



Paper & Paperboard Testing Program

Summary Report #3031 S - November 2019

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

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

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311	Tearing Strength - Newsprint
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320	Tensile Breaking Strength - Newsprint
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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:

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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 #3031S,
November 2019

WebCode	Data Flag	Sample SA73			Sample SA74		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4KVZKB		42.19	-2.63	-0.66	35.33	-3.33	-0.91
7P296C		42.93	-1.89	-0.48	36.04	-2.62	-0.72
7TWZBN	*	45.29	0.46	0.12	42.90	4.24	1.16
7YALJV		42.25	-2.58	-0.65	37.40	-1.26	-0.34
CLUXHH		48.54	3.72	0.94	39.71	1.05	0.29
CWHVEH		42.55	-2.28	-0.57	33.51	-5.15	-1.41
E7Y2NQ		46.15	1.32	0.33	40.92	2.26	0.62
EAYDJQ		46.45	1.62	0.41	39.89	1.23	0.34
F24RRX		48.60	3.77	0.95	42.50	3.84	1.05
G3V6V2		42.38	-2.44	-0.62	37.17	-1.48	-0.41
GPKL8E		44.46	-0.37	-0.09	36.86	-1.80	-0.49
GQZYZH		43.27	-1.56	-0.39	36.72	-1.93	-0.53
KFPTD7		46.93	2.10	0.53	41.53	2.87	0.79
MMHMNA		49.23	4.40	1.11	41.37	2.71	0.74
MVCRGB	*	57.95	13.13	3.30	50.79	12.13	3.32
NBH9NF		43.80	-1.03	-0.26	37.20	-1.46	-0.40
NDM4M7		44.69	-0.14	-0.04	39.45	0.79	0.22
NRL72R		42.78	-2.05	-0.52	37.00	-1.65	-0.45
QFQJ7G		45.09	0.27	0.07	40.44	1.78	0.49
TPHGTK		41.54	-3.29	-0.83	35.82	-2.84	-0.78
U37BWK		37.09	-7.74	-1.95	33.91	-4.75	-1.30
U3MMEP		45.34	0.52	0.13	38.25	-0.41	-0.11
V2UXRN		46.91	2.08	0.52	39.96	1.30	0.36
WDWZD4		38.20	-6.63	-1.67	33.10	-5.56	-1.52
X96Y2G		46.40	1.57	0.40	38.61	-0.05	-0.01
X9KHLE		48.10	3.27	0.82	41.50	2.84	0.78
ZYNYKB		41.18	-3.64	-0.92	35.88	-2.78	-0.76

Summary Statistics	Sample SA73	Sample SA74
Grand Means	44.83 psi	38.66 psi
Std Dev Btwn Labs	3.97 psi	3.65 psi
Statistics based on 27 of 27 reporting participants.		

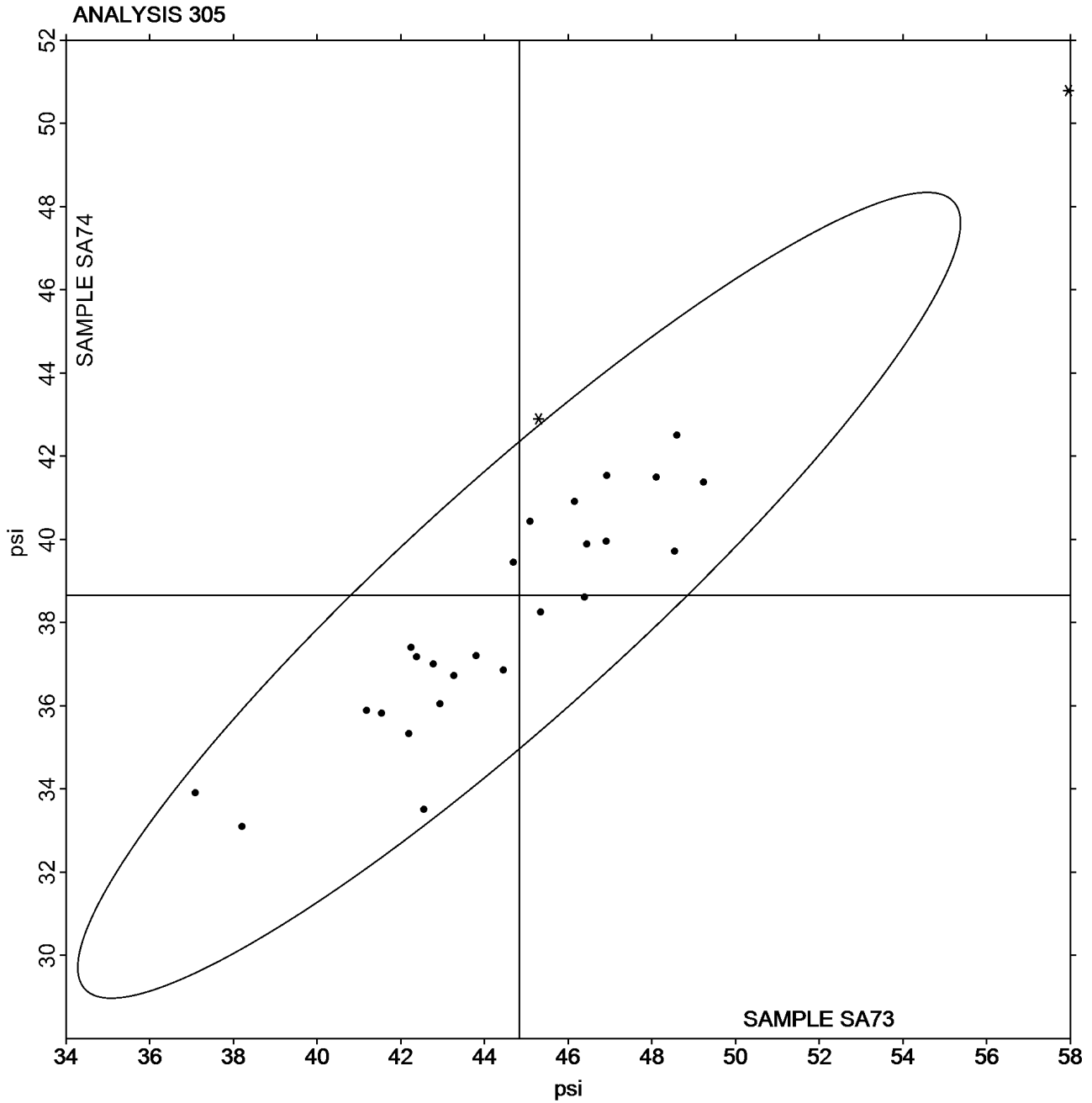


Paper & Paperboard Interlaboratory Testing Program
Analysis 305
Bursting Strength - Printing Papers
TAPPI Official Test Method T403

Report #3031S,
November 2019

Grand Mean Sample SA73 = 44.825
psi

Grand Mean Sample SA74 = 38.658
psi





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

Report #3031S,
November 2019

WebCode	Data Flag	Sample SB73			Sample SB74		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3FPPB6		88.90	-2.57	-0.40	90.60	-7.10	-0.85
4T737C		95.15	3.68	0.57	100.25	2.55	0.31
6J2BGH		98.90	7.43	1.14	105.50	7.80	0.94
88W2PB		93.30	1.83	0.28	99.10	1.40	0.17
9934NE		87.04	-4.43	-0.68	95.73	-1.97	-0.24
9AWUT8		89.79	-1.68	-0.26	102.81	5.11	0.61
EFPMP		76.19	-15.28	-2.35	81.80	-15.90	-1.91
FE9VCR		94.50	3.03	0.47	97.75	0.05	0.01
FLR9YX		97.30	5.83	0.90	107.30	9.60	1.15
GJYJCV		88.54	-2.92	-0.45	90.33	-7.37	-0.89
GPKL8E		82.44	-9.03	-1.39	92.18	-5.52	-0.66
J4BABA		87.40	-4.07	-0.63	86.80	-10.90	-1.31
KRJCRB		89.22	-2.24	-0.35	98.54	0.85	0.10
MVCRGB		97.52	6.05	0.93	105.87	8.17	0.98
MVPLVP		102.57	11.10	1.71	114.32	16.62	2.00
N4FYGM		96.57	5.11	0.79	103.89	6.19	0.74
NQNUA7		100.90	9.43	1.45	104.40	6.70	0.80
PX7LYA		85.80	-5.67	-0.87	88.50	-9.20	-1.11
QFQJ7G		88.56	-2.90	-0.45	96.13	-1.57	-0.19
QX9HEZ		92.88	1.42	0.22	95.83	-1.87	-0.22
QZEZCV		98.58	7.11	1.10	103.39	5.69	0.68
R7PYQ6		94.70	3.23	0.50	106.81	9.11	1.09
RLQHUC		77.26	-14.21	-2.19	81.36	-16.34	-1.96
U3MMEP		88.32	-3.14	-0.48	94.59	-3.11	-0.37
U7PEFB		90.26	-1.21	-0.19	92.11	-5.58	-0.67
WDWZD4		91.58	0.11	0.02	92.58	-5.12	-0.61
XGDJXX		95.40	3.93	0.61	109.40	11.70	1.41

Summary Statistics	Sample SB73	Sample SB74
Grand Means	91.47 psi	97.70 psi
Std Dev Btwn Labs	6.49 psi	8.32 psi
Statistics based on 27 of 27 reporting participants.		



Paper & Paperboard Interlaboratory Testing Program

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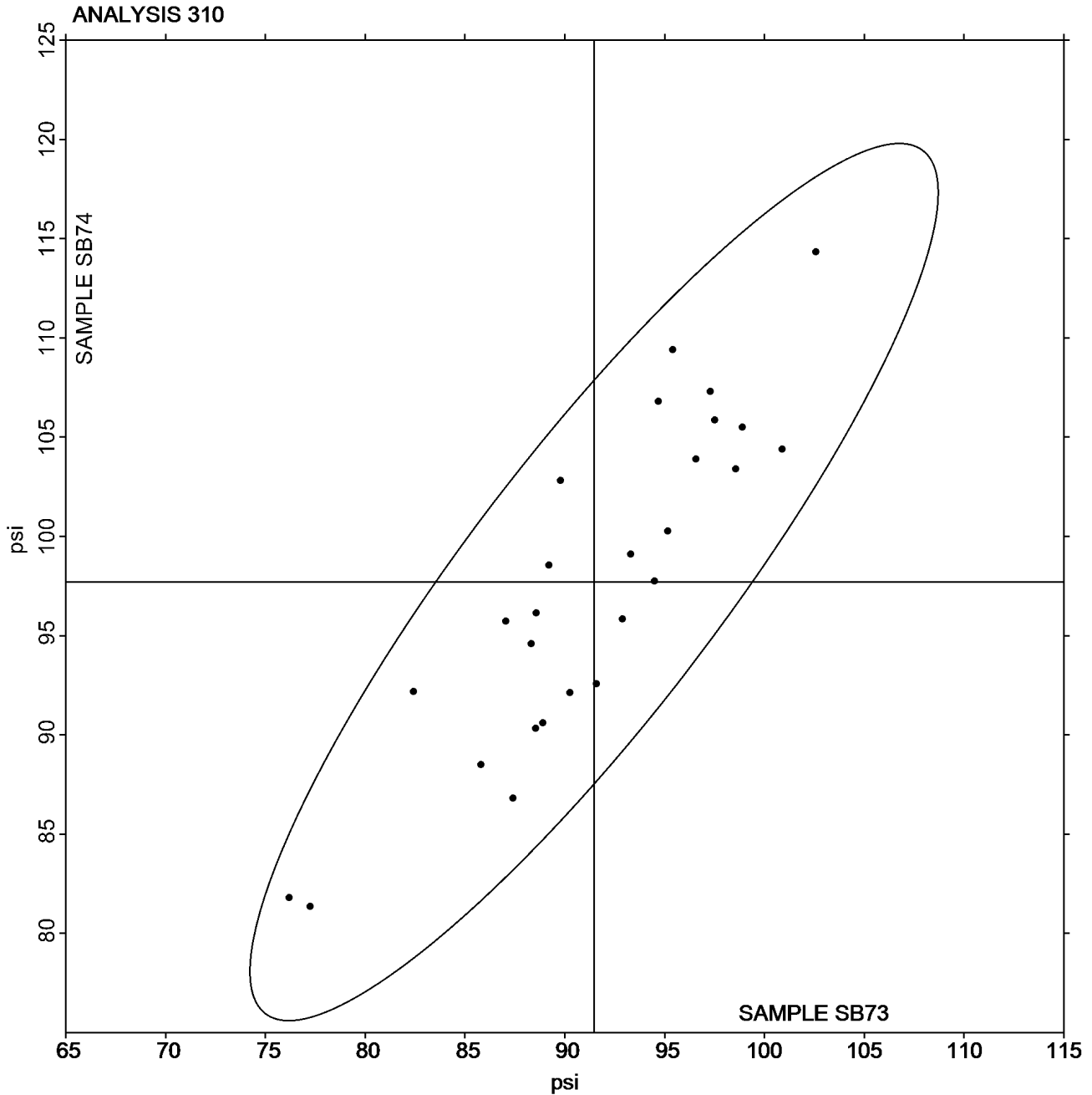
Analysis 310

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

Grand Mean Sample SB73 = 91.466
psi

Grand Mean Sample SB74 = 97.699
psi





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

Report #3031S,
November 2019

WebCode	Data Flag	<u>Sample SK73</u>			<u>Sample SK74</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
77MWA2		29.40	2.37	0.47	29.29	2.27	0.44
7FXYV2		30.09	3.06	0.61	30.07	3.06	0.59
NBH9NF		21.16	-5.87	-1.17	21.21	-5.80	-1.12
U3MMEP		22.18	-4.85	-0.97	21.79	-5.22	-1.01
V2UXRN		32.32	5.29	1.05	32.70	5.69	1.10

Summary Statistics	<u>Sample SK73</u>	<u>Sample SK74</u>
Grand Means	27.03 Grams	27.01 Grams
Std Dev Btwn Labs	5.02 Grams	5.19 Grams
Statistics based on 5 of 5 reporting participants.		

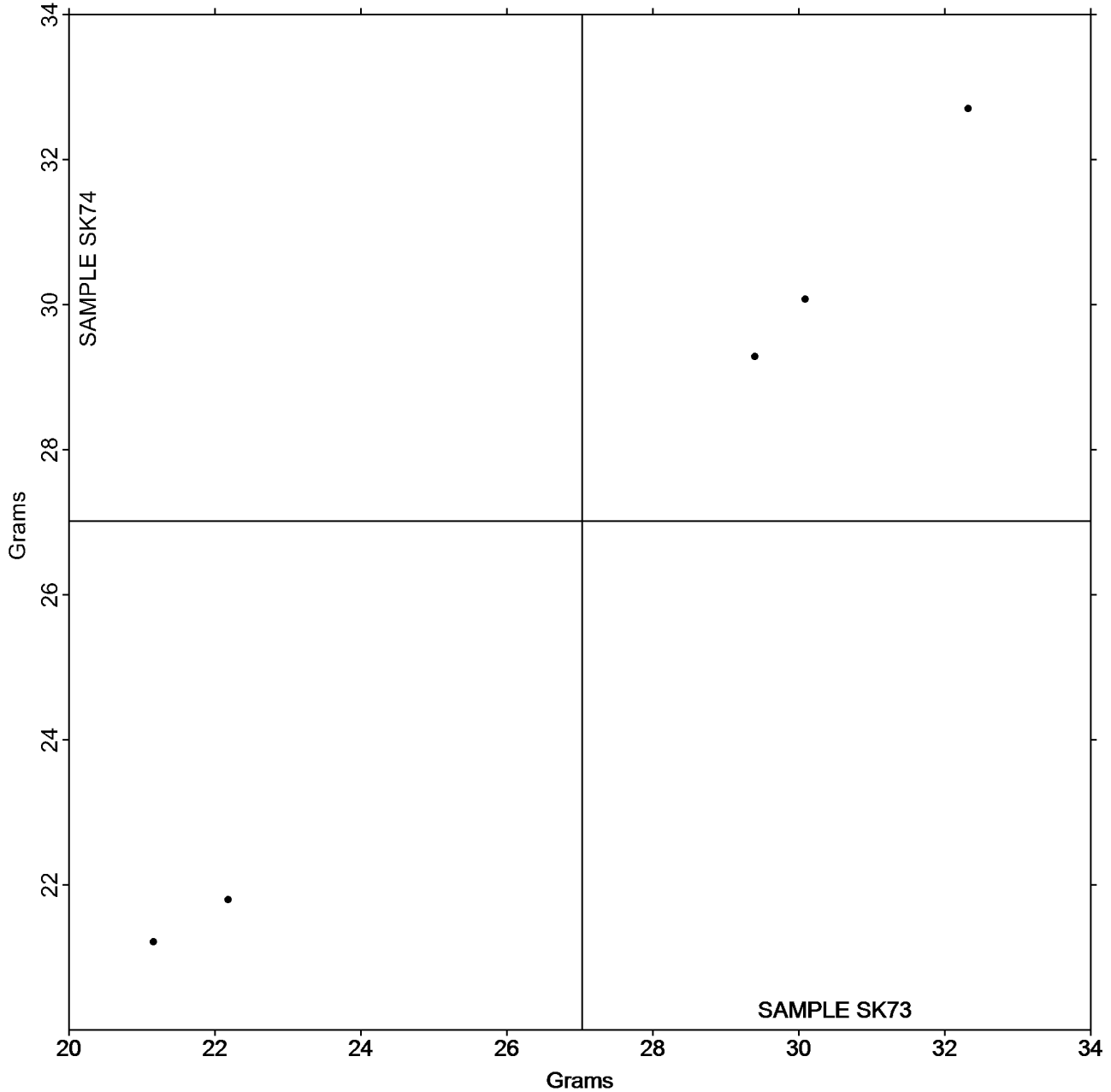


Analysis 311
Tearing Strength - Newsprint
TAPPI Official Test Method T414

Grand Mean Sample SK73 = 27.030
Grams

Grand Mean Sample SK74 = 27.012
Grams

ANALYSIS 311



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



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

Report #3031S,
November 2019

WebCode	Data Flag	Sample SC73			Sample SC74		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2TVLU8		68.36	3.67	0.83	67.61	5.46	1.00
2ZEKQ8		63.20	-1.49	-0.34	57.70	-4.45	-0.82
3RDZAV	X	83.57	18.88	4.30	67.99	5.84	1.07
7NQ8GT		57.80	-6.89	-1.57	55.58	-6.57	-1.21
7P296C		66.74	2.05	0.47	67.18	5.02	0.93
9AWUT8		65.19	0.50	0.11	61.44	-0.71	-0.13
9M83Y7	X	133.20	68.51	15.59	128.00	65.85	12.12
ARFRUY		58.44	-6.25	-1.42	56.84	-5.31	-0.98
B8JY67		57.42	-7.27	-1.65	52.18	-9.97	-1.84
CLUXHH		68.60	3.91	0.89	68.00	5.85	1.08
CWHVEH		67.70	3.01	0.69	65.68	3.53	0.65
DYYMZ4		68.93	4.24	0.97	68.41	6.26	1.15
E7Y2NQ		58.56	-6.13	-1.39	57.24	-4.91	-0.90
EAYDJQ	X	48.91	-15.78	-3.59	48.36	-13.79	-2.54
EFRAB3	X	42.70	-21.99	-5.00	36.04	-26.11	-4.81
F24RRX		64.60	-0.09	-0.02	62.60	0.45	0.08
FE9VCR		58.45	-6.24	-1.42	54.40	-7.75	-1.43
FH9TDP		67.20	2.51	0.57	67.80	5.65	1.04
FLR9YX		74.20	9.51	2.16	71.20	9.05	1.67
FTALXW	X	76.78	12.09	2.75	66.54	4.39	0.81
G3V6V2		66.94	2.26	0.51	67.31	5.16	0.95
G9Y9JE		58.40	-6.29	-1.43	52.52	-9.63	-1.77
GJYJCV		70.36	5.67	1.29	71.04	8.89	1.64
GPKL8E	X	45.02	-19.67	-4.47	41.92	-20.23	-3.72
GQZYZH		71.20	6.51	1.48	70.50	8.35	1.54
H2R67L		64.20	-0.49	-0.11	62.16	0.01	0.00
HPYHZQ	*	74.00	9.32	2.12	68.66	6.51	1.20
JNZXQW		65.31	0.63	0.14	61.16	-0.99	-0.18
KFPTD7		58.30	-6.39	-1.45	53.70	-8.45	-1.56
KM7CVK		62.63	-2.06	-0.47	55.49	-6.66	-1.23
L7UAC3		62.64	-2.05	-0.47	58.40	-3.75	-0.69
MVCRGB		63.87	-0.81	-0.18	62.13	-0.03	-0.01
MZKFTQ		66.76	2.07	0.47	65.44	3.29	0.60
NDM4M7		65.52	0.83	0.19	65.00	2.85	0.52
NQNUA7		59.82	-4.87	-1.11	56.86	-5.29	-0.97
PLCCHG		65.80	1.11	0.25	66.06	3.91	0.72
PMBR3L		67.64	2.95	0.67	65.98	3.83	0.70
Q272CR		62.41	-2.28	-0.52	57.88	-4.27	-0.79
QFQJ7G		60.91	-3.78	-0.86	59.10	-3.05	-0.56
QZEZCV		64.96	0.27	0.06	61.20	-0.95	-0.18



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

Report #3031S,
November 2019

WebCode	Data Flag	<u>Sample SC73</u>			<u>Sample SC74</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
R7PYQ6		63.49	-1.20	-0.27	58.38	-3.78	-0.69
TLHMZ4		70.46	5.78	1.31	70.44	8.29	1.53
TPHGTK		63.10	-1.59	-0.36	61.24	-0.91	-0.17
U3MMEP		66.11	1.42	0.32	63.96	1.80	0.33
X9KHLE		66.36	1.67	0.38	64.59	2.44	0.45
YEMN2H		64.93	0.25	0.06	63.54	1.39	0.26
YH3RW7		56.50	-8.19	-1.86	54.36	-7.79	-1.43
ZL4JGC		65.30	0.61	0.14	62.10	-0.05	-0.01
ZYNYKB	*	68.18	3.49	0.79	59.56	-2.60	-0.48

Summary Statistics	<u>Sample SC73</u>	<u>Sample SC74</u>
Grand Means	64.69 Grams	62.15 Grams
Std Dev Btw Labs	4.40 Grams	5.43 Grams
Statistics based on 43 of 49 reporting participants.		

Comments on Assigned Data Flags for Test #312

- EAYDJQ (X) - Data for sample SC73 are low.
- FTALXW (X) - Data for sample SC73 are high. Inconsistent within the determinations of both samples.
- EFRAB3 (X) - Data for both samples are low. Inconsistent within the determinations of sample SC73.
- 9M83Y7 (X) - Extreme Data.
- 3RDZAV (X) - Data for sample SC73 are high. Inconsistent within the determinations of both samples.
- GPKL8E (X) - Data for both samples are low.

Analysis Notes:

9AWUT8 - One determination removed from the Lab Mean of Sample SC74 per Grubb's Test at 1% risk (TAPPI 1205).



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

Report #3031S,
November 2019

WebCode	Data Flag	Sample SD73			Sample SD74		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4GHVDG		164.4	-11.2	-0.59	204.5	-2.3	-0.11
69YC7M		206.4	30.8	1.63	236.7	29.9	1.34
72DG2C	*	183.9	8.3	0.44	185.9	-20.9	-0.94
7YALJV		163.7	-11.9	-0.63	187.0	-19.8	-0.89
868QJP		146.6	-29.0	-1.54	172.4	-34.4	-1.55
88W2PB	*	126.7	-48.9	-2.59	149.4	-57.4	-2.58
9934NE		179.2	3.6	0.19	206.8	0.0	0.00
9Y2JN8	X	45.8	-129.8	-6.87	53.6	-153.2	-6.90
AFEFBQ		178.9	3.3	0.17	221.8	15.0	0.68
DCRVXL		141.8	-33.8	-1.79	157.9	-48.9	-2.20
DU7V2Z		165.7	-9.9	-0.52	204.2	-2.6	-0.12
E49ZH3		181.0	5.4	0.29	212.9	6.1	0.28
EFPMPUP		190.8	15.2	0.80	240.1	33.2	1.50
F24RRX		171.4	-4.2	-0.22	220.9	14.1	0.63
FAEKTX		170.1	-5.5	-0.29	191.3	-15.5	-0.70
FLR9YX		181.2	5.6	0.30	220.0	13.2	0.59
GPKL8E	*	127.2	-48.4	-2.56	171.9	-34.9	-1.57
H36EJT		172.5	-3.1	-0.16	214.4	7.6	0.34
JNZXQW		176.9	1.3	0.07	221.0	14.2	0.64
KRJCRB		187.6	12.0	0.64	220.8	14.0	0.63
L3TXQB		172.6	-3.0	-0.16	198.2	-8.6	-0.39
LP9HMB		177.8	2.2	0.12	204.5	-2.3	-0.10
LRV9WF		198.2	22.6	1.19	239.3	32.4	1.46
NJUNG6		170.6	-5.0	-0.26	209.8	2.9	0.13
NMBZLL		184.7	9.1	0.48	215.8	9.0	0.40
PX7LYA		198.9	23.3	1.23	206.3	-0.5	-0.02
Q74KFB		201.4	25.8	1.37	241.1	34.3	1.54
QHB3XJ		156.1	-19.5	-1.03	187.9	-18.9	-0.85
QX9HEZ		193.7	18.1	0.96	214.0	7.2	0.32
RLQHUC		177.6	2.0	0.10	213.1	6.3	0.28
TMTTW6		172.9	-2.7	-0.14	203.3	-3.5	-0.16
U3MMEP		183.3	7.7	0.41	213.1	6.3	0.28
WDWZD4		167.5	-8.1	-0.43	196.0	-10.8	-0.49
WNX8LA		168.0	-7.6	-0.40	181.2	-25.7	-1.16
WVQTX2		200.7	25.1	1.33	232.9	26.1	1.17
WY2UKE		195.7	20.1	1.06	220.6	13.8	0.62
XZ27FZ	X	892.2	716.6	37.91	911.4	704.5	31.71
Y9Y4X2	X	43.9	-131.7	-6.97	55.9	-150.9	-6.79
YA97JZ		186.0	10.4	0.55	228.5	21.7	0.98



Paper & Paperboard Interlaboratory Testing Program

Report #3031S,
November 2019

Analysis 314

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

Summary Statistics	Sample SD73	Sample SD74
Grand Means	175.60 Grams	206.82 Grams
Stnd Dev Btwn Labs	18.90 Grams	22.22 Grams

Statistics based on 36 of 39 reporting participants.

Comments on Assigned Data Flags for Test #314

Y9Y4X2 (X) - Extreme Data.

9Y2JN8 (X) - Extreme Data.

XZ27FZ (X) - Extreme Data.

Analysis Notes:

9Y2JN8 - Data possibly off by a factor of 4.

Y9Y4X2 - Data possibly off by a factor of 4.



Paper & Paperboard Interlaboratory Testing Program

Report #3031S,
November 2019

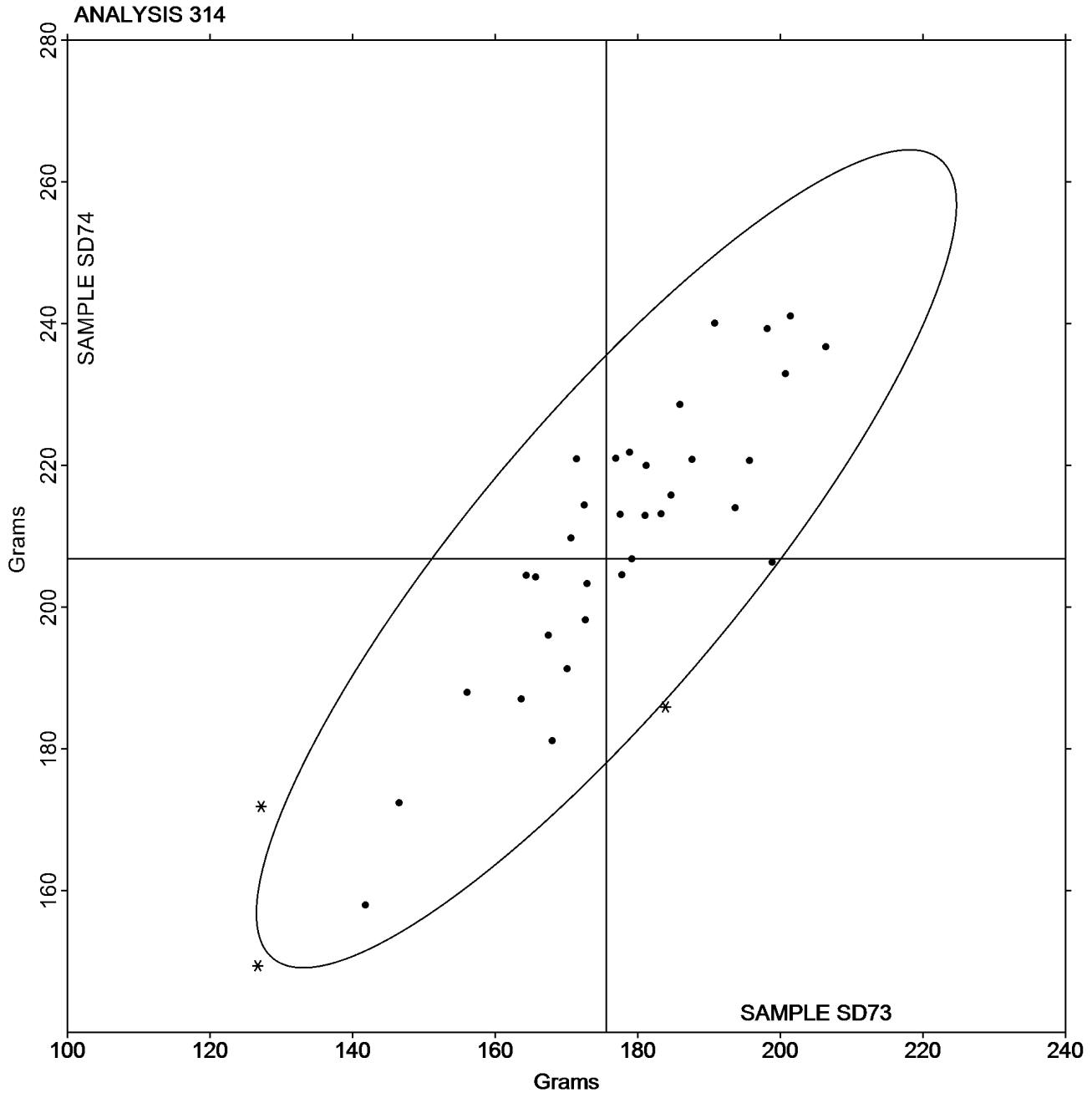
Analysis 314

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

Grand Mean Sample SD73 = 175.60
Grams

Grand Mean Sample SD74 = 206.82
Grams





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

Report #3031S,
November 2019

WebCode	Data Flag	<u>Sample SR73</u>			<u>Sample SR74</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6J2BGH		2.174	-0.002	-0.03	2.194	0.038	0.56
77MWA2		2.108	-0.069	-0.83	2.154	-0.001	-0.02
7FXV2		2.149	-0.028	-0.33	2.156	0.000	0.00
JNZXQW		2.138	-0.039	-0.47	2.116	-0.039	-0.57
KFPTD7		2.227	0.050	0.61	2.205	0.049	0.72
NBH9NF		2.336	0.160	1.92	2.259	0.103	1.51
Q272CR		2.121	-0.056	-0.67	2.139	-0.017	-0.24
QFQJ7G		2.146	-0.031	-0.37	2.161	0.005	0.08
V2UXRN		2.290	0.114	1.37	2.175	0.020	0.29
X96Y2G		2.076	-0.100	-1.21	1.996	-0.159	-2.33

Summary Statistics	<u>Sample SR73</u>	<u>Sample SR74</u>
Grand Means	2.18 kN/m	2.16 kN/m
Std Dev Btwn Labs	0.08 kN/m	0.07 kN/m
Statistics based on 10 of 10 reporting participants.		

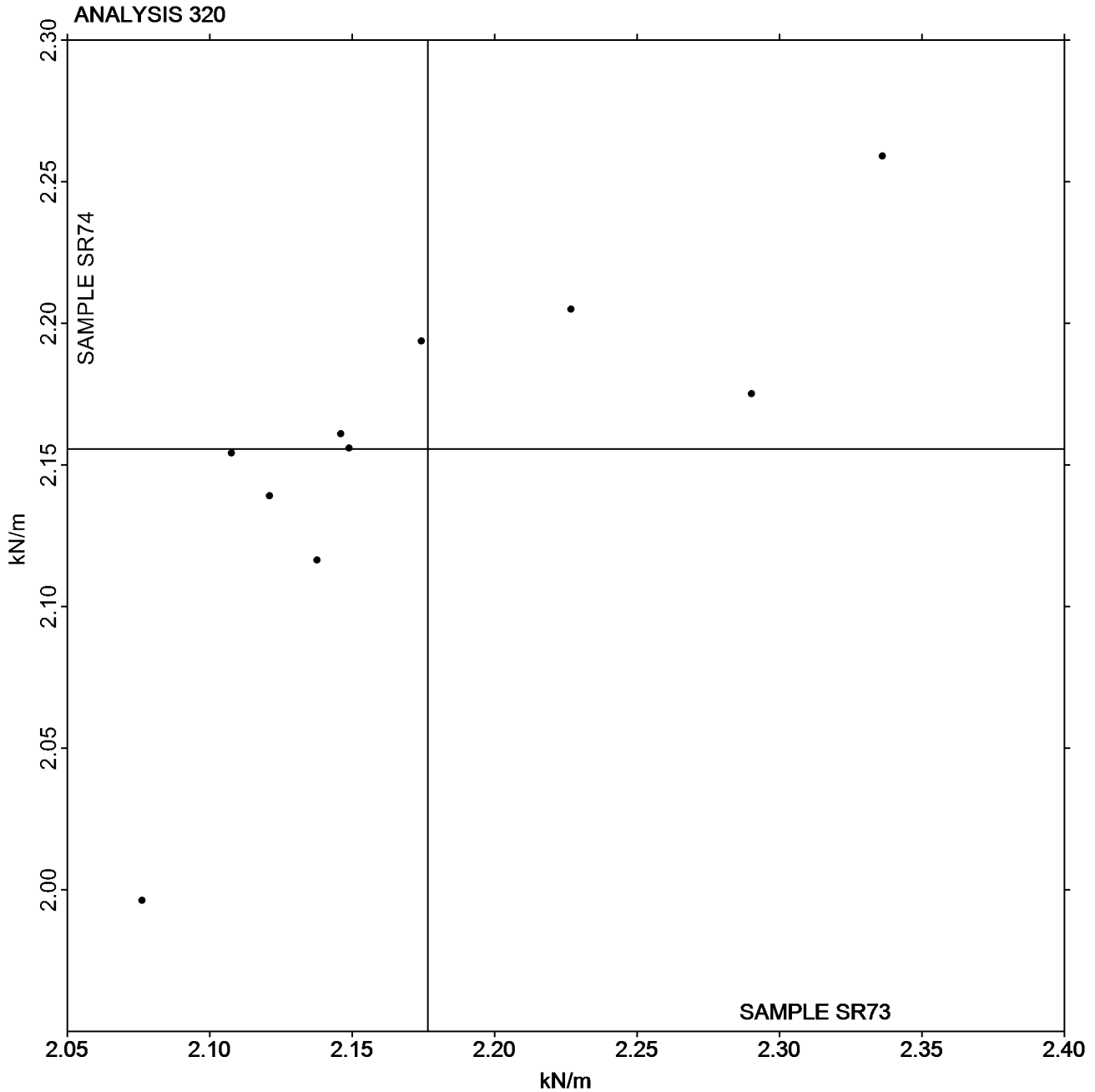


Paper & Paperboard Interlaboratory Testing Program
Analysis 320
Tensile Breaking Strength - Newsprint
TAPPI Official Test Method T494

Report #3031S,
November 2019

Grand Mean Sample SR73 = 2.1765
kN/m

Grand Mean Sample SR74 = 2.1555
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 #3031S,
November 2019

WebCode	Data Flag	<u>Sample SR73</u>			<u>Sample SR74</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6J2BGH		14.25	0.35	0.35	13.88	0.39	0.37
77MWA2		12.72	-1.19	-1.20	13.61	0.11	0.11
7FXV2		13.73	-0.17	-0.17	13.89	0.39	0.38
JNZXQW		14.45	0.55	0.56	14.70	1.20	1.17
KFPTD7		14.58	0.68	0.69	13.97	0.47	0.45
NBH9NF		13.33	-0.57	-0.58	11.88	-1.61	-1.57
Q272CR		14.21	0.31	0.31	14.77	1.28	1.24
QFQJ7G		12.86	-1.05	-1.06	12.45	-1.05	-1.02
V2UXRN		15.92	2.02	2.04	13.80	0.30	0.30
X96Y2G		12.98	-0.92	-0.93	12.03	-1.47	-1.43

Summary Statistics	<u>Sample SR73</u>	<u>Sample SR74</u>
Grand Means	13.90 Joules/sq m	13.50 Joules/sq m
Std Dev Btwn Labs	0.99 Joules/sq m	1.03 Joules/sq m
Statistics based on 10 of 10 reporting participants.		

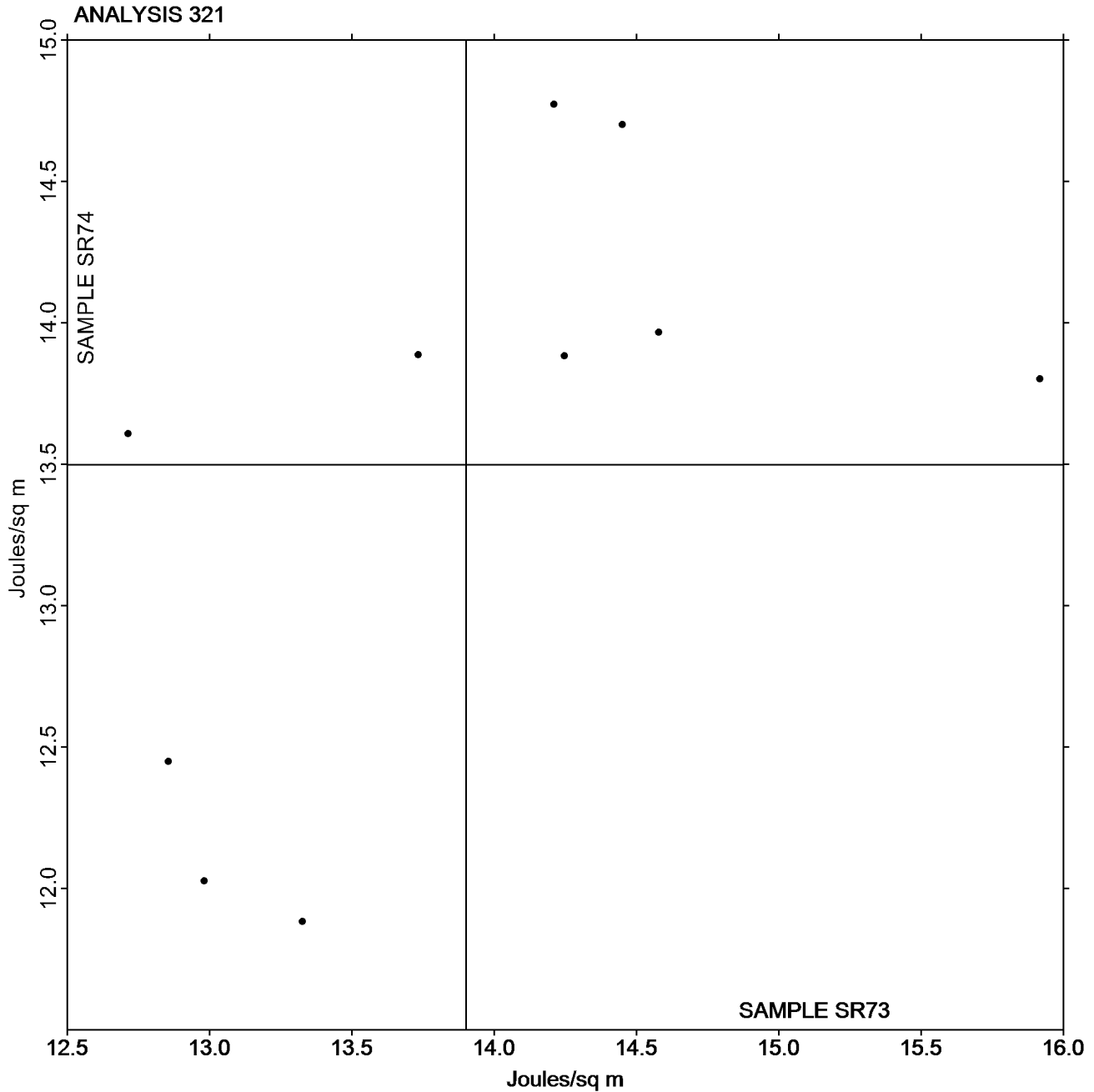


Paper & Paperboard Interlaboratory Testing Program
Analysis 321
Tensile Energy Absorption - Newsprint
TAPPI Official Test Method T494

Report #3031S,
November 2019

Grand Mean Sample SR73 = 13.902
Joules/sq m

Grand Mean Sample SR74 = 13.498
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 #3031S,
November 2019

WebCode	Data Flag	<u>Sample SR73</u>			<u>Sample SR74</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6J2BGH		1.115	-0.023	-0.17	1.085	-0.028	-0.22
7FXV2		1.074	-0.064	-0.46	1.072	-0.040	-0.31
JNZXQW		0.978	-0.160	-1.14	0.993	-0.119	-0.93
KFPTD7		1.193	0.055	0.39	1.173	0.061	0.48
NBH9NF		1.245	0.107	0.76	1.193	0.081	0.63
Q272CR		1.112	-0.026	-0.19	1.136	0.024	0.19
QFQJ7G		1.017	-0.121	-0.86	0.987	-0.125	-0.98
V2UXRN		1.443	0.305	2.17	1.382	0.270	2.11
X96Y2G		1.068	-0.070	-0.50	0.989	-0.123	-0.96

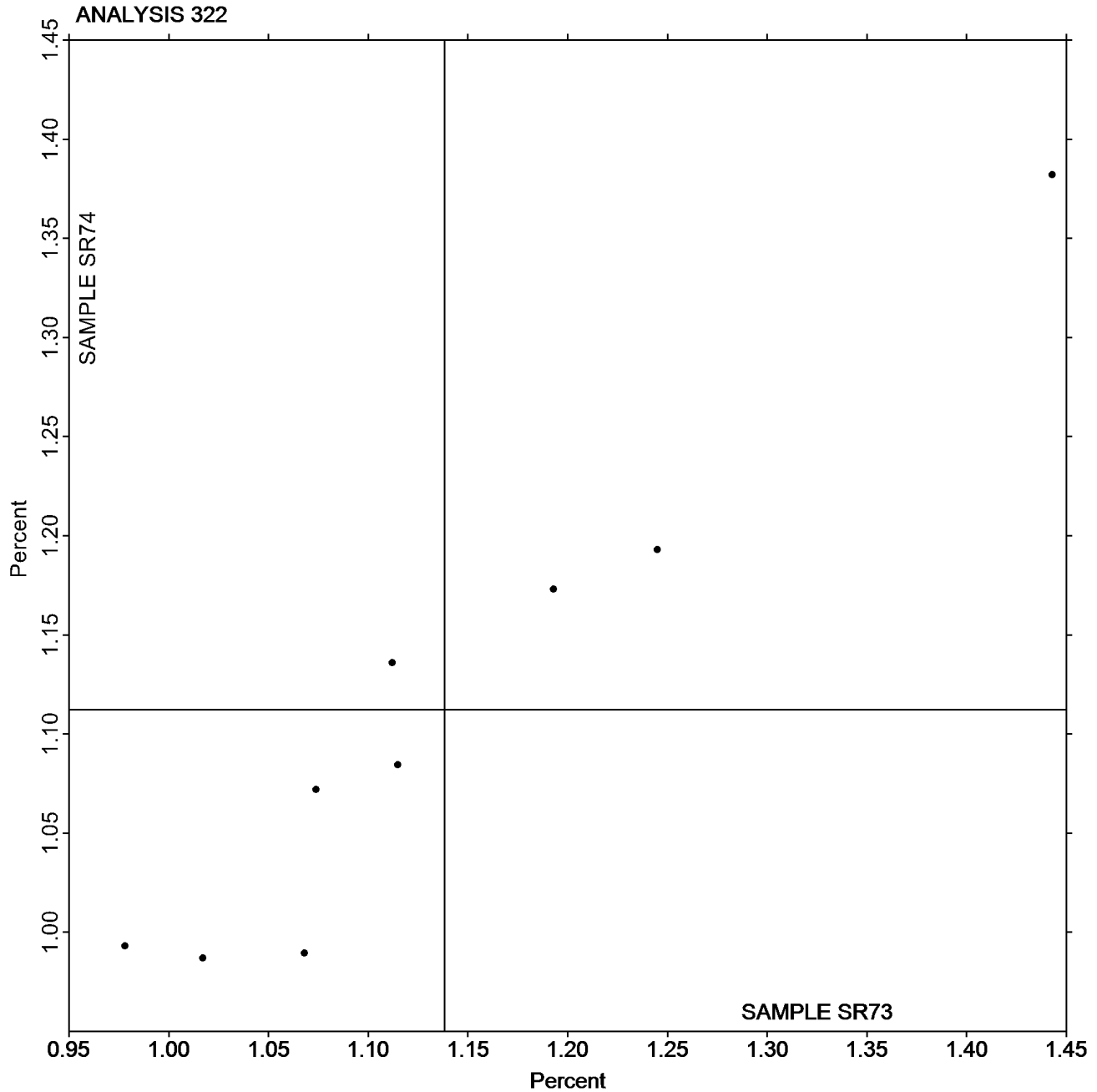
Summary Statistics	<u>Sample SR73</u>	<u>Sample SR74</u>
Grand Means	1.14 Percent	1.11 Percent
Std Dev Btwn Labs	0.14 Percent	0.13 Percent
Statistics based on 9 of 9 reporting participants.		



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

Grand Mean Sample SR73 = 1.1383
Percent

Grand Mean Sample SR74 = 1.1122
Percent



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



Paper & Paperboard Interlaboratory Testing Program

**Report #3031S,
November 2019**

Analysis 325

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF73			Sample SF74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2TVLU8		3.952	-0.285	-1.04	4.097	-0.136	-0.55	XX
2ZEKQ8		4.661	0.424	1.54	4.511	0.279	1.12	TC
3RDZAV		4.399	0.161	0.59	4.387	0.154	0.62	LA
4KVZKB		4.571	0.333	1.21	4.397	0.165	0.66	LH
7NQ8GT		4.433	0.195	0.71	4.471	0.238	0.96	LI
7P296C		4.299	0.061	0.22	4.240	0.007	0.03	LI
8P924J		3.916	-0.322	-1.17	3.934	-0.299	-1.21	XX
9M83Y7		3.982	-0.256	-0.93	4.112	-0.120	-0.48	XX
ARFRUY		4.588	0.350	1.27	4.505	0.273	1.10	LH
B8JY67		4.116	-0.122	-0.44	4.161	-0.071	-0.29	TF
CLUXHH		4.327	0.089	0.32	4.384	0.151	0.61	LH
CWHVEH		4.154	-0.084	-0.30	4.182	-0.050	-0.20	TF
DYYMZ4		4.103	-0.135	-0.49	4.020	-0.212	-0.86	IM
E7Y2NQ		4.760	0.522	1.90	4.784	0.552	2.23	TJ
EAYDJQ		4.334	0.096	0.35	4.415	0.183	0.74	TP
EFRAB3	X	3.698	-0.540	-1.96	4.198	-0.034	-0.14	TP
FE9VCR		4.483	0.245	0.89	4.614	0.382	1.54	TF
FTALXW	X	26.970	22.732	82.59	25.480	21.247	85.68	LB
G3V6V2		4.175	-0.063	-0.23	4.216	-0.017	-0.07	LF
G9Y9JE		3.902	-0.336	-1.22	4.124	-0.108	-0.44	TB
GPKL8E		4.478	0.240	0.87	4.597	0.364	1.47	TM
GQZYZH		4.329	0.091	0.33	4.334	0.101	0.41	LH
H2R67L		4.080	-0.158	-0.57	4.119	-0.114	-0.46	LE
HPYHZQ		4.298	0.060	0.22	4.280	0.048	0.19	XX
KM7CVK		4.308	0.070	0.26	4.193	-0.040	-0.16	VM
MZKFTQ		4.258	0.020	0.07	4.168	-0.065	-0.26	LI
NDM4M7		4.052	-0.186	-0.68	4.194	-0.038	-0.15	LX
NJBNQL		3.935	-0.303	-1.10	4.035	-0.198	-0.80	XX
NMBZLL		3.801	-0.437	-1.59	3.716	-0.517	-2.08	XX
NQNUA7		4.580	0.342	1.24	4.438	0.205	0.83	TO
NRL72R		4.001	-0.237	-0.86	4.032	-0.201	-0.81	DL
PAZ3NB	*	4.824	0.586	2.13	4.597	0.364	1.47	LX
PLCCHG		3.846	-0.392	-1.42	3.736	-0.497	-2.00	ID
QFQJ7G		4.262	0.024	0.09	4.264	0.031	0.13	LH
R7PYQ6		4.189	-0.049	-0.18	4.068	-0.165	-0.67	LH
TLHMZ4		3.937	-0.301	-1.09	3.972	-0.261	-1.05	TO
TPHGTK		4.035	-0.203	-0.74	4.061	-0.171	-0.69	TB
U37BWK		4.649	0.411	1.49	4.575	0.342	1.38	LX
U3MMEP		4.269	0.031	0.11	4.288	0.055	0.22	LH
X9KHLE		4.238	0.000	0.00	4.220	-0.013	-0.05	LH



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

Report #3031S,
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WebCode	Data Flag	Sample SF73			Sample SF74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
Y9Y4X2		3.786	-0.451	-1.64	3.815	-0.418	-1.69	IM
YEMN2H		4.000	-0.237	-0.86	3.977	-0.256	-1.03	DM
YH3RW7		4.602	0.364	1.32	4.474	0.242	0.98	TO
YUFEZK		4.511	0.273	0.99	4.523	0.290	1.17	FP
ZL4JGC		3.839	-0.399	-1.45	3.895	-0.337	-1.36	TO
ZYNYKB		4.205	-0.033	-0.12	4.108	-0.124	-0.50	LA

Summary Statistics	Sample SF73	Sample SF74
Grand Means	4.24 kN/m	4.23 kN/m
Std Dev Btw Labs	0.28 kN/m	0.25 kN/m

Statistics based on 44 of 46 reporting participants.

Comments on Assigned Data Flags for Test #325

FTALXW (X) - Extreme Data.

EFRAB3 (X) - Inconsistent in testing between samples.

Analysis Notes:

FTALXW - Possibly incorrect units selected.

Key to Instrument Codes Reported by Participants

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



Paper & Paperboard Interlaboratory Testing Program

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Analysis 325

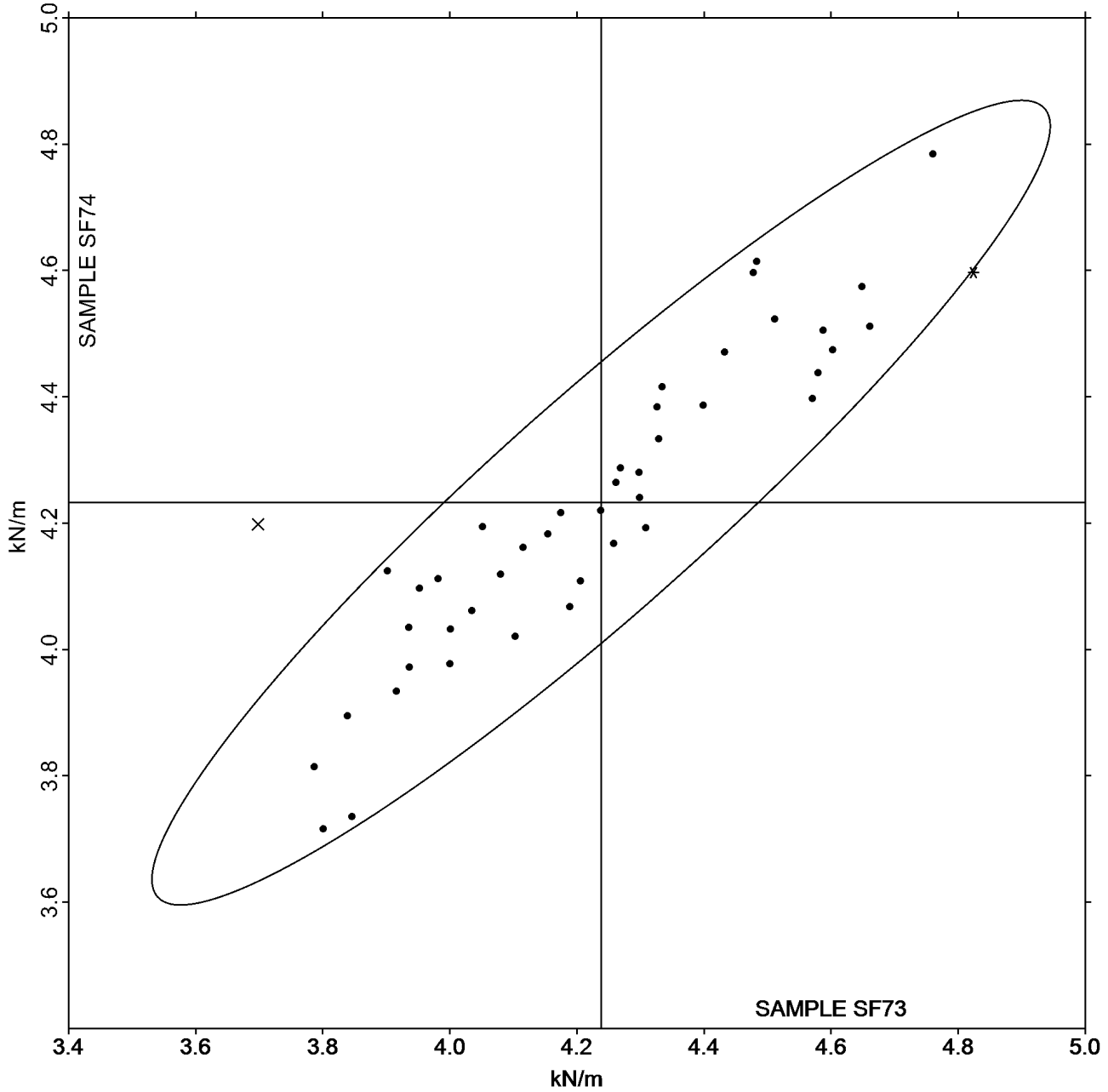
Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

Grand Mean Sample SF73 = 4.2379
kN/m

Grand Mean Sample SF74 = 4.2325
kN/m

ANALYSIS 325





Paper & Paperboard Interlaboratory Testing Program

**Report #3031S,
November 2019**

Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF73			Sample SF74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2TVLU8		43.08	-0.51	-0.11	44.21	0.24	0.05	XX
3RDZAV		47.75	4.16	0.87	45.05	1.08	0.23	LA
4KVZKB		47.04	3.45	0.72	47.13	3.15	0.66	LH
7NQ8GT		36.70	-6.89	-1.44	36.18	-7.79	-1.62	LX
7P296C		39.91	-3.68	-0.77	41.05	-2.93	-0.61	LI
ARFRUY		47.85	4.26	0.89	46.07	2.10	0.44	LH
CWHVEH		46.81	3.22	0.68	50.94	6.97	1.45	TF
DYYMZ4		43.18	-0.41	-0.09	39.74	-4.23	-0.88	IM
EAYDJQ		42.37	-1.22	-0.26	44.00	0.03	0.01	TP
FE9VCR		40.43	-3.16	-0.66	44.14	0.17	0.04	TF
FTALXW		50.61	7.02	1.47	49.11	5.14	1.07	LA
G3V6V2		42.42	-1.17	-0.25	43.61	-0.36	-0.08	LX
GPKL8E		46.08	2.49	0.52	49.35	5.38	1.12	TM
GQZYZH		47.11	3.52	0.74	47.59	3.62	0.75	LH
HPYHZQ		33.80	-9.79	-2.05	36.25	-7.72	-1.61	XX
MZKFTQ		40.39	-3.20	-0.67	39.20	-4.77	-0.99	LI
NDM4M7		39.39	-4.20	-0.88	45.27	1.30	0.27	LX
NJBNQL	*	46.85	3.26	0.68	53.38	9.41	1.96	XX
NMBZLL		41.71	-1.88	-0.39	42.00	-1.97	-0.41	XX
NQNUA7	*	55.46	11.87	2.49	49.29	5.32	1.11	TO
NRL72R		44.73	1.14	0.24	45.74	1.77	0.37	DL
PAZ3NB		42.06	-1.53	-0.32	42.30	-1.67	-0.35	LX
PLCCHG		38.95	-4.64	-0.97	37.09	-6.88	-1.43	ID
QFQJ7G		39.64	-3.95	-0.83	39.52	-4.45	-0.93	LH
R7PYQ6		44.66	1.07	0.22	45.04	1.07	0.22	LH
TLHMZ4		48.31	4.71	0.99	50.06	6.09	1.27	TO
TPHGTK		46.06	2.47	0.52	45.53	1.56	0.33	TB
U37BWK		46.65	3.06	0.64	44.45	0.48	0.10	LX
U3MMEP		47.09	3.50	0.73	45.30	1.33	0.28	LH
X9KHLE		42.67	-0.92	-0.19	43.15	-0.82	-0.17	LH
Y9Y4X2		39.43	-4.16	-0.87	40.82	-3.15	-0.66	IM
YH3RW7		42.47	-1.12	-0.24	41.15	-2.82	-0.59	TO
YUFEZK		51.75	8.16	1.71	53.32	9.35	1.95	FP
ZL4JGC		37.85	-5.74	-1.20	37.86	-6.11	-1.27	TO
ZYNYKB		34.43	-9.16	-1.92	34.05	-9.92	-2.07	LA



Paper & Paperboard Interlaboratory Testing Program

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Analysis 327

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SF73	Sample SF74
Grand Means	43.59 Joules/sq m	43.97 Joules/sq m
Stnd Dev Btwn Labs	4.77 Joules/sq m	4.80 Joules/sq m

Statistics based on 35 of 35 reporting participants.

Key to Instrument Codes Reported by Participants

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



Paper & Paperboard Interlaboratory Testing Program

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Analysis 327

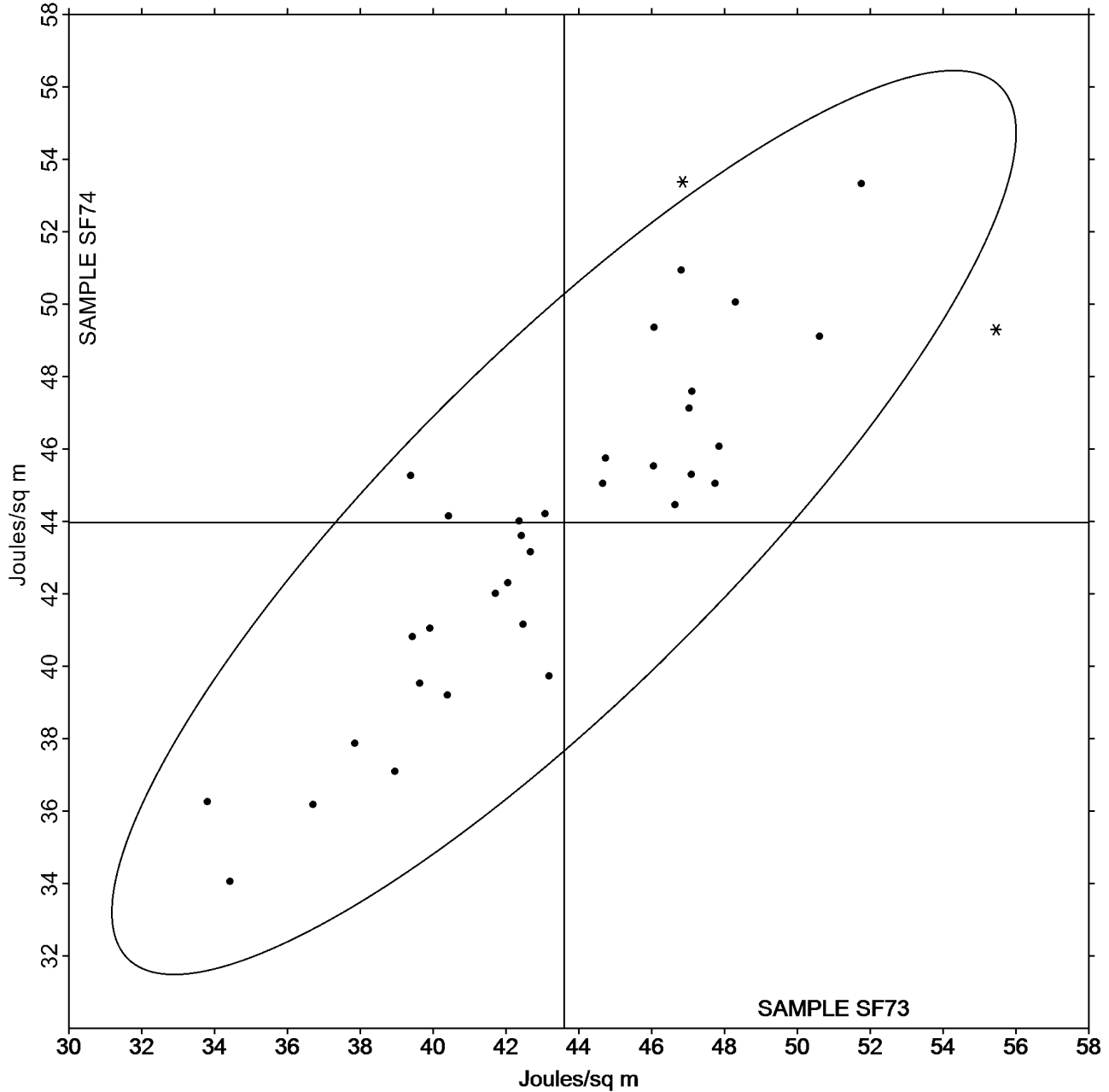
Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

Grand Mean Sample SF73 = 43.591
Joules/sq m

Grand Mean Sample SF74 = 43.970
Joules/sq m

ANALYSIS 327





Paper & Paperboard Interlaboratory Testing Program

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November 2019**

Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SF73			Sample SF74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2TVLU8		1.631	0.038	0.22	1.649	0.027	0.17	XX
3RDZAV		1.566	-0.027	-0.16	1.488	-0.134	-0.83	XX
4KVZKB		1.583	-0.010	-0.06	1.632	0.010	0.06	LH
7NQ8GT		1.343	-0.250	-1.48	1.325	-0.297	-1.85	LI
7P296C		1.345	-0.248	-1.47	1.401	-0.221	-1.37	LI
ARFRUY		1.609	0.016	0.09	1.579	-0.043	-0.27	LH
B8JY67		1.509	-0.084	-0.50	1.556	-0.066	-0.41	TF
CWHVEH	*	1.900	0.307	1.82	2.025	0.403	2.51	TF
DYYMZ4		1.694	0.101	0.60	1.526	-0.095	-0.59	IM
EAYDJQ		1.586	-0.007	-0.04	1.743	0.121	0.75	TP
FE9VCR		1.540	-0.053	-0.32	1.619	-0.003	-0.02	TF
FTALXW		1.509	-0.084	-0.50	1.531	-0.091	-0.56	LA
G3V6V2		1.561	-0.032	-0.19	1.587	-0.035	-0.22	LX
G9Y9JE		1.459	-0.134	-0.80	1.424	-0.198	-1.23	TF
GPKL8E		1.705	0.112	0.66	1.759	0.137	0.86	TM
GQZYZH		1.667	0.074	0.44	1.680	0.058	0.36	LH
HPYHZQ		1.509	-0.084	-0.50	1.614	-0.008	-0.05	XX
KM7CVK		1.450	-0.143	-0.85	1.520	-0.102	-0.63	VM
MZKFTQ		1.488	-0.105	-0.62	1.477	-0.145	-0.90	LI
NDM4M7		1.481	-0.112	-0.67	1.645	0.023	0.14	LX
NJBNQL		1.499	-0.094	-0.56	1.646	0.024	0.15	XX
NMBZLL		1.673	0.080	0.47	1.698	0.076	0.47	XX
NQNUA7	*	1.977	0.384	2.27	1.813	0.191	1.19	TO
NRL72R		1.869	0.276	1.63	1.883	0.261	1.63	DL
PAZ3NB		1.284	-0.309	-1.83	1.402	-0.220	-1.37	LX
PLCCHG		1.556	-0.037	-0.22	1.531	-0.091	-0.57	ID
QFQJ7G		1.443	-0.150	-0.89	1.442	-0.180	-1.12	LH
R7PYQ6		1.685	0.092	0.54	1.737	0.115	0.72	LH
TLHMZ4		1.973	0.380	2.25	2.018	0.396	2.47	TO
TPHGTK		1.806	0.213	1.26	1.778	0.156	0.97	TB
U37BWK		1.560	-0.033	-0.20	1.517	-0.105	-0.65	LX
U3MMEP		1.709	0.116	0.69	1.661	0.039	0.24	LH
X9KHLE		1.560	-0.033	-0.20	1.577	-0.045	-0.28	LH
YH3RW7	*	1.329	-0.264	-1.57	1.614	-0.008	-0.05	TO
YUFEZK		1.802	0.209	1.24	1.849	0.227	1.41	FP
ZL4JGC		1.552	-0.041	-0.24	1.510	-0.112	-0.70	TX
ZYNYKB		1.540	-0.053	-0.32	1.550	-0.072	-0.45	LA



Paper & Paperboard Interlaboratory Testing Program

Report #3031S,
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Analysis 328

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

Summary Statistics	Sample SF73	Sample SF74
Grand Means	1.59 Percent	1.62 Percent
Stnd Dev Btwn Labs	0.17 Percent	0.16 Percent

Statistics based on 37 of 37 reporting participants.

Key to Instrument Codes Reported by Participants

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

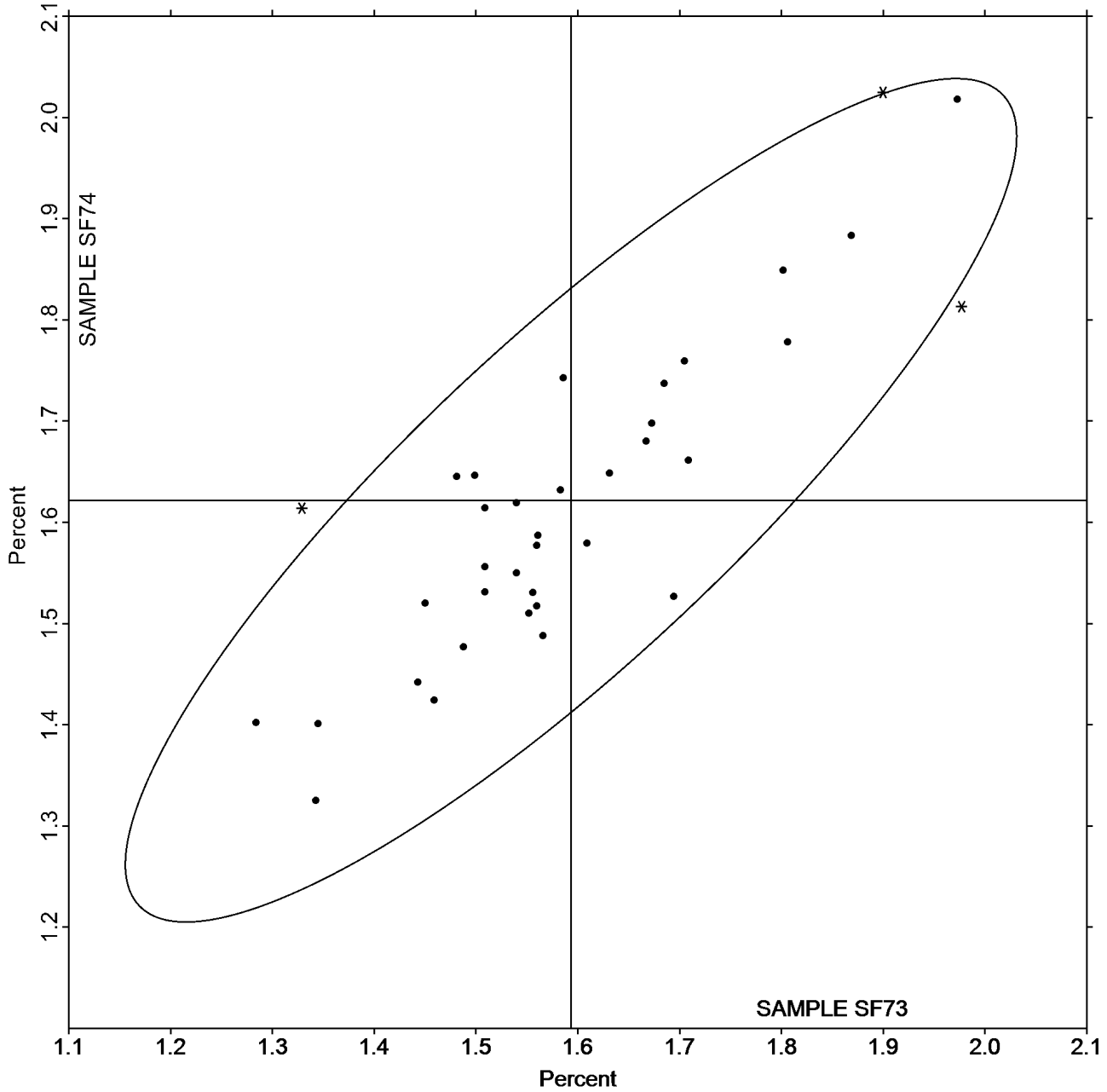
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Analysis 328 Elongation to Break - Printing Papers TAPPI Official Test Method T494

Grand Mean Sample SF73 = 1.5933
Percent

Grand Mean Sample SF74 = 1.6218
Percent

ANALYSIS 328





Paper & Paperboard Interlaboratory Testing Program

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Analysis 330

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE73			Sample SE74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2EBYNF		17.95	1.69	1.45	16.01	1.24	1.23	LE
38A2HN		16.97	0.71	0.61	15.27	0.51	0.50	TH
3U7NF7		17.69	1.43	1.23	15.50	0.74	0.73	TX
4GHVDG		17.76	1.50	1.29	16.10	1.33	1.32	TH
4T737C		16.17	-0.09	-0.08	14.78	0.02	0.02	IK
69YC7M		16.97	0.70	0.60	15.43	0.66	0.65	ID
6L67ZK	X	36.88	20.61	17.71	28.12	13.36	13.20	LA
868QJP	*	14.52	-1.75	-1.50	14.61	-0.16	-0.15	IN
8QQQTQ		16.11	-0.15	-0.13	15.08	0.31	0.31	IF
9934NE		15.99	-0.28	-0.24	14.00	-0.76	-0.75	ID
9AWUT8		14.69	-1.57	-1.35	13.78	-0.98	-0.97	IF
9Y2JN8		17.70	1.43	1.23	15.81	1.04	1.03	LX
9ZCHJF		16.61	0.35	0.30	15.05	0.29	0.28	TH
BFRK2M		17.55	1.29	1.11	16.22	1.45	1.44	IR
BXXRFP		16.26	-0.01	0.00	15.15	0.38	0.38	IK
CJDFU8		18.30	2.04	1.75	16.73	1.96	1.94	XX
DCRVXL		17.85	1.59	1.37	16.06	1.30	1.28	IR
EBQHPJ		16.32	0.06	0.05	14.47	-0.30	-0.29	IF
EFPMUP		16.48	0.22	0.19	14.43	-0.34	-0.33	LH
F24RRX		15.04	-1.23	-1.06	14.27	-0.50	-0.49	TA
F2GJJE		15.06	-1.20	-1.04	13.76	-1.01	-0.99	TT
FAEKTX		16.84	0.57	0.49	15.11	0.35	0.34	LW
FE9VCR		15.34	-0.93	-0.80	14.87	0.11	0.11	TO
FLR9YX		17.04	0.78	0.67	15.33	0.57	0.56	IF
GJYJCV		15.44	-0.82	-0.71	13.73	-1.04	-1.02	LE
GPKL8E		17.17	0.90	0.78	15.06	0.29	0.29	XX
H36EJT		17.02	0.75	0.65	15.33	0.56	0.56	LH
HRJLKG		16.27	0.01	0.01	15.24	0.47	0.47	IK
JQ87QF		15.91	-0.35	-0.30	14.65	-0.11	-0.11	IF
LRV9WF		15.03	-1.24	-1.06	13.53	-1.24	-1.22	LE
MVCRGB		13.42	-2.85	-2.45	12.63	-2.14	-2.11	TR
MVPLVP		15.28	-0.98	-0.85	14.38	-0.38	-0.38	TB
NJBNQL		15.44	-0.83	-0.71	13.30	-1.47	-1.45	LA
NJUNG6	X	11.55	-4.71	-4.05	10.74	-4.02	-3.97	IM
NMBZLL		15.26	-1.00	-0.86	13.20	-1.57	-1.55	LW
PMBR3L		15.25	-1.02	-0.88	13.36	-1.41	-1.39	XX
PX7LYA		16.87	0.61	0.52	15.15	0.38	0.38	LE
Q74KFB		15.73	-0.54	-0.46	13.77	-0.99	-0.98	TK
QHB3XJ		17.11	0.84	0.72	15.57	0.81	0.80	TO
R4ADB6		17.70	1.43	1.23	16.03	1.26	1.25	LA



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

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WebCode	Data Flag	Sample SE73			Sample SE74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
RLQHUC		15.43	-0.83	-0.71	14.33	-0.43	-0.43	IM
TMTTW6		13.88	-2.39	-2.05	13.20	-1.57	-1.55	IN
TVR6M9		15.84	-0.42	-0.36	13.73	-1.04	-1.03	IM
U3MMEP		16.42	0.15	0.13	14.81	0.05	0.05	LH
VHXZEF		15.56	-0.70	-0.61	13.83	-0.93	-0.92	IM
WAYKWU		18.21	1.94	1.67	16.15	1.38	1.37	LI
WDWZD4	*	17.46	1.19	1.02	16.78	2.01	1.99	TH
WNX8LA		17.08	0.82	0.70	15.11	0.34	0.34	LE
WVQTX2		14.05	-2.22	-1.90	13.36	-1.40	-1.39	TA
WY2UKE		15.74	-0.52	-0.45	14.38	-0.39	-0.38	TR
XGDJXX		16.79	0.53	0.45	15.78	1.01	1.00	IK
XXLKZZ		18.06	1.79	1.54	16.27	1.50	1.49	TH
XZ27FZ		15.15	-1.11	-0.96	13.24	-1.52	-1.50	IN
Y9Y4X2		15.54	-0.72	-0.62	13.99	-0.78	-0.77	IM
YA97JZ		16.11	-0.16	-0.14	14.44	-0.33	-0.32	LW
ZWFZWV		16.87	0.60	0.52	15.20	0.44	0.43	TB

Summary Statistics	Sample SE73	Sample SE74
Grand Means	16.26 kN/m	14.77 kN/m
Std Dev Btwn Labs	1.16 kN/m	1.01 kN/m

Statistics based on 54 of 56 reporting participants.

Comments on Assigned Data Flags for Test #330

6L67ZK (X) - Extreme Data.

NJUNG6 (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of both samples.

Key to Instrument Codes Reported by Participants

ID	Instron 4200 Series	IF	Instron 3340 Series
IK	Instron 4400 Series	IM	Instron 5500 Series
IN	Instron 3360 Series	IR	Instron 5900 Series
LA	L & W Autoline	LE	L & W Tensile Tester 066
LH	L & W Alwetron TH1 (Horizontal) SE 060	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		

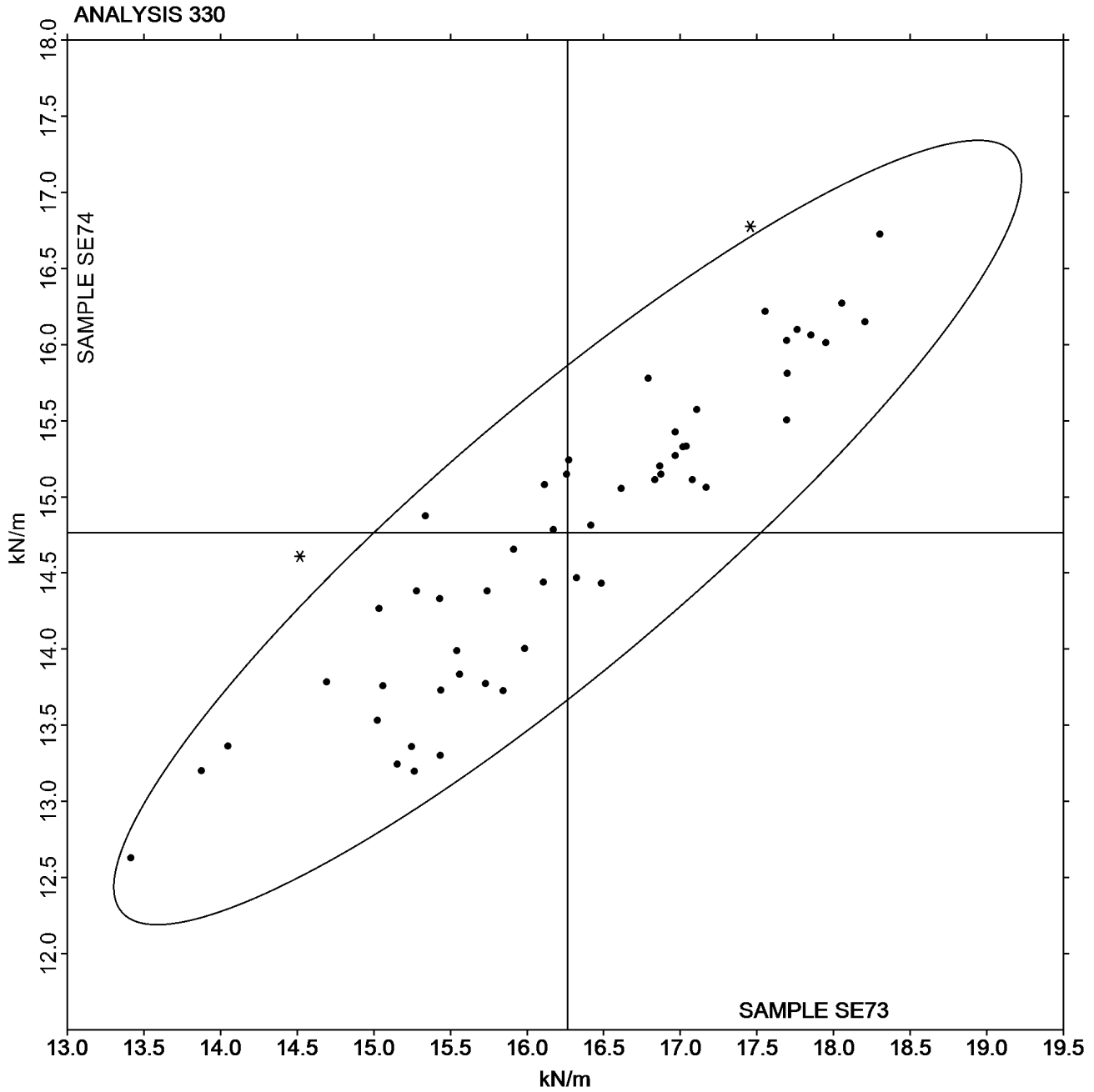


Paper & Paperboard Interlaboratory Testing Program
Analysis 330
Tensile Breaking Strength - Packaging Papers
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Grand Mean Sample SE73 = 16.265
kN/m

Grand Mean Sample SE74 = 14.766
kN/m





Paper & Paperboard Interlaboratory Testing Program

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Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample SE73			Sample SE74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2EBYNF		205.7	25.3	0.82	252.0	30.9	0.91	LE
38A2HN		204.8	24.3	0.79	253.5	32.3	0.96	TH
3U7NF7		204.9	24.5	0.80	235.8	14.7	0.43	XX
4GHVDG		205.9	25.5	0.83	243.9	22.8	0.67	TH
4T737C		218.6	38.2	1.24	266.8	45.7	1.35	IK
6L67ZK	*	83.5	-96.9	-3.16	122.1	-99.1	-2.93	LA
868QJP		148.1	-32.4	-1.05	200.7	-20.5	-0.61	IN
8QQQTQ	*	222.6	42.1	1.37	294.0	72.9	2.16	IF
9934NE		172.0	-8.4	-0.27	201.7	-19.5	-0.58	ID
9AWUT8		174.8	-5.6	-0.18	222.1	1.0	0.03	IF
9Y2JN8		207.1	26.7	0.87	248.1	26.9	0.80	LX
9ZCHJF		225.9	45.5	1.48	267.7	46.5	1.38	TH
CJDFU8	*	266.9	86.5	2.82	321.4	100.3	2.97	XX
EBQHPJ		236.0	55.6	1.81	268.0	46.9	1.39	IF
EFPMUP		181.0	0.6	0.02	213.3	-7.8	-0.23	LH
F2GJJE		167.6	-12.8	-0.42	203.4	-17.7	-0.52	TT
FAEKTX		161.8	-18.7	-0.61	203.2	-18.0	-0.53	LW
FE9VCR		175.9	-4.6	-0.15	208.4	-12.7	-0.38	TO
FLR9YX		178.5	-1.9	-0.06	213.9	-7.3	-0.22	IN
GJYJCV		166.3	-14.1	-0.46	196.3	-24.8	-0.74	LE
GPKL8E		189.9	9.5	0.31	221.0	-0.1	0.00	XX
H36EJT		159.8	-20.6	-0.67	204.7	-16.4	-0.49	LH
JQ87QF		172.1	-8.3	-0.27	208.4	-12.7	-0.38	IF
LRV9WF		156.4	-24.0	-0.78	200.7	-20.5	-0.61	LE
MVCRGB		125.0	-55.4	-1.81	159.2	-62.0	-1.83	TR
MVPLVP	*	164.2	-16.2	-0.53	231.1	9.9	0.29	TB
NJBNQL		183.1	2.7	0.09	225.8	4.6	0.14	LA
NJUNG6	X	110.1	-70.3	-2.29	109.6	-111.6	-3.30	IM
NMBZLL		166.8	-13.6	-0.44	199.5	-21.7	-0.64	LW
PMBR3L		193.6	13.1	0.43	219.0	-2.1	-0.06	XX
PX7LYA		166.7	-13.8	-0.45	206.2	-14.9	-0.44	LE
Q74KFB		193.5	13.1	0.43	225.9	4.8	0.14	TK
QHB3XJ		186.4	6.0	0.19	228.9	7.8	0.23	TO
R4ADB6		188.4	7.9	0.26	229.8	8.7	0.26	LA
TMTTW6		151.3	-29.1	-0.95	207.7	-13.4	-0.40	IN
TVR6M9		190.3	9.9	0.32	210.6	-10.5	-0.31	IM
U3MMEP		179.8	-0.6	-0.02	211.1	-10.1	-0.30	LH
VHXZEF		171.7	-8.7	-0.28	210.1	-11.0	-0.33	IM
WNX8LA		156.7	-23.7	-0.77	205.9	-15.2	-0.45	LE
WVQTX2		127.6	-52.8	-1.72	158.8	-62.3	-1.85	TA



Paper & Paperboard Interlaboratory Testing Program
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WebCode	Data Flag	Sample SE73			Sample SE74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
WY2UKE		175.4	-5.0	-0.16	214.2	-6.9	-0.20	TR
XGDJXX		176.0	-4.4	-0.14	221.2	0.1	0.00	XX
XZ27FZ		195.6	15.2	0.50	250.6	29.5	0.87	IN
YA97JZ		169.1	-11.3	-0.37	207.4	-13.8	-0.41	LW
ZWFZWV		191.1	10.6	0.35	236.4	15.3	0.45	TB

Summary Statistics	Sample SE73	Sample SE74
Grand Means	180.41 Joules/sq m	221.15 Joules/sq m
Std Dev Btwn Labs	30.71 Joules/sq m	33.78 Joules/sq m

Statistics based on 44 of 45 reporting participants.

Comments on Assigned Data Flags for Test #331

NJUNG6 (X) - Data for sample SE74 are low. Inconsistent within the determinations of sample SE73.

Key to Instrument Codes Reported by Participants

ID	Instron 4200 series	IF	Instron 3340 Series
IK	Instron 4400 Series	IM	Instron 5500 Series
IN	Instron 3360 Series	LA	L & W Autoline
LE	L & W Tensile Tester 066	LH	L & W Alwetron TH1 (Horizontal) SE 060
LW	L & W Tensile Tester SE062	LX	L & W (model not specified)
TA	Thwing-Albert Tensile Tester	TB	Thwing-Albert EJA/1000
TH	Thwing-Albert QC-3A	TK	Thwing-Albert Model 37-4
TO	Thwing-Albert QC-1000	TR	TMI Horizontal Tensile Tester
TT	Tinius Olsen Model MHT	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program

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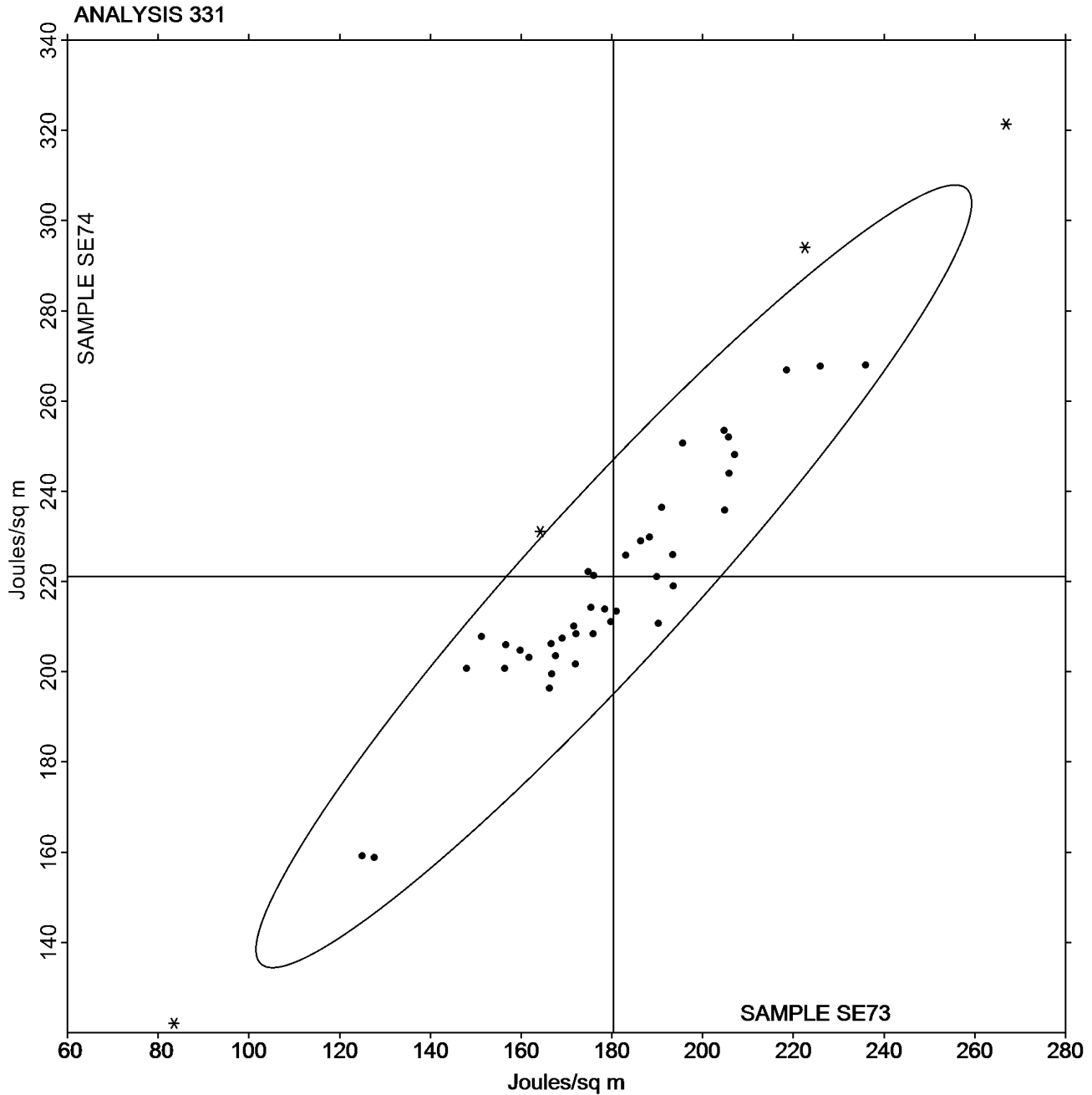
Analysis 331

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

Grand Mean Sample SE73 = 180.41
Joules/sq m

Grand Mean Sample SE74 = 221.15
Joules/sq m





Paper & Paperboard Interlaboratory Testing Program
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WebCode	Data Flag	Sample SE73			Sample SE74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2EBYNF		1.788	0.064	0.27	2.360	0.119	0.42	LE
38A2HN		1.930	0.206	0.87	2.550	0.309	1.10	TH
3U7NF7		1.833	0.109	0.46	2.325	0.084	0.30	XX
4GHVDG		1.978	0.254	1.07	2.430	0.189	0.67	TH
4T737C		2.245	0.521	2.19	2.822	0.581	2.07	IK
69YC7M		1.742	0.018	0.08	2.316	0.075	0.27	ID
6L67ZK	X	0.608	-1.116	-4.69	0.825	-1.416	-5.04	XX
868QJP		1.141	-0.583	-2.45	1.547	-0.695	-2.47	IN
8QQQTQ		1.654	-0.070	-0.29	2.218	-0.024	-0.08	IF
9934NE		1.695	-0.029	-0.12	2.179	-0.062	-0.22	ID
9AWUT8		2.002	0.278	1.17	2.657	0.416	1.48	IF
9Y2JN8		1.746	0.022	0.09	2.339	0.098	0.35	LX
9ZCHJF		2.289	0.565	2.38	2.907	0.666	2.37	TH
BFRK2M		1.780	0.056	0.24	2.190	-0.051	-0.18	IR
CJDFU8		2.249	0.525	2.21	2.884	0.642	2.29	XX
DCRVXL		1.610	-0.114	-0.48	1.960	-0.281	-1.00	IR
EBQHPJ		1.716	-0.008	-0.03	2.118	-0.123	-0.44	IF
EFPMUP		1.655	-0.069	-0.29	2.207	-0.034	-0.12	LH
F24RRX		1.570	-0.154	-0.65	2.240	-0.001	0.00	TB
F2GJJE		1.860	0.136	0.57	2.386	0.145	0.51	TT
FAEKTX		1.501	-0.223	-0.94	2.017	-0.224	-0.80	LW
FE9VCR		1.748	0.024	0.10	2.139	-0.102	-0.36	TO
FLR9YX		1.683	-0.041	-0.17	2.139	-0.103	-0.37	IN
GJYJCV		1.615	-0.109	-0.46	2.102	-0.139	-0.50	LE
GPKL8E		1.790	0.067	0.28	2.322	0.081	0.29	XX
H36EJT		1.463	-0.261	-1.10	1.998	-0.243	-0.87	LH
JQ87QF		1.491	-0.233	-0.98	1.873	-0.368	-1.31	IF
LRV9WF		1.571	-0.153	-0.64	2.174	-0.067	-0.24	LE
MVCRGB	X	1.336	-0.388	-1.63	1.174	-1.067	-3.80	TR
MVPLVP	*	1.650	-0.074	-0.31	2.387	0.146	0.52	TB
NJBNQL		1.516	-0.208	-0.87	2.087	-0.154	-0.55	LA
NJUNG6	X	1.517	-0.207	-0.87	1.690	-0.551	-1.96	IM
NMBZLL		1.649	-0.075	-0.31	2.219	-0.022	-0.08	LW
PMBR3L		2.018	0.294	1.24	2.517	0.276	0.98	XX
PX7LYA		1.517	-0.207	-0.87	2.009	-0.232	-0.83	LE
Q74KFB		1.921	0.197	0.83	2.472	0.231	0.82	TK
QHB3XJ		1.920	0.196	0.82	2.401	0.160	0.57	TO
R4ADB6		1.554	-0.170	-0.71	2.065	-0.176	-0.63	LA
TMTTW6		1.277	-0.447	-1.88	1.615	-0.627	-2.23	IN
TVR6M9		1.831	0.107	0.45	2.281	0.040	0.14	IM



Paper & Paperboard Interlaboratory Testing Program
Analysis 332
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WebCode	Data Flag	Sample SE73			Sample SE74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
U3MMEP		1.719	-0.005	-0.02	2.122	-0.119	-0.42	LH
VHXZEF		2.025	0.301	1.27	2.556	0.315	1.12	IM
WNX8LA		1.404	-0.320	-1.34	2.013	-0.228	-0.81	LE
WVQTX2		1.474	-0.250	-1.05	1.876	-0.365	-1.30	TA
WY2UKE		1.766	0.042	0.18	2.296	0.055	0.19	TR
XGDJXX	X	2.071	0.347	1.46	2.310	0.069	0.24	XX
XZ27FZ		1.569	-0.155	-0.65	2.047	-0.195	-0.69	IN
YA97JZ		1.615	-0.109	-0.46	2.145	-0.096	-0.34	LW
ZWFZWV		1.803	0.079	0.33	2.353	0.112	0.40	TB

Summary Statistics	Sample SE73	Sample SE74
Grand Means	1.72 Percent	2.24 Percent
Std Dev Btwn Labs	0.24 Percent	0.28 Percent

Statistics based on 45 of 49 reporting participants.

Comments on Assigned Data Flags for Test #332

- 6L67ZK (X) - Data for both samples are low. Possible Systematic Error.
- MVCRGB (X) - Data for sample SE74 are low. Inconsistent within the determinations of both samples.
- XGDJXX (X) - Inconsistent in testing between samples.
- NJUNG6 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.

Key to Instrument Codes Reported by Participants

ID	Instron 4200 Series	IF	Instron 3340 Series
IK	Instron 4400 Series	IM	Instron 5500 Series
IN	Instron 3360 Series	IR	Instron 5900 Series
LA	L & W Autoline 300	LE	L & W Tensile Tester 066
LH	L & W Alwetron TH1 (Horizontal) SE 060	LW	L & W Tensile Tester SE062
LX	L & W (model not specified)	TA	Thwing-Albert Tensile Tester
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TK	Thwing-Albert Model 37-4	TO	Thwing-Albert QC-1000
TR	TMI Horizontal Tensile Tester	TT	Tinius Olsen Model MHT
XX	Instrument make/model not specified by lab		



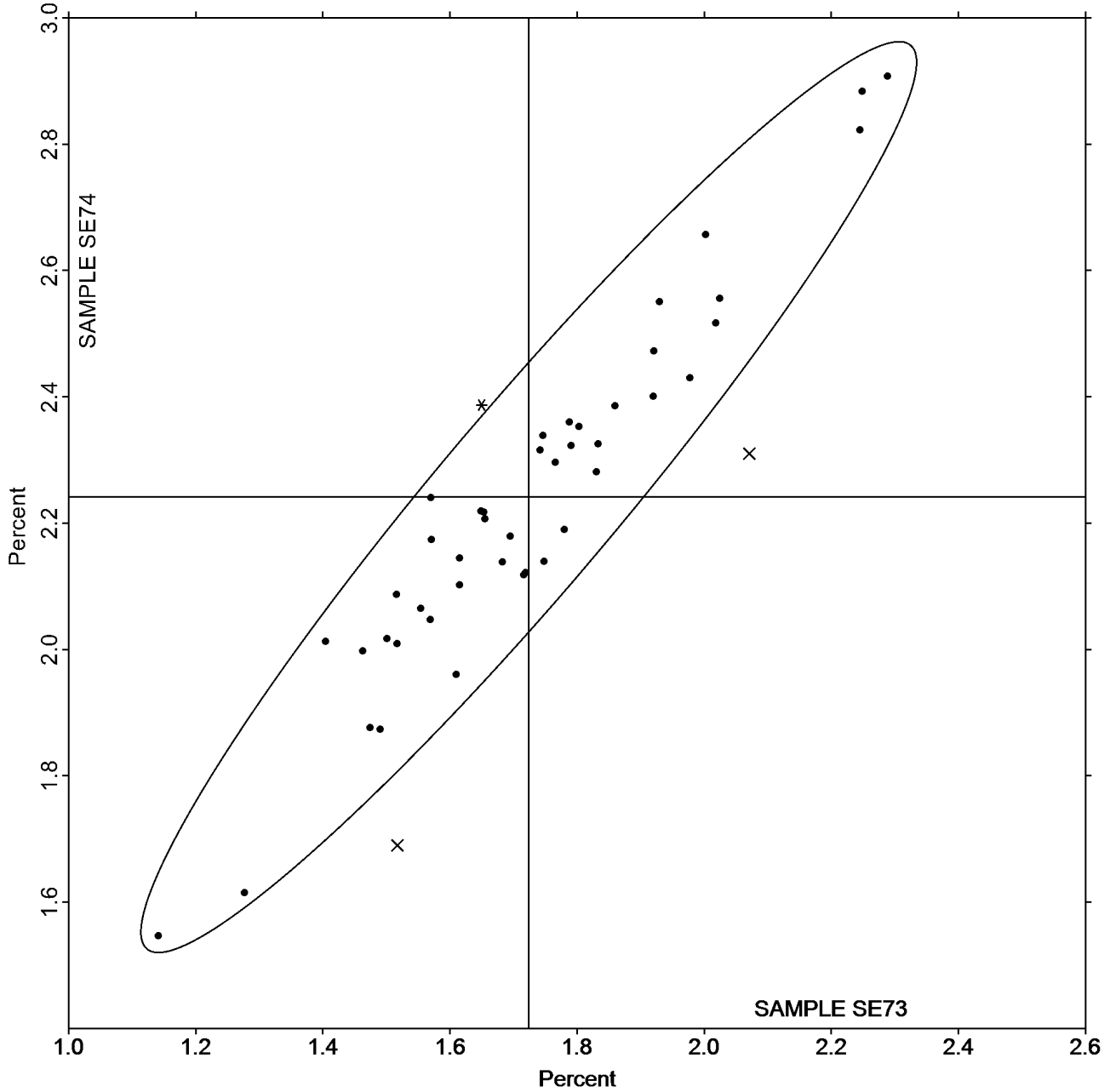
Paper & Paperboard Interlaboratory Testing Program
Analysis 332
Elongation to Break - Packaging Papers
TAPPI Official Test Method T494

Report #3031S,
November 2019

Grand Mean Sample SE73 = 1.7238
Percent

Grand Mean Sample SE74 = 2.2413
Percent

ANALYSIS 332





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

Report #3031S,
November 2019

WebCode	Data Flag	Sample SG73			Sample SG74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
29BFQQ		49.00	9.62	0.82	44.40	5.46	0.39	MT
9ZCHJF		45.50	6.12	0.52	37.20	-1.74	-0.13	MT
B8JY67		49.60	10.22	0.87	48.40	9.46	0.68	MT
E7Y2NQ		27.50	-11.88	-1.01	22.70	-16.24	-1.18	MT
F24RRX		32.10	-7.28	-0.62	31.00	-7.94	-0.57	MT
H2R67L		47.90	8.52	0.72	64.80	25.86	1.87	MT
KM7CVK		22.60	-16.78	-1.43	23.20	-15.74	-1.14	MT
MVCRGB	X	653.20	613.82	52.15	409.00	370.06	26.78	MT
MZKFTQ		50.90	11.52	0.98	53.90	14.96	1.08	MT
NBH9NF		22.70	-16.68	-1.42	23.30	-15.64	-1.13	MT
NMBZLL		48.80	9.42	0.80	48.20	9.26	0.67	MT
PMBR3L		27.10	-12.28	-1.04	26.40	-12.54	-0.91	MT
RLQHUC		48.90	9.52	0.81	43.80	4.86	0.35	MT

Summary Statistics	Sample SG73	Sample SG74
Grand Means	39.38 Double Folds	38.94 Double Folds
Std Dev Btwn Labs	11.77 Double Folds	13.82 Double Folds
Statistics based on 12 of 13 reporting participants.		

Comments on Assigned Data Flags for Test #334

MVCRGB (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

MT MIT - Tinius Olsen



Paper & Paperboard Interlaboratory Testing Program

Report #3031S,
November 2019

Analysis 334

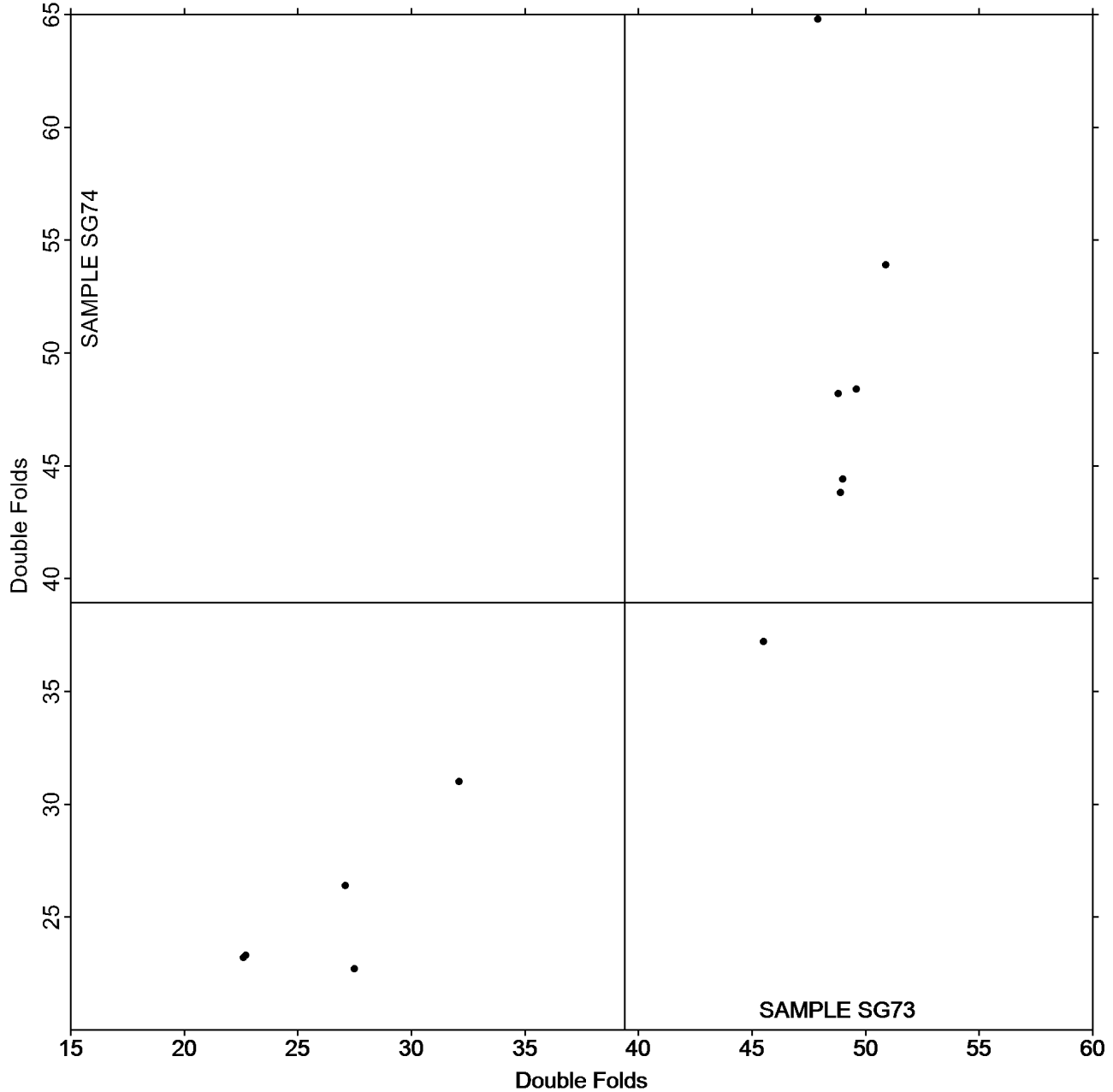
Folding Endurance (MIT) - Double Folds

TAPPI Official Test Method T511

Grand Mean Sample SG73 = 39.383
Double Folds

Grand Mean Sample SG74 = 38.942
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 #3031S,
November 2019

WebCode	Data Flag	Sample SH73			Sample SH74		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2ZEKQ8		150.0	9.2	0.80	145.4	4.7	0.40
7YALJV		141.6	0.8	0.07	149.6	8.9	0.76
9AWUT8		151.0	10.2	0.88	142.1	1.3	0.11
ARFRUY		110.7	-30.1	-2.60	113.3	-27.4	-2.34
CLUXHH		138.2	-2.6	-0.23	133.1	-7.6	-0.65
CWHVEH		131.2	-9.6	-0.83	135.2	-5.5	-0.47
EAYDJQ		157.4	16.6	1.43	159.1	18.4	1.57
F24RRX		142.9	2.1	0.18	135.5	-5.2	-0.45
FH9TDP		138.7	-2.1	-0.18	138.2	-2.6	-0.22
GQZYZH		143.9	3.1	0.26	150.1	9.3	0.80
KM7CVK	X	192.2	51.4	4.44	152.7	12.0	1.02
MVPLVP		125.2	-15.6	-1.35	122.1	-18.6	-1.59
NBH9NF		146.2	5.4	0.47	140.5	-0.3	-0.02
NQNUA7		128.8	-12.0	-1.04	130.3	-10.4	-0.89
PMBR3L		149.2	8.4	0.72	150.5	9.8	0.83
RLQHUC		142.5	1.7	0.15	137.6	-3.1	-0.26
TPHGTK		140.5	-0.3	-0.02	143.4	2.7	0.23
X96Y2G		138.5	-2.3	-0.20	149.4	8.7	0.74
ZYNYKB		157.9	17.1	1.48	157.9	17.1	1.46

Summary Statistics	Sample SH73	Sample SH74
Grand Means	140.80 Gurley Units	140.74 Gurley Units
Std Dev Btwn Labs	11.57 Gurley Units	11.73 Gurley Units
Statistics based on 18 of 19 reporting participants.		

Comments on Assigned Data Flags for Test #336

KM7CVK (X) - Data for sample SH73 are high.

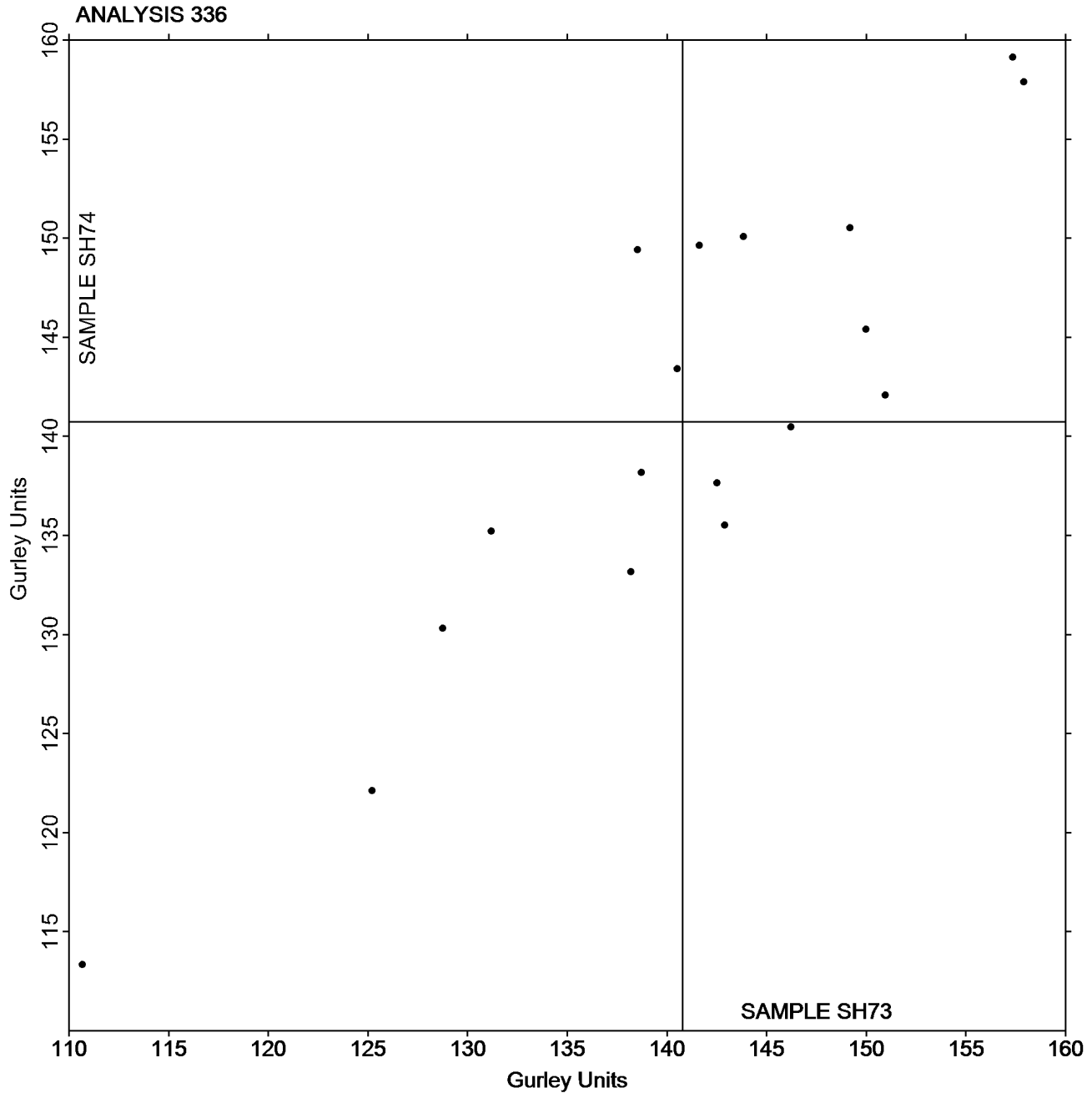


Paper & Paperboard Interlaboratory Testing Program
Analysis 336
Bending Resistance, Gurley Type
TAPPI Official Test Method T543

Report #3031S,
November 2019

Grand Mean Sample SH73 = 140.80
Gurley Units

Grand Mean Sample SH74 = 140.74
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 #3031S,
November 2019

WebCode	Data Flag	<u>Sample SJ73</u>			<u>Sample SJ74</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
8P924J		3.557	0.039	0.05	3.400	-0.084	-0.10
9AWUT8		4.052	0.534	0.62	3.797	0.313	0.37
9M83Y7		2.220	-1.298	-1.49	2.240	-1.244	-1.46
E7Y2NQ		3.998	0.480	0.55	3.825	0.341	0.40
FAEKTJ		3.450	-0.068	-0.08	3.450	-0.034	-0.04
FLR9YX		4.760	1.242	1.43	4.860	1.376	1.61
FTALXW		1.800	-1.718	-1.98	1.840	-1.644	-1.92
GQZYZH		3.571	0.053	0.06	3.636	0.152	0.18
PAZ3NB		2.688	-0.830	-0.95	2.676	-0.808	-0.95
RLQHUC		4.294	0.776	0.89	4.276	0.792	0.93
TLHMZ4		3.905	0.387	0.45	3.954	0.470	0.55
TPHGTK		3.917	0.399	0.46	3.849	0.365	0.43

Summary Statistics	<u>Sample SJ73</u>	<u>Sample SJ74</u>
Grand Means	3.52 Taber Units	3.48 Taber Units
Stnd Dev Btwn Labs	0.87 Taber Units	0.85 Taber Units

Statistics based on 12 of 12 reporting participants.



Paper & Paperboard Interlaboratory Testing Program

Report #3031S,
November 2019

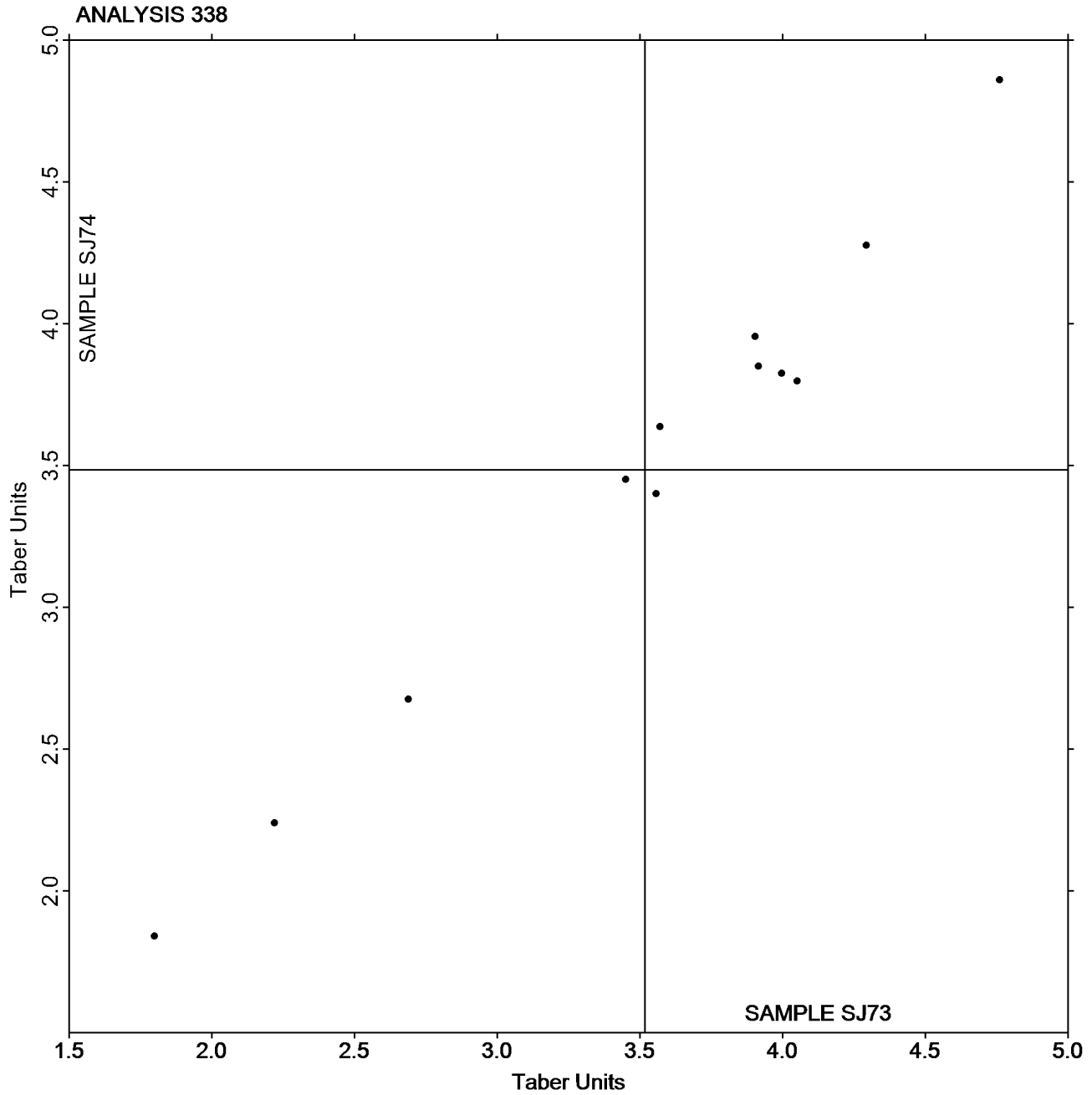
Analysis 338

Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

Grand Mean Sample SJ73 = 3.5176
Taber Units

Grand Mean Sample SJ74 = 3.4836
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 #3031S,
November 2019

WebCode	Data Flag	<u>Sample SQ73</u>			<u>Sample SQ74</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2EBYNF		24.61	3.55	0.97	24.33	2.95	0.88
EFRAB3		19.04	-2.02	-0.55	19.82	-1.56	-0.46
FAEKTX		22.85	1.79	0.49	23.20	1.82	0.54
GPKL8E		14.60	-6.46	-1.77	14.00	-7.38	-2.19
NJBNQL		15.11	-5.95	-1.63	17.41	-3.97	-1.18
NMBZLL		21.86	0.80	0.22	22.05	0.67	0.20
RLQHUC		20.55	-0.51	-0.14	21.12	-0.26	-0.08
X96Y2G		22.47	1.41	0.39	22.31	0.93	0.28
Y9Y4X2		22.45	1.39	0.38	22.63	1.25	0.37
ZL4JGC		21.50	0.44	0.12	21.85	0.47	0.14
ZWFZVV		26.66	5.60	1.53	26.42	5.04	1.50

Summary Statistics	<u>Sample SQ73</u>	<u>Sample SQ74</u>
Grand Means	21.06 Taber Units	21.38 Taber Units
Std Dev Btwn Labs	3.65 Taber Units	3.36 Taber Units

Statistics based on 11 of 11 reporting participants.

Analysis Notes:

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



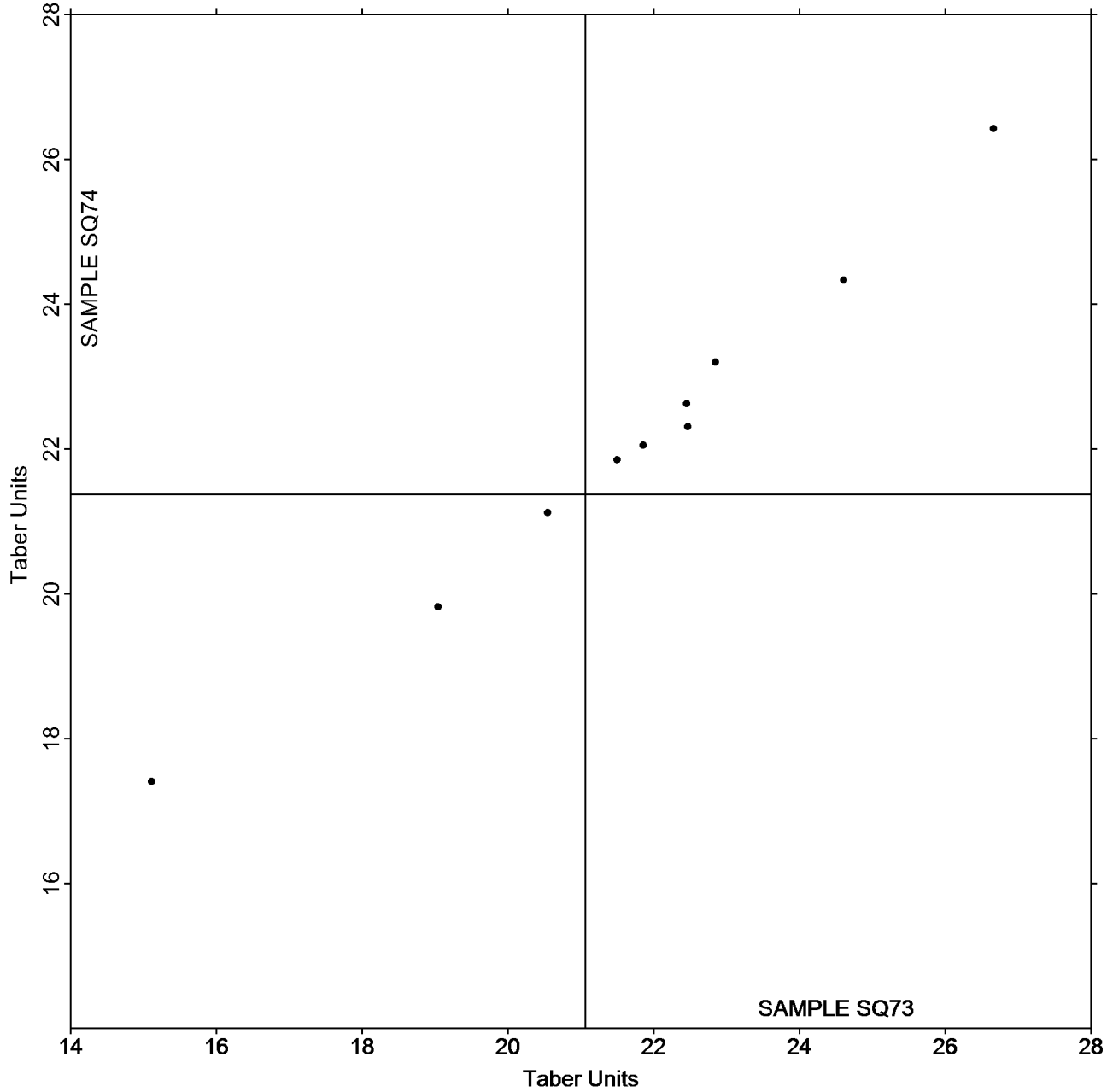
Paper & Paperboard Interlaboratory Testing Program
Analysis 339
Bending Resistance, Taber Type - 10 to 100 Taber Units
TAPPI Official Test Method T489

Report #3031S,
November 2019

Grand Mean Sample SQ73 = 21.064
Taber Units

Grand Mean Sample SQ74 = 21.376
Taber Units

ANALYSIS 339



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



Paper & Paperboard Interlaboratory Testing Program

**Report #3031S,
November 2019**

Analysis 340

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

TAPPI Official Test Method T489

WebCode	Data Flag	<u>Sample ST73</u>			<u>Sample ST74</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
72DG2C		181.0	4.1	0.46	180.3	0.7	0.07
88W2PB		175.7	-1.2	-0.13	175.6	-4.0	-0.39
9ZCHJF		182.9	6.0	0.67	192.1	12.5	1.23
FAEKTX		170.3	-6.7	-0.74	174.8	-4.8	-0.47
GPKL8E		172.4	-4.5	-0.50	171.5	-8.1	-0.79
KRJCRB		180.4	3.4	0.38	181.8	2.2	0.22
NMBZLL		174.1	-2.8	-0.32	176.9	-2.7	-0.26
PMBR3L		167.6	-9.4	-1.04	172.9	-6.7	-0.65
RJZE4P		175.0	-1.9	-0.21	175.2	-4.4	-0.43
VEJPGX		183.3	6.4	0.71	182.1	2.5	0.25
WY2UKE		163.5	-13.4	-1.49	166.6	-13.0	-1.27
X96Y2G		178.3	1.4	0.15	179.7	0.1	0.01
XXLKZZ		200.8	23.9	2.66	208.5	28.9	2.83
ZQPQMX		171.6	-5.3	-0.59	176.0	-3.6	-0.35

Summary Statistics	<u>Sample ST73</u>	<u>Sample ST74</u>
Grand Means	176.91 Taber Units	179.55 Taber Units
Stnd Dev Btwn Labs	8.99 Taber Units	10.24 Taber Units
Statistics based on 14 of 14 reporting participants.		



Paper & Paperboard Interlaboratory Testing Program

Report #3031S,
November 2019

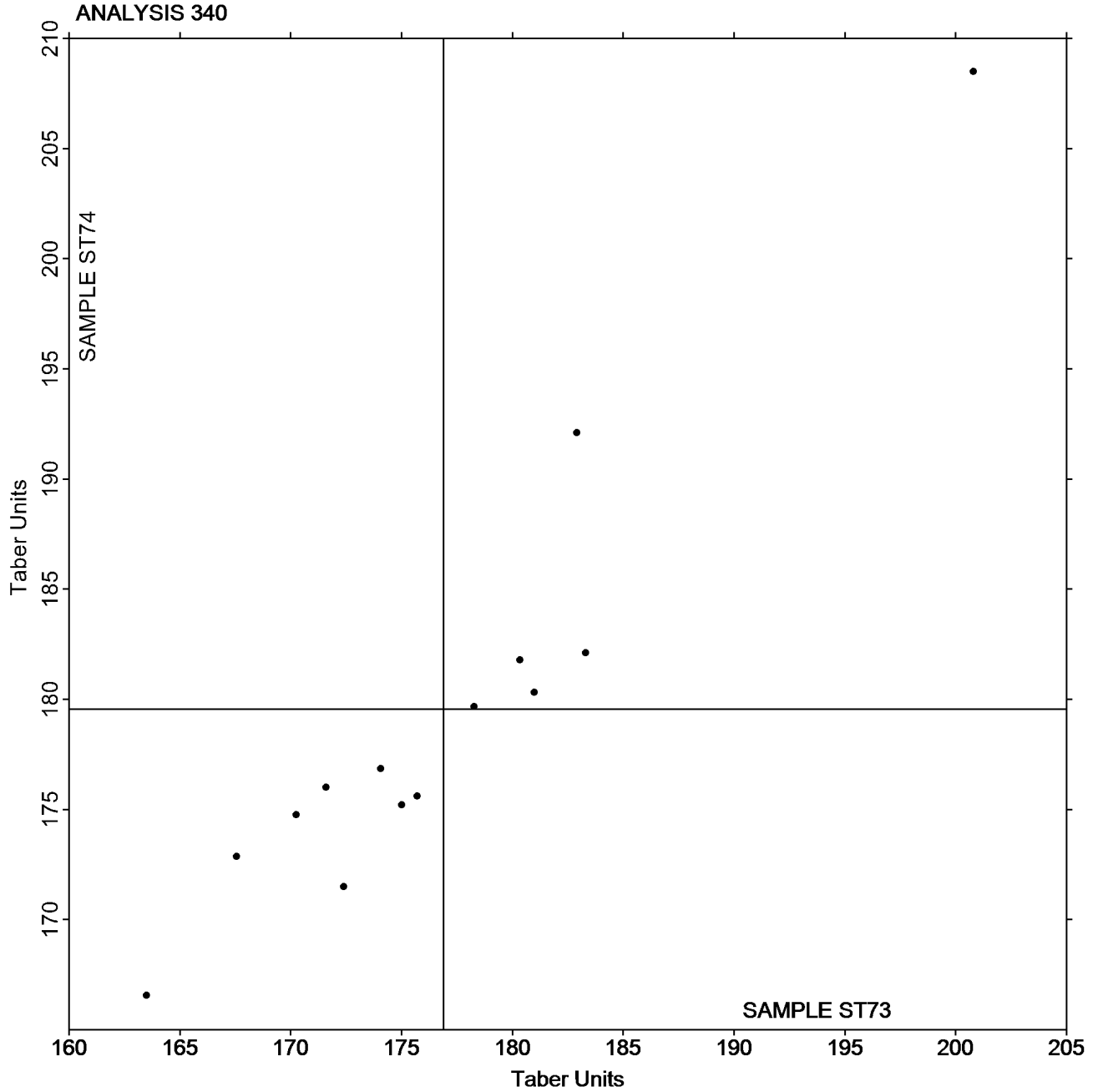
Analysis 340

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

TAPPI Official Test Method T489

Grand Mean Sample ST73 = 176.91
Taber Units

Grand Mean Sample ST74 = 179.55
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 #3031S,
November 2019

WebCode	Data Flag	<u>Sample SM73</u>			<u>Sample SM74</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2EBYNF		77.42	5.12	1.05	74.84	3.04	0.62	TA
38A2HN		69.80	-2.50	-0.51	68.60	-3.20	-0.65	TA
6T6PXA		77.84	5.54	1.14	76.64	4.84	0.98	DX
9AWUT8		81.10	8.80	1.81	82.12	10.32	2.09	TL
9ZCHJF		65.30	-7.00	-1.44	65.84	-5.96	-1.21	LW
BL6E97		73.32	1.02	0.21	72.92	1.12	0.23	DX
E49ZH3		69.30	-3.00	-0.62	69.62	-2.18	-0.44	TA
G3V6V2		66.80	-5.50	-1.13	66.20	-5.61	-1.14	LW
JNZXQW		70.20	-2.10	-0.43	69.80	-2.00	-0.41	CD
NMBZLL		71.56	-0.74	-0.15	71.30	-0.50	-0.10	LW
RLQHUC		68.88	-3.42	-0.70	67.36	-4.44	-0.90	CD
ZWFZVW		76.08	3.78	0.78	76.42	4.62	0.94	TA

Summary Statistics	<u>Sample SM73</u>	<u>Sample SM74</u>
Grand Means	72.30 psi	71.80 psi
Stnd Dev Btwn Labs	4.87 psi	4.93 psi

Statistics based on 12 of 12 reporting participants.

Key to Instrument Codes Reported by Participants

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

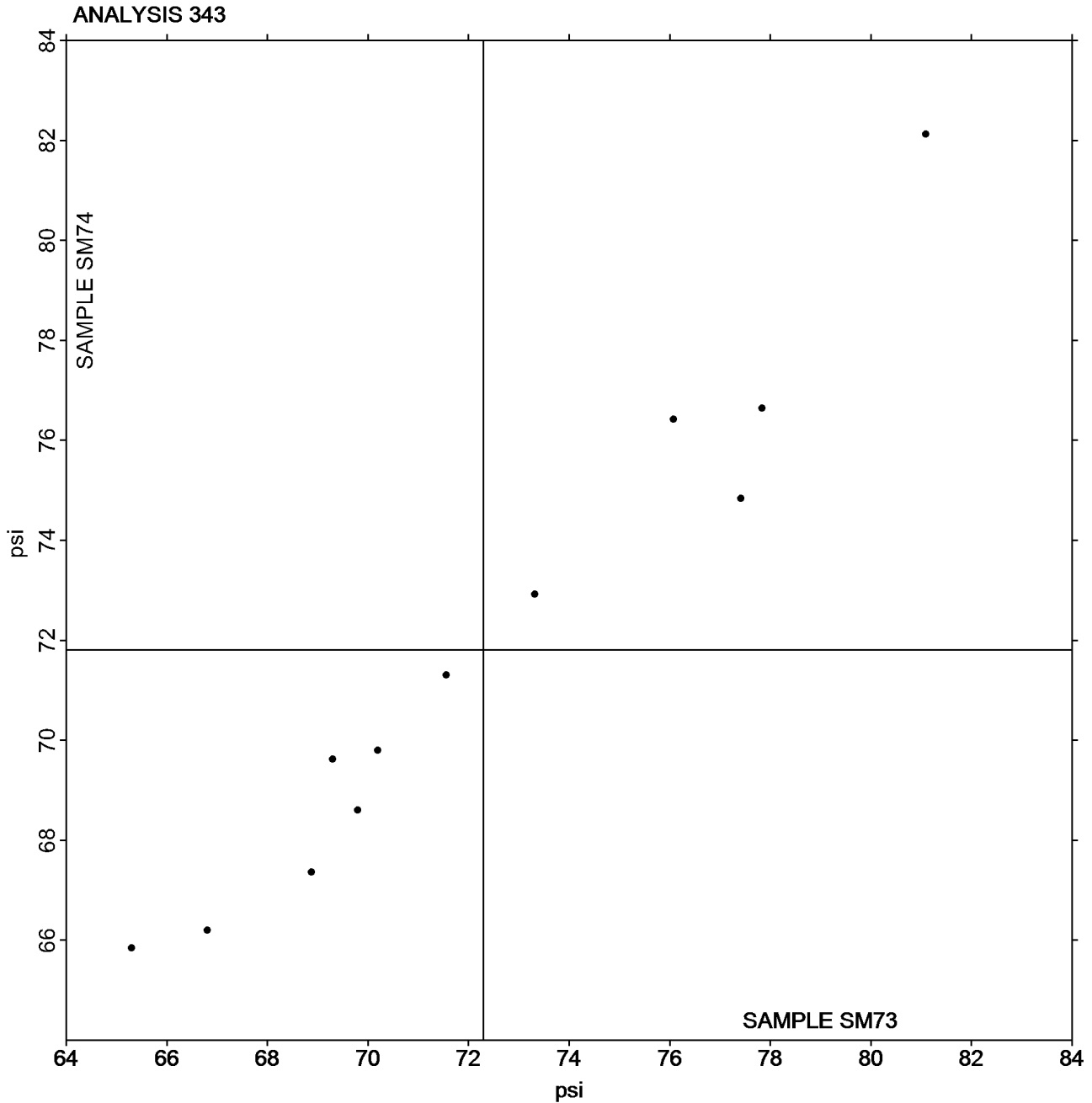


Analysis 343
Z-Direction Tensile

TAPPI Official Test Method T541

Grand Mean Sample SM73 = 72.300
psi

Grand Mean Sample SM74 = 71.805
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 #3031S,
November 2019

WebCode	Data Flag	Sample SZ73			Sample SZ74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4T737C		63.17	-0.56	-0.09	66.27	1.45	0.22	PG
72DG2C		59.92	-3.81	-0.61	58.12	-6.70	-1.03	CD
88W2PB		72.20	8.47	1.35	76.20	11.38	1.75	LW
FLPLHJ		50.36	-13.37	-2.13	50.28	-14.54	-2.24	LW
JMQPJW		58.20	-5.53	-0.88	59.40	-5.42	-0.84	CA
KCM8UT		68.92	5.19	0.83	69.84	5.02	0.77	LW
KRJCRB		62.80	-0.93	-0.15	65.60	0.78	0.12	CA
N4FYGM		63.54	-0.19	-0.03	63.12	-1.70	-0.26	LW
NMBZLL		59.72	-4.01	-0.64	60.34	-4.48	-0.69	XX
PMBR3L		62.32	-1.41	-0.23	63.16	-1.66	-0.26	CA
R4ADB6		64.37	0.63	0.10	62.96	-1.85	-0.29	TA
RJZE4P		62.00	-1.73	-0.28	63.00	-1.82	-0.28	CA
TBNJKG		64.80	1.07	0.17	63.58	-1.24	-0.19	DP
UT2VWK		66.82	3.09	0.49	68.92	4.10	0.63	LW
VEJPGX		75.34	11.61	1.85	78.18	13.36	2.06	TA
WAYKWU	*	74.16	10.43	1.66	68.73	3.91	0.60	CH
X96Y2G		63.26	-0.47	-0.08	68.20	3.38	0.52	CA
ZQPQMX		55.32	-8.41	-1.34	60.84	-3.98	-0.61	TZ

Summary Statistics	Sample SZ73	Sample SZ74
Grand Means	63.73 psi	64.82 psi
Std Dev Btwn Labs	6.28 psi	6.49 psi
Statistics based on 18 of 18 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
XX	Instrument make/model not specified by lab		

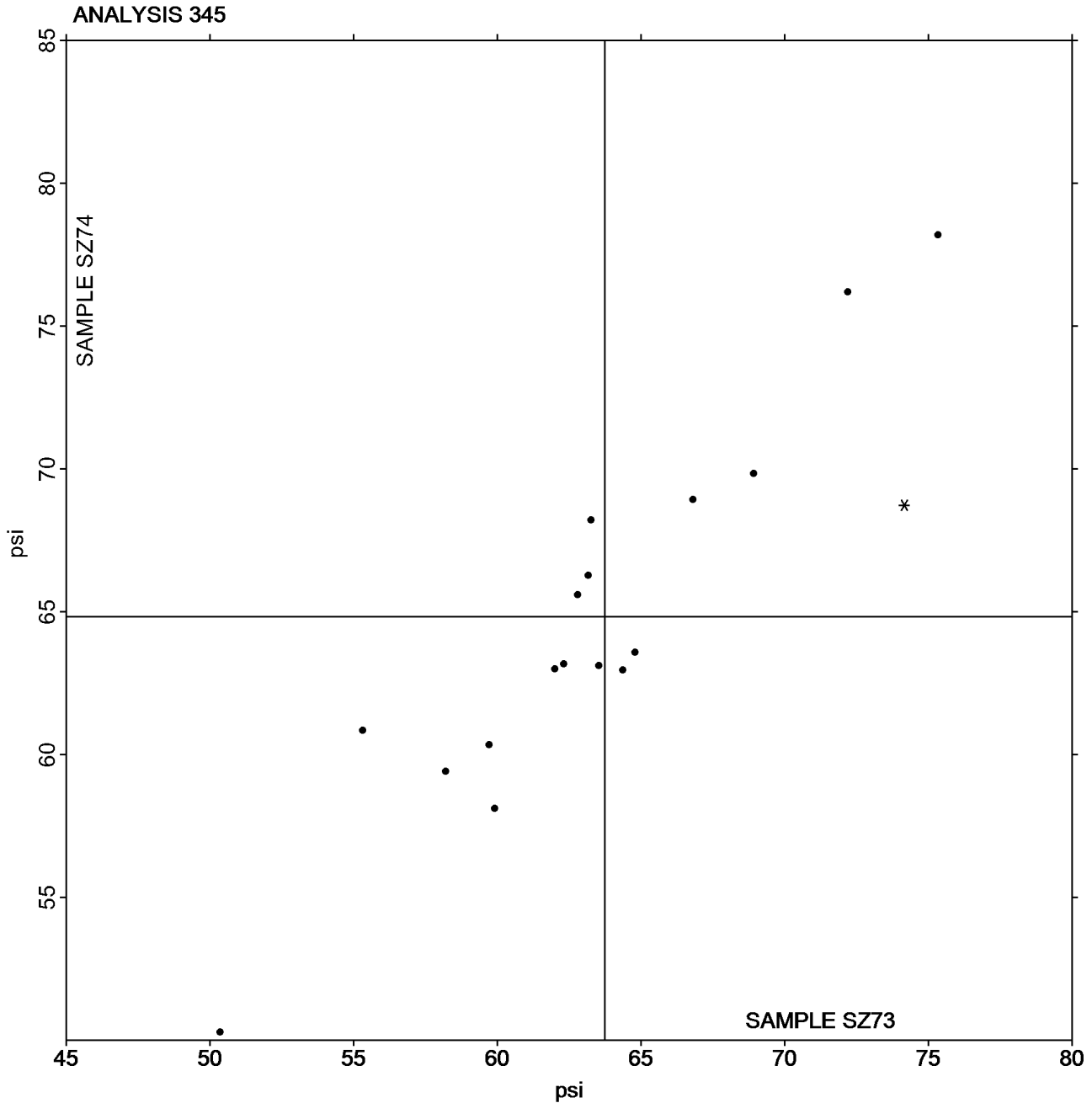


Paper & Paperboard Interlaboratory Testing Program
Analysis 345
Z-Direction Tensile, Recycled Paperboard
TAPPI Official Test Method T541

Report #3031S,
November 2019

Grand Mean Sample SZ73 = 63.735
psi

Grand Mean Sample SZ74 = 64.819
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 #3031S,
November 2019

WebCode	Data Flag	Sample SN73			Sample SN74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2EBYNF		185.2	17.1	1.08	187.8	19.4	0.99	HY
4GHVDG		163.2	-4.9	-0.31	165.0	-3.4	-0.17	HZ
9ZCHJF		137.0	-31.1	-1.98	121.4	-47.0	-2.40	HZ
ARFRUY		194.8	26.7	1.69	191.0	22.6	1.15	HZ
BBQYNR		191.2	23.1	1.46	204.4	36.0	1.84	XX
CWHVEH		157.2	-10.9	-0.69	154.6	-13.8	-0.71	HY
E49ZH3		171.8	3.7	0.23	172.2	3.8	0.19	HY
GQZYZH		150.8	-17.3	-1.10	148.9	-19.5	-1.00	KR
KM7CVK		186.4	18.3	1.16	187.6	19.2	0.98	HY
KRJCRB		163.2	-4.9	-0.31	165.4	-3.0	-0.15	HY
MVPLVP		158.4	-9.7	-0.62	166.9	-1.5	-0.08	HY
NDM4M7		169.1	0.9	0.06	173.9	5.5	0.28	HY
NMBZLL		156.8	-11.3	-0.72	156.8	-11.6	-0.59	HY
NQNUA7		153.6	-14.5	-0.92	149.8	-18.6	-0.95	HY
PMBR3L		170.0	1.9	0.12	166.6	-1.8	-0.09	HZ
QHB3XJ		167.0	-1.1	-0.07	167.0	-1.4	-0.07	HY
ZWFZVW		182.8	14.7	0.93	183.8	15.4	0.79	HZ

Summary Statistics	Sample SN73	Sample SN74
Grand Means	168.15 1000th ft-lbs	168.42 1000th ft-lbs
Std Dev Btwn Labs	15.76 1000th ft-lbs	19.56 1000th ft-lbs
Statistics based on 17 of 17 reporting participants.		

Key to Instrument Codes Reported by Participants

HY	Huygen Digitized Scott Internal Bond Tester	HZ	Huygen Internal Bond Tester with AccuPress
KR	Kumagai Riki Kogyo Internal Bond Tester	XX	Instrument make/model not specified by lab



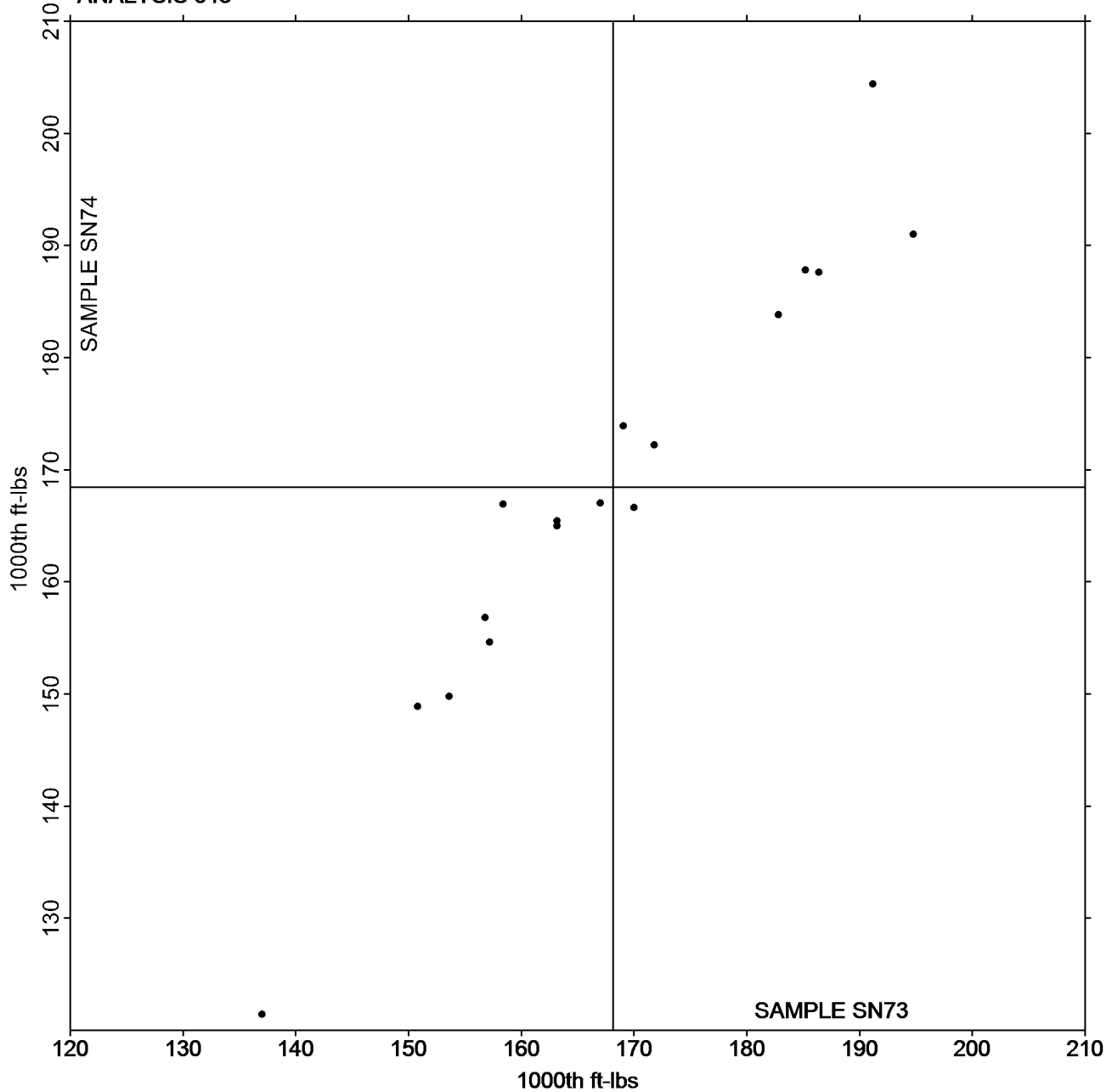
Paper & Paperboard Interlaboratory Testing Program
Analysis 348
Internal Bond Strength - Modified Scott Mechanics
TAPPI Provisional Test Method T569

Report #3031S,
November 2019

Grand Mean Sample SN73 = 168.15
1000th ft-lbs

Grand Mean Sample SN74 = 168.42
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 #3031S,
November 2019

WebCode	Data Flag	<u>Sample SP73</u>			<u>Sample SP74</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3RDZAV		177.2	5.0	0.12	181.4	4.3	0.09	SC
AFEFBQ		266.8	94.5	2.33	281.5	104.4	2.13	SC
FAEKTIX		158.8	-13.4	-0.33	160.0	-17.1	-0.35	XX
GPKL8E		174.4	2.2	0.05	175.8	-1.3	-0.03	TM
N4FYGM		142.6	-29.6	-0.73	142.4	-34.7	-0.71	XX
PX7LYA		214.0	41.8	1.03	244.0	66.9	1.37	SC
QFQJ7G		132.0	-40.2	-0.99	135.5	-41.6	-0.85	XX
TLHMZ4		164.0	-8.2	-0.20	172.0	-5.1	-0.10	SC
U3MMEP		146.6	-25.7	-0.63	142.4	-34.7	-0.71	TM
WAYKWU		146.0	-26.2	-0.65	136.0	-41.1	-0.84	TM

Summary Statistics	<u>Sample SP73</u>	<u>Sample SP74</u>
Grand Means	172.24 1000th ft-lbs	177.10 1000th ft-lbs
Std Dev Btwn Labs	40.55 1000th ft-lbs	48.92 1000th ft-lbs
Statistics based on 10 of 10 reporting participants.		

Key to Instrument Codes Reported by Participants

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

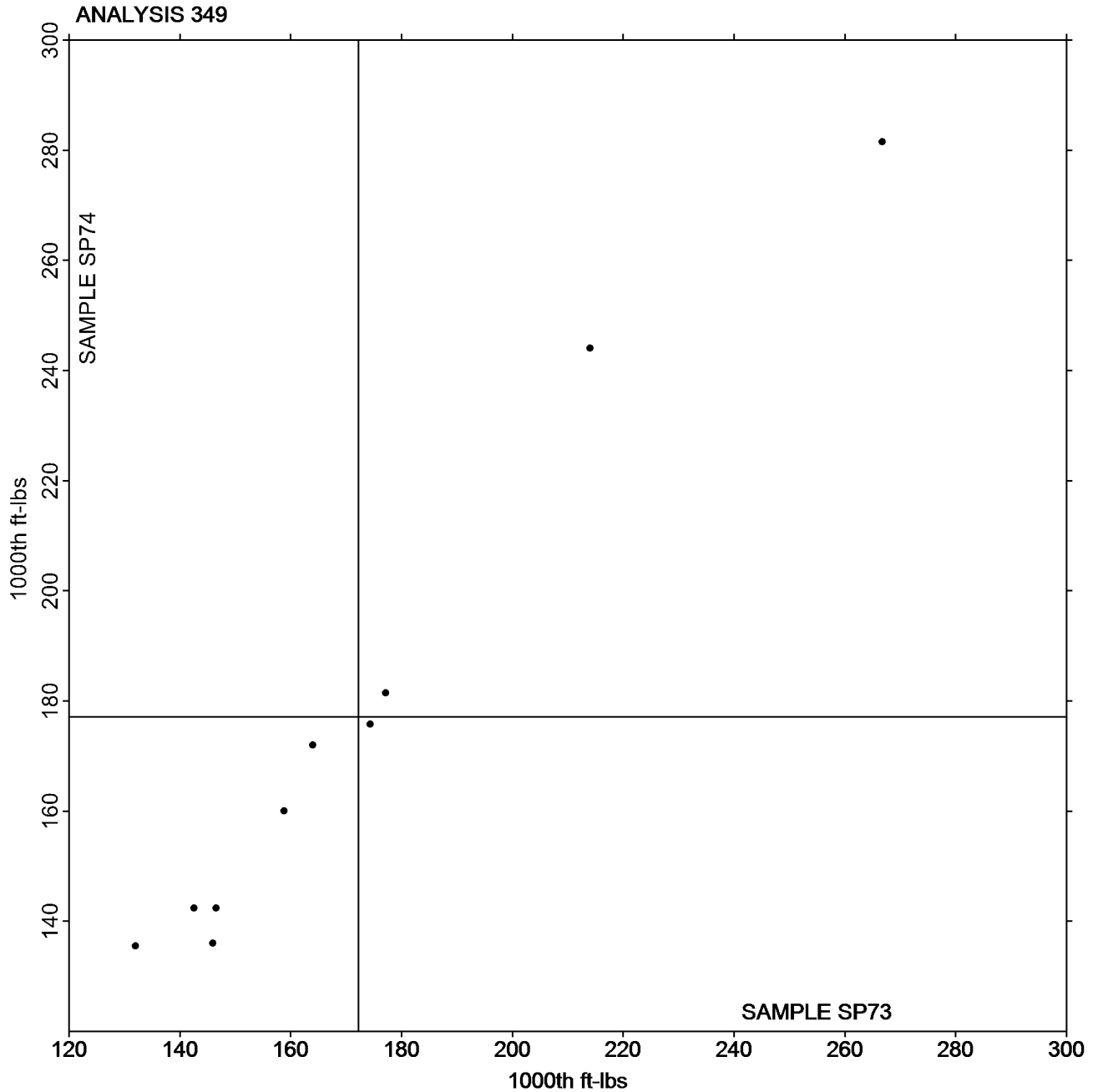


Paper & Paperboard Interlaboratory Testing Program
Analysis 349
Internal Bond Strength - Scott Bond Models
TAPPI Provisional Test Method T569

Report #3031S,
November 2019

Grand Mean Sample SP73 = 172.24
1000th ft-lbs

Grand Mean Sample SP74 = 177.10
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 #3031S,
November 2019

-End of Report-