

## Paper & Paperboard Interlaboratory Testing Program

### Summary Report #276S - May 2015

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## **The CTS Paper & Paperboard Interlaboratory Fiberboard 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)

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

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

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

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### Common Problems Highlighted in Footnotes

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

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

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 305**  
**Bursting Strength - Printing Papers**

WebCode	Data Flag	Sample SA19			Sample SA20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
27XDHR		33.68	-3.28	-0.99	24.12	-2.36	-0.94
2DJJZK		33.72	-3.24	-0.98	26.10	-0.37	-0.15
4Y9VY2		35.09	-1.87	-0.57	23.79	-2.69	-1.07
69DZNW		38.90	1.94	0.59	28.30	1.82	0.73
76BG2N		34.40	-2.56	-0.77	25.27	-1.21	-0.48
76MFWX		34.71	-2.25	-0.68	25.69	-0.78	-0.31
7FBABF		37.70	0.74	0.22	26.52	0.04	0.02
88VTDY		34.87	-2.09	-0.63	25.45	-1.03	-0.41
CN2LAN		35.42	-1.54	-0.47	25.75	-0.73	-0.29
CQQYPL		41.72	4.76	1.44	31.84	5.36	2.14
D936C2		40.69	3.73	1.13	28.22	1.74	0.70
E6ZLRE		38.41	1.45	0.44	27.04	0.56	0.22
F7R3GG		31.45	-5.51	-1.67	21.80	-4.68	-1.87
HVER3M	X	38.15	1.19	0.36	33.65	7.17	2.87
JFN3RC		38.10	1.14	0.35	28.40	1.92	0.77
JKXHYE		35.40	-1.56	-0.47	24.01	-2.47	-0.99
LE7RRA		34.21	-2.75	-0.83	25.50	-0.97	-0.39
M7644G	*	45.20	8.24	2.50	30.70	4.22	1.69
PZUNTJ		35.60	-1.36	-0.41	23.30	-3.18	-1.27
RV8QFD		37.62	0.66	0.20	28.28	1.81	0.72
U6RV3V		39.29	2.33	0.71	27.93	1.45	0.58
WVVR27		42.20	5.24	1.59	29.50	3.02	1.21
X2ECKC		33.07	-3.89	-1.18	23.46	-3.01	-1.20
Z29UK4		38.93	1.97	0.60	29.06	2.58	1.03
Z8CL7U		36.64	-0.32	-0.10	25.41	-1.07	-0.43

		Sample SA19	Summary Statistics	Sample SA20
Grand Means		36.959 psi		26.477 psi
SD Btwn Labs		3.297 psi		2.502 psi
Statistics based on 24 of 25 reporting participants				

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

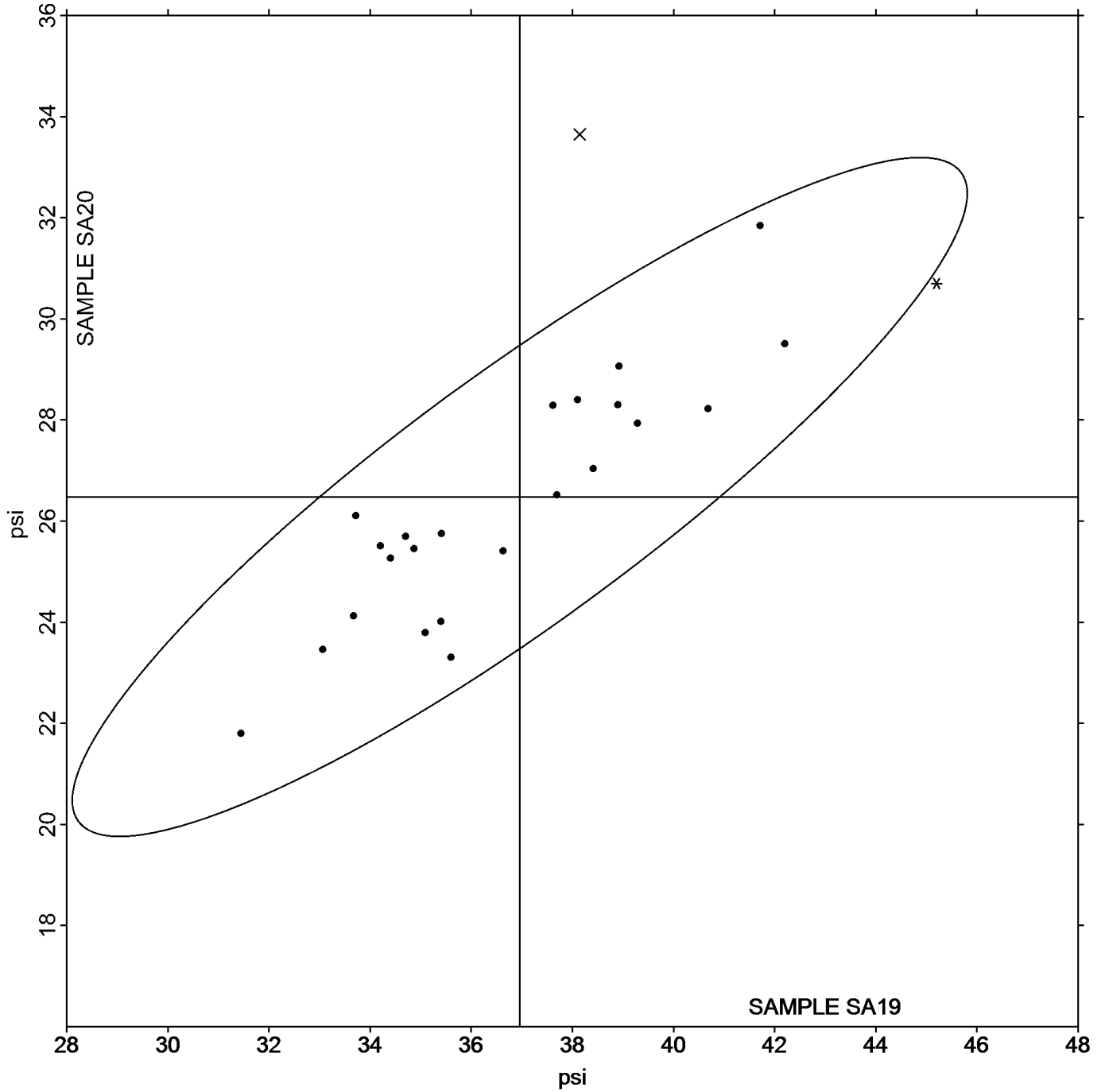
HVER3M (X) - Data for Sample SA20 are high. Inconsistent in testing within determinations for Sample SA19.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 305  
Bursting Strength - Printing Papers

Grand Mean Sample SA19 = 36.959 psi

Grand Mean Sample SA20 = 26.477 psi

ANALYSIS 305



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 310

## Bursting Strength - Packaging Papers

WebCode	Data Flag	Sample SB19			Sample SB20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3B6E3M	*	94.20	5.24	1.15	100.0	-8.9	-1.92
3YDQ62		87.84	-1.12	-0.25	113.5	4.6	0.98
4MDQLU		88.01	-0.95	-0.21	105.1	-3.8	-0.82
6APWU2		96.18	7.22	1.59	114.2	5.3	1.13
7BWLNX		85.30	-3.66	-0.80	110.0	1.1	0.24
7J8XQM		87.60	-1.36	-0.30	109.6	0.7	0.15
7MMC92		86.36	-2.60	-0.57	107.3	-1.6	-0.35
ACGJFC		89.50	0.54	0.12	103.1	-5.8	-1.25
CALM6N		78.95	-10.01	-2.20	100.2	-8.7	-1.87
DUHKWE		83.70	-5.26	-1.16	107.8	-1.1	-0.24
E6ZLRE		86.81	-2.15	-0.47	111.8	2.9	0.62
FB4VU2		94.57	5.61	1.23	109.6	0.7	0.16
GH4KYC		89.74	0.78	0.17	111.4	2.5	0.54
GJ9GWL		84.60	-4.36	-0.96	105.3	-3.7	-0.79
J9YUXX		87.80	-1.16	-0.25	107.7	-1.3	-0.27
KNW67N		95.85	6.89	1.51	119.1	10.2	2.19
L4JZX6		89.00	0.04	0.01	109.6	0.7	0.16
LTKX2N		83.80	-5.16	-1.13	112.5	3.5	0.76
MCAVGL		91.60	2.64	0.58	105.4	-3.5	-0.76
Q47ZZK		96.57	7.61	1.67	112.8	3.8	0.83
Q92RB3		94.90	5.94	1.31	114.7	5.8	1.25
RV8QFD		88.20	-0.76	-0.17	113.4	4.5	0.97
UEGB7D		90.36	1.40	0.31	108.1	-0.8	-0.17
VPB3C4		83.38	-5.58	-1.23	107.1	-1.8	-0.39
YHXFRP		89.14	0.18	0.04	103.5	-5.4	-1.15

## Sample SB19

## Summary Statistics

## Sample SB20

Grand Means            88.957 psi  
SD Btwn Labs            4.551 psi

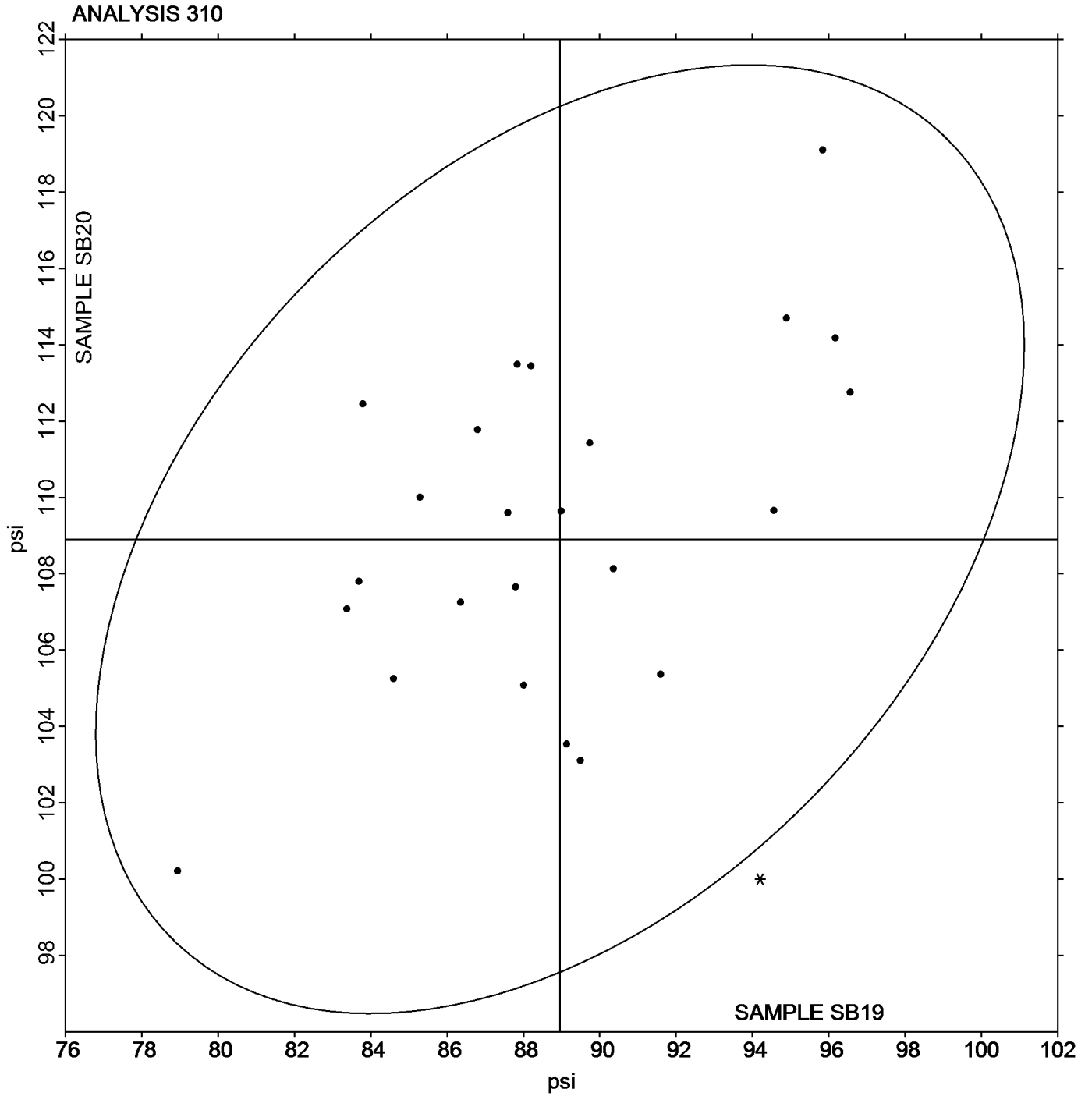
108.91 psi  
4.65 psi

Statistics based on 25 of 25 reporting participants

TAPPI-CTS Interlaboratory Testing Program  
Analysis 310  
Bursting Strength - Packaging Papers

Grand Mean Sample **SB19** = 88.957 psi

Grand Mean Sample **SB20** = 108.91 psi





**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 311**  
**Tearing Strength - Newsprint**

WebCode	Data Flag	Sample SK19			Sample SK20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
93U4CH		26.54	-1.83	-0.66	26.38	-1.83	-0.66
E6ZLRE		25.49	-2.88	-1.04	25.36	-2.85	-1.02
KZ6WW3		26.72	-1.65	-0.60	26.24	-1.97	-0.71
KZT3EG		32.54	4.17	1.51	32.30	4.10	1.47
RXWWZA		31.98	3.61	1.31	31.90	3.69	1.33
U6RV3V		27.59	-0.78	-0.28	27.45	-0.76	-0.27
YBZQ8E		27.75	-0.62	-0.23	27.82	-0.39	-0.14

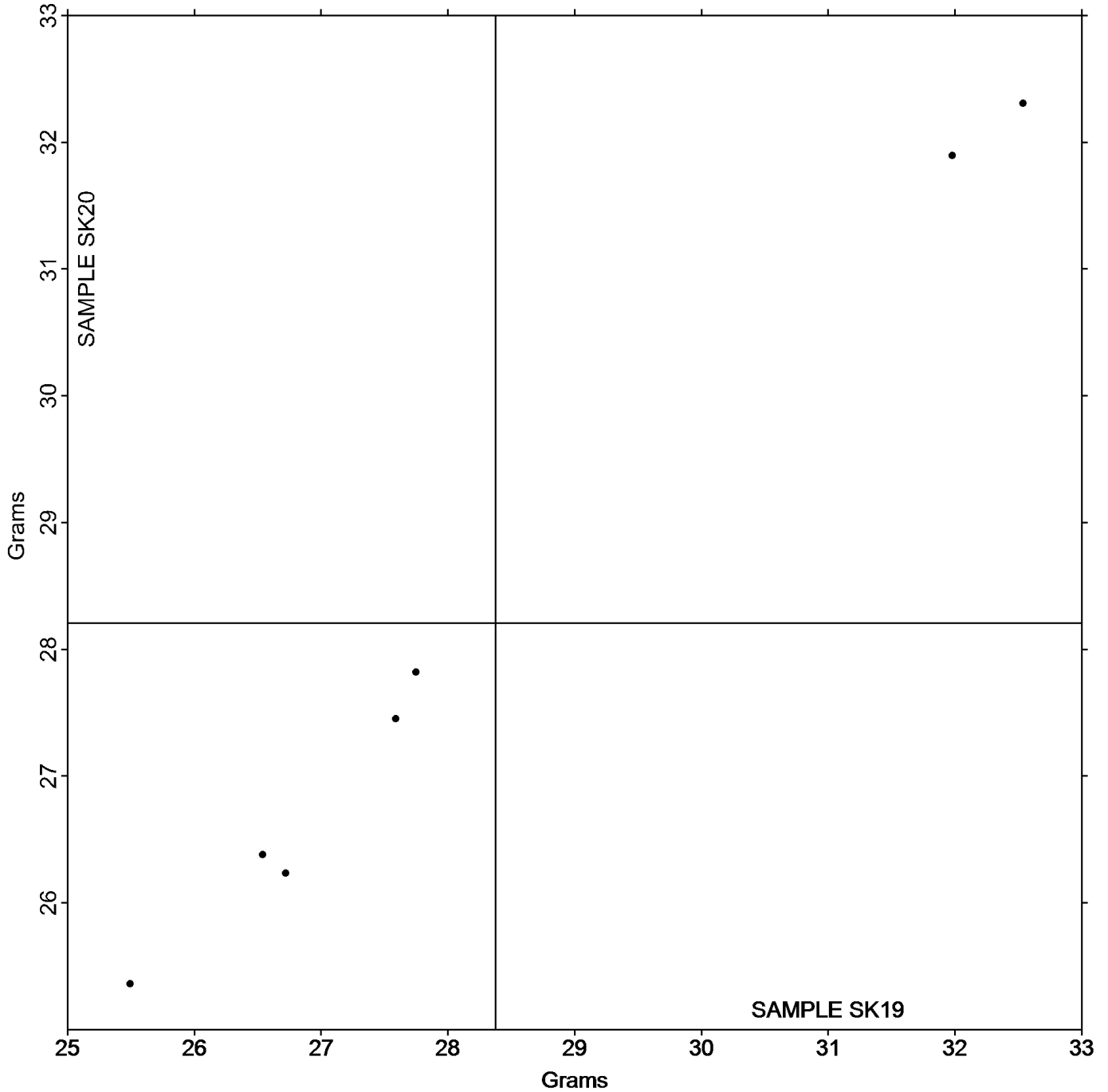
	Sample SK19	Summary Statistics	Sample SK20
Grand Means	28.373 Grams		28.207 Grams
SD Btwn Labs	2.761 Grams		2.783 Grams
			Statistics based on 7 of 7 reporting participants

TAPPI-CTS Interlaboratory Testing Program  
Analysis 311  
Tearing Strength - Newsprint

Grand Mean Sample **SK19** = 28.373 Grams

Grand Mean Sample **SK20** = 28.207 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.

## TAPPI-CTS Interlaboratory Testing Program

## Analysis 312

## Tearing Strength - Printing Papers

WebCode	Data Flag	Sample SC19			Sample SC20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
27XDHR		69.90	3.96	0.95	52.37	3.25	1.04
2DJJZK		64.50	-1.44	-0.34	45.20	-3.92	-1.25
2FJVUY		59.42	-6.52	-1.56	43.04	-6.08	-1.94
2KCWWD		69.26	3.32	0.79	49.18	0.06	0.02
3B6E3M	X	31.30	-34.64	-8.27	22.40	-26.72	-8.52
3YDQ62		65.05	-0.89	-0.21	48.75	-0.37	-0.12
4CJ42T	X	131.88	65.94	15.75	100.58	51.46	16.42
4Y9VY2		73.34	7.40	1.77	51.48	2.36	0.75
678LWW		57.02	-8.92	-2.13	43.30	-5.82	-1.86
6H3NJY		67.50	1.56	0.37	52.70	3.58	1.14
6K8ENT		67.04	1.10	0.26	49.42	0.30	0.10
6PE34F		68.10	2.16	0.52	51.63	2.51	0.80
76BG2N		67.06	1.12	0.27	48.84	-0.28	-0.09
76MFWX		72.92	6.98	1.67	54.57	5.45	1.74
7J8XQM		65.24	-0.70	-0.17	47.81	-1.31	-0.42
7MMC92		67.98	2.04	0.49	50.39	1.28	0.41
7U8FF4		59.80	-6.14	-1.47	45.50	-3.62	-1.15
88VTDY		63.86	-2.08	-0.50	49.72	0.60	0.19
A7CNWC		59.48	-6.46	-1.54	46.74	-2.38	-0.76
CALM6N		63.92	-2.02	-0.48	46.88	-2.24	-0.71
CN2LAN		68.40	2.46	0.59	49.26	0.14	0.05
D936C2		67.80	1.86	0.44	46.90	-2.22	-0.71
DAJDNB	X	104.00	38.06	9.09	54.40	5.28	1.69
E6ZLRE		65.55	-0.39	-0.09	47.08	-2.04	-0.65
GJ9GWL		59.87	-6.07	-1.45	43.30	-5.82	-1.86
H8CN9V		70.76	4.82	1.15	51.74	2.62	0.84
HVER3M	*	72.30	6.36	1.52	49.80	0.68	0.22
HYGT3J		66.68	0.74	0.18	48.88	-0.24	-0.08
J9YUXK		61.35	-4.59	-1.10	45.00	-4.12	-1.31
JFN3RC		67.21	1.27	0.30	50.50	1.38	0.44
JKXHYE		72.48	6.54	1.56	56.37	7.25	2.31
JLCMXD		57.92	-8.02	-1.92	44.70	-4.42	-1.41
JRHGR9		71.15	5.21	1.24	55.11	5.99	1.91
L4JZX6		65.96	0.02	0.00	50.24	1.12	0.36
L9C326	X	62.43	-3.51	-0.84	57.88	8.76	2.80
LE7RRA		67.03	1.09	0.26	50.07	0.95	0.30
M7644G		63.28	-2.66	-0.64	45.26	-3.86	-1.23
MV7988		62.50	-3.44	-0.82	47.06	-2.06	-0.66
NTZYYB	X	91.20	25.26	6.03	86.40	37.28	11.89
RCKYH3		66.29	0.35	0.08	50.03	0.91	0.29
RFYWN4		69.70	3.76	0.90	51.60	2.48	0.79
RV8QFD		65.80	-0.14	-0.03	48.74	-0.38	-0.12
UEGB7D		65.87	-0.07	-0.02	48.78	-0.33	-0.11

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 312**  
**Tearing Strength - Printing Papers**

WebCode	Data Flag	Sample SC19			Sample SC20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
UN3THK	X	76.40	10.46	2.50	62.80	13.68	4.36
V284RT		64.97	-0.97	-0.23	51.24	2.12	0.68
VPB3C4		72.81	6.87	1.64	54.06	4.94	1.58
WYXFRT		67.85	1.91	0.46	50.21	1.09	0.35
X2ECKC		65.40	-0.54	-0.13	51.40	2.28	0.73
XW4CBR		58.02	-7.92	-1.89	45.39	-3.73	-1.19
YHXFRP		65.19	-0.75	-0.18	49.42	0.30	0.09
YVP8B9		66.66	0.72	0.17	50.28	1.16	0.37
Z29UK4		60.84	-5.10	-1.22	46.42	-2.70	-0.86
Z8CL7U		68.22	2.28	0.54	52.18	3.06	0.98

Sample SC19		Summary Statistics	Sample SC20	
Grand Means	65.941 Grams		49.118 Grams	
SD Btwn Labs	4.187 Grams		3.135 Grams	
Statistics based on 47 of 53 reporting participants				

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

3B6E3M (X) - Extreme data.

4CJ42T (X) - Extreme data.

DAJDNB (X) - Extreme data for Sample SC19. Inconsistent in testing within the determinations for both samples.

L9C326 (X) - Data for Sample SC20 are high. Inconsistent in testing within the determinations for both samples.

NTZYYB (X) - Extreme data.

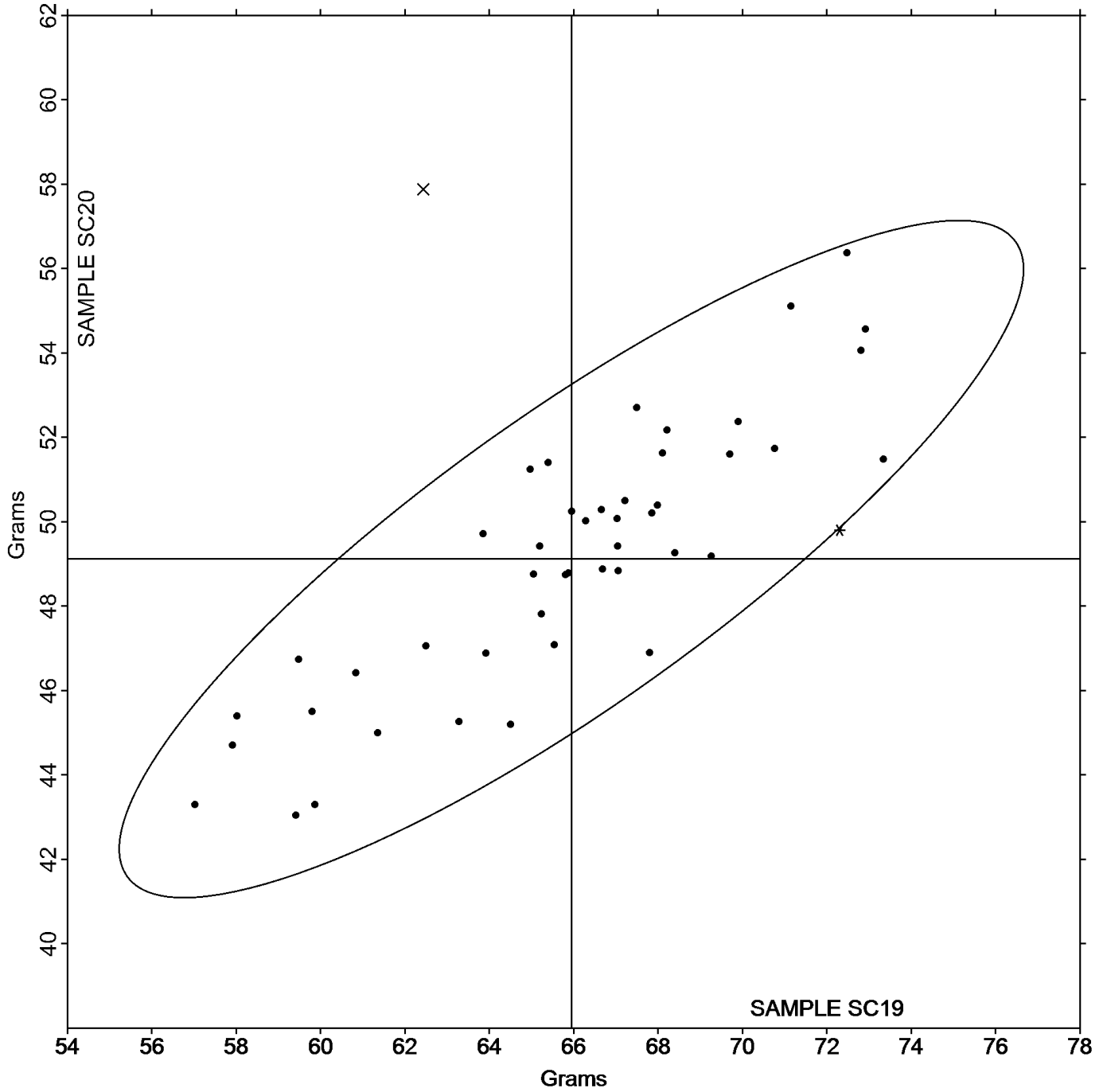
UN3THK (X) - Data for Sample SC20 are high. Inconsistent in testing within the determinations for both samples.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 312  
Tearing Strength - Printing Papers

Grand Mean Sample **SC19** = 65.941 Grams

Grand Mean Sample **SC20** = 49.118 Grams

ANALYSIS 312



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 314

## Tearing Strength - Packaging Papers

WebCode	Data Flag	Sample SD19			Sample SD20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3B6E3M	X	36.7	-124.1	-9.77	33.0	-112.8	-9.73
3RF2QJ	X	36.2	-124.6	-9.81	34.2	-111.6	-9.63
4FYXF6		175.9	15.1	1.19	157.3	11.4	0.99
4MDQLU		172.2	11.4	0.90	159.7	13.8	1.19
69DZNW		156.8	-4.0	-0.32	143.2	-2.6	-0.22
6JDTXM	X	192.0	31.2	2.46	158.8	13.0	1.12
6MT8E3	X	194.0	33.2	2.61	161.5	15.7	1.36
6XCN89		173.9	13.1	1.03	152.8	7.0	0.61
7BWLNX		138.8	-22.0	-1.73	128.8	-17.0	-1.47
ACGJFC		152.5	-8.3	-0.65	136.5	-9.3	-0.80
AQWUVM	*	122.7	-38.1	-3.00	110.0	-35.8	-3.09
BQEXCZ		170.8	10.0	0.78	154.5	8.7	0.75
CQQYPL		158.4	-2.4	-0.19	137.4	-8.4	-0.72
DUHKWE		157.2	-3.6	-0.28	145.2	-0.6	-0.05
E6ZLRE		156.2	-4.6	-0.36	143.7	-2.1	-0.18
EU2TG3		168.7	7.9	0.62	155.6	9.8	0.85
F7R3GG		178.4	17.6	1.39	161.2	15.4	1.33
FB4VU2		179.8	19.0	1.49	161.5	15.7	1.36
GH4KYC		170.1	9.3	0.73	150.1	4.3	0.37
H6LKFN		165.8	5.0	0.39	149.3	3.5	0.30
HPGVMW		154.4	-6.4	-0.50	140.0	-5.8	-0.50
HPXCHP		176.1	15.3	1.20	157.8	12.0	1.04
HQ6MC9	X	4.1	-156.7	-12.34	3.8	-142.0	-12.25
HWL3W		165.2	4.4	0.34	149.0	3.2	0.27
KZ6WW3		153.2	-7.7	-0.60	139.1	-6.7	-0.58
L7QBXE		157.8	-3.1	-0.24	141.3	-4.5	-0.39
LGRGCM		154.7	-6.1	-0.48	137.7	-8.1	-0.70
LTKX2N		144.6	-16.2	-1.28	129.8	-16.0	-1.38
MCAVGL		168.2	7.4	0.58	151.1	5.2	0.45
MZZ9JG		147.4	-13.4	-1.06	138.8	-7.0	-0.60
P88LG4		156.6	-4.2	-0.33	142.9	-2.9	-0.25
PFJT2D		162.8	2.0	0.16	144.5	-1.3	-0.11
PQYRM9		159.8	-1.0	-0.08	145.8	0.0	0.00
PZUNTJ	*	154.2	-6.6	-0.52	148.6	2.8	0.24
Q47ZZK	*	184.6	23.8	1.87	172.8	27.0	2.33
QFYEBE		151.5	-9.3	-0.73	135.6	-10.2	-0.88
UWEM2U		157.6	-3.2	-0.25	144.4	-1.4	-0.12
XD8N63		159.6	-1.2	-0.09	145.6	-0.2	-0.02

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 314**  
**Tearing Strength - Packaging Papers**

	<b>Sample SD19</b>	<b>Summary Statistics</b>	<b>Sample SD20</b>
Grand Means	160.80 Grams		145.80 Grams
SD Btwn Labs	12.70 Grams		11.60 Grams
Statistics based on 33 of 38 reporting participants			

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

3B6E3M (X) - Extreme data.

3RF2QJ (X) - Extreme data.

6JDTXM (X) - Inconsistent in testing between samples.

6MT8E3 (X) - Inconsistent in testing between samples.

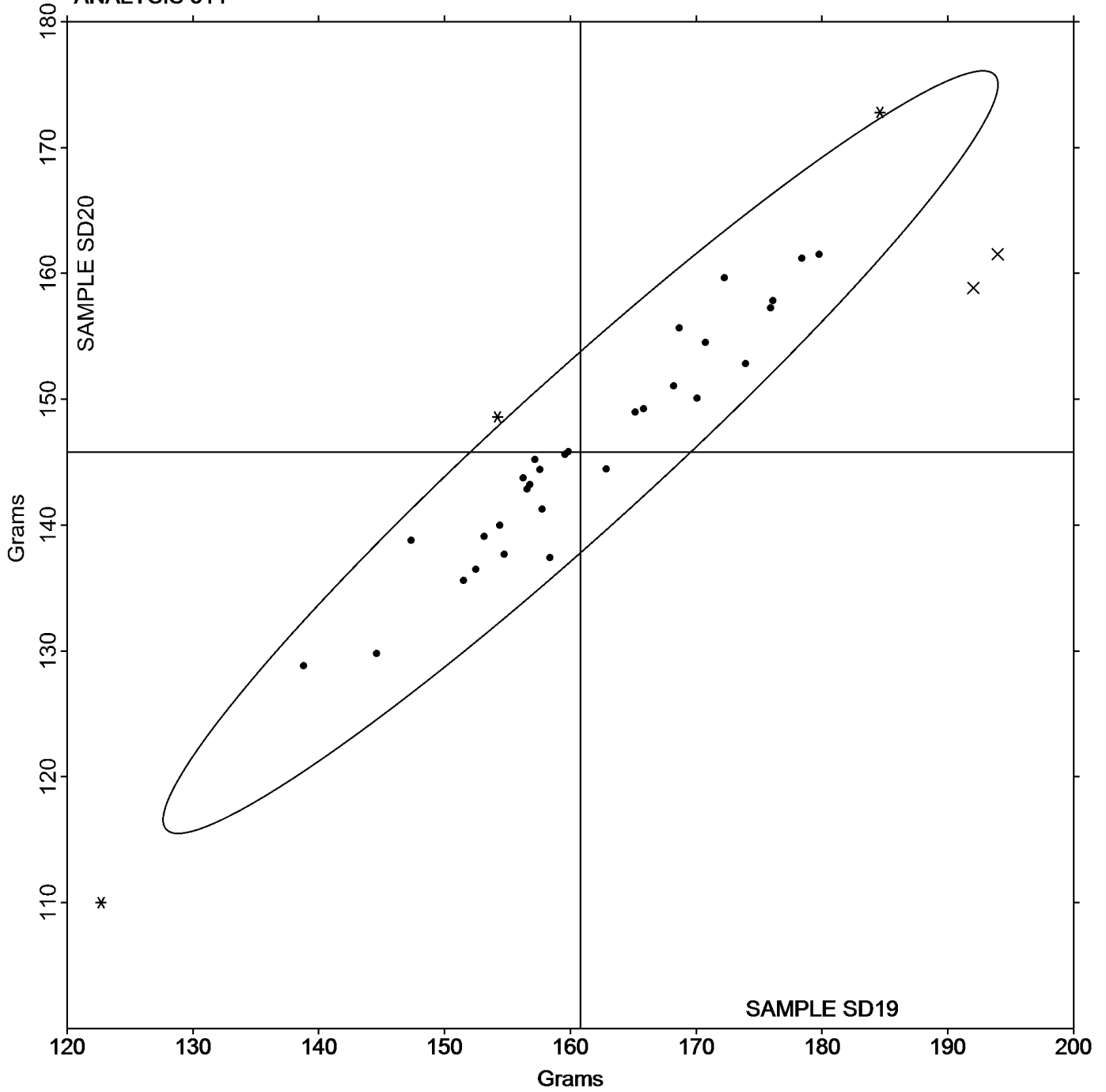
HQ6MC9 (X) - Extreme data.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 314  
Tearing Strength - Packaging Papers

Grand Mean Sample **SD19** = 160.80 Grams

Grand Mean Sample **SD20** = 145.80 Grams

ANALYSIS 314





**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 320**  
**Tensile Breaking Strength - Newsprint**

WebCode	Data Flag	Sample SR19			Sample SR20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
7FBABF		2.436	-0.223	-1.55	2.481	-0.109	-0.62
93U4CH		2.577	-0.082	-0.57	2.574	-0.015	-0.09
D936C2		2.737	0.078	0.54	2.804	0.214	1.22
KZ6WW3		2.779	0.120	0.83	2.662	0.073	0.41
KZT3EG		2.570	-0.089	-0.61	2.530	-0.059	-0.34
P2J29G		2.552	-0.107	-0.74	2.407	-0.183	-1.04
Q92RB3	X	0.595	-2.064	-14.30	0.584	-2.006	-11.42
RV8QFD		2.627	-0.032	-0.22	2.407	-0.182	-1.04
RXWWZA		2.697	0.038	0.26	2.611	0.022	0.12
U6RV3V		2.734	0.075	0.52	2.663	0.074	0.42
XXZG4E		2.969	0.310	2.15	2.951	0.362	2.06
YBZQ8E		2.571	-0.088	-0.61	2.394	-0.195	-1.11

		Summary Statistics	
	Sample SR19		Sample SR20
Grand Means	2.6591 kN/m		2.5895 kN/m
SD Btwn Labs	0.1444 kN/m		0.1756 kN/m
Statistics based on 11 of 12 reporting participants			

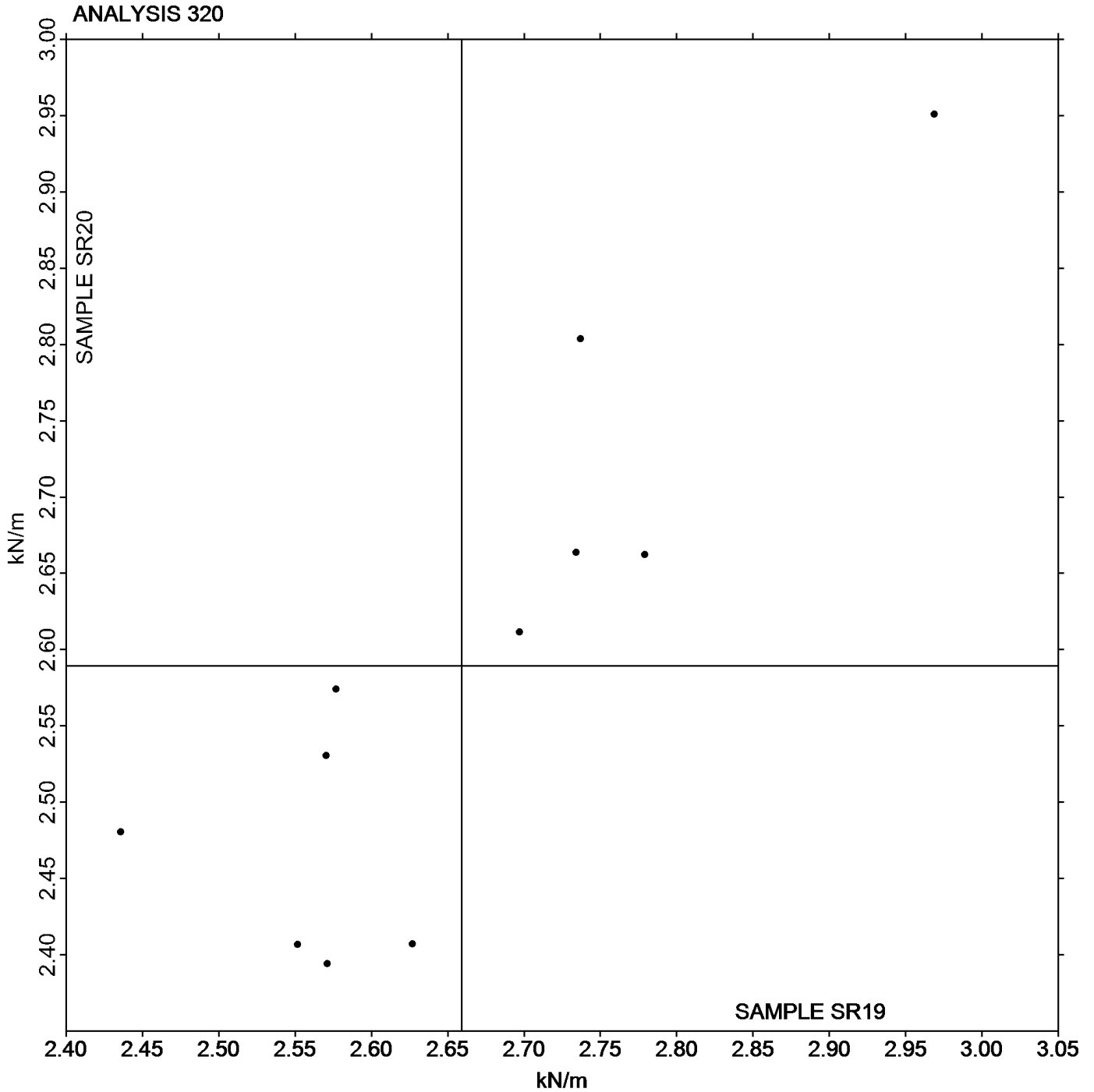
**Comments on assigned Data Flags for Test #320**

Q92RB3 (X) - Extreme data.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 320  
Tensile Breaking Strength - Newsprint

Grand Mean Sample **SR19** = 2.6591 kN/m

Grand Mean Sample **SR20** = 2.5895 kN/m



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

## TAPPI-CTS Interlaboratory Testing Program

## Analysis 321

## Tensile Energy Absorption - Newsprint

WebCode	Data Flag	Sample SR19			Sample SR20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
7FBABF		14.10	-3.00	-1.36	18.47	-0.61	-0.26
93U4CH		17.84	0.73	0.33	20.38	1.30	0.56
D936C2		14.93	-2.18	-0.98	19.50	0.42	0.18
KZ6WW3		19.07	1.96	0.89	19.58	0.50	0.22
KZT3EG		14.40	-2.71	-1.23	16.09	-2.99	-1.29
P2J29G		19.86	2.76	1.25	20.02	0.94	0.41
Q92RB3		15.48	-1.63	-0.74	17.64	-1.44	-0.62
RV8QFD		18.03	0.93	0.42	17.06	-2.02	-0.87
RXWWZA		16.01	-1.09	-0.49	16.59	-2.49	-1.07
U6RV3V		18.19	1.09	0.49	20.19	1.11	0.48
XXZG4E		20.25	3.14	1.42	24.35	5.27	2.27

## Summary Statistics

## Sample SR19

## Sample SR20

Grand Means            17.105 Joules/sq m  
SD Btwn Labs            2.209 Joules/sq m

19.078 Joules/sq m  
2.317 Joules/sq m

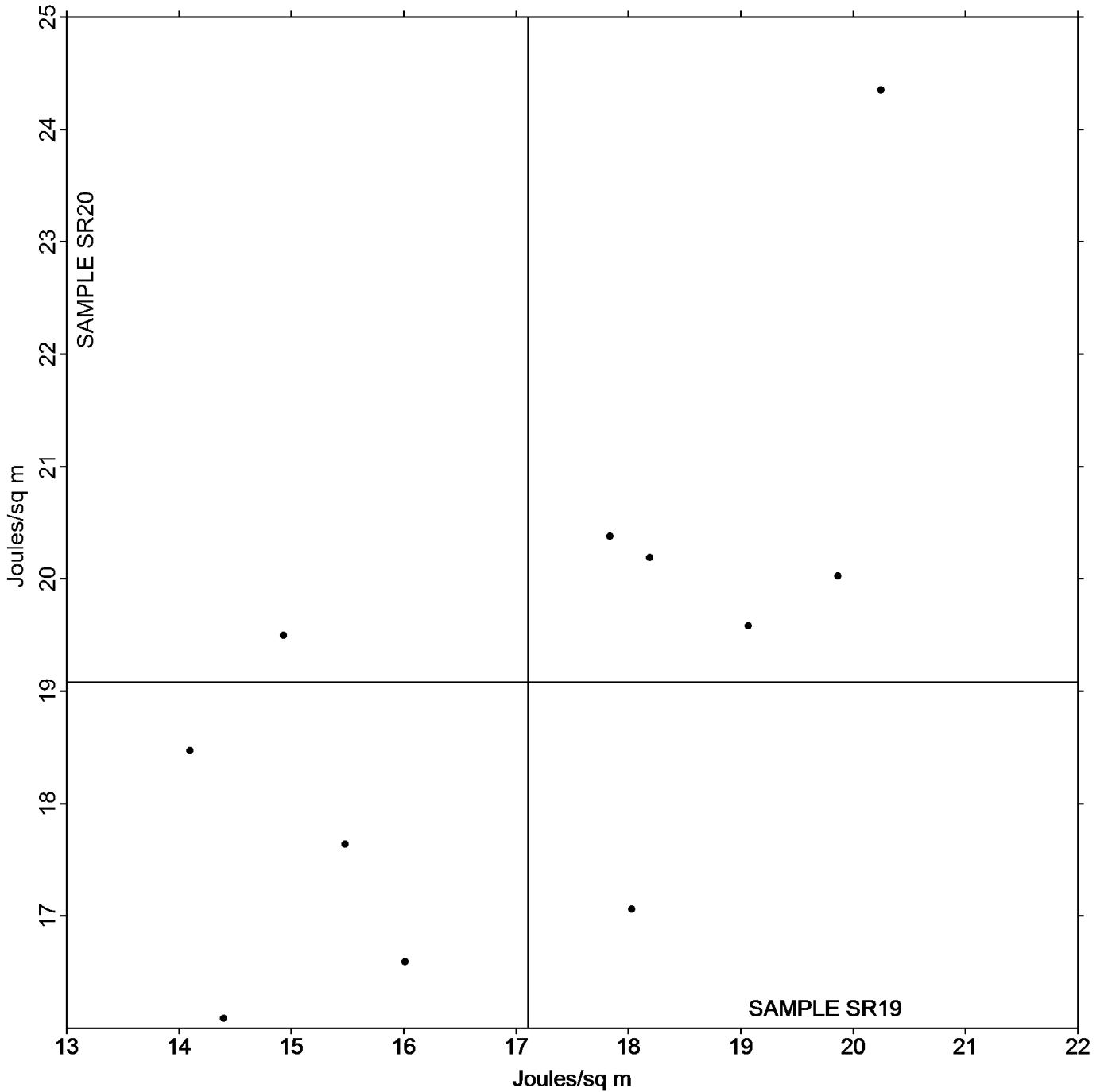
Statistics based on 11 of 11 reporting participants

TAPPI-CTS Interlaboratory Testing Program  
Analysis 321  
Tensile Energy Absorption - Newsprint

Grand Mean Sample **SR19** = 17.105 Joules/sq m

Grand Mean Sample **SR20** = 19.078 Joules/sq m

ANALYSIS 321



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

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 322**  
**Elongation to Break - Newsprint**

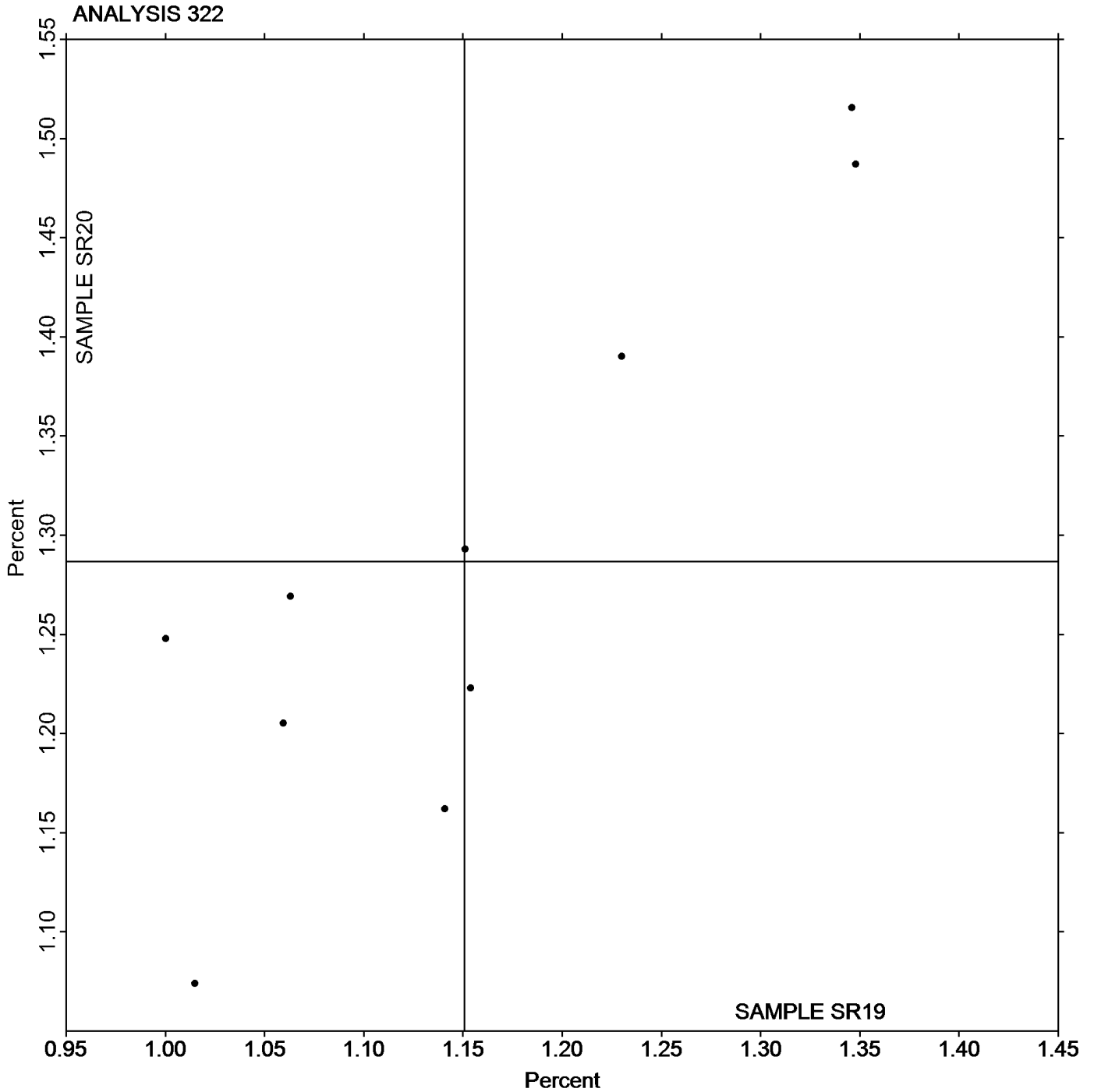
WebCode	Data Flag	Sample SR19			Sample SR20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
7FBABF		1.000	-0.151	-1.21	1.248	-0.039	-0.28
93U4CH		1.151	0.000	0.00	1.293	0.006	0.05
D936C2		1.230	0.079	0.63	1.390	0.103	0.74
KZ6WW3		1.154	0.003	0.03	1.223	-0.064	-0.45
P2J29G		1.348	0.197	1.58	1.487	0.200	1.43
Q92RB3		1.060	-0.091	-0.73	1.205	-0.081	-0.58
RV8QFD		1.141	-0.010	-0.08	1.162	-0.125	-0.89
RXWWZA		1.015	-0.136	-1.09	1.074	-0.213	-1.52
U6RV3V		1.346	0.195	1.56	1.516	0.229	1.63
XXZG4E		1.063	-0.088	-0.70	1.269	-0.018	-0.13

		<b>Summary Statistics</b>	
		<b>Sample SR19</b>	<b>Sample SR20</b>
Grand Means		1.1508 Percent	1.2867 Percent
SD Btwn Labs		0.1250 Percent	0.1400 Percent
Statistics based on 10 of 10 reporting participants			

TAPPI-CTS Interlaboratory Testing Program  
Analysis 322  
Elongation to Break - Newsprint

Grand Mean Sample **SR19** = 1.1508 Percent

Grand Mean Sample **SR20** = 1.2867 Percent



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

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 325**  
**Tensile Breaking Strength - Printing Papers**

WebCode	Data Flag	Sample SF19			Sample SF20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
27XDHR		5.201	-0.338	-0.99	5.818	-0.125	-0.38	LI
2FJVUY		6.128	0.589	1.72	6.375	0.433	1.31	LF
2KCWWD		5.467	-0.072	-0.21	5.704	-0.239	-0.72	TI
3YDQ62		5.391	-0.148	-0.43	5.942	0.000	0.00	XX
4CJ42T		5.626	0.087	0.25	5.909	-0.034	-0.10	LE
4JDFQU		5.600	0.060	0.18	6.360	0.418	1.27	XX
4Y9VY2		4.884	-0.656	-1.92	5.274	-0.669	-2.02	ID
678LWW		6.310	0.770	2.25	6.366	0.423	1.28	LH
6H3NJY		5.407	-0.133	-0.39	5.930	-0.013	-0.04	TC
6K8ENT		5.487	-0.053	-0.15	6.188	0.246	0.74	LH
6PE34F		5.466	-0.073	-0.21	5.856	-0.087	-0.26	LI
76BG2N		5.864	0.325	0.95	6.309	0.366	1.11	LH
76MFWX		5.042	-0.498	-1.45	5.576	-0.367	-1.11	LH
7MMC92		5.718	0.179	0.52	6.243	0.300	0.91	LI
7U8FF4		5.642	0.103	0.30	6.067	0.124	0.38	TB
88VTDY		5.502	-0.037	-0.11	5.655	-0.287	-0.87	TB
8Y3FGK		6.088	0.548	1.60	6.282	0.339	1.03	TJ
A7CNWC		5.348	-0.192	-0.56	6.113	0.170	0.52	TF
CALM6N		5.632	0.093	0.27	6.285	0.343	1.04	TA
CN2LAN		5.763	0.223	0.65	6.099	0.156	0.47	LH
E3TA8R		5.492	-0.047	-0.14	5.879	-0.064	-0.19	IN
E6ZLRE		5.737	0.198	0.58	6.066	0.123	0.37	LH
FEJKVP	M	No data reported for this sample			6.323	0.381	1.15	XX
H28WXC		5.237	-0.302	-0.88	5.295	-0.648	-1.96	LH
H8CN9V		5.729	0.190	0.55	6.095	0.153	0.46	MR
HCA8CE		5.580	0.041	0.12	6.199	0.257	0.78	TB
HVER3M		5.132	-0.407	-1.19	5.852	-0.091	-0.27	LH
HYGT3J		5.443	-0.097	-0.28	6.058	0.116	0.35	LX
J9YUXK		5.717	0.177	0.52	6.011	0.068	0.21	TP
JFN3RC		5.471	-0.068	-0.20	5.647	-0.295	-0.89	LH
JKXHYE		5.167	-0.372	-1.09	5.499	-0.443	-1.34	LA
JLCMXD	X	5.433	-0.106	-0.31	6.632	0.689	2.09	TJ
JRHGR9		5.347	-0.193	-0.56	5.785	-0.158	-0.48	XX
LE7RRA		5.596	0.056	0.16	5.977	0.035	0.11	IM
LTKX2N		5.632	0.093	0.27	6.238	0.295	0.89	IM
M7644G		5.860	0.320	0.94	6.397	0.455	1.38	TO
MV7988		6.239	0.700	2.04	6.752	0.810	2.45	TB
RCKYH3		4.914	-0.626	-1.83	5.222	-0.720	-2.18	SP
RFYWN4		5.162	-0.377	-1.10	5.641	-0.301	-0.91	TO
RV8QFD		5.297	-0.242	-0.71	5.942	-0.001	0.00	LH
UEGB7D		5.351	-0.188	-0.55	5.778	-0.165	-0.50	LI
V284RT		5.706	0.167	0.49	5.604	-0.339	-1.03	TP
VDE4DK		5.156	-0.384	-1.12	5.547	-0.396	-1.20	RE

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 325**  
**Tensile Breaking Strength - Printing Papers**

WebCode	Data Flag	Sample SF19			Sample SF20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
WYXFRT		4.818	-0.721	-2.11	5.404	-0.539	-1.63	IM
X2ECKC		5.322	-0.218	-0.64	5.528	-0.415	-1.26	TF
XCWV49		5.937	0.397	1.16	6.126	0.183	0.56	LA
XKNA48		5.632	0.093	0.27	6.194	0.252	0.76	TP
XW4CBR		6.054	0.515	1.50	6.061	0.118	0.36	XX
YHXFRP		5.639	0.100	0.29	6.065	0.122	0.37	LH
Z29UK4		6.084	0.544	1.59	6.142	0.199	0.60	TJ
Z8CL7U		5.416	-0.123	-0.36	5.831	-0.112	-0.34	LH

Sample SF19		Summary Statistics	Sample SF20	
Grand Means	5.5395 kN/m		5.9426 kN/m	
SD Btwn Labs	0.3424 kN/m		0.3302 kN/m	
Statistics based on 49 of 51 reporting participants				

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

FEJKVP (M) - No data for Sample SF19.

JLCMXD (X) - Inconsistent in testing between samples.

**Instrument Code List**

- |  |   |
|--|---|
| (ID) - Instron 4201/4202<br>(IN) - Instron 3340 series<br>(LE) - L & W Tensile Tester 066<br>(LH) - L & W Alwetron TH1 (Horizontal) SE 060/065F<br>(LX) - L & W (model not specified)<br>(RE) - Regmed<br>(TA) - Testometric AX<br>(TC) - Thwing-Albert Electro-Hydraulic, Model 30LT<br>(TI) - Thwing-Albert QC II<br>(TO) - Thwing-Albert QC-1000<br>(XX) - Instrument make/model not specified by lab | (IM) - Instron 5500 Series<br>(LA) - L & W Tensile - Autoline 300<br>(LF) - L & W Tensile/Fracture Toughness Tester SE 064<br>(LI) - L & W Tensile Tester SE 062<br>(MR) - MTS Alliance RT series<br>(SP) - Schopper Type Tensile Tester (TMI)<br>(TB) - Thwing-Albert EJA/1000<br>(TF) - Thwing-Albert EJA Vantage-1<br>(TJ) - Thwing-Albert QC II-XS<br>(TP) - TMI Monitor/Tensile 100 (84-21-01) |
|--|---|

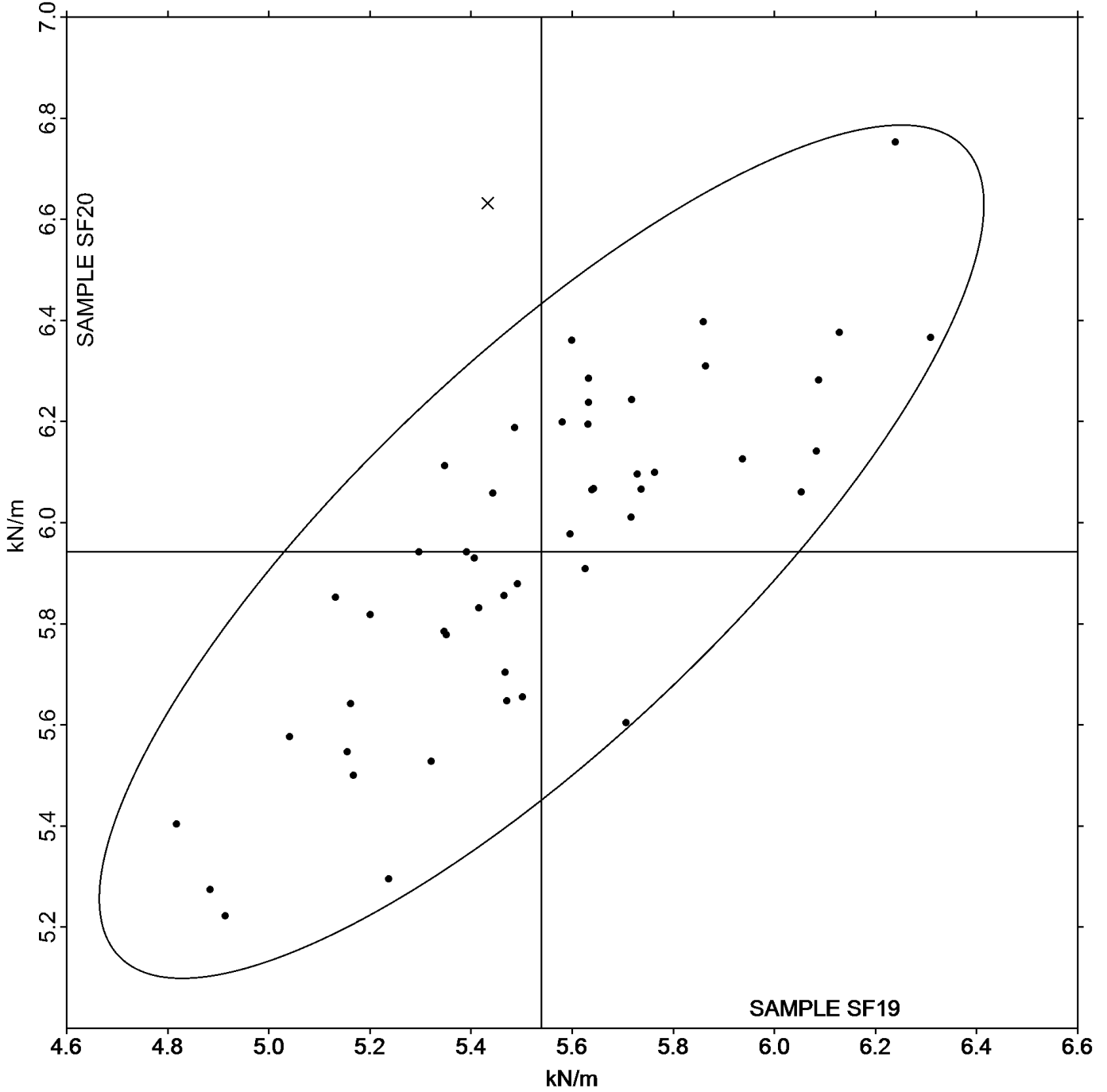


TAPPI-CTS Interlaboratory Testing Program  
Analysis 325  
Tensile Breaking Strength - Printing Papers

Grand Mean Sample **SF19** = 5.5395 kN/m

Grand Mean Sample **SF20** = 5.9426 kN/m

ANALYSIS 325



TAPPI-CTS Interlaboratory Testing Program

Analysis 327

Tensile Energy Absorption - Printing Papers

WebCode	Data Flag	Sample SF19			Sample SF20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
27XDHR		72.86	-6.14	-0.68	84.31	1.28	0.13	LI
2FJVUY		72.46	-6.54	-0.73	71.64	-11.39	-1.19	LW
2KCWWD		83.91	4.92	0.55	87.27	4.24	0.44	TI
3YDQ62		75.05	-3.95	-0.44	85.21	2.18	0.23	XX
4JDFQU		81.97	2.97	0.33	93.93	10.90	1.14	LX
4Y9VY2		70.44	-8.56	-0.95	72.85	-10.18	-1.06	ID
678LWW		88.43	9.43	1.05	80.03	-3.00	-0.31	LH
6K8ENT		66.31	-12.69	-1.41	80.64	-2.39	-0.25	LH
6PE34F		77.60	-1.40	-0.15	81.25	-1.78	-0.19	LI
76BG2N		86.41	7.41	0.82	88.60	5.57	0.58	LH
76MFWX		76.56	-2.44	-0.27	80.90	-2.13	-0.22	LH
7MMC92		80.93	1.93	0.21	90.57	7.54	0.79	LI
88VTDY		87.65	8.65	0.96	88.54	5.51	0.58	TB
8Y3FGK		90.82	11.82	1.31	92.35	9.32	0.97	TJ
CN2LAN		83.24	4.24	0.47	81.52	-1.51	-0.16	LH
E6ZLRE		78.66	-0.34	-0.04	80.60	-2.43	-0.25	LH
H28WXC		75.76	-3.24	-0.36	74.14	-8.89	-0.93	LH
H8CN9V		86.39	7.39	0.82	87.17	4.14	0.43	MR
HYGT3J		77.74	-1.26	-0.14	87.05	4.02	0.42	LX
J9YUXK		61.13	-17.86	-1.98	58.65	-24.38	-2.55	TP
JFN3RC		64.65	-14.35	-1.59	71.29	-11.74	-1.23	LH
JKXHYE		63.51	-15.48	-1.72	62.90	-20.13	-2.11	LA
JRHGR9		90.77	11.77	1.31	94.39	11.36	1.19	XX
LE7RRA		86.13	7.13	0.79	93.78	10.75	1.12	IM
LTKX2N		81.39	2.39	0.27	94.25	11.22	1.17	IM
M7644G		98.65	19.66	2.18	99.82	16.79	1.76	TO
MV7988		93.09	14.09	1.56	103.98	20.95	2.19	TB
RFYWN4		76.55	-2.44	-0.27	82.23	-0.80	-0.08	TO
RV8QFD		74.94	-4.06	-0.45	85.33	2.30	0.24	LH
UEGB7D		74.78	-4.22	-0.47	80.88	-2.15	-0.22	LI
V284RT		83.71	4.71	0.52	74.76	-8.27	-0.86	TP
VDE4DK		78.23	-0.77	-0.08	79.93	-3.10	-0.32	RE
WYXFRT		64.60	-14.40	-1.60	76.05	-6.98	-0.73	IM
X2ECKC		86.88	7.88	0.87	80.51	-2.52	-0.26	TF
YHXFRP		83.89	4.89	0.54	87.73	4.70	0.49	LH
Z8CL7U		67.82	-11.18	-1.24	74.01	-9.02	-0.94	LH

		Summary Statistics	
	Sample SF19		Sample SF20
Grand Means	78.997 Joules/sq m		83.030 Joules/sq m
SD Btwn Labs	9.015 Joules/sq m		9.562 Joules/sq m
Statistics based on 36 of 36 reporting participants			

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 327**  
**Tensile Energy Absorption - Printing Papers**

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**Instrument Code List**

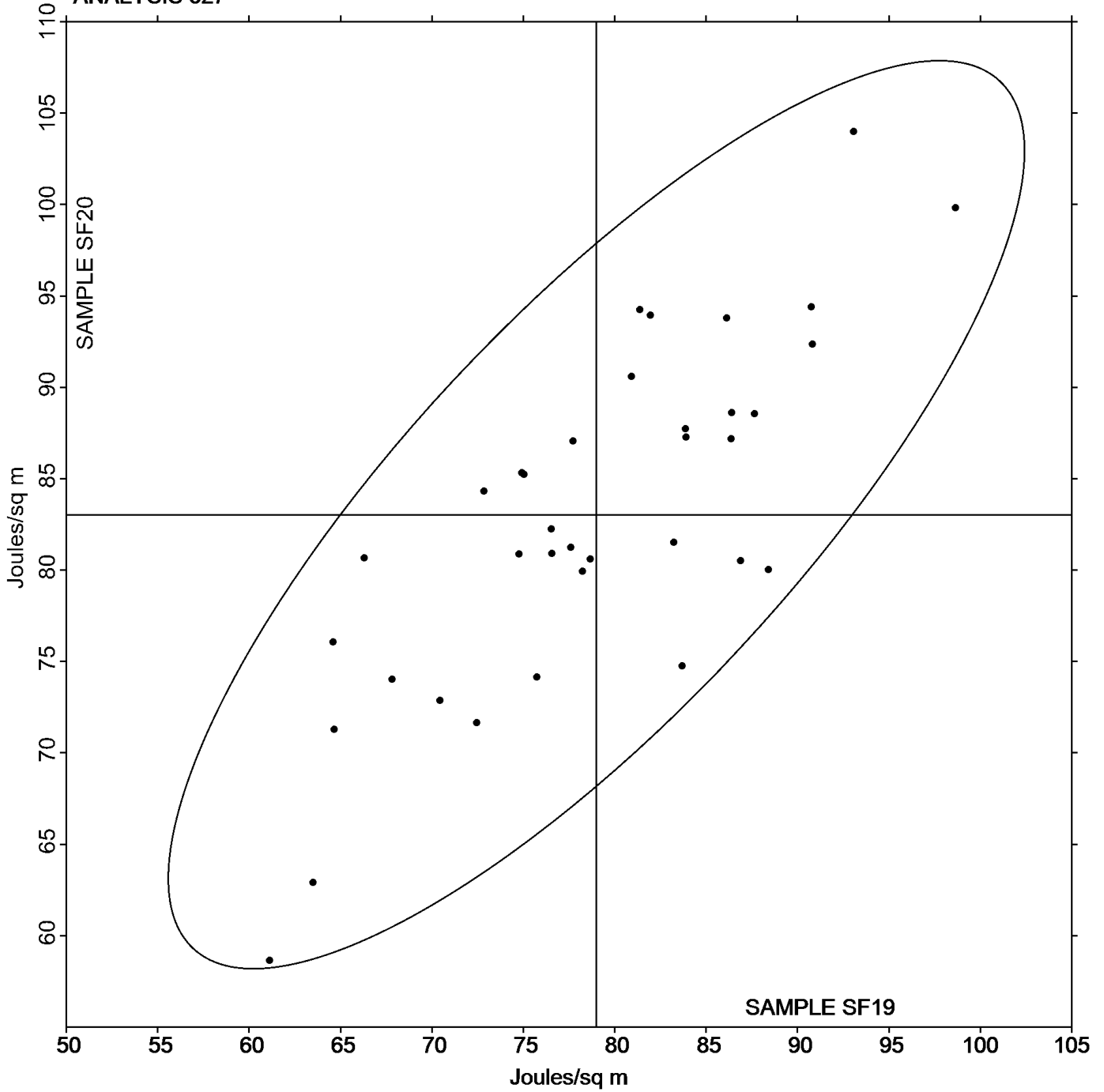
(ID) - Instron 4201	(IM) - Instron 5500 Series
(LA) - L & W Tensile - Autoline 300	(LH) - L & W Alwetron TH1 (Horizontal) SE 060
(LI) - L & W Tensile Tester SE 062	(LW) - L & W Tensile Tester SE 064
(LX) - L & W (model not specified)	(MR) - MTS Alliance RT series
(RE) - Regmed	(TB) - Thwing-Albert EJA/1000
(TF) - Thwing-Albert EJA Vantage-1	(TI) - Thwing-Albert QC II
(TJ) - Thwing-Albert QC II-XS	(TO) - Thwing-Albert QC-1000
(TP) - TMI Monitor/Tensile 100 (84-21-01)	(XX) - Instrument make/model not specified by lab

TAPPI-CTS Interlaboratory Testing Program  
Analysis 327  
Tensile Energy Absorption - Printing Papers

Grand Mean Sample **SF19** = 78.997 Joules/sq m

Grand Mean Sample **SF20** = 83.030 Joules/sq m

ANALYSIS 327



## TAPPI-CTS Interlaboratory Testing Program

## Analysis 328

## Elongation to Break - Printing Papers

WebCode	Data Flag	Sample SF19			Sample SF20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
27XDHR		2.061	-0.095	-0.55	2.170	0.005	0.03	LI
2FJVUY		1.820	-0.336	-1.93	1.760	-0.405	-2.25	LX
2KCWWD		2.324	0.168	0.96	2.352	0.187	1.04	TI
3YDQ62		2.179	0.023	0.13	2.282	0.117	0.65	XX
4JDFQU	X	2.155	-0.001	-0.01	2.665	0.500	2.78	LX
4Y9VY2		2.115	-0.042	-0.24	2.069	-0.096	-0.53	ID
678LWW		2.070	-0.086	-0.49	1.902	-0.263	-1.46	LH
6K8ENT	*	1.747	-0.409	-2.35	1.908	-0.257	-1.43	LH
6PE34F		2.088	-0.068	-0.39	2.083	-0.082	-0.46	LI
76BG2N		2.156	0.000	0.00	2.093	-0.072	-0.40	LH
76MFWX		2.249	0.093	0.53	2.195	0.030	0.17	LH
7MMC92		2.099	-0.057	-0.33	2.189	0.024	0.13	LI
7U8FF4		2.300	0.144	0.83	2.320	0.155	0.86	TF
88VTDY		2.429	0.273	1.57	2.438	0.273	1.51	TB
8Y3FGK		2.265	0.109	0.63	2.339	0.174	0.97	TJ
A7CNWC		2.200	0.044	0.25	2.320	0.155	0.86	TF
CN2LAN		2.145	-0.011	-0.06	2.022	-0.143	-0.79	LH
E3TA8R		2.282	0.126	0.72	2.275	0.110	0.61	IN
E6ZLRE		2.013	-0.143	-0.82	1.994	-0.171	-0.95	LH
H28WXC		2.184	0.028	0.16	2.103	-0.062	-0.34	LH
H8CN9V		2.275	0.119	0.68	2.204	0.039	0.22	MR
HCA8CE		2.221	0.065	0.37	2.286	0.121	0.67	TB
HYGT3J		2.092	-0.064	-0.37	2.145	-0.020	-0.11	LX
J9YUXK		2.074	-0.082	-0.47	2.110	-0.055	-0.31	TP
JFN3RC		1.766	-0.390	-2.24	1.883	-0.282	-1.57	LH
JKXHYE		2.136	-0.020	-0.11	2.018	-0.147	-0.82	LA
JLCMXD		2.020	-0.136	-0.78	1.850	-0.315	-1.75	LH
JRHGR9		2.422	0.266	1.53	2.459	0.294	1.63	XX
LE7RRA		2.337	0.181	1.04	2.392	0.227	1.26	IM
LTKX2N		2.173	0.017	0.10	2.307	0.142	0.79	IM
M7644G	X	2.852	0.696	3.99	2.721	0.556	3.09	TO
MV7988		2.227	0.071	0.41	2.341	0.176	0.98	TB
RFYWN4		2.169	0.013	0.07	2.188	0.023	0.13	TG
RV8QFD		2.091	-0.065	-0.37	2.155	-0.010	-0.06	LH
UEGB7D		2.062	-0.094	-0.54	2.098	-0.067	-0.37	LI
V284RT		2.446	0.290	1.66	2.433	0.268	1.49	TP
VDE4DK		2.316	0.160	0.92	2.273	0.108	0.60	RE
WYXFRT		2.145	-0.011	-0.06	2.286	0.121	0.67	XX
X2ECKC	*	2.437	0.281	1.61	2.214	0.049	0.27	TF
YHXFRP		2.185	0.029	0.17	2.170	0.005	0.03	LH
Z8CL7U		1.765	-0.391	-2.24	1.808	-0.357	-1.98	LH

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 328**  
**Elongation to Break - Printing Papers**

	<b>Sample SF19</b>	<b>Summary Statistics</b>	<b>Sample SF20</b>
Grand Means	2.1560 Percent		2.1650 Percent
SD Btwn Labs	0.1743 Percent		0.1800 Percent
Statistics based on 39 of 41 reporting participants			

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

4JDFQU (X) - Inconsistent in testing between samples, data for Sample SF20 are high. Inconsistent within the determinations for Sample SF19.

M7644G (X) - Systematic error (data for both samples are high).

**Instrument Code List**

(ID) - Instron 4201	(IM) - Instron 5500
(IN) - Instron 3340 Series	(LA) - L & W Tensile - Autoline 300
(LH) - L & W Alwetron TH1 (Horizontal) SE 060	(LI) - L & W Tensile Tester SE 062
(LX) - L & W (model not specified)	(MR) - MTS Alliance RT series
(RE) - Regmed	(TB) - Thwing-Albert EJA/1000
(TF) - Thwing-Albert EJA Vantage-1	(TG) - Thwing-Albert QC
(TI) - Thwing-Albert QC II	(TJ) - Thwing-Albert QC II-XS
(TO) - Thwing-Albert QC-1000	(TP) - TMI Monitor/Tensile 100 (84-21-01)
(XX) - Instrument make/model not specified by lab	

# TAPPI-CTS Interlaboratory Testing Program

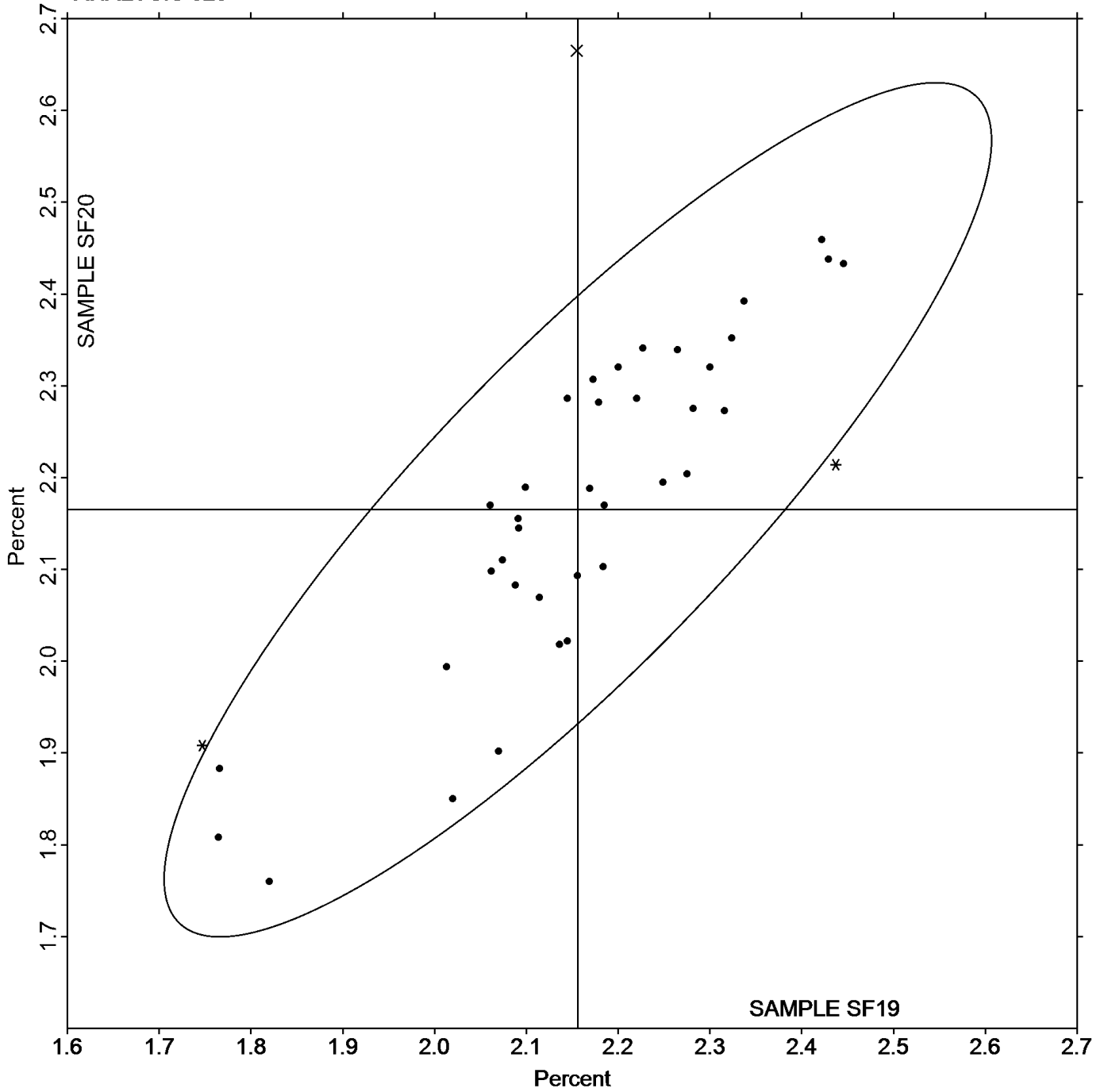
## Analysis 328

### Elongation to Break - Printing Papers

Grand Mean Sample **SF19** = 2.1560 Percent

Grand Mean Sample **SF20** = 2.1650 Percent

#### ANALYSIS 328



**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 330**  
**Tensile Breaking Strength - Packaging Papers**

WebCode	Data Flag	Sample SE19			Sample SE20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3B6E3M		14.25	-1.18	-0.89	18.84	0.89	0.73	IF
4MDQLU		17.64	2.21	1.65	20.21	2.26	1.86	LA
6MT8E3		13.13	-2.31	-1.73	17.59	-0.36	-0.30	LA
6XCN89	X	10.68	-4.75	-3.56	9.57	-8.38	-6.91	TP
7BWLNX		16.04	0.61	0.46	17.92	-0.04	-0.03	IK
7J8XQM		13.20	-2.23	-1.67	17.58	-0.37	-0.31	IF
9FJ32Y		17.67	2.24	1.67	20.80	2.84	2.34	LA
9UG6UZ		15.90	0.47	0.35	19.22	1.27	1.04	TA
BQEXCZ		15.90	0.46	0.35	18.21	0.26	0.21	XX
E6ZLRE		15.89	0.45	0.34	18.94	0.98	0.81	LH
EU2TG3		17.54	2.10	1.57	19.61	1.66	1.37	LA
F7R3GG	M	15.09	-0.35	-0.26	No data reported for this sample			TH
FL4LDN		16.53	1.09	0.82	19.16	1.21	0.99	TB
GH4KYC		13.59	-1.84	-1.38	16.11	-1.85	-1.52	IK
H6LKFN		15.12	-0.31	-0.24	17.05	-0.91	-0.75	SA
HPGVMW		16.25	0.81	0.61	18.82	0.86	0.71	LW
HPXCHP		15.17	-0.27	-0.20	16.61	-1.34	-1.11	LW
HTCWHJ		15.04	-0.39	-0.29	18.37	0.41	0.34	TX
HWL3W		15.72	0.28	0.21	17.43	-0.52	-0.43	ID
J9YUXK		15.71	0.27	0.20	16.21	-1.74	-1.44	TO
KNW67N		16.03	0.59	0.44	17.59	-0.37	-0.30	XX
KXGERW		15.93	0.49	0.37	17.99	0.03	0.03	XX
LWJLAH	*	12.24	-3.20	-2.39	14.08	-3.87	-3.19	IM
MZZ9JG		13.20	-2.23	-1.67	17.41	-0.55	-0.45	IN
P88LG4		16.65	1.22	0.91	18.08	0.13	0.10	TO
PFJT2D		15.85	0.42	0.31	17.81	-0.15	-0.12	LE
PQYRM9		16.79	1.36	1.02	18.93	0.98	0.80	XX
PZUNTJ		15.67	0.24	0.18	17.93	-0.02	-0.02	TO
Q47ZZK		15.76	0.33	0.24	18.85	0.89	0.74	TP
QFYEBE		17.02	1.58	1.18	18.98	1.02	0.84	TO
R9TAMN		14.53	-0.90	-0.68	17.29	-0.67	-0.55	TH
UF7T8Y	X	26.95	11.52	8.62	31.09	13.13	10.82	LE
UWEM2U		15.34	-0.10	-0.07	17.78	-0.18	-0.15	SP
VFN4JC		15.13	-0.30	-0.23	17.45	-0.50	-0.41	IM
VPB3C4		15.57	0.14	0.10	16.94	-1.02	-0.84	LE
X92TL3		14.81	-0.63	-0.47	16.92	-1.04	-0.85	LW
XD8N63		16.57	1.13	0.85	18.56	0.61	0.50	LH
XYRLKT		15.72	0.28	0.21	17.52	-0.44	-0.36	LA
XZJQT7	*	12.83	-2.60	-1.95	17.79	-0.16	-0.13	ID
YVP8B9		15.17	-0.27	-0.20	17.77	-0.18	-0.15	XX



**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 330**  
**Tensile Breaking Strength - Packaging Papers**

	<b>Sample SE19</b>	<b>Summary Statistics</b>	<b>Sample SE20</b>
Grand Means	15.435 kN/m		17.956 kN/m
SD Btwn Labs	1.336 kN/m		1.214 kN/m
Statistics based on 37 of 40 reporting participants			

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

6XCN89 (X) - Extreme data.

F7R3GG (M) - No data for Sample SE20.

UF7T8Y (X) - Extreme data.

**Analysis Notes:**

KXGERW - Data appear to be reported as lb/inch, not kN/m as indicated on datasheet. Units corrected by CTS.

**Instrument Code List**

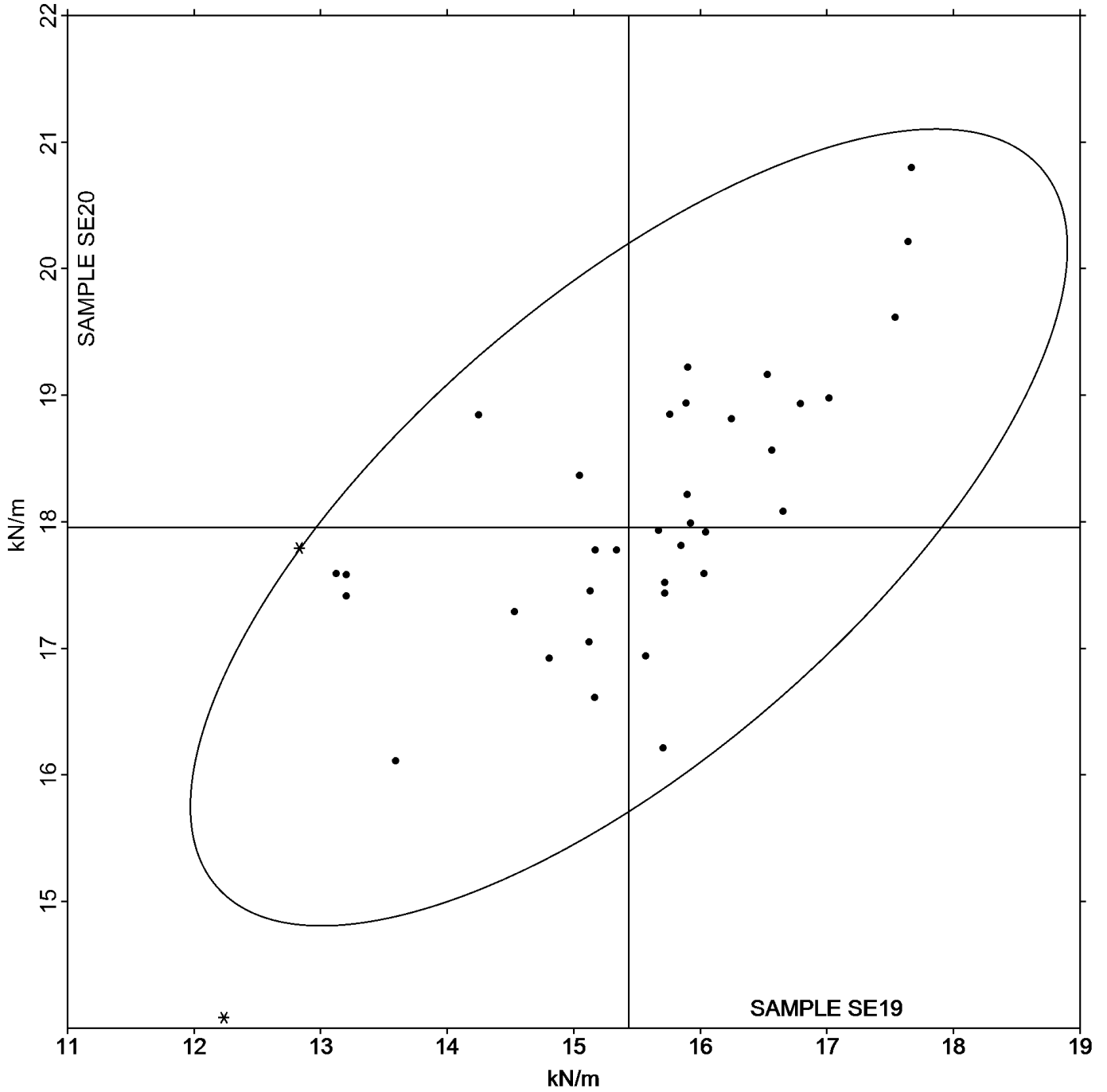
(ID) - Instron 4201	(IF) - Instron 3340 Series
(IK) - Instron 4400 Series	(IM) - Instron 5500 Series
(IN) - Instron 3360 Series	(LA) - L & W Autoline
(LE) - L & W Tensile Tester 066	(LH) - L & W Alwetron TH1 (Horizontal) SE 060
(LW) - L & W Tensile Tester SE062	(SA) - Shimadzu Autograph AG 2000 A
(SP) - Schopper Type Tensile Tester (TMI)	(TA) - Thwing-Albert Tensile Tester
(TB) - Thwing-Albert EJA/1000	(TH) - Thwing-Albert QC-3A
(TO) - Thwing-Albert QC-1000	(TP) - TMI Monitor/Tensile 100 (84-21-01)
(TX) - Thwing-Albert (model not specified)	(XX) - Instrument make/model not specified by lab

TAPPI-CTS Interlaboratory Testing Program  
Analysis 330  
Tensile Breaking Strength - Packaging Papers

Grand Mean Sample **SE19** = 15.435 kN/m

Grand Mean Sample **SE20** = 17.956 kN/m

ANALYSIS 330



**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 331**  
**Tensile Energy Absorption - Packaging Papers**

WebCode	Data Flag	Sample SE19			Sample SE20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3B6E3M		147.2	-30.4	-1.30	177.8	-17.7	-0.64	IN
4MDQLU		190.6	13.1	0.56	190.6	-5.0	-0.18	LA
6MT8E3		189.0	11.5	0.49	202.9	7.4	0.27	LA
7BWLNX		176.6	-0.9	-0.04	159.7	-35.9	-1.29	XX
7J8XQM		162.5	-15.1	-0.65	208.7	13.2	0.48	IF
9FJ32Y		162.8	-14.7	-0.63	191.4	-4.1	-0.15	LA
BQEXCZ		166.0	-11.6	-0.50	196.4	0.9	0.03	XX
E6ZLRE		156.1	-21.5	-0.92	183.2	-12.4	-0.45	LH
EU2TG3		194.4	16.8	0.72	200.0	4.5	0.16	LA
F7R3GG	M	187.9	10.4	0.45	No data reported for this sample			TH
FL4LDN		219.6	42.1	1.81	255.2	59.7	2.15	TB
GH4KYC		190.3	12.8	0.55	220.1	24.6	0.89	IK
H6LKFN		168.9	-8.7	-0.37	185.9	-9.6	-0.35	SA
HPGVMW		136.3	-41.3	-1.77	132.9	-62.6	-2.26	LW
HPXCHP		171.2	-6.3	-0.27	176.5	-19.1	-0.69	LW
HTCWHJ		199.2	21.7	0.93	208.0	12.5	0.45	XX
J9YUXK		192.2	14.7	0.63	175.6	-19.9	-0.72	TO
KNW67N		184.3	6.8	0.29	217.1	21.6	0.78	XX
LWJLAH	*	125.1	-52.5	-2.25	180.5	-15.0	-0.54	IM
MZZ9JG	X	240.1	62.6	2.69	334.8	139.3	5.02	IN
P88LG4	X	182.1	4.6	0.20	307.9	112.4	4.05	TO
PFJT2D		170.1	-7.4	-0.32	171.4	-24.1	-0.87	LE
PQYRM9		191.2	13.6	0.59	207.1	11.6	0.42	XX
PZUNTJ		210.5	32.9	1.42	214.5	19.0	0.69	TO
Q47ZZK	*	225.2	47.7	2.05	275.2	79.7	2.87	TP
QFYEBE		197.3	19.8	0.85	203.9	8.4	0.30	TO
R9TAMN		159.7	-17.9	-0.77	193.6	-1.9	-0.07	TH
UF7T8Y	X	312.2	134.7	5.79	366.5	171.0	6.17	LE
VFN4JC		156.2	-21.3	-0.92	178.3	-17.2	-0.62	IM
XD8N63		159.4	-18.1	-0.78	163.6	-31.9	-1.15	LH
XYRLKT		193.9	16.3	0.70	208.9	13.4	0.48	LA
XZJQT7		173.0	-4.5	-0.19	176.7	-18.8	-0.68	ID
YVP8B9		179.9	2.3	0.10	214.3	18.8	0.68	XX

		Summary Statistics	
	Sample SE19		Sample SE20
Grand Means	177.54 Joules/sq m		195.51 Joules/sq m
SD Btwn Labs	23.28 Joules/sq m		27.73 Joules/sq m
Statistics based on 29 of 33 reporting participants			

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 331**  
**Tensile Energy Absorption - Packaging Papers**

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

F7R3GG (M) - No data for Sample SE20.

MZZ9JG (X) - Data for both samples are high. Inconsistent in testing within the determinations for both samples.

P88LG4 (X) - Data for Sample SE20 are high. Inconsistent in testing within determinations for Sample SE20.

UF7T8Y (X) - Extreme data.

**Instrument Code List**

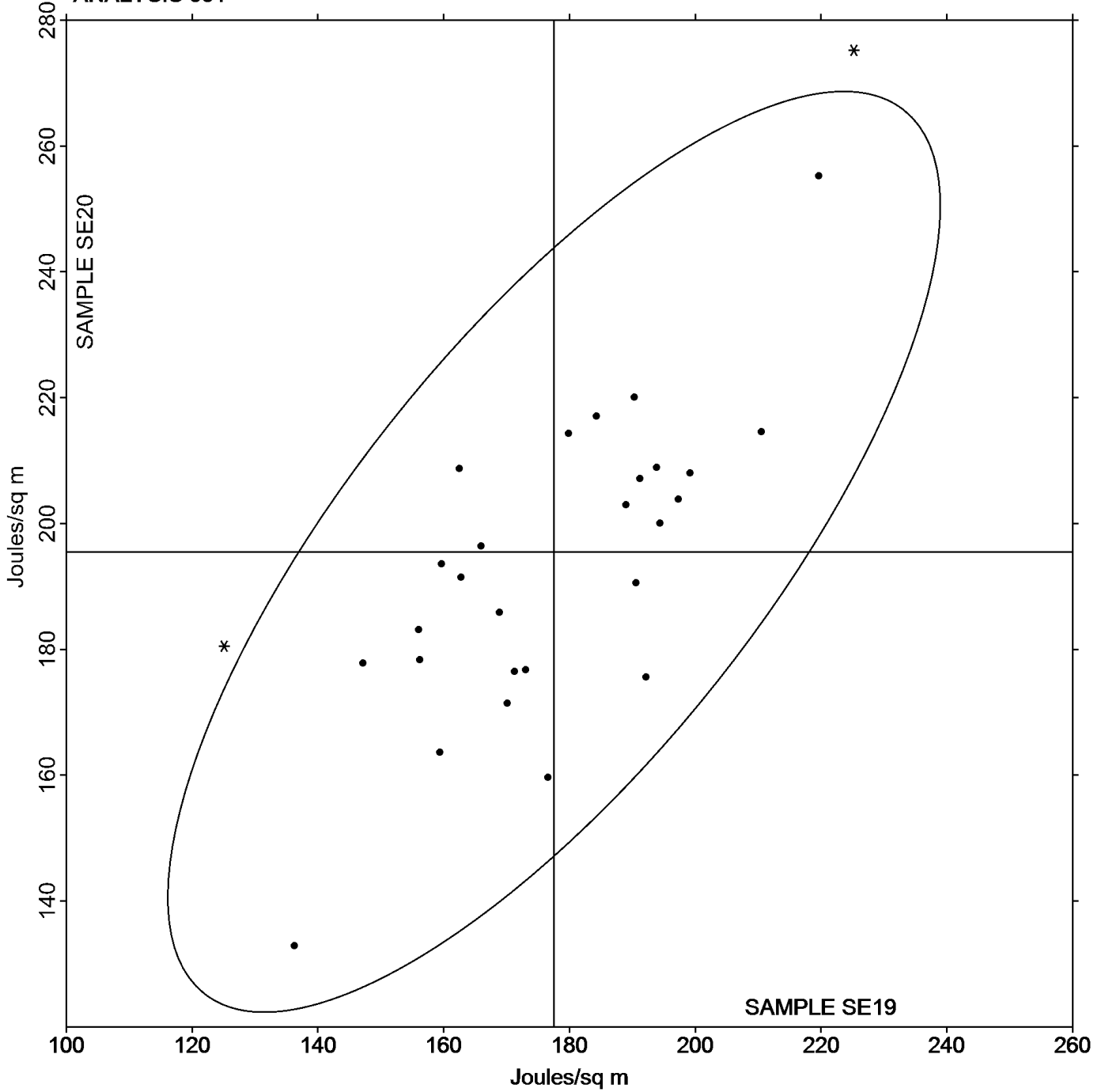
(ID) - Instron 4201	(IF) - Instron 3340 Series
(IK) - Instron 4400 Series	(IM) - Instron 5500 Series
(IN) - Instron 3360 Series	(LA) - L & W Autoline
(LE) - L & W Tensile Tester 066	(LH) - L & W Alwetron TH1 (Horizontal) SE 060
(LW) - L & W Tensile Tester SE062	(SA) - Shimadzu Autograph AG 2000 A
(TB) - Thwing-Albert EJA/1000	(TH) - Thwing-Albert QC-3A
(TO) - Thwing-Albert QC-1000	(TP) - TMI Monitor/Tensile 100 (84-21-01)
(XX) - Instrument make/model not specified by lab	

TAPPI-CTS Interlaboratory Testing Program  
Analysis 331  
Tensile Energy Absorption - Packaging Papers

Grand Mean Sample **SE19** = 177.54 Joules/sq m

Grand Mean Sample **SE20** = 195.51 Joules/sq m

ANALYSIS 331



**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 332**  
**Elongation to Break - Packaging Papers**

WebCode	Data Flag	Sample SE19			Sample SE20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3B6E3M		1.579	-0.331	-0.75	1.616	-0.160	-0.39	IN
4MDQLU		1.651	-0.259	-0.58	1.484	-0.292	-0.72	LA
6MT8E3	*	2.325	0.415	0.94	1.710	-0.066	-0.16	LA
7BWLNX		1.434	-0.476	-1.08	1.267	-0.509	-1.26	XX
7J8XQM		2.269	0.359	0.81	2.090	0.314	0.78	IF
9FJ32Y		1.398	-0.512	-1.16	1.378	-0.398	-0.98	XX
BQEXCZ		1.583	-0.327	-0.74	1.602	-0.174	-0.43	XX
E6ZLRE		1.480	-0.430	-0.97	1.451	-0.325	-0.80	LH
EU2TG3		1.594	-0.316	-0.71	1.450	-0.326	-0.81	LA
F7R3GG	M	2.000	0.090	0.20	No data reported for this sample			TH
FL4LDN		2.460	0.550	1.24	2.220	0.444	1.10	TB
GH4KYC		2.308	0.399	0.90	2.292	0.516	1.27	IK
H6LKFN		1.749	-0.161	-0.36	1.692	-0.084	-0.21	SA
HPGVMW		1.385	-0.525	-1.19	1.207	-0.569	-1.41	LW
HPXCHP		1.711	-0.199	-0.45	1.609	-0.167	-0.41	LW
HTCWHJ		2.313	0.403	0.91	1.904	0.128	0.32	XX
HWL3W		1.776	-0.134	-0.30	1.593	-0.183	-0.45	ID
J9YUXK		1.886	-0.024	-0.05	1.644	-0.132	-0.33	TO
KNW67N		1.799	-0.111	-0.25	1.834	0.057	0.14	XX
LWJLAH	X	1.563	-0.347	-0.78	2.173	0.397	0.98	IM
MZZ9JG	*	3.060	1.150	2.60	2.910	1.134	2.80	IN
P88LG4	X	1.768	-0.142	-0.32	2.580	0.804	1.99	TO
PFJT2D		1.606	-0.304	-0.69	1.449	-0.327	-0.81	LE
PQYRM9		1.773	-0.137	-0.31	1.790	0.014	0.03	XX
PZUNTJ		3.018	1.108	2.50	2.726	0.950	2.35	TO
Q47ZZK		2.490	0.580	1.31	2.550	0.774	1.91	TP
QFYEBE		1.814	-0.096	-0.22	1.695	-0.081	-0.20	TO
R9TAMN		1.922	0.012	0.03	1.938	0.162	0.40	TH
UF7T8Y		1.776	-0.134	-0.30	1.771	-0.005	-0.01	LE
VFN4JC		1.975	0.065	0.15	1.964	0.188	0.46	IM
X92TL3		1.593	-0.317	-0.72	1.498	-0.278	-0.69	LW
XD8N63		1.488	-0.422	-0.95	1.378	-0.398	-0.98	LH
XYRLKT		1.560	-0.350	-0.79	1.473	-0.303	-0.75	LA
XZJQT7	*	2.442	0.532	1.20	1.742	-0.034	-0.08	ID
YVP8B9		1.895	-0.015	-0.03	1.911	0.135	0.33	XX

Summary Statistics	
Sample SE19	Sample SE20
Grand Means	1.9097 Percent
SD Btwn Labs	0.4424 Percent
	1.7762 Percent
	0.4047 Percent
Statistics based on 32 of 35 reporting participants	

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 332**  
**Elongation to Break - Packaging Papers**

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

F7R3GG (M) - No data for Sample SE20.

LWJLAH (X) - Inconsistent in testing between samples.

P88LG4 (X) - Inconsistent in testing between samples.

**Instrument Code List**

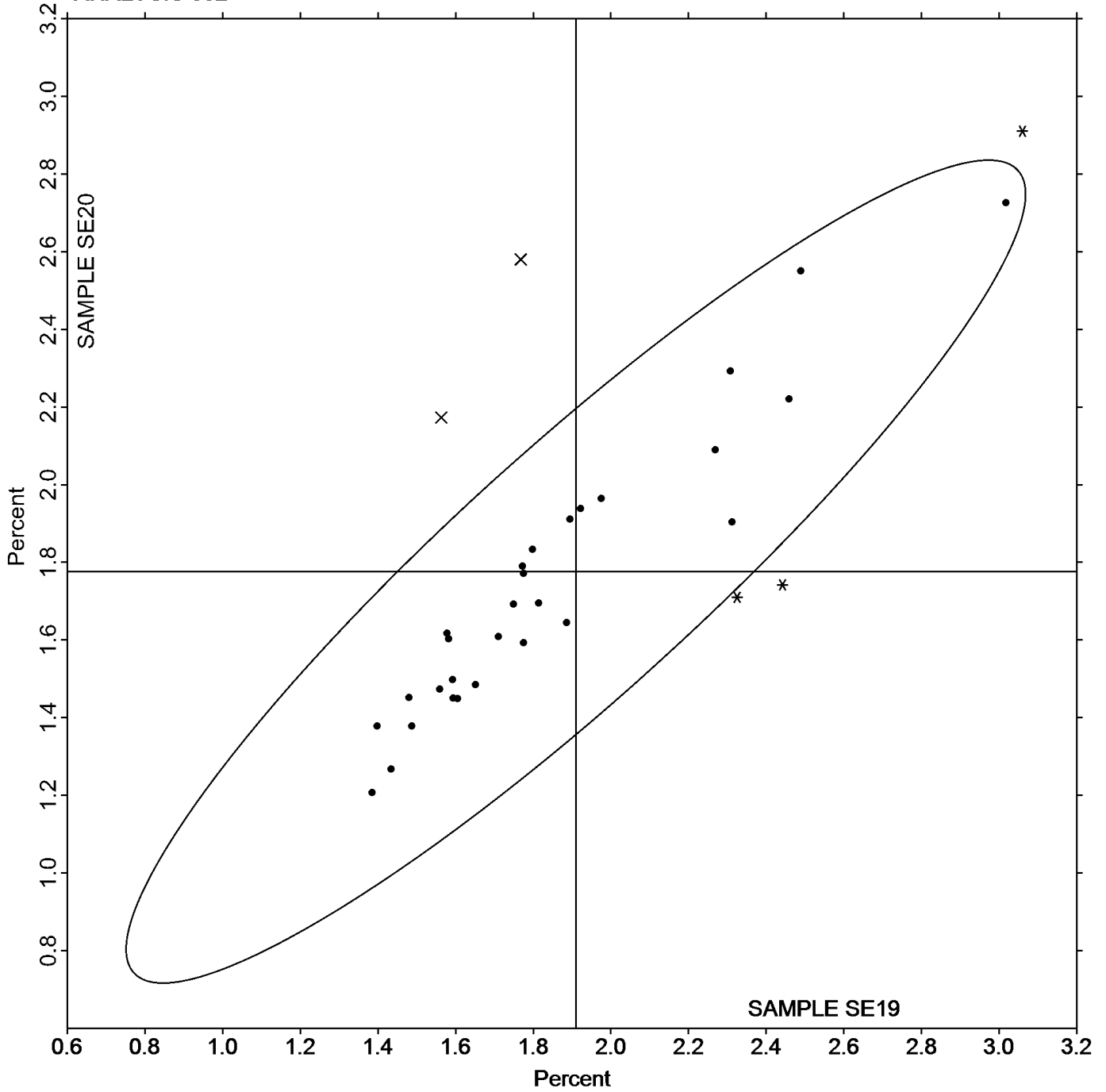
(ID) - Instron 4201	(IF) - Instron 3340 Series
(IK) - Instron 4400 Series	(IM) - Instron 5500 Series
(IN) - Instron 3360 Series	(LA) - L & W Autoline 300
(LE) - L & W Tensile Tester 066	(LH) - L & W Alwetron TH1 (Horizontal) SE 060
(LW) - L & W Tensile Tester SE062	(SA) - Shimadzu Autograph AG 2000 A
(TB) - Thwing-Albert EJA/1000	(TH) - Thwing-Albert QC-3A
(TO) - Thwing-Albert QC-1000	(TP) - TMI Monitor/Tensile 100 (84-21-01)
(XX) - Instrument make/model not specified by lab	

TAPPI-CTS Interlaboratory Testing Program  
Analysis 332  
Elongation to Break - Packaging Papers

Grand Mean Sample **SE19** = 1.9097 Percent

Grand Mean Sample **SE20** = 1.7762 Percent

ANALYSIS 332





**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 334**  
**Folding Endurance (MIT) - Double Folds**

WebCode	Data Flag	Sample SG19			Sample SG20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4CJ42T		36.60	2.08	0.26	108.60	19.86	0.73	MT
4Y9VY2		30.80	-3.72	-0.46	83.90	-4.84	-0.18	MT
69DZNW		40.20	5.68	0.70	89.80	1.06	0.04	MT
6PE34F		49.50	14.98	1.84	117.60	28.86	1.06	MT
6XCN89		21.20	-13.32	-1.64	44.60	-44.14	-1.62	MT
A7CNWC		19.60	-14.92	-1.84	68.50	-20.24	-0.74	MT
EU2TG3		38.30	3.78	0.46	113.30	24.56	0.90	XX
JLCMXD		29.30	-5.22	-0.64	119.80	31.06	1.14	MT
LE7RRA		37.50	2.98	0.37	94.70	5.96	0.22	MT
WVVR27		33.40	-1.12	-0.14	113.70	24.96	0.92	MT
WYXFRT		41.38	6.85	0.84	88.70	-0.04	0.00	MT
X92TL3		26.00	-8.52	-1.05	54.20	-34.54	-1.27	MT
YVP8B9		28.00	-6.52	-0.80	111.40	22.66	0.83	MT
Z29UK4		41.80	7.28	0.90	31.40	-57.34	-2.11	XX
ZHCBMV		40.20	5.68	0.70	101.20	12.46	0.46	MT
ZYJ87V		38.60	4.08	0.50	78.40	-10.34	-0.38	XX

	Sample SG19	Summary Statistics	Sample SG20
Grand Means	34.523 Double Folds		88.738 Double Folds
SD Btwn Labs	8.126 Double Folds		27.194 Double Folds
Statistics based on 16 of 16 reporting participants			

### Instrument Code List

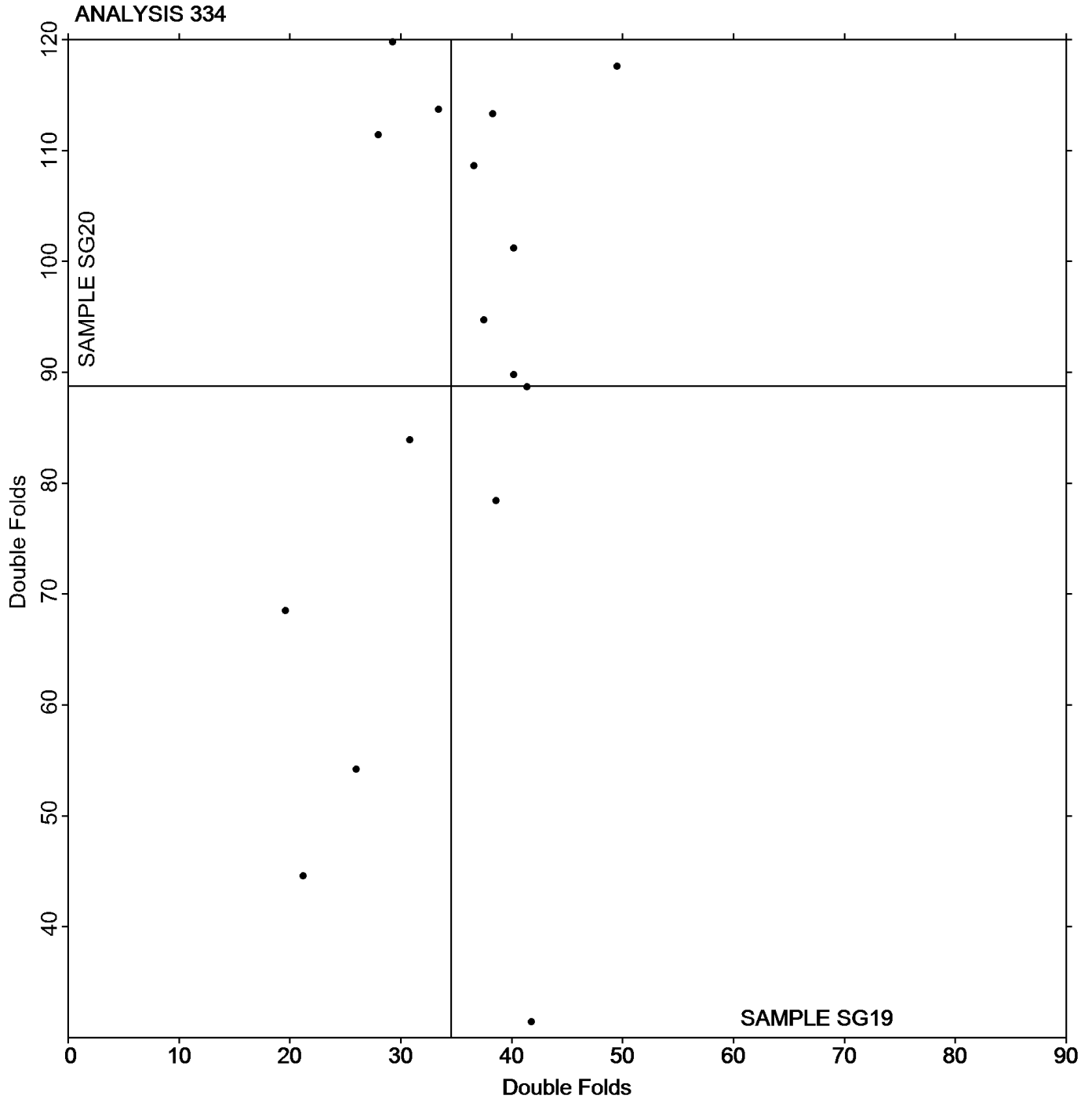
(MT) - MIT - Tinius Olsen

(XX) - Instrument make/model not specified by lab

TAPPI-CTS Interlaboratory Testing Program  
Analysis 334  
Folding Endurance (MIT) - Double Folds

Grand Mean Sample **SG19** = 34.523 Double Folds

Grand Mean Sample **SG20** = 88.738 Double Folds



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

## TAPPI-CTS Interlaboratory Testing Program

## Analysis 336

## Bending Resistance, Gurley Type

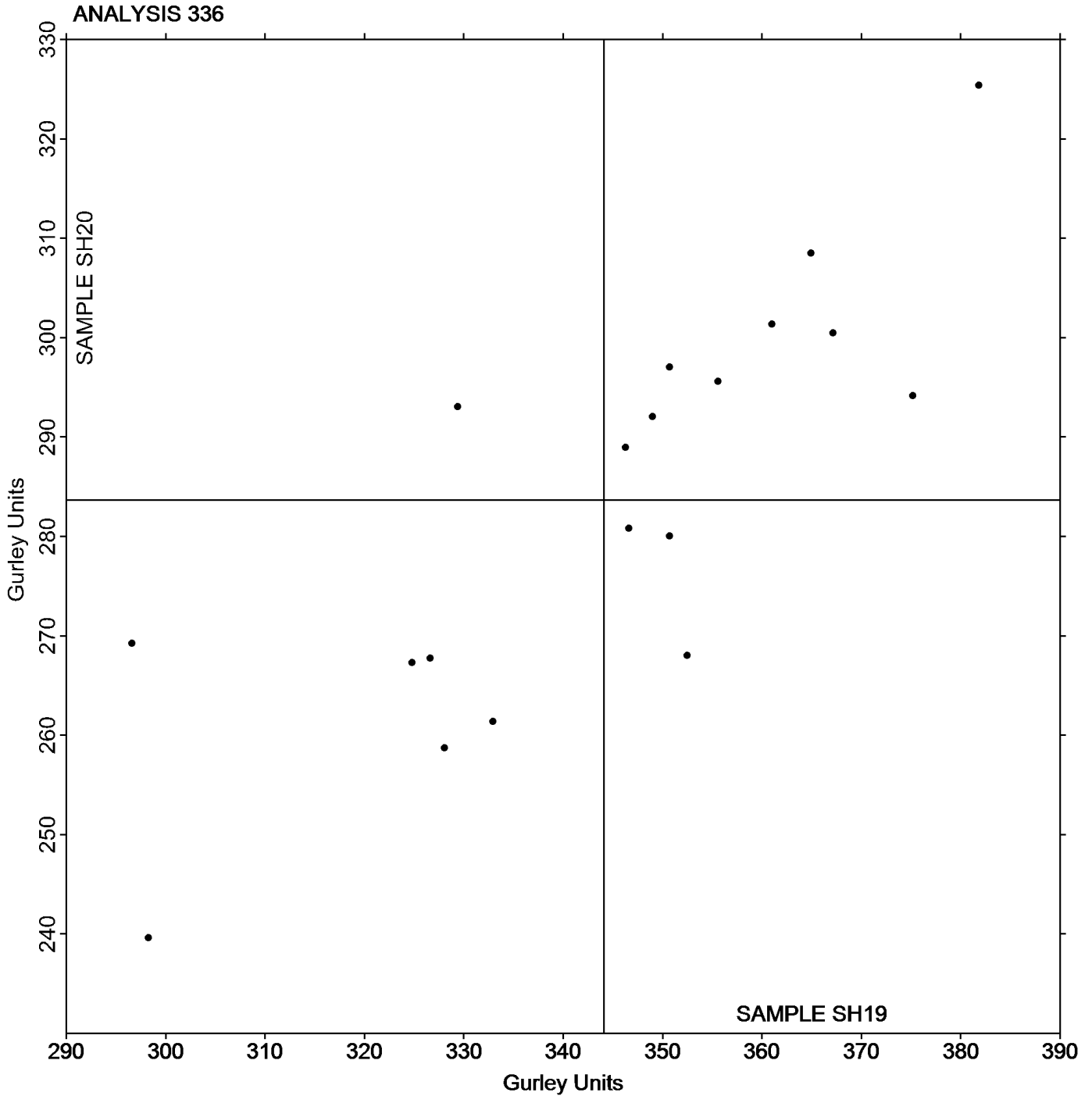
WebCode	Data Flag	Sample SH19			Sample SH20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2KCWWD		326.7	-17.5	-0.76	267.7	-15.9	-0.77
678LWW		367.2	23.0	1.00	300.5	16.8	0.82
6H3NJY		324.8	-19.3	-0.84	267.3	-16.3	-0.79
76MFWX		296.6	-47.5	-2.06	269.2	-14.4	-0.70
7J8XQM		375.2	31.1	1.35	294.2	10.5	0.51
CN2LAN		355.6	11.5	0.50	295.6	12.0	0.58
DUHKWE		381.8	37.7	1.63	325.4	41.7	2.03
H8CN9V		298.3	-45.9	-1.99	239.6	-44.1	-2.14
HCA8CE		346.3	2.1	0.09	288.9	5.3	0.26
HVER3M		329.4	-14.7	-0.64	293.0	9.4	0.46
JKXHYE		349.0	4.9	0.21	292.0	8.4	0.41
JLCMXD		332.9	-11.2	-0.48	261.4	-22.3	-1.08
L9C326		361.0	16.9	0.73	301.4	17.7	0.86
LE7RRA		350.7	6.6	0.29	280.0	-3.6	-0.18
M7644G		328.0	-16.1	-0.70	258.7	-24.9	-1.21
PZUNTJ		350.7	6.6	0.29	297.0	13.4	0.65
UN3THK		346.6	2.5	0.11	280.8	-2.8	-0.14
YBZQ8E		352.5	8.4	0.36	268.0	-15.6	-0.76
YVP8B9		364.9	20.8	0.90	308.5	24.8	1.21

		Summary Statistics	
	Sample SH19		Sample SH20
Grand Means	344.11 Gurley Units		283.64 Gurley Units
SD Btwn Labs	23.10 Gurley Units		20.58 Gurley Units
Statistics based on 19 of 19 reporting participants			

TAPPI-CTS Interlaboratory Testing Program  
Analysis 336  
Bending Resistance, Gurley Type

Grand Mean Sample **SH19** = 344.11 Gurley Units

Grand Mean Sample **SH20** = 283.64 Gurley Units



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

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 338**  
**Bending Resistance, Taber Type - 0 to 10 Units**

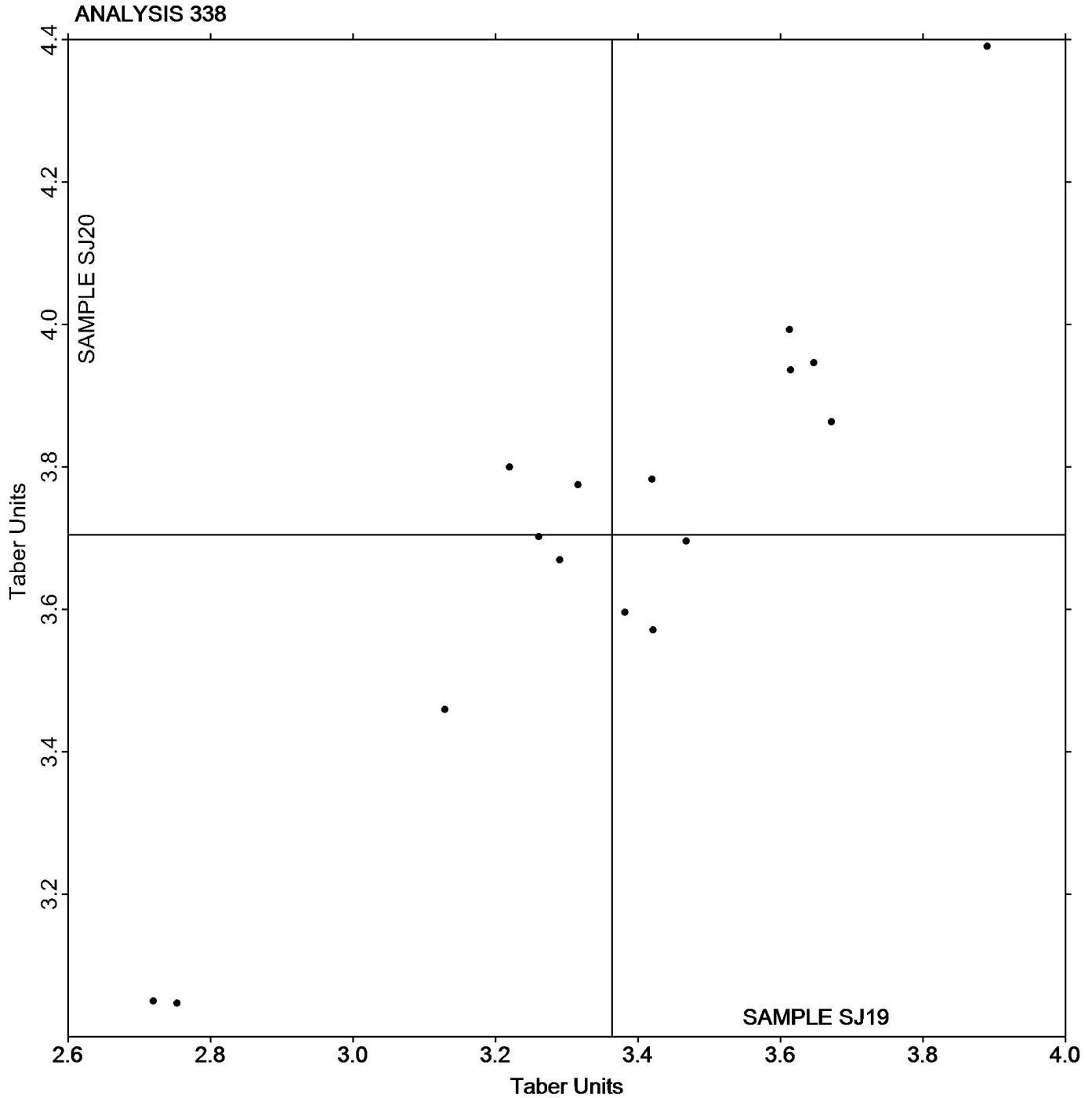
WebCode	Data Flag	Sample SJ19			Sample SJ20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3B6E3M		3.890	0.527	1.68	4.390	0.685	2.06
4JDFQU		3.220	-0.143	-0.46	3.800	0.095	0.29
4Y9VY2		3.468	0.105	0.33	3.696	-0.009	-0.03
7J8XQM		3.290	-0.073	-0.23	3.669	-0.036	-0.11
88VTDY		3.420	0.056	0.18	3.783	0.078	0.23
8Y3FGK		3.129	-0.234	-0.75	3.459	-0.246	-0.74
CN2LAN		3.613	0.249	0.79	3.993	0.288	0.86
DAJDNB		3.316	-0.047	-0.15	3.775	0.070	0.21
FEJKVP		3.421	0.058	0.18	3.571	-0.134	-0.40
H8CN9V		2.753	-0.610	-1.95	3.047	-0.658	-1.98
HCA8CE		3.382	0.018	0.06	3.596	-0.109	-0.33
HPGVMW		2.720	-0.643	-2.05	3.050	-0.655	-1.97
LE7RRA		3.647	0.284	0.90	3.946	0.241	0.73
XKNA48		3.672	0.309	0.98	3.863	0.158	0.48
Z29UK4		3.614	0.251	0.80	3.936	0.231	0.70
ZHCBMV		3.261	-0.102	-0.33	3.702	-0.003	-0.01

		Summary Statistics	
	Sample SJ19		Sample SJ20
Grand Means	3.3634 Taber Units		3.7047 Taber Units
SD Btwn Labs	0.3137 Taber Units		0.3329 Taber Units
Statistics based on 16 of 16 reporting participants			

TAPPI-CTS Interlaboratory Testing Program  
Analysis 338  
Bending Resistance, Taber Type - 0 to 10 Units

Grand Mean Sample **SJ19** = 3.3634 Taber Units

Grand Mean Sample **SJ20** = 3.7047 Taber Units



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

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 339**  
**Bending Resistance, Taber Type - 10 to 100 Taber Units**

WebCode	Data Flag	Sample SQ19			Sample SQ20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
DUHKWE		123.7	-5.9	-0.84	233.6	-4.8	-0.47
EU2TG3		138.9	9.3	1.32	254.9	16.5	1.60
FL4LDN		130.0	0.4	0.05	236.5	-1.9	-0.19
HPGVMW		126.3	-3.3	-0.47	234.3	-4.1	-0.40
JRHGR9	X	45.4	-84.1	-11.94	79.4	-159.0	-15.47
LE7RRA		134.0	4.4	0.63	239.7	1.3	0.13
LTKX2N		134.5	4.9	0.70	248.5	10.1	0.98
RFYWN4		126.5	-3.1	-0.44	231.8	-6.6	-0.65
UF7T8Y		135.7	6.1	0.87	249.7	11.3	1.10
X92TL3		131.6	2.0	0.28	235.5	-2.9	-0.28
XYRLKT		114.8	-14.8	-2.10	219.7	-18.7	-1.82

Summary Statistics		
	Sample SQ19	Sample SQ20
Grand Means	129.58 Taber Units	238.40 Taber Units
SD Btwn Labs	7.04 Taber Units	10.28 Taber Units
Statistics based on 10 of 11 reporting participants		

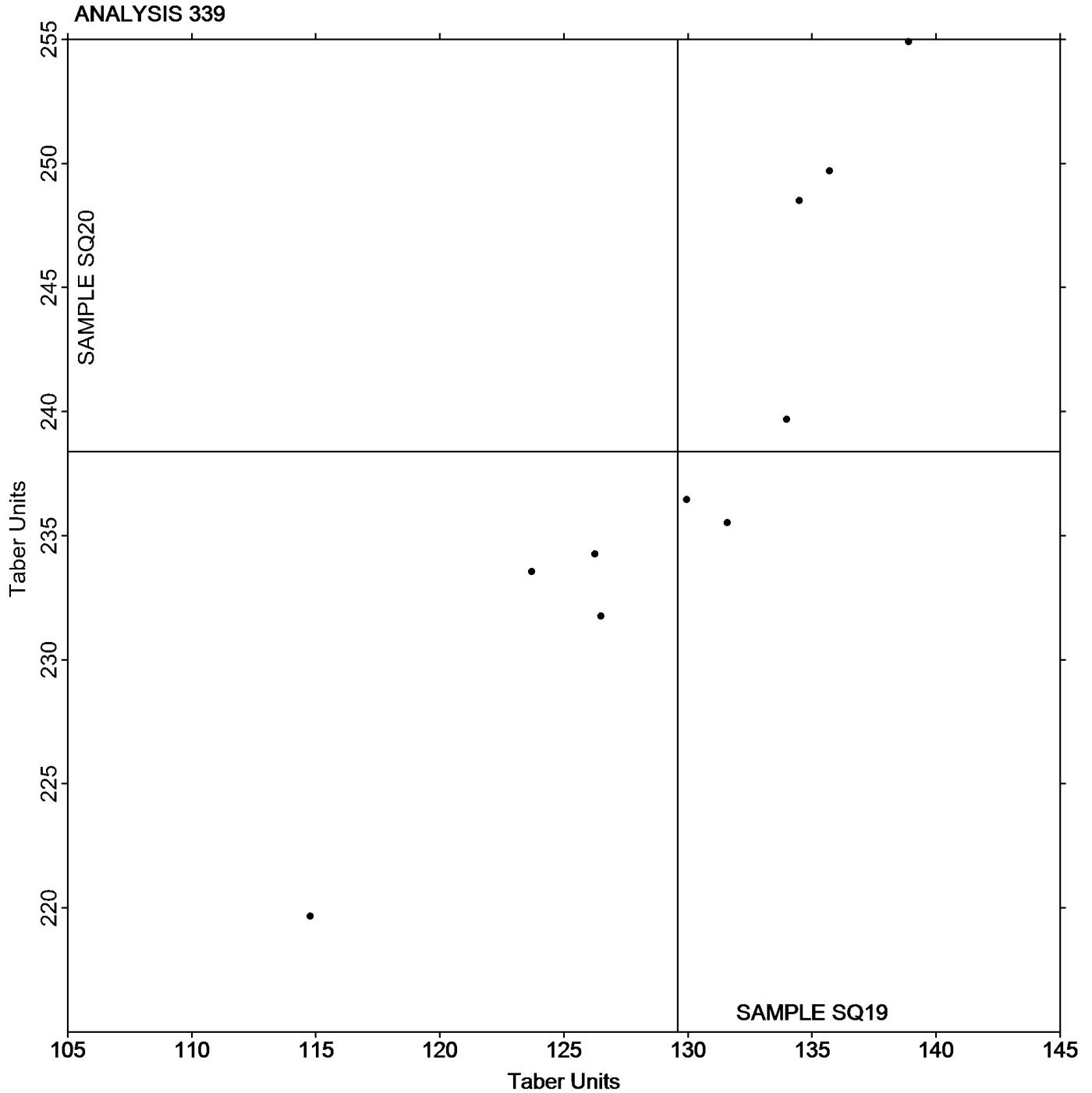
**Comments on assigned Data Flags for Test #339**

JRHGR9 (X) - Extreme data.

TAPPI-CTS Interlaboratory Testing Program  
Analysis 339  
Bending Resistance, Taber Type - 10 to 100 Taber Units

Grand Mean Sample **SQ19** = 129.58 Taber Units

Grand Mean Sample **SQ20** = 238.40 Taber Units



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



**TAPPI-CTS Interlaboratory Testing Program  
Analysis 340**

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

WebCode	Data Flag	Sample ST19			Sample ST20		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3RF2QJ		296.7	4.4	0.25	250.0	2.2	0.12
4UZAB4		285.0	-7.3	-0.41	247.3	-0.6	-0.03
63Q8EH		312.5	20.2	1.13	242.5	-5.3	-0.30
8CJJFZ	X	363.9	71.6	4.01	399.2	151.3	8.60
9HL42W		325.4	33.1	1.85	292.7	44.8	2.55
9UG6UZ		283.0	-9.3	-0.52	255.0	7.2	0.41
ACGJFC		272.2	-20.1	-1.13	236.7	-11.1	-0.63
H6LKFN		284.7	-7.6	-0.42	232.9	-14.9	-0.85
HPGVMW		274.8	-17.6	-0.98	246.3	-1.6	-0.09
HQ6MC9		292.5	0.2	0.01	256.8	9.0	0.51
HWWL3W		291.0	-1.3	-0.07	251.5	3.7	0.21
KZ6WW3		288.0	-4.3	-0.24	243.1	-4.7	-0.27
Q47ZZK		279.6	-12.7	-0.71	223.0	-24.8	-1.41
QQF7QC		333.2	40.9	2.29	274.2	26.4	1.50
R9TAMN		283.3	-9.0	-0.50	235.1	-12.7	-0.72
YVP8B9		282.6	-9.8	-0.55	230.6	-17.2	-0.98

Summary Statistics		
	Sample ST19	Sample ST20
Grand Means	292.30 Taber Units	247.84 Taber Units
SD Btwn Labs	17.85 Taber Units	17.59 Taber Units
Statistics based on 15 of 16 reporting participants		

**Comments on assigned Data Flags for Test #340**

8CJJFZ (X) - Extreme data.

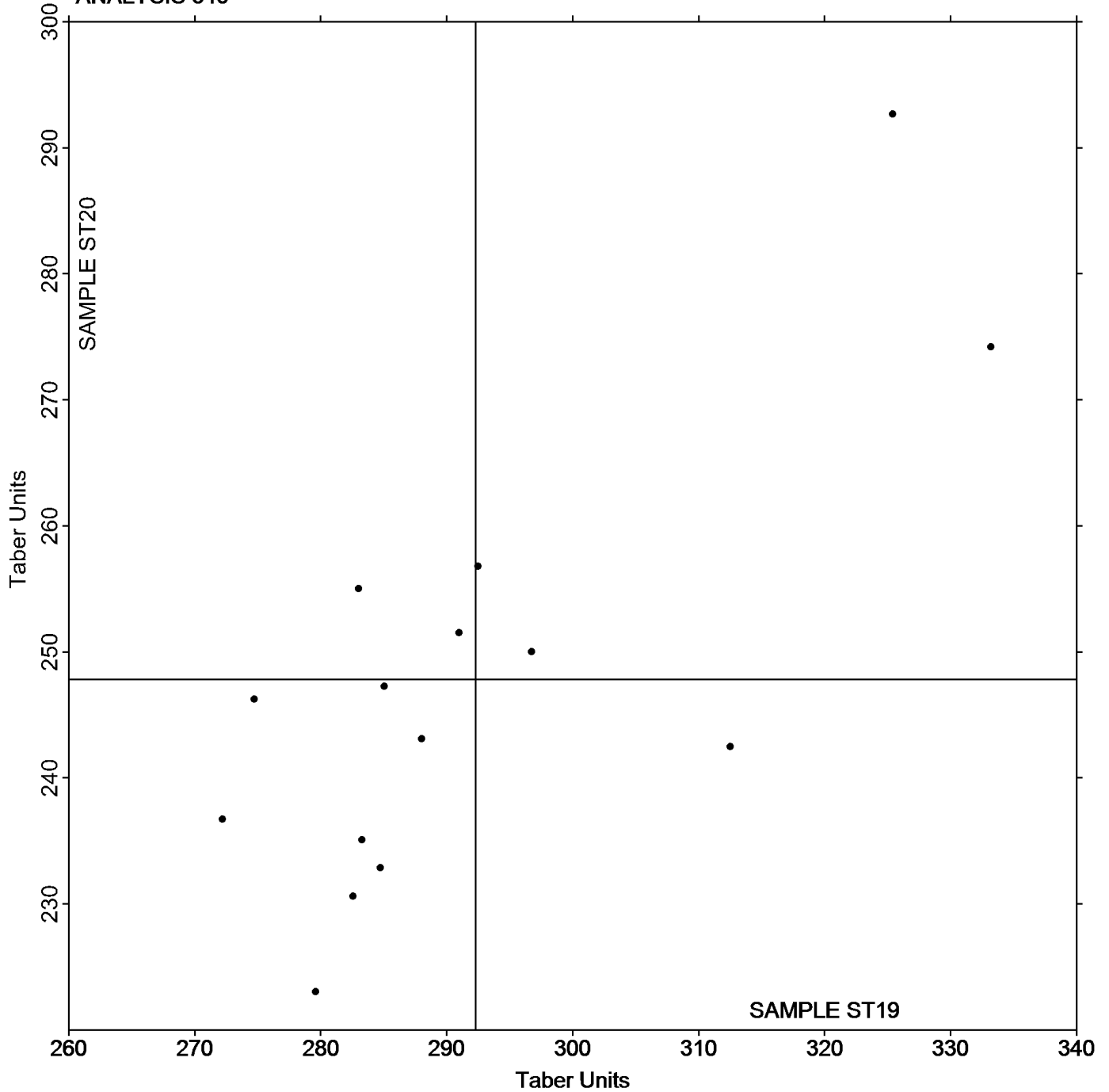
### TAPPI-CTS Interlaboratory Testing Program Analysis 340

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

Grand Mean Sample **ST19** = 292.30 Taber Units

Grand Mean Sample **ST20** = 247.84 Taber Units

#### ANALYSIS 340



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

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 343**  
**Z-Direction Tensile**

WebCode	Data Flag	Sample SM19			Sample SM20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
27XDHR		66.86	-8.90	-1.13	43.31	-14.21	-2.08	LW
4UZAB4		85.24	9.48	1.20	65.66	8.14	1.19	CA
4Y9VY2		78.96	3.20	0.41	55.58	-1.94	-0.28	CD
6JDTXM		80.74	4.98	0.63	59.52	2.00	0.29	TA
7J8XQM		77.00	1.24	0.16	63.88	6.36	0.93	TL
EU2TG3		83.28	7.52	0.95	62.54	5.02	0.73	LW
FL4LDN		91.62	15.86	2.01	68.82	11.30	1.65	TA
JRHGR9		65.72	-10.04	-1.27	47.37	-10.15	-1.48	LW
KNW67N		64.68	-11.08	-1.40	49.34	-8.18	-1.20	DT
LE7RRA		76.21	0.45	0.06	54.39	-3.13	-0.46	TZ
LNQYRY		74.06	-1.70	-0.22	56.02	-1.50	-0.22	DT
NTZYYB		81.00	5.24	0.66	57.00	-0.52	-0.08	XX
Q47ZZK	*	67.79	-7.97	-1.01	66.46	8.94	1.31	XX
R9TAMN		63.86	-11.90	-1.51	54.64	-2.88	-0.42	LW
RNPCET		75.50	-0.26	-0.03	59.00	1.48	0.22	DT
UF7T8Y		80.70	4.94	0.63	58.88	1.36	0.20	TA
X92TL3		74.68	-1.08	-0.14	55.40	-2.12	-0.31	LW

Summary Statistics			
	Sample SM19		Sample SM20
Grand Means	75.759 psi		57.518 psi
SD Btwn Labs	7.900 psi		6.839 psi
Statistics based on 17 of 17 reporting participants			

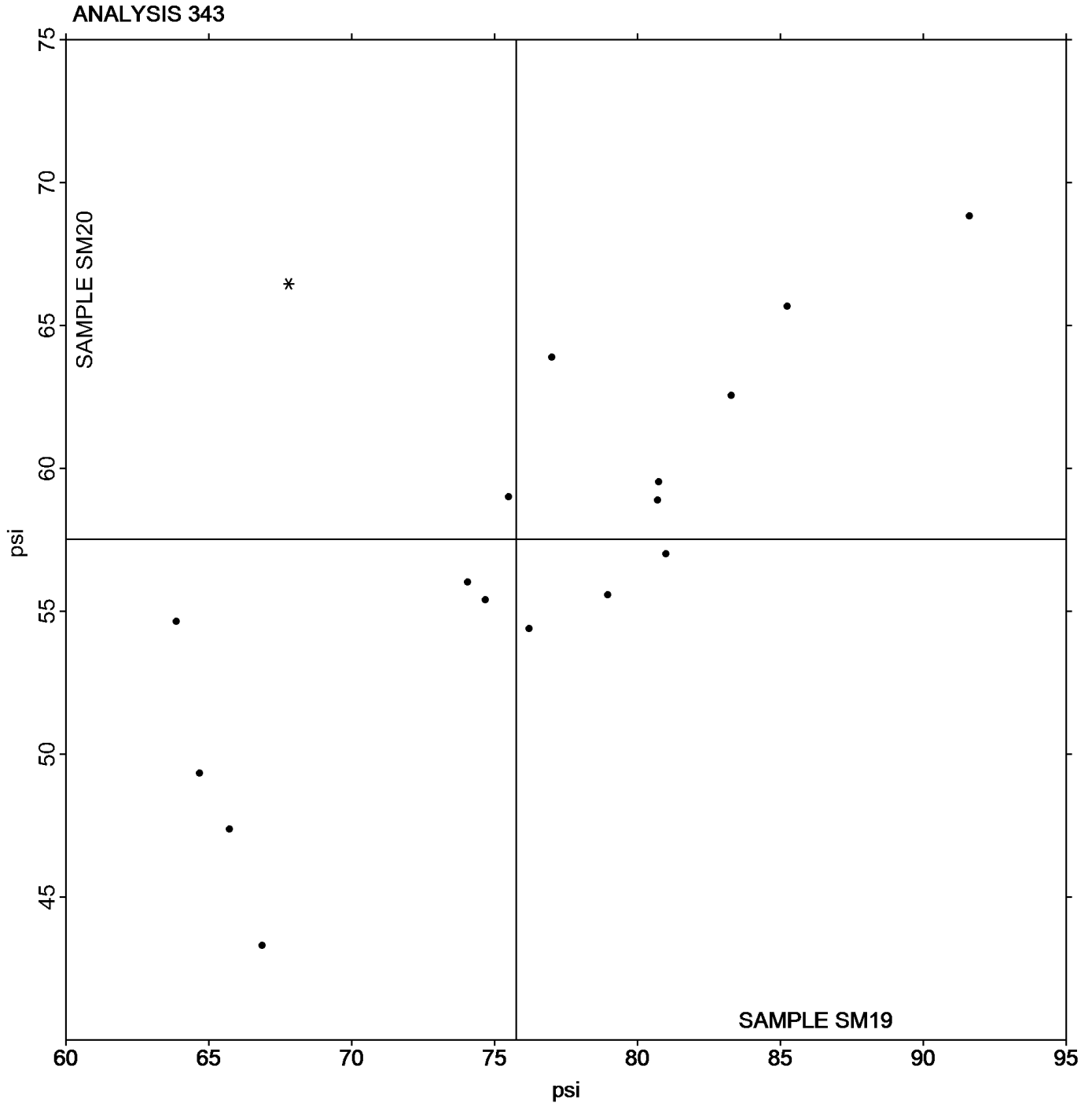
**Instrument Code List**

- |                                     |   |
|-------------------------------------|---|
| (CA) - CSI CS-163                   | (CD) - CSI CS-163D                                |
| (DT) - Dek-Tron DCS-163A ZDT Tester | (LW) - L & W ZD Tensile Tester                    |
| (TA) - Thwing-Albert Tensile Tester | (TL) - TMI Lab Master                             |
| (TZ) - TMI Monitor/ZDT Tester       | (XX) - Instrument make/model not specified by lab |

### TAPPI-CTS Interlaboratory Testing Program Analysis 343 Z-Direction Tensile

Grand Mean Sample **SM19** = 75.759 psi

Grand Mean Sample **SM20** = 57.518 psi



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

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 345**  
**Z-Direction Tensile, Recycled Paperboard**

WebCode	Data Flag	Sample SZ19			Sample SZ20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
63Q8EH		38.40	3.08	1.28	43.00	3.10	1.01	CA
6APWU2		34.20	-1.12	-0.47	39.40	-0.50	-0.16	LW
6LFQ4A		35.84	0.52	0.22	35.98	-3.92	-1.28	LW
6MT8E3		32.75	-2.57	-1.07	39.02	-0.88	-0.29	XX
7FBABF		33.98	-1.34	-0.56	40.04	0.14	0.05	CA
8CJFZ		35.63	0.31	0.13	41.11	1.21	0.40	TZ
9HL42W		36.40	1.08	0.45	41.20	1.30	0.42	CA
ACGJFC		37.00	1.68	0.70	38.80	-1.10	-0.36	CA
AQWUVM		33.56	-1.76	-0.73	39.02	-0.88	-0.29	TL
GH4KYC		38.97	3.65	1.52	43.84	3.94	1.28	PG
HQ6MC9		36.30	0.98	0.41	44.98	5.08	1.66	TL
KXGERW		33.00	-2.32	-0.97	35.10	-4.80	-1.56	TL
KZ6WW3		38.68	3.36	1.40	33.64	-6.26	-2.04	CA
QQF7QC		35.20	-0.12	-0.05	38.80	-1.10	-0.36	TL
TZJVTY		37.44	2.12	0.88	43.60	3.70	1.21	TL
W9LEFD		30.60	-4.72	-1.97	39.82	-0.08	-0.03	LW
YVP8B9		32.50	-2.82	-1.17	40.90	1.00	0.33	CA

		Summary Statistics	
	Sample SZ19		Sample SZ20
Grand Means	35.320 psi		39.897 psi
SD Btwn Labs	2.401 psi		3.068 psi
Statistics based on 17 of 17 reporting participants			

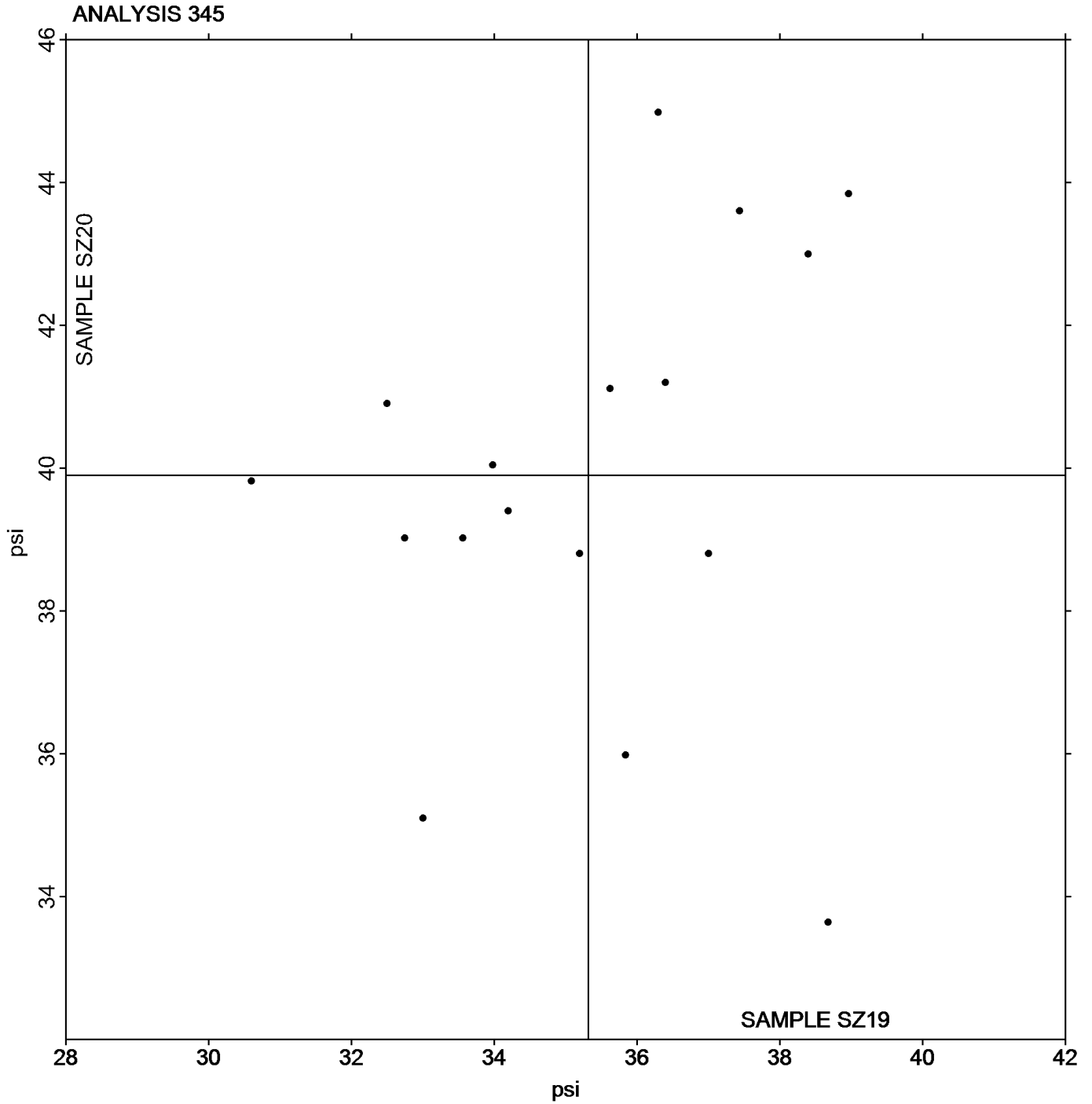
**Instrument Code List**

- |                                      |   |
|--------------------------------------|---|
| (CA) - CSI CS-163                    | (LW) - L & W ZD Tensile Tester                    |
| (PG) - Perkins Model A Mullen Tester | (TL) - TMI Lab Master                             |
| (TZ) - TMI Monitor/ZDT Tester        | (XX) - Instrument make/model not specified by lab |

TAPPI-CTS Interlaboratory Testing Program  
Analysis 345  
Z-Direction Tensile, Recycled Paperboard

Grand Mean Sample **SZ19** = 35.320 psi

Grand Mean Sample **SZ20** = 39.897 psi



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

**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 348**  
**Internal Bond Strength - Modified Scott Mechanics**

WebCode	Data Flag	Sample SN19			Sample SN20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4Y9VY2		101.20	3.31	0.41	80.60	4.39	0.65	HY
678LWW		95.00	-2.89	-0.36	81.04	4.83	0.72	HZ
6JDTXM		112.20	14.31	1.77	87.60	11.39	1.70	HY
9HL42W		82.16	-15.73	-1.95	63.92	-12.29	-1.83	HY
CN2LAN		96.23	-1.66	-0.21	75.39	-0.82	-0.12	KR
EU2TG3		108.20	10.31	1.28	87.00	10.79	1.61	XX
FL4LDN		95.60	-2.29	-0.28	77.60	1.39	0.21	HZ
HCA8CE		93.20	-4.69	-0.58	76.04	-0.17	-0.03	HY
HYGT3J		98.00	0.11	0.01	73.80	-2.41	-0.36	HY
JLCMXD		95.80	-2.09	-0.26	66.60	-9.61	-1.43	HY
LE7RRA		101.40	3.51	0.43	76.20	-0.01	0.00	HY
M7644G		96.60	-1.29	-0.16	76.80	0.59	0.09	HY
P88LG4		101.00	3.11	0.39	76.20	-0.01	0.00	HZ
QFYEBE		93.60	-4.29	-0.53	70.60	-5.61	-0.84	HY
R9TAMN		82.60	-15.29	-1.90	67.20	-9.01	-1.34	HZ
UF7T8Y		111.20	13.31	1.65	88.00	11.79	1.76	HY
X2ECKC		94.80	-3.09	-0.38	73.80	-2.41	-0.36	HY
X92TL3		94.20	-3.69	-0.46	72.80	-3.41	-0.51	HY
YVP8B9		107.00	9.11	1.13	76.80	0.59	0.09	HZ

Summary Statistics			
	Sample SN19		Sample SN20
Grand Means	97.894	1000th ft-lbs	76.210
SD Btwn Labs	8.067	1000th ft-lbs	6.710
Statistics based on 19 of 19 reporting participants			

**Instrument Code List**

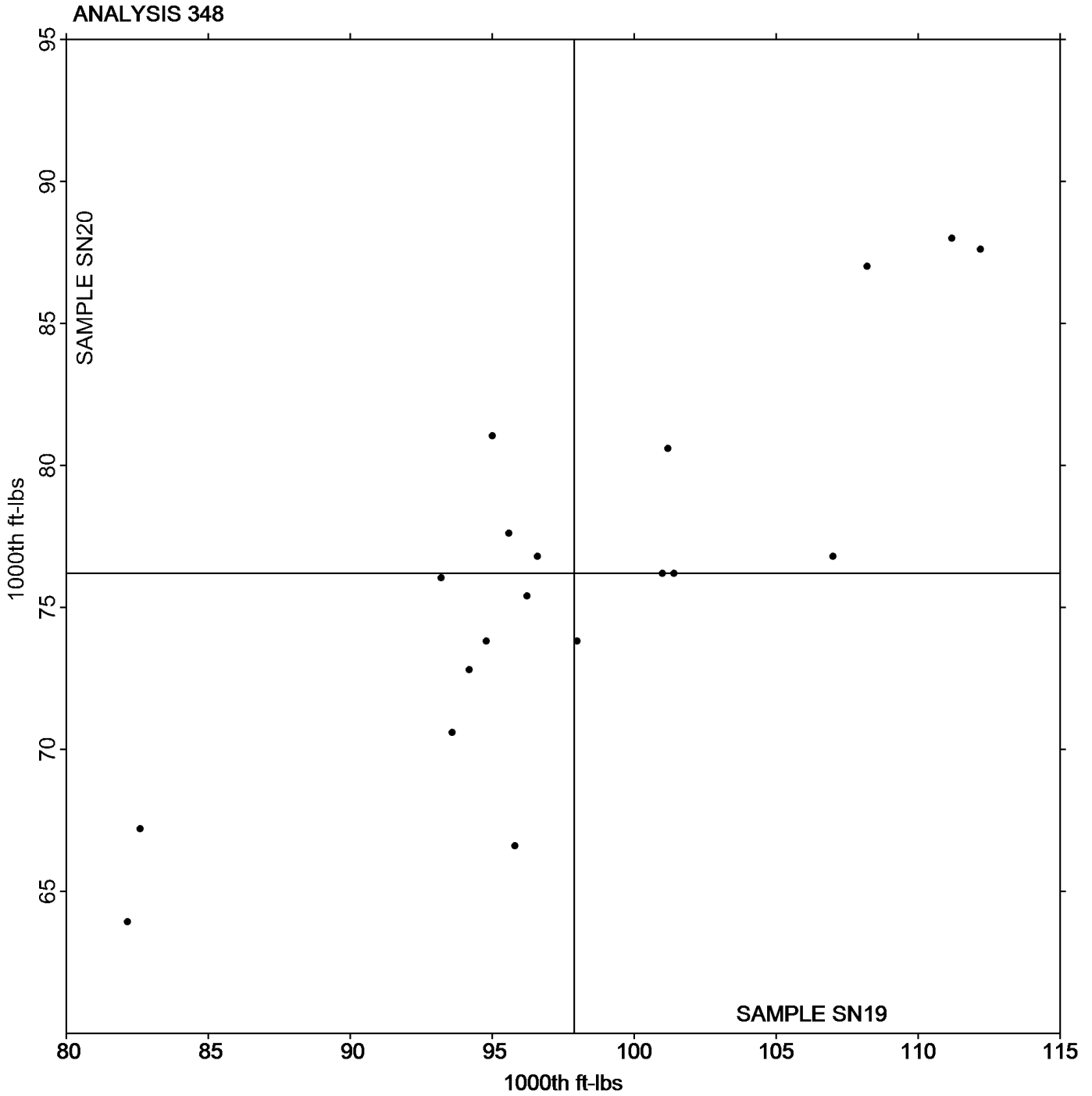
(HY) - Huygen Digitized Scott Internal Bond Tester  
 (KR) - Kumagai Riki Kogyo Internal Bond Tester

(HZ) - Huygen Internal Bond Tester with AccuPress  
 (XX) - Instrument make/model not specified by lab

TAPPI-CTS Interlaboratory Testing Program  
Analysis 348  
Internal Bond Strength - Modified Scott Mechanics

Grand Mean Sample **SN19** = 97.894 1000th ft-lbs

Grand Mean Sample **SN20** = 76.210 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.



**TAPPI-CTS Interlaboratory Testing Program**  
**Analysis 349**  
**Internal Bond Strength - Scott Bond Models**

WebCode	Data Flag	Sample SP19			Sample SP20			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
E6ZLRE		83.75	-0.99	-0.10	70.55	5.25	0.83	TM
GH4KYC		96.00	11.26	1.11	72.20	6.90	1.10	TM
HPGVMW		100.10	15.36	1.52	68.30	3.00	0.48	SC
JJ3LQK		75.99	-8.75	-0.86	57.61	-7.69	-1.22	TM
KXGERW	X	61.80	-22.94	-2.27	36.20	-29.10	-4.62	TM
Q47ZZK		72.23	-12.51	-1.24	55.86	-9.43	-1.50	TM
RV8QFD		84.51	-0.23	-0.02	67.57	2.27	0.36	XX
Z29UK4		80.60	-4.14	-0.41	65.00	-0.30	-0.05	TM

		Summary Statistics			
		Sample SP19		Sample SP20	
Grand Means		84.741	1000th ft-lbs	65.299	1000th ft-lbs
SD Btwn Labs		10.115	1000th ft-lbs	6.293	1000th ft-lbs
Statistics based on 7 of 8 reporting participants					

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

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

**Instrument Code List**

(SC) - Scott Internal Bond Tester (Manual)

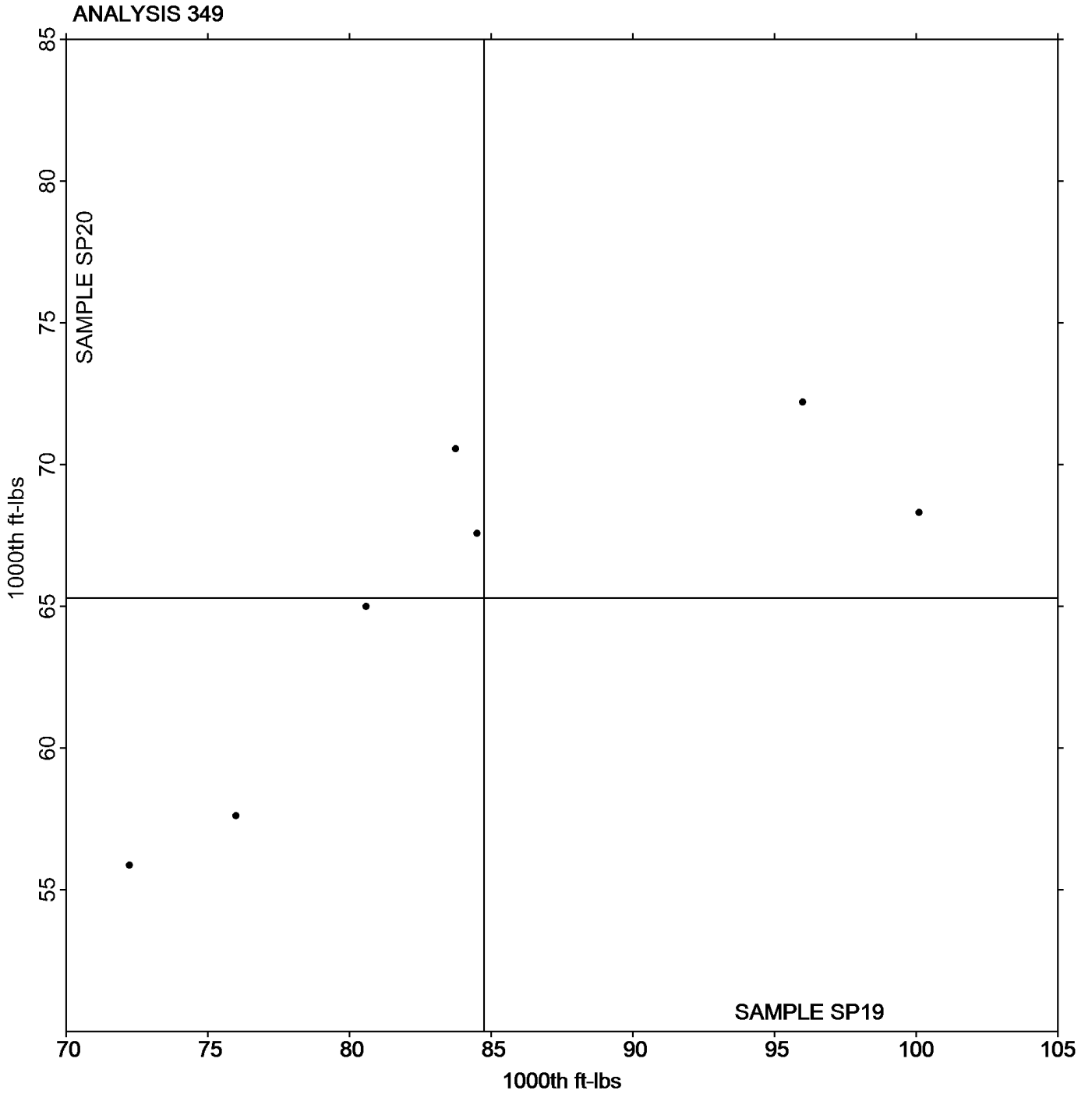
(TM) - TMI Monitor/Internal Bond Tester

(XX) - Instrument make/model not specified by lab

TAPPI-CTS Interlaboratory Testing Program  
Analysis 349  
Internal Bond Strength - Scott Bond Models

Grand Mean Sample **SP19** = 84.741 1000th ft-lbs

Grand Mean Sample **SP20** = 65.299 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.