



Paper & Paperboard Testing Program

Summary Report #3051 S - March 2020

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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 #3051S,
March 2020

WebCode	Data Flag	Sample SA77			Sample SA78		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2D6ULL		43.34	-0.96	-0.21	43.45	-0.98	-0.21
3D3EV7		44.12	-0.18	-0.04	42.86	-1.57	-0.34
6CL94L	*	57.02	12.72	2.71	55.66	11.22	2.45
6Q3ZB2		44.28	-0.02	0.00	42.76	-1.67	-0.37
722CJZ		41.20	-3.10	-0.66	40.96	-3.47	-0.76
8JUK9H		42.49	-1.81	-0.39	43.57	-0.86	-0.19
CLJEZ7		55.97	11.67	2.49	54.64	10.20	2.23
CTLJWV		44.19	-0.11	-0.02	43.87	-0.56	-0.12
FWDTUN		37.83	-6.48	-1.38	38.87	-5.56	-1.22
HH4ZW8		45.12	0.82	0.17	46.78	2.35	0.51
LWRA83		40.15	-4.15	-0.88	40.12	-4.32	-0.94
N93G6E		44.81	0.51	0.11	43.85	-0.58	-0.13
P7LNLW		41.37	-2.94	-0.63	41.64	-2.79	-0.61
RLTP8X	*	49.20	4.90	1.04	52.00	7.57	1.65
RU7E9Q		40.06	-4.24	-0.90	40.78	-3.65	-0.80
U9JEB		42.67	-1.63	-0.35	42.53	-1.91	-0.42
UMGVME		46.19	1.89	0.40	45.75	1.32	0.29
W9T8T8		40.96	-3.34	-0.71	41.28	-3.15	-0.69
WUDAM7		47.00	2.70	0.57	49.40	4.97	1.09
Y4NJ2A		43.22	-1.08	-0.23	42.95	-1.49	-0.32
YWBCJK		42.46	-1.84	-0.39	42.71	-1.72	-0.38
ZU3LUG		41.00	-3.30	-0.70	41.10	-3.33	-0.73

Summary Statistics	Sample SA77	Sample SA78
Grand Means	44.30 psi	44.43 psi
Std Dev Btwn Labs	4.69 psi	4.57 psi
Statistics based on 22 of 22 reporting participants.		



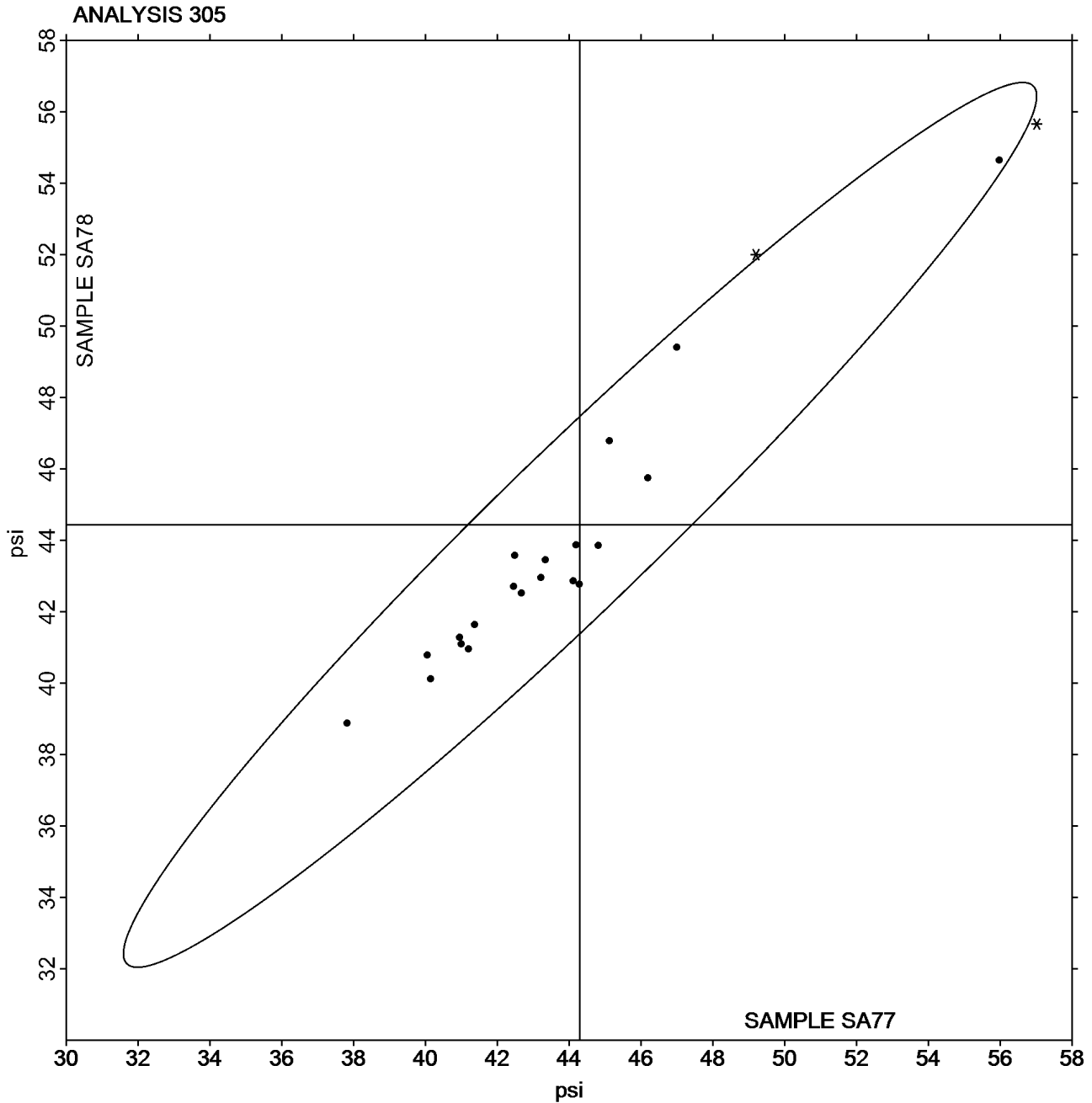
Paper & Paperboard Interlaboratory Testing Program

Report #3051S,
March 2020

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

Grand Mean Sample SA77 = 44.302
psi

Grand Mean Sample SA78 = 44.433
psi





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

Report #3051S,
March 2020

WebCode	Data Flag	Sample SB77			Sample SB78		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29EJCM		87.11	-6.61	-1.08	85.27	-5.56	-0.94
4YK9YX		89.28	-4.44	-0.73	92.83	2.00	0.34
67U2KD		91.80	-1.92	-0.32	86.80	-4.03	-0.68
6CL94L		98.32	4.60	0.75	96.57	5.73	0.96
7W7HLY		88.82	-4.90	-0.80	86.32	-4.51	-0.76
8QUUL3		90.11	-3.61	-0.59	90.37	-0.46	-0.08
9XP2YF		104.71	10.99	1.80	99.31	8.48	1.43
CDE8K8		96.00	2.28	0.37	90.15	-0.68	-0.11
CXXC6B		97.62	3.89	0.64	94.67	3.84	0.65
DZYZW6		89.70	-4.02	-0.66	81.60	-9.23	-1.55
EBF4GA		94.17	0.45	0.07	88.50	-2.33	-0.39
FJNT4L		105.92	12.20	2.00	103.72	12.89	2.17
JNNFZ6		100.36	6.64	1.09	99.21	8.38	1.41
N8NZ4U		87.05	-6.67	-1.09	85.10	-5.73	-0.96
PYNY4T		93.60	-0.12	-0.02	88.10	-2.73	-0.46
T4Q3PB		93.90	0.18	0.03	91.80	0.97	0.16
TGCGJX		84.60	-9.12	-1.49	88.39	-2.44	-0.41
VD7T2D		86.12	-7.60	-1.25	79.17	-11.66	-1.96
VMDF8T		95.30	1.58	0.26	95.40	4.57	0.77
WFNE6K		98.06	4.34	0.71	100.48	9.65	1.62
WJNQZK		102.35	8.63	1.41	93.90	3.07	0.52
X3X6VK		100.10	6.38	1.04	94.80	3.97	0.67
XN3M7M		85.41	-8.31	-1.36	84.78	-6.06	-1.02
Y4NJ2A		87.43	-6.29	-1.03	88.75	-2.08	-0.35
YWBCJK		87.87	-5.85	-0.96	85.01	-5.82	-0.98
ZKRK9G		96.75	3.03	0.50	89.35	-1.48	-0.25
ZU3LUG		98.06	4.34	0.71	92.10	1.27	0.21

Summary Statistics	Sample SB77	Sample SB78
Grand Means	93.72 psi	90.83 psi
Std Dev Btwn Labs	6.10 psi	5.95 psi
Statistics based on 27 of 27 reporting participants.		

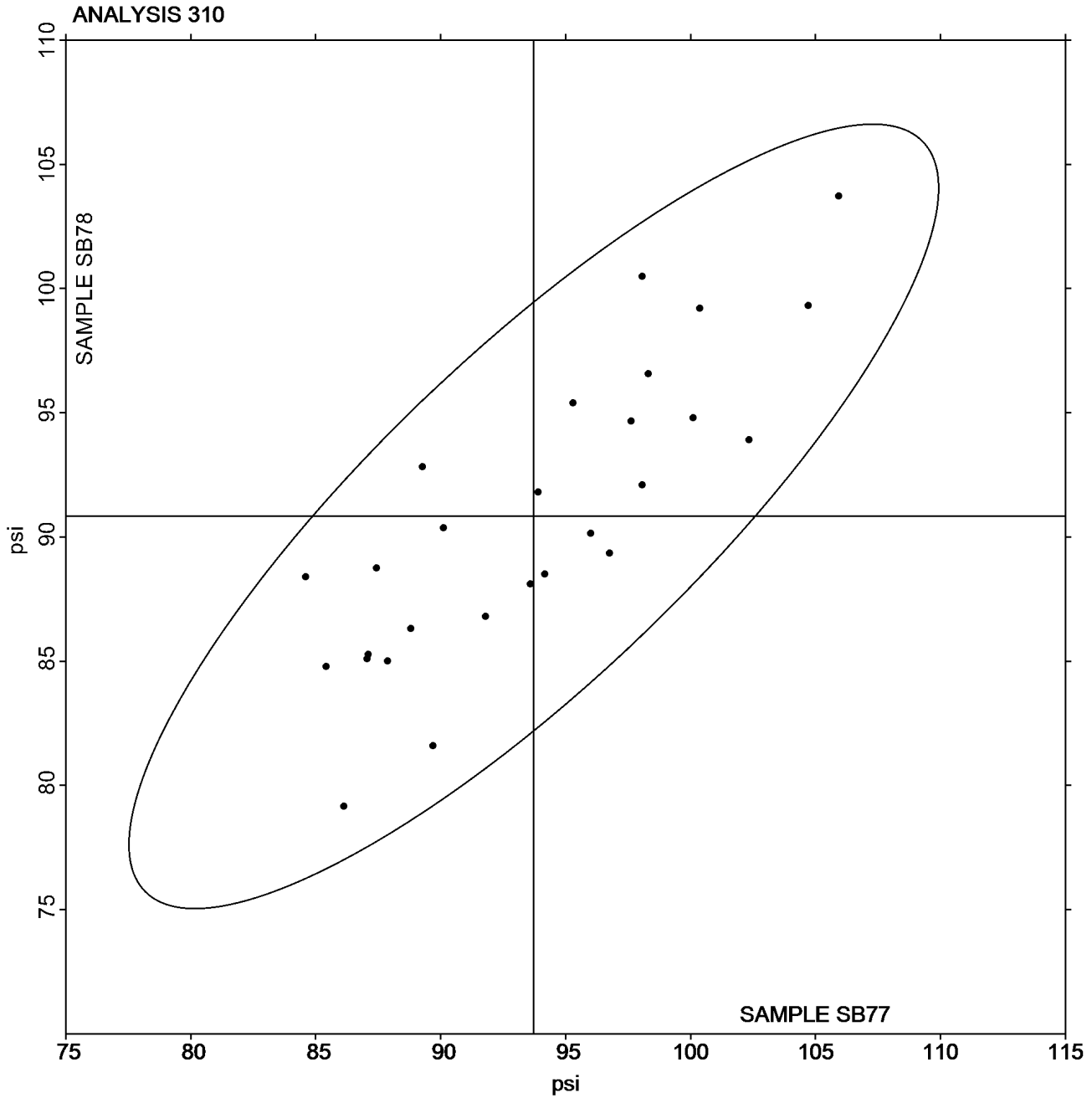


Paper & Paperboard Interlaboratory Testing Program
Analysis 310
Bursting Strength - Packaging Papers
TAPPI Official Test Method T403

Report #3051S,
March 2020

Grand Mean Sample SB77 = 93.723
psi

Grand Mean Sample SB78 = 90.831
psi





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

Report #3051S,
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WebCode	Data Flag	<u>Sample SK77</u>			<u>Sample SK78</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6Q3ZB2		30.90	1.81	0.25	29.58	1.26	0.18
9ZEKLY		32.96	3.87	0.53	31.86	3.53	0.50
FXPPYR		34.21	5.12	0.70	33.77	5.45	0.77
HH4ZW8		18.30	-10.79	-1.47	18.08	-10.24	-1.45

Summary Statistics	<u>Sample SK77</u>	<u>Sample SK78</u>
Grand Means	29.09 Grams	28.32 Grams
Stnd Dev Btwn Labs	7.32 Grams	7.04 Grams
Statistics based on 4 of 4 reporting participants.		



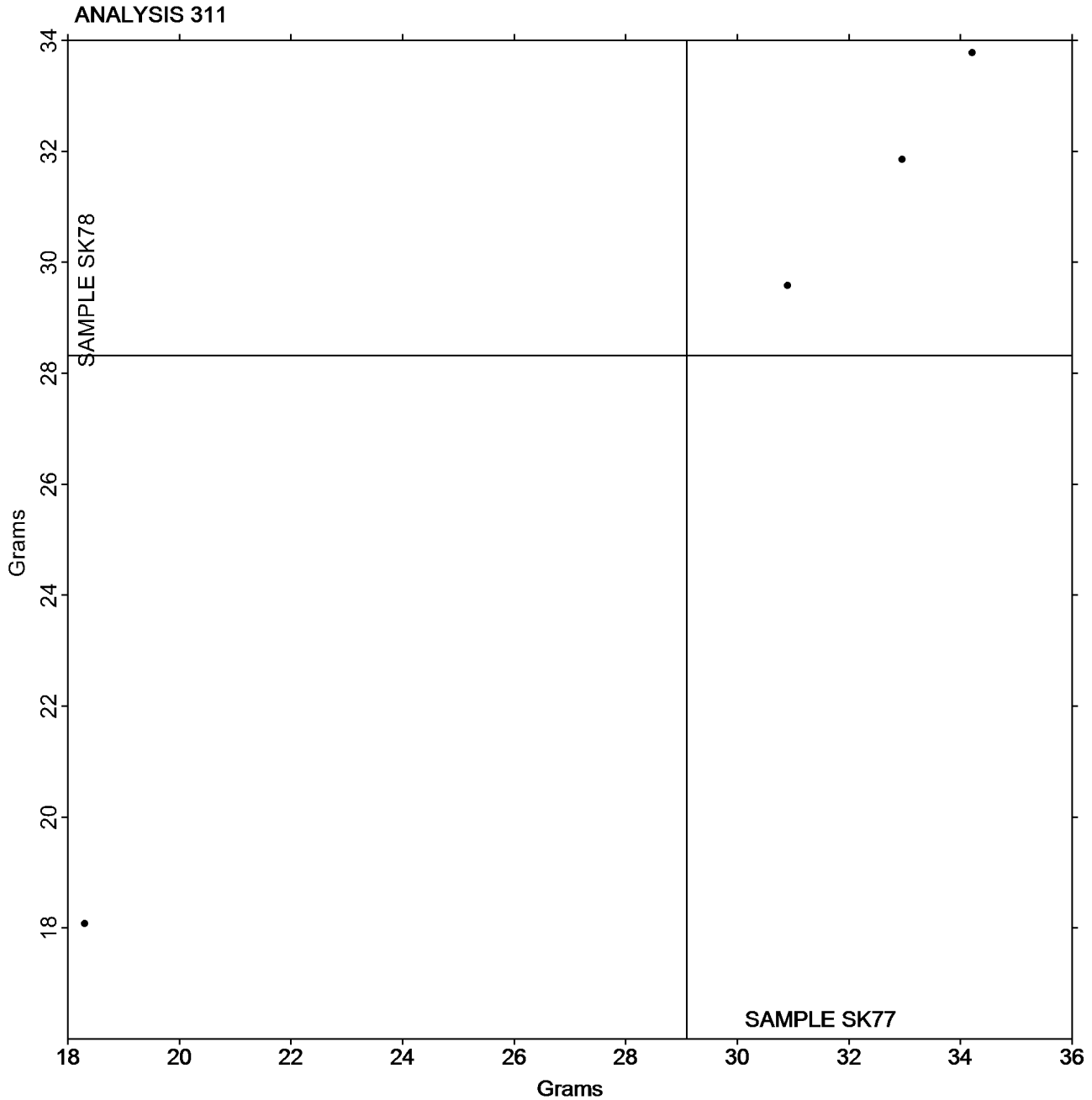
Paper & Paperboard Interlaboratory Testing Program

Report #3051S,
March 2020

Analysis 311 Tearing Strength - Newsprint TAPPI Official Test Method T414

Grand Mean Sample SK77 = 29.092
Grams

Grand Mean Sample SK78 = 28.323
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 #3051S,
March 2020

WebCode	Data Flag	Sample SC77			Sample SC78		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29EJCM		66.35	2.00	0.40	63.36	1.53	0.34
29T2D8		63.62	-0.73	-0.15	61.52	-0.30	-0.07
2D6ULL		65.27	0.92	0.18	62.63	0.81	0.18
3A4ZA2		58.58	-5.77	-1.15	56.10	-5.72	-1.28
3D3EV7		70.96	6.61	1.31	68.23	6.41	1.43
4YK9YX		70.22	5.86	1.17	66.66	4.84	1.08
6CL6V6		69.86	5.51	1.09	65.94	4.12	0.92
6CL94L	*	65.43	1.07	0.21	66.44	4.62	1.03
722CJZ		62.14	-2.21	-0.44	61.12	-0.70	-0.16
7RBQE2		58.41	-5.94	-1.18	57.87	-3.95	-0.88
7W7HLY		61.73	-2.62	-0.52	58.85	-2.97	-0.66
8JUK9H		66.16	1.81	0.36	63.44	1.62	0.36
97Q9LV		65.51	1.15	0.23	63.85	2.03	0.45
9AJHMG		58.40	-5.95	-1.18	57.40	-4.42	-0.99
9AL3JW		67.64	3.29	0.65	63.18	1.36	0.30
A7KEFV		63.98	-0.37	-0.07	59.59	-2.23	-0.50
BLTRAX		60.33	-4.02	-0.80	59.40	-2.42	-0.54
BRGGNF		62.92	-1.43	-0.28	60.44	-1.38	-0.31
CDE8K8		54.03	-10.32	-2.05	51.00	-10.82	-2.41
CTLJWV		55.01	-9.34	-1.86	54.10	-7.72	-1.72
CXXC6B		62.96	-1.39	-0.28	60.64	-1.18	-0.26
D6E8K6		59.85	-4.50	-0.90	57.66	-4.16	-0.93
EXUPLM		65.25	0.90	0.18	59.08	-2.74	-0.61
GHQZJL		64.71	0.36	0.07	62.63	0.81	0.18
GQ7LRP		67.38	3.03	0.60	63.84	2.02	0.45
GZRMAK	*	79.15	14.80	2.94	75.86	14.04	3.13
J8Z3NY		66.20	1.85	0.37	64.42	2.60	0.58
JVPMNK		66.34	1.99	0.40	62.14	0.32	0.07
KEZYTG		64.70	0.35	0.07	62.60	0.78	0.17
LWRA83		66.50	2.15	0.43	64.00	2.18	0.49
M4NJZD		66.00	1.65	0.33	63.40	1.58	0.35
N8NZ4U		57.15	-7.20	-1.43	56.53	-5.29	-1.18
P7LNLW		65.20	0.85	0.17	62.58	0.76	0.17
RY287R		69.86	5.51	1.10	67.21	5.39	1.20
TGCGJX		67.12	2.77	0.55	64.63	2.81	0.63
TU3DLV		59.56	-4.79	-0.95	55.96	-5.86	-1.31
U9JEB		62.39	-1.96	-0.39	57.01	-4.81	-1.07
UMGVME		57.64	-6.71	-1.33	58.80	-3.02	-0.67
VMDF8T		73.00	8.65	1.72	68.40	6.58	1.47
WFNE6K		61.71	-2.64	-0.52	62.19	0.37	0.08



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

Report #3051S,
March 2020

WebCode	Data Flag	<u>Sample SC77</u>			<u>Sample SC78</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
WUDAM7		63.83	-0.52	-0.10	61.84	0.02	0.00
X3X6VK		59.20	-5.15	-1.02	57.28	-4.54	-1.01
XN3M7M		74.44	10.09	2.01	68.57	6.75	1.50
Y2KMH8		67.40	3.05	0.61	64.80	2.98	0.66
Y4NJ2A		61.78	-2.57	-0.51	58.76	-3.06	-0.68

Summary Statistics	<u>Sample SC77</u>	<u>Sample SC78</u>
Grand Means	64.35 Grams	61.82 Grams
Std Dev Btwn Labs	5.03 Grams	4.48 Grams
Statistics based on 45 of 45 reporting participants.		



Paper & Paperboard Interlaboratory Testing Program

Report #3051S,
March 2020

Analysis 312

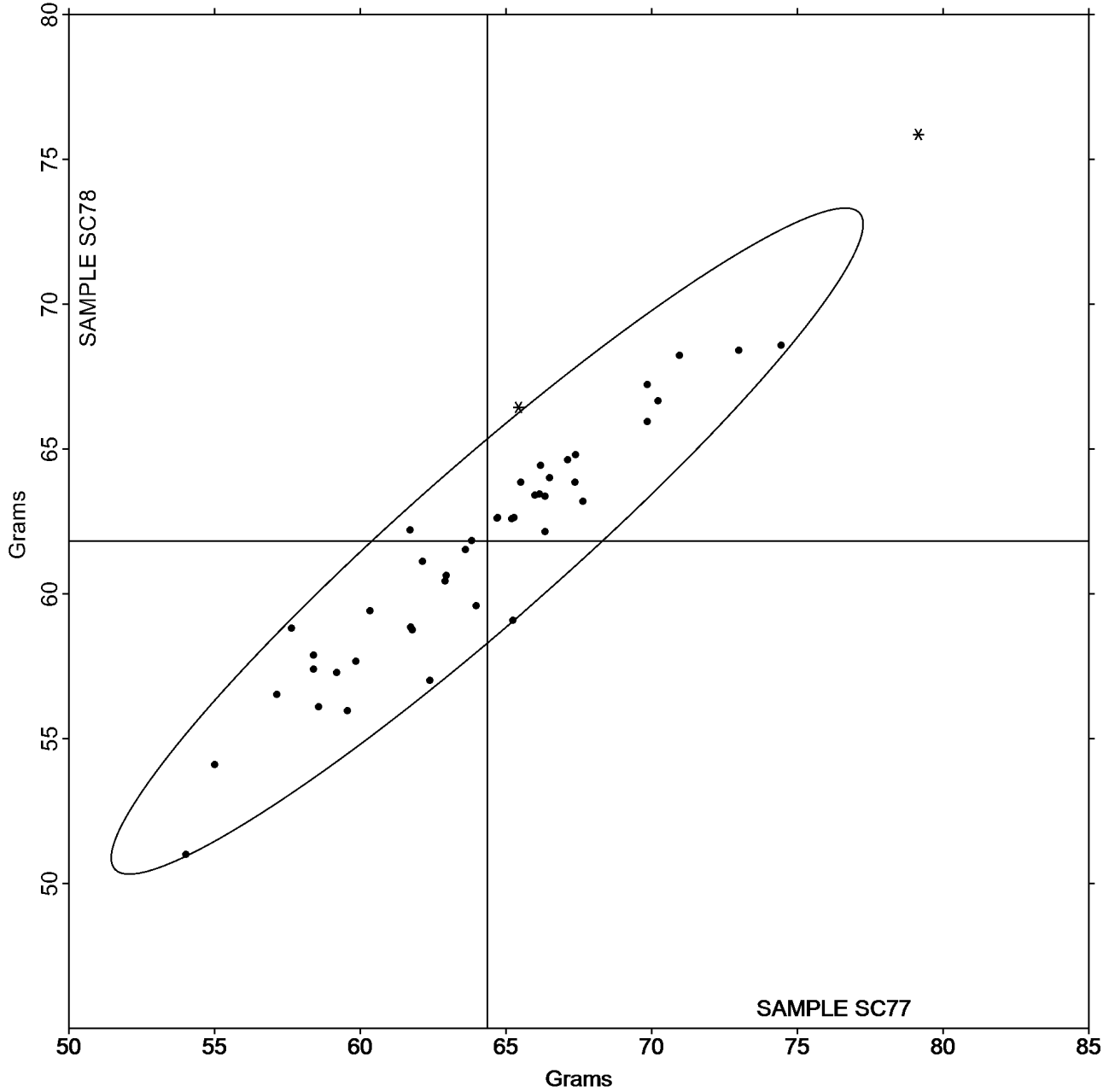
Tearing Strength - Printing Papers

TAPPI Official Test Method T414

Grand Mean Sample SC77 = 64.353
Grams

Grand Mean Sample SC78 = 61.821
Grams

ANALYSIS 312





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

Report #3051S,
March 2020

WebCode	Data Flag	Sample SD77			Sample SD78		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2DNVB9		224.8	16.3	0.97	177.4	14.2	0.96
3AM788		234.6	26.1	1.56	178.1	15.0	1.01
4YK9YX		224.3	15.8	0.94	175.0	11.9	0.80
7KBG2H		167.5	-41.0	-2.45	126.9	-36.2	-2.45
8QUUL3		226.8	18.3	1.09	179.1	15.9	1.08
97Q9LV		221.9	13.4	0.80	170.6	7.5	0.51
9A2L4U		197.7	-10.8	-0.64	164.6	1.4	0.10
9XP2YF		194.2	-14.3	-0.85	153.8	-9.3	-0.63
EBF4GA		215.7	7.2	0.43	171.9	8.8	0.59
EMT2UQ		217.9	9.4	0.56	159.7	-3.4	-0.23
FKZRXU		219.2	10.7	0.64	172.0	8.9	0.60
FZ9NB2		196.2	-12.3	-0.74	159.0	-4.1	-0.28
GVFYAN		202.6	-5.9	-0.35	152.8	-10.4	-0.70
H6E266	X	272.4	63.8	3.81	189.9	26.7	1.81
HC6AWQ		201.7	-6.8	-0.40	163.6	0.5	0.03
HL6WNN		203.5	-5.0	-0.30	161.0	-2.1	-0.15
KCAHV2		218.0	9.5	0.57	178.8	15.7	1.06
KCP2FY		217.8	9.3	0.56	165.4	2.2	0.15
M4NJZD		222.3	13.8	0.82	169.3	6.2	0.42
MGXZ7H		207.5	-1.0	-0.06	160.9	-2.2	-0.15
MH92RG		212.4	3.9	0.23	172.8	9.7	0.65
MMLM2N		220.5	12.0	0.71	168.8	5.7	0.38
MZ84NZ	*	223.2	14.7	0.88	191.6	28.5	1.93
NKCYVW		177.0	-31.5	-1.88	134.3	-28.8	-1.95
P7Q7JV		201.4	-7.1	-0.42	157.2	-5.9	-0.40
PLEG7X		209.6	1.1	0.07	168.0	4.9	0.33
PYNY4T		213.0	4.5	0.27	179.4	16.3	1.10
QXQ7JT		206.6	-1.9	-0.12	151.4	-11.7	-0.79
REEG7V		196.8	-11.7	-0.70	161.6	-1.6	-0.11
T4Q3PB	*	166.9	-41.6	-2.48	119.3	-43.8	-2.96
VA4Z2M		195.3	-13.2	-0.79	152.8	-10.3	-0.70
VD7T2D		215.5	7.0	0.42	164.5	1.4	0.09
VHHLAR		216.0	7.5	0.45	167.5	4.4	0.29
VMDF8T		228.4	19.9	1.19	171.2	8.1	0.55
VXD3ZP		192.6	-15.9	-0.95	152.8	-10.3	-0.70
WJNQZK		233.4	24.9	1.49	179.2	16.1	1.09
WV3M7N		181.5	-27.0	-1.61	134.7	-28.5	-1.92
X3L2Q9		194.1	-14.4	-0.86	156.3	-6.8	-0.46
XC6K2T		209.0	0.5	0.03	168.4	5.2	0.35
Y6K4MN		231.1	22.6	1.35	172.3	9.1	0.62



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

Report #3051S,
March 2020

WebCode	Data Flag	<u>Sample SD77</u>			<u>Sample SD78</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
YJXCMR	X	196.1	-12.4	-0.74	181.8	18.6	1.26
ZKRK9G	X	273.3	64.7	3.87	191.2	28.1	1.90
ZU3LUG		201.6	-6.9	-0.41	161.2	-1.9	-0.13

Summary Statistics	<u>Sample SD77</u>	<u>Sample SD78</u>
Grand Means	208.50 Grams	163.13 Grams
Stnd Dev Btwn Labs	16.75 Grams	14.81 Grams
Statistics based on 40 of 43 reporting participants.		

Comments on Assigned Data Flags for Test #314

- H6E266 (X) - Data for sample SD77 are high. Inconsistent within the determinations of sample SD77.
- YJXCMR (X) - Inconsistent in testing between samples.
- ZKRK9G (X) - Data for sample SD77 are high.

Analysis Notes:

PLEG7X - Data appear to be transposed between samples. Switched by CTS.



Paper & Paperboard Interlaboratory Testing Program

Report #3051S,
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Analysis 314

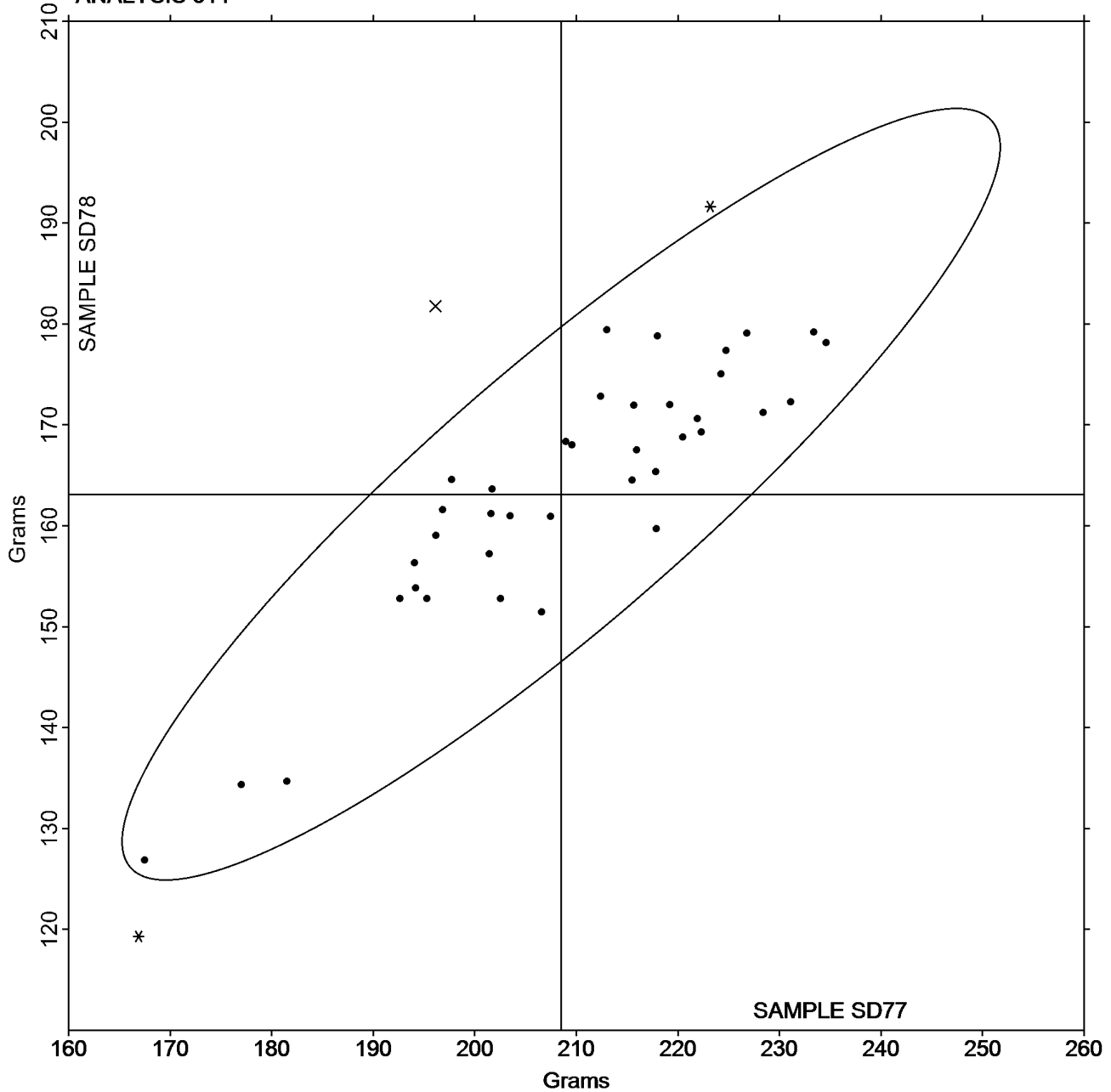
Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

Grand Mean Sample SD77 = 208.50
Grams

Grand Mean Sample SD78 = 163.13
Grams

ANALYSIS 314





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

Report #3051S,
March 2020

WebCode	Data Flag	Sample SR77			Sample SR78		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6Q3ZB2		2.840	-0.004	-0.04	2.917	0.034	0.42
97Q9LV		2.798	-0.046	-0.50	2.856	-0.028	-0.35
9ZEKLY		2.765	-0.079	-0.85	2.836	-0.048	-0.59
A7KEFV		3.010	0.166	1.80	3.021	0.137	1.70
FXPPYR		2.833	-0.011	-0.11	2.983	0.099	1.23
HH4ZW8		2.919	0.075	0.81	2.892	0.008	0.10
N93G6E		2.688	-0.156	-1.69	2.863	-0.021	-0.26
VHHLAR		2.891	0.047	0.51	2.827	-0.057	-0.70
Y4NJ2A		2.851	0.007	0.08	2.759	-0.125	-1.55

Summary Statistics	Sample SR77	Sample SR78
Grand Means	2.84 kN/m	2.88 kN/m
Stnd Dev Btwn Labs	0.09 kN/m	0.08 kN/m

Statistics based on 9 of 9 reporting participants.

Analysis Notes:

- 9ZEKLY - Data appear to be off by a factor of 1000. May be missing a decimal point. CTS will not correct the data going forward.
- FXPPYR - Data appear to be off by a factor of 1000. May be missing a decimal point. CTS will not correct the data going forward.

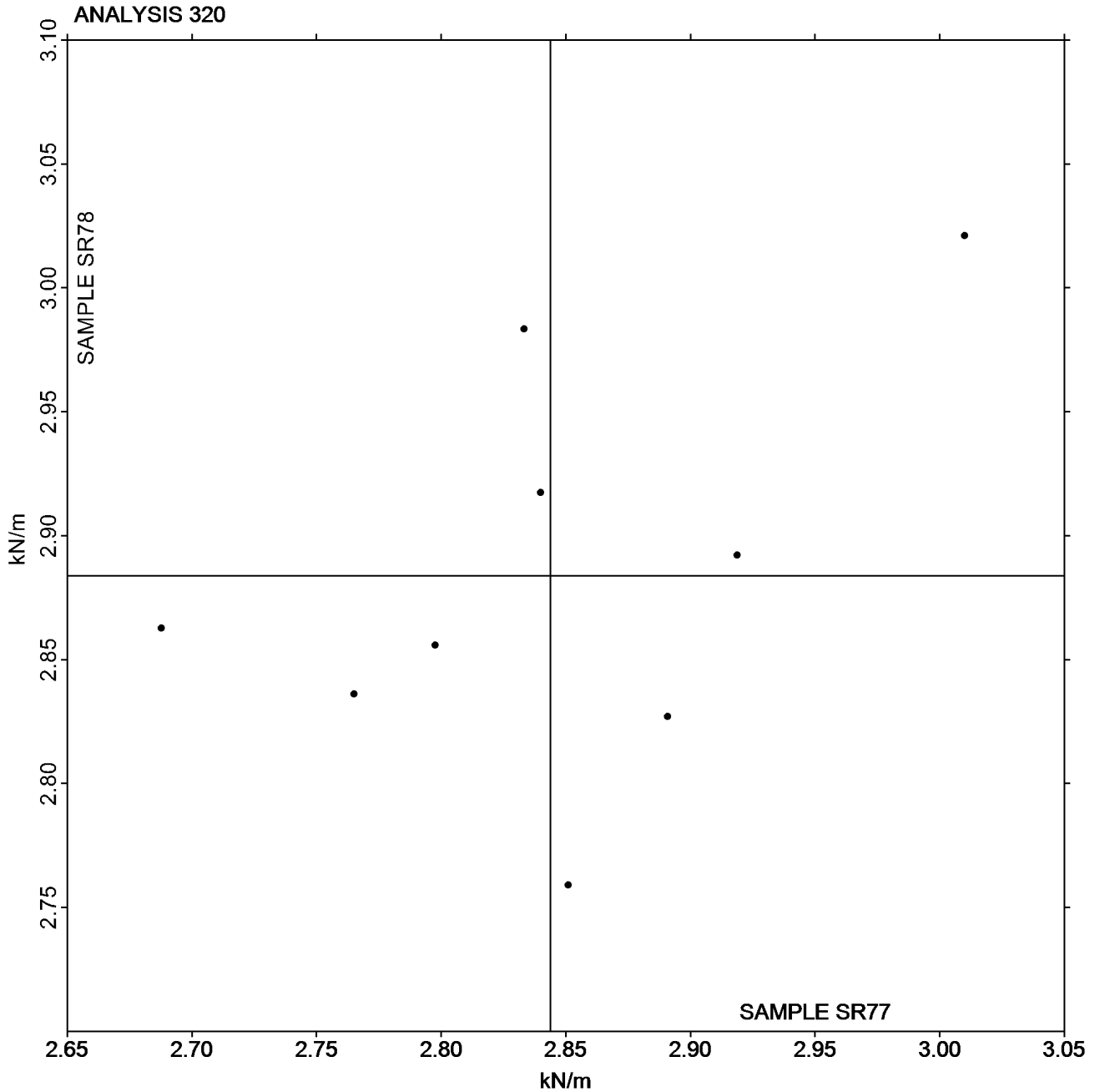


Paper & Paperboard Interlaboratory Testing Program
Analysis 320
Tensile Breaking Strength - Newsprint
TAPPI Official Test Method T494

Report #3051S,
March 2020

Grand Mean Sample SR77 = 2.8438
kN/m

Grand Mean Sample SR78 = 2.8838
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 #3051S,
March 2020

WebCode	Data Flag	<u>Sample SR77</u>			<u>Sample SR78</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6Q3ZB2		16.55	-0.89	-0.32	17.27	-0.74	-0.24
97Q9LV		18.42	0.98	0.35	20.32	2.30	0.73
9ZEKLY		14.15	-3.29	-1.17	14.50	-3.52	-1.12
A7KEFV		18.88	1.44	0.51	17.63	-0.39	-0.12
FXPPYR		15.96	-1.49	-0.53	17.51	-0.50	-0.16
HH4ZW8		21.44	4.00	1.42	23.18	5.16	1.64
N93G6E		14.86	-2.59	-0.92	17.29	-0.72	-0.23
VHHLAR		21.69	4.24	1.51	21.20	3.19	1.02
Y4NJ2A		15.05	-2.39	-0.85	13.24	-4.78	-1.52

Summary Statistics	<u>Sample SR77</u>	<u>Sample SR78</u>
Grand Means	17.44 Joules/sq m	18.02 Joules/sq m
Stnd Dev Btwn Labs	2.81 Joules/sq m	3.14 Joules/sq m
Statistics based on 9 of 9 reporting participants.		



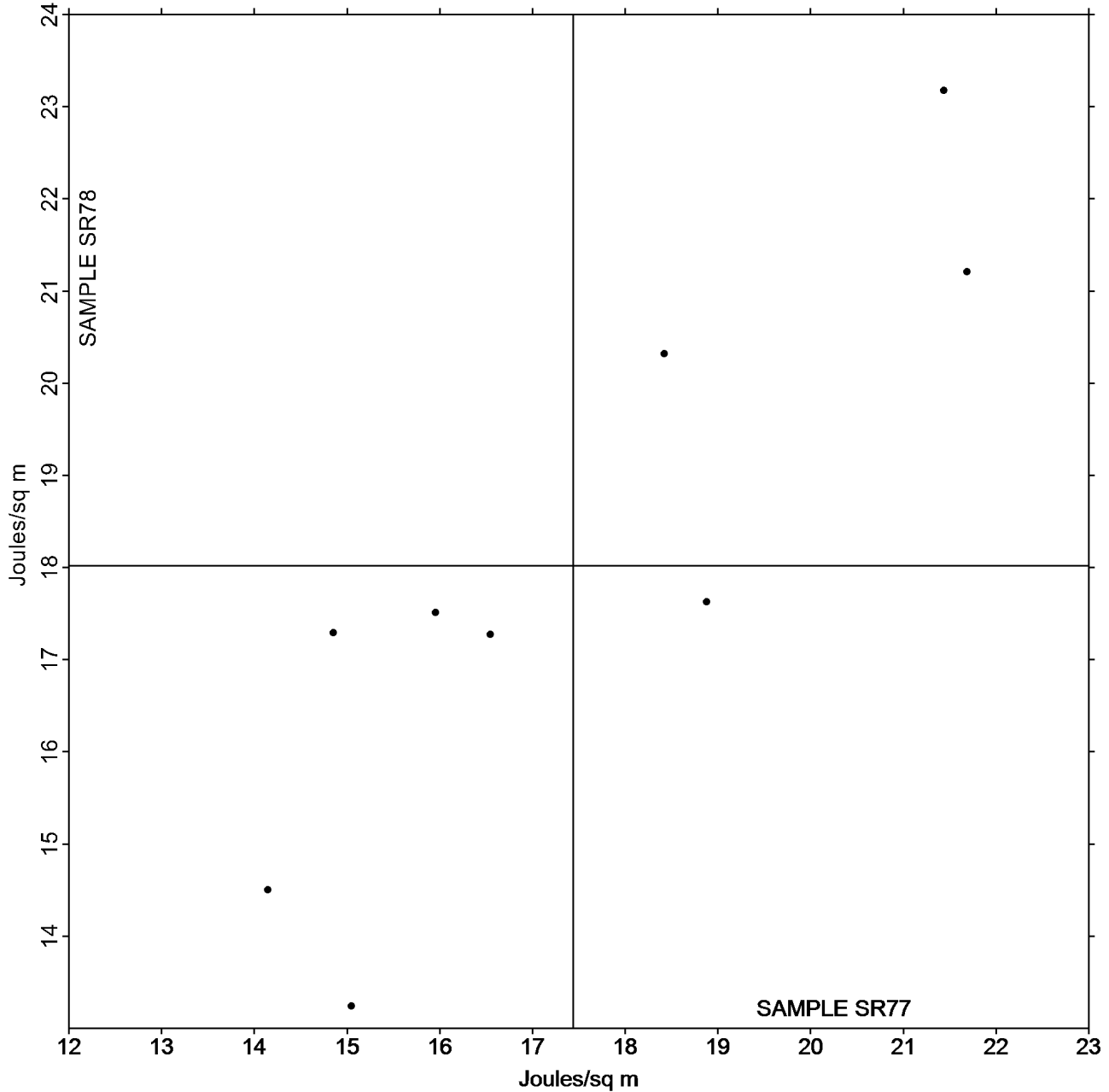
Paper & Paperboard Interlaboratory Testing Program
Analysis 321
Tensile Energy Absorption - Newsprint
TAPPI Official Test Method T494

Report #3051S,
March 2020

Grand Mean Sample SR77 = 17.442
Joules/sq m

Grand Mean Sample SR78 = 18.016
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 #3051S,
March 2020

WebCode	Data Flag	<u>Sample SR77</u>			<u>Sample SR78</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6Q3ZB2		1.234	0.207	1.58	1.267	0.221	1.57
97Q9LV		0.941	-0.086	-0.66	1.002	-0.043	-0.31
A7KEFV		1.057	0.030	0.23	0.996	-0.050	-0.35
FXPPYR		0.948	-0.079	-0.61	1.006	-0.040	-0.28
HH4ZW8		0.960	-0.067	-0.52	0.980	-0.066	-0.47
N93G6E		0.950	-0.077	-0.59	1.037	-0.008	-0.06
VHHLAR		1.221	0.194	1.48	1.237	0.192	1.36
Y4NJ2A		0.908	-0.119	-0.91	0.839	-0.207	-1.47

Summary Statistics	<u>Sample SR77</u>	<u>Sample SR78</u>
Grand Means	1.03 Percent	1.05 Percent
Std Dev Btwn Labs	0.13 Percent	0.14 Percent

Statistics based on 8 of 8 reporting participants.



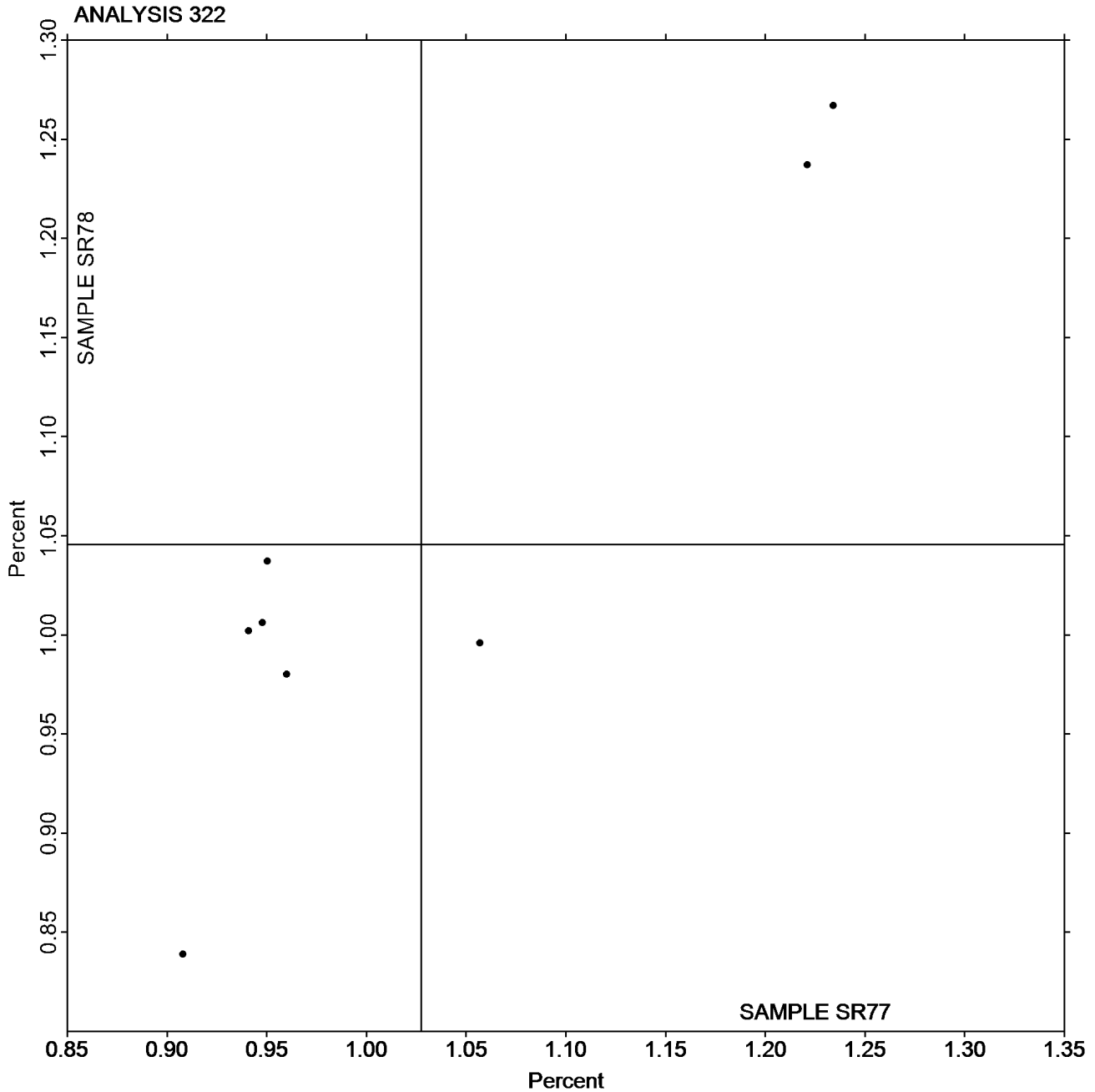
Paper & Paperboard Interlaboratory Testing Program

Report #3051S,
March 2020

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

Grand Mean Sample SR77 = 1.0274
Percent

Grand Mean Sample SR78 = 1.0455
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
Analysis 325
Tensile Breaking Strength - Printing Papers
TAPPI Official Test Method T494

Report #3051S,
March 2020

WebCode	Data Flag	Sample SF77			Sample SF78			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
29EJCM		6.909	0.025	0.07	6.961	0.113	0.29	LH
29T2D8		7.043	0.159	0.47	6.732	-0.117	-0.30	LE
2D6ULL		6.815	-0.069	-0.20	6.739	-0.110	-0.28	LF
3A4ZA2		6.627	-0.257	-0.75	6.564	-0.285	-0.73	TF
3D3EV7		6.755	-0.129	-0.38	6.742	-0.107	-0.27	LH
6CL6V6		6.427	-0.456	-1.34	6.362	-0.487	-1.24	ID
722CJZ		6.598	-0.286	-0.84	6.586	-0.262	-0.67	TB
7FERKB		7.172	0.288	0.85	7.429	0.580	1.48	LX
7RBQE2		6.855	-0.029	-0.09	7.029	0.181	0.46	LI
8JUK9H		6.761	-0.123	-0.36	6.813	-0.035	-0.09	LX
9AJHMG		7.476	0.592	1.74	7.462	0.613	1.57	LH
9AL3JW		6.520	-0.364	-1.07	6.385	-0.463	-1.18	IM
APUHCW		7.269	0.385	1.13	7.318	0.469	1.20	FP
AYYPCC	X	5.543	-1.341	-3.94	5.674	-1.174	-3.00	RE
BLTRAX		7.263	0.380	1.11	7.165	0.317	0.81	TC
CDE8K8		7.086	0.202	0.59	7.233	0.384	0.98	TF
CLJEZ7		7.190	0.306	0.90	7.316	0.468	1.20	LH
CTLJVW		6.647	-0.237	-0.70	6.761	-0.087	-0.22	TP
D6E8K6		7.108	0.225	0.66	6.902	0.053	0.14	LA
EMT2UQ		6.280	-0.604	-1.77	6.389	-0.460	-1.17	LI
EXUPLM		6.898	0.014	0.04	6.681	-0.167	-0.43	VM
FKZRXU		6.593	-0.291	-0.85	6.560	-0.289	-0.74	IM
FWDTUN		7.385	0.501	1.47	7.203	0.354	0.90	LX
GHQZJL		7.147	0.263	0.77	6.732	-0.117	-0.30	LI
GZRMAK		7.272	0.388	1.14	7.574	0.725	1.85	LB
J8Z3NY		7.518	0.635	1.86	7.750	0.902	2.30	XX
JVPMNK		7.080	0.197	0.58	6.802	-0.046	-0.12	XX
KEZYTG		6.635	-0.249	-0.73	6.646	-0.202	-0.52	TO
LWRA83		6.690	-0.194	-0.57	6.485	-0.363	-0.93	TF
MB8RFW	X	2.778	-4.106	-12.06	3.141	-3.708	-9.47	XX
MH7GW2		6.841	-0.043	-0.13	6.974	0.126	0.32	TV
P7LNLW	*	6.295	-0.589	-1.73	6.575	-0.274	-0.70	LI
RCQ3ND		6.483	-0.401	-1.18	6.363	-0.486	-1.24	LA
TGCGJX		6.298	-0.586	-1.72	6.255	-0.594	-1.52	LI
TU3DLV		6.805	-0.079	-0.23	6.627	-0.222	-0.57	TB
U9JJEB		6.466	-0.418	-1.23	6.243	-0.605	-1.55	LA
UMGVME		7.462	0.578	1.70	7.608	0.759	1.94	TJ
W9T8T8		7.060	0.176	0.52	6.959	0.111	0.28	LH
WFNE6K		6.630	-0.254	-0.75	6.430	-0.419	-1.07	LH
WUDAM7		6.850	-0.034	-0.10	6.827	-0.022	-0.06	LH



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

Report #3051S,
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WebCode	Data Flag	Sample SF77			Sample SF78			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
X3X6VK		7.019	0.135	0.40	6.734	-0.115	-0.29	TO
Y4NJ2A		7.125	0.241	0.71	7.026	0.177	0.45	LH

Summary Statistics	Sample SF77	Sample SF78
Grand Means	6.88 kN/m	6.85 kN/m
Std Dev Btwn Labs	0.34 kN/m	0.39 kN/m

Statistics based on 40 of 42 reporting participants.

Comments on Assigned Data Flags for Test #325

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

MB8RFW (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

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	TO	Thwing-Albert QC-1000
TP	TMI Monitor/Tensile 100 (84-21-01)	TV	Thwing-Albert Vantage NX
VM	Valmet PaperLab (was Kajaani/Robotest)	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program

Report #3051S,
March 2020

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF77			Sample SF78			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
29EJCM		97.54	1.75	0.14	99.84	7.13	0.61	LH
2D6ULL		96.55	0.76	0.06	93.11	0.39	0.03	LF
3D3EV7		97.26	1.47	0.12	94.53	1.81	0.16	LH
6CL6V6		97.84	2.05	0.17	92.97	0.26	0.02	ID
722CJZ		107.00	11.21	0.93	104.90	12.18	1.05	TB
7FERKB		100.23	4.44	0.37	100.79	8.07	0.69	LX
7RBQE2		76.75	-19.04	-1.58	77.95	-14.77	-1.27	LX
8JUK9H		92.55	-3.24	-0.27	92.13	-0.59	-0.05	LX
9AJHMG		95.42	-0.37	-0.03	92.12	-0.60	-0.05	LH
9AL3JW		87.22	-8.58	-0.71	84.34	-8.38	-0.72	IM
APUHCW		118.79	23.00	1.91	114.73	22.01	1.89	FP
AYYPCC		88.87	-6.92	-0.57	88.08	-4.64	-0.40	RE
CDE8K8		85.97	-9.82	-0.81	83.32	-9.39	-0.81	TF
CTLJVW		96.52	0.73	0.06	93.93	1.21	0.10	TP
D6E8K6		98.56	2.77	0.23	91.93	-0.79	-0.07	LA
EMT2UQ		89.58	-6.21	-0.51	90.64	-2.07	-0.18	LI
FKZRXU		96.96	1.17	0.10	92.99	0.28	0.02	IM
FWDTUN		98.98	3.19	0.26	94.10	1.38	0.12	LX
GHQZJL		89.61	-6.18	-0.51	84.88	-7.84	-0.67	LI
GZRMAK		106.23	10.44	0.86	103.48	10.76	0.92	LB
J8Z3NY		105.51	9.72	0.81	111.06	18.34	1.58	XX
JVPMNK		70.97	-24.82	-2.06	67.13	-25.58	-2.20	XX
KEZYTG		101.99	6.20	0.51	96.50	3.79	0.33	TO
LWRA83		110.51	14.71	1.22	100.40	7.68	0.66	TF
MH7GW2		115.95	20.16	1.67	112.27	19.56	1.68	TF
P7LNLW	*	72.84	-22.95	-1.90	79.93	-12.79	-1.10	LI
RCQ3ND		105.51	9.72	0.81	105.08	12.36	1.06	LA
TGCGJX		88.32	-7.47	-0.62	84.37	-8.34	-0.72	LI
U9JJEB	*	66.26	-29.53	-2.45	57.63	-35.09	-3.01	LA
W9T8T8		99.36	3.56	0.30	94.18	1.46	0.13	LH
WFNE6K		97.34	1.55	0.13	92.38	-0.34	-0.03	LH
WUDAM7		93.33	-2.46	-0.20	88.85	-3.87	-0.33	LH
X3X6VK	*	115.44	19.65	1.63	99.97	7.25	0.62	TO
Y4NJ2A		95.13	-0.66	-0.05	91.86	-0.86	-0.07	LH

Summary Statistics	Sample SF77	Sample SF78
Grand Means	95.79 Joules/sq m	92.72 Joules/sq m
Std Dev Btwn Labs	12.07 Joules/sq m	11.64 Joules/sq m
Statistics based on 34 of 34 reporting participants.		



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

Report #3051S,
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Key to Instrument Codes Reported by Participants

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	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
TO	Thwing-Albert QC-1000	TP	TMI Monitor/Tensile 100 (84-21-01)
XX	Instrument make/model not specified by lab		



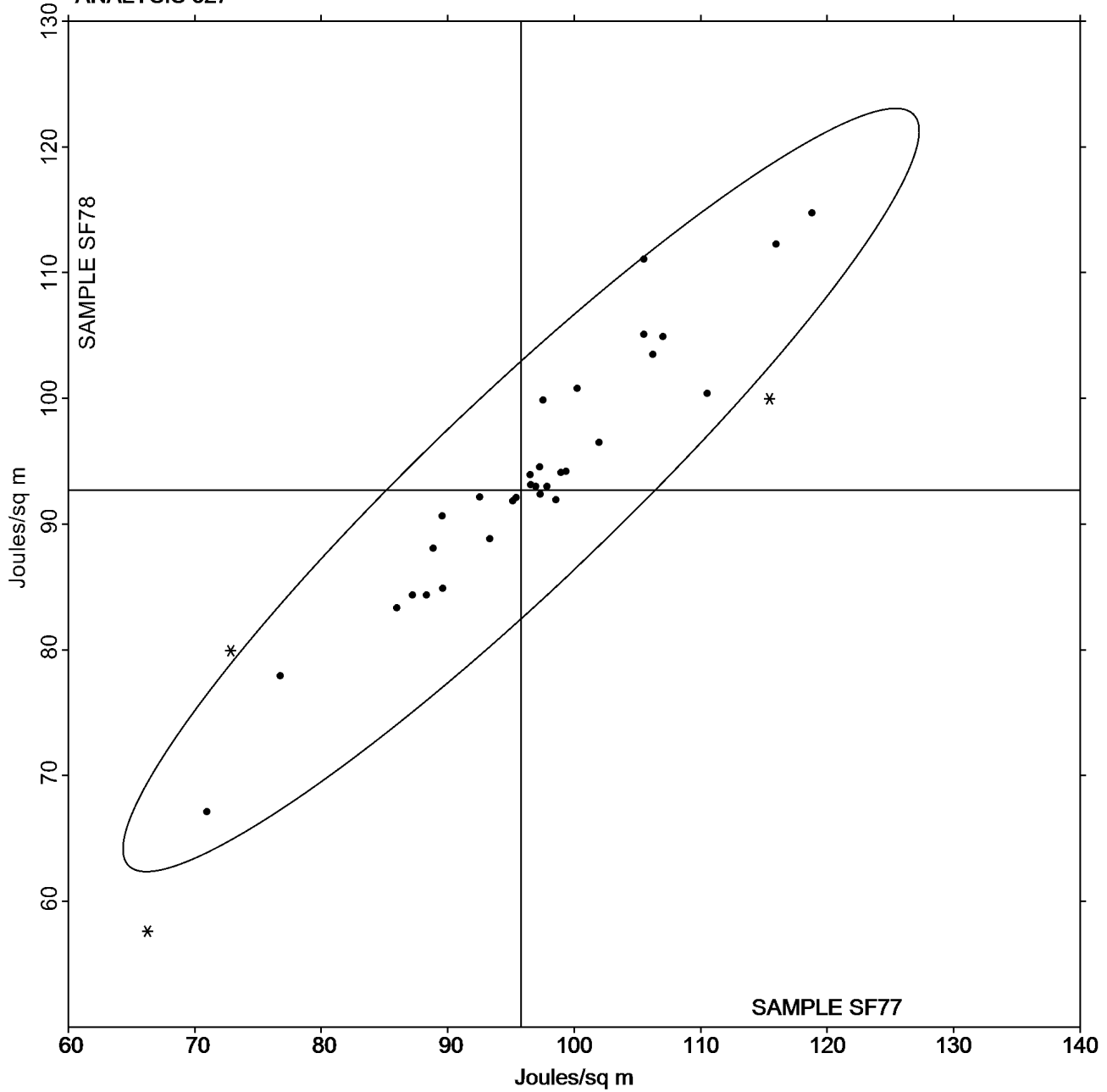
Paper & Paperboard Interlaboratory Testing Program
Analysis 327
Tensile Energy Absorption - Printing Papers
TAPPI Official Test Method T494

Report #3051S,
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Grand Mean Sample SF77 = 95.791
Joules/sq m

Grand Mean Sample SF78 = 92.717
Joules/sq m

ANALYSIS 327





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

Report #3051S,
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WebCode	Data Flag	Sample SF77			Sample SF78			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
29EJCM		2.145	-0.051	-0.20	2.177	0.046	0.20	LH
2D6ULL		2.167	-0.029	-0.11	2.106	-0.025	-0.11	LF
3A4ZA2		2.146	-0.050	-0.19	2.079	-0.052	-0.23	TF
3D3EV7		2.173	-0.023	-0.09	2.126	-0.005	-0.02	LH
6CL6V6		2.327	0.131	0.50	2.238	0.107	0.47	ID
722CJZ		2.556	0.360	1.37	2.497	0.366	1.59	TB
7FERKB		2.441	0.245	0.93	2.319	0.188	0.82	LX
7RBQE2		1.754	-0.442	-1.68	1.746	-0.385	-1.67	LI
8JUK9H		2.069	-0.127	-0.48	2.037	-0.094	-0.41	LX
9AJHMG		1.938	-0.258	-0.98	1.887	-0.244	-1.06	LH
9AL3JW		2.208	0.011	0.04	2.062	-0.069	-0.30	IM
APUHCW		2.523	0.327	1.24	2.446	0.315	1.37	FP
AYYPCC		2.653	0.456	1.73	2.563	0.432	1.88	RE
CDE8K8		2.003	-0.193	-0.73	1.916	-0.215	-0.93	TF
CTLJVW		2.428	0.231	0.88	2.366	0.235	1.02	TP
D6E8K6		1.984	-0.212	-0.81	1.913	-0.218	-0.95	XX
EMT2UQ		2.182	-0.014	-0.05	2.215	0.084	0.37	LI
EXUPLM		2.020	-0.176	-0.67	2.070	-0.061	-0.26	VM
FKZRXU		2.262	0.066	0.25	2.179	0.048	0.21	IM
FWDTUN		2.055	-0.141	-0.54	2.003	-0.128	-0.56	LX
GHQZJL		1.931	-0.265	-1.01	1.962	-0.169	-0.73	LI
GZRMAK		2.164	-0.032	-0.12	2.036	-0.095	-0.41	LB
J8Z3NY		2.195	-0.001	-0.01	2.235	0.104	0.45	XX
JVPMNK		1.887	-0.309	-1.17	1.861	-0.270	-1.17	XX
KEZYTG		2.361	0.165	0.62	2.235	0.104	0.45	TX
LWRA83		2.683	0.486	1.85	2.522	0.391	1.70	TF
MH7GW2		2.802	0.605	2.30	2.662	0.531	2.31	TF
P7LNLW		1.642	-0.554	-2.11	1.732	-0.399	-1.74	LI
RCQ3ND		2.150	-0.046	-0.18	2.165	0.034	0.15	LA
TGCGJX		2.117	-0.079	-0.30	2.036	-0.095	-0.41	LI
TU3DLV		2.259	0.063	0.24	2.101	-0.030	-0.13	TF
U9JJEB	*	1.859	-0.337	-1.28	1.703	-0.428	-1.86	LA
W9T8T8		2.131	-0.065	-0.25	2.051	-0.080	-0.35	LH
WFNE6K		2.270	0.074	0.28	2.250	0.119	0.52	LH
WUDAM7		2.082	-0.114	-0.43	1.990	-0.141	-0.61	LH
X3X6VK	*	2.665	0.469	1.78	2.355	0.224	0.98	TO
Y4NJ2A		2.037	-0.159	-0.61	1.996	-0.135	-0.59	LH



Paper & Paperboard Interlaboratory Testing Program

Report #3051S,
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Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SF77	Sample SF78
Grand Means	2.20 Percent	2.13 Percent
Stnd Dev Btwn Labs	0.26 Percent	0.23 Percent

Statistics based on 37 of 37 reporting participants.

Key to Instrument Codes Reported by Participants

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	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
TO	Thwing-Albert QC-1000	TP	TMI Monitor/Tensile 100 (84-21-01)
TX	Thwing-Albert (model not specified)	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		



Paper & Paperboard Interlaboratory Testing Program

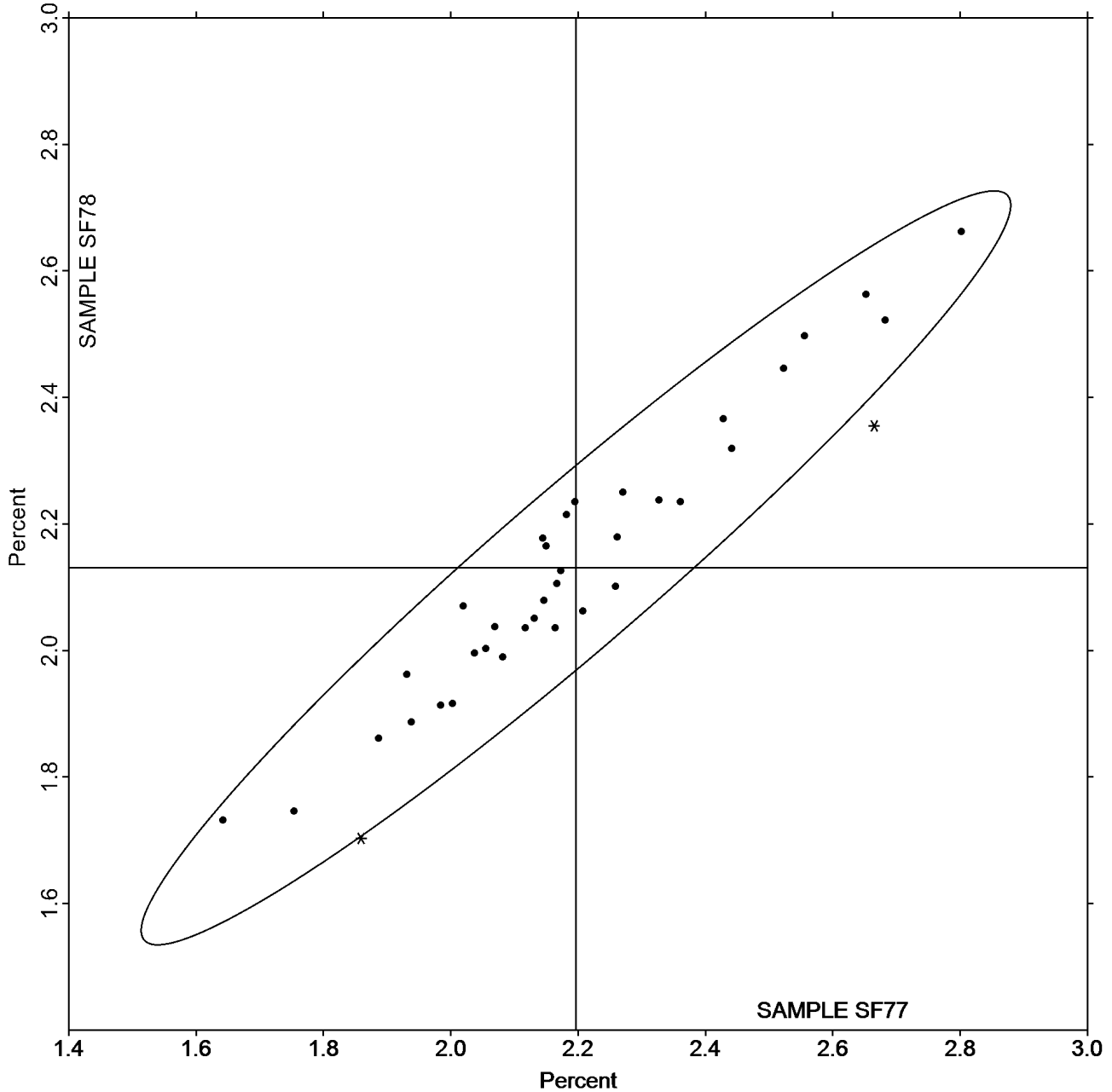
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Analysis 328 Elongation to Break - Printing Papers TAPPI Official Test Method T494

Grand Mean Sample SF77 = 2.1964
Percent

Grand Mean Sample SF78 = 2.1307
Percent

ANALYSIS 328





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

Report #3051S,
March 2020

WebCode	Data Flag	Sample SE77			Sample SE78			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2DNVB9		3.982	-0.181	-0.47	4.049	-0.135	-0.36	LE
32PJAF		4.356	0.193	0.50	4.404	0.220	0.59	TX
3AM788		4.103	-0.061	-0.16	4.022	-0.162	-0.44	TK
3EEHZH		3.941	-0.223	-0.57	4.075	-0.109	-0.29	IK
4YK9YX		4.131	-0.033	-0.08	4.074	-0.110	-0.30	LE
67U2KD		4.327	0.164	0.42	4.453	0.269	0.72	IK
6CL94L		4.086	-0.077	-0.20	4.171	-0.013	-0.03	TR
7W7HLY		4.010	-0.153	-0.39	4.343	0.159	0.43	IF
884JY3		3.956	-0.208	-0.53	4.077	-0.107	-0.29	IM
9XP2YF		4.051	-0.113	-0.29	4.048	-0.136	-0.37	ID
CDE8K8		4.704	0.540	1.39	4.765	0.581	1.56	TO
DNAYMQ		4.632	0.468	1.20	4.755	0.571	1.54	LE
EAZKWC		4.149	-0.014	-0.04	4.048	-0.136	-0.37	CE
EMT2UQ		3.755	-0.408	-1.05	3.775	-0.409	-1.10	LW
FJNT4L		3.997	-0.166	-0.43	3.965	-0.219	-0.59	TB
FKZR XU		4.105	-0.059	-0.15	4.061	-0.123	-0.33	IM
FZ9NB2	*	4.486	0.322	0.83	4.050	-0.134	-0.36	IN
GQ7LRP		3.904	-0.260	-0.67	3.947	-0.237	-0.64	XX
GTQFM6		4.437	0.273	0.70	4.515	0.332	0.89	IR
H9YTG9		3.887	-0.277	-0.71	3.753	-0.431	-1.16	TT
HC6AWQ		4.233	0.069	0.18	4.303	0.119	0.32	LE
HL6WNN		3.865	-0.299	-0.77	3.935	-0.249	-0.67	LW
J4G8L7		4.696	0.532	1.37	4.701	0.517	1.39	LI
JNNFZ6		3.462	-0.702	-1.80	3.533	-0.651	-1.75	TB
JRNQW6		4.511	0.348	0.89	4.653	0.469	1.26	TH
JXE274		4.214	0.051	0.13	4.349	0.165	0.44	DM
KCAHV2		4.395	0.231	0.59	4.474	0.290	0.78	IR
KM8J97	X	7.304	3.140	8.07	7.354	3.170	8.52	LA
M4NJZD		3.942	-0.221	-0.57	4.021	-0.163	-0.44	TA
MH92RG		4.110	-0.053	-0.14	4.182	-0.002	0.00	LH
MMLM2N		4.107	-0.057	-0.15	4.100	-0.083	-0.22	LW
MZ84NZ		4.879	0.715	1.84	4.837	0.653	1.76	ID
NKCYVW		3.662	-0.502	-1.29	3.543	-0.641	-1.72	IN
P7Q7JV	*	3.656	-0.508	-1.31	4.043	-0.141	-0.38	IM
PLEG7X		4.081	-0.083	-0.21	3.867	-0.317	-0.85	LX
PQXEYU	*	4.626	0.462	1.19	4.251	0.067	0.18	IF
PUWPUU		4.866	0.702	1.80	4.716	0.532	1.43	IF
PV66Z		4.009	-0.155	-0.40	3.763	-0.420	-1.13	TH
PYNY4T		4.252	0.088	0.23	4.280	0.096	0.26	LE
QPGG7V		3.810	-0.353	-0.91	3.976	-0.207	-0.56	IK



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

Report #3051S,
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WebCode	Data Flag	<u>Sample SE77</u>			<u>Sample SE78</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
QUTP8Y		4.010	-0.153	-0.39	4.098	-0.086	-0.23	TH
RCQ3ND		3.936	-0.228	-0.59	3.807	-0.376	-1.01	LA
REEG7V		4.082	-0.082	-0.21	4.065	-0.119	-0.32	IF
VA4Z2M		3.423	-0.741	-1.90	3.717	-0.467	-1.25	IM
VD7T2D		3.405	-0.758	-1.95	3.379	-0.805	-2.16	IM
VMDF8T		4.328	0.164	0.42	4.423	0.239	0.64	IF
VNNE6M		3.298	-0.866	-2.23	3.487	-0.697	-1.87	TB
VXD3ZP		4.254	0.090	0.23	4.374	0.191	0.51	IF
WJNQZK		4.156	-0.007	-0.02	4.222	0.039	0.10	LA
WV3M7N		4.089	-0.075	-0.19	3.974	-0.210	-0.56	IN
X3L2Q9		4.443	0.279	0.72	4.520	0.336	0.90	TO
XN3M7M		4.522	0.358	0.92	4.622	0.438	1.18	LW
YJXCMR		5.000	0.836	2.15	4.915	0.732	1.97	LA
ZKRK9G		5.033	0.869	2.23	4.972	0.788	2.12	LA
ZU3LUG		4.485	0.321	0.83	4.471	0.287	0.77	TH

Summary Statistics	<u>Sample SE77</u>	<u>Sample SE78</u>
Grand Means	4.16 kN/m	4.18 kN/m
Std Dev Btwn Labs	0.39 kN/m	0.37 kN/m

Statistics based on 54 of 55 reporting participants.

Comments on Assigned Data Flags for Test #330

KM8J97 (X) - Extreme Data.

Analysis Notes:

J4G8L7 - One determination removed from the Lab Mean of Sample SE77 per Grubb's Test at 1% risk (TAPPI 1205).

PLEG7X - Data appear to be reported as lb/15 mm, not kN/m as indicated on the data entry form. Units will not be changed by CTS going forward.



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

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Key to Instrument Codes Reported by Participants

CE	Chatillon Model ET1100	DM	IDM MTC-100 Tensile Tester
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	LI	Lloyds Instruments
LW	L & W Tensile Tester SE062	LX	L & W (model not specified)
TA	Thwing-Albert Tensile Tester	TB	Thwing-Albert EJA/1000
TH	Thwing-Albert QC-3A	TK	Thwing-Albert Model 37-4
TO	Thwing-Albert QC-1000	TR	TMI Horizontal Tensile Tester
TT	Tinius Olsen Model MHT	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		



Paper & Paperboard Interlaboratory Testing Program

Report #3051S,
March 2020

Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE77			Sample SE78			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2DNVB9		40.89	-1.24	-0.15	43.29	0.93	0.12	LE
3AM788		47.63	5.51	0.68	44.91	2.55	0.33	TK
4YK9YX		42.31	0.18	0.02	42.09	-0.26	-0.03	LE
67U2KD		44.38	2.26	0.28	45.53	3.18	0.41	XX
6CL94L		44.28	2.15	0.26	43.01	0.66	0.09	TR
7W7HLY		36.76	-5.36	-0.66	43.37	1.02	0.13	IF
884JY3		43.38	1.25	0.15	45.12	2.77	0.36	IM
9XP2YF		42.54	0.41	0.05	41.80	-0.55	-0.07	ID
CDE8K8		38.97	-3.16	-0.39	40.72	-1.63	-0.21	TO
DNAYMQ		48.50	6.37	0.78	52.72	10.37	1.35	LE
EMT2UQ		39.27	-2.86	-0.35	40.37	-1.98	-0.26	LW
FJNT4L		41.04	-1.09	-0.13	42.73	0.38	0.05	TB
FKZRXU		44.13	2.00	0.25	42.10	-0.25	-0.03	IM
FZ9NB2	X	47.41	5.28	0.65	36.01	-6.34	-0.83	IN
GQ7LRP		43.80	1.67	0.21	43.58	1.23	0.16	XX
H9YTG9		41.03	-1.09	-0.13	34.94	-7.41	-0.97	TT
HC6AWQ		39.42	-2.71	-0.33	40.60	-1.75	-0.23	LE
HL6WNN		43.26	1.13	0.14	42.60	0.25	0.03	LW
JXE274		54.84	12.71	1.56	58.51	16.16	2.11	DM
KM8J97		47.14	5.01	0.62	48.79	6.44	0.84	LA
MH92RG		40.43	-1.70	-0.21	41.30	-1.05	-0.14	LH
MMLM2N		44.10	1.97	0.24	41.55	-0.80	-0.10	LW
NKCYVW		32.29	-9.83	-1.21	30.43	-11.93	-1.55	IN
P7Q7JV	*	16.07	-26.06	-3.20	19.60	-22.75	-2.97	IM
PLEG7X	X	157.88	115.75	14.22	157.40	115.04	14.99	LX
PQXEYU		47.72	5.60	0.69	40.64	-1.71	-0.22	IF
PUWPUU		55.74	13.61	1.67	51.00	8.65	1.13	IF
PV662Z		46.67	4.54	0.56	47.56	5.21	0.68	TH
PYNY4T		43.68	1.55	0.19	42.42	0.07	0.01	LE
QUTP8Y		42.76	0.63	0.08	47.28	4.93	0.64	TH
RCQ3ND		53.71	11.58	1.42	50.35	8.00	1.04	LA
VA4Z2M		27.47	-14.66	-1.80	34.22	-8.13	-1.06	IM
VD7T2D		32.97	-9.15	-1.12	32.21	-10.14	-1.32	IM
VMDF8T		38.80	-3.33	-0.41	40.09	-2.26	-0.29	IN
VNNE6M		28.05	-14.08	-1.73	29.92	-12.43	-1.62	TB
VXD3ZP		39.98	-2.15	-0.26	36.79	-5.56	-0.72	IF
WJNQZK		50.79	8.66	1.06	51.66	9.31	1.21	LA
WV3M7N		36.52	-5.61	-0.69	36.96	-5.39	-0.70	IN
X3L2Q9		47.83	5.70	0.70	48.70	6.35	0.83	TO
XN3M7M		47.15	5.02	0.62	48.03	5.68	0.74	LW



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

Report #3051S,
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WebCode	Data Flag	<u>Sample SE77</u>			<u>Sample SE78</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
YJXCMR		51.95	9.83	1.21	49.24	6.89	0.90	LA
ZKRK9G		53.12	10.99	1.35	53.76	11.41	1.49	LA
ZU3LUG		25.89	-16.24	-2.00	25.89	-16.46	-2.15	TH

Summary Statistics	<u>Sample SE77</u>	<u>Sample SE78</u>
Grand Means	42.13 Joules/sq m	42.35 Joules/sq m
Std Dev Btwn Labs	8.14 Joules/sq m	7.67 Joules/sq m
Statistics based on 41 of 43 reporting participants.		

Comments on Assigned Data Flags for Test #331

PLEG7X (X) - Extreme Data.

FZ9NB2 (X) - Inconsistent in testing between samples.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	ID	Instron 4200 series
IF	Instron 3340 Series	IM	Instron 5500 Series
IN	Instron 3360 Series	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)
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
Analysis 332
Elongation to Break - Packaging Papers
TAPPI Official Test Method T494

Report #3051S,
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WebCode	Data Flag	Sample SE77			Sample SE78			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2DNVB9		1.571	-0.006	-0.03	1.624	0.048	0.22	LE
3AM788		1.802	0.225	1.11	1.735	0.159	0.72	TK
4YK9YX		1.531	-0.046	-0.22	1.552	-0.024	-0.11	LE
67U2KD		1.542	-0.035	-0.17	1.530	-0.046	-0.21	XX
6CL94L		1.690	0.114	0.56	1.657	0.081	0.37	TR
7W7HLY		1.598	0.021	0.11	1.710	0.134	0.61	IF
884JY3		1.874	0.297	1.47	1.888	0.312	1.42	IM
9XP2YF		1.650	0.073	0.36	1.626	0.050	0.23	ID
CDE8K8		1.410	-0.167	-0.82	1.439	-0.137	-0.62	TO
DNAYMQ		1.615	0.038	0.19	1.710	0.134	0.61	LE
EMT2UQ		1.614	0.037	0.18	1.687	0.111	0.50	LW
FJNT4L		1.569	-0.008	-0.04	1.635	0.059	0.27	TB
FKZRXU		1.660	0.083	0.41	1.608	0.032	0.15	IM
FZ9NB2	X	1.367	-0.210	-1.03	1.082	-0.494	-2.24	IN
GQ7LRP		1.742	0.165	0.82	1.705	0.129	0.59	XX
GTQFM6		1.560	-0.017	-0.08	1.600	0.024	0.11	IR
H9YTG9	*	1.776	0.199	0.98	1.590	0.014	0.06	TT
HC6AWQ		1.438	-0.139	-0.68	1.456	-0.120	-0.54	LE
HL6WNN		1.733	0.156	0.77	1.721	0.145	0.66	LW
JXE274		1.811	0.235	1.16	1.940	0.364	1.65	DM
KCAHV2		1.610	0.033	0.16	1.620	0.044	0.20	IR
KM8J97	X	2.417	0.840	4.15	2.459	0.883	4.01	LA
M4NJZD		1.600	0.023	0.12	1.650	0.074	0.34	TB
MH92RG		1.530	-0.047	-0.23	1.540	-0.036	-0.16	LH
MMLM2N		1.650	0.073	0.36	1.566	-0.010	-0.04	LW
MZ84NZ		1.622	0.045	0.22	1.612	0.036	0.16	ID
NKCYVW		1.071	-0.506	-2.49	1.079	-0.496	-2.26	IN
P7Q7JV	*	1.042	-0.534	-2.64	0.947	-0.629	-2.86	IM
PLEG7X		1.772	0.195	0.96	1.709	0.133	0.60	LX
PQXEYU	*	1.381	-0.195	-0.96	1.205	-0.371	-1.68	IF
PUWPUU		1.470	-0.107	-0.53	1.381	-0.195	-0.88	IF
PV662Z		1.989	0.412	2.03	2.079	0.503	2.29	TH
PYNY4T		1.572	-0.005	-0.02	1.535	-0.041	-0.19	LE
QUTP8Y		1.790	0.213	1.05	1.830	0.254	1.15	TH
RCQ3ND		1.718	0.141	0.70	1.666	0.090	0.41	LA
VA4Z2M	*	1.374	-0.203	-1.00	1.547	-0.029	-0.13	IM
VD7T2D		1.558	-0.018	-0.09	1.519	-0.057	-0.26	IM
VMDF8T		1.277	-0.299	-1.48	1.322	-0.254	-1.15	IN
VNNE6M		1.358	-0.219	-1.08	1.363	-0.213	-0.97	TB
VXD3ZP		1.188	-0.389	-1.92	1.116	-0.460	-2.09	IF



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

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WebCode	Data Flag	Sample SE77			Sample SE78			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
WJNQZK		1.862	0.285	1.41	1.858	0.282	1.28	LA
WV3M7N		1.256	-0.321	-1.58	1.274	-0.301	-1.37	IN
X3L2Q9		1.666	0.089	0.44	1.692	0.116	0.53	TO
XN3M7M		1.633	0.056	0.28	1.635	0.059	0.27	LW
YJXCMR		1.593	0.016	0.08	1.549	-0.027	-0.12	LA
ZKRK9G		1.602	0.025	0.13	1.631	0.055	0.25	LA
ZU3LUG	X	3.356	1.780	8.78	3.316	1.740	7.91	TH

Summary Statistics	Sample SE77	Sample SE78
Grand Means	1.58 Percent	1.58 Percent
Std Dev Btwn Labs	0.20 Percent	0.22 Percent

Statistics based on 44 of 47 reporting participants.

Comments on Assigned Data Flags for Test #332

KM8J97 (X) - Data for both samples are high. Possible Systematic Error.

ZU3LUG (X) - Extreme Data.

FZ9NB2 (X) - Inconsistent in testing between samples.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	ID	Instron 4200 Series
IF	Instron 3340 Series	IM	Instron 5500 Series
IN	Instron 3360 Series	IR	Instron 5900 Series
LA	L & W Autoline 300	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)	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



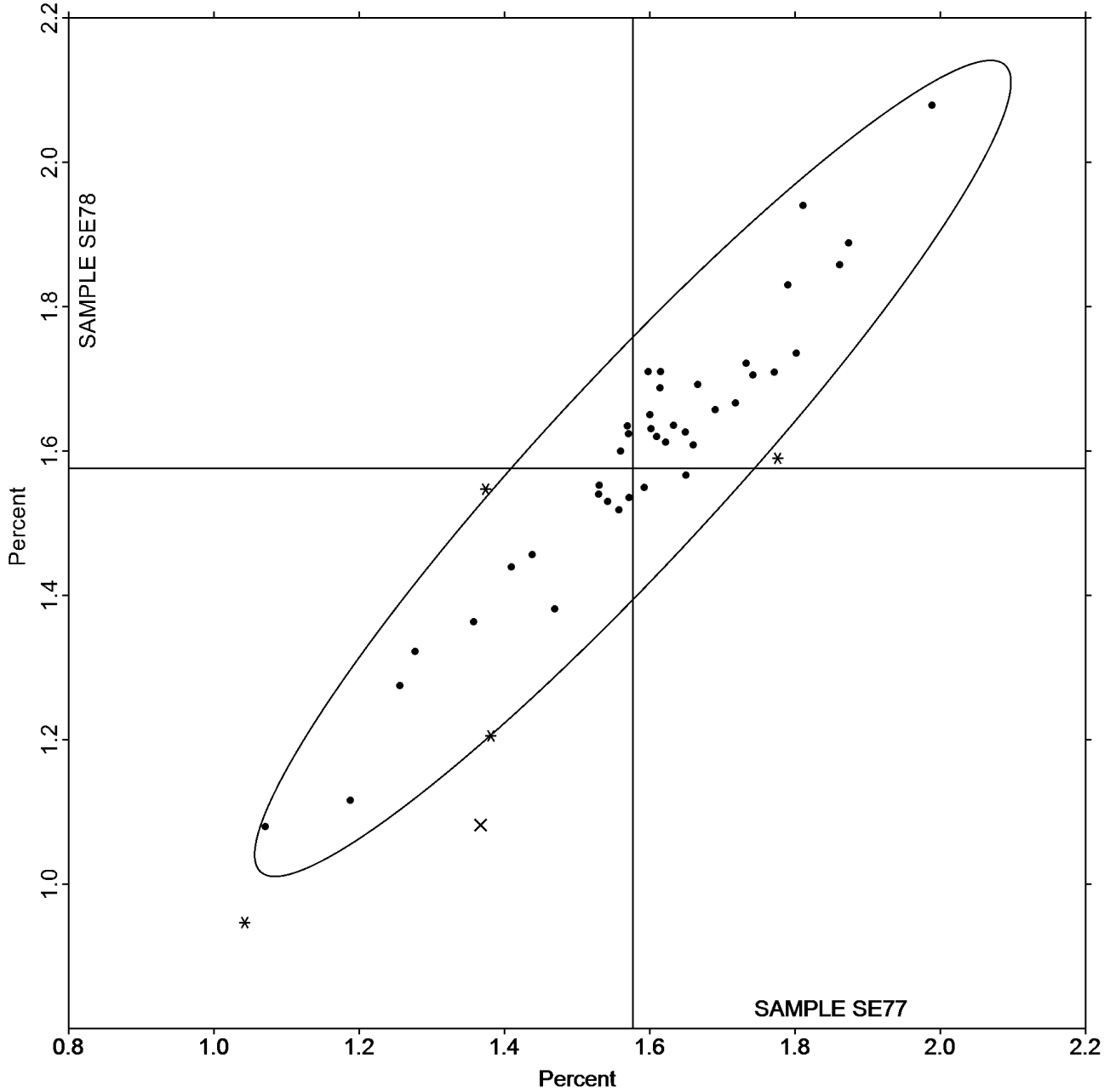
Paper & Paperboard Interlaboratory Testing Program
Analysis 332
Elongation to Break - Packaging Papers
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Grand Mean Sample SE77 = 1.5766
Percent

Grand Mean Sample SE78 = 1.5759
Percent

ANALYSIS 332





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

Report #3051S,
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WebCode	Data Flag	<u>Sample SG77</u>			<u>Sample SG78</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
29T2D8		270.1	43.3	0.96	153.2	-78.8	-1.04	MT
3A4ZA2		205.7	-21.1	-0.47	209.9	-22.1	-0.29	MT
EMT2UQ		238.9	12.1	0.27	358.3	126.3	1.66	MT
EXUPLM		196.5	-30.3	-0.67	165.8	-66.2	-0.87	MT
GHQZJL		212.3	-14.5	-0.32	214.2	-17.8	-0.23	MT
GQ7LRP		268.5	41.7	0.93	291.8	59.8	0.79	MT
M4NJZD		135.0	-91.8	-2.04	141.4	-90.6	-1.19	MT
PV66Z		201.7	-25.1	-0.56	183.3	-48.7	-0.64	MT
RHER3V		276.8	50.0	1.11	321.2	89.2	1.17	MT
VD7T2D		262.6	35.8	0.80	281.2	49.2	0.65	MT

Summary Statistics	<u>Sample SG77</u>	<u>Sample SG78</u>
Grand Means	226.81 Double Folds	232.03 Double Folds
Std Dev Btwn Labs	44.94 Double Folds	75.93 Double Folds
Statistics based on 10 of 10 reporting participants.		

Key to Instrument Codes Reported by Participants

MT MIT - Tinius Olsen



Paper & Paperboard Interlaboratory Testing Program

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Analysis 334

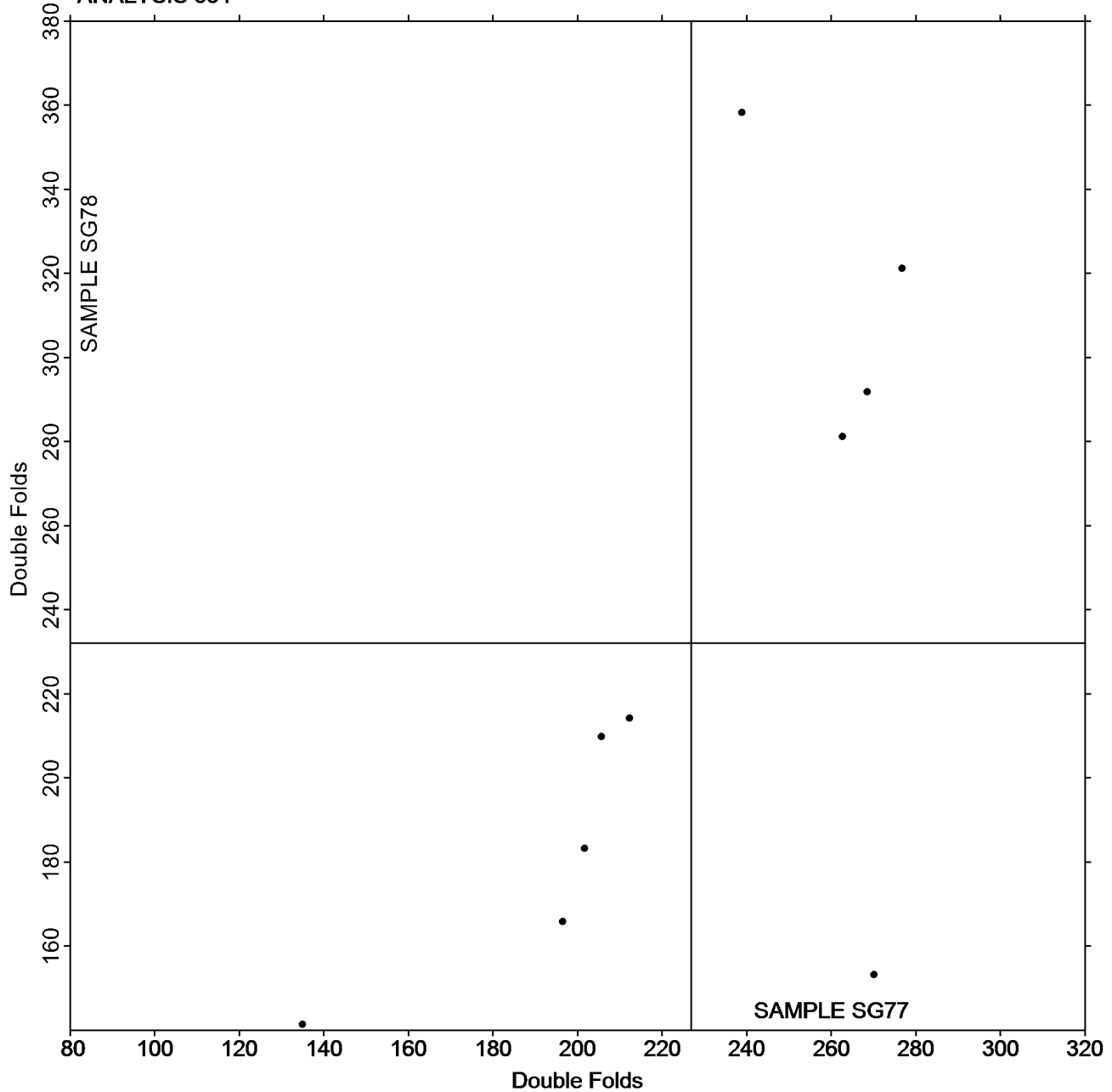
Folding Endurance (MIT) - Double Folds

TAPPI Official Test Method T511

Grand Mean Sample SG77 = 226.81
Double Folds

Grand Mean Sample SG78 = 232.03
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 #3051S,
March 2020

WebCode	Data Flag	Sample SH77			Sample SH78		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3D3EV7		152.7	8.2	0.68	150.5	7.2	0.68
722CJZ		143.6	-0.9	-0.08	148.5	5.2	0.49
7W7HLY		144.3	-0.2	-0.02	135.4	-7.9	-0.75
9AJHMG		142.2	-2.3	-0.19	140.0	-3.3	-0.32
BLTRAX		150.3	5.7	0.47	145.9	2.6	0.25
CLJEZ7		135.4	-9.2	-0.76	139.2	-4.2	-0.40
CTLJVW		153.4	8.8	0.73	150.2	6.9	0.66
EXUPLM		171.7	27.2	2.24	158.6	15.3	1.45
FJNT4L		121.4	-23.1	-1.91	120.5	-22.8	-2.17
GQ7LRP		149.4	4.9	0.40	146.5	3.2	0.30
LWRA83		134.5	-10.0	-0.83	138.8	-4.6	-0.44
M4NJZD		145.0	0.5	0.04	149.3	6.0	0.57
N93G6E		133.6	-10.9	-0.90	137.0	-6.4	-0.61
U9JJEB		161.5	17.0	1.40	163.8	20.4	1.94
VD7T2D	X	3.2	-141.3	-11.66	3.2	-140.1	-13.33
X3X6VK		134.3	-10.2	-0.84	133.0	-10.4	-0.99
Y2KMH8		139.3	-5.3	-0.43	136.2	-7.1	-0.68

Summary Statistics	Sample SH77	Sample SH78
Grand Means	144.55 Gurley Units	143.34 Gurley Units
Std Dev Btwn Labs	12.12 Gurley Units	10.52 Gurley Units
Statistics based on 16 of 17 reporting participants.		

Comments on Assigned Data Flags for Test #336

VD7T2D (X) - Extreme Data.



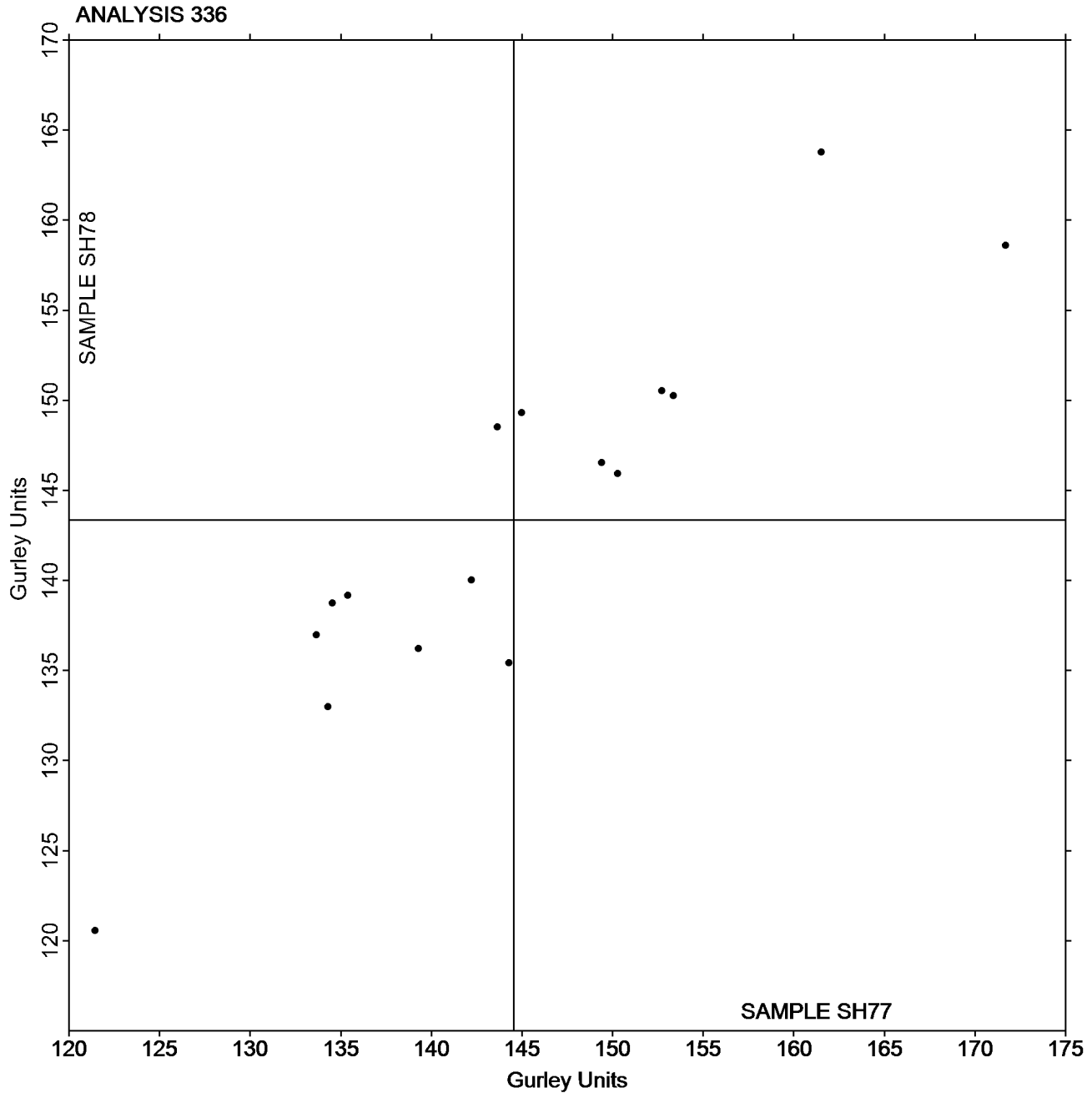
Paper & Paperboard Interlaboratory Testing Program

Report #3051S,
March 2020

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

Grand Mean Sample SH77 = 144.55
Gurley Units

Grand Mean Sample SH78 = 143.34
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 #3051S,
March 2020

WebCode	Data Flag	<u>Sample SJ77</u>			<u>Sample SJ78</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3D3EV7		4.414	-0.672	-0.66	4.451	-0.669	-0.59
722CJZ		4.673	-0.414	-0.41	4.623	-0.498	-0.44
7FERKB		4.217	-0.869	-0.86	4.253	-0.867	-0.77
7W7HLY		4.695	-0.391	-0.39	5.001	-0.119	-0.11
GZRMAK		7.590	2.504	2.47	8.020	2.900	2.56
RY287R		4.772	-0.314	-0.31	4.657	-0.463	-0.41
UMGVME		4.719	-0.367	-0.36	5.104	-0.016	-0.01
VD7T2D		5.157	0.071	0.07	4.732	-0.388	-0.34
VMDF8T		5.540	0.454	0.45	5.240	0.120	0.11

Summary Statistics	<u>Sample SJ77</u>	<u>Sample SJ78</u>
Grand Means	5.09 Taber Units	5.12 Taber Units
Stnd Dev Btwn Labs	1.02 Taber Units	1.13 Taber Units
Statistics based on 9 of 9 reporting participants.		



Paper & Paperboard Interlaboratory Testing Program

Report #3051S,
March 2020

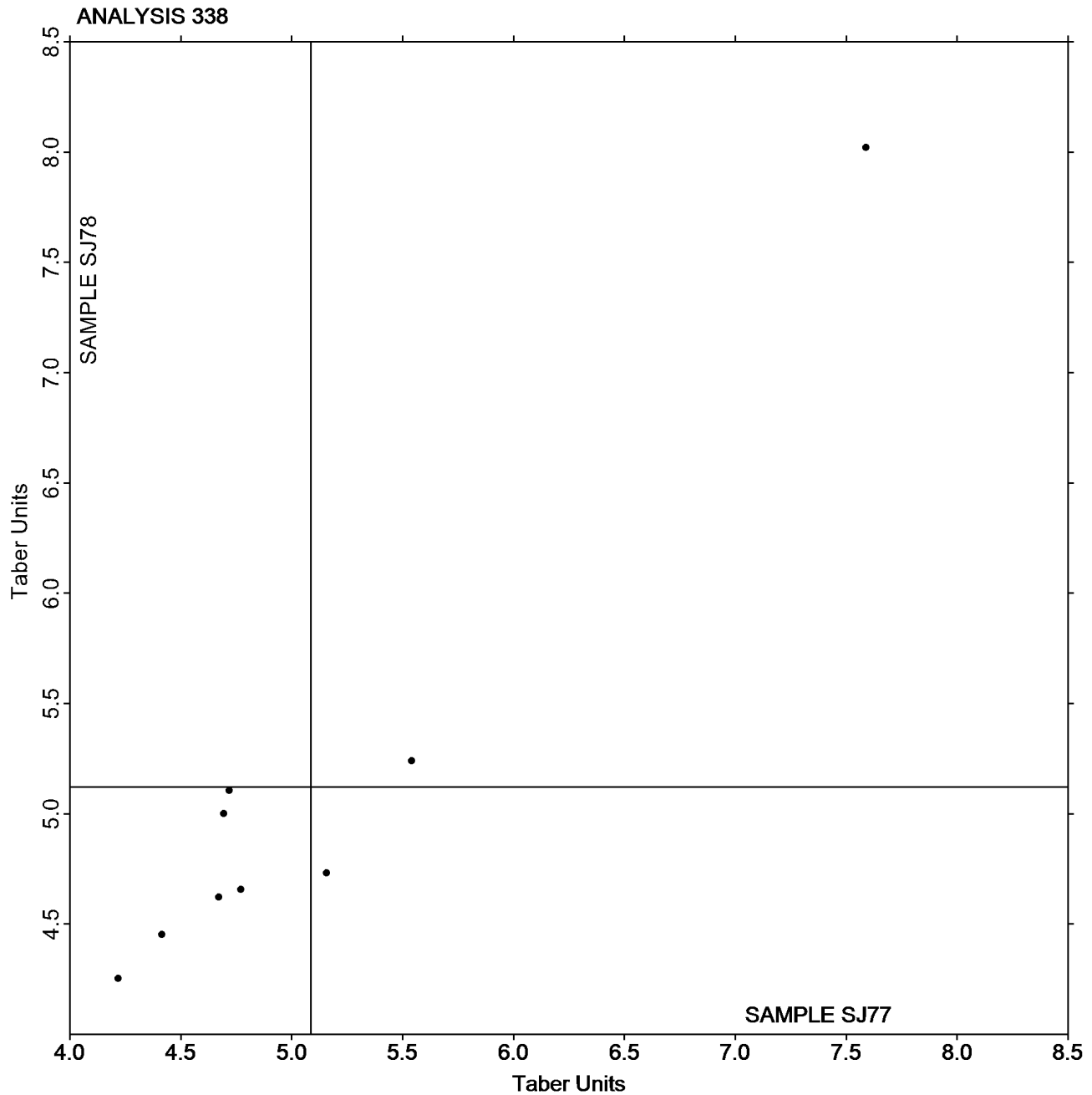
Analysis 338

Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

Grand Mean Sample SJ77 = 5.0863
Taber Units

Grand Mean Sample SJ78 = 5.1201
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 #3051S,
March 2020

WebCode	Data Flag	<u>Sample SQ77</u>			<u>Sample SQ78</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
9A2L4U		39.10	1.46	0.93	61.50	2.37	0.93
DNAYMQ		38.50	0.86	0.55	63.30	4.17	1.63
EMT2UQ		40.02	2.38	1.52	61.32	2.19	0.86
FKZRXU		38.20	0.56	0.36	59.08	-0.06	-0.02
HC6AWQ		38.10	0.46	0.29	58.90	-0.23	-0.09
HL6WNN		36.45	-1.19	-0.76	57.65	-1.48	-0.58
JNMFZ6		35.72	-1.92	-1.23	55.83	-3.31	-1.30
KEZYTG		35.25	-2.39	-1.53	55.20	-3.93	-1.54
N93G6E		36.54	-1.10	-0.71	58.28	-0.85	-0.34
VNNE6M		38.54	0.90	0.58	60.29	1.16	0.45

Summary Statistics	<u>Sample SQ77</u>	<u>Sample SQ78</u>
Grand Means	37.64 Taber Units	59.13 Taber Units
Std Dev Btwn Labs	1.56 Taber Units	2.55 Taber Units
Statistics based on 10 of 10 reporting participants.		

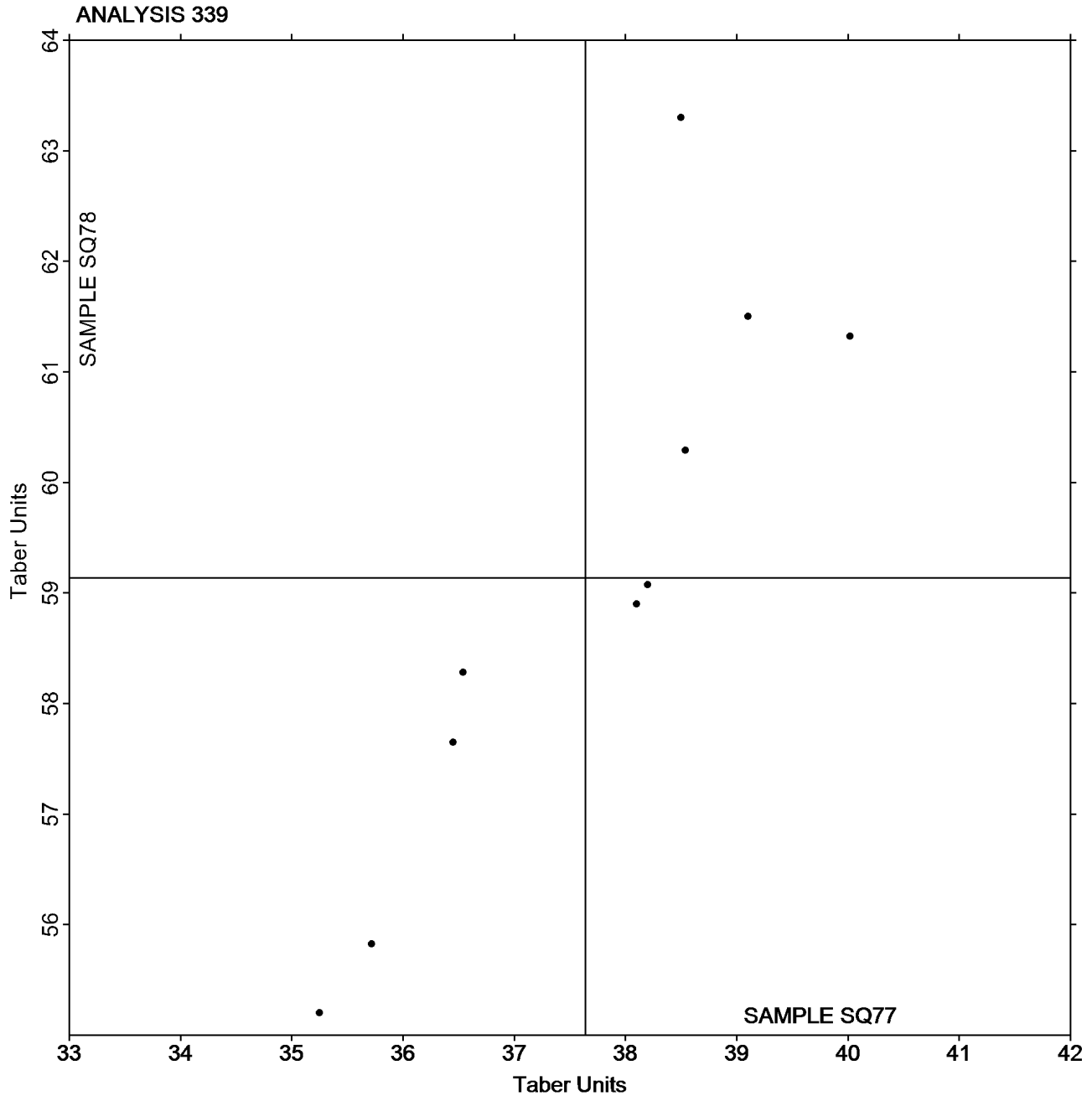


Paper & Paperboard Interlaboratory Testing Program
Analysis 339
Bending Resistance, Taber Type - 10 to 100 Taber Units
TAPPI Official Test Method T489

Report #3051S,
March 2020

Grand Mean Sample SQ77 = 37.642
Taber Units

Grand Mean Sample SQ78 = 59.134
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 #3051S,
March 2020**

Analysis 340

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

TAPPI Official Test Method T489

WebCode	Data Flag	<u>Sample ST77</u>			<u>Sample ST78</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2JE3V3		286.9	-6.2	-0.37	289.3	-3.7	-0.23
7KBG2H		286.4	-6.7	-0.40	280.4	-12.6	-0.77
EAZKWC		285.4	-7.7	-0.46	292.9	-0.1	0.00
EBF4GA		293.5	0.5	0.03	291.0	-2.0	-0.12
EMT2UQ		292.6	-0.5	-0.03	282.9	-10.0	-0.62
GQ7LRP		271.4	-21.7	-1.31	273.4	-19.6	-1.20
JRNQW6		325.5	32.4	1.96	330.0	37.0	2.27
MGXZ7H		279.1	-14.0	-0.84	286.6	-6.4	-0.39
N93G6E		289.1	-4.0	-0.24	286.2	-6.7	-0.41
PV662Z		284.0	-9.1	-0.55	281.6	-11.4	-0.70
R3F3LP		289.1	-4.0	-0.24	287.9	-5.1	-0.31
REEG7V		297.9	4.8	0.29	306.5	13.5	0.83
T4Q3PB		329.1	36.0	2.17	320.0	27.0	1.66

Summary Statistics	<u>Sample ST77</u>	<u>Sample ST78</u>
Grand Means	293.08 Taber Units	292.98 Taber Units
Stnd Dev Btwn Labs	16.57 Taber Units	16.30 Taber Units
Statistics based on 13 of 13 reporting participants.		



Paper & Paperboard Interlaboratory Testing Program

Report #3051S,
March 2020

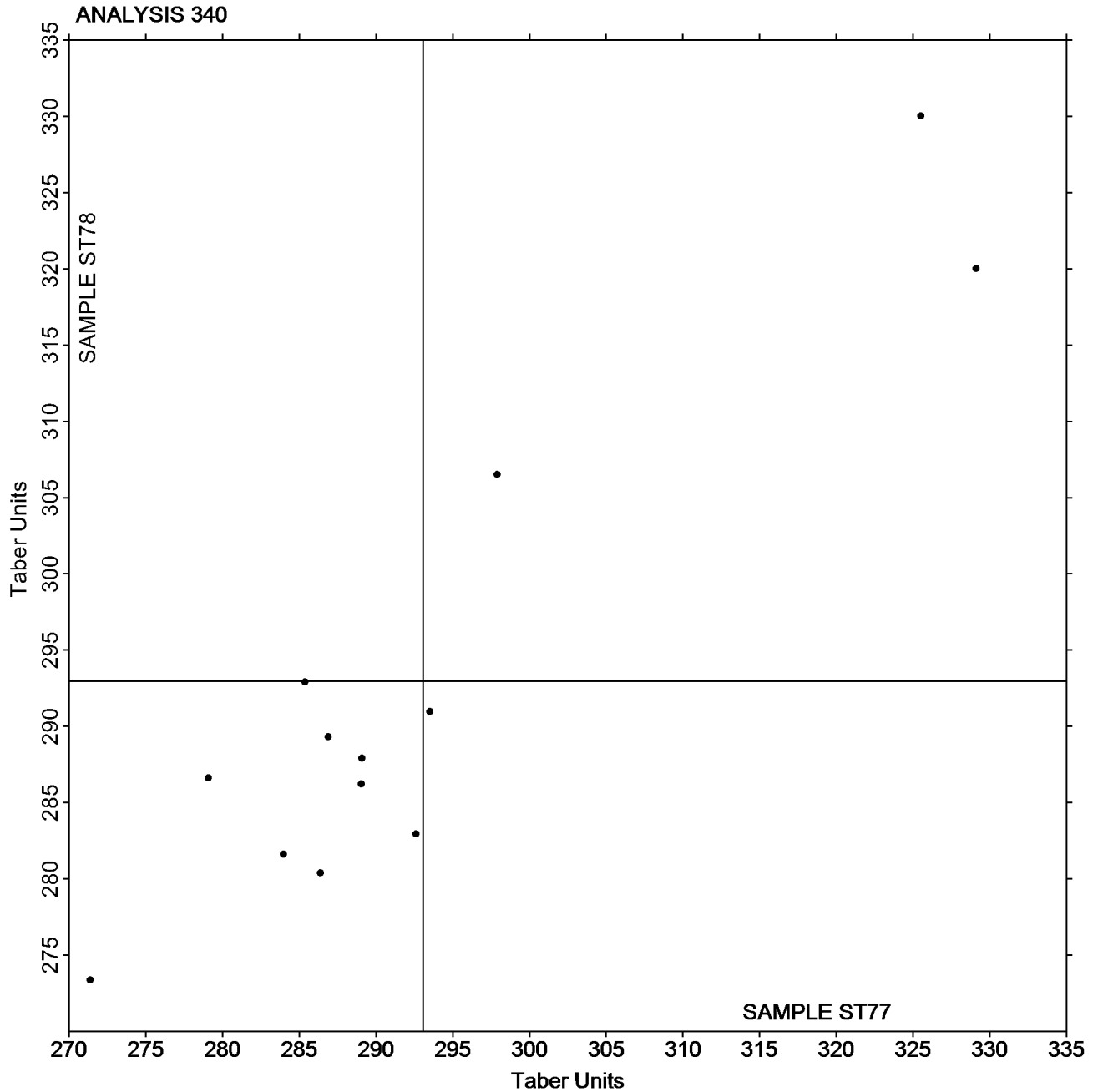
Analysis 340

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

TAPPI Official Test Method T489

Grand Mean Sample ST77 = 293.08
Taber Units

Grand Mean Sample ST78 = 292.98
Taber Units



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



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

Report #3051S,
March 2020

WebCode	Data Flag	<u>Sample SM77</u>			<u>Sample SM78</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2D6ULL		65.91	-11.70	-1.43	76.70	-19.19	-1.34	LW
7W7HLY		86.89	9.29	1.14	92.89	-2.99	-0.21	TL
7ZMQAX		72.58	-5.02	-0.62	88.90	-6.99	-0.49	DX
97Q9LV		86.00	8.40	1.03	114.80	18.91	1.32	DT
9A2L4U		84.80	7.20	0.88	117.78	21.89	1.53	TA
B9JC4T		79.18	1.58	0.19	96.54	0.65	0.05	DX
DNAYMQ		78.96	1.36	0.17	105.10	9.21	0.64	TA
EMT2UQ		79.40	1.80	0.22	96.60	0.71	0.05	LW
PV662Z		87.60	10.00	1.22	111.98	16.09	1.12	LW
QUTP8Y		64.20	-13.40	-1.64	80.40	-15.49	-1.08	TA
VD7T2D		68.96	-8.64	-1.06	75.56	-20.33	-1.42	CD
VNNE6M		76.74	-0.86	-0.11	93.38	-2.51	-0.17	TA

Summary Statistics	<u>Sample SM77</u>	<u>Sample SM78</u>
Grand Means	77.60 psi	95.89 psi
Std Dev Btwn Labs	8.16 psi	14.36 psi

Statistics based on 12 of 12 reporting participants.

Key to Instrument Codes Reported by Participants

CD	CSI CS-163D	DT	Dek-Tron DCS-163A ZDT Tester
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

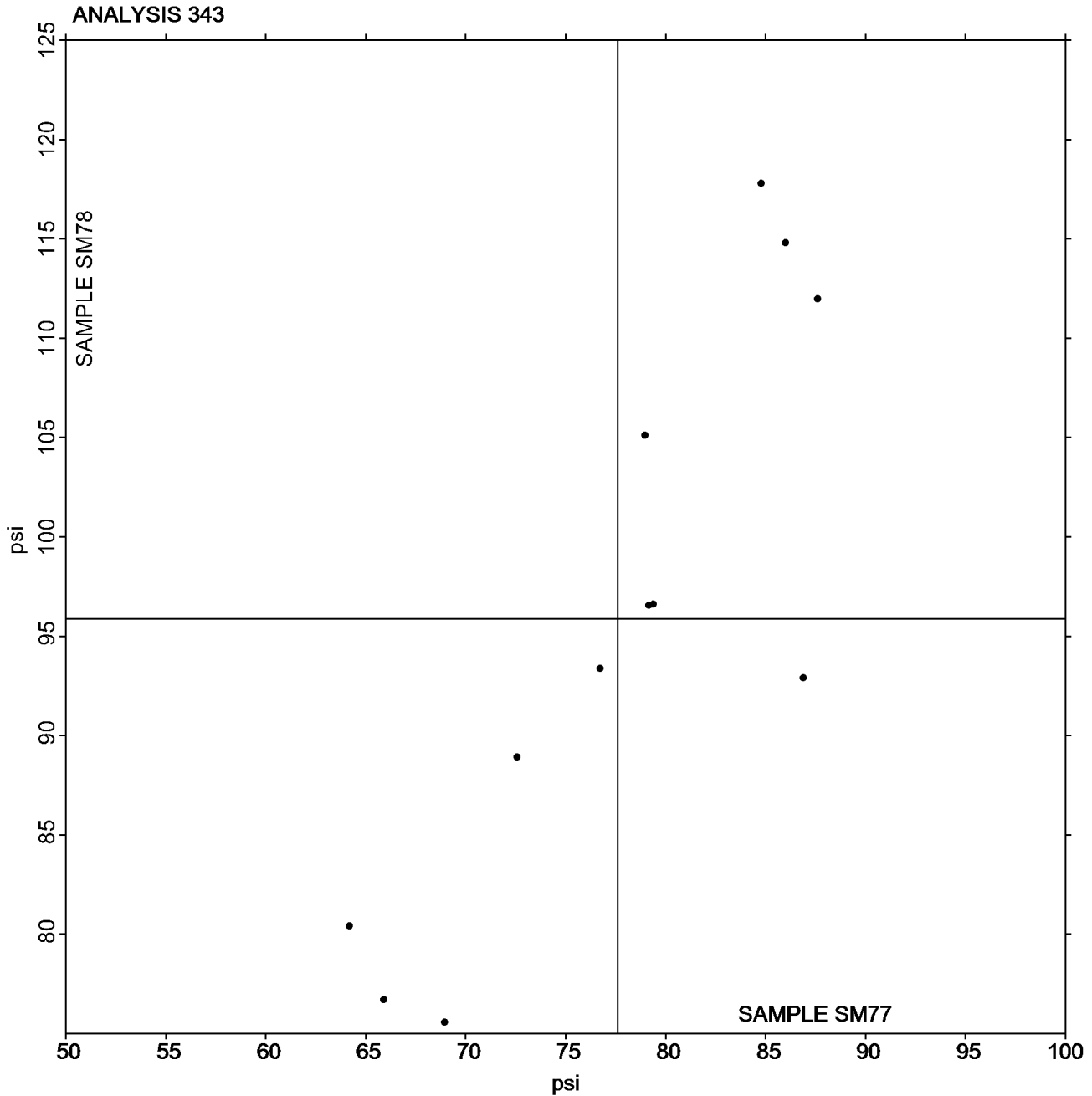
Report #3051S,
March 2020

Analysis 343 Z-Direction Tensile

TAPPI Official Test Method T541

Grand Mean Sample SM77 = 77.601
psi

Grand Mean Sample SM78 = 95.886
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 #3051S,
March 2020

WebCode	Data Flag	Sample SZ77			Sample SZ78			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2JE3V3		64.40	1.94	0.34	66.60	4.15	0.67	TA
7KBG2H		57.82	-4.64	-0.81	59.02	-3.43	-0.56	CD
884JY3		55.00	-7.46	-1.30	56.80	-5.65	-0.92	CA
9XP2YF		56.88	-5.58	-0.98	57.88	-4.57	-0.74	XX
EAZKWC		65.40	2.94	0.51	62.55	0.10	0.02	CH
EBF4GA		66.80	4.34	0.76	66.40	3.95	0.64	CA
EWFZLV		64.16	1.70	0.30	64.24	1.79	0.29	DP
GQ7LRP		63.80	1.34	0.23	59.36	-3.09	-0.50	CA
J4G8L7		72.92	10.46	1.83	76.46	14.01	2.27	CH
JNNEZ6		70.16	7.70	1.35	66.90	4.45	0.72	DP
MGXZ7H		61.64	-0.82	-0.14	59.92	-2.53	-0.41	CD
MM4TZE		58.70	-3.76	-0.66	63.00	0.55	0.09	DP
N93G6E		65.26	2.80	0.49	62.82	0.37	0.06	CA
R3F3LP		48.14	-14.32	-2.50	49.18	-13.27	-2.15	TZ
T4Q3PB		68.20	5.74	1.00	67.20	4.75	0.77	LW
U7TKZC		62.64	0.18	0.03	72.04	9.59	1.56	XX
XU4R3C		58.90	-3.56	-0.62	55.52	-6.93	-1.12	LW
YC7RP7		61.80	-0.66	-0.12	61.60	-0.85	-0.14	CA
YJXCMR		64.13	1.67	0.29	59.05	-3.40	-0.55	TA

Summary Statistics	Sample SZ77	Sample SZ78
Grand Means	62.46 psi	62.45 psi
Std Dev Btwn Labs	5.72 psi	6.17 psi
Statistics based on 19 of 19 reporting participants.		

Key to Instrument Codes Reported by Participants

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

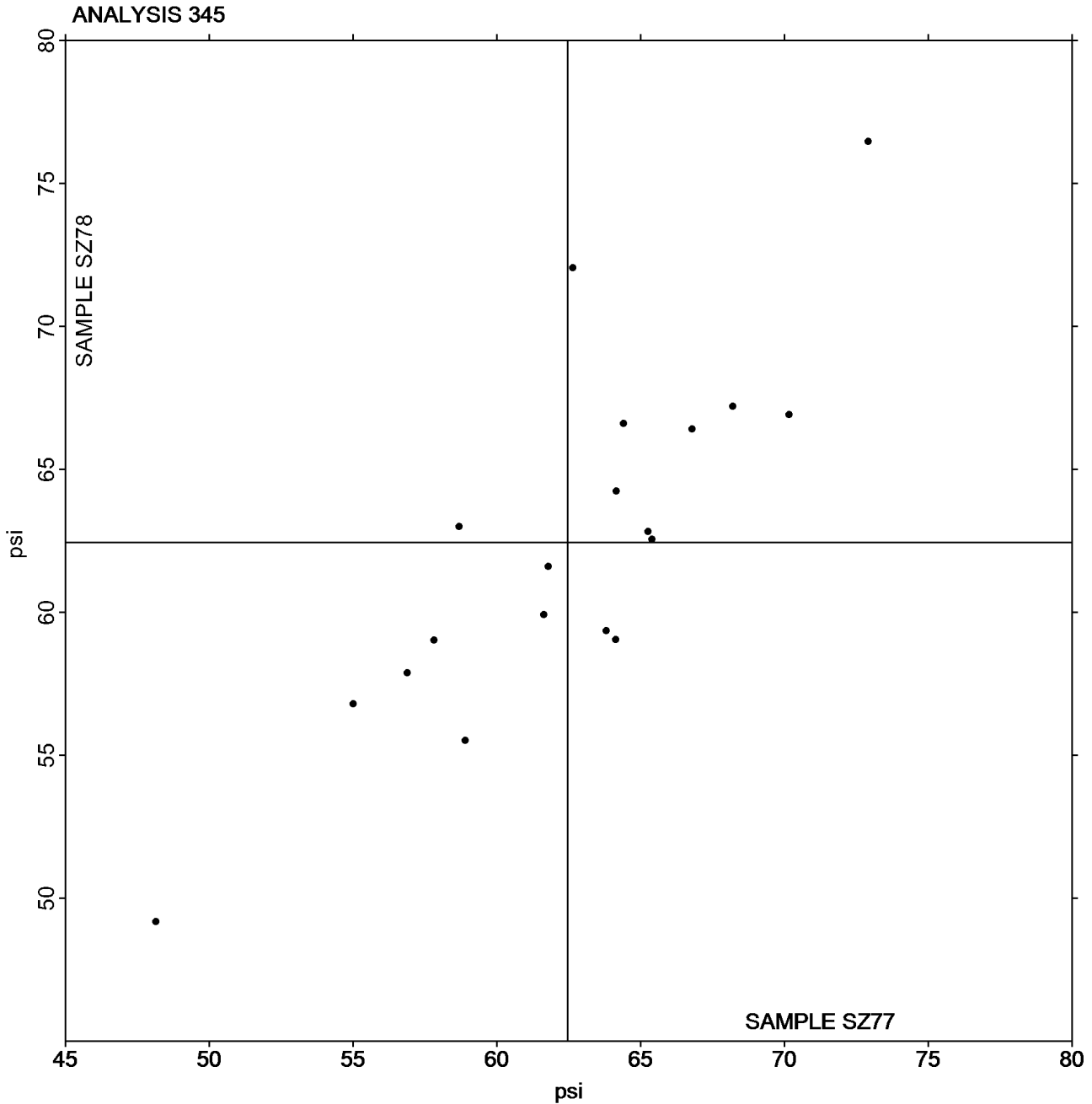


Paper & Paperboard Interlaboratory Testing Program
Analysis 345
Z-Direction Tensile, Recycled Paperboard
TAPPI Official Test Method T541

Report #3051S,
March 2020

Grand Mean Sample SZ77 = 62.460
psi

Grand Mean Sample SZ78 = 62.449
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 #3051S,
March 2020

WebCode	Data Flag	<u>Sample SN77</u>			<u>Sample SN78</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3D3EV7		90.84	-6.16	-0.77	87.12	-10.48	-1.30	KR
8JUK9H		102.32	5.32	0.66	104.96	7.36	0.92	HY
9A2L4U		104.00	7.00	0.87	100.00	2.40	0.30	HY
9AJHMG		113.00	16.00	2.00	114.20	16.60	2.07	HZ
AYYPCC		103.45	6.45	0.80	102.69	5.09	0.63	HY
DNAYMQ		107.80	10.80	1.35	108.20	10.60	1.32	HY
EMT2UQ		91.00	-6.00	-0.75	96.60	-1.00	-0.12	HY
EXUPLM		98.80	1.80	0.22	101.20	3.60	0.45	HY
FJNT4L		93.20	-3.80	-0.47	96.80	-0.80	-0.10	HY
GQ7LRP		87.80	-9.20	-1.15	94.60	-3.00	-0.37	HZ
LWRA83		91.20	-5.80	-0.72	91.60	-6.00	-0.75	HY
PV662Z		82.20	-14.80	-1.85	81.40	-16.20	-2.02	HZ
VHHLAR		99.20	2.20	0.27	99.60	2.00	0.25	HZ
VNNE6M		97.60	0.60	0.07	98.00	0.40	0.05	HZ
X3L2Q9		98.60	1.60	0.20	93.20	-4.40	-0.55	HY
X3X6VK		91.00	-6.00	-0.75	91.40	-6.20	-0.77	HY

Summary Statistics	<u>Sample SN77</u>	<u>Sample SN78</u>
Grand Means	97.00 1000th ft-lbs	97.60 1000th ft-lbs
Stnd Dev Btwn Labs	8.02 1000th ft-lbs	8.03 1000th ft-lbs
Statistics based on 16 of 16 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



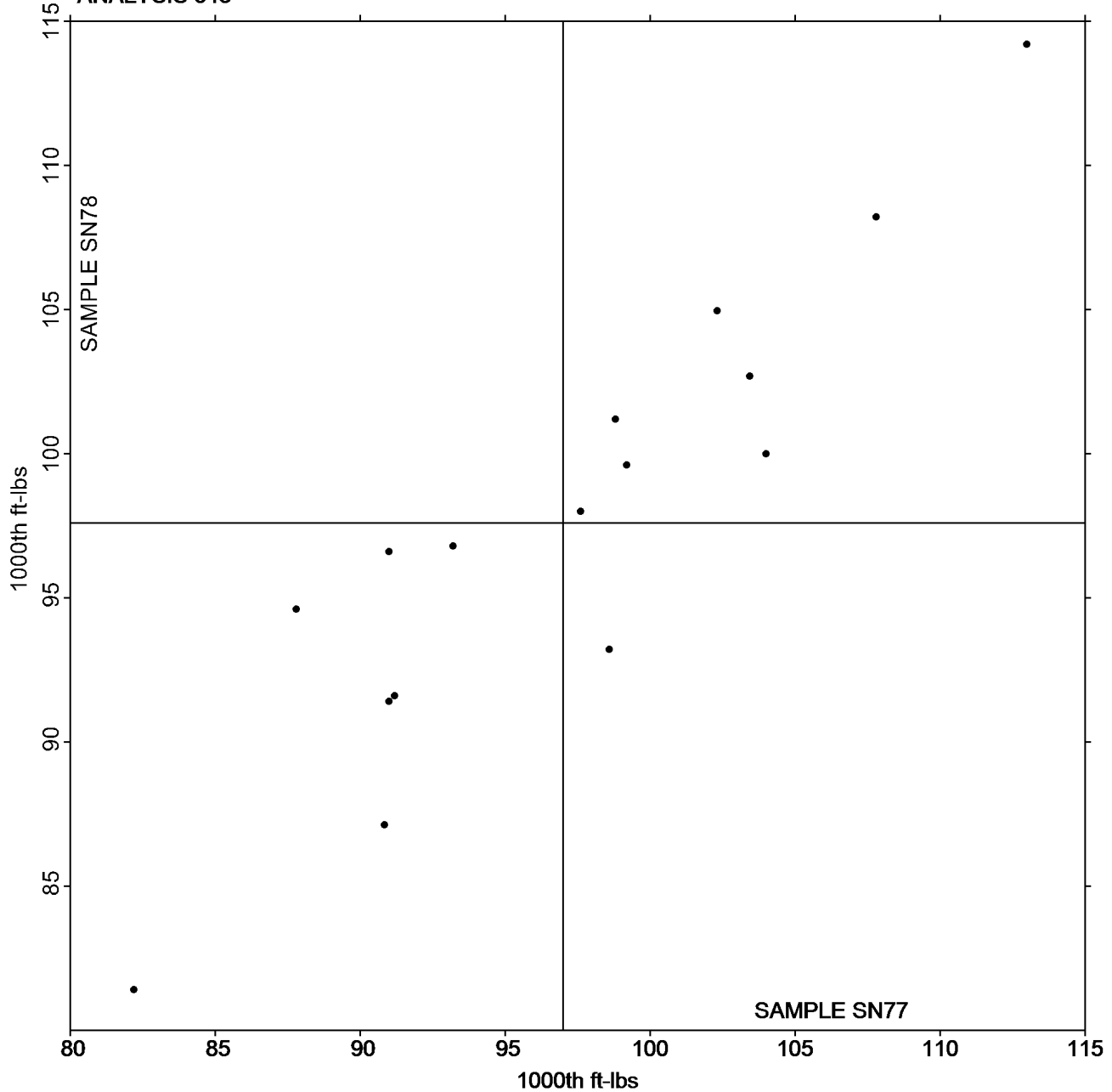
Paper & Paperboard Interlaboratory Testing Program
Analysis 348
Internal Bond Strength - Modified Scott Mechanics
TAPPI Provisional Test Method T569

Report #3051S,
March 2020

Grand Mean Sample SN77 = 97.001
1000th ft-lbs

Grand Mean Sample SN78 = 97.598
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 #3051S,
March 2020

WebCode	Data Flag	<u>Sample SP77</u>			<u>Sample SP78</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
722CJZ		99.40	11.90	0.75	95.44	7.76	0.51	XX
D6E8K6		97.00	9.50	0.60	96.20	8.52	0.57	SC
EH3RKR		101.60	14.10	0.88	103.20	15.52	1.03	XX
HL6WNN		90.76	3.26	0.20	88.18	0.50	0.03	XX
J4G8L7		66.20	-21.30	-1.34	68.60	-19.08	-1.27	TM
PYNY4T		113.00	25.50	1.60	115.00	27.32	1.81	SC
RU7E9Q		71.32	-16.18	-1.02	73.92	-13.76	-0.91	TM
RY287R		78.60	-8.90	-0.56	80.20	-7.48	-0.50	SC
WJNQZK		93.34	5.84	0.37	95.00	7.32	0.49	SC
Y4NJ2A		72.52	-14.98	-0.94	74.42	-13.26	-0.88	XX
YJXCMR		65.67	-21.83	-1.37	66.00	-21.68	-1.44	SC
YWBCJK		100.60	13.10	0.82	96.00	8.32	0.55	TM

Summary Statistics	<u>Sample SP77</u>	<u>Sample SP78</u>
Grand Means	87.50 1000th ft-lbs	87.68 1000th ft-lbs
Std Dev Btwn Labs	15.93 1000th ft-lbs	15.07 1000th ft-lbs

Statistics based on 12 of 12 reporting participants.

Key to Instrument Codes Reported by Participants

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



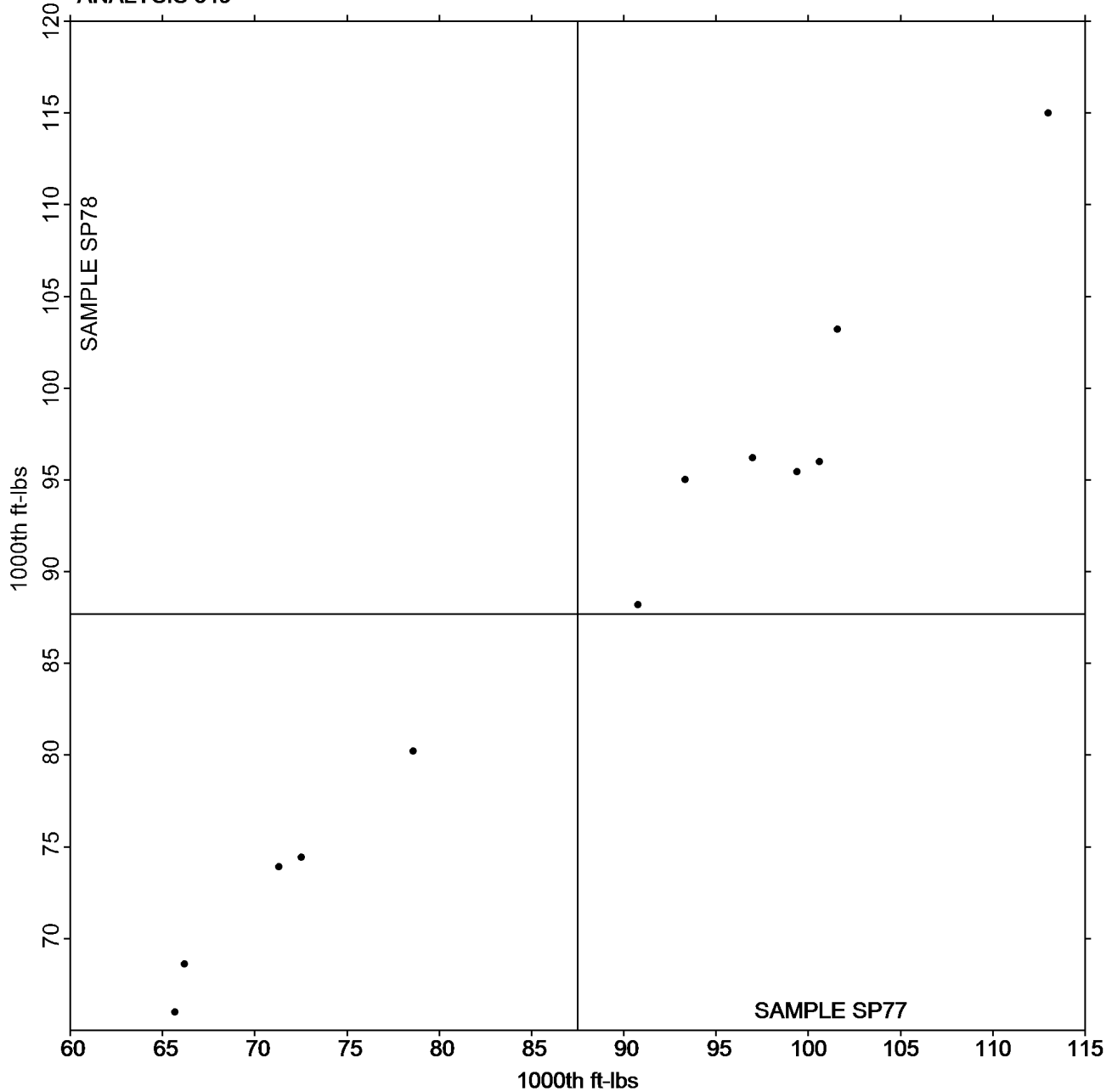
Paper & Paperboard Interlaboratory Testing Program
Analysis 349
Internal Bond Strength - Scott Bond Models
TAPPI Provisional Test Method T569

Report #3051S,
March 2020

Grand Mean Sample SP77 = 87.500
1000th ft-lbs

Grand Mean Sample SP78 = 87.680
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.



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

Report #3051S,
March 2020

-End of Report-