

Paper & Paperboard Testing Program

Summary Report #2981 S - January 2019

[Introduction to the Paper & Paperboard Interlaboratory Program](#)

[Explanation of Tables and Definitions of Terms](#)

<u>Analysis</u>	<u>Analysis Name</u>
305	Bursting Strength - Printing Papers
310	Bursting Strength - Packaging Papers
311	Tearing Strength - Newsprint
312	Tearing Strength - Printing Papers
314	Tearing Strength - Packaging Papers
320	Tensile Breaking Strength - Newsprint
321	Tensile Energy Absorption - Newsprint
322	Elongation to Break - Newsprint
325	Tensile Breaking Strength - Printing Papers
327	Tensile Energy Absorption - Printing Papers
328	Elongation to Break - Printing Papers
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334	Folding Endurance (MIT) - Double Folds
336	Bending Resistance, Gurley Type
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349	Internal Bond Strength - Scott Bond Models

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:

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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 #2981S,
January 2019

WebCode	Data Flag	<u>Sample SA63</u>			<u>Sample SA64</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
27NYBJ		26.81	0.80	0.27	26.17	0.00	0.00
2UULCM		28.80	2.78	0.94	26.90	0.73	0.26
4NLWT6		28.10	2.08	0.70	26.90	0.73	0.26
73F3Z7		26.54	0.53	0.18	26.79	0.62	0.22
7GUDL8		21.64	-4.38	-1.47	23.69	-2.48	-0.87
9V2D7M		19.86	-6.16	-2.07	20.24	-5.92	-2.09
A7LVHU		27.48	1.46	0.49	25.89	-0.27	-0.10
B9M683		26.55	0.53	0.18	28.49	2.33	0.82
GGYAJA		26.97	0.96	0.32	26.76	0.60	0.21
GLBKAH		26.12	0.10	0.04	26.60	0.44	0.15
GVXFMR		25.56	-0.46	-0.15	26.15	-0.01	0.00
GWTYDK		25.39	-0.63	-0.21	27.15	0.99	0.35
KGJKLX		29.34	3.32	1.12	27.31	1.15	0.40
L7K2QP		28.52	2.50	0.84	28.36	2.19	0.77
MKV892		21.57	-4.45	-1.50	21.25	-4.92	-1.73
MLPT4D		23.90	-2.12	-0.71	23.60	-2.57	-0.90
PH4VM2		25.35	-0.66	-0.22	24.67	-1.49	-0.53
PUX2NC		23.26	-2.76	-0.93	25.04	-1.13	-0.40
RNJCT9		25.05	-0.97	-0.33	25.25	-0.91	-0.32
VJFFXX		27.78	1.76	0.59	28.41	2.24	0.79
WMUD6K		22.90	-3.12	-1.05	23.80	-2.37	-0.83
XBXLZ8		27.51	1.49	0.50	27.61	1.44	0.51
XDGZ48	*	33.40	7.38	2.48	34.75	8.59	3.02

Summary Statistics	<u>Sample SA63</u>	<u>Sample SA64</u>
Grand Means	26.02 psi	26.17 psi
Std Dev Btwn Labs	2.97 psi	2.84 psi
Statistics based on 23 of 23 reporting participants.		

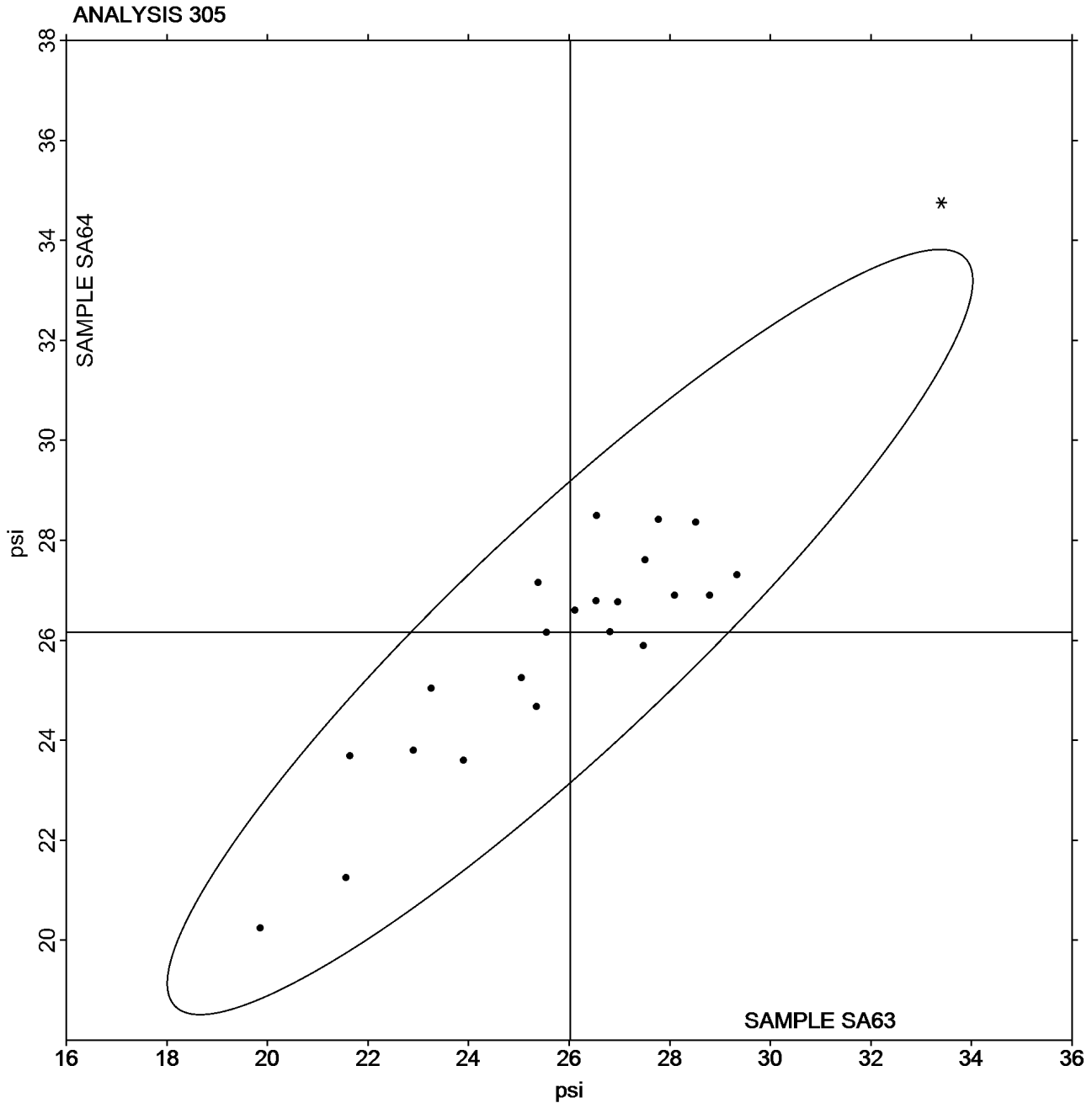


Paper & Paperboard Interlaboratory Testing Program
Analysis 305
Bursting Strength - Printing Papers
TAPPI Official Test Method T403

Report #2981S,
January 2019

Grand Mean Sample SA63 = 26.017
psi

Grand Mean Sample SA64 = 26.165
psi





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

Report #2981S,
January 2019

WebCode	Data Flag	Sample SB63			Sample SB64		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3GNPU7		91.37	1.22	0.23	81.03	4.60	0.76
3QUW8K	*	105.16	15.01	2.84	91.11	14.68	2.44
4CRF46		80.63	-9.53	-1.80	68.04	-8.40	-1.40
4PC8JX		85.23	-4.92	-0.93	66.99	-9.44	-1.57
6YV2BL		91.79	1.64	0.31	86.26	9.83	1.63
73F3Z7		88.17	-1.98	-0.38	74.61	-1.82	-0.30
7BNHZL		90.63	0.48	0.09	78.57	2.14	0.36
82XCGZ		83.65	-6.50	-1.23	69.53	-6.90	-1.15
8KBX72		81.83	-8.32	-1.58	67.99	-8.44	-1.40
974LUZ		89.88	-0.28	-0.05	77.34	0.91	0.15
9ALTAL		95.80	5.65	1.07	74.90	-1.53	-0.25
B8TJCQ		87.85	-2.30	-0.44	72.84	-3.59	-0.60
CT7Q2N	*	92.10	1.95	0.37	67.50	-8.93	-1.48
GT7FCM		89.58	-0.57	-0.11	71.75	-4.68	-0.78
GVXFMR		85.31	-4.85	-0.92	73.81	-2.62	-0.44
GWTYDK		91.30	1.14	0.22	74.40	-2.04	-0.34
H482HL		83.40	-6.75	-1.28	68.70	-7.73	-1.28
HWM2TN		94.87	4.72	0.89	79.79	3.35	0.56
JKNTD3		82.83	-7.32	-1.39	74.75	-1.68	-0.28
MV2RXP		85.25	-4.90	-0.93	72.65	-3.78	-0.63
NH7X2L		88.05	-2.10	-0.40	74.25	-2.18	-0.36
NREMKC		97.58	7.42	1.41	84.50	8.06	1.34
NZ3NVU		96.40	6.25	1.18	83.30	6.87	1.14
P9CC9T		90.70	0.55	0.10	79.10	2.67	0.44
UX43T6		89.70	-0.45	-0.09	81.60	5.17	0.86
WMUD6K		93.36	3.21	0.61	84.20	7.77	1.29
X98KUJ		92.78	2.63	0.50	77.26	0.83	0.14
XDGZ48		96.39	6.24	1.18	80.43	4.00	0.66
XMR3P9		88.84	-1.32	-0.25	74.11	-2.32	-0.38
YDXGWE		92.34	2.19	0.41	80.28	3.85	0.64
YKFPKB		92.00	1.85	0.35	77.80	1.37	0.23

Summary Statistics	Sample SB63	Sample SB64
Grand Means	90.15 psi	76.43 psi
Std Dev Btwn Labs	5.28 psi	6.02 psi
Statistics based on 31 of 31 reporting participants.		

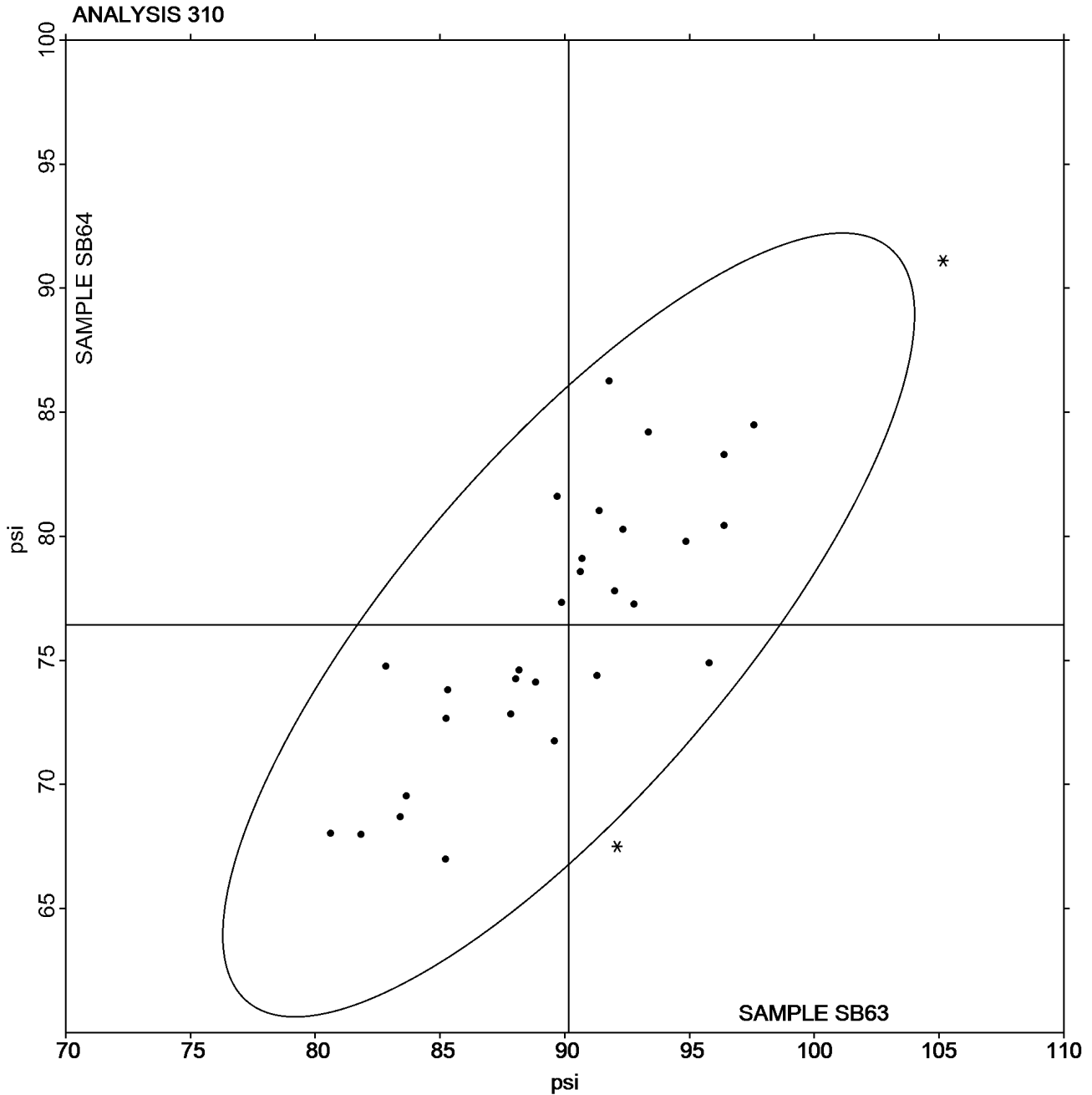


Paper & Paperboard Interlaboratory Testing Program
Analysis 310
Bursting Strength - Packaging Papers
TAPPI Official Test Method T403

Report #2981S,
January 2019

Grand Mean Sample SB63 = 90.154
psi

Grand Mean Sample SB64 = 76.432
psi





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

Report #2981S,
January 2019

WebCode	Data Flag	<u>Sample SK63</u>			<u>Sample SK64</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2JXDYC		31.04	7.53	1.34	30.52	7.23	1.28
2TKCNW		20.61	-2.90	-0.52	20.26	-3.03	-0.53
7XHQXE		16.49	-7.02	-1.25	16.54	-6.75	-1.19
BRHW83		29.43	5.92	1.05	29.81	6.52	1.15
GWTYDK		22.80	-0.71	-0.13	22.46	-0.82	-0.15
VJFFXX		20.71	-2.80	-0.50	20.13	-3.16	-0.56

Summary Statistics	<u>Sample SK63</u>	<u>Sample SK64</u>
Grand Means	23.51 Grams	23.29 Grams
Std Dev Btwn Labs	5.62 Grams	5.66 Grams
Statistics based on 6 of 6 reporting participants.		



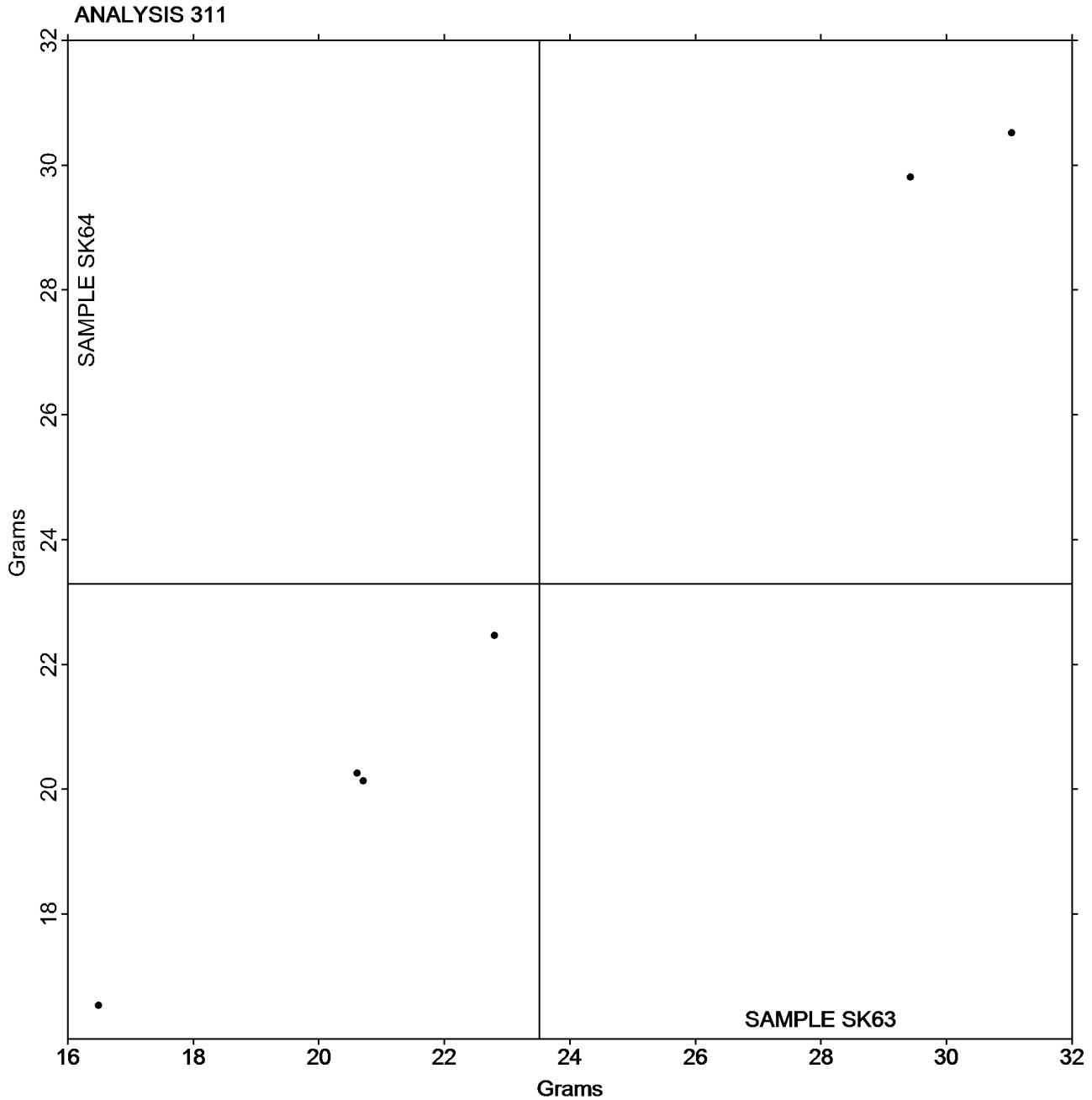
Paper & Paperboard Interlaboratory Testing Program

Report #2981S,
January 2019

Analysis 311 Tearing Strength - Newsprint TAPPI Official Test Method T414

Grand Mean Sample SK63 = 23.513
Grams

Grand Mean Sample SK64 = 23.287
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 #2981S,
January 2019

WebCode	Data Flag	Sample SC63			Sample SC64		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
23PNFJ		58.02	-5.92	-2.12	59.25	-4.77	-1.49
27NYBJ	X	55.68	-8.26	-2.95	59.13	-4.89	-1.53
2UULCM		66.30	2.36	0.84	65.20	1.18	0.37
4NLWT6		64.15	0.21	0.07	62.69	-1.33	-0.42
73F3Z7		63.20	-0.74	-0.26	63.65	-0.37	-0.12
7BNHZL		62.78	-1.16	-0.42	62.63	-1.39	-0.44
7DFTJR		66.22	2.28	0.81	66.32	2.30	0.72
7GUDL8		64.38	0.44	0.16	65.18	1.16	0.36
8KBX72		65.23	1.29	0.46	66.53	2.50	0.78
99F2NZ		65.80	1.86	0.66	64.54	0.52	0.16
9ALTAL		68.80	4.86	1.74	71.00	6.98	2.18
9JVXMC		63.77	-0.17	-0.06	65.16	1.14	0.36
A7LVHU		66.51	2.57	0.92	67.35	3.33	1.04
B8TJCQ		65.51	1.56	0.56	66.19	2.17	0.68
B9M683		65.96	2.02	0.72	66.96	2.94	0.92
BF2BHE		66.27	2.33	0.83	67.03	3.01	0.94
FTD3FV		63.00	-0.94	-0.34	61.49	-2.53	-0.79
GVXFMR		60.82	-3.12	-1.12	62.08	-1.94	-0.61
GWTYDK		63.72	-0.22	-0.08	65.26	1.24	0.39
H4MGBT		65.64	1.70	0.61	67.84	3.82	1.19
HWM2TN		63.85	-0.09	-0.03	62.33	-1.70	-0.53
JKNTD3		67.07	3.12	1.12	68.01	3.98	1.25
K7LJ89	X	54.21	-9.73	-3.48	60.12	-3.90	-1.22
KGJKLX		65.40	1.46	0.52	64.60	0.58	0.18
L7K2QP		60.12	-3.82	-1.37	59.54	-4.48	-1.40
LD6ZJH	*	62.13	-1.81	-0.65	58.31	-5.71	-1.79
MKV892		65.60	1.66	0.59	65.01	0.99	0.31
MLPT4D		59.20	-4.74	-1.69	58.11	-5.91	-1.85
MV2RXP		60.95	-2.99	-1.07	61.54	-2.48	-0.78
NH7X2L		60.28	-3.66	-1.31	59.89	-4.13	-1.29
NZ3NVU		59.76	-4.18	-1.49	60.24	-3.78	-1.18
P38FM8	X	57.34	-6.60	-2.36	63.72	-0.30	-0.09
PB2LF9		64.59	0.65	0.23	63.83	-0.19	-0.06
PUX2NC		63.96	0.02	0.01	63.56	-0.46	-0.14
QYNVYH	X	50.32	-13.62	-4.87	51.89	-12.13	-3.80
R2QYKD		59.94	-4.00	-1.43	58.46	-5.56	-1.74
RNJCT9		67.57	3.62	1.29	68.28	4.26	1.33
TM63HL		65.06	1.12	0.40	66.06	2.04	0.64
UJX8A4		60.68	-3.26	-1.17	61.62	-2.40	-0.75
VR7YER		60.00	-3.94	-1.41	60.30	-3.72	-1.16



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

Report #2981S,
January 2019

WebCode	Data Flag	<u>Sample SC63</u>			<u>Sample SC64</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
XDGZ48		62.17	-1.78	-0.63	62.31	-1.71	-0.54
XMR3P9		69.02	5.08	1.82	67.73	3.71	1.16
XVL8HA		63.60	-0.34	-0.12	64.62	0.60	0.19
XX9RJ8		66.60	2.66	0.95	65.80	1.78	0.56
YNGPRB		68.02	4.08	1.46	68.40	4.38	1.37

Summary Statistics	<u>Sample SC63</u>	<u>Sample SC64</u>
Grand Means	63.94 Grams	64.02 Grams
Std Dev Btwn Labs	2.80 Grams	3.20 Grams
Statistics based on 41 of 45 reporting participants.		

Comments on Assigned Data Flags for Test #312

- QYNVYH (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of sample SC64.
- 27NYBJ (X) - Data for sample SC63 are low.
- K7LJ89 (X) - Data for sample SC63 are low. Inconsistent within the determinations of both samples.
- P38FM8 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SC64.

Analysis Notes:

- MLPT4D - One determination removed from the Lab Mean of Sample SC64 per Grubb's Test at 1% risk (TAPPI 1205).
- YNGPRB - Data appear to be reported as mN, not gf as indicated on datasheet. CTS will not correct the Units going forward.



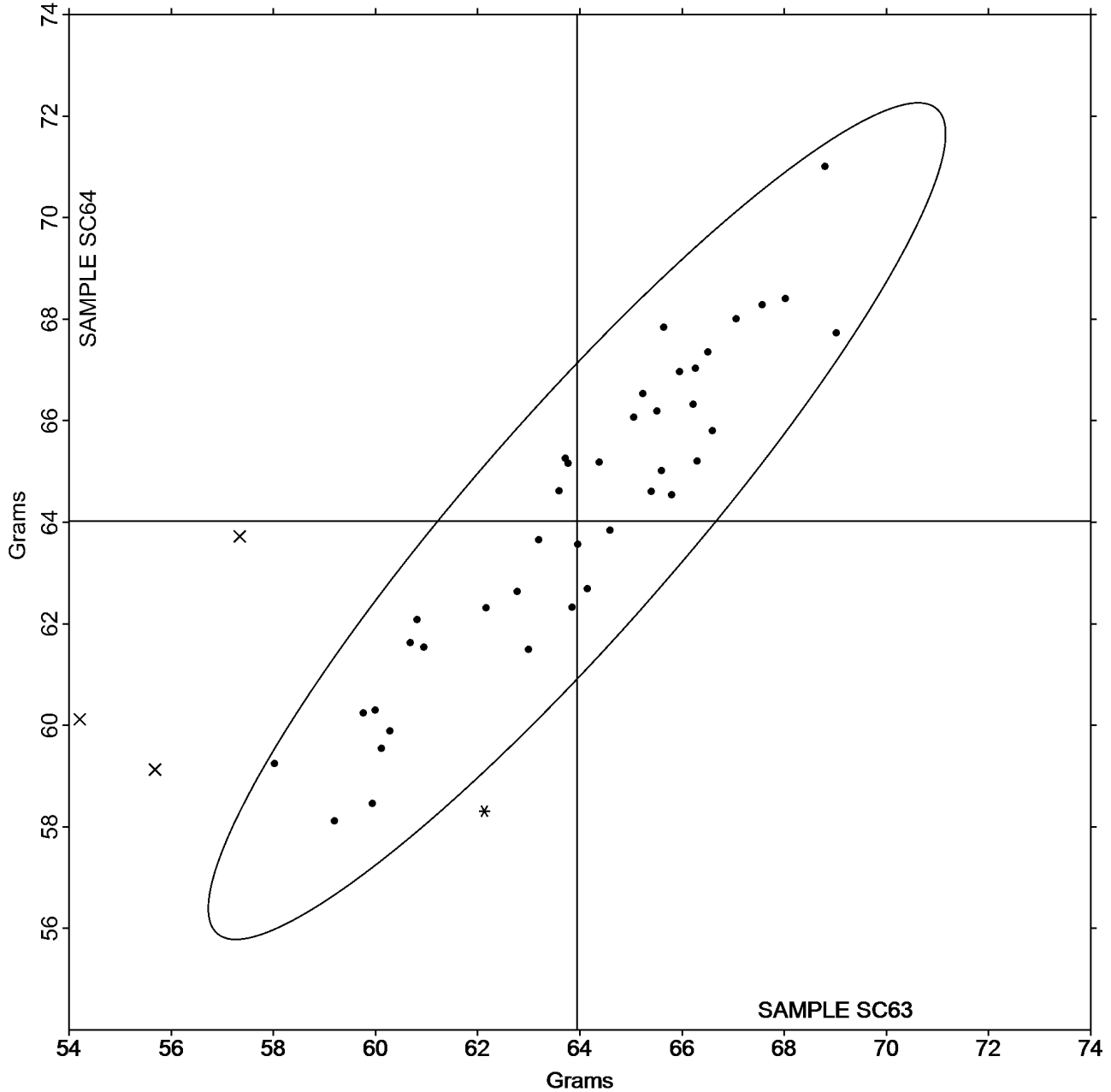
Paper & Paperboard Interlaboratory Testing Program
Analysis 312
Tearing Strength - Printing Papers
TAPPI Official Test Method T414

Report #2981S,
January 2019

Grand Mean Sample SC63 = 63.943
Grams

Grand Mean Sample SC64 = 64.022
Grams

ANALYSIS 312





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

Report #2981S,
January 2019

WebCode	Data Flag	Sample SD63			Sample SD64		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2GQXLE		142.6	4.2	0.28	167.6	2.2	0.12
2UULCM		132.3	-6.1	-0.41	160.4	-5.0	-0.28
3KKDAR		159.1	20.7	1.38	185.5	20.1	1.12
3LM2WX	*	169.9	31.5	2.10	190.2	24.8	1.39
3LW8ZZ		133.6	-4.8	-0.32	163.3	-2.1	-0.12
4CRF46		143.7	5.3	0.35	173.2	7.8	0.44
4PC8JX		133.0	-5.4	-0.36	163.2	-2.2	-0.12
4WUDHQ		140.3	1.9	0.13	163.7	-1.7	-0.10
77Y2K3	X	136.0	-2.4	-0.16	128.4	-37.0	-2.07
82XCGZ		126.4	-12.0	-0.80	149.2	-16.2	-0.91
8MDVGU		134.5	-3.9	-0.26	158.0	-7.4	-0.42
8NB7BC		139.0	0.6	0.04	169.4	4.0	0.22
974LUZ		121.6	-16.8	-1.12	159.4	-6.0	-0.34
9ALTAL		146.0	7.6	0.51	166.4	1.0	0.05
ALA9M2	X	0.3	-138.1	-9.18	3,139.7	2,974.3	166.31
EC8NDF		144.0	5.6	0.37	178.4	13.0	0.73
FPERJV		126.6	-11.8	-0.79	153.9	-11.5	-0.64
FX83UQ		154.0	15.6	1.03	193.3	27.9	1.56
GT7FCM		147.4	9.0	0.60	167.0	1.5	0.09
GVXFMR		109.8	-28.6	-1.90	137.1	-28.3	-1.58
GWTYDK		139.2	0.8	0.05	164.3	-1.1	-0.06
H482HL	*	166.9	28.5	1.89	209.7	44.3	2.47
HAEPVM		138.7	0.3	0.02	167.8	2.3	0.13
HPTTGH	X	65.7	-72.7	-4.83	90.1	-75.4	-4.21
MT873D		138.3	-0.1	-0.01	161.3	-4.1	-0.23
NC3A4E		131.5	-6.9	-0.46	161.6	-3.8	-0.21
PB2LF9	*	115.0	-23.4	-1.56	126.4	-39.0	-2.18
PB63QF	M	118.0	-20.4	-1.36	No data reported for this sample		
PUWE27		153.5	15.1	1.01	188.7	23.3	1.30
QB2XKG		142.9	4.5	0.30	175.4	10.0	0.56
RZXZC8		127.2	-11.2	-0.75	150.6	-14.8	-0.83
UJZVW9		136.8	-1.6	-0.11	159.2	-6.3	-0.35
UX43T6		131.0	-7.4	-0.49	151.0	-14.4	-0.81
VA83QG		109.0	-29.4	-1.96	135.6	-29.8	-1.67
W6TR4Q		125.4	-12.9	-0.86	150.1	-15.3	-0.86
WMUD6K		116.8	-21.6	-1.44	138.4	-27.0	-1.51
X98KUJ		153.8	15.4	1.02	186.1	20.6	1.15
YDXGWE		152.7	14.3	0.95	178.9	13.4	0.75
YX4R34		161.4	23.0	1.53	185.7	20.3	1.13



Paper & Paperboard Interlaboratory Testing Program

Report #2981S,
January 2019

Analysis 314

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

Summary Statistics	Sample SD63	Sample SD64
Grand Means	138.39 Grams	165.42 Grams
Stnd Dev Btwn Labs	15.03 Grams	17.88 Grams

Statistics based on 35 of 39 reporting participants.

Comments on Assigned Data Flags for Test #314

- HPTTGH (X) - Data for both samples are low.
- 77Y2K3 (X) - Inconsistent in testing between samples.
- PB63QF (M) - Participant did not submit data for sample SD64.
- ALA9M2 (X) - Extreme Data.



Paper & Paperboard Interlaboratory Testing Program

Report #2981S,
January 2019

Analysis 314

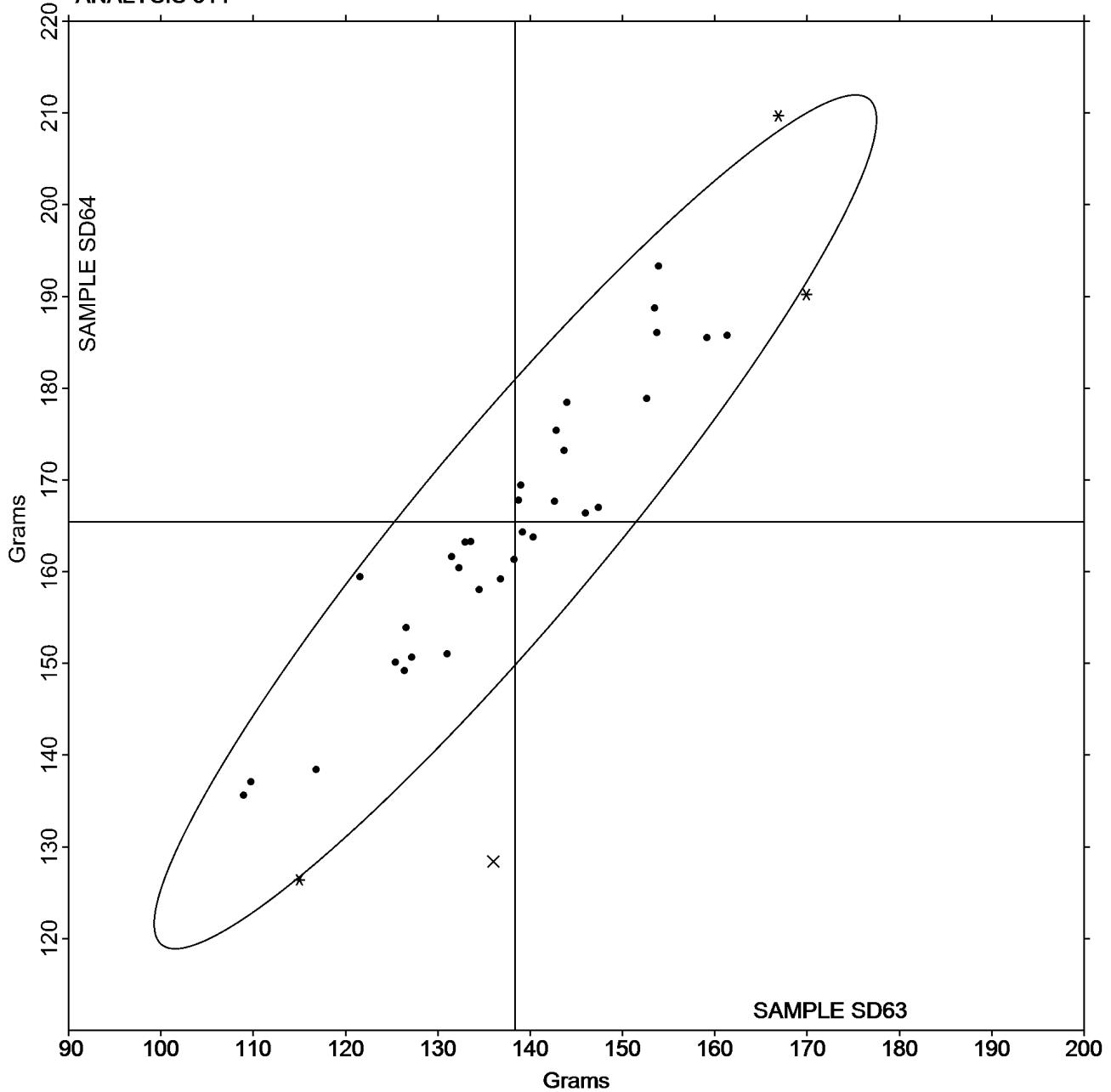
Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

Grand Mean Sample SD63 = 138.39
Grams

Grand Mean Sample SD64 = 165.42
Grams

ANALYSIS 314





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

Report #2981S,
January 2019

WebCode	Data Flag	<u>Sample SR63</u>			<u>Sample SR64</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2JXDYC		2.046	-0.017	-0.14	2.071	-0.034	-0.34
2TKCNW		1.904	-0.158	-1.33	1.921	-0.183	-1.87
73F3Z7		2.067	0.005	0.04	2.077	-0.028	-0.28
7XHQXE		2.037	-0.025	-0.21	2.092	-0.013	-0.13
BRHW83		2.116	0.054	0.46	2.192	0.087	0.89
CT7Q2N		2.174	0.112	0.94	2.183	0.079	0.80
GGYAJA		1.857	-0.205	-1.74	2.023	-0.082	-0.83
JB2UMX		1.959	-0.103	-0.87	2.010	-0.095	-0.97
MLPT4D		2.223	0.161	1.36	2.250	0.145	1.48
PB2LF9		2.104	0.042	0.35	2.130	0.025	0.26
VJFFXX		2.197	0.134	1.14	2.203	0.098	1.00

Summary Statistics	<u>Sample SR63</u>	<u>Sample SR64</u>
Grand Means	2.06 kN/m	2.10 kN/m
Std Dev Btwn Labs	0.12 kN/m	0.10 kN/m

Statistics based on 11 of 11 reporting participants.



Paper & Paperboard Interlaboratory Testing Program

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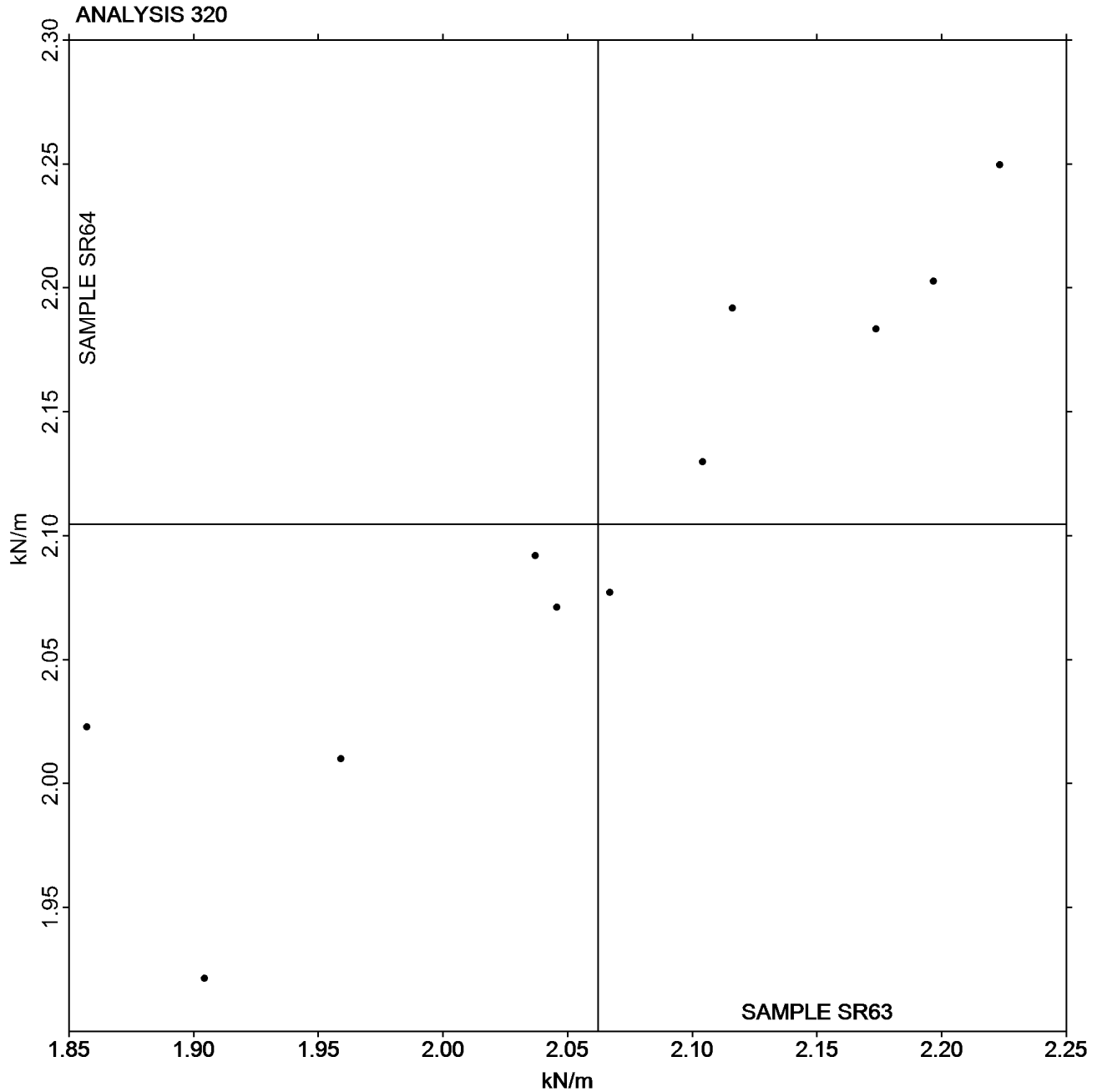
Analysis 320

Tensile Breaking Strength - Newsprint

TAPPI Official Test Method T494

Grand Mean Sample SR63 = 2.0622
kN/m

Grand Mean Sample SR64 = 2.1047
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 #2981S,
January 2019

WebCode	Data Flag	<u>Sample SR63</u>			<u>Sample SR64</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2JXDYC		13.54	-0.18	-0.13	12.79	-1.35	-1.38
2TKCNW		16.39	2.66	1.84	15.23	1.08	1.11
73F3Z7		12.28	-1.44	-1.00	12.15	-2.00	-2.04
7XHQXE		13.34	-0.39	-0.27	15.13	0.98	1.01
BRHW83		13.37	-0.35	-0.24	14.82	0.68	0.69
CT7Q2N		13.82	0.09	0.06	13.95	-0.19	-0.20
GGYAJA		10.64	-3.08	-2.13	13.67	-0.48	-0.49
JB2UMX		14.20	0.48	0.33	14.99	0.84	0.86
MLPT4D		14.27	0.55	0.38	14.51	0.36	0.37
PB2LF9		14.67	0.95	0.66	14.05	-0.10	-0.10
VJFFXX		14.44	0.72	0.50	14.32	0.17	0.18

Summary Statistics	<u>Sample SR63</u>	<u>Sample SR64</u>
Grand Means	13.72 Joules/sq m	14.15 Joules/sq m
Std Dev Btwn Labs	1.45 Joules/sq m	0.98 Joules/sq m
Statistics based on 11 of 11 reporting participants.		



Paper & Paperboard Interlaboratory Testing Program

Report #2981S,
January 2019

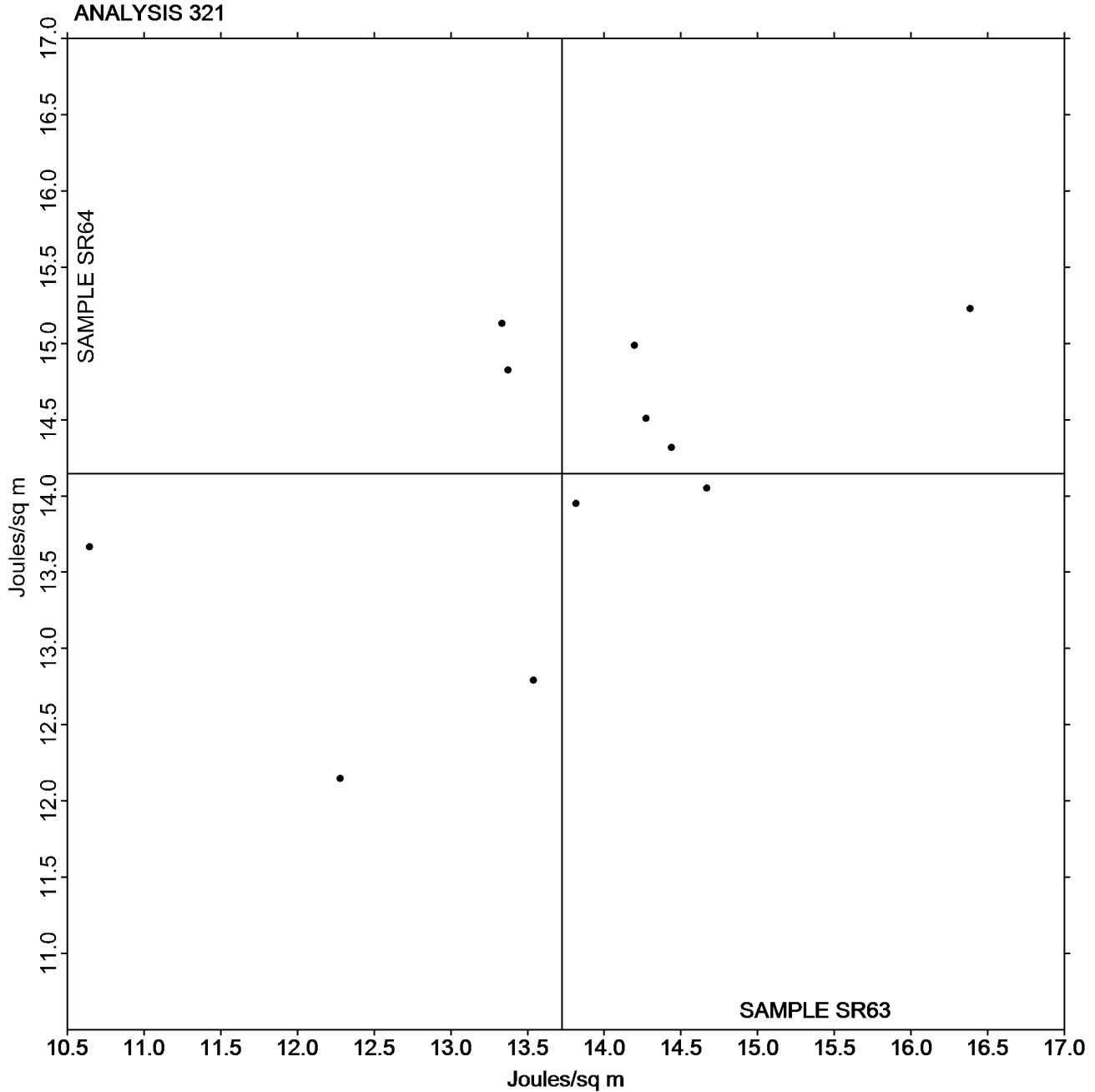
Analysis 321

Tensile Energy Absorption - Newsprint

TAPPI Official Test Method T494

Grand Mean Sample SR63 = 13.724
Joules/sq m

Grand Mean Sample SR64 = 14.145
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 #2981S,
January 2019

WebCode	Data Flag	<u>Sample SR63</u>			<u>Sample SR64</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2JXDYC		1.092	-0.051	-0.35	1.053	-0.096	-0.71
2TKCNW		1.396	0.253	1.74	1.319	0.170	1.27
73F3Z7		1.005	-0.138	-0.95	0.990	-0.159	-1.18
7XHQXE		1.103	-0.040	-0.27	1.182	0.033	0.25
CT7Q2N		1.094	-0.048	-0.33	1.099	-0.050	-0.37
GGYAJA		0.979	-0.164	-1.13	1.136	-0.012	-0.09
JB2UMX		1.252	0.109	0.75	1.322	0.173	1.29
MLPT4D		1.120	-0.023	-0.16	1.074	-0.075	-0.56
PB2LF9		1.026	-0.117	-0.80	0.984	-0.165	-1.23
VJFFXX		1.361	0.218	1.50	1.327	0.178	1.33

Summary Statistics	<u>Sample SR63</u>	<u>Sample SR64</u>
Grand Means	1.14 Percent	1.15 Percent
Std Dev Btwn Labs	0.15 Percent	0.13 Percent

Statistics based on 10 of 10 reporting participants.

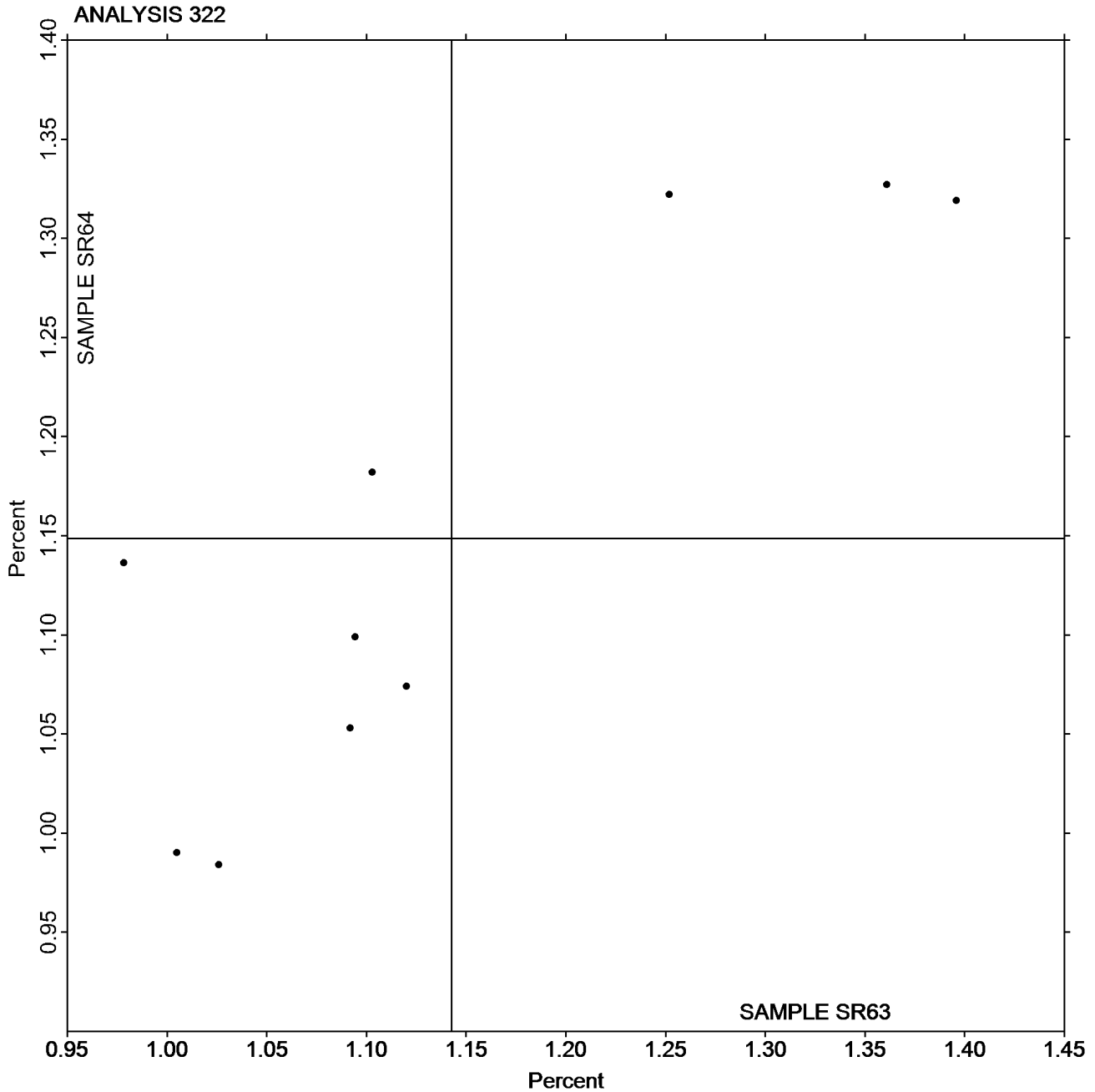


Paper & Paperboard Interlaboratory Testing Program
Analysis 322
Elongation to Break - Newsprint
TAPPI Official Test Method T494

Report #2981S,
January 2019

Grand Mean Sample SR63 = 1.1428
Percent

Grand Mean Sample SR64 = 1.1486
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 #2981S,
January 2019

WebCode	Data Flag	Sample SF63			Sample SF64			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
23PNFJ		4.788	0.452	1.60	4.755	0.430	1.69	XX
27NYBJ		4.476	0.141	0.50	4.566	0.240	0.94	LA
4NLWT6		4.269	-0.066	-0.24	4.243	-0.083	-0.32	LH
73F3Z7		4.177	-0.159	-0.56	4.214	-0.111	-0.44	LH
7GUDL8		4.842	0.507	1.79	4.807	0.482	1.89	TO
8KBX72		4.305	-0.031	-0.11	4.432	0.107	0.42	LI
99F2NZ		3.982	-0.354	-1.25	4.092	-0.233	-0.92	LE
9A9ZXT		3.899	-0.437	-1.55	3.889	-0.437	-1.71	RE
9JVXMC		4.059	-0.277	-0.98	4.116	-0.209	-0.82	IM
9V2D7M		4.201	-0.135	-0.48	4.204	-0.121	-0.48	DL
A7LVHU		4.358	0.023	0.08	4.399	0.074	0.29	LH
B9M683		4.142	-0.193	-0.68	4.172	-0.153	-0.60	LX
BF2BHE		4.190	-0.146	-0.52	4.192	-0.133	-0.52	LI
FTD3FV		4.498	0.162	0.57	4.250	-0.076	-0.30	TC
GDDNQL		4.447	0.111	0.39	4.494	0.169	0.66	FP
GLBKAH		4.567	0.231	0.82	4.620	0.295	1.16	LF
GVXFMR		4.272	-0.063	-0.22	4.335	0.010	0.04	XX
GWTYDK		4.192	-0.144	-0.51	4.174	-0.151	-0.59	LH
H4MGBT		3.693	-0.643	-2.27	3.680	-0.645	-2.53	ID
HWM2TN		4.262	-0.074	-0.26	4.210	-0.115	-0.45	LH
K7LJ89	X	3.350	-0.985	-3.49	4.432	0.107	0.42	FP
KGJKLX		4.394	0.058	0.21	4.310	-0.015	-0.06	LH
L7K2QP	*	4.802	0.466	1.65	4.532	0.207	0.81	TJ
LD6ZJH		4.397	0.061	0.22	4.490	0.165	0.65	LI
MKV892		4.534	0.198	0.70	4.542	0.217	0.85	LX
MV2RXP		4.533	0.197	0.70	4.682	0.356	1.40	TF
NZ3NVU		4.145	-0.190	-0.67	4.154	-0.171	-0.67	TO
P38FM8		4.520	0.184	0.65	4.363	0.037	0.15	TP
P6C2CT		4.594	0.258	0.91	4.573	0.248	0.97	TP
PH4VM2		4.463	0.127	0.45	4.371	0.046	0.18	LH
PUX2NC		4.023	-0.312	-1.10	4.038	-0.287	-1.13	TB
QYNVYH	X	4.935	0.600	2.12	4.343	0.018	0.07	VM
R2QYKD		3.987	-0.349	-1.23	4.199	-0.126	-0.49	TB
RM7FPN		4.278	-0.057	-0.20	4.250	-0.075	-0.29	XX
RNJCT9		4.725	0.389	1.38	4.673	0.348	1.36	LI
TM63HL		4.660	0.324	1.15	4.443	0.118	0.46	LA
UJX8A4		4.194	-0.142	-0.50	4.168	-0.157	-0.62	TF
VR7YER		4.486	0.150	0.53	4.468	0.143	0.56	TO
XMR3P9		4.097	-0.239	-0.84	4.088	-0.237	-0.93	LI
XX9RJ8		4.809	0.473	1.68	4.665	0.340	1.33	XX



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

Report #2981S,
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WebCode	Data Flag	Sample SF63			Sample SF64			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
YNGPRB		3.827	-0.509	-1.80	3.832	-0.493	-1.94	TO

Summary Statistics	Sample SF63	Sample SF64
Grand Means	4.34 kN/m	4.33 kN/m
Std Dev Btwn Labs	0.28 kN/m	0.25 kN/m
Statistics based on 39 of 41 reporting participants.		

Comments on Assigned Data Flags for Test #325

- QYNVYH (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SF64.
- K7LJ89 (X) - Data for sample SF63 are low. Inconsistent within the determinations of both samples.

Analysis Notes:

- TM63HL - Data appear to be reported as kN/m, not lb/inch as indicated on datasheet. Units corrected by CTS.
- XX9RJ8 - Data appear to be reported as lb/in, not kg/15 mm as indicated on datasheet. Units corrected by CTS.

Key to Instrument Codes Reported by Participants

DL	EMIC DL500 Universal Testing Machines	FP	Frank PTI Universal Tester TS
ID	Instron 4201/4202	IM	Instron 5500 Series
LA	L & W Tensile - Autoline 300	LE	L & W Tensile Tester 066
LF	L & W Tensile/Fracture Toughness Tester SE 064	LH	L & W Alwetron TH1 (Horizontal) SE 060/065F
LI	L & W Tensile Tester SE 062	LX	L & W (model not specified)
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)	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		



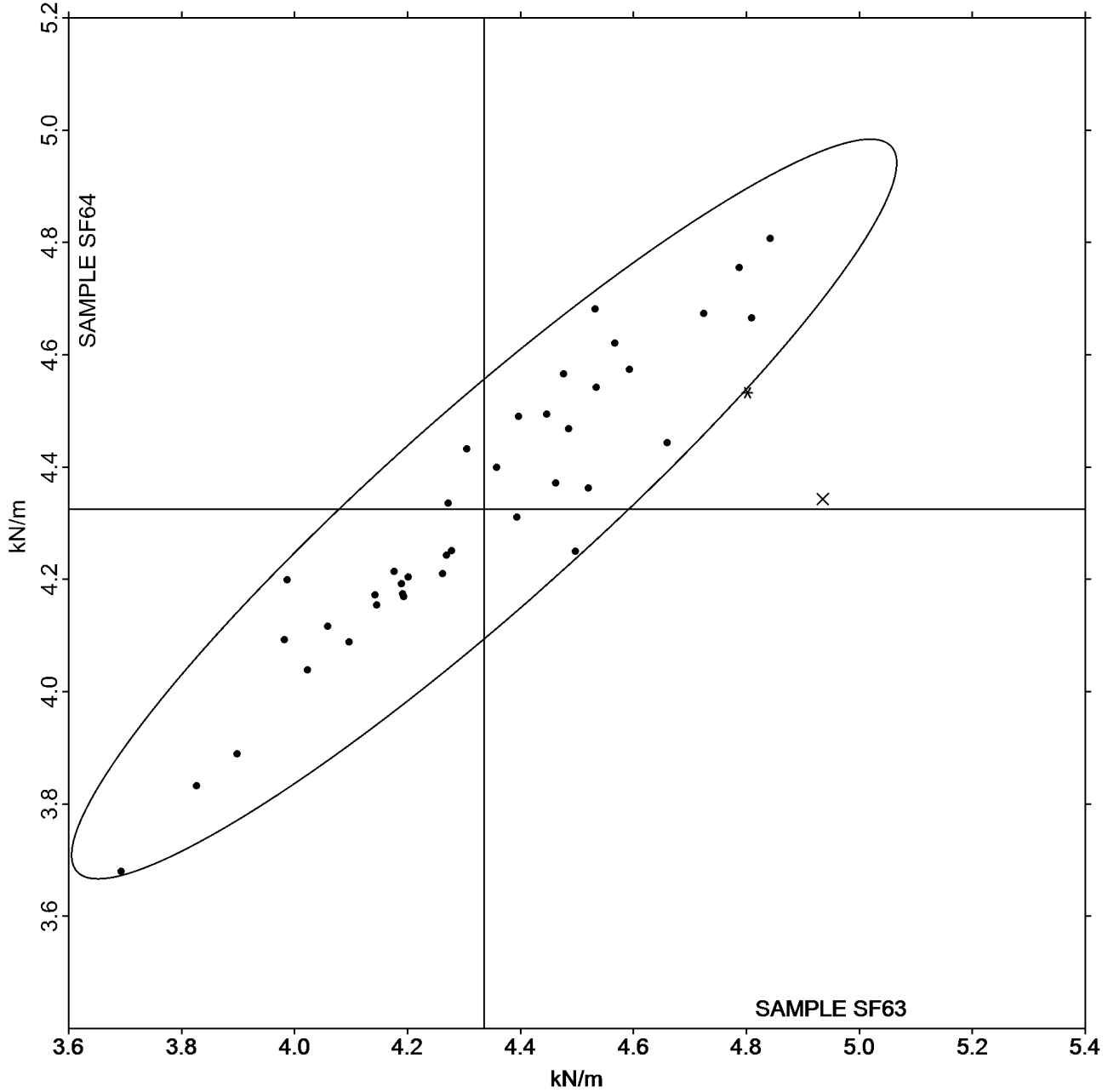
Paper & Paperboard Interlaboratory Testing Program
Analysis 325
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Grand Mean Sample SF63 = 4.3356
kN/m

Grand Mean Sample SF64 = 4.3253
kN/m

ANALYSIS 325





Paper & Paperboard Interlaboratory Testing Program

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January 2019**

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF63			Sample SF64			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
23PNFJ		31.14	-13.41	-2.29	30.65	-13.42	-2.55	XX
27NYBJ		29.32	-15.23	-2.60	31.55	-12.51	-2.38	LA
4NLWT6		42.07	-2.48	-0.42	40.80	-3.26	-0.62	LH
73F3Z7		40.79	-3.76	-0.64	43.73	-0.34	-0.06	LH
8KBX72		45.12	0.57	0.10	46.96	2.90	0.55	LI
9A9ZXT		41.32	-3.23	-0.55	37.52	-6.54	-1.24	RE
9JVXMC		43.28	-1.27	-0.22	43.99	-0.07	-0.01	IM
9V2D7M		46.56	2.01	0.34	46.80	2.73	0.52	DL
A7LVHU		46.08	1.53	0.26	46.83	2.77	0.53	LH
B9M683		43.87	-0.68	-0.12	43.47	-0.59	-0.11	LX
BF2BHE		42.84	-1.72	-0.29	39.17	-4.89	-0.93	LI
GDDNQL		53.51	8.95	1.53	53.00	8.93	1.70	FP
GLBKAH		50.72	6.17	1.05	51.56	7.49	1.42	LW
GVXFMR		45.32	0.77	0.13	45.61	1.55	0.29	XX
GWTYDK		44.83	0.28	0.05	45.41	1.34	0.26	LH
H4MGBT	X	229.40	184.85	31.56	217.79	173.72	32.98	ID
HWM2TN		47.60	3.05	0.52	44.00	-0.06	-0.01	LH
K7LJ89	X	49.03	4.48	0.76	57.40	13.33	2.53	FP
LD6ZJH		35.68	-8.87	-1.51	38.02	-6.05	-1.15	LI
MKV892		43.85	-0.70	-0.12	43.32	-0.74	-0.14	LX
MV2RXP		41.83	-2.72	-0.46	46.00	1.94	0.37	TF
NZ3NVU		52.10	7.55	1.29	49.91	5.85	1.11	TO
P38FM8		47.05	2.50	0.43	44.41	0.35	0.07	TP
PH4VM2		47.65	3.10	0.53	47.60	3.54	0.67	LH
PUX2NC		44.80	0.25	0.04	45.01	0.94	0.18	TB
RNJCT9		51.78	7.23	1.24	49.47	5.40	1.03	LI
TM63HL	*	53.78	9.23	1.58	46.18	2.12	0.40	LA
VR7YER		43.41	-1.14	-0.19	42.85	-1.21	-0.23	TO
XMR3P9		40.90	-3.65	-0.62	40.19	-3.87	-0.74	LI
YNGPRB		50.20	5.65	0.97	49.77	5.70	1.08	TO

Summary Statistics	Sample SF63	Sample SF64
Grand Means	44.55 Joules/sq m	44.06 Joules/sq m
Std Dev Btwn Labs	5.86 Joules/sq m	5.27 Joules/sq m
Statistics based on 28 of 30 reporting participants.		

Comments on Assigned Data Flags for Test #327

H4MGBT (X) - Extreme Data.

K7LJ89 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.



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

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Key to Instrument Codes Reported by Participants

DL	EMIC DL500 Universal Testing Machines	FP	Frank PTI Universal Tester TS
ID	Instron 4201	IM	Instron 5500 Series
LA	L & W Tensile - Autoline 300	LH	L & W Alwetron TH1 (Horizontal) SE 060
LI	L & W Tensile Tester SE 062	LW	L & W Tensile Tester SE 064
LX	L & W (model not specified)	RE	Regmed
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TO	Thwing-Albert QC-1000	TP	TMI Monitor/Tensile 100 (84-21-01)
XX	Instrument make/model not specified by lab		



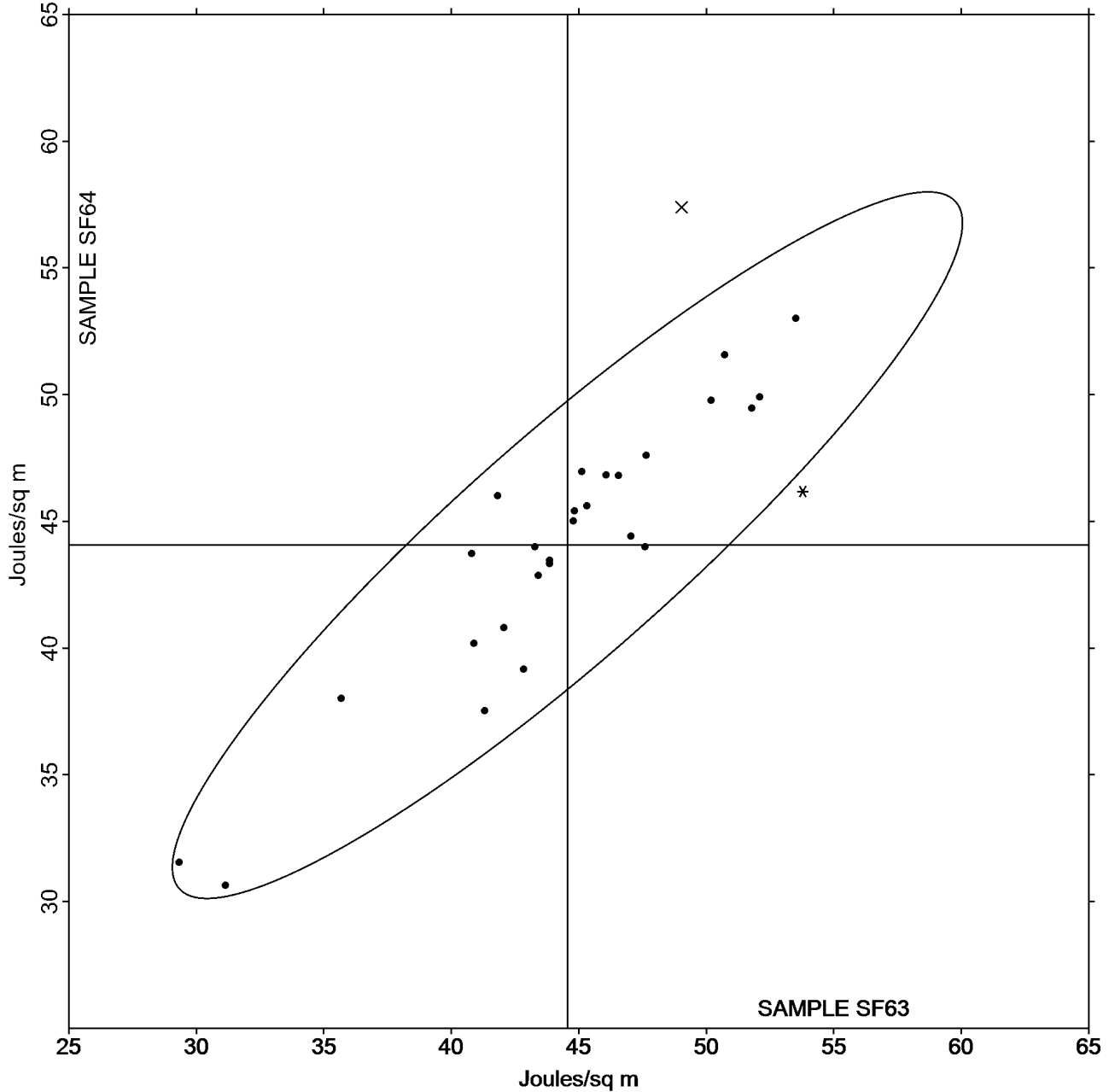
Paper & Paperboard Interlaboratory Testing Program
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Grand Mean Sample SF63 = 44.550
Joules/sq m

Grand Mean Sample SF64 = 44.063
Joules/sq m

ANALYSIS 327





Paper & Paperboard Interlaboratory Testing Program

Report #2981S,
January 2019

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF63			Sample SF64			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
23PNFJ		1.332	-0.313	-1.55	1.314	-0.303	-1.65	XX
27NYBJ		1.303	-0.342	-1.69	1.364	-0.253	-1.38	LA
4NLWT6		1.535	-0.110	-0.54	1.502	-0.115	-0.63	LH
73F3Z7		1.499	-0.146	-0.72	1.551	-0.066	-0.36	LH
8KBX72		1.616	-0.029	-0.14	1.632	0.015	0.08	LI
9A9ZXT		1.741	0.096	0.48	1.615	-0.002	-0.01	RE
9JVXMC		1.701	0.056	0.28	1.739	0.122	0.66	IM
9V2D7M		1.831	0.186	0.92	1.843	0.226	1.23	DL
A7LVHU		1.625	-0.020	-0.10	1.636	0.019	0.10	LH
B9M683		1.612	-0.033	-0.16	1.579	-0.038	-0.21	LX
BF2BHE		1.579	-0.066	-0.33	1.460	-0.157	-0.86	LI
GDDNQL		1.860	0.215	1.06	1.838	0.221	1.20	FP
GLBKAH		1.704	0.059	0.29	1.710	0.093	0.51	LW
GVXFMR		1.769	0.124	0.62	1.729	0.112	0.61	XX
GWTYDK		1.626	-0.019	-0.09	1.686	0.069	0.38	LH
H4MGBT		1.643	-0.002	-0.01	1.585	-0.032	-0.17	ID
HWM2TN		1.730	0.085	0.42	1.630	0.013	0.07	LH
K7LJ89		2.135	0.490	2.43	2.016	0.399	2.17	FP
LD6ZJH		1.328	-0.317	-1.57	1.376	-0.241	-1.31	LI
MKV892		1.513	-0.132	-0.65	1.490	-0.127	-0.69	LX
MV2RXP		1.578	-0.067	-0.33	1.657	0.040	0.22	TF
NZ3NVU		2.114	0.469	2.32	2.026	0.409	2.23	TO
P38FM8		1.789	0.144	0.71	1.721	0.104	0.57	TP
PH4VM2		1.637	-0.008	-0.04	1.660	0.043	0.23	LH
PUX2NC		1.762	0.117	0.58	1.761	0.144	0.78	TB
QYNVYH		1.450	-0.195	-0.97	1.320	-0.297	-1.62	VM
R2QYKD		1.393	-0.252	-1.25	1.542	-0.075	-0.41	TF
RNJCT9		1.581	-0.064	-0.32	1.531	-0.086	-0.47	LI
TM63HL		1.607	-0.038	-0.19	1.455	-0.162	-0.88	XX
UJX8A4		1.622	-0.023	-0.11	1.465	-0.152	-0.83	TF
VR7YER		1.489	-0.156	-0.77	1.468	-0.149	-0.81	TO
XMR3P9		1.527	-0.118	-0.58	1.508	-0.109	-0.59	LI
YNGPRB		2.054	0.409	2.03	1.957	0.340	1.85	TO

Summary Statistics	Sample SF63	Sample SF64
Grand Means	1.64 Percent	1.62 Percent
Std Dev Btwn Labs	0.20 Percent	0.18 Percent

Statistics based on 33 of 33 reporting participants.



Paper & Paperboard Interlaboratory Testing Program

Report #2981S,
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Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

Key to Instrument Codes Reported by Participants

DL	EMIC DL500 Universal Testing Machines	FP	Frank PTI Universal Tester TS
ID	Instron 4201	IM	Instron 5500
LA	L & W Tensile - Autoline 300	LH	L & W Alwetron TH1 (Horizontal) SE 060
LI	L & W Tensile Tester SE 062	LW	L & W Tensile Tester SE 064
LX	L & W (model not specified)	RE	Regmed
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TO	Thwing-Albert QC-1000	TP	TMI Monitor/Tensile 100 (84-21-01)
VM	Valmet PaperLab (was Kajaani/Robotest)	XX	Instrument make/model not specified by lab



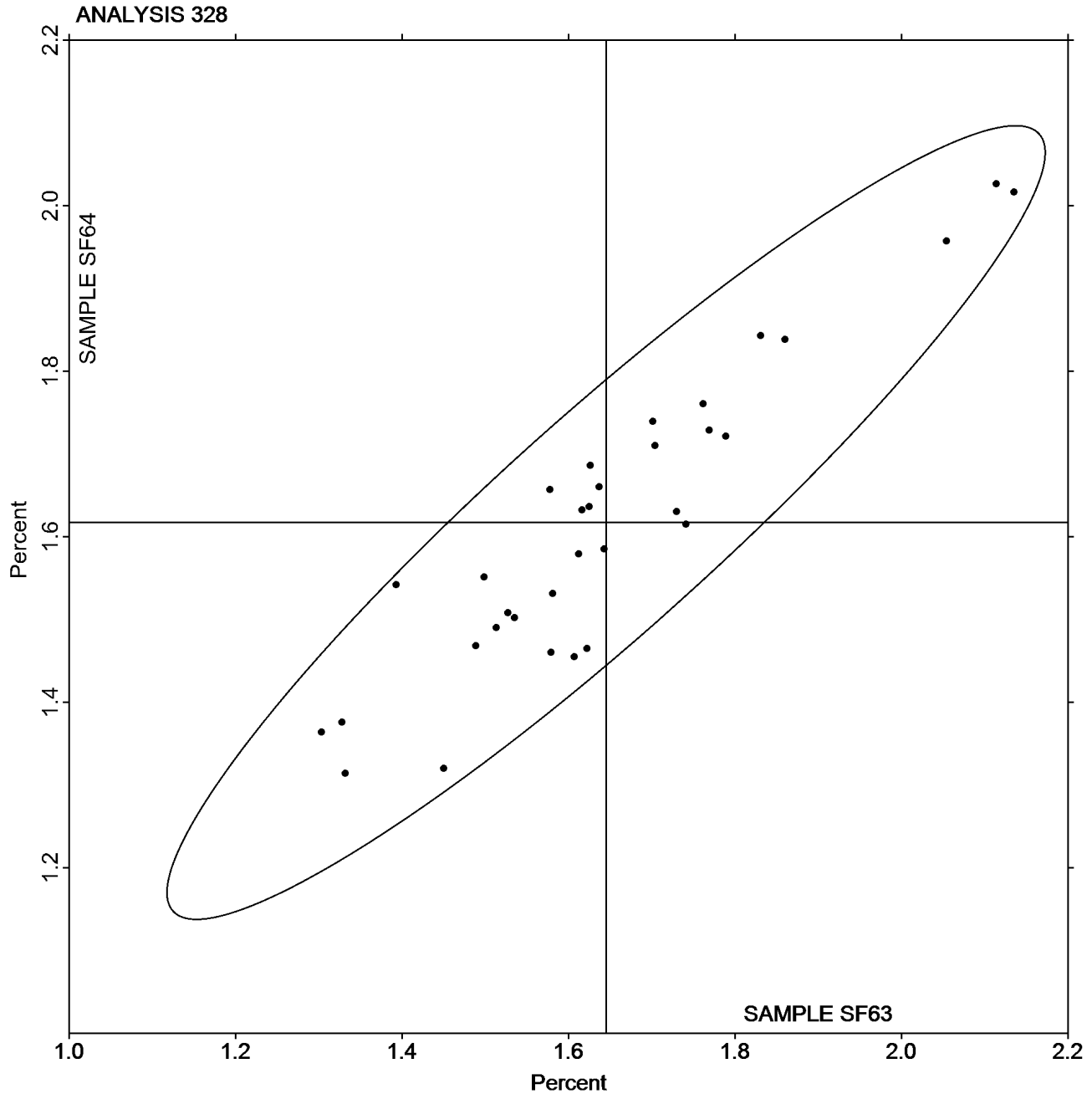
Paper & Paperboard Interlaboratory Testing Program

Report #2981S,
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Analysis 328 Elongation to Break - Printing Papers TAPPI Official Test Method T494

Grand Mean Sample SF63 = 1.6450
Percent

Grand Mean Sample SF64 = 1.6171
Percent





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

Report #2981S,
January 2019

WebCode	Data Flag	Sample SE63			Sample SE64			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2GQXLE		8.671	0.034	0.06	8.640	0.000	0.00	TA
2JEP7B		8.928	0.291	0.48	8.885	0.245	0.36	IK
2UULCM		7.970	-0.668	-1.11	8.028	-0.611	-0.90	TA
2XHXYEY		8.970	0.333	0.55	8.788	0.148	0.22	TH
34JTB4		9.321	0.683	1.14	9.775	1.135	1.67	CE
3LM2WX		8.112	-0.525	-0.87	8.108	-0.532	-0.78	TR
3LW8ZZ		8.088	-0.550	-0.91	7.763	-0.877	-1.29	IF
3MEY64		9.404	0.767	1.27	9.282	0.642	0.94	TH
3QUW8K		8.665	0.028	0.05	8.460	-0.180	-0.26	TB
4CRF46		8.402	-0.236	-0.39	8.370	-0.270	-0.40	LH
4PC8JX		8.001	-0.636	-1.06	7.775	-0.865	-1.27	ID
6YV2BL		8.986	0.349	0.58	8.635	-0.005	-0.01	IK
7BNHZL		8.669	0.032	0.05	8.739	0.099	0.15	IF
7DFTJR	*	7.620	-1.018	-1.69	7.989	-0.650	-0.96	XX
7DU3P8		8.428	-0.209	-0.35	8.662	0.022	0.03	TT
82XCGZ		8.495	-0.142	-0.24	8.502	-0.137	-0.20	LE
8MDVGU		8.301	-0.336	-0.56	8.442	-0.198	-0.29	IF
8NB7BC		7.512	-1.125	-1.87	7.169	-1.471	-2.16	IM
974LUZ		8.155	-0.482	-0.80	8.246	-0.393	-0.58	IM
9ALTAL		9.412	0.775	1.29	9.040	0.400	0.59	IF
9XVZ2Y		9.113	0.476	0.79	9.163	0.524	0.77	LA
ALA9M2		8.801	0.164	0.27	9.308	0.668	0.98	IK
EC8NDF		9.150	0.513	0.85	8.974	0.334	0.49	LX
FPERJV		8.452	-0.185	-0.31	8.403	-0.237	-0.35	LE
FX83UQ		7.513	-1.124	-1.87	7.779	-0.861	-1.27	LE
GEA2CT		8.832	0.195	0.32	8.781	0.141	0.21	TB
GVXFMR		8.465	-0.172	-0.29	8.586	-0.053	-0.08	XX
GWTYDK		8.489	-0.148	-0.25	8.340	-0.300	-0.44	LH
H482HL		8.061	-0.576	-0.96	7.961	-0.679	-1.00	LE
H63L6K		9.630	0.993	1.65	10.070	1.430	2.10	DW
HAEPVM		8.157	-0.480	-0.80	8.273	-0.367	-0.54	XX
JKNTD3		8.086	-0.551	-0.92	7.951	-0.689	-1.01	LE
JNRHRK		8.963	0.325	0.54	9.139	0.499	0.73	IK
L8EQAK		8.134	-0.503	-0.84	8.001	-0.639	-0.94	IM
L98NGQ		9.094	0.457	0.76	9.217	0.577	0.85	TX
MT873D		9.456	0.819	1.36	9.389	0.749	1.10	TO
MV2RXP		8.748	0.110	0.18	8.641	0.001	0.00	TO
NC3A4E		8.302	-0.335	-0.56	8.329	-0.311	-0.46	LW
PB63QF	X	6.355	-2.283	-3.79	7.696	-0.944	-1.39	IM
PWMF8U		7.636	-1.001	-1.66	7.504	-1.136	-1.67	LA



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

Report #2981S,
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WebCode	Data Flag	<u>Sample SE63</u>			<u>Sample SE64</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
PZKWLA		8.651	0.014	0.02	8.494	-0.146	-0.22	TH
Q2BGXM		9.399	0.762	1.27	9.466	0.826	1.22	IR
QB2XKG		7.867	-0.770	-1.28	8.066	-0.574	-0.84	TK
RZXZC8		9.175	0.538	0.89	9.140	0.500	0.74	TO
UER966		9.562	0.925	1.54	9.385	0.745	1.10	LI
UZ8U27	X	12.165	3.528	5.86	10.900	2.261	3.33	LA
V3R3LQ		7.671	-0.967	-1.61	7.548	-1.092	-1.61	LW
W6TR4Q		8.475	-0.162	-0.27	8.311	-0.329	-0.48	LH
WMUD6K		9.781	1.144	1.90	10.134	1.494	2.20	TH
WUA733	*	8.595	-0.042	-0.07	8.002	-0.638	-0.94	IM
X98KUJ		9.693	1.056	1.75	10.058	1.418	2.09	LA
XDGZ48		8.974	0.337	0.56	9.231	0.591	0.87	TR
YKFPKB		9.179	0.542	0.90	9.316	0.676	1.00	IK
YX4R34		8.918	0.281	0.47	9.017	0.377	0.55	ID

Summary Statistics	<u>Sample SE63</u>	<u>Sample SE64</u>
Grand Means	8.64 kN/m	8.64 kN/m
Std Dev Btwn Labs	0.60 kN/m	0.68 kN/m
Statistics based on 52 of 54 reporting participants.		

Comments on Assigned Data Flags for Test #330

UZ8U27 (X) - Data for both samples are high. Possible Systematic Error.

PB63QF (X) - Data for sample SE63 are low. Inconsistent within the determinations of both samples.

Key to Instrument Codes Reported by Participants

CE	Chatillon Model ET1100	DW	Dongguan Walter W-304 Tester
ID	Instron 4201	IF	Instron 3340 Series
IK	Instron 4400 Series	IM	Instron 5500 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

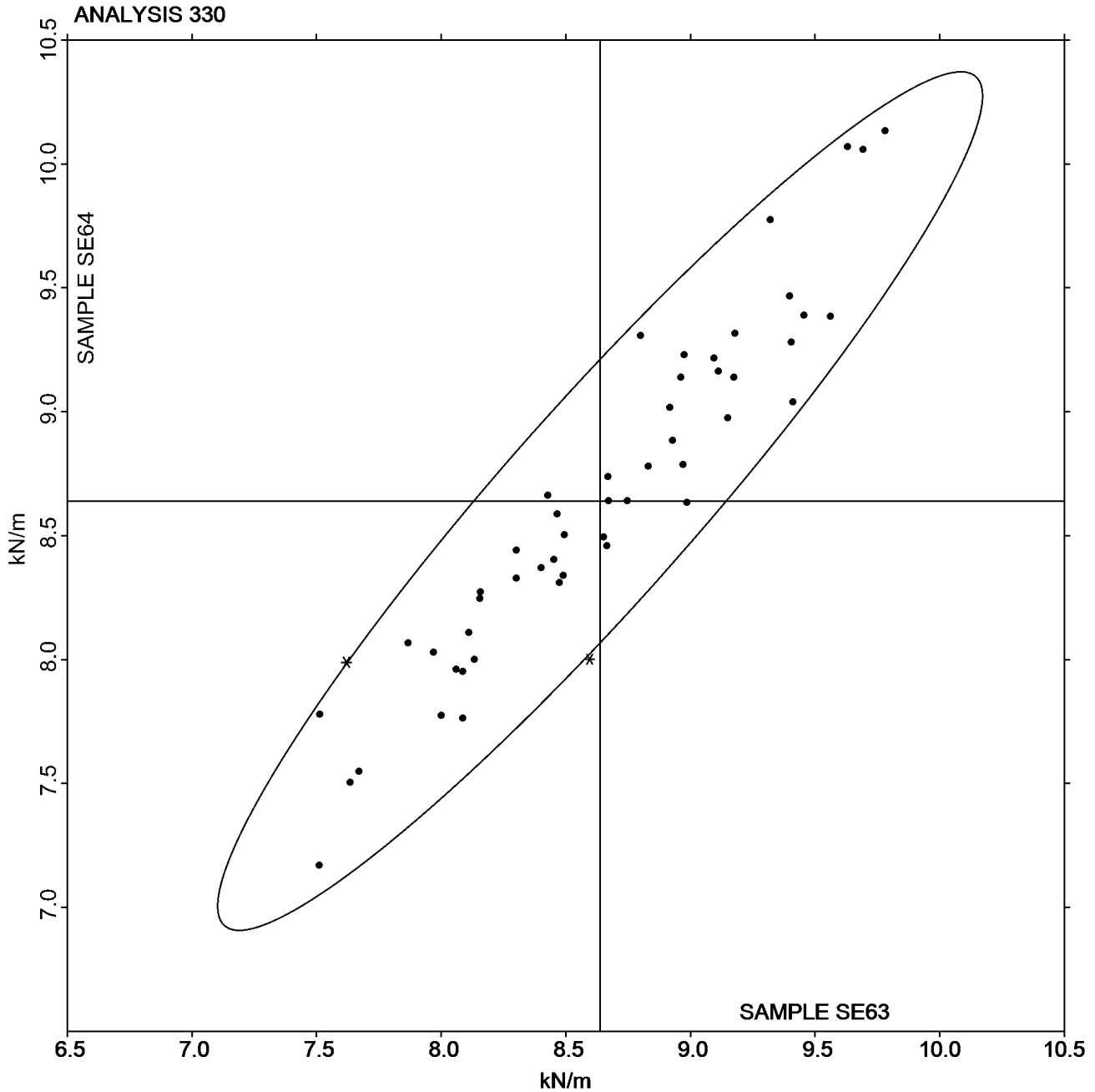


Paper & Paperboard Interlaboratory Testing Program
Analysis 330
Tensile Breaking Strength - Packaging Papers
TAPPI Official Test Method T494

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Grand Mean Sample SE63 = 8.6372
kN/m

Grand Mean Sample SE64 = 8.6399
kN/m





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

Report #2981S,
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WebCode	Data Flag	Sample SE63			Sample SE64			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2GQXLE		76.4	-24.9	-2.41	74.65	-25.19	-2.49	TA
2XHXY		122.1	20.8	2.02	115.70	15.86	1.57	TH
3LM2WX		96.2	-5.0	-0.49	94.18	-5.66	-0.56	TR
3LW8ZZ		94.5	-6.8	-0.66	82.60	-17.25	-1.70	IF
3QUW8K		105.2	3.9	0.38	102.10	2.26	0.22	TB
4CRF46		96.7	-4.6	-0.44	98.07	-1.77	-0.17	LH
4PC8JX		108.2	7.0	0.68	95.82	-4.02	-0.40	ID
6YV2BL		118.6	17.4	1.68	111.40	11.56	1.14	IK
7BNHZL		105.4	4.1	0.40	98.48	-1.36	-0.13	IF
7DFTJR		93.3	-7.9	-0.77	105.02	5.18	0.51	XX
7DU3P8		90.6	-10.7	-1.03	97.52	-2.32	-0.23	TT
82XCGZ		96.1	-5.1	-0.50	95.18	-4.66	-0.46	LE
8NB7BC		95.4	-5.8	-0.56	86.91	-12.93	-1.28	IM
974LUZ		111.1	9.9	0.96	106.87	7.03	0.69	IM
9ALTAL		97.1	-4.1	-0.40	90.35	-9.49	-0.94	IN
9XVZ2Y		117.0	15.7	1.52	117.92	18.08	1.78	LA
FPERJV		93.5	-7.8	-0.75	91.63	-8.21	-0.81	LE
FX83UQ		83.1	-18.2	-1.76	92.07	-7.77	-0.77	LE
GEA2CT		113.2	11.9	1.15	109.53	9.69	0.96	TB
GVXFMR		105.9	4.7	0.45	109.64	9.79	0.97	XX
GWTYDK		99.4	-1.9	-0.18	103.23	3.39	0.33	LH
H482HL		99.1	-2.1	-0.21	100.27	0.43	0.04	LE
H63L6K		82.6	-18.6	-1.80	94.64	-5.20	-0.51	DW
HAEPVM		92.2	-9.1	-0.88	92.25	-7.59	-0.75	XX
JKNTD3		96.2	-5.0	-0.48	87.47	-12.37	-1.22	LE
L8EQAK		97.8	-3.5	-0.33	94.92	-4.92	-0.49	IM
L98NGQ		110.0	8.7	0.84	111.63	11.79	1.16	XX
MT873D		120.3	19.1	1.84	116.17	16.33	1.61	TO
MV2RXP		101.1	-0.1	-0.01	95.01	-4.83	-0.48	TO
NC3A4E		94.6	-6.7	-0.65	92.82	-7.02	-0.69	LW
PB63QF	X	36.5	-64.8	-6.27	43.01	-56.83	-5.61	IM
PWMF8U		111.6	10.4	1.01	109.02	9.18	0.91	LA
PZKWLA		110.2	8.9	0.86	106.24	6.40	0.63	TH
QB2XKG		97.0	-4.2	-0.41	102.80	2.96	0.29	TK
RZXZC8		106.1	4.8	0.46	104.88	5.04	0.50	TO
UZ8U27		111.9	10.7	1.03	104.73	4.88	0.48	LA
V3R3LQ		99.9	-1.3	-0.13	96.12	-3.73	-0.37	LW
W6TR4Q		94.0	-7.3	-0.70	91.80	-8.05	-0.79	LH
WMUD6K		104.4	3.1	0.30	116.79	16.95	1.67	TH
WUA733		108.0	6.8	0.65	96.88	-2.96	-0.29	IM



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

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January 2019

WebCode	Data Flag	<u>Sample SE63</u>			<u>Sample SE64</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
X98KUJ		109.4	8.2	0.79	112.58	12.74	1.26	LA
XDGZ48		100.5	-0.8	-0.08	105.57	5.73	0.57	TR
YKFPKB		86.5	-14.8	-1.43	81.89	-17.96	-1.77	XX

Summary Statistics	<u>Sample SE63</u>	<u>Sample SE64</u>
Grand Means	101.25 Joules/sq m	99.84 Joules/sq m
Std Dev Btwn Labs	10.34 Joules/sq m	10.13 Joules/sq m
Statistics based on 42 of 43 reporting participants.		

Comments on Assigned Data Flags for Test #331

PB63QF (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

DW	Dongguan Walter W-304 Tester	ID	Instron 4201
IF	Instron 3340 Series	IK	Instron 4400 Series
IM	Instron 5500 Series	IN	Instron 3360 Series
LA	L & W Autoline	LE	L & W Tensile Tester 066
LH	L & W Alwetron TH1 (Horizontal) SE 060	LW	L & W Tensile Tester SE062
TA	Thwing-Albert Tensile Tester	TB	Thwing-Albert EJA/1000
TH	Thwing-Albert QC-3A	TK	Thwing-Albert Model 37-4
TO	Thwing-Albert QC-1000	TR	TMI Horizontal Tensile Tester
TT	Tinius Olsen Model MHT	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program

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Analysis 331

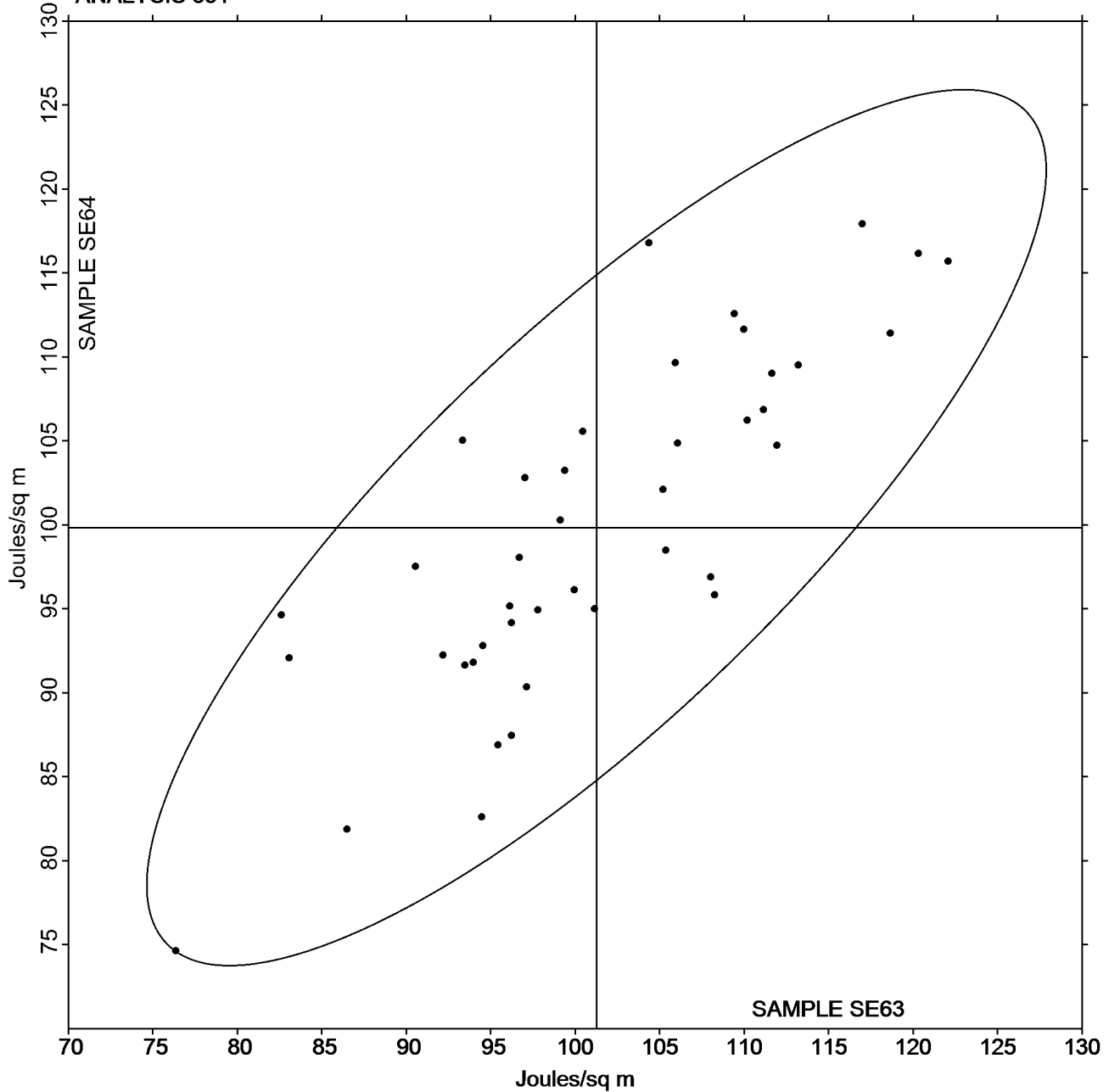
Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

Grand Mean Sample SE63 = 101.25
Joules/sq m

Grand Mean Sample SE64 = 99.841
Joules/sq m

ANALYSIS 331





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

Report #2981S,
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WebCode	Data Flag	Sample SE63			Sample SE64			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2GQXLE	*	1.327	-0.510	-2.93	1.285	-0.544	-2.95	TA
2UULCM		1.700	-0.137	-0.79	1.700	-0.129	-0.70	TB
2XHXYEY	X	2.637	0.800	4.59	2.278	0.449	2.43	TH
3LM2WX		1.841	0.004	0.02	1.804	-0.025	-0.14	TR
3LW8ZZ	X	1.812	-0.026	-0.15	1.536	-0.293	-1.59	IF
3QUW8K		1.837	0.000	0.00	1.820	-0.009	-0.05	TB
4CRF46		1.717	-0.120	-0.69	1.742	-0.087	-0.47	LH
4PC8JX		2.029	0.192	1.10	1.877	0.047	0.26	ID
6YV2BL		2.054	0.217	1.24	2.003	0.174	0.94	IK
7BNHZL		2.109	0.272	1.56	1.988	0.159	0.86	IF
7DFTJR		1.903	0.066	0.38	2.022	0.193	1.05	XX
7DU3P8		1.778	-0.059	-0.34	1.855	0.026	0.14	TT
82XCGZ		1.708	-0.129	-0.74	1.678	-0.151	-0.82	LE
8NB7BC		2.087	0.250	1.43	1.958	0.129	0.70	IN
974LUZ		2.042	0.204	1.17	1.992	0.163	0.88	IM
9ALTAL		1.544	-0.293	-1.68	1.411	-0.419	-2.27	IN
9XVZ2Y		1.873	0.036	0.21	1.873	0.044	0.24	LA
FPERJV		1.677	-0.160	-0.92	1.644	-0.185	-1.00	LE
FX83UQ		1.665	-0.172	-0.99	1.761	-0.068	-0.37	LE
GEA2CT		1.944	0.107	0.61	1.901	0.072	0.39	TB
GVXFMR		1.978	0.141	0.81	2.025	0.196	1.06	XX
GWTYDK		1.857	0.020	0.11	1.945	0.116	0.63	LH
H482HL		1.809	-0.028	-0.16	1.857	0.028	0.15	LE
H63L6K	X	2.579	0.742	4.25	2.734	0.905	4.90	DW
HAEPVM		1.712	-0.125	-0.72	1.688	-0.141	-0.76	XX
JKNTD3		1.761	-0.076	-0.44	1.649	-0.180	-0.98	LE
L8EQAK		1.807	-0.030	-0.17	1.776	-0.053	-0.29	IM
L98NGQ		1.825	-0.012	-0.07	1.871	0.042	0.23	XX
MT873D		2.073	0.236	1.35	2.015	0.186	1.01	TO
MV2RXP		1.846	0.009	0.05	1.776	-0.053	-0.29	TO
NC3A4E		1.726	-0.111	-0.64	1.697	-0.132	-0.72	LW
PB63QF	X	1.198	-0.640	-3.67	1.484	-0.345	-1.87	IM
PWMF8U		1.812	-0.025	-0.14	1.792	-0.037	-0.20	LA
PZKWLA		2.100	0.263	1.51	2.060	0.231	1.25	TH
Q2BGXM		1.600	-0.237	-1.36	1.660	-0.169	-0.92	IS
QB2XKG		1.910	0.073	0.42	1.967	0.138	0.75	TK
RZXZC8		1.929	0.092	0.53	1.907	0.078	0.42	TO
UZ8U27	*	2.184	0.347	1.99	2.334	0.505	2.74	XX
V3R3LQ		1.899	0.062	0.35	1.857	0.028	0.15	LW
W6TR4Q		1.689	-0.148	-0.85	1.699	-0.130	-0.70	LH



Paper & Paperboard Interlaboratory Testing Program
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WebCode	Data Flag	<u>Sample SE63</u>			<u>Sample SE64</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
WMUD6K		1.847	0.010	0.06	1.951	0.122	0.66	TH
WUA733		2.033	0.196	1.12	2.025	0.196	1.06	IM
X98KUJ		1.678	-0.159	-0.91	1.673	-0.156	-0.85	LA
XDGZ48		1.749	-0.089	-0.51	1.797	-0.032	-0.17	TR
YKFPKB		1.630	-0.207	-1.19	1.580	-0.249	-1.35	XX
YX4R34		1.876	0.039	0.22	1.906	0.077	0.42	ID

Summary Statistics	<u>Sample SE63</u>	<u>Sample SE64</u>
Grand Means	1.84 Percent	1.83 Percent
Std Dev Btwn Labs	0.17 Percent	0.18 Percent

Statistics based on 42 of 46 reporting participants.

Comments on Assigned Data Flags for Test #332

- H63L6K (X) - Data for both samples are high. Possible Systematic Error.
- 2XHXY (X) - Data for sample SE63 are high. Inconsistent within the determinations of sample SE63.
- PB63QF (X) - Data for sample SE63 are low. Inconsistent within the determinations of both samples.
- 3LW8ZZ (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SE63.

Key to Instrument Codes Reported by Participants

DW	Dongguan Walter W-304 Tester	ID	Instron 4201
IF	Instron 3340 Series	IK	Instron 4400 Series
IM	Instron 5500 Series	IN	Instron 3360 Series
IS	Instron 5965	LA	L & W Autoline 300
LE	L & W Tensile Tester 066	LH	L & W Alwetron TH1 (Horizontal) SE 060
LW	L & W Tensile Tester SE062	TA	Thwing-Albert Tensile Tester
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TK	Thwing-Albert Model 37-4	TO	Thwing-Albert QC-1000
TR	TMI Horizontal Tensile Tester	TT	Tinius Olsen Model MHT
XX	Instrument make/model not specified by lab		



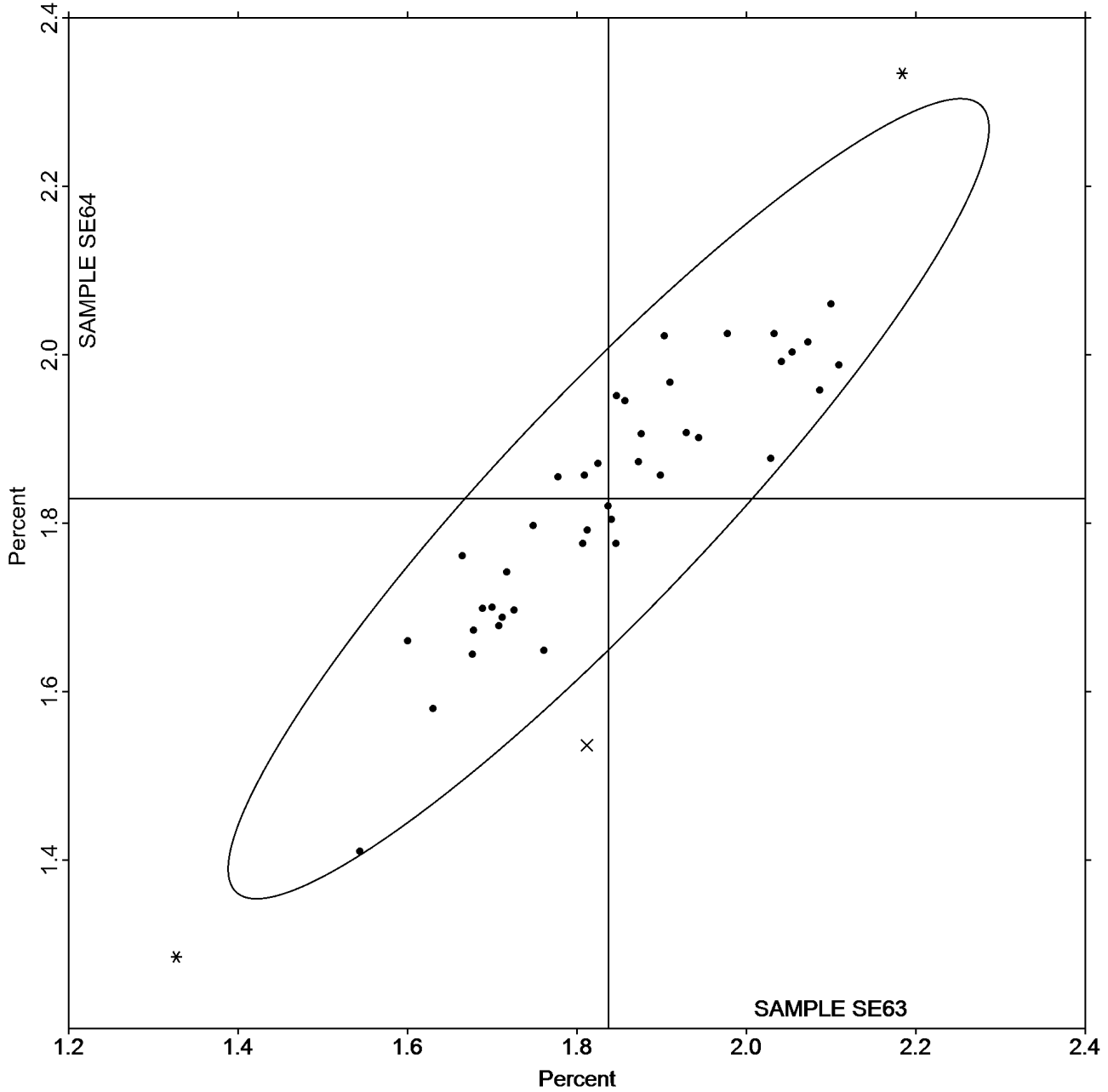
Paper & Paperboard Interlaboratory Testing Program
Analysis 332
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Grand Mean Sample SE63 = 1.8372
Percent

Grand Mean Sample SE64 = 1.8291
Percent

ANALYSIS 332





Paper & Paperboard Interlaboratory Testing Program

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Analysis 334

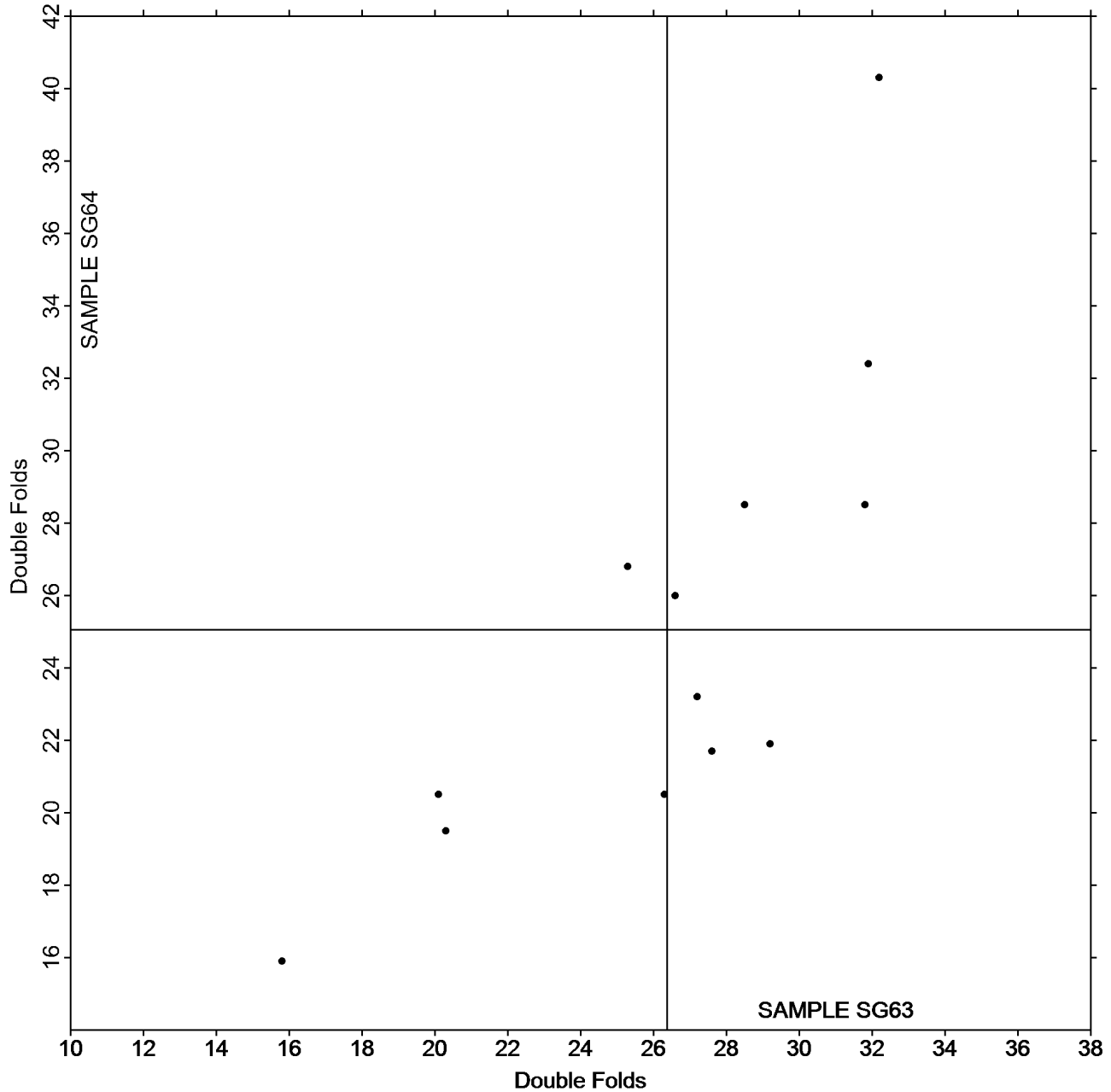
Folding Endurance (MIT) - Double Folds

TAPPI Official Test Method T511

Grand Mean Sample SG63 = 26.369
Double Folds

Grand Mean Sample SG64 = 25.054
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 #2981S,
January 2019

WebCode	Data Flag	<u>Sample SH63</u>			<u>Sample SH64</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
27NYBJ		189.9	7.5	0.68	219.1	16.6	1.47
2TKCNW		187.1	4.8	0.43	206.7	4.2	0.37
2UULCM		182.7	0.4	0.03	204.3	1.9	0.16
3QUW8K		159.0	-23.4	-2.12	184.0	-18.4	-1.62
7BNHZL		190.9	8.6	0.78	208.7	6.2	0.55
7DFTJR		202.0	19.7	1.78	221.3	18.9	1.67
7GUDL8	X	251.8	69.5	6.30	276.0	73.6	6.49
974LUZ		185.4	3.0	0.27	211.6	9.1	0.80
A7LVHU		185.4	3.0	0.27	194.5	-8.0	-0.70
FTD3FV		188.1	5.7	0.52	203.5	1.0	0.09
GGYAJA		188.3	5.9	0.54	203.1	0.7	0.06
KGJKLX		177.2	-5.2	-0.47	194.9	-7.5	-0.66
NZ3NVU		172.0	-10.3	-0.94	197.4	-5.1	-0.45
PUX2NC		178.9	-3.4	-0.31	202.9	0.5	0.04
XMACB9		166.1	-16.2	-1.47	182.2	-20.2	-1.78

Summary Statistics	<u>Sample SH63</u>	<u>Sample SH64</u>
Grand Means	182.35 Gurley Units	202.44 Gurley Units
Std Dev Btwn Labs	11.03 Gurley Units	11.34 Gurley Units
	Statistics based on 14 of 15 reporting participants.	

Comments on Assigned Data Flags for Test #336

7GUDL8 (X) - Extreme Data.



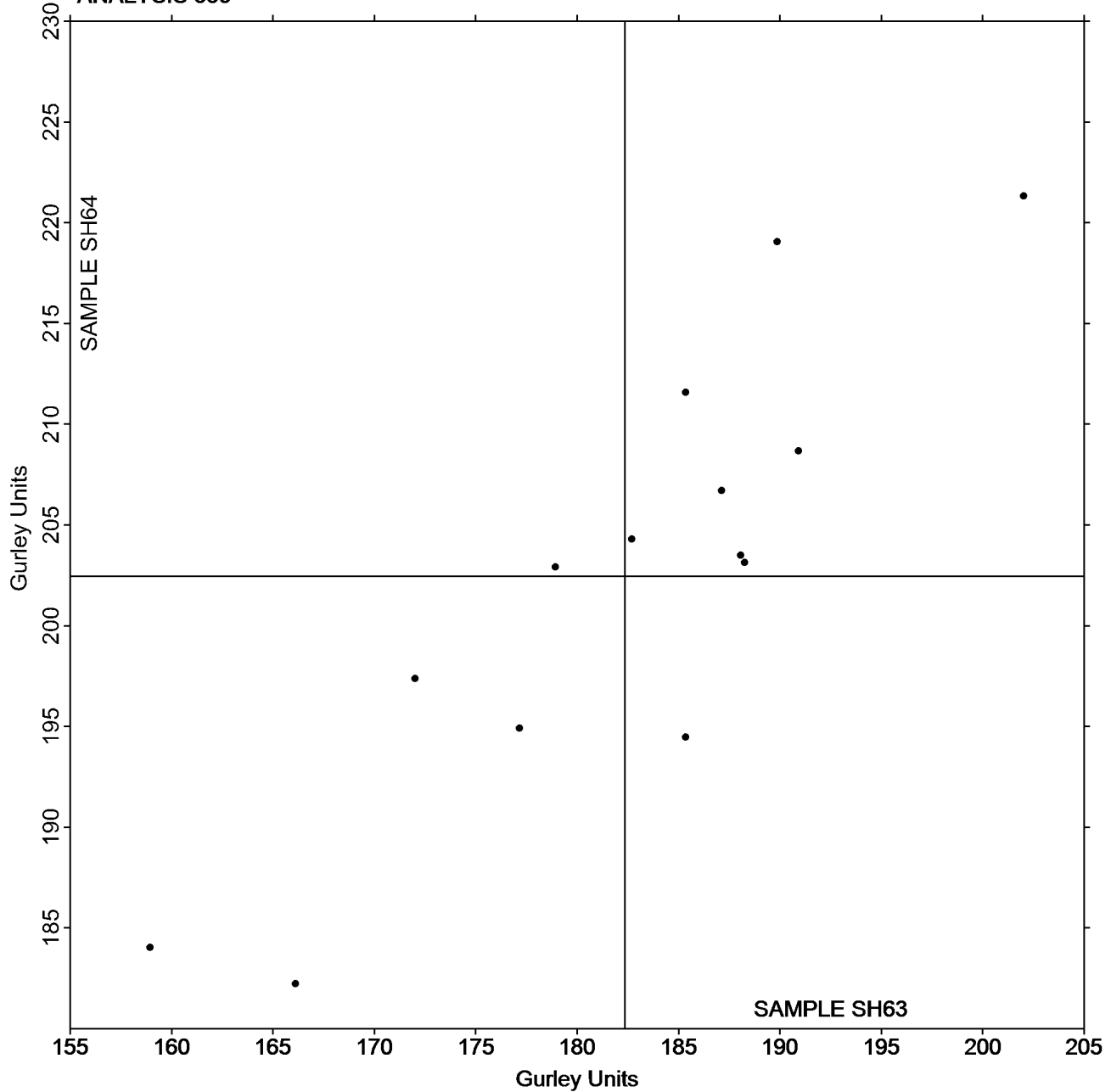
Paper & Paperboard Interlaboratory Testing Program
Analysis 336
Bending Resistance, Gurley Type
TAPPI Official Test Method T543

Report #2981S,
January 2019

Grand Mean Sample SH63 = 182.35
Gurley Units

Grand Mean Sample SH64 = 202.44
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 #2981S,
January 2019

WebCode	Data Flag	<u>Sample SJ63</u>			<u>Sample SJ64</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
7BNHZL		4.348	0.194	0.57	4.346	0.286	0.75
974LUZ		4.097	-0.057	-0.17	4.192	0.132	0.35
9ALTAL		3.860	-0.294	-0.86	3.530	-0.530	-1.38
A7LVHU		4.360	0.206	0.60	4.035	-0.025	-0.06
L7K2QP		4.377	0.223	0.65	4.199	0.139	0.36
NC3A4E		3.470	-0.684	-1.99	3.360	-0.700	-1.83
P6C2CT		4.728	0.574	1.67	4.760	0.700	1.83
PUX2NC		4.090	-0.064	-0.19	4.076	0.016	0.04
RM7FPN		4.297	0.143	0.42	4.195	0.135	0.35
XX9RJ8		4.263	0.109	0.32	4.152	0.092	0.24
YNGPRB		3.803	-0.351	-1.02	3.811	-0.249	-0.65

Summary Statistics	<u>Sample SJ63</u>	<u>Sample SJ64</u>
Grand Means	4.15 Taber Units	4.06 Taber Units
Std Dev Btwn Labs	0.34 Taber Units	0.38 Taber Units

Statistics based on 11 of 11 reporting participants.

Analysis Notes:

- 7BNHZL - Data appear to be reported as mN-m, not g-cm as indicated on datasheet. CTS will not correct the Units going forward.
- YNGPRB - Data appear to be reported as g-cm, not mN-m as indicated on datasheet. CTS will not correct the Units going forward.



Paper & Paperboard Interlaboratory Testing Program

Report #2981S,
January 2019

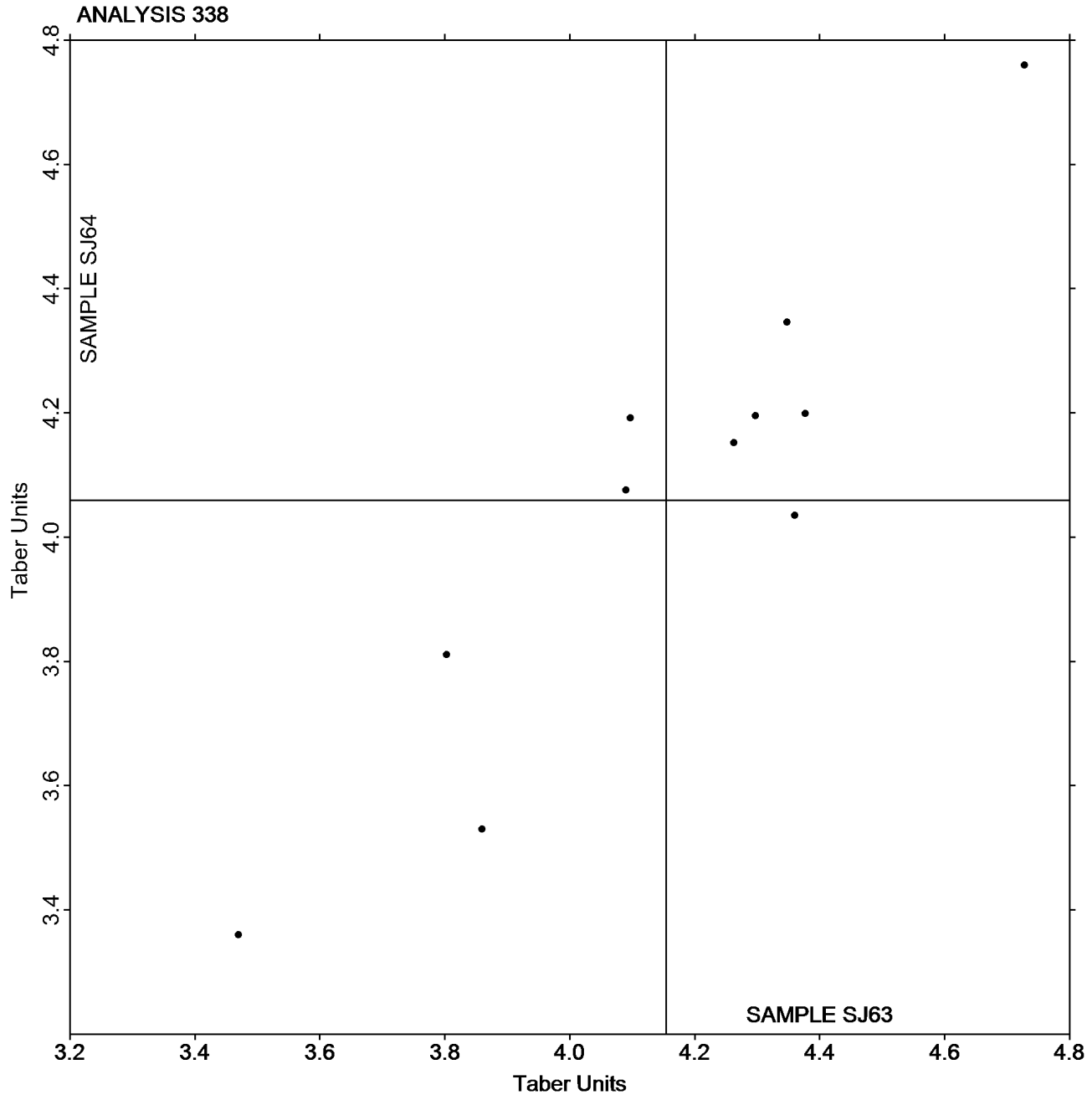
Analysis 338

Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

Grand Mean Sample SJ63 = 4.1539
Taber Units

Grand Mean Sample SJ64 = 4.0596
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 #2981S,
January 2019

WebCode	Data Flag	<u>Sample SQ63</u>			<u>Sample SQ64</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
974LUZ		21.04	0.22	0.15	21.05	1.33	0.80
GEA2CT		24.25	3.43	2.33	23.30	3.58	2.15
GGYAJA		20.83	0.00	0.00	18.81	-0.91	-0.55
GVXFMR	X	10.40	-10.42	-7.09	8.80	-10.92	-6.55
K7LJ89		19.93	-0.89	-0.61	18.46	-1.26	-0.76
NC3A4E		19.50	-1.32	-0.90	19.30	-0.42	-0.25
P38FM8		20.14	-0.68	-0.47	19.34	-0.38	-0.23
V3R3LQ		20.26	-0.56	-0.38	18.40	-1.32	-0.79
VR7YER		20.65	-0.17	-0.12	19.10	-0.62	-0.37

Summary Statistics	<u>Sample SQ63</u>	<u>Sample SQ64</u>
Grand Means	20.82 Taber Units	19.72 Taber Units
Std Dev Btwn Labs	1.47 Taber Units	1.67 Taber Units
Statistics based on 8 of 9 reporting participants.		

Comments on Assigned Data Flags for Test #339

GVXFMR (X) - Extreme Data.

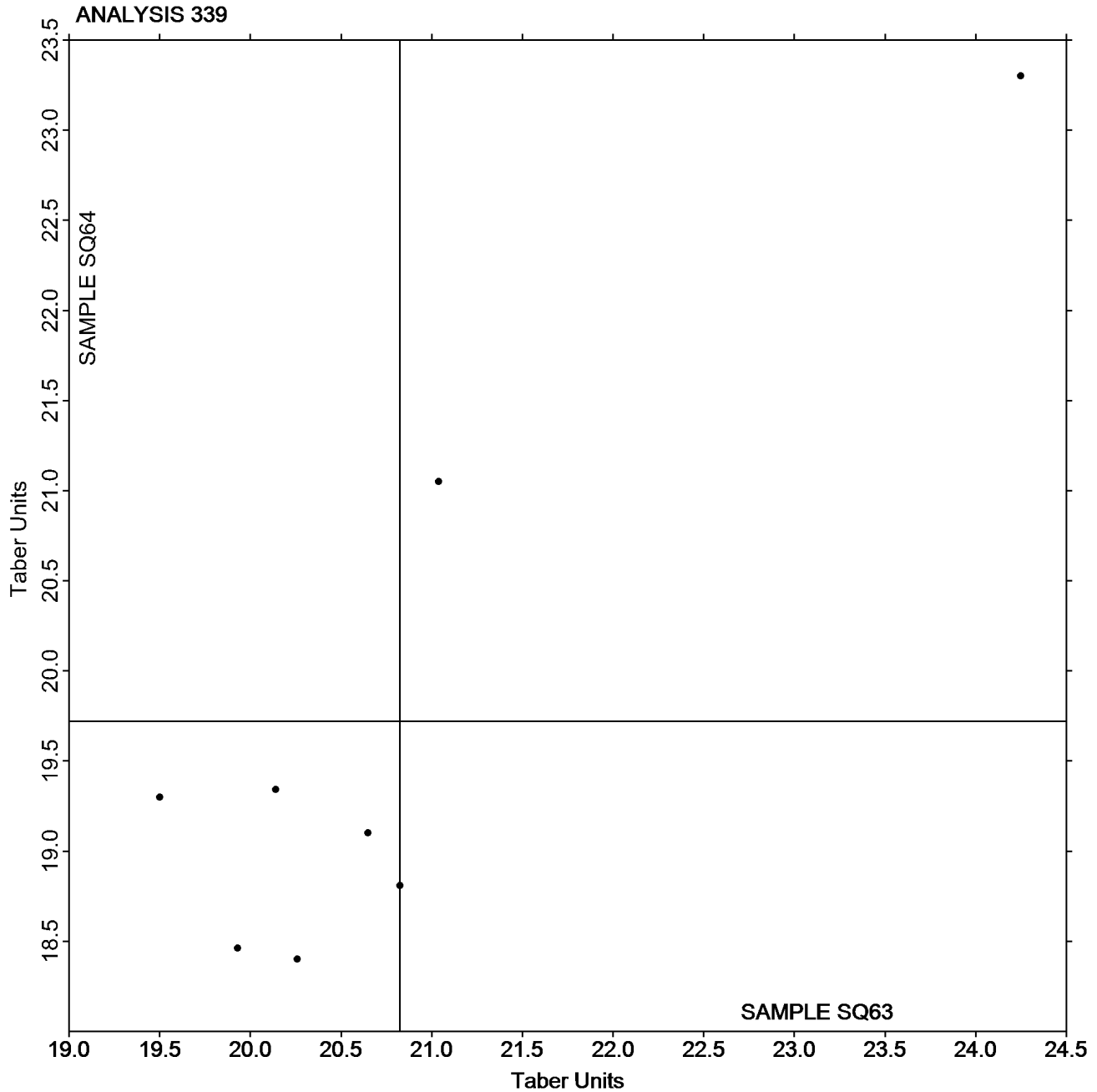


Paper & Paperboard Interlaboratory Testing Program
Analysis 339
Bending Resistance, Taber Type - 10 to 100 Taber Units
TAPPI Official Test Method T489

Report #2981S,
January 2019

Grand Mean Sample SQ63 = 20.824
Taber Units

Grand Mean Sample SQ64 = 19.720
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 #2981S,
January 2019**

Analysis 340

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

TAPPI Official Test Method T489

WebCode	Data Flag	Sample ST63			Sample ST64		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2XHXYEY		172.3	7.2	0.72	165.1	3.9	0.43
34JTB4		168.9	3.8	0.38	153.0	-8.2	-0.89
3LM2WX		167.4	2.4	0.23	161.0	-0.2	-0.02
3MEY64	*	193.3	28.2	2.80	186.7	25.5	2.79
4WUDHQ		168.2	3.1	0.31	158.7	-2.5	-0.27
7DFTJR		162.4	-2.7	-0.26	164.4	3.3	0.36
8JGCBP		166.2	1.1	0.11	167.7	6.5	0.72
8MDVGU		171.3	6.2	0.62	165.5	4.3	0.47
8P6WRY		163.2	-1.9	-0.18	157.4	-3.8	-0.41
GGYAJA		162.3	-2.8	-0.27	161.4	0.2	0.02
GT7FCM		160.1	-5.0	-0.49	165.4	4.3	0.47
GVXFMR		149.7	-15.4	-1.52	152.7	-8.5	-0.92
HPTTGH	X	357.8	192.8	19.10	358.5	197.3	21.58
NC3A4E		166.8	1.7	0.17	157.8	-3.4	-0.37
UX43T6		151.4	-13.7	-1.35	151.4	-9.8	-1.07
V3R3LQ		171.9	6.9	0.68	166.6	5.4	0.59
YDXGWE		156.4	-8.6	-0.86	160.7	-0.5	-0.05
YUKWZB		154.1	-10.9	-1.08	144.3	-16.9	-1.85

Summary Statistics	Sample ST63	Sample ST64
Grand Means	165.06 Taber Units	161.16 Taber Units
Std Dev Btwn Labs	10.09 Taber Units	9.14 Taber Units
Statistics based on 17 of 18 reporting participants.		

Comments on Assigned Data Flags for Test #340

HPTTGH (X) - Extreme Data.

Analysis Notes:

4WUDHQ - Data appear to be reported as g-cm, not mN-m as indicated on datasheet. CTS will not correct the Units going forward.



Paper & Paperboard Interlaboratory Testing Program

Report #2981S,
January 2019

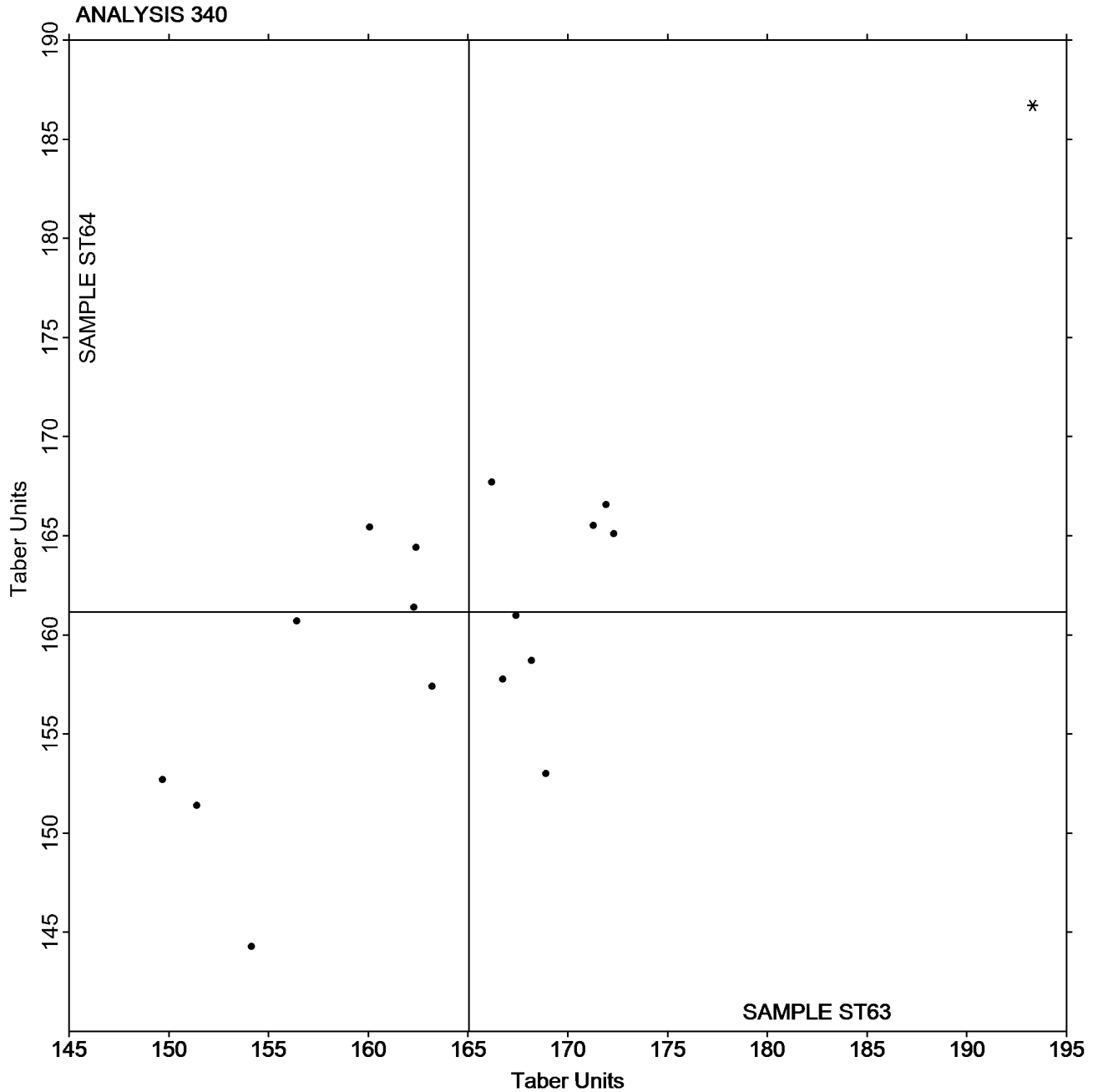
Analysis 340

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

TAPPI Official Test Method T489

Grand Mean Sample ST63 = 165.06
Taber Units

Grand Mean Sample ST64 = 161.16
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 #2981S,
January 2019

WebCode	Data Flag	<u>Sample SM63</u>			<u>Sample SM64</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2XHKEY		83.44	-12.57	-1.19	84.82	-11.55	-1.08	LW
7BNHZL		105.48	9.47	0.90	97.56	1.18	0.11	TL
974LUZ		78.48	-17.53	-1.66	79.00	-17.37	-1.63	TZ
BAVKDM		108.16	12.15	1.15	107.28	10.91	1.02	DX
GEA2CT		101.72	5.71	0.54	97.34	0.97	0.09	TA
GLBKAH		90.56	-5.44	-0.52	89.75	-6.62	-0.62	LW
HPTTGH		89.60	-6.41	-0.61	88.80	-7.57	-0.71	CA
K7LJ89		102.81	6.80	0.64	107.93	11.56	1.08	LW
PB2LF9		113.60	17.59	1.67	116.80	20.43	1.91	DT
PZKWLA		93.20	-2.81	-0.27	96.40	0.03	0.00	TA
UYE6E4		91.46	-4.55	-0.43	92.46	-3.91	-0.37	DX
V3R3LQ		103.18	7.17	0.68	105.86	9.49	0.89	LW
YDXGWE		86.39	-9.62	-0.91	88.85	-7.52	-0.70	LX

Summary Statistics	<u>Sample SM63</u>	<u>Sample SM64</u>
Grand Means	96.01 psi	96.37 psi
Std Dev Btwn Labs	10.54 psi	10.69 psi
Statistics based on 13 of 13 reporting participants.		

Key to Instrument Codes Reported by Participants

CA	CSI CS-163	DT	Dek-Tron DCS-163A ZDT Tester
DX	Dek-Tron XP2 Series	LW	L & W ZD Tensile Tester
LX	L & W (model not specified)	TA	Thwing-Albert Tensile Tester
TL	TMI Lab Master	TZ	TMI Monitor/ZDT Tester



Paper & Paperboard Interlaboratory Testing Program

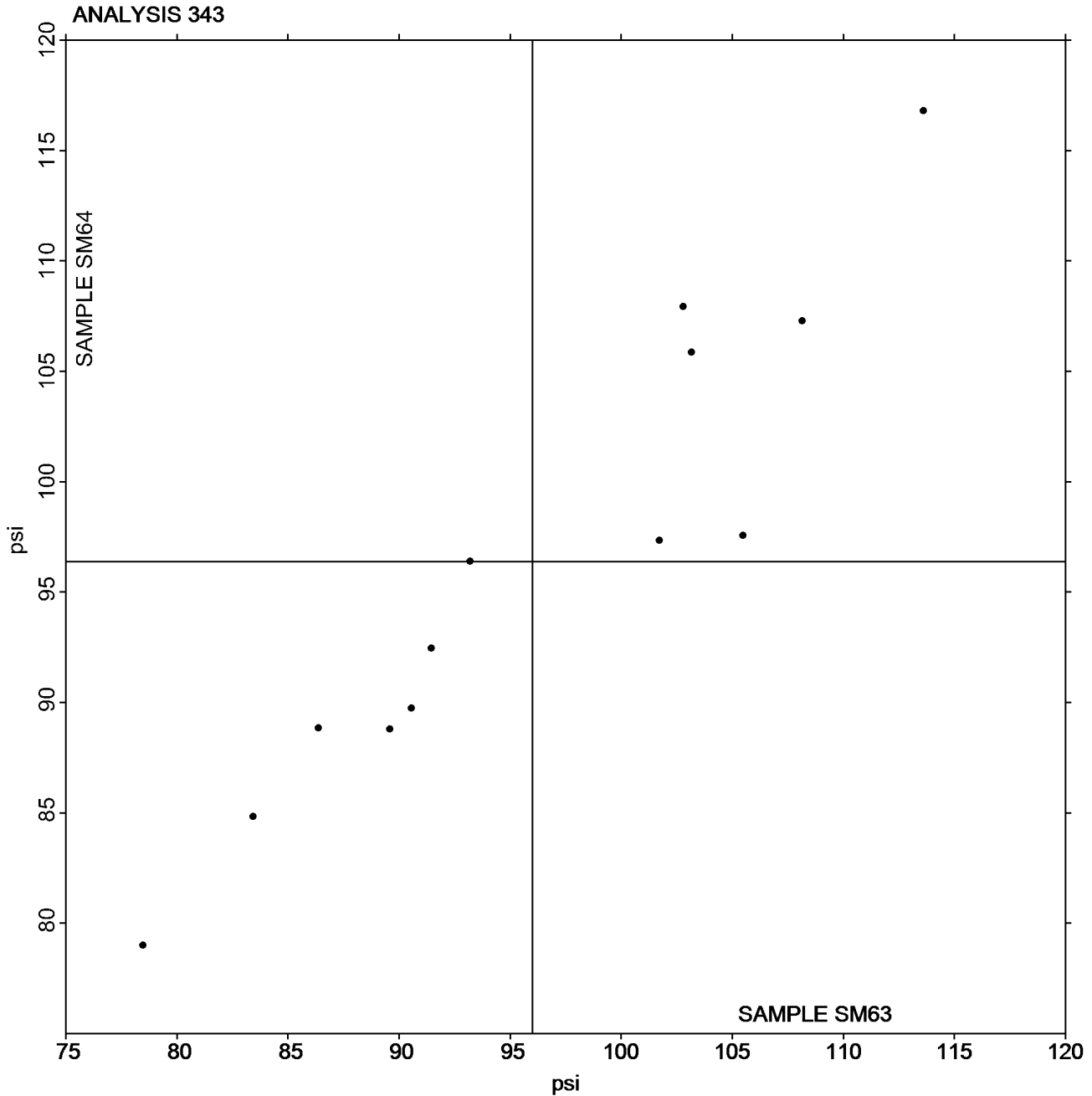
Report #2981S,
January 2019

Analysis 343 Z-Direction Tensile

TAPPI Official Test Method T541

Grand Mean Sample SM63 = 96.006
psi

Grand Mean Sample SM64 = 96.373
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 #2981S,
January 2019

WebCode	Data Flag	<u>Sample SZ63</u>			<u>Sample SZ64</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
34JTB4		57.78	-3.25	-0.45	63.47	1.44	0.19	CH
4WUDHQ		55.08	-5.95	-0.83	55.96	-6.07	-0.79	CD
6YV2BL		62.14	1.11	0.16	60.96	-1.07	-0.14	PG
7DFTJR		65.60	4.57	0.64	66.40	4.37	0.57	CA
8JGCBP		63.60	2.57	0.36	65.20	3.17	0.41	CA
8P6WRY		45.00	-16.03	-2.23	47.04	-14.99	-1.94	TZ
9XVZ2Y		59.24	-1.79	-0.25	60.14	-1.89	-0.24	TA
GGYAJA		65.30	4.27	0.59	66.16	4.13	0.53	CA
GLC9WN		54.96	-6.07	-0.84	55.28	-6.75	-0.87	LW
GLRECD		55.16	-5.87	-0.82	52.36	-9.67	-1.25	CD
GT7FCM		67.30	6.27	0.87	69.88	7.85	1.02	TA
KAJZJ3		65.16	4.13	0.58	66.16	4.13	0.53	DP
NREMKC		56.44	-4.59	-0.64	54.94	-7.09	-0.92	LW
UER966		73.44	12.41	1.73	73.12	11.09	1.44	CH
UX43T6		69.20	8.17	1.14	73.40	11.37	1.47	LW

Summary Statistics	<u>Sample SZ63</u>	<u>Sample SZ64</u>
Grand Means	61.03 psi	62.03 psi
Std Dev Btwn Labs	7.18 psi	7.72 psi

Statistics based on 15 of 15 reporting participants.

Key to Instrument Codes Reported by Participants

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

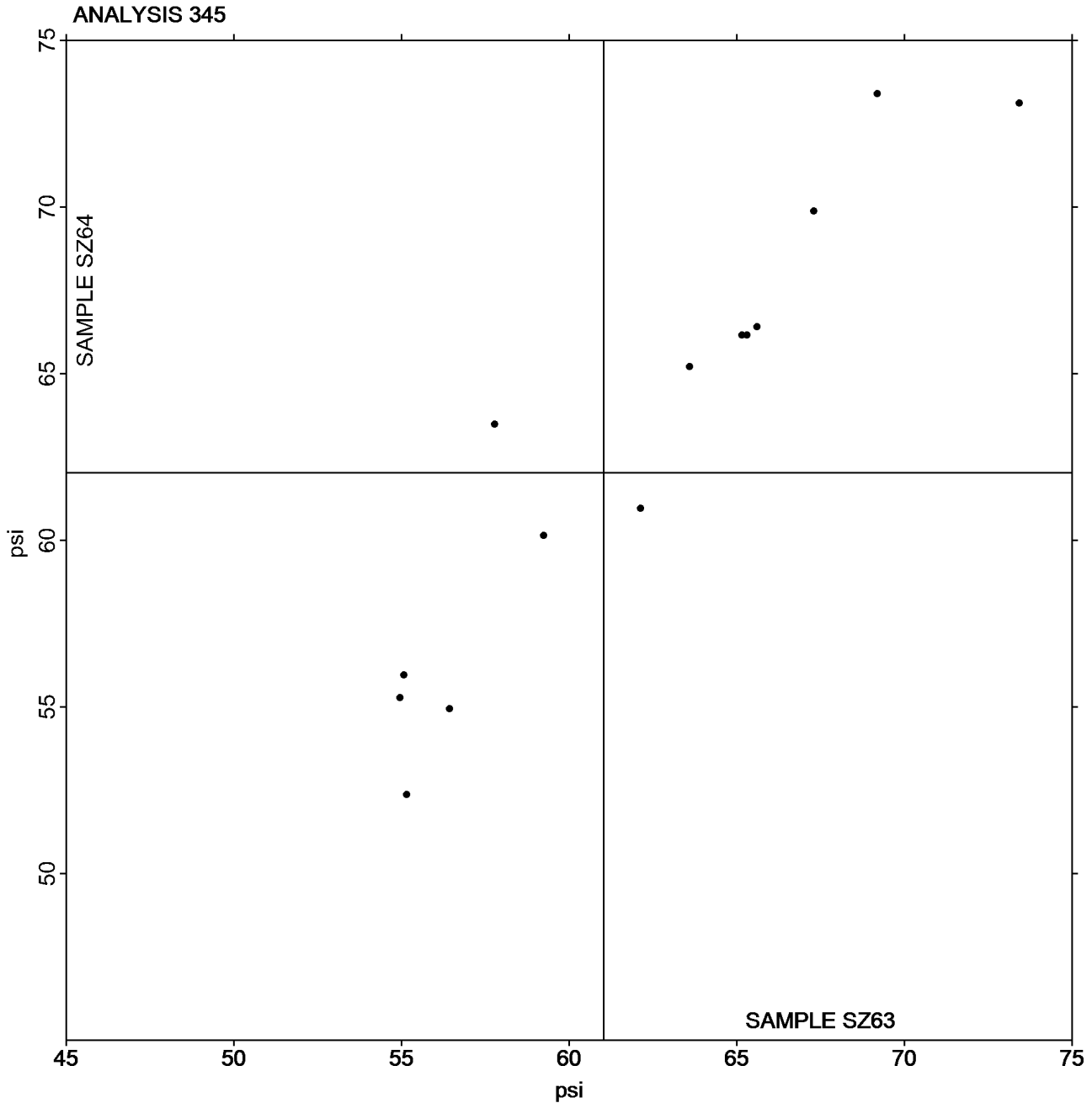


Paper & Paperboard Interlaboratory Testing Program
Analysis 345
Z-Direction Tensile, Recycled Paperboard
TAPPI Official Test Method T541

Report #2981S,
January 2019

Grand Mean Sample SZ63 = 61.026
psi

Grand Mean Sample SZ64 = 62.032
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 #2981S,
January 2019

WebCode	Data Flag	<u>Sample SN63</u>			<u>Sample SN64</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2XHXEY		126.6	-26.8	-2.18	136.8	-19.3	-1.51	HZ
3QUW8K		154.8	1.3	0.11	158.6	2.5	0.19	HY
7DFTJR		154.0	0.6	0.05	158.4	2.3	0.18	HZ
7GUDL8		151.4	-2.0	-0.17	154.0	-2.1	-0.16	HY
9A9ZXT		156.5	3.0	0.25	165.4	9.3	0.73	HY
9QBU9Y		148.4	-5.0	-0.41	136.6	-19.5	-1.52	XX
A7LVHU		151.0	-2.5	-0.20	155.3	-0.8	-0.06	KR
B9M683		159.5	6.0	0.49	157.9	1.8	0.14	HY
GEA2CT		170.2	16.8	1.36	176.8	20.7	1.62	HZ
GT7FCM		162.2	8.8	0.71	175.4	19.3	1.51	HY
MT873D		149.6	-3.8	-0.31	149.6	-6.5	-0.51	HZ
NZ3NVU		149.2	-4.2	-0.34	151.8	-4.3	-0.34	HY
QYNVYH		155.0	1.6	0.13	151.8	-4.3	-0.34	HY
RZXZC8		168.4	15.0	1.21	166.6	10.5	0.82	HY
TQ787F		129.0	-24.5	-1.99	134.5	-21.6	-1.69	TM
V3R3LQ		169.4	16.0	1.30	168.2	12.1	0.94	HY

Summary Statistics	<u>Sample SN63</u>	<u>Sample SN64</u>
Grand Means	153.44 1000th ft-lbs	156.10 1000th ft-lbs
Stnd Dev Btwn Labs	12.31 1000th ft-lbs	12.81 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	TM	TMI Internal Bond Tester
XX	Instrument make/model not specified by lab		



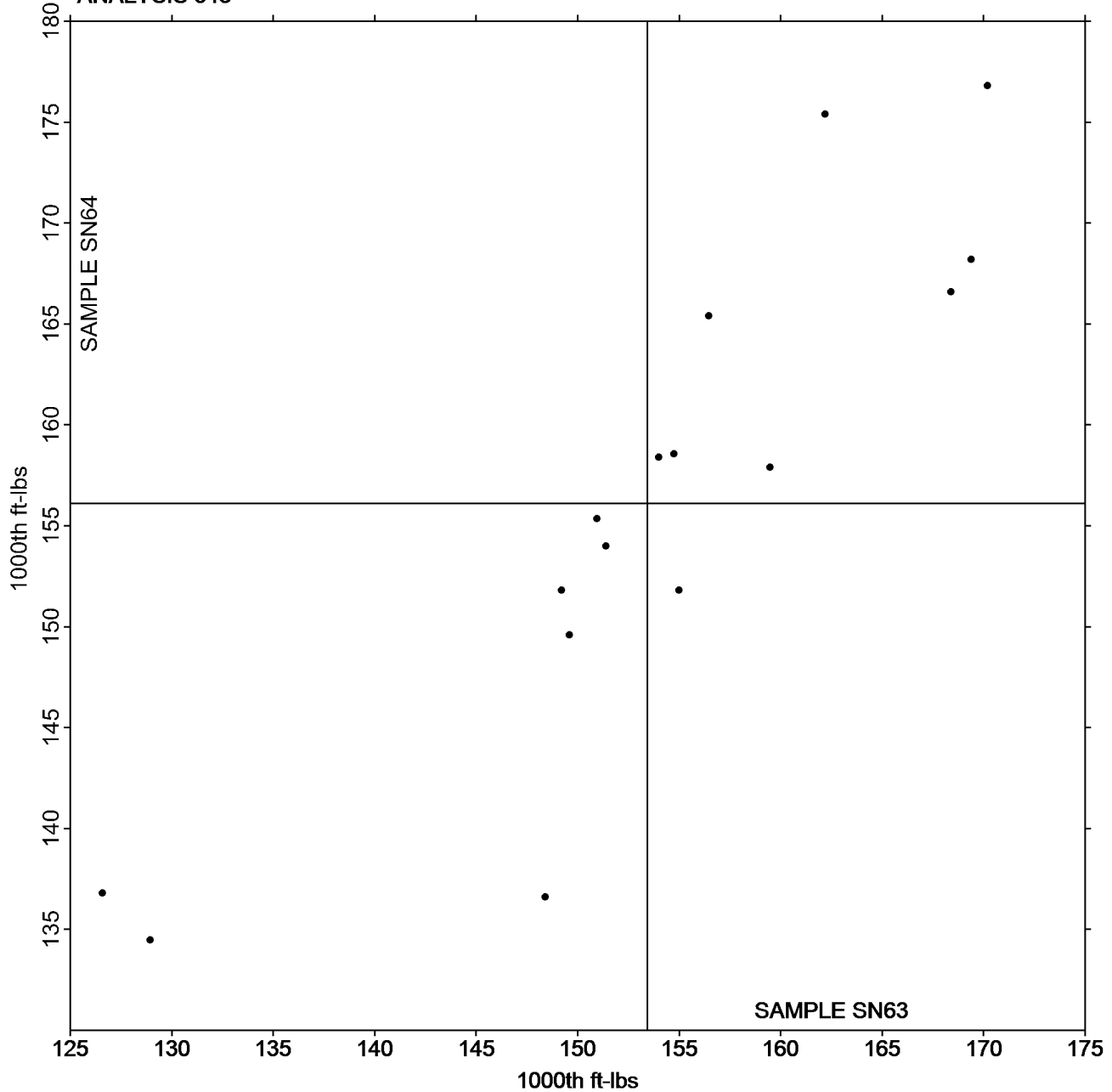
Paper & Paperboard Interlaboratory Testing Program
Analysis 348
Internal Bond Strength - Modified Scott Mechanics
TAPPI Provisional Test Method T569

Report #2981S,
January 2019

Grand Mean Sample SN63 = 153.44
1000th ft-lbs

Grand Mean Sample SN64 = 156.10
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 #2981S,
January 2019

WebCode	Data Flag	Sample SP63			Sample SP64			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
73F3Z7		122.9	-33.4	-1.37	123.5	-38.1	-1.36	XX
77Y2K3	X	262.6	106.3	4.36	240.4	78.8	2.81	SC
82XCGZ		175.6	19.3	0.79	202.2	40.6	1.45	SC
GWTYDK		156.0	-0.3	-0.01	153.4	-8.2	-0.29	TM
NC3A4E		194.5	38.2	1.57	197.0	35.4	1.26	XX
NREMKC		130.4	-25.9	-1.06	143.0	-18.6	-0.66	XX
TM63HL		178.2	21.9	0.90	183.6	22.0	0.79	SC
UER966		152.2	-4.1	-0.17	156.6	-5.0	-0.18	TM
YDXGWE		132.5	-23.8	-0.98	129.9	-31.6	-1.13	TM
YNGPRB		164.4	8.1	0.33	165.0	3.4	0.12	SC

Summary Statistics	Sample SP63	Sample SP64
Grand Means	156.29 1000th ft-lbs	161.58 1000th ft-lbs
Std Dev Btwn Labs	24.36 1000th ft-lbs	28.03 1000th ft-lbs
Statistics based on 9 of 10 reporting participants.		

Comments on Assigned Data Flags for Test #349

77Y2K3 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample SP64.

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

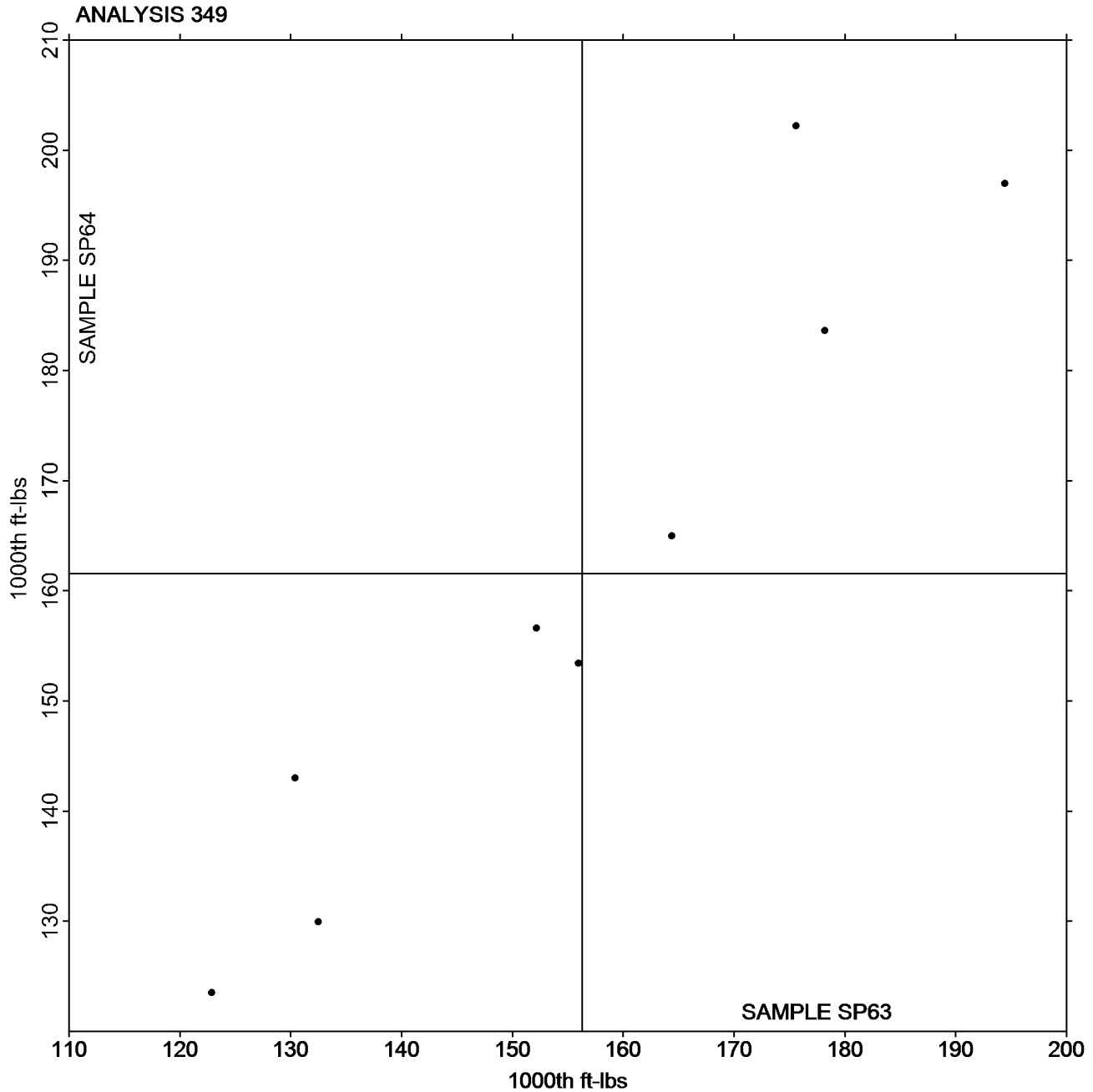


Paper & Paperboard Interlaboratory Testing Program
Analysis 349
Internal Bond Strength - Scott Bond Models
TAPPI Provisional Test Method T569

Report #2981S,
January 2019

Grand Mean Sample SP63 = 156.29
1000th ft-lbs

Grand Mean Sample SP64 = 161.58
1000th ft-lbs



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



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

Report #2981S,
January 2019

-End of Report-