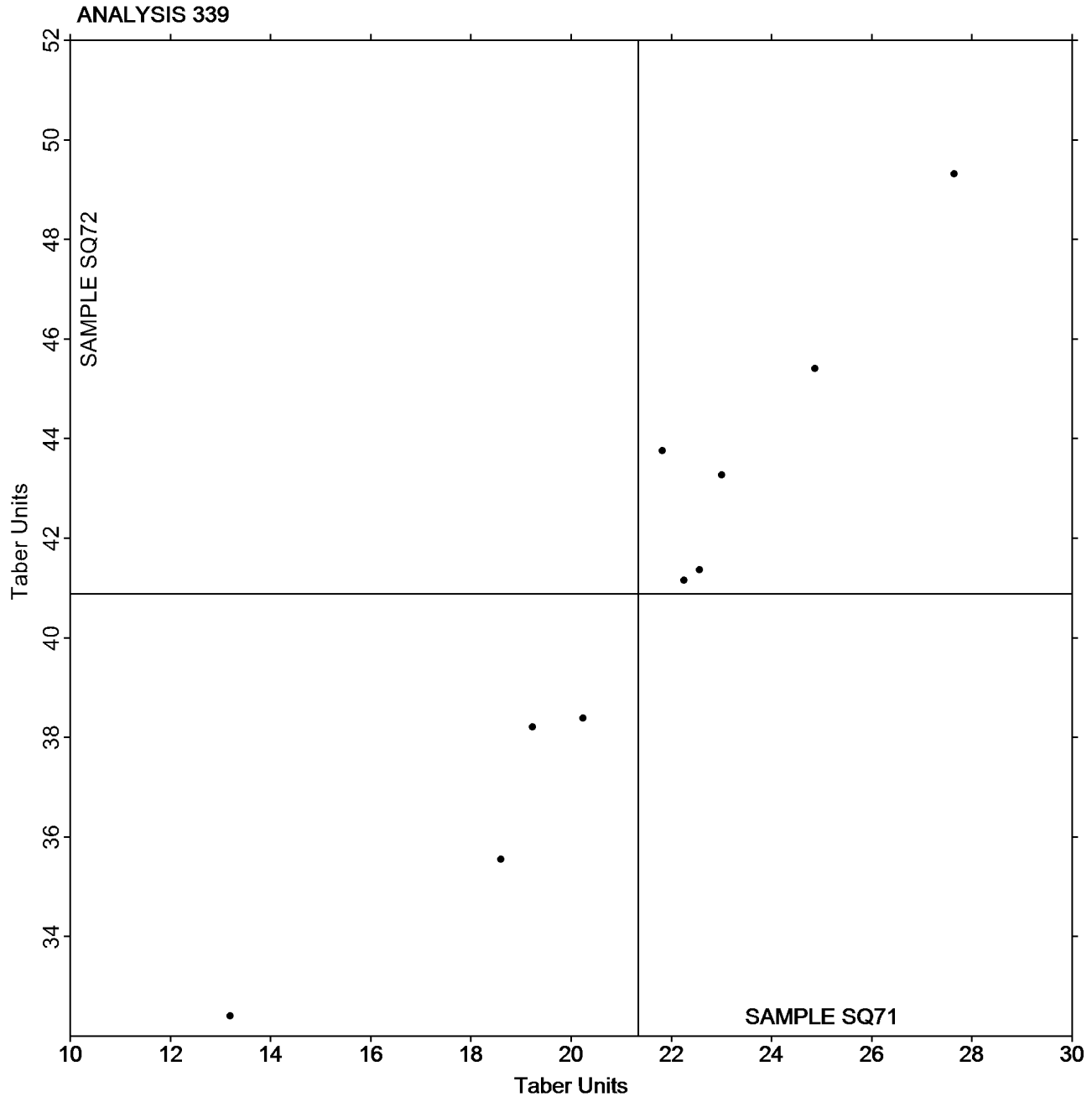
Analysis 339

Bending Resistance, Taber Type - 10 to 100 Taber Units

TAPPI Official Test Method T489

Grand Mean Sample SQ71 = 21.343
Taber Units

Grand Mean Sample SQ72 = 40.881
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 #3021S,
September 2019**

Analysis 340

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

TAPPI Official Test Method T489

WebCode	Data Flag	Sample ST71			Sample ST72		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6T29JU		174.0	-0.8	-0.12	176.5	1.5	0.19
8J7PHQ	*	192.0	17.2	2.69	199.3	24.2	3.09
A64XUR		170.1	-4.6	-0.72	166.9	-8.1	-1.03
A83EZU		174.3	-0.5	-0.08	172.6	-2.4	-0.30
AB4JDE		180.2	5.5	0.85	179.6	4.6	0.58
AX2Q9W		176.4	1.6	0.25	175.8	0.8	0.10
CALC3G		169.0	-5.8	-0.90	181.3	6.3	0.80
ERFKJC		181.5	6.7	1.05	171.8	-3.3	-0.42
F7DVLP		171.0	-3.8	-0.59	171.5	-3.5	-0.45
FHKYQJ		166.6	-8.2	-1.28	168.7	-6.3	-0.80
GNRU7D		181.4	6.6	1.04	184.1	9.1	1.16
MH6X3X		178.5	3.7	0.58	173.6	-1.4	-0.18
PGH9PV		168.8	-6.0	-0.93	170.3	-4.7	-0.60
RTLFW		171.3	-3.5	-0.54	170.3	-4.7	-0.60
RVUNPW		171.8	-3.0	-0.46	173.1	-1.9	-0.25
YVQAHN		169.2	-5.6	-0.87	167.3	-7.7	-0.99
ZQ64YK		174.9	0.1	0.02	172.7	-2.4	-0.30

Summary Statistics	Sample ST71	Sample ST72
Grand Means	174.76 Taber Units	175.02 Taber Units
Std Dev Btwn Labs	6.41 Taber Units	7.83 Taber Units
Statistics based on 17 of 17 reporting participants.		



Paper & Paperboard Interlaboratory Testing Program

Report #3021S,
September 2019

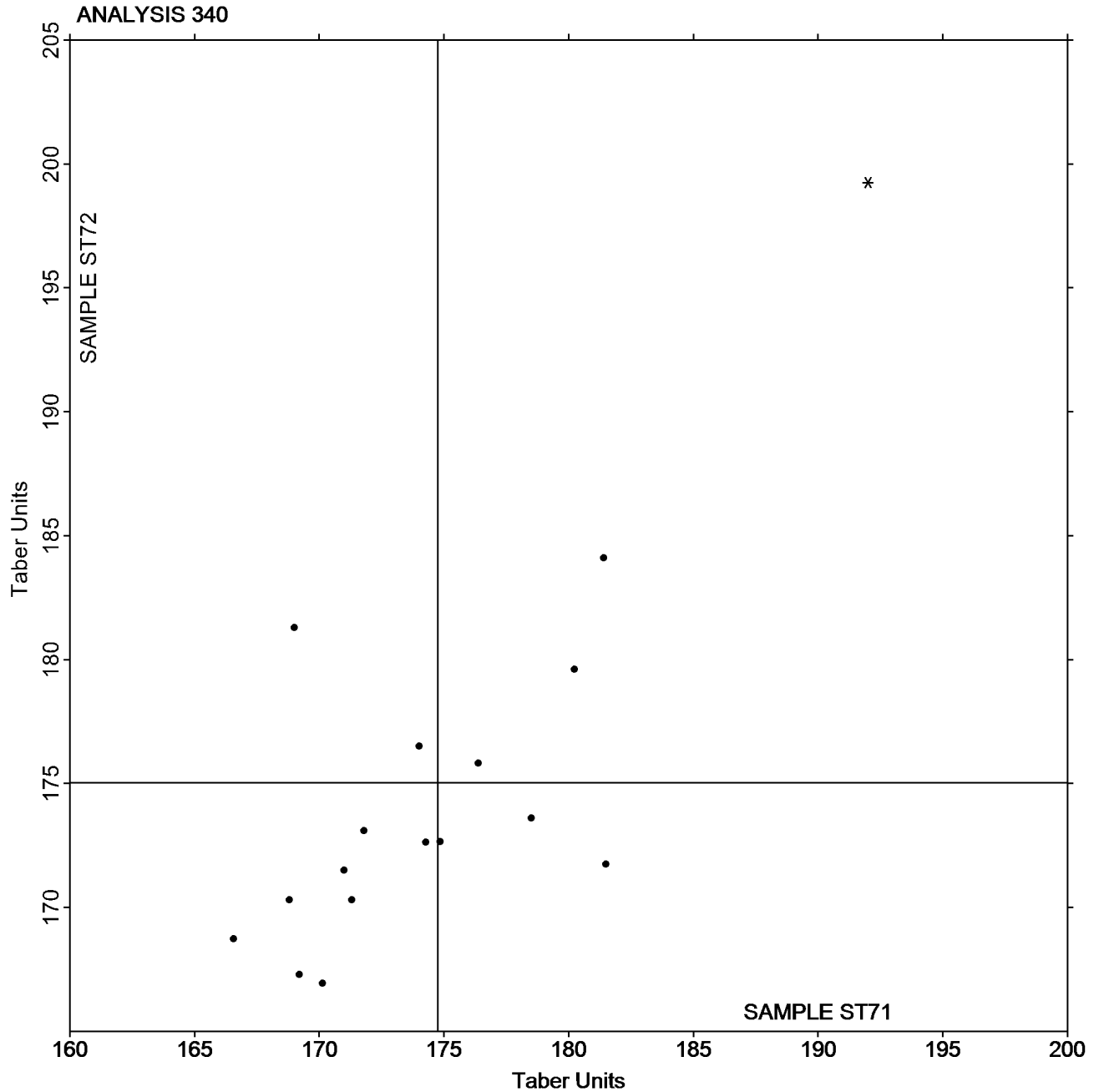
Analysis 340

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

TAPPI Official Test Method T489

Grand Mean Sample ST71 = 174.76
Taber Units

Grand Mean Sample ST72 = 175.02
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 #3021S,
September 2019

WebCode	Data Flag	Sample SM71			Sample SM72			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6T29JU		67.82	-27.34	-1.08	67.72	-27.29	-1.08	LW
6YL9XL		103.00	7.84	0.31	104.16	9.15	0.36	TA
A83EZU		69.07	-26.09	-1.03	69.18	-25.82	-1.02	LW
EREU6G		104.84	9.68	0.38	102.96	7.95	0.31	CD
GXTE7K		83.60	-11.56	-0.46	81.60	-13.41	-0.53	TA
KJN3L6		98.00	2.84	0.11	97.68	2.67	0.11	DX
R4NTHX		97.52	2.36	0.09	100.02	5.01	0.20	DX
RDP993		76.46	-18.70	-0.74	75.65	-19.35	-0.77	LW
TXEUNJ		97.92	2.76	0.11	94.50	-0.51	-0.02	TA
Y386YJ		95.50	0.34	0.01	96.15	1.14	0.05	TL
YMEDDH		79.64	-15.52	-0.62	81.04	-13.97	-0.55	CD
ZQ64YK		95.70	0.54	0.02	96.42	1.41	0.06	LW
ZQPM4Q		168.00	72.84	2.89	168.00	72.99	2.89	TA

Summary Statistics	Sample SM71	Sample SM72
Grand Means	95.16 psi	95.01 psi
Std Dev Btwn Labs	25.22 psi	25.28 psi
Statistics based on 13 of 13 reporting participants.		

Key to Instrument Codes Reported by Participants

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



Paper & Paperboard Interlaboratory Testing Program

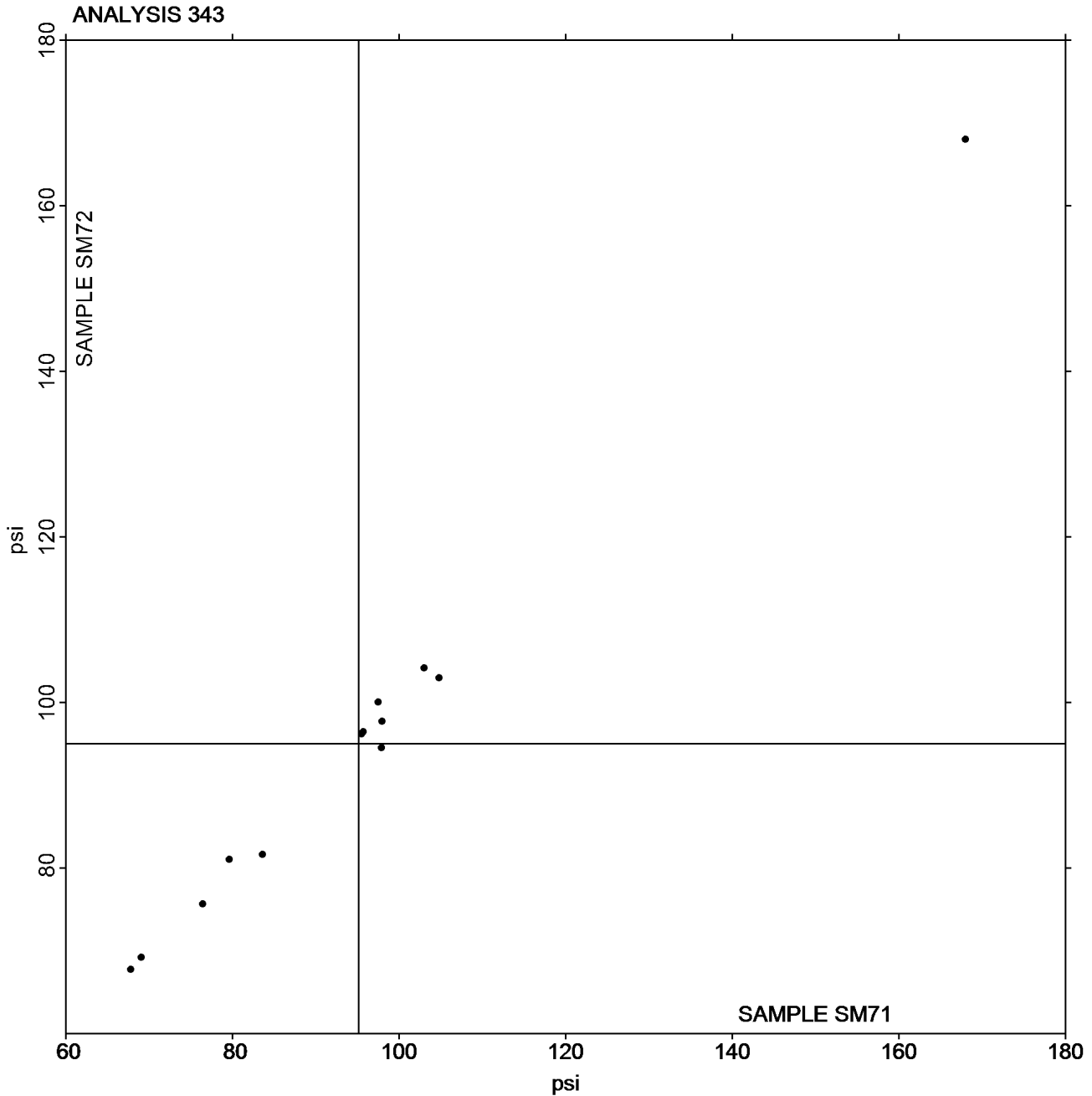
Report #3021S,
September 2019

Analysis 343 Z-Direction Tensile

TAPPI Official Test Method T541

Grand Mean Sample SM71 = 95.160
psi

Grand Mean Sample SM72 = 95.006
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 #3021S,
September 2019

WebCode	Data Flag	<u>Sample SZ71</u>			<u>Sample SZ72</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2ER43Q		63.62	2.88	0.36	63.62	1.36	0.16	PG
6DQ89D		57.60	-3.14	-0.39	60.80	-1.45	-0.17	CA
AB4JDE		63.98	3.24	0.41	65.40	3.15	0.36	CA
AX2Q9W		66.80	6.06	0.76	67.60	5.35	0.61	CA
CALC3G		61.72	0.98	0.12	60.08	-2.17	-0.25	CD
DQ6HXD		58.84	-1.90	-0.24	68.72	6.47	0.74	LW
F7DVLP		69.32	8.58	1.08	73.10	10.85	1.24	TA
FHKYQJ		61.00	0.26	0.03	64.40	2.15	0.25	CA
HVJPGG		51.51	-9.23	-1.16	57.70	-4.56	-0.52	TA
KGFZJ8		69.96	9.22	1.16	71.20	8.95	1.02	LW
MH6X3X		58.40	-2.34	-0.29	58.04	-4.21	-0.48	CD
N6T6UH		45.40	-15.34	-1.93	47.34	-14.91	-1.71	LW
PGH9PV		48.22	-12.52	-1.57	46.36	-15.89	-1.82	TZ
RVUNPW		65.40	4.66	0.59	65.00	2.75	0.31	CA
TP3QJ7		62.12	1.38	0.17	62.20	-0.05	-0.01	LW
YVQAHN		75.60	14.86	1.87	77.60	15.35	1.76	LW
ZQ64YK		53.12	-7.62	-0.96	49.16	-13.09	-1.50	XX

Summary Statistics	<u>Sample SZ71</u>	<u>Sample SZ72</u>
Grand Means	60.74 psi	62.25 psi
Std Dev Btwn Labs	7.96 psi	8.73 psi
Statistics based on 17 of 17 reporting participants.		

Key to Instrument Codes Reported by Participants

CA	CSI CS-163	CD	CSI CS-163D
LW	L & W ZD Tensile Tester	PG	Perkins Model A Mullen Tester
TA	Thwing-Albert Tensile Tester	TZ	TMI Monitor/ZDT Tester
XX	Instrument make/model not specified by lab		

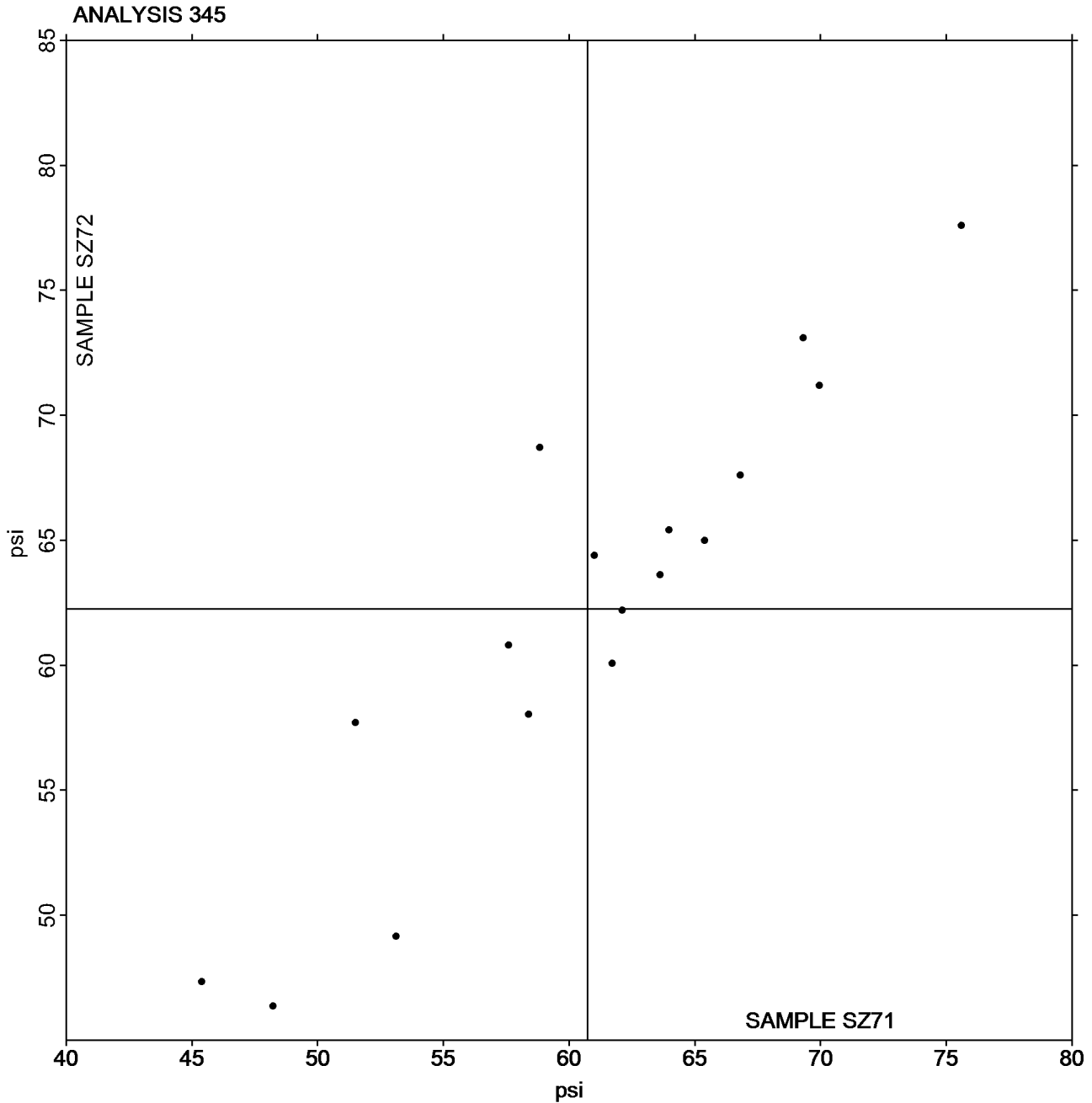


Paper & Paperboard Interlaboratory Testing Program
Analysis 345
Z-Direction Tensile, Recycled Paperboard
TAPPI Official Test Method T541

Report #3021S,
September 2019

Grand Mean Sample SZ71 = 60.742
psi

Grand Mean Sample SZ72 = 62.254
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 #3021S,
September 2019

WebCode	Data Flag	Sample SN71			Sample SN72			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6T29JU		139.0	-24.1	-1.19	124.8	-34.5	-1.70	HZ
6YL9XL		186.0	22.9	1.13	184.6	25.3	1.25	HY
AMXQEP		182.0	18.9	0.94	174.4	15.1	0.75	HY
AX2Q9W		150.0	-13.1	-0.65	147.6	-11.7	-0.58	HY
BH42P6		170.8	7.7	0.38	163.0	3.7	0.18	HY
CHDMEX		146.6	-16.5	-0.82	144.2	-15.1	-0.74	HY
E4AYGN		149.2	-13.9	-0.69	152.4	-6.8	-0.34	KR
F3EKQP		192.5	29.4	1.46	190.2	30.9	1.52	HY
FHKYQJ		157.4	-5.7	-0.28	161.0	1.7	0.08	HZ
GK9Z3K		167.6	4.5	0.22	166.8	7.5	0.37	HZ
KTQFKK		168.6	5.5	0.27	163.6	4.3	0.21	HY
PPVGWN		160.6	-2.5	-0.13	156.3	-3.0	-0.15	HY
QTC2J4		176.2	13.1	0.65	176.6	17.3	0.85	HZ
RJGJHZ		162.4	-0.7	-0.04	156.2	-3.1	-0.15	HY
TXEUNJ		177.0	13.9	0.69	169.0	9.7	0.48	HZ
ZQ64YK		177.2	14.1	0.70	168.4	9.1	0.45	HY
ZQPM4Q		109.8	-53.3	-2.64	108.6	-50.7	-2.50	HY

Summary Statistics	Sample SN71	Sample SN72
Grand Means	163.11 1000th ft-lbs	159.28 1000th ft-lbs
Std Dev Btwn Labs	20.19 1000th ft-lbs	20.28 1000th ft-lbs
Statistics based on 17 of 17 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



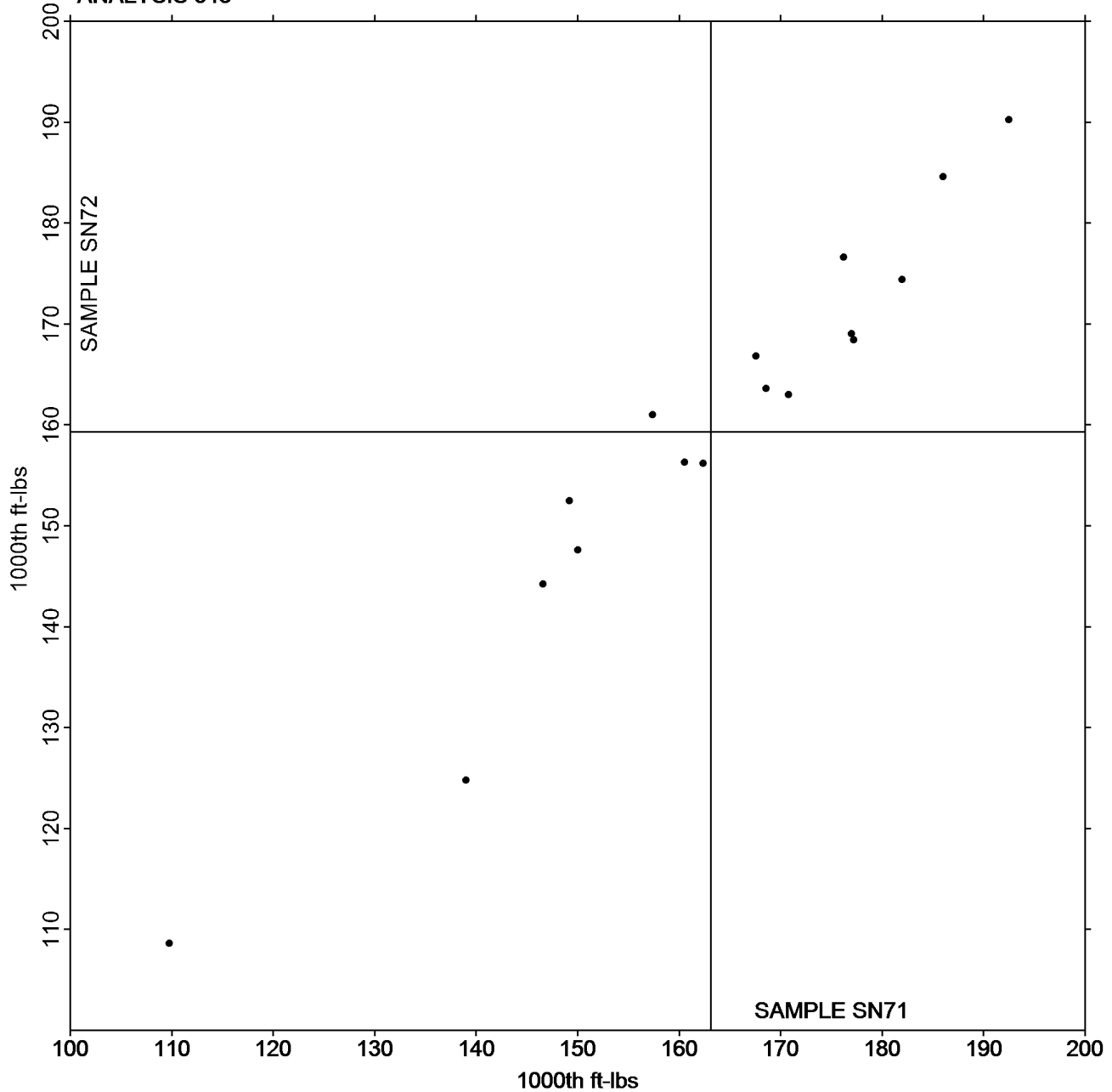
Paper & Paperboard Interlaboratory Testing Program
Analysis 348
Internal Bond Strength - Modified Scott Mechanics
TAPPI Provisional Test Method T569

Report #3021S,
September 2019

Grand Mean Sample SN71 = 163.11
1000th ft-lbs

Grand Mean Sample SN72 = 159.28
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 #3021S,
September 2019

WebCode	Data Flag	<u>Sample SP71</u>			<u>Sample SP72</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4JBDYT		135.2	-21.1	-0.77	138.6	-9.3	-0.26	TM
A83EZU		115.0	-41.4	-1.50	110.7	-37.2	-1.05	TM
B6F2TB		153.2	-3.1	-0.11	86.2	-61.6	-1.75	SC
ERFKJC		196.9	40.6	1.48	195.8	48.0	1.36	XX
GBWM3G		137.4	-18.9	-0.69	132.4	-15.4	-0.44	SC
GDMP86		191.0	34.7	1.26	190.8	43.0	1.22	SC
QC464B		136.9	-19.4	-0.70	134.4	-13.5	-0.38	XX
RTLFW		186.6	30.3	1.10	182.6	34.8	0.99	TM
TP3QJ7		147.0	-9.3	-0.34	147.6	-0.2	-0.01	XX
Z9QPLV		163.9	7.6	0.28	159.4	11.6	0.33	TM

Summary Statistics	<u>Sample SP71</u>	<u>Sample SP72</u>
Grand Means	156.32 1000th ft-lbs	147.84 1000th ft-lbs
Std Dev Btwn Labs	27.51 1000th ft-lbs	35.24 1000th ft-lbs
	Statistics based on 10 of 10 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



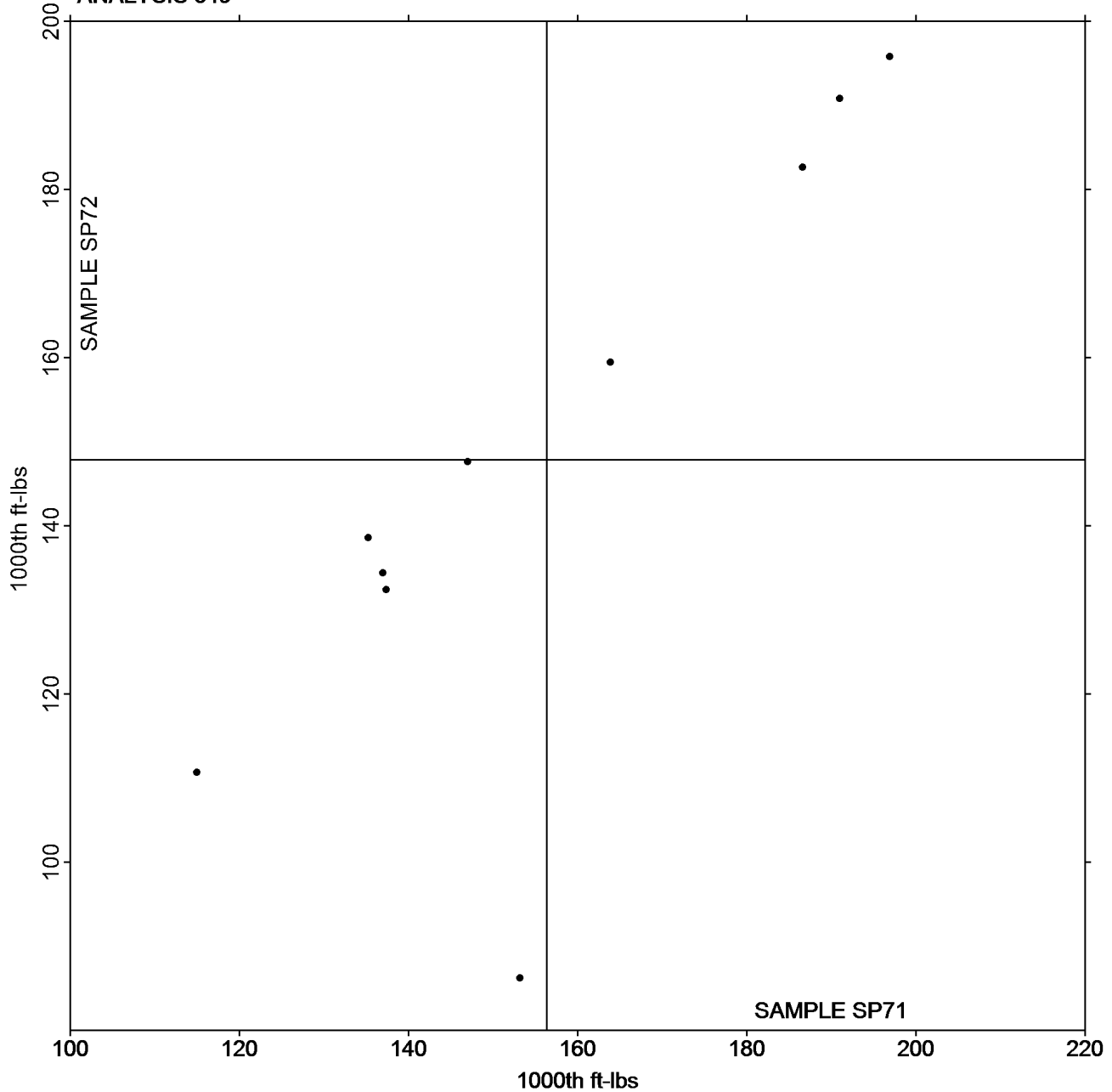
Paper & Paperboard Interlaboratory Testing Program
Analysis 349
Internal Bond Strength - Scott Bond Models
TAPPI Provisional Test Method T569

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Grand Mean Sample SP71 = 156.32
1000th ft-lbs

Grand Mean Sample SP72 = 147.84
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.



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-End of Report-