



Paper & Paperboard Testing Program

Summary Report #4301 - May 2024

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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 industries including color, rubber, plastics, fasteners and metals, containerboard, paper, agriculture, hemp, 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 100 countries, currently participate in the CTS programs.

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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.



Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3101
Thickness (Caliper), Printing papers
TAPPI Official Test Method T411

WebCode	Data Flag	Sample CP29			Sample CP30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29ZJLU		4.619	-0.051	-0.66	4.713	0.024	0.27
2CL977		4.695	0.025	0.32	4.692	0.003	0.03
39X96G		4.647	-0.023	-0.30	4.637	-0.052	-0.59
3HMZRA		4.526	-0.144	-1.86	4.530	-0.159	-1.82
3TP3D7		4.531	-0.139	-1.80	4.542	-0.147	-1.68
49FHWW		4.593	-0.077	-1.00	4.643	-0.046	-0.53
4FV2DB		4.697	0.027	0.35	4.748	0.059	0.67
4LFJ9X	*	4.530	-0.140	-1.81	4.651	-0.038	-0.43
62A9ZN		4.742	0.072	0.93	4.754	0.065	0.74
6NJC2B		4.774	0.104	1.34	4.742	0.053	0.61
6Y4MB3		4.659	-0.011	-0.15	4.742	0.053	0.61
77XEV2		4.776	0.105	1.36	4.839	0.150	1.71
7AWQR2		4.650	-0.020	-0.26	4.650	-0.039	-0.45
9ZL7LB		4.636	-0.034	-0.44	4.646	-0.043	-0.49
ABHAP6		4.707	0.037	0.47	4.693	0.003	0.04
AKMG66		4.675	0.005	0.06	4.679	-0.010	-0.12
ANMR26		4.737	0.067	0.86	4.779	0.090	1.03
BPBNZH		4.627	-0.043	-0.56	4.662	-0.027	-0.31
CH9XUX		4.744	0.073	0.95	4.739	0.050	0.57
CLBRUN		4.687	0.017	0.22	4.639	-0.050	-0.57
CRF9Q4		4.761	0.091	1.17	4.733	0.044	0.50
DU44QH		4.613	-0.058	-0.74	4.670	-0.019	-0.21
EUXCB7		4.784	0.114	1.47	4.814	0.125	1.43
HHRQCW		4.672	0.001	0.02	4.612	-0.077	-0.88
J3F94A		4.671	0.001	0.01	4.688	-0.001	-0.01
JFKREA		4.727	0.057	0.73	4.703	0.014	0.16
K2FVTL		4.693	0.023	0.29	4.717	0.028	0.31
L6VH8R		4.562	-0.108	-1.40	4.556	-0.133	-1.52
L8H39P		4.644	-0.026	-0.34	4.654	-0.035	-0.40
MY4XEV		4.700	0.030	0.38	4.701	0.012	0.14
N3GXCM		4.619	-0.051	-0.66	4.690	0.001	0.01
N8DLTU		4.796	0.126	1.63	4.806	0.117	1.34
PDGPEL		4.622	-0.048	-0.62	4.570	-0.119	-1.36
PKG64U		4.699	0.029	0.37	4.738	0.049	0.56
PU7VQL		4.646	-0.025	-0.32	4.654	-0.035	-0.41
QX27YQ		4.724	0.053	0.69	4.792	0.103	1.18
TV8ZUK		4.734	0.064	0.82	4.754	0.065	0.75
WXGGBE		4.611	-0.059	-0.77	4.598	-0.091	-1.04
X4Y4NG		4.688	0.018	0.23	4.661	-0.028	-0.32
XEX2AV		4.620	-0.050	-0.65	4.583	-0.106	-1.21



Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3101
Thickness (Caliper), Printing papers
TAPPI Official Test Method T411

WebCode	Data Flag	<u>Sample CP29</u>			<u>Sample CP30</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
Y7MZNU		4.668	-0.002	-0.03	4.711	0.022	0.25
Y9D2W4	*	4.450	-0.220	-2.85	4.466	-0.223	-2.55
Z8VC4B		4.770	0.100	1.29	4.864	0.175	2.00
ZXKAHA		4.770	0.100	1.29	4.864	0.175	2.00

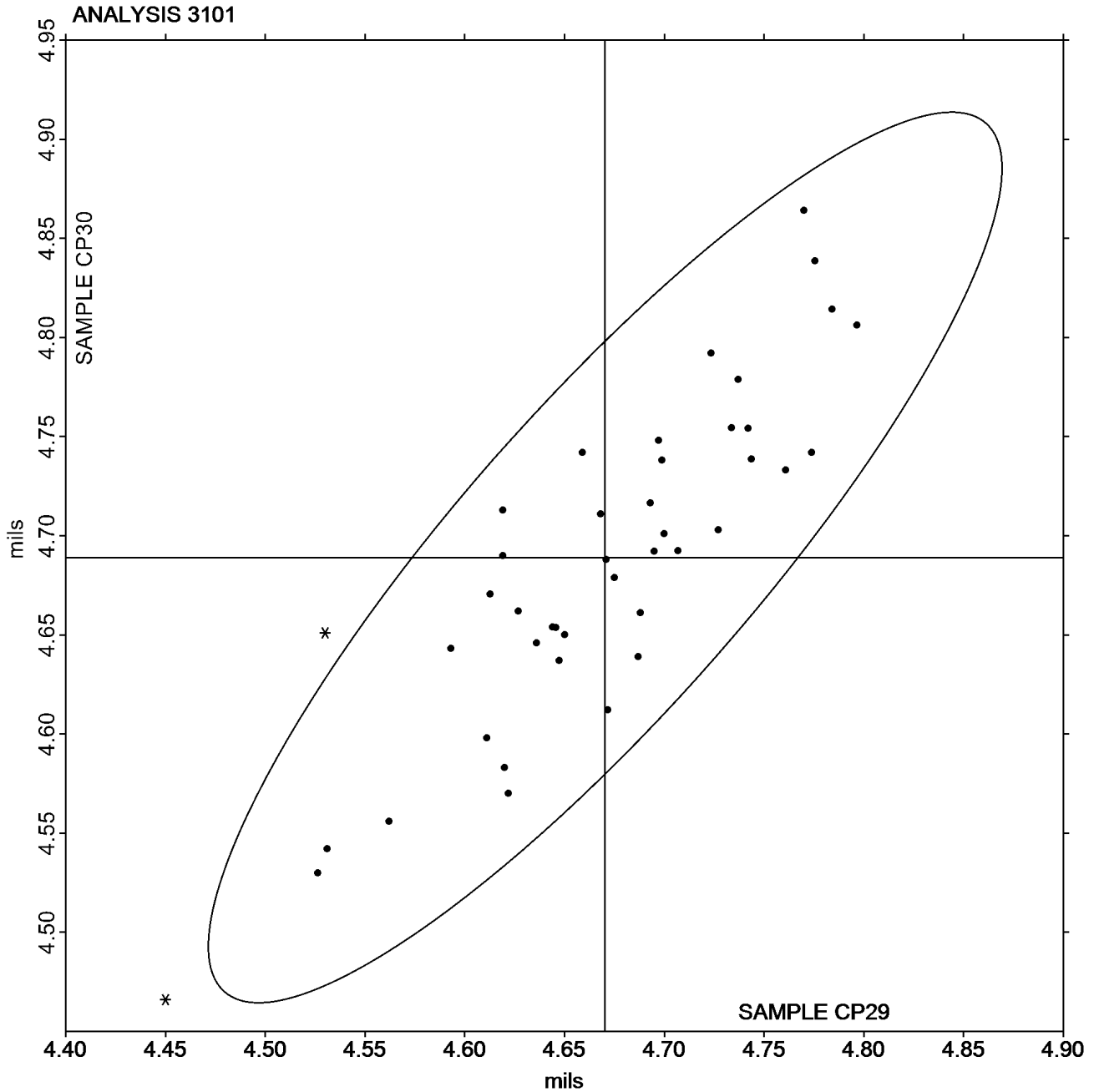
Summary Statistics	<u>Sample CP29</u>	<u>Sample CP30</u>
Grand Means	4.67 mils	4.69 mils
Std Dev Btwn Labs	0.08 mils	0.09 mils
Statistics based on 44 of 44 reporting participants.		



Analysis 3101
Thickness (Caliper), Printing papers
TAPPI Official Test Method T411

Grand Mean Sample CP29 = 4.6703
mils

Grand Mean Sample CP30 = 4.6890
mils





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Paper & Paperboard Interlaboratory Testing Program
Analysis 3111
Bursting Strength - Printing Papers
TAPPI Official Test Method T403

WebCode	Data Flag	Sample BP29			Sample BP30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29ZJLU		26.37	3.50	1.84	25.69	2.91	1.72
3HMZRA		23.50	0.63	0.33	23.05	0.27	0.16
4FV2DB		25.16	2.30	1.20	24.53	1.75	1.04
62A9ZN		24.40	1.53	0.80	24.30	1.52	0.90
68E4LA		24.66	1.79	0.94	23.01	0.23	0.13
6Y4MB3		21.95	-0.92	-0.48	22.06	-0.72	-0.42
ABHAP6		23.55	0.69	0.36	24.07	1.29	0.76
ANMR26		21.87	-1.00	-0.52	21.41	-1.37	-0.81
CH9XUX		23.42	0.55	0.29	23.87	1.09	0.65
DU44QH		23.28	0.41	0.22	21.92	-0.86	-0.51
E2YLHY		25.40	2.53	1.33	24.80	2.02	1.20
F7MTBR		19.65	-3.22	-1.69	19.80	-2.98	-1.76
FB3ZYQ		21.38	-1.49	-0.78	21.83	-0.95	-0.56
J3F94A		21.18	-1.69	-0.89	21.82	-0.96	-0.57
JBAGNZ		21.10	-1.77	-0.93	21.40	-1.38	-0.81
JFKREA		24.40	1.53	0.80	24.50	1.72	1.02
L8H39P		19.98	-2.89	-1.52	19.65	-3.13	-1.85
MPE8T4		22.94	0.07	0.04	23.42	0.64	0.38
N8DLTU		21.81	-1.05	-0.55	21.25	-1.53	-0.90
PKG64U		19.44	-3.43	-1.80	20.86	-1.92	-1.14
QX27YQ		22.57	-0.30	-0.16	22.95	0.17	0.10
WLJFXA		23.36	0.49	0.26	23.47	0.69	0.41
WXGGBE		20.81	-2.06	-1.08	20.42	-2.35	-1.39
Y7MZNU		24.40	1.53	0.80	24.20	1.42	0.84
Y9D2W4		25.80	2.93	1.54	25.50	2.72	1.61
Z8VC4B		22.16	-0.71	-0.37	22.44	-0.34	-0.20

Summary Statistics	Sample BP29	Sample BP30
Grand Means	22.87 psi	22.78 psi
Std Dev Btwn Labs	1.91 psi	1.69 psi
Statistics based on 26 of 26 reporting participants.		

Analysis Notes:

WXGGBE - Data appear to be reported as kPa, not psi as indicated on data entry form. CTS will not correct the Units going forward.

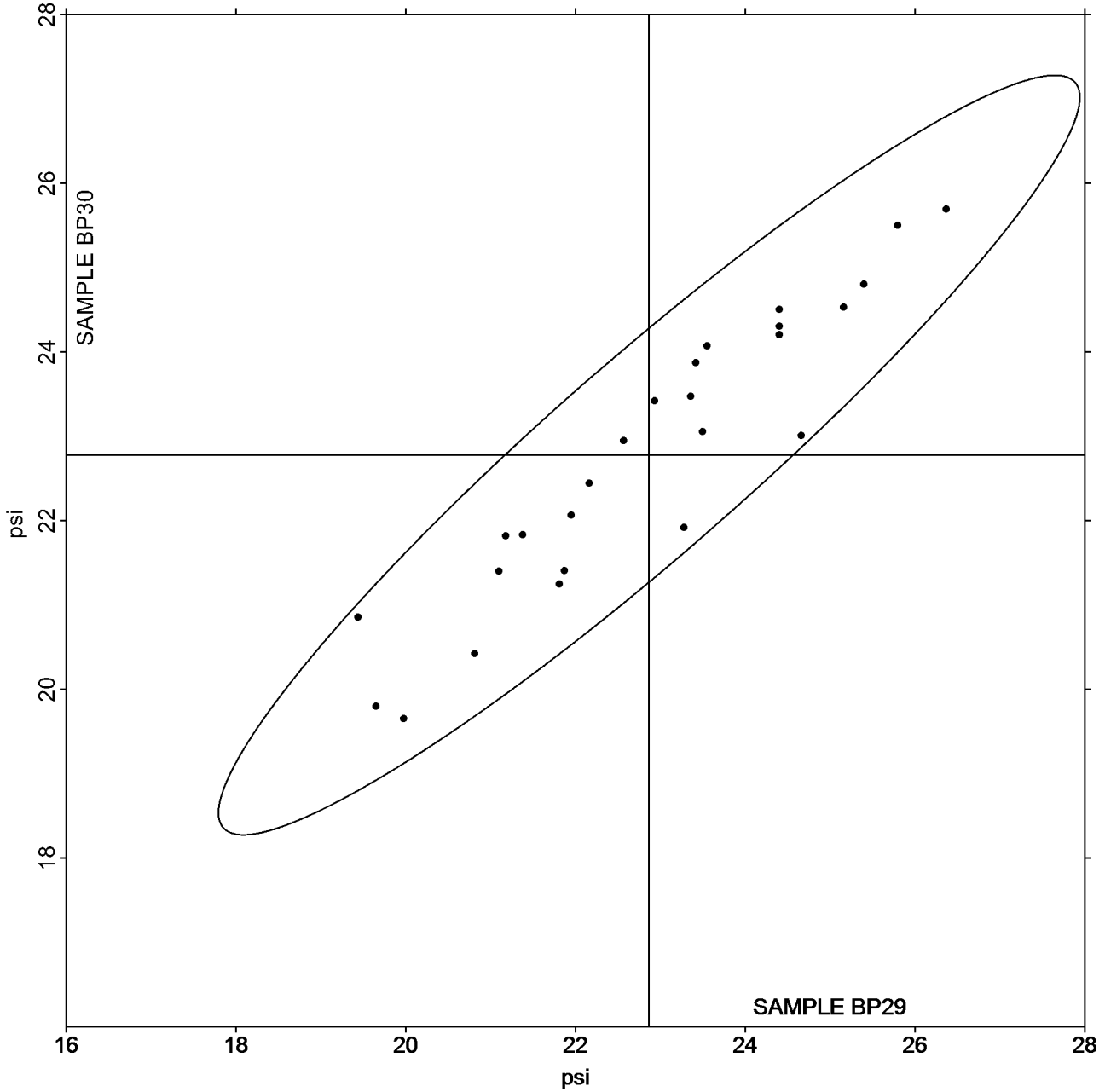


Paper & Paperboard Interlaboratory Testing Program Report #4301, May 2024
Analysis 3111
Bursting Strength - Printing Papers
TAPPI Official Test Method T403

Grand Mean Sample BP29 = 22.867
psi

Grand Mean Sample BP30 = 22.777
psi

ANALYSIS 3111





Paper & Paperboard Interlaboratory Testing Program Report #4301, May 2024

Analysis 3113
Tearing Strength - Printing Papers
TAPPI Official Test Method T414

WebCode	Data Flag	Sample RP29			Sample RP30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29ZJLU	*	73.34	0.56	0.08	82.58	9.73	1.55
2CL977		73.50	0.72	0.11	73.26	0.41	0.07
2YCNNY		79.40	6.62	0.98	75.77	2.92	0.46
3HMZRA		66.15	-6.64	-0.98	70.12	-2.73	-0.43
3MZHAQ		82.50	9.72	1.44	78.46	5.61	0.89
4FV2DB		76.09	3.30	0.49	70.84	-2.01	-0.32
4LFJ9X	*	85.60	12.82	1.90	76.00	3.15	0.50
62A9ZN		71.70	-1.08	-0.16	76.40	3.55	0.57
68E4LA		74.04	1.26	0.19	74.74	1.89	0.30
7AWQR2		62.04	-10.74	-1.59	60.97	-11.88	-1.89
9ZL7LB		70.22	-2.56	-0.38	71.10	-1.75	-0.28
ABHAP6		75.73	2.95	0.44	72.93	0.08	0.01
AEX44G		67.01	-5.77	-0.86	68.34	-4.51	-0.72
AKMG66		73.32	0.54	0.08	73.26	0.41	0.07
ANMR26		82.56	9.78	1.45	82.68	9.83	1.57
AP2YML		74.94	2.16	0.32	74.00	1.15	0.18
BPBNZH		70.40	-2.38	-0.35	70.60	-2.25	-0.36
CH9XUX		66.45	-6.33	-0.94	66.68	-6.17	-0.98
CRF9Q4		63.38	-9.40	-1.40	62.84	-10.01	-1.59
DU44QH		74.82	2.04	0.30	76.54	3.69	0.59
E2YLHY		82.80	10.02	1.49	80.40	7.55	1.20
EUXCB7		80.70	7.92	1.17	78.76	5.91	0.94
FTHAZR		68.07	-4.72	-0.70	65.46	-7.39	-1.18
J3F94A		68.22	-4.56	-0.68	69.70	-3.15	-0.50
JFKREA		74.70	1.92	0.28	72.20	-0.65	-0.10
K2FVTL		78.87	6.08	0.90	79.39	6.54	1.04
L77KTQ		71.31	-1.47	-0.22	77.57	4.72	0.75
L8H39P		69.70	-3.08	-0.46	73.97	1.12	0.18
MKJFK7		79.67	6.89	1.02	81.10	8.25	1.31
MY4XEV		60.02	-12.76	-1.89	62.80	-10.05	-1.60
N3GXCM	X	29.27	-43.51	-6.46	30.40	-42.45	-6.76
N8DLTU		76.36	3.57	0.53	76.75	3.91	0.62
PKG64U		74.46	1.68	0.25	76.90	4.05	0.64
PU7VQL		68.54	-4.24	-0.63	69.04	-3.81	-0.61
QBMJ9F		63.92	-8.87	-1.32	62.73	-10.12	-1.61
QX27YQ		75.65	2.87	0.43	76.52	3.67	0.58
RWJFNL		72.24	-0.54	-0.08	70.83	-2.02	-0.32
TWG689		75.41	2.63	0.39	76.34	3.49	0.56
X4Y4NG		72.00	-0.78	-0.12	71.20	-1.65	-0.26
XEX2AV	*	52.32	-20.46	-3.04	53.12	-19.73	-3.14



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Paper & Paperboard Interlaboratory Testing Program
Analysis 3113
Tearing Strength - Printing Papers
TAPPI Official Test Method T414

WebCode	Data Flag	<u>Sample RP29</u>			<u>Sample RP30</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
Y7MZNU		74.00	1.22	0.18	72.70	-0.15	-0.02
Y9D2W4		72.92	0.14	0.02	73.28	0.43	0.07
Z8VC4B		81.80	9.02	1.34	80.80	7.95	1.27

Summary Statistics	<u>Sample RP29</u>	<u>Sample RP30</u>
Grand Means	72.78 Grams	72.85 Grams
Stnd Dev Btwn Labs	6.74 Grams	6.28 Grams
Statistics based on 42 of 43 reporting participants.		

Comments on Assigned Data Flags for Test #3113

N3GXCM (X) - Extreme Data.



Paper & Paperboard Interlaboratory Testing Program Report #4301, May 2024

Analysis 3115
Tensile Breaking Strength - Printing Papers
TAPPI Official Test Method T494

WebCode	Data Flag	Sample NP29			Sample NP30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29ZJLU	X	6.706	0.538	1.38	6.016	-0.159	-0.36
2CL977		6.891	0.724	1.85	6.920	0.745	1.69
3HMZRA		5.807	-0.361	-0.92	5.957	-0.218	-0.49
49FHWW		6.441	0.273	0.70	6.644	0.470	1.07
4LFJ9X		6.094	-0.073	-0.19	6.322	0.148	0.33
68E4LA		5.904	-0.264	-0.68	5.897	-0.278	-0.63
77XEV2		5.383	-0.785	-2.01	5.297	-0.878	-1.99
7AWQR2		6.210	0.042	0.11	6.140	-0.035	-0.08
9ZL7LB		6.781	0.613	1.57	7.006	0.831	1.89
ABHAP6		6.107	-0.061	-0.16	6.237	0.062	0.14
AEX44G		6.460	0.293	0.75	6.462	0.287	0.65
AKMG66		6.376	0.208	0.53	6.309	0.134	0.31
ANMR26		5.943	-0.225	-0.58	5.895	-0.280	-0.63
AP2YML		5.859	-0.309	-0.79	5.838	-0.337	-0.76
BPBNZH		5.897	-0.271	-0.69	6.096	-0.079	-0.18
CH9XUX		6.560	0.392	1.00	6.697	0.522	1.19
CLBRUN		6.797	0.629	1.61	6.884	0.710	1.61
CRF9Q4		5.715	-0.453	-1.16	5.658	-0.516	-1.17
D3CVV7		5.470	-0.698	-1.79	5.256	-0.919	-2.08
DU44QH		6.469	0.301	0.77	6.424	0.249	0.57
EUXCB7		5.731	-0.437	-1.12	5.720	-0.455	-1.03
J3F94A		6.248	0.080	0.20	6.185	0.010	0.02
JFKREA		5.883	-0.285	-0.73	5.734	-0.441	-1.00
JT6AAY		6.110	-0.058	-0.15	6.134	-0.041	-0.09
K2FVTL		5.893	-0.275	-0.70	5.804	-0.371	-0.84
L6VH8R		6.029	-0.139	-0.36	5.767	-0.407	-0.92
L77KTQ		6.067	-0.100	-0.26	5.946	-0.228	-0.52
L8H39P		6.877	0.709	1.82	7.062	0.888	2.01
MY4XEV		5.624	-0.544	-1.39	5.407	-0.767	-1.74
N3GXCM	*	6.239	0.071	0.18	6.688	0.514	1.16
N8DLTU		5.818	-0.350	-0.90	5.988	-0.187	-0.42
PKG64U		5.840	-0.327	-0.84	5.803	-0.371	-0.84
PU7VQL		5.896	-0.272	-0.70	6.046	-0.129	-0.29
QBMJ9F		5.990	-0.178	-0.46	5.960	-0.215	-0.49
QX27YQ		6.151	-0.017	-0.04	6.402	0.227	0.52
RWJFNL		6.483	0.315	0.81	6.362	0.187	0.43
TV8ZUK		6.643	0.475	1.22	6.502	0.327	0.74
VATLPM		6.220	0.052	0.13	5.976	-0.199	-0.45
X4Y4NG		6.736	0.569	1.46	6.515	0.340	0.77
XEX2AV		5.874	-0.294	-0.75	6.073	-0.101	-0.23



Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3115
Tensile Breaking Strength - Printing Papers
TAPPI Official Test Method T494

WebCode	Data Flag	<u>Sample NP29</u>			<u>Sample NP30</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
Y7MZNU		6.471	0.303	0.78	6.428	0.253	0.57
Y9D2W4		6.798	0.631	1.62	6.697	0.523	1.19
Z8VC4B		6.264	0.097	0.25	6.193	0.018	0.04

Summary Statistics	<u>Sample NP29</u>	<u>Sample NP30</u>
Grand Means	6.17 kN/m	6.17 kN/m
Stnd Dev Btwn Labs	0.39 kN/m	0.44 kN/m
Statistics based on 42 of 43 reporting participants.		

Comments on Assigned Data Flags for Test #3115

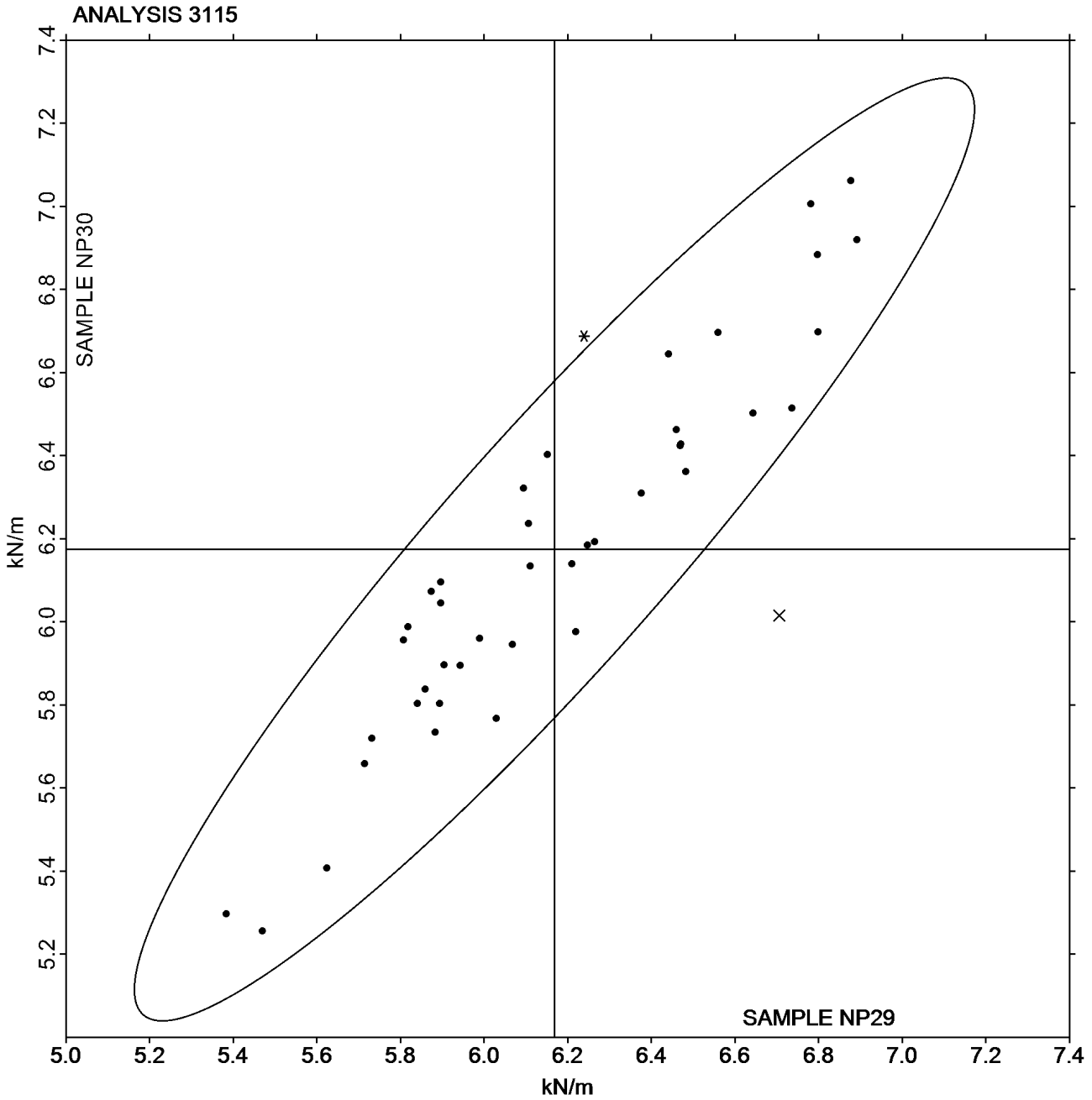
29ZJLU (X) - Inconsistent in testing between samples.



Paper & Paperboard Interlaboratory Testing Program Report #4301, May 2024
Analysis 3115
Tensile Breaking Strength - Printing Papers
TAPPI Official Test Method T494

Grand Mean Sample NP29 = 6.1678
kN/m

Grand Mean Sample NP30 = 6.1745
kN/m





Analysis 3116

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NP29			Sample NP30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2CL977		88.28	11.42	1.19	94.54	17.97	1.87
3HMZRA		58.26	-18.60	-1.93	60.73	-15.84	-1.64
49FHWW		75.47	-1.39	-0.14	77.10	0.53	0.06
4LFJ9X	*	74.43	-2.43	-0.25	86.10	9.54	0.99
68E4LA		77.54	0.68	0.07	76.63	0.07	0.01
77XEV2		67.24	-9.61	-1.00	69.03	-7.54	-0.78
7AWQR2		80.80	3.94	0.41	77.40	0.83	0.09
9ZL7LB		83.08	6.23	0.65	86.88	10.31	1.07
ABHAP6		84.11	7.25	0.75	82.67	6.11	0.63
AEX44G		66.26	-10.60	-1.10	65.95	-10.62	-1.10
AKMG66		74.37	-2.48	-0.26	71.72	-4.85	-0.50
ANMR26		77.44	0.58	0.06	74.84	-1.72	-0.18
BPBNZH	*	52.81	-24.05	-2.50	58.74	-17.83	-1.85
D3CVV7		74.25	-2.61	-0.27	72.25	-4.31	-0.45
DU44QH		80.90	4.04	0.42	81.75	5.18	0.54
EUXCB7		70.91	-5.95	-0.62	68.57	-8.00	-0.83
J3F94A		86.86	10.01	1.04	84.94	8.37	0.87
JFKREA		73.86	-3.00	-0.31	73.31	-3.26	-0.34
JT6AAAY		84.38	7.52	0.78	83.09	6.52	0.68
K2FVTL		74.14	-2.72	-0.28	72.82	-3.74	-0.39
L6VH8R		77.92	1.06	0.11	70.21	-6.35	-0.66
L77KTQ		57.03	-19.82	-2.06	54.38	-22.19	-2.30
L8H39P		90.82	13.96	1.45	93.42	16.85	1.75
N3GXCM		76.34	-0.52	-0.05	80.57	4.01	0.42
N8DLTU		81.04	4.18	0.43	77.88	1.31	0.14
PKG64U		86.67	9.81	1.02	85.69	9.12	0.95
QBMJ9F		75.77	-1.09	-0.11	72.60	-3.97	-0.41
QX27YQ		80.78	3.92	0.41	88.77	12.20	1.27
RWJFNL		75.82	-1.04	-0.11	79.01	2.44	0.25
TV8ZUK		81.24	4.38	0.45	78.61	2.04	0.21
VATLPM		88.65	11.79	1.23	82.20	5.64	0.59
X4Y4NG	*	98.38	21.52	2.24	89.65	13.08	1.36
Y7MZNU		72.33	-4.53	-0.47	73.33	-3.23	-0.34
Y9D2W4		78.06	1.21	0.13	74.40	-2.17	-0.22
Z8VC4B		63.75	-13.10	-1.36	60.03	-16.54	-1.72



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Analysis 3116
Tensile Energy Absorption - Printing Papers
TAPPI Official Test Method T494

Summary Statistics	<u>Sample NP29</u>	<u>Sample NP30</u>
Grand Means	76.86 Joules/sq m	76.57 Joules/sq m
Stnd Dev Btwn Labs	9.62 Joules/sq m	9.63 Joules/sq m

Statistics based on 35 of 35 reporting participants.

Analysis Notes:

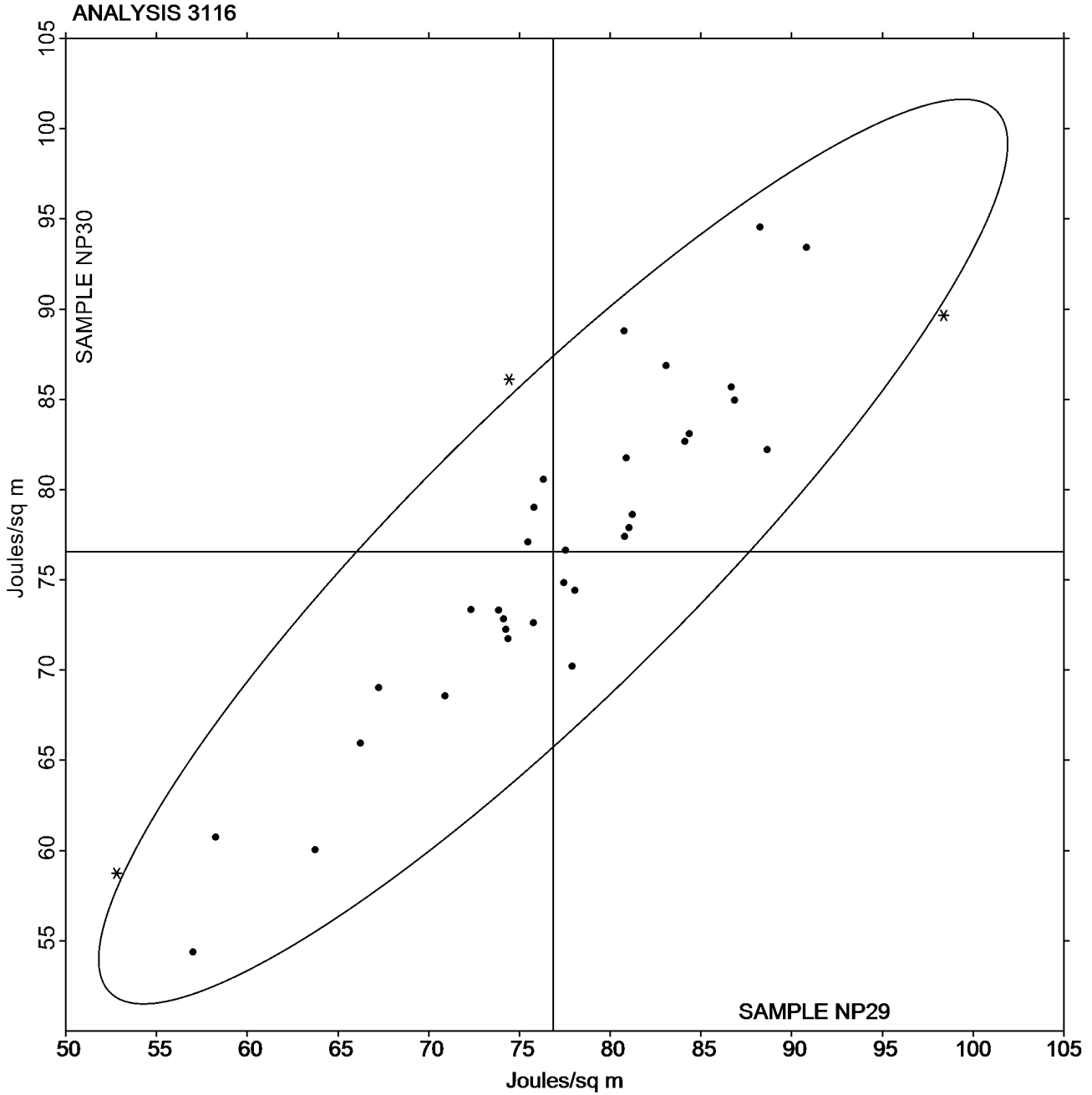
EUXCB7 - One determination removed from the Lab Mean of Sample NP29 per Grubb's Test at 1% risk (TAPPI 1205).



Paper & Paperboard Interlaboratory Testing Program Report #4301, May 2024
Analysis 3116
Tensile Energy Absorption - Printing Papers
TAPPI Official Test Method T494

Grand Mean Sample NP29 = 76.856
Joules/sq m

Grand Mean Sample NP30 = 76.566
Joules/sq m





Analysis 3117

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NP29			Sample NP30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2CL977		2.029	0.097	0.43	2.099	0.173	0.86
3HMZRA		1.711	-0.221	-0.99	1.812	-0.114	-0.56
49FHWW		1.766	-0.166	-0.74	1.746	-0.180	-0.89
4LFJ9X	X	2.530	0.598	2.67	3.090	1.164	5.77
68E4LA		1.970	0.038	0.17	1.943	0.017	0.09
77XEV2		1.734	-0.198	-0.89	1.743	-0.183	-0.91
7AWQR2		1.780	-0.152	-0.68	1.750	-0.176	-0.87
9ZL7LB		1.683	-0.249	-1.11	1.768	-0.158	-0.78
ABHAP6		1.983	0.051	0.23	1.937	0.011	0.06
AEX44G		1.620	-0.312	-1.39	1.612	-0.314	-1.55
AKMG66		1.770	-0.162	-0.72	1.735	-0.191	-0.94
ANMR26		1.930	-0.002	-0.01	1.877	-0.049	-0.24
BPBNZH	X	142.500	140.568	628.34	152.900	150.974	748.63
CRF9Q4		1.720	-0.212	-0.95	1.813	-0.113	-0.56
D3CVV7		2.142	0.210	0.94	2.186	0.260	1.29
DU44QH		1.898	-0.034	-0.15	1.947	0.021	0.11
EUXCB7		1.810	-0.122	-0.55	1.780	-0.146	-0.72
J3F94A		2.139	0.207	0.93	2.124	0.198	0.98
JFKREA		1.934	0.002	0.01	1.957	0.031	0.16
JT6AAAY		2.138	0.206	0.92	2.055	0.129	0.64
K2FVTL		2.093	0.161	0.72	2.082	0.156	0.78
L6VH8R		1.966	0.034	0.15	1.859	-0.067	-0.33
L77KTQ		1.757	-0.175	-0.78	1.812	-0.114	-0.56
L8H39P		1.904	-0.028	-0.13	1.915	-0.011	-0.05
MY4XEVI	X	1.766	-0.166	-0.74	1.533	-0.393	-1.95
N3GXCM		2.108	0.176	0.79	2.072	0.146	0.73
N8DLTU		1.830	-0.102	-0.46	1.785	-0.141	-0.70
PKG64U	*	2.488	0.556	2.49	2.474	0.549	2.72
QBMJ9F		1.920	-0.012	-0.05	1.940	0.014	0.07
QX27YQ		1.951	0.019	0.08	2.050	0.124	0.62
RWJFNL		1.775	-0.157	-0.70	1.838	-0.088	-0.43
TV8ZUK		1.794	-0.138	-0.62	1.762	-0.164	-0.81
VATLPM		2.363	0.431	1.93	2.285	0.359	1.78
X4Y4NG		2.470	0.538	2.40	2.348	0.422	2.09
XEX2AV		1.730	-0.202	-0.90	1.720	-0.206	-1.02
Y7MZNU		1.710	-0.222	-0.99	1.740	-0.186	-0.92
Y9D2W4		1.733	-0.199	-0.89	1.687	-0.239	-1.18
Z8VC4B		2.271	0.339	1.52	2.142	0.216	1.07



Analysis 3117

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

Summary Statistics	Sample NP29	Sample NP30
Grand Means	1.93 Percent	1.93 Percent
Stnd Dev Btwn Labs	0.22 Percent	0.20 Percent

Statistics based on 35 of 38 reporting participants.

Comments on Assigned Data Flags for Test #3117

BPBNZH (X) - Extreme Data.

MY4XEV (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample NP29.

4LFJ9X (X) - Data for both samples are high. Possible Systematic Error.

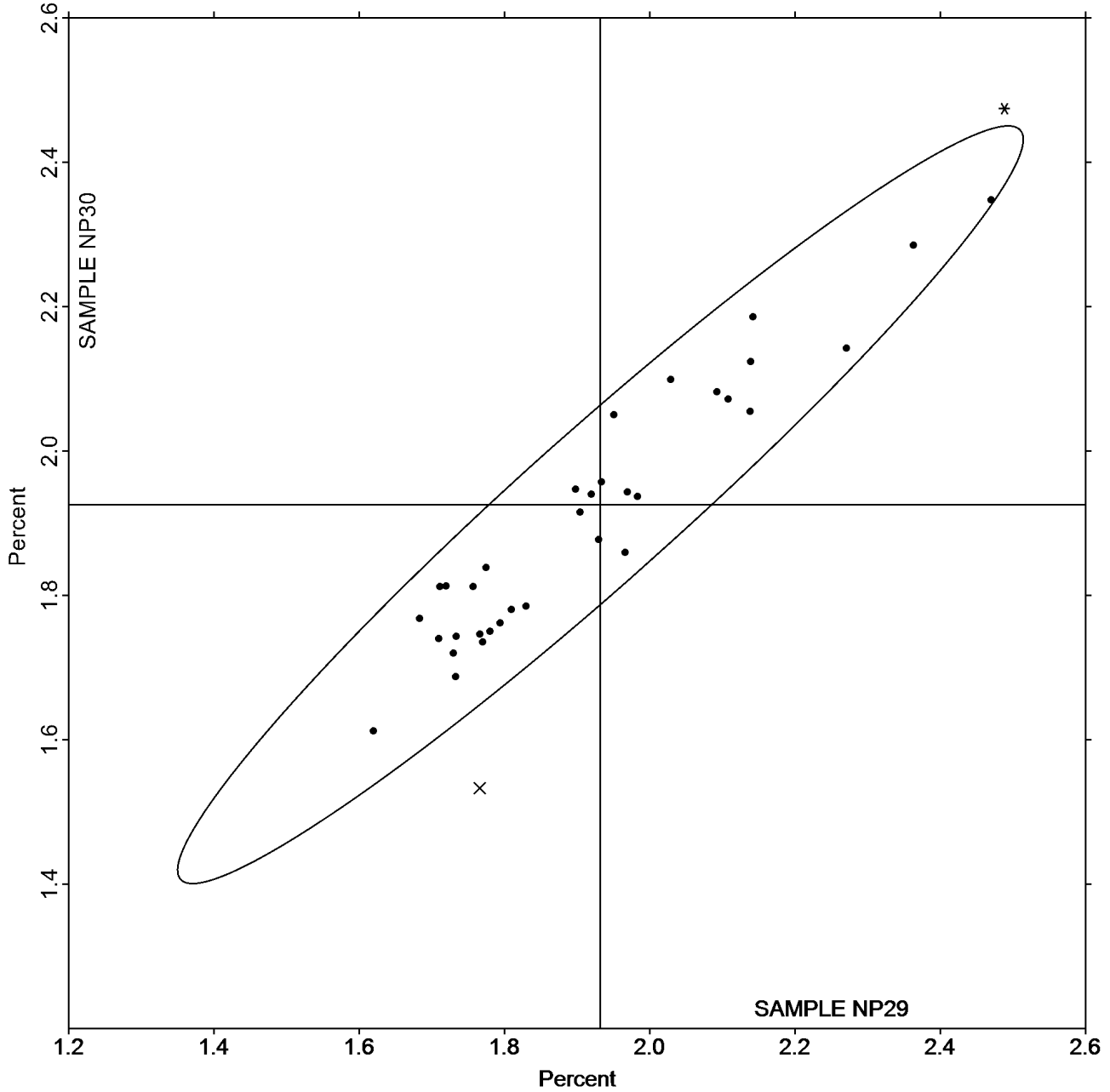


Analysis 3117
Elongation to Break - Printing Papers
TAPPI Official Test Method T494

Grand Mean Sample NP29 = 1.9320
Percent

Grand Mean Sample NP30 = 1.9256
Percent

ANALYSIS 3117





Analysis 3121

Air Resistance - Gurley Oil Type

TAPPI Official Test Method T460

WebCode	Data Flag	Sample PP29			Sample PP30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29ZJLU		16.34	0.75	0.68	15.62	-0.01	-0.02
2CL977		15.29	-0.30	-0.27	15.17	-0.47	-0.51
3HMZRA		18.35	2.76	2.51	17.67	2.03	2.19
4BJDDE		14.99	-0.60	-0.54	15.14	-0.50	-0.54
62A9ZN		16.41	0.82	0.74	16.06	0.42	0.46
64ZA9X	*	15.92	0.33	0.30	16.99	1.35	1.46
68E4LA		15.26	-0.33	-0.30	15.48	-0.16	-0.17
6DY62L		13.53	-2.06	-1.87	13.63	-2.01	-2.17
6NJC2B		14.19	-1.40	-1.27	14.13	-1.51	-1.63
AJVHQ7		15.46	-0.13	-0.12	16.14	0.50	0.55
CRF9Q4		15.22	-0.37	-0.34	15.73	0.09	0.10
E2YLHY		15.50	-0.09	-0.08	15.40	-0.24	-0.25
EUXCB7		15.01	-0.58	-0.53	14.79	-0.85	-0.91
F7MTBR		15.11	-0.48	-0.44	15.22	-0.42	-0.45
FB3ZYQ		15.64	0.05	0.05	15.41	-0.23	-0.24
FJUE3W		14.62	-0.97	-0.88	15.09	-0.55	-0.59
GUMGHB		15.26	-0.33	-0.30	15.93	0.29	0.32
J3F94A		16.65	1.06	0.96	16.13	0.49	0.53
JFKREA		15.96	0.37	0.34	15.98	0.34	0.37
K2FVTL		17.74	2.15	1.95	17.55	1.91	2.07
L8H39P		16.46	0.87	0.79	16.67	1.03	1.12
MPE8T4		16.18	0.59	0.54	16.28	0.64	0.70
MY4XEV		15.17	-0.42	-0.38	15.79	0.15	0.17
N8DLTU		15.44	-0.15	-0.14	15.27	-0.37	-0.39
NKYY64		15.27	-0.32	-0.29	15.09	-0.55	-0.59
PDGPEL		14.94	-0.65	-0.59	15.01	-0.63	-0.68
PKG64U	*	19.05	3.45	3.14	17.97	2.33	2.52
PU7VQL		15.99	0.40	0.36	16.42	0.78	0.85
QBMJ9F		13.86	-1.73	-1.57	14.34	-1.30	-1.40
QX27YQ		14.84	-0.75	-0.68	14.88	-0.76	-0.82
V6J7GY		15.72	0.13	0.12	15.55	-0.09	-0.09
VATLPM		15.10	-0.49	-0.44	14.83	-0.81	-0.87
WLJFXA		15.36	-0.23	-0.21	15.53	-0.11	-0.11
X4Y4NG		14.91	-0.69	-0.62	15.99	0.36	0.38
XEX2AV		16.37	0.78	0.70	15.64	0.00	0.00
Y9D2W4		15.30	-0.29	-0.26	15.10	-0.54	-0.58
Z8VC4B		14.44	-1.15	-1.04	14.91	-0.73	-0.79



Summary Statistics	<u>Sample PP29</u>	<u>Sample PP30</u>
Grand Means	15.59 sec/100 cc	15.64 sec/100 cc
Stnd Dev Btwn Labs	1.10 sec/100 cc	0.93 sec/100 cc

Statistics based on 37 of 37 reporting participants.

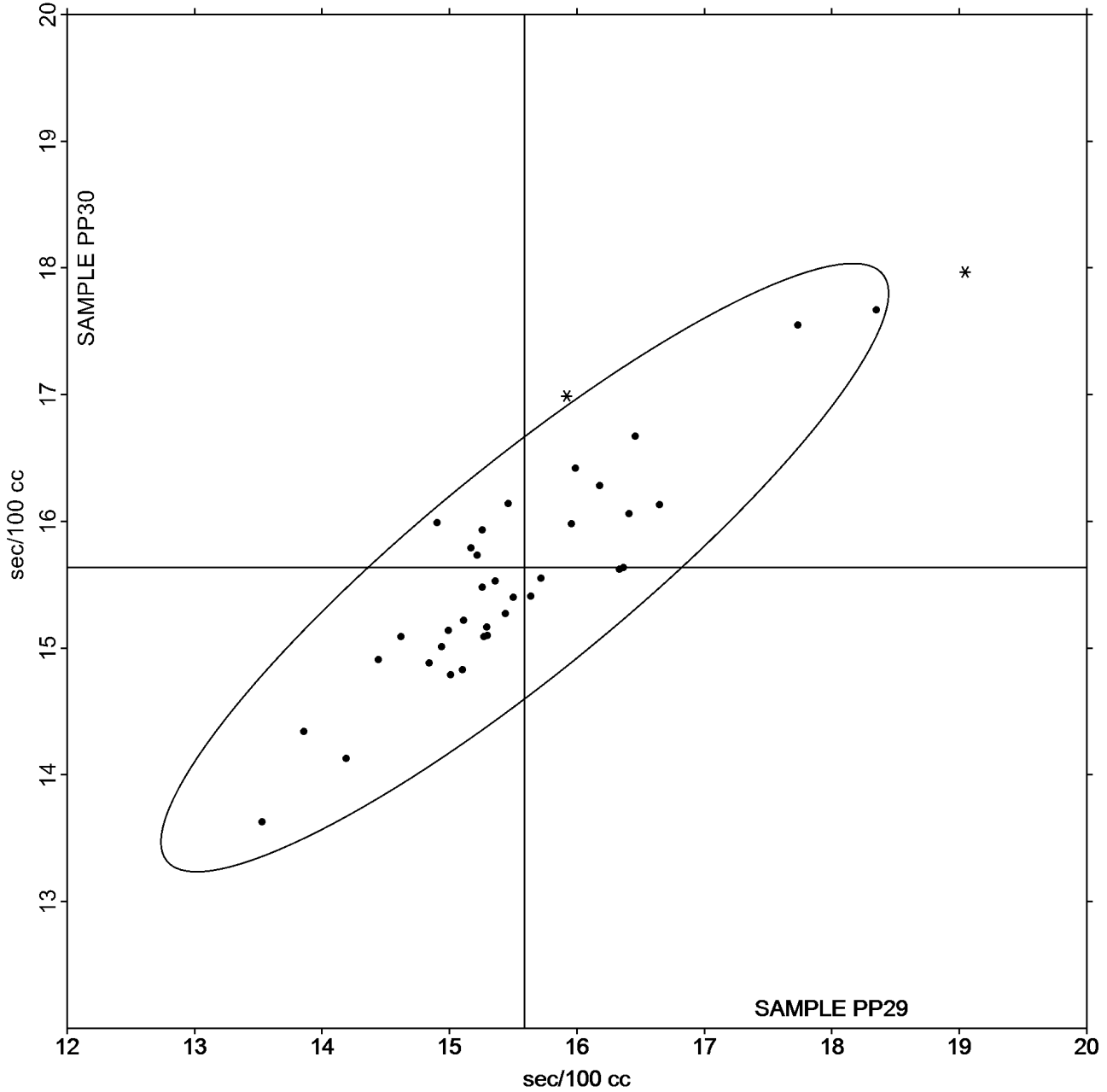


Analysis 3121
Air Resistance - Gurley Oil Type
TAPPI Official Test Method T460

Grand Mean Sample PP29 = 15.590
sec/100 cc

Grand Mean Sample PP30 = 15.635
sec/100 cc

ANALYSIS 3121





Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3123
Porosity - Sheffield Type - Sheffield Units for 3/4 inch Diameter Orifice
TAPPI Official Test Method T547

WebCode	Data Flag	Sample PP29			Sample PP30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
62A9ZN		163.9	-4.6	-0.27	171.3	0.9	0.07
BPBNZH		187.3	18.8	1.11	182.7	12.3	0.96
E2YLHY		154.2	-14.3	-0.84	157.1	-13.3	-1.03
WXGGBE	X	30.0	-138.5	-8.14	31.8	-138.6	-10.81

Summary Statistics	<u>Sample PP29</u>	<u>Sample PP30</u>
Grand Means	168.47 Sheffield Units	170.37 Sheffield Units
Std Dev Btwn Labs	17.02 Sheffield Units	12.83 Sheffield Units
Statistics based on 3 of 4 reporting participants.		

Comments on Assigned Data Flags for Test #3123

WXGGBE (X) - Extreme Data.

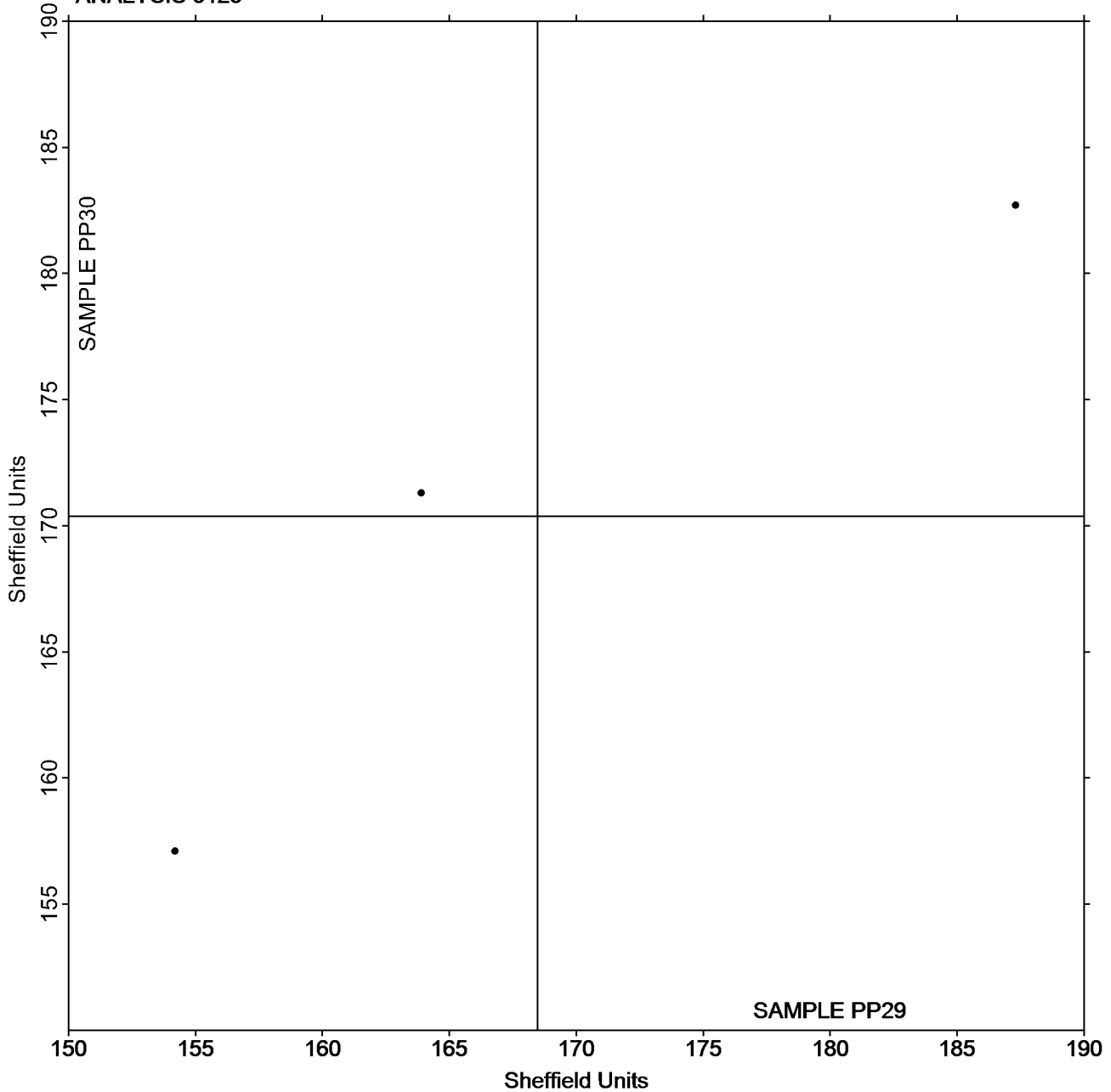


Paper & Paperboard Interlaboratory Testing Program Report #4301, May 2024
Analysis 3123
Porosity - Sheffield Type - Sheffield Units for 3/4 inch Diameter Orifice
TAPPI Official Test Method T547

Grand Mean Sample PP29 = 168.47
Sheffield Units

Grand Mean Sample PP30 = 170.37
Sheffield Units

ANALYSIS 3123



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



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Paper & Paperboard Interlaboratory Testing Program
Analysis 3131
Roughness - Print Surf Method - 2.5 to 6.0 Microns
TAPPI Official Test Method T555

WebCode	Data Flag	<u>Sample PH29</u>			<u>Sample PH30</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4BJDDE		4.416	0.397	1.36	4.357	0.324	1.20
4FV2DB		4.182	0.163	0.56	4.239	0.206	0.76
64ZA9X		3.240	-0.779	-2.68	3.333	-0.700	-2.58
68E4LA		4.021	0.002	0.01	3.990	-0.043	-0.16
J3F94A		4.104	0.085	0.29	4.159	0.126	0.47
L6VH8R		3.875	-0.144	-0.49	3.800	-0.233	-0.86
NKYY64		4.021	0.002	0.01	4.044	0.011	0.04
PGCGLJ		4.090	0.071	0.24	4.064	0.031	0.12
PU7VQL		3.851	-0.168	-0.58	3.863	-0.170	-0.63
TV8ZUK		4.002	-0.017	-0.06	4.177	0.144	0.53
WZ4XTY		4.164	0.145	0.50	4.141	0.108	0.40
Y7MZNU		4.262	0.243	0.83	4.224	0.191	0.71
Z8VC4B	X	12.191	8.172	28.07	11.395	7.362	27.16

Summary Statistics	<u>Sample PH29</u>	<u>Sample PH30</u>
Grand Means	4.02 Microns	4.03 Microns
Stnd Dev Btwn Labs	0.29 Microns	0.27 Microns
Statistics based on 12 of 13 reporting participants.		

Comments on Assigned Data Flags for Test #3131

Z8VC4B (X) - Extreme Data.



Analysis 3131

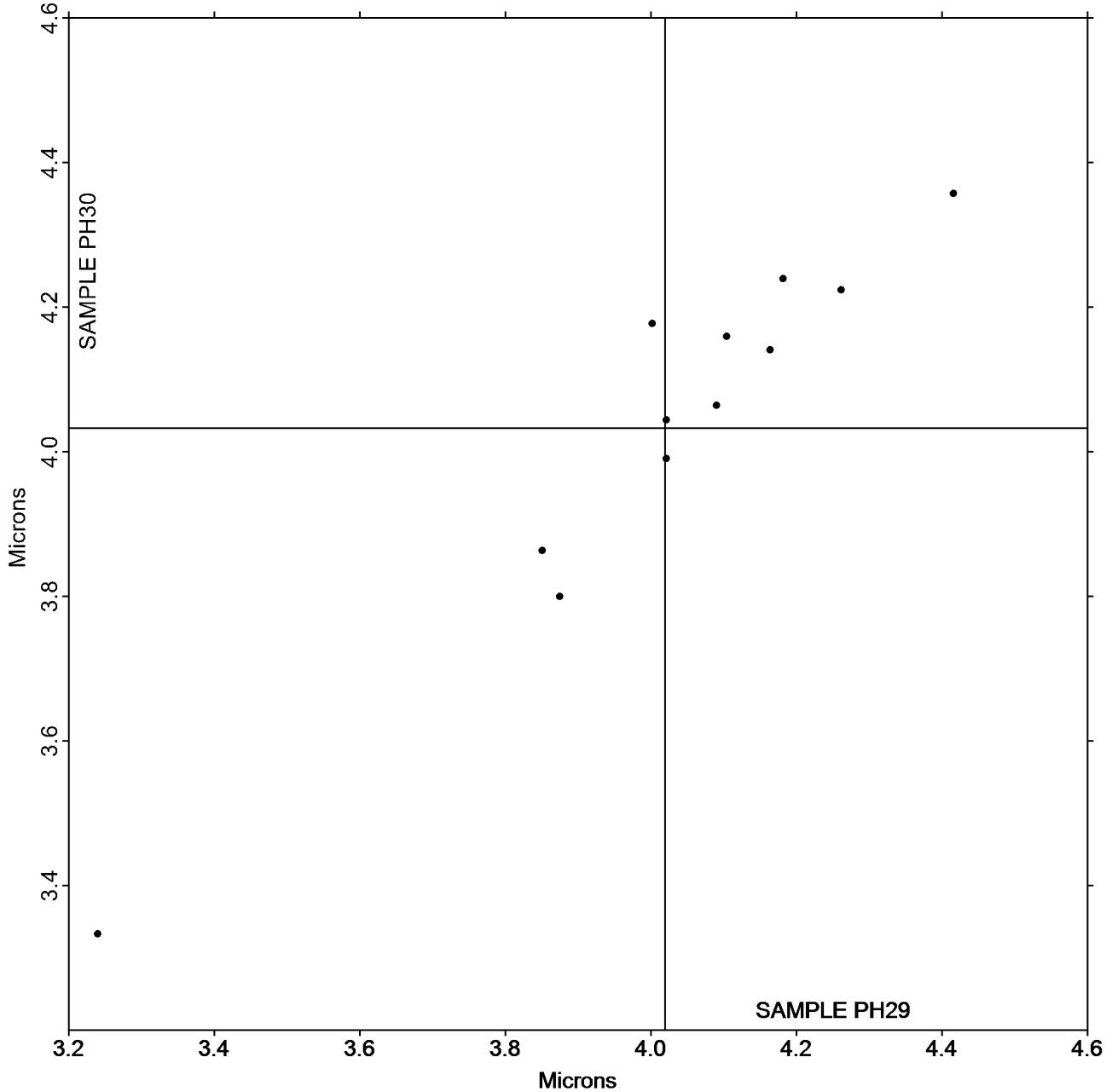
Roughness - Print Surf Method - 2.5 to 6.0 Microns

TAPPI Official Test Method T555

Grand Mean Sample PH29 = 4.0190
Microns

Grand Mean Sample PH30 = 4.0326
Microns

ANALYSIS 3131



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



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Paper & Paperboard Interlaboratory Testing Program
Analysis 3133
Roughness - Sheffield Type
TAPPI Official Test Method T538

WebCode	Data Flag	Sample SR29			Sample SR30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29ZJLU		115.0	-0.9	-0.14	111.5	-6.9	-1.01
2CL977		111.2	-4.8	-0.74	112.4	-6.0	-0.88
2ETJ3A		122.1	6.1	0.93	128.4	9.9	1.45
3HMZRA		101.2	-14.8	-2.26	106.3	-12.1	-1.77
3MZHAQ		123.9	7.9	1.21	121.9	3.4	0.50
49FHWW		122.4	6.5	0.99	125.3	6.8	1.00
4BJDDE		115.0	-1.0	-0.15	116.2	-2.3	-0.33
4LFJ9X	X	443.9	327.9	50.12	443.9	325.4	47.46
4UVZ28		126.6	10.6	1.62	127.3	8.8	1.28
62A9ZN		113.2	-2.8	-0.42	108.5	-10.0	-1.45
68E4LA		123.5	7.5	1.15	130.8	12.3	1.80
6NJC2B		116.8	0.8	0.13	123.4	4.9	0.72
AGPZTB		121.5	5.5	0.85	125.8	7.3	1.07
AT3ZP4	X	247.5	131.5	20.10	249.5	131.0	19.11
BPBNZH	X	110.4	-5.6	-0.85	132.2	13.7	2.01
CLBRUN		110.0	-6.0	-0.91	115.0	-3.4	-0.50
CRF9Q4		117.3	1.3	0.20	113.7	-4.8	-0.69
E2YLHY		110.6	-5.4	-0.82	111.5	-7.0	-1.01
EFG77		117.5	1.5	0.23	122.7	4.2	0.62
F2E8RZ		108.1	-7.9	-1.21	117.6	-0.8	-0.12
FB3ZYQ		115.2	-0.8	-0.12	113.3	-5.2	-0.75
HC2F3Y		110.8	-5.2	-0.79	107.6	-10.9	-1.58
J3F94A		111.1	-4.9	-0.75	113.0	-5.4	-0.79
JFKREA		122.3	6.3	0.96	121.0	2.5	0.36
JNXJ8T		111.5	-4.5	-0.68	114.0	-4.5	-0.65
K2FVTL		105.7	-10.2	-1.56	110.5	-7.9	-1.16
L6VH8R		116.2	0.2	0.03	111.2	-7.3	-1.06
L77KTQ		112.5	-3.5	-0.53	115.6	-2.9	-0.42
L8H39P	X	142.6	26.7	4.07	131.4	13.0	1.89
MY4XEY		117.0	1.0	0.16	119.6	1.1	0.17
N3GXCM	*	133.7	17.7	2.71	130.0	11.6	1.69
NKYY64		114.6	-1.4	-0.21	112.8	-5.6	-0.82
PDGPEL		126.0	10.0	1.53	125.5	7.0	1.03
PGCGLJ		104.5	-11.4	-1.75	116.0	-2.4	-0.36
PKG64U		113.6	-2.4	-0.36	115.1	-3.4	-0.49
PU7VQL		114.4	-1.6	-0.24	114.7	-3.8	-0.55
QX27YQ		120.2	4.2	0.65	127.6	9.1	1.33
T4FRWM		118.5	2.5	0.39	123.3	4.8	0.71
TV8ZUK		114.3	-1.7	-0.26	115.6	-2.9	-0.42
VATLPM		125.8	9.8	1.49	132.7	14.2	2.07



Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3133
Roughness - Sheffield Type
TAPPI Official Test Method T538

WebCode	Data Flag	Sample SR29			Sample SR30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
WLJFXA		114.8	-1.2	-0.18	123.3	4.8	0.71
WXGGBE	X	430.2	314.2	48.03	431.6	313.1	45.67
X4Y4NG	X	443.1	327.1	49.99	443.4	325.0	47.39
XEX2AV		113.6	-2.4	-0.37	113.3	-5.1	-0.74
XGN4H4		114.1	-1.9	-0.29	119.8	1.3	0.20
XZYZV9		120.2	4.2	0.65	124.6	6.1	0.90
Y7MZNU		108.8	-7.2	-1.10	118.1	-0.4	-0.05
Z8VC4B	X	16.5	-99.5	-15.20	16.7	-101.7	-14.84

Summary Statistics	<u>Sample SR29</u>	<u>Sample SR30</u>
Grand Means	115.98 Sheffield	118.45 Sheffield
Stnd Dev Btwn Labs	6.54 Sheffield	6.86 Sheffield

Statistics based on 41 of 48 reporting participants.

Comments on Assigned Data Flags for Test #3133

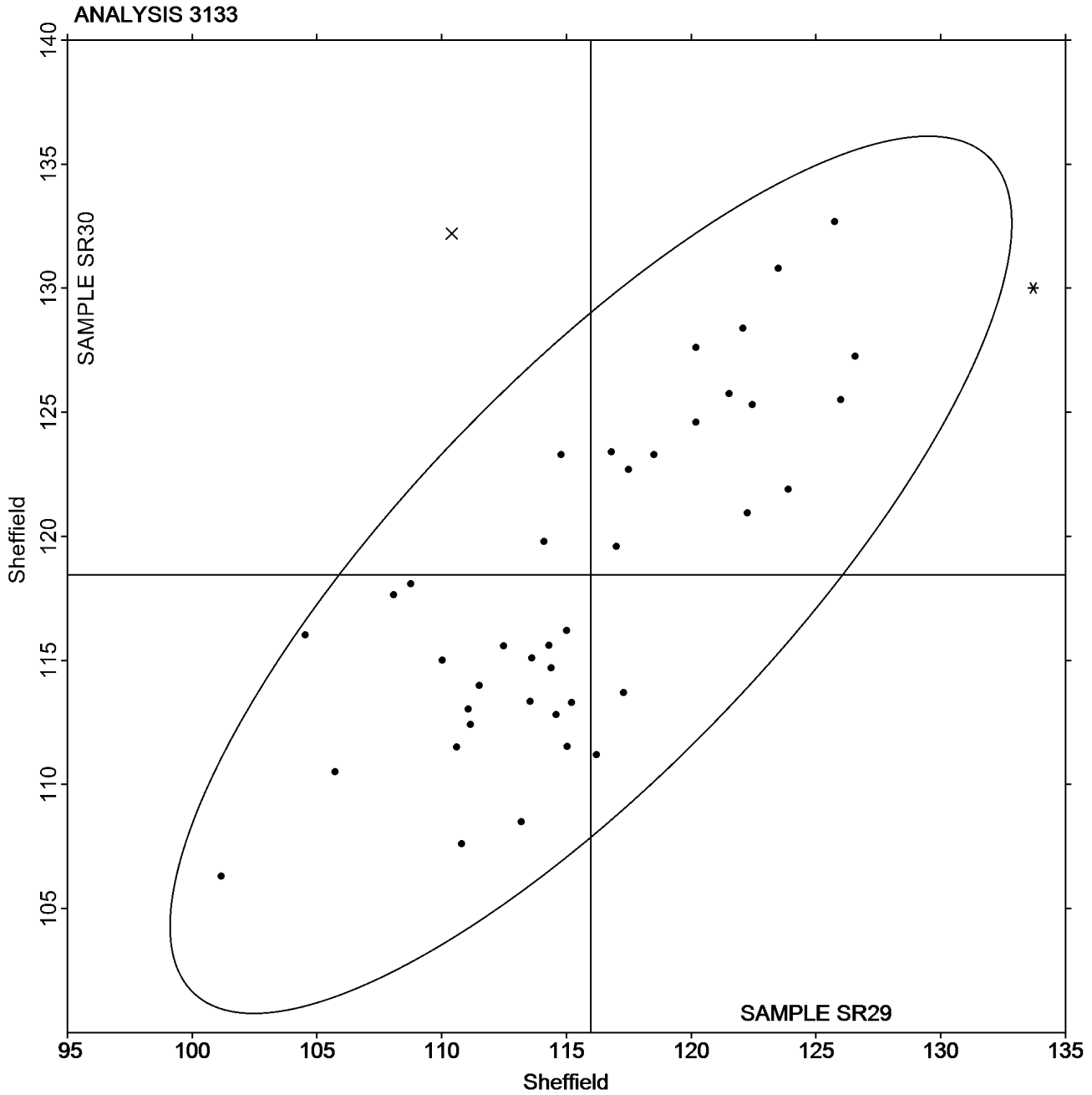
- BPBNZH (X) - Inconsistent in testing between samples.
- AT3ZP4 (X) - Extreme Data.
- X4Y4NG (X) - Extreme Data.
- 4LFJ9X (X) - Extreme Data.
- Z8VC4B (X) - Extreme Data.
- L8H39P (X) - Data for sample SR29 are high.
- WXGGBE (X) - Extreme Data.



Analysis 3133
Roughness - Sheffield Type
TAPPI Official Test Method T538

Grand Mean Sample SR29 = 115.98
Sheffield

Grand Mean Sample SR30 = 118.45
Sheffield





Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3135
Grammage (Mass per Unit Area)
TAPPI Official Test Method T410

WebCode	Data Flag	Sample GM29			Sample GM30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
49FHWW		75.70	0.34	0.74	75.89	0.60	1.27
4FV2DB		75.36	-0.01	-0.01	75.30	0.01	0.01
62A9ZN		75.44	0.08	0.18	75.53	0.24	0.50
6Y4MB3		75.74	0.38	0.83	75.08	-0.21	-0.45
77XEV2		74.65	-0.71	-1.56	75.01	-0.28	-0.60
8RWVXB		75.18	-0.18	-0.40	75.72	0.43	0.90
9B3Q68	X	15.44	-59.93	-130.78	15.51	-59.78	-126.64
ABHAP6		75.52	0.16	0.34	75.34	0.05	0.10
BPBNZH		75.47	0.11	0.24	75.22	-0.07	-0.15
CH9XUX		75.47	0.11	0.24	75.08	-0.21	-0.44
CLBRUN		74.88	-0.48	-1.05	75.07	-0.22	-0.47
CRF9Q4		75.84	0.48	1.05	75.42	0.13	0.27
D3CVV7		76.40	1.04	2.26	76.40	1.11	2.35
JFKREA		75.41	0.04	0.10	75.22	-0.07	-0.15
MY4XEV		74.72	-0.64	-1.40	74.60	-0.69	-1.47
QBMJ9F		75.12	-0.24	-0.53	75.12	-0.17	-0.37
QX27YQ		76.00	0.64	1.39	76.25	0.96	2.03
WE28AD		75.46	0.10	0.21	74.95	-0.35	-0.74
WUYGWJ		74.87	-0.49	-1.07	75.12	-0.18	-0.37
WXGGBE		74.58	-0.79	-1.71	74.40	-0.89	-1.89
Z7G8AJ		75.23	-0.13	-0.28	75.19	-0.10	-0.22
ZJMYCQ		75.56	0.20	0.43	75.24	-0.05	-0.11

Summary Statistics	Sample GM29	Sample GM30
Grand Means	75.36 g/sq m	75.29 g/sq m
Std Dev Btwn Labs	0.46 g/sq m	0.47 g/sq m
Statistics based on 21 of 22 reporting participants.		

Comments on Assigned Data Flags for Test #3135

9B3Q68 (X) - Extreme Data.

Analysis Notes:

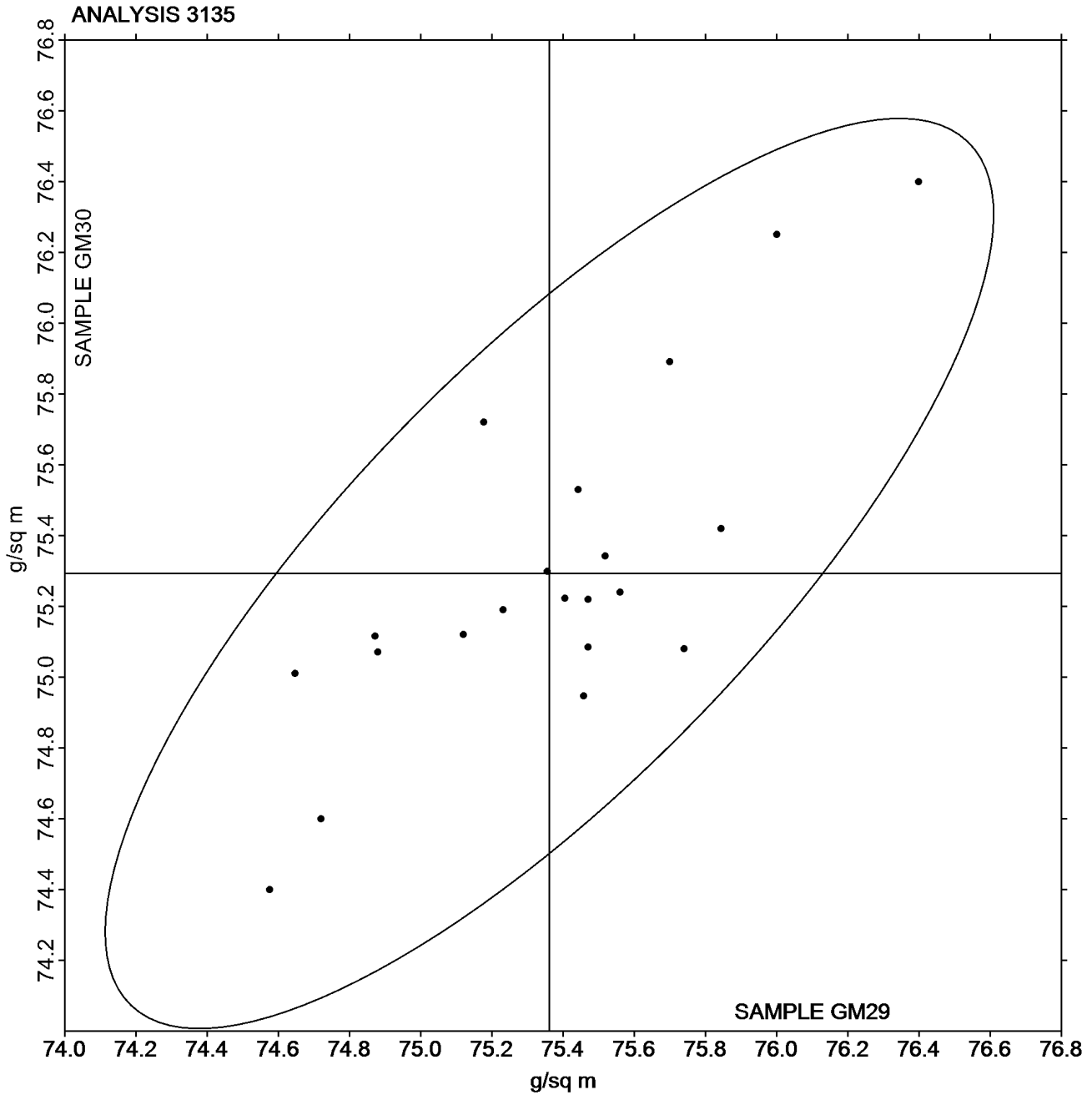
CRF9Q4 - One determination removed from the Lab Mean of Sample GM29 per Grubb's Test at 1% risk (TAPPI 1205).



Analysis 3135
Grammage (Mass per Unit Area)
TAPPI Official Test Method T410

Grand Mean Sample GM29 = 75.361
g/sq m

Grand Mean Sample GM30 = 75.293
g/sq m





Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3141
Opacity (89% Reflectance Backing) - Fine Papers
TAPPI Official Test Method T425

WebCode	Data Flag	Sample VR29			Sample VR30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29ZJLU		95.22	0.37	1.33	95.15	0.29	1.26
3MZHAQ		95.43	0.58	2.12	95.45	0.60	2.54
49FHWW		95.17	0.32	1.17	95.11	0.26	1.09
62A9ZN	*	94.12	-0.73	-2.65	94.46	-0.39	-1.68
9ZL7LB		95.09	0.25	0.89	95.06	0.21	0.89
AEX44G		94.89	0.04	0.14	94.89	0.03	0.14
BPBNZH		94.89	0.04	0.15	94.96	0.11	0.45
CLBRUN		94.68	-0.17	-0.61	94.89	0.04	0.15
CRF9Q4		94.78	-0.07	-0.25	94.83	-0.02	-0.10
E2YLHY		94.76	-0.09	-0.33	94.79	-0.07	-0.29
J3F94A		94.91	0.06	0.22	94.80	-0.05	-0.23
JFKREA		94.89	0.04	0.15	94.98	0.13	0.54
K2FVTL		94.91	0.06	0.21	94.84	-0.01	-0.06
L8H39P		94.55	-0.30	-1.09	94.55	-0.31	-1.30
MY4XEV	X	91.69	-3.16	-11.48	91.68	-3.17	-13.52
PDGPEL		94.66	-0.19	-0.68	94.51	-0.34	-1.47
PGCGLJ		95.00	0.15	0.56	94.95	0.09	0.40
PKG64U		94.70	-0.15	-0.53	94.71	-0.15	-0.63
WXGGBE		94.91	0.07	0.24	94.77	-0.08	-0.35
Y7MZNU		94.69	-0.16	-0.57	94.73	-0.12	-0.51
Z8VC4B		94.72	-0.13	-0.47	94.66	-0.20	-0.84

Summary Statistics	Sample VR29	Sample VR30
Grand Means	94.85 Percent	94.85 Percent
Std Dev Btwn Labs	0.28 Percent	0.23 Percent
Statistics based on 20 of 21 reporting participants.		

Comments on Assigned Data Flags for Test #3141

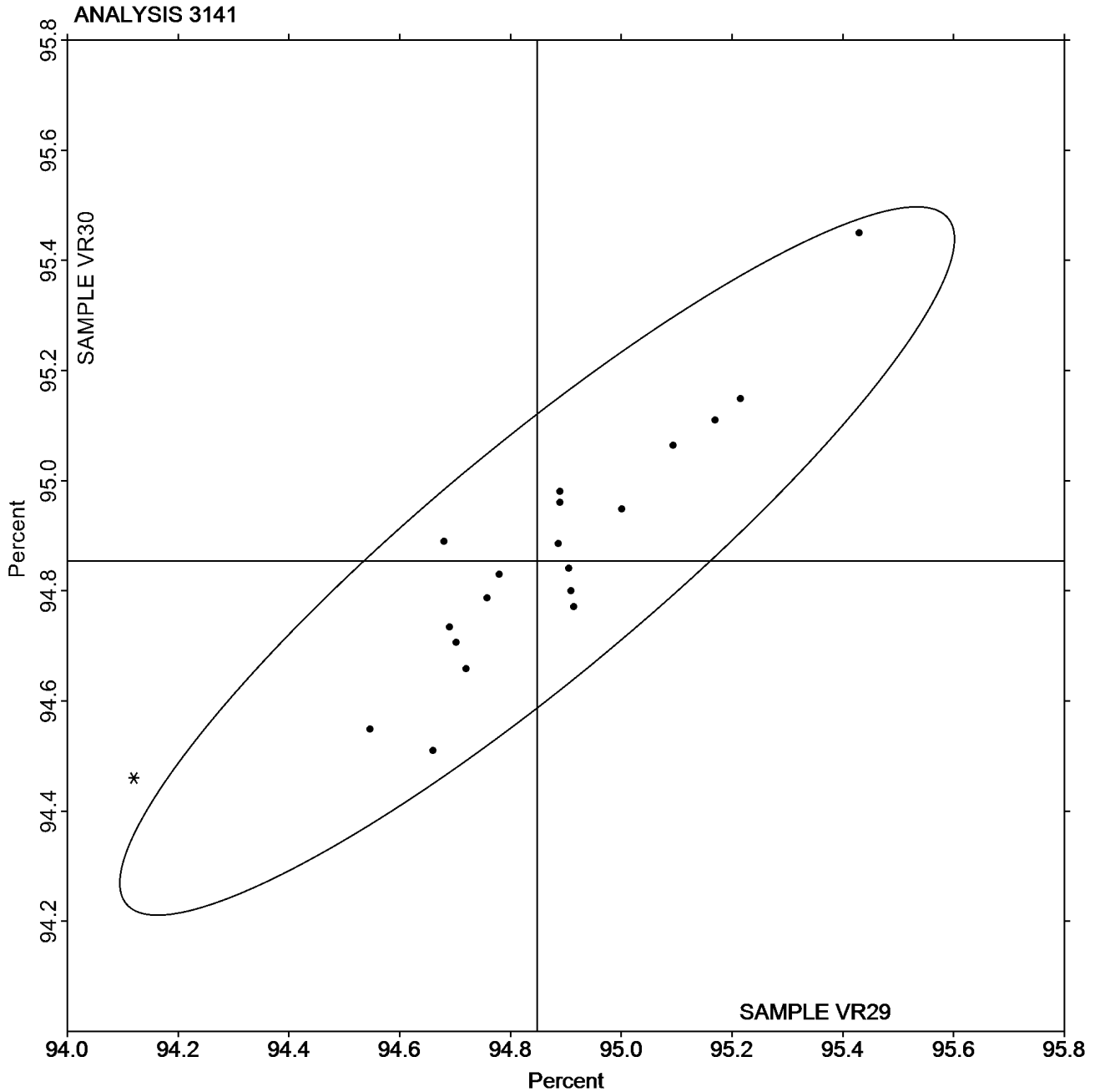
MY4XEV (X) - Extreme Data.



Analysis 3141
Opacity (89% Reflectance Backing) - Fine Papers
TAPPI Official Test Method T425

Grand Mean Sample VR29 = 94.848
Percent

Grand Mean Sample VR30 = 94.854
Percent





Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3143
Opacity (Paper Backing) - Fine Papers and Newsprint
TAPPI Official Test Method T519

WebCode	Data Flag	Sample VP29			Sample VP30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
ABHAP6		95.49	-0.04	-0.51	95.50	0.07	1.08
EUXCB7		95.60	0.08	1.15	95.37	-0.06	-0.89
QBMJ9F	X	13.86	-81.66	-1,152.30	14.34	-81.09	-1,310.45
QX27YQ		95.48	-0.05	-0.64	95.42	-0.01	-0.19

Summary Statistics	Sample VP29	Sample VP30
Grand Means	95.52 Percent	95.43 Percent
Stnd Dev Btwn Labs	0.07 Percent	0.06 Percent

Statistics based on 3 of 4 reporting participants.

Comments on Assigned Data Flags for Test #3143

QBMJ9F (X) - Extreme Data.



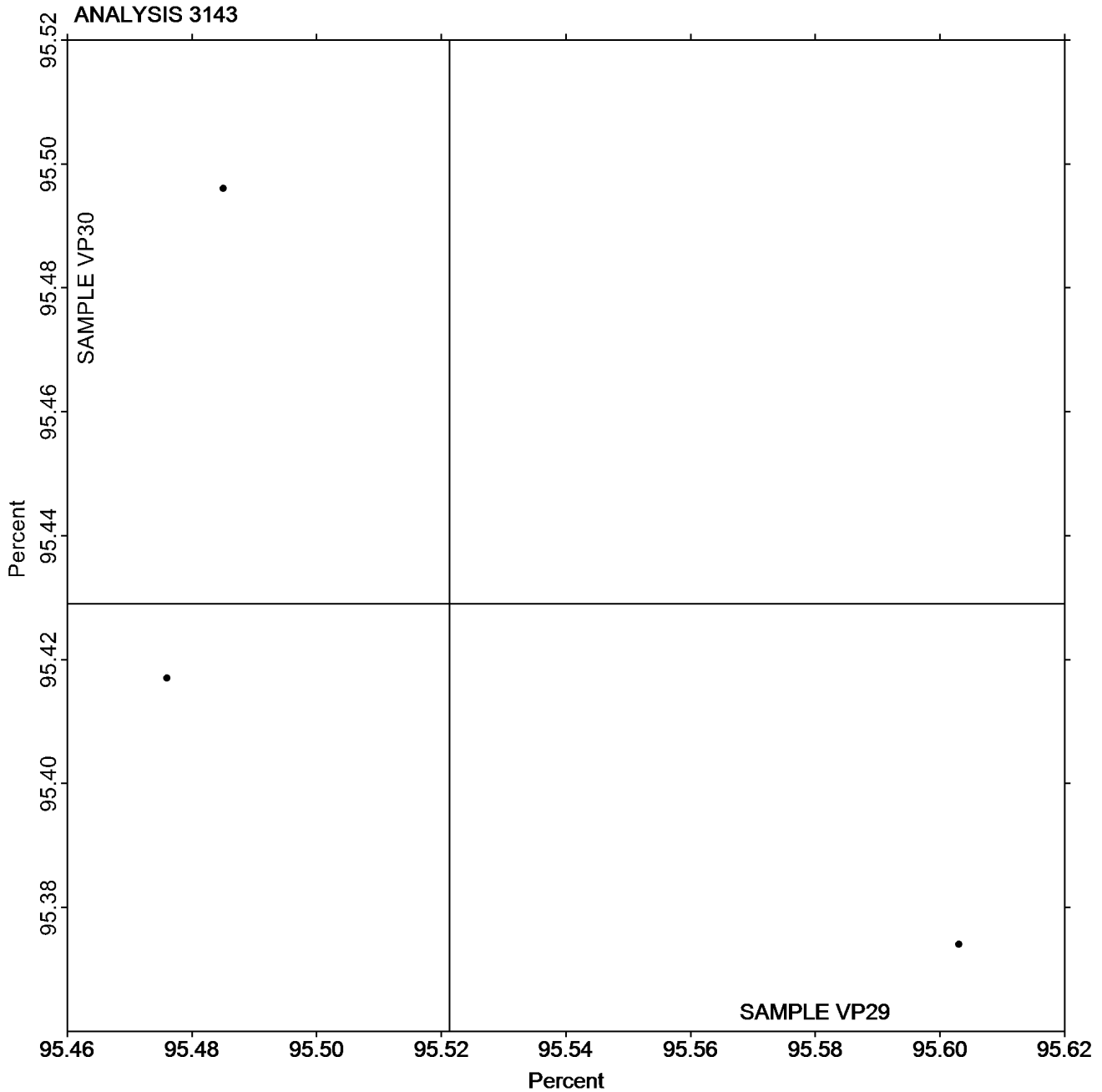
Analysis 3143

Opacity (Paper Backing) - Fine Papers and Newsprint

TAPPI Official Test Method T519

Grand Mean Sample VP29 = 95.521
Percent

Grand Mean Sample VP30 = 95.429
Percent



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



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Paper & Paperboard Interlaboratory Testing Program
Analysis 3145
Directional Brightness of Fluorescent Samples
TAPPI Official Test Method T452

WebCode	Data Flag	<u>Sample BF29</u>			<u>Sample BF30</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29ZJLU		99.30	1.03	0.68	99.59	1.37	0.96
3HMZRA		98.56	0.30	0.20	98.59	0.37	0.26
6NJC2B		99.28	1.01	0.67	99.42	1.20	0.84
9ZL7LB		98.48	0.21	0.14	98.11	-0.11	-0.08
AEX44G		98.51	0.24	0.16	98.02	-0.20	-0.14
J3F94A		98.45	0.19	0.12	98.72	0.50	0.35
JFKREA		99.22	0.95	0.63	98.80	0.58	0.41
K2FVTL		95.08	-3.19	-2.11	95.37	-2.85	-2.00
L8H39P		94.84	-3.43	-2.27	94.98	-3.24	-2.27
N3GXCM		99.09	0.82	0.55	98.95	0.73	0.51
PGCGLJ		99.34	1.07	0.71	99.05	0.84	0.59
WXGGBE		98.36	0.10	0.06	98.34	0.13	0.09
Z8VC4B		98.94	0.67	0.45	98.88	0.66	0.47

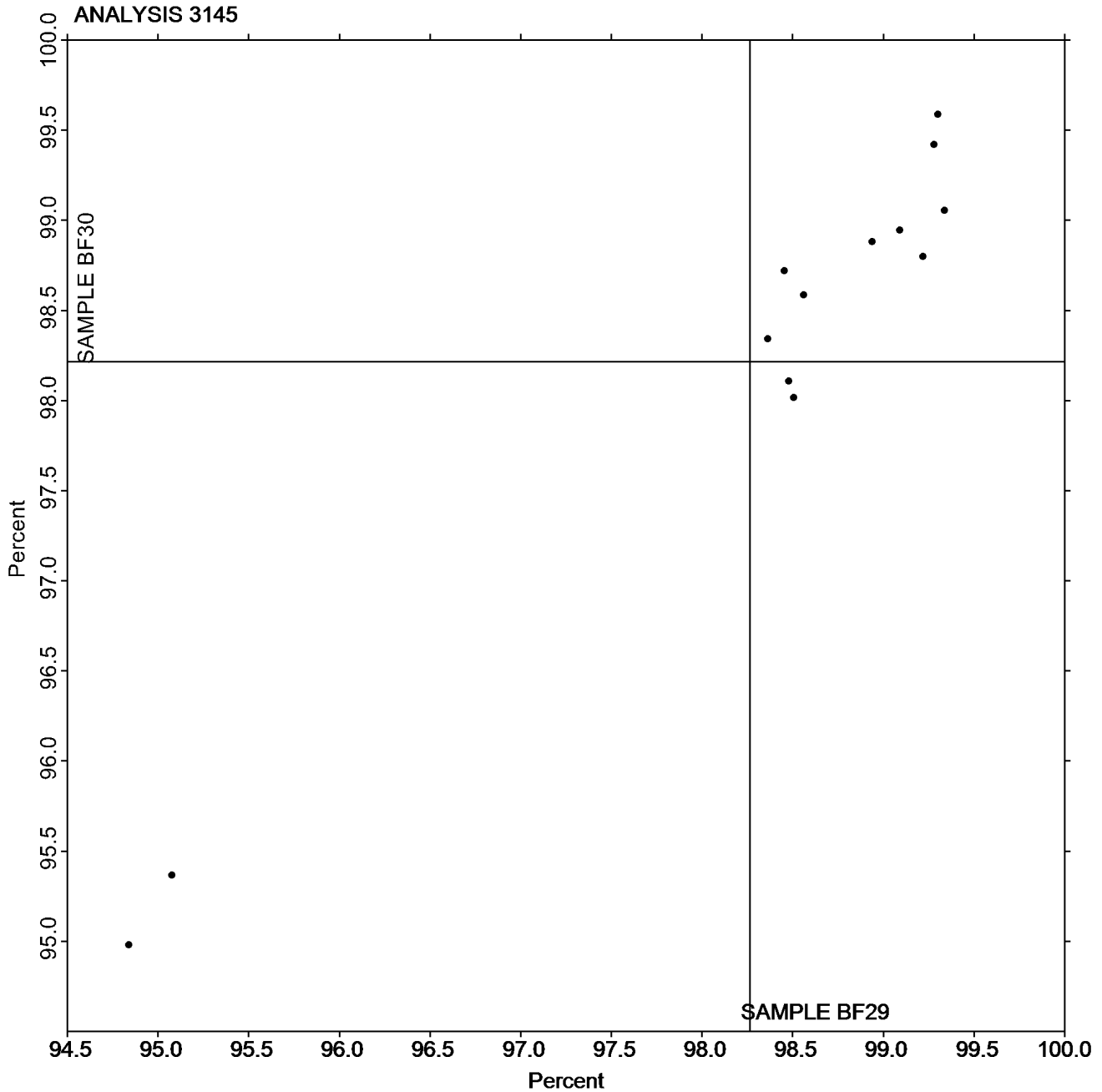
Summary Statistics	<u>Sample BF29</u>	<u>Sample BF30</u>
Grand Means	98.27 Percent	98.22 Percent
Stnd Dev Btwn Labs	1.51 Percent	1.43 Percent
Statistics based on 13 of 13 reporting participants.		



Paper & Paperboard Interlaboratory Testing Program Report #4301, May 2024
Analysis 3145
Directional Brightness of Fluorescent Samples
TAPPI Official Test Method T452

Grand Mean Sample BF29 = 98.265
Percent

Grand Mean Sample BF30 = 98.215
Percent



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



Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3146
Fluorescent Component of Directional Brightness
TAPPI Official Test Method T452

WebCode	Data Flag	Sample BF29			Sample BF30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29ZJLU		8.242	0.412	1.31	7.988	0.192	0.66
3HMZRA		7.892	0.062	0.20	7.906	0.110	0.38
6NJC2B		8.140	0.310	0.99	8.120	0.324	1.12
9ZL7LB		7.850	0.020	0.06	7.832	0.036	0.12
AEX44G		7.692	-0.138	-0.44	7.650	-0.146	-0.50
J3F94A		7.922	0.092	0.29	7.984	0.188	0.65
JFKREA		8.072	0.242	0.77	8.026	0.230	0.79
K2FVTL		7.438	-0.392	-1.25	7.656	-0.140	-0.48
L8H39P		7.160	-0.670	-2.13	7.100	-0.696	-2.40
N3GXCM		7.978	0.148	0.47	7.930	0.134	0.46
PGCGLJ	X	102.468	94.638	301.03	102.210	94.414	325.46
WXGGBE		7.742	-0.088	-0.28	7.562	-0.234	-0.81
Z8VC4B	X	90.300	82.470	262.32	90.240	82.444	284.20

Summary Statistics	Sample BF29	Sample BF30
Grand Means	7.83 Percent	7.80 Percent
Stnd Dev Btwn Labs	0.31 Percent	0.29 Percent
Statistics based on 11 of 13 reporting participants.		

Comments on Assigned Data Flags for Test #3146

- PGCGLJ (X) - Extreme Data.
- Z8VC4B (X) - Extreme Data.



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Paper & Paperboard Interlaboratory Testing Program
Analysis 3201
Bending Resistance, Taber Type - 0 to 10 Units
TAPPI Official Test Method T566

WebCode	Data Flag	<u>Sample TP29</u>			<u>Sample TP30</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
29ZJLU		2.058	-0.202	-1.24	1.880	-0.354	-1.18
49FHWW		2.445	0.185	1.13	2.288	0.054	0.18
BPBNZH		2.429	0.169	1.03	2.455	0.221	0.74
CLBRUN		2.358	0.098	0.60	2.782	0.548	1.83
DU44QH		2.072	-0.188	-1.15	2.066	-0.168	-0.56
E2YLHY		2.420	0.160	0.98	2.480	0.246	0.82
J3F94A		2.077	-0.184	-1.12	2.069	-0.165	-0.55
K2FVTL	X	21.944	19.684	120.21	21.863	19.629	65.48
L8H39P		2.297	0.037	0.22	1.882	-0.352	-1.17
WXGGBE	X	1,658.065	1,655.804	10,111.90	1,695.794	1,693.561	5,649.71
Z8VC4B		2.187	-0.073	-0.45	2.201	-0.033	-0.11

Summary Statistics	<u>Sample TP29</u>	<u>Sample TP30</u>
Grand Means	2.26 Taber Units	2.23 Taber Units
Std Dev Btwn Labs	0.16 Taber Units	0.30 Taber Units
Statistics based on 9 of 11 reporting participants.		

Comments on Assigned Data Flags for Test #3201

- K2FVTL (X) - Extreme Data.
- WXGGBE (X) - Extreme Data.



Analysis 3201

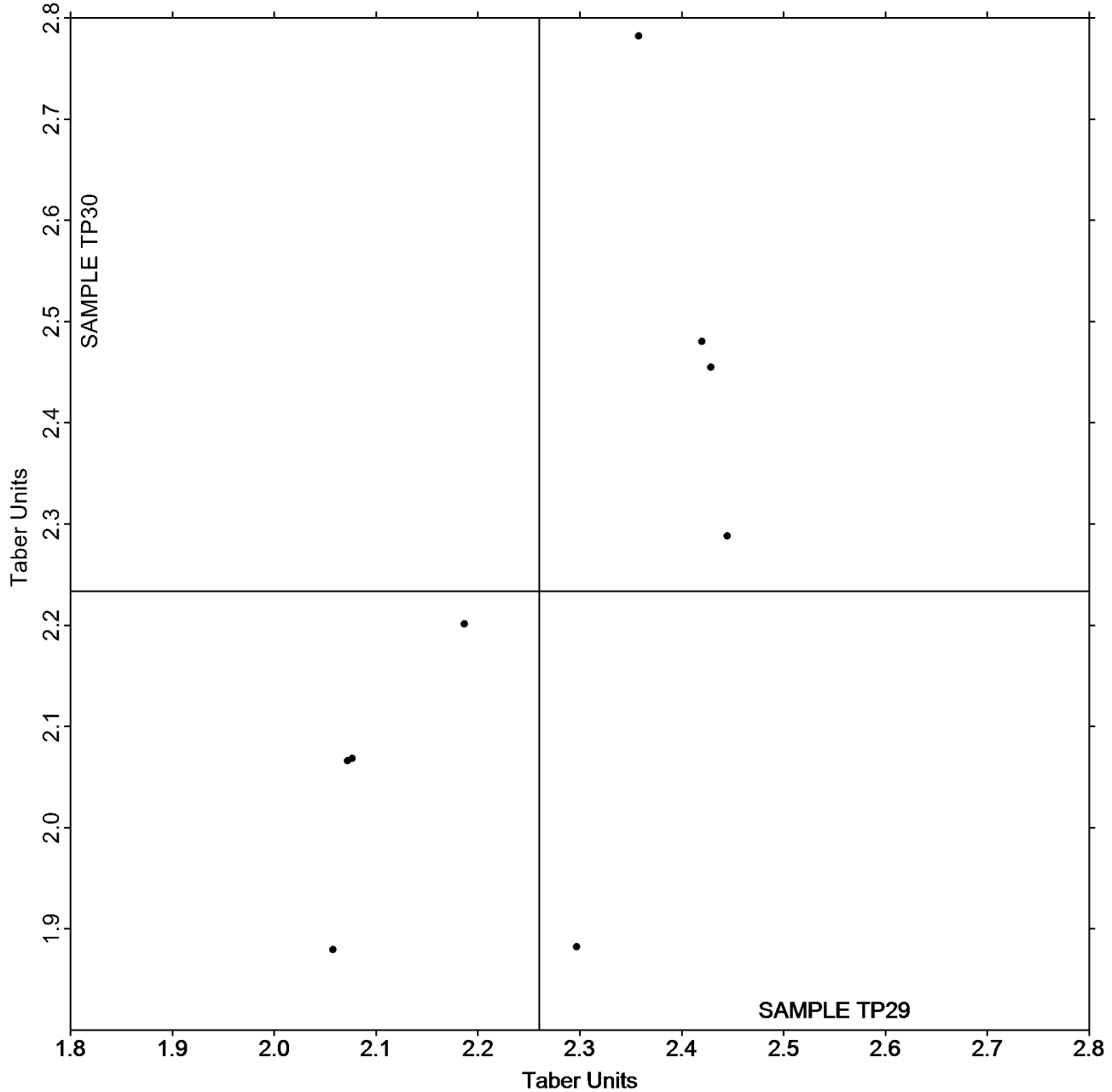
Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

Grand Mean Sample TP29 = 2.2603
Taber Units

Grand Mean Sample TP30 = 2.2336
Taber Units

ANALYSIS 3201



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



Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3203
Bending Resistance, Taber Type - 10 to 100 Taber Units
TAPPI Official Test Method T489

WebCode	Data Flag	<u>Sample TC29</u>			<u>Sample TC30</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2ETJ3A		22.18	1.44	1.16	46.78	3.78	1.33
4UVZ28		22.78	2.04	1.65	46.17	3.17	1.11
68E4LA		20.27	-0.48	-0.38	44.35	1.35	0.47
JFKREA		19.85	-0.89	-0.72	42.05	-0.95	-0.33
L6VH8R		20.49	-0.25	-0.20	43.52	0.52	0.18
MMAGRF		19.71	-1.03	-0.83	38.52	-4.48	-1.57
NKYY64	X	48.15	27.41	22.12	64.00	21.00	7.38
PU7VQL		20.38	-0.36	-0.29	39.37	-3.63	-1.27
TV8ZUK		22.31	1.57	1.27	45.70	2.70	0.95
WZ4XTY		19.10	-1.64	-1.32	40.76	-2.24	-0.79
Z8VC4B		20.35	-0.39	-0.32	42.77	-0.23	-0.08

Summary Statistics	<u>Sample TC29</u>	<u>Sample TC30</u>
Grand Means	20.74 Taber Units	43.00 Taber Units
Std Dev Btwn Labs	1.24 Taber Units	2.85 Taber Units
Statistics based on 10 of 11 reporting participants.		

Comments on Assigned Data Flags for Test #3203

NKYY64 (X) - Extreme Data.



Analysis 3203

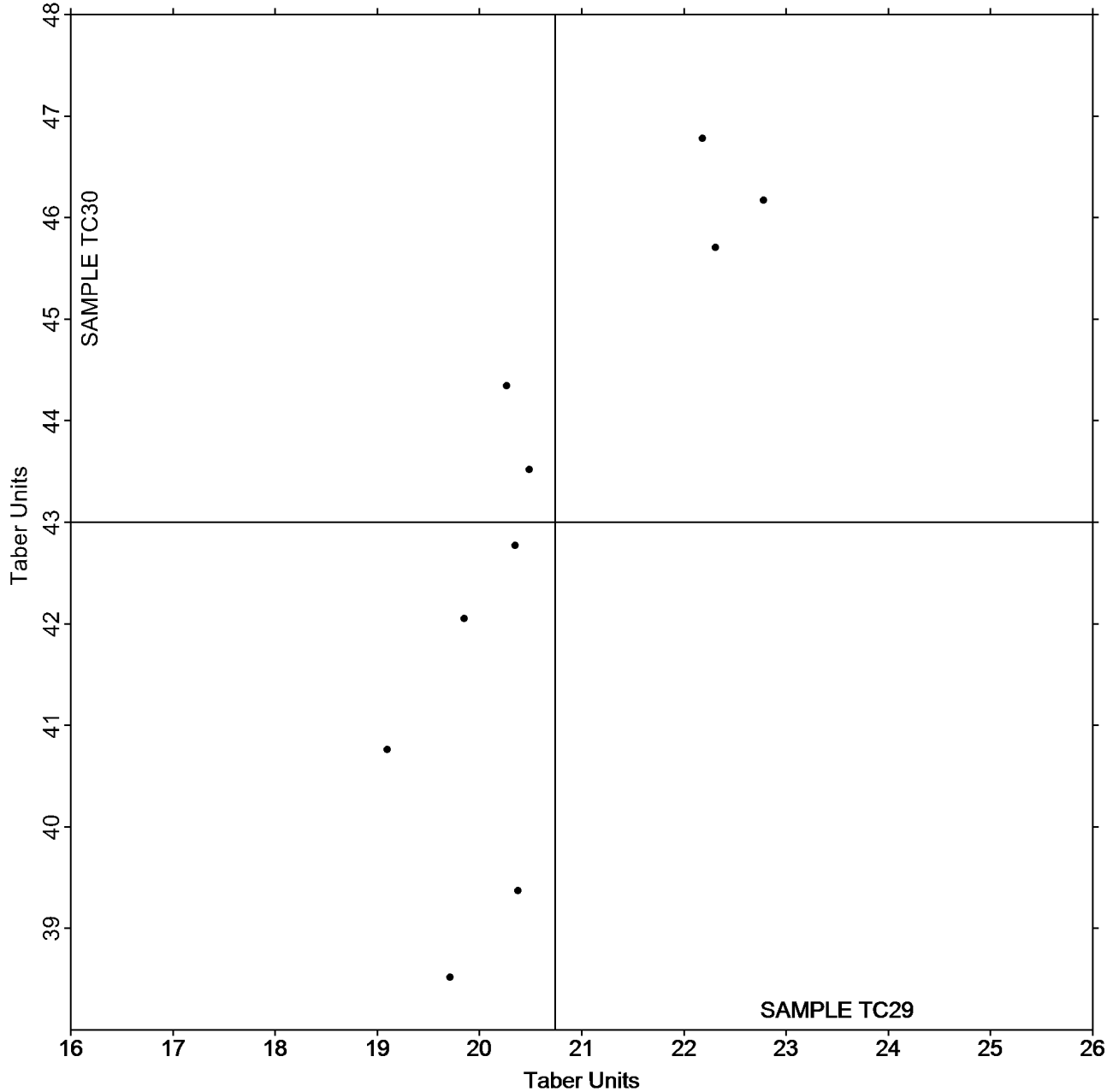
Bending Resistance, Taber Type - 10 to 100 Taber Units

TAPPI Official Test Method T489

Grand Mean Sample TC29 = 20.741
Taber Units

Grand Mean Sample TC30 = 42.999
Taber Units

ANALYSIS 3203



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



Analysis 3205

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

TAPPI Official Test Method T489

WebCode	Data Flag	<u>Sample TR29</u>			<u>Sample TR30</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3MZHAQ		171.4	-4.0	-0.83	170.4	-5.3	-0.83
4BJDDE		170.9	-4.6	-0.93	168.4	-7.2	-1.13
68E4LA		174.1	-1.3	-0.27	178.4	2.7	0.42
AT3ZP4		177.3	1.9	0.39	174.4	-1.3	-0.20
G4C6FY		177.7	2.3	0.47	177.8	2.1	0.34
JNXJ8T		181.6	6.2	1.26	181.5	5.8	0.92
L6VH8R		171.7	-3.7	-0.76	177.3	1.7	0.26
T4FRWM		179.4	4.0	0.81	186.3	10.6	1.67
TV8ZUK		183.4	8.0	1.64	180.7	5.1	0.80
W7CE2M		167.8	-7.7	-1.57	164.3	-11.4	-1.78
XZYZV9		174.4	-1.0	-0.21	172.7	-3.0	-0.46

Summary Statistics	<u>Sample TR29</u>	<u>Sample TR30</u>
Grand Means	175.42 Taber Units	175.65 Taber Units
Std Dev Btwn Labs	4.89 Taber Units	6.39 Taber Units
Statistics based on 11 of 11 reporting participants.		

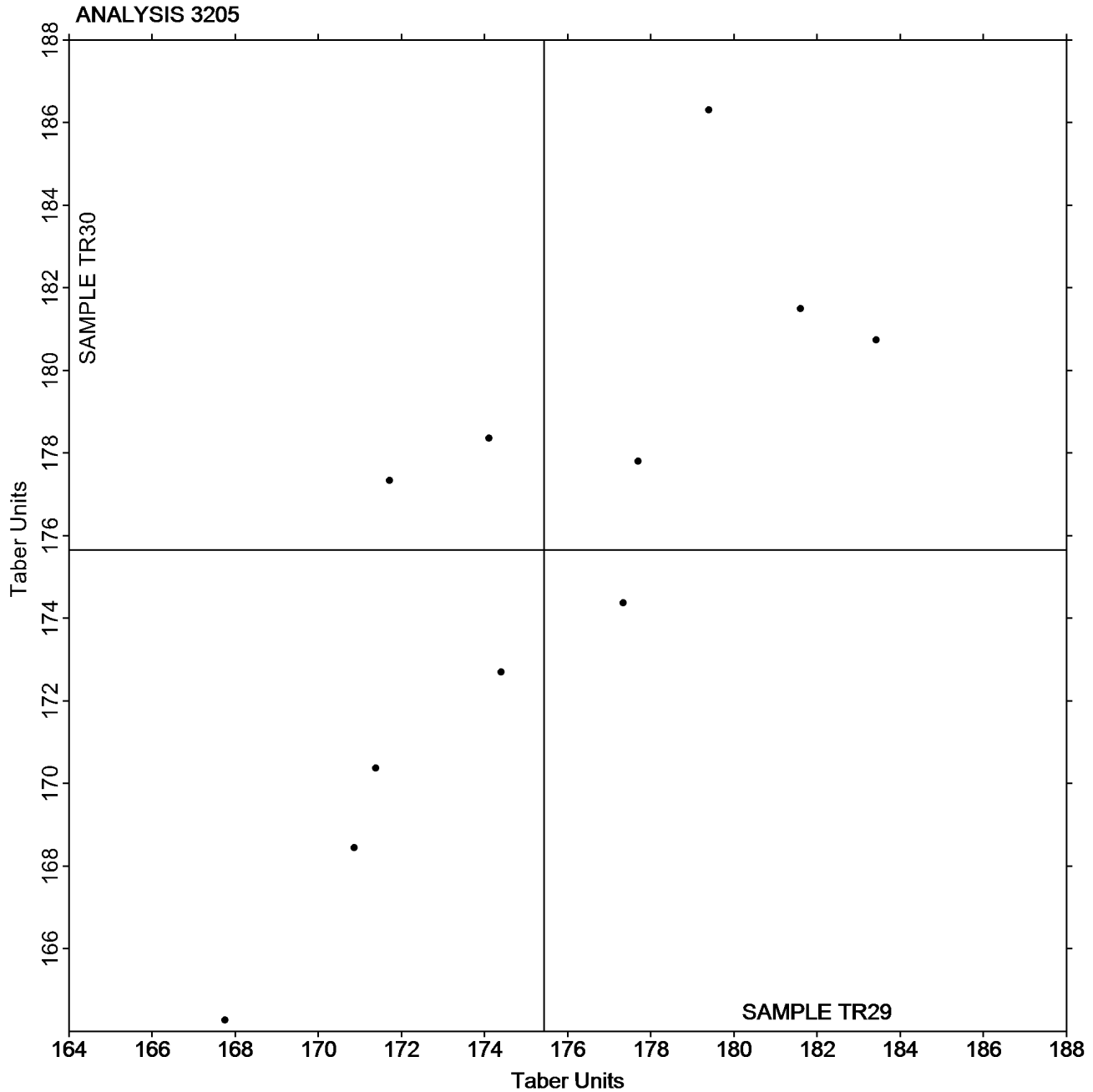
Analysis Notes:

AT3ZP4 - Data appear to be reported as mN/m, not g/cm as indicated on data entry form. CTS will not correct the Units going forward.



Grand Mean Sample TR29 = 175.42
Taber Units

Grand Mean Sample TR30 = 175.65
Taber Units



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



Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3207
Z-Direction Tensile, Recycled Paperboard
TAPPI Official Test Method T541

WebCode	Data Flag	<u>Sample ZR29</u>			<u>Sample ZR30</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3MZHAQ		61.68	-2.55	-0.44	62.44	-1.83	-0.32
4BJDDE		63.20	-1.03	-0.18	62.80	-1.47	-0.25
68E4LA		64.56	0.33	0.06	62.32	-1.95	-0.34
9Z8GKJ		75.68	11.45	1.97	76.30	12.03	2.07
AJVHQ7		63.04	-1.18	-0.20	60.94	-3.32	-0.57
AT3ZP4		57.25	-6.98	-1.20	58.56	-5.71	-0.98
D863DE		74.34	10.11	1.74	75.10	10.83	1.87
EDPHGC		56.00	-8.23	-1.42	58.20	-6.07	-1.05
EW6RHC		55.30	-8.93	-1.54	54.12	-10.15	-1.75
EXWM87		63.40	-0.83	-0.14	68.22	3.95	0.68
G4C6FY		62.60	-1.63	-0.28	62.60	-1.67	-0.29
GUMGHB		69.10	4.87	0.84	71.00	6.73	1.16
HHRQCW		67.60	3.37	0.58	64.60	0.33	0.06
L6VH8R		68.62	4.39	0.76	67.28	3.01	0.52
LHZ2HR		64.34	0.11	0.02	64.64	0.37	0.06
W7CE2M		61.50	-2.73	-0.47	58.72	-5.54	-0.96
XGN4H4		71.80	7.57	1.30	69.60	5.33	0.92
XZYZV9		62.68	-1.55	-0.27	63.60	-0.67	-0.12
YBCKRA		57.64	-6.59	-1.13	60.04	-4.23	-0.73

Summary Statistics	<u>Sample ZR29</u>	<u>Sample ZR30</u>
Grand Means	64.23 psi	64.27 psi
Std Dev Btwn Labs	5.81 psi	5.80 psi
Statistics based on 19 of 19 reporting participants.		

Analysis Notes:

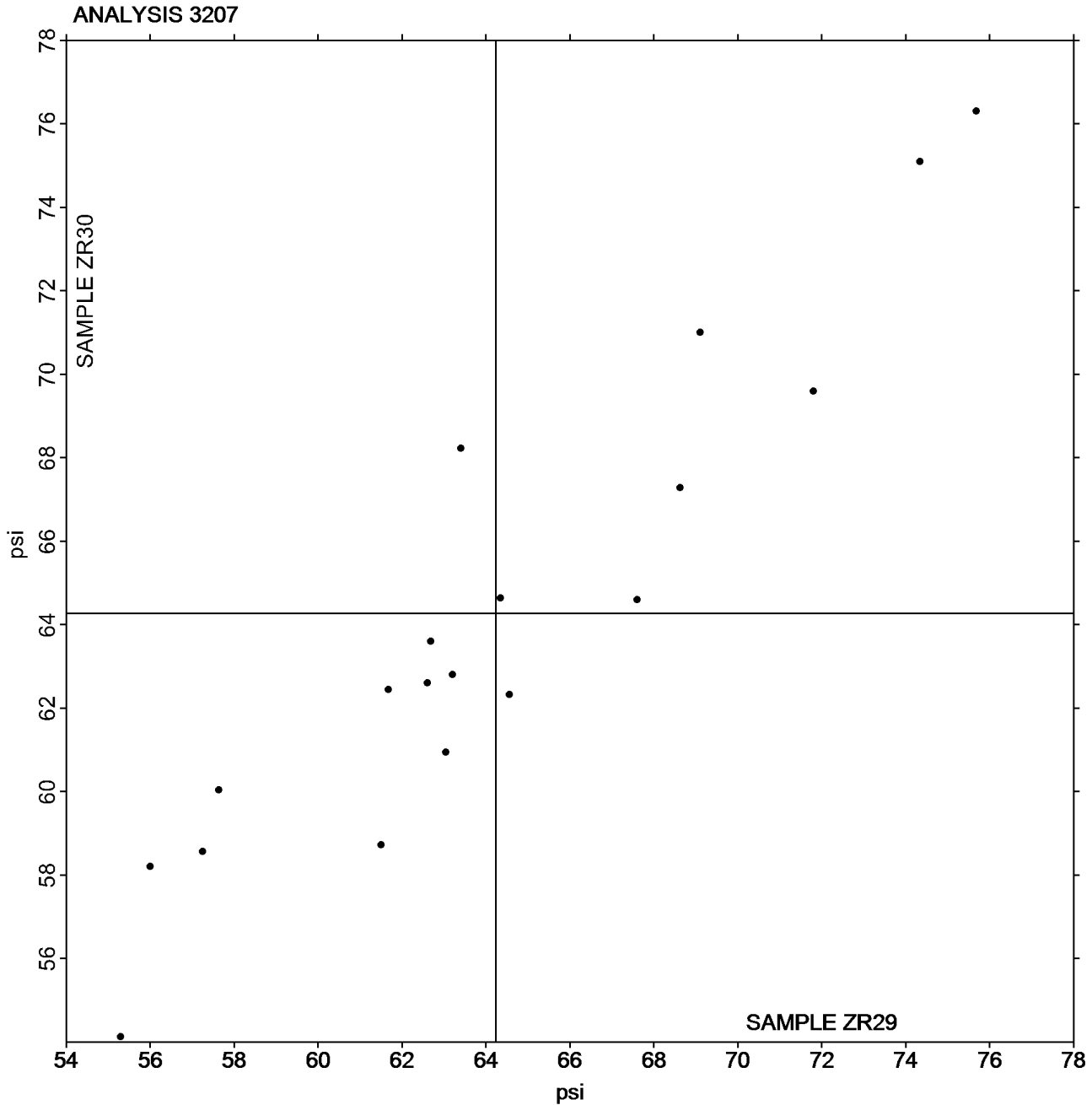
AT3ZP4 - One determination removed from the Lab Mean of Sample ZR29 per Grubb's Test at 1% risk (TAPPI 1205).



Paper & Paperboard Interlaboratory Testing Program Report #4301, May 2024
Analysis 3207
Z-Direction Tensile, Recycled Paperboard
TAPPI Official Test Method T541

Grand Mean Sample ZR29 = 64.228
psi

Grand Mean Sample ZR30 = 64.268
psi



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



**Analysis 3209
Z-Direction Tensile**

TAPPI Official Test Method T541

WebCode	Data Flag	Sample ZP29			Sample ZP30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2ETJ3A		70.08	2.28	0.33	92.40	7.65	0.66
477DGM		74.60	6.80	0.98	105.80	21.05	1.81
4UVZ28		67.12	-0.68	-0.10	92.36	7.61	0.65
8GEE74		65.04	-2.76	-0.40	77.72	-7.03	-0.60
JNXJ8T		78.60	10.80	1.56	86.00	1.25	0.11
JX3QLT		59.18	-8.62	-1.25	74.90	-9.85	-0.85
L6VH8R		77.52	9.72	1.40	101.80	17.05	1.47
MMAGRF		73.26	5.46	0.79	83.88	-0.87	-0.07
PU7VQL		67.06	-0.75	-0.11	76.30	-8.45	-0.73
QX27YQ		57.67	-10.14	-1.46	71.68	-13.07	-1.12
T4FRWM		66.20	-1.60	-0.23	93.82	9.07	0.78
TCQTHN		58.08	-9.72	-1.40	73.10	-11.65	-1.00
WZ4XTY		67.04	-0.76	-0.11	72.00	-12.75	-1.10

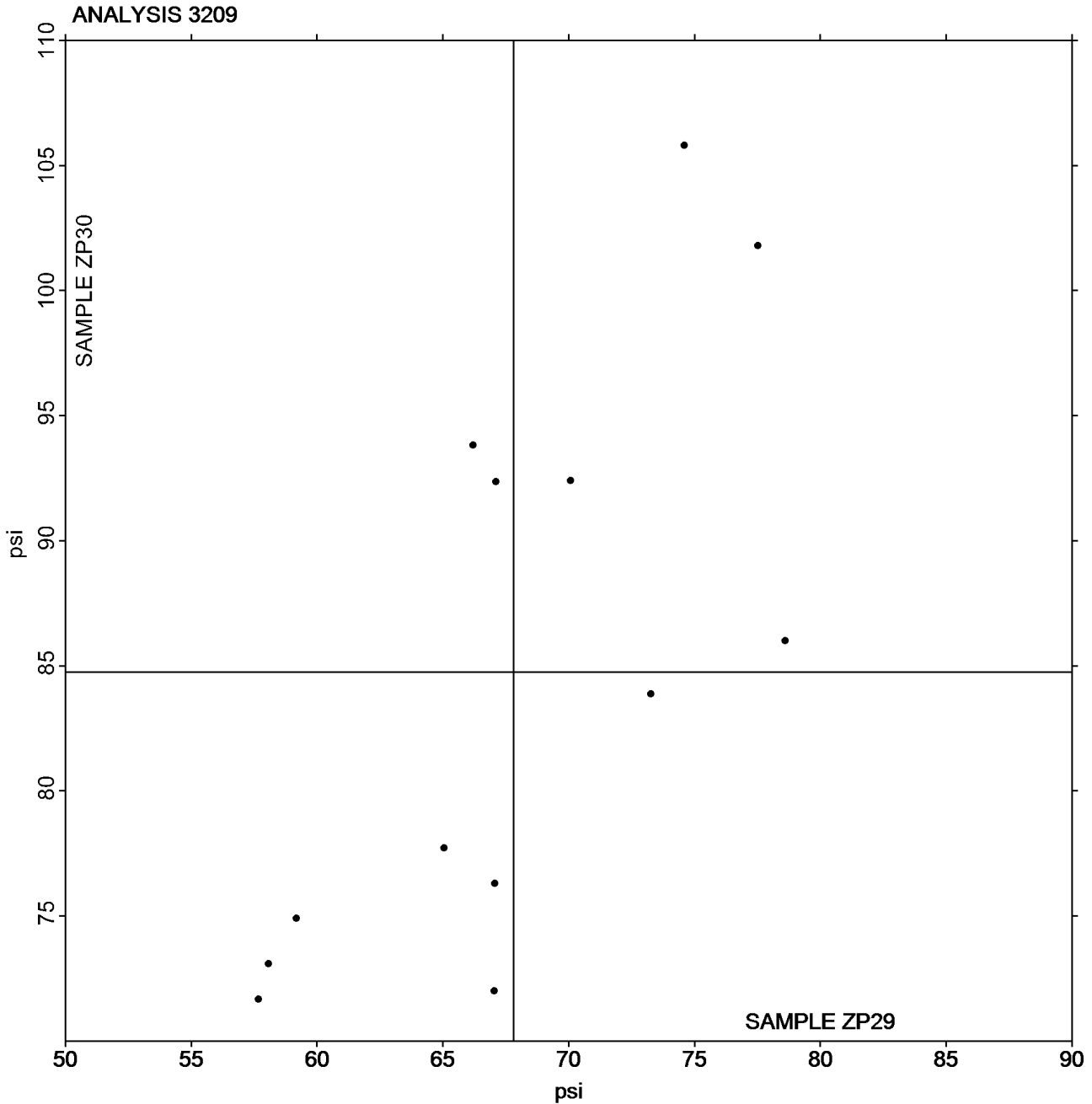
Summary Statistics	Sample ZP29	Sample ZP30
Grand Means	67.80 psi	84.75 psi
Std Dev Btwn Labs	6.93 psi	11.63 psi
Statistics based on 13 of 13 reporting participants.		



Paper & Paperboard Interlaboratory Testing Program Report #4301, May 2024
Analysis 3209
Z-Direction Tensile
TAPPI Official Test Method T541

Grand Mean Sample ZP29 = 67.803
psi

Grand Mean Sample ZP30 = 84.751
psi



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



Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3211
Internal Bond Strength - Modified Scott Mechanics
TAPPI Provisional Test Method T569

WebCode	Data Flag	<u>Sample SM29</u>			<u>Sample SM30</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2ETJ3A		84.60	7.01	1.40	124.4	16.0	1.63
3MZHAQ		83.28	5.69	1.14	113.0	4.6	0.47
477DGM		68.60	-8.99	-1.80	104.2	-4.2	-0.43
4BJDDE		71.80	-5.79	-1.16	116.8	8.4	0.85
4UVZ28		81.20	3.61	0.72	110.0	1.6	0.16
DU44QH		78.44	0.85	0.17	98.2	-10.3	-1.05
L6VH8R		79.60	2.01	0.40	113.4	5.0	0.51
MMAGRF		83.00	5.41	1.08	119.2	10.8	1.10
PKG64U		71.00	-6.59	-1.32	100.2	-8.2	-0.84
T4FRWM		72.20	-5.39	-1.08	89.0	-19.4	-1.98
WXGGBE		79.40	1.81	0.36	98.0	-10.4	-1.06
X4Y4NG		77.20	-0.39	-0.08	109.4	1.0	0.10
XEX2AV		79.80	2.21	0.44	117.0	8.6	0.87
Y9D2W4		76.20	-1.39	-0.28	105.2	-3.2	-0.33

Summary Statistics	<u>Sample SM29</u>	<u>Sample SM30</u>
Grand Means	77.59 1000th ft-lbs	108.43 1000th ft-lbs
Stnd Dev Btwn Labs	5.00 1000th ft-lbs	9.81 1000th ft-lbs
Statistics based on 14 of 14 reporting participants.		

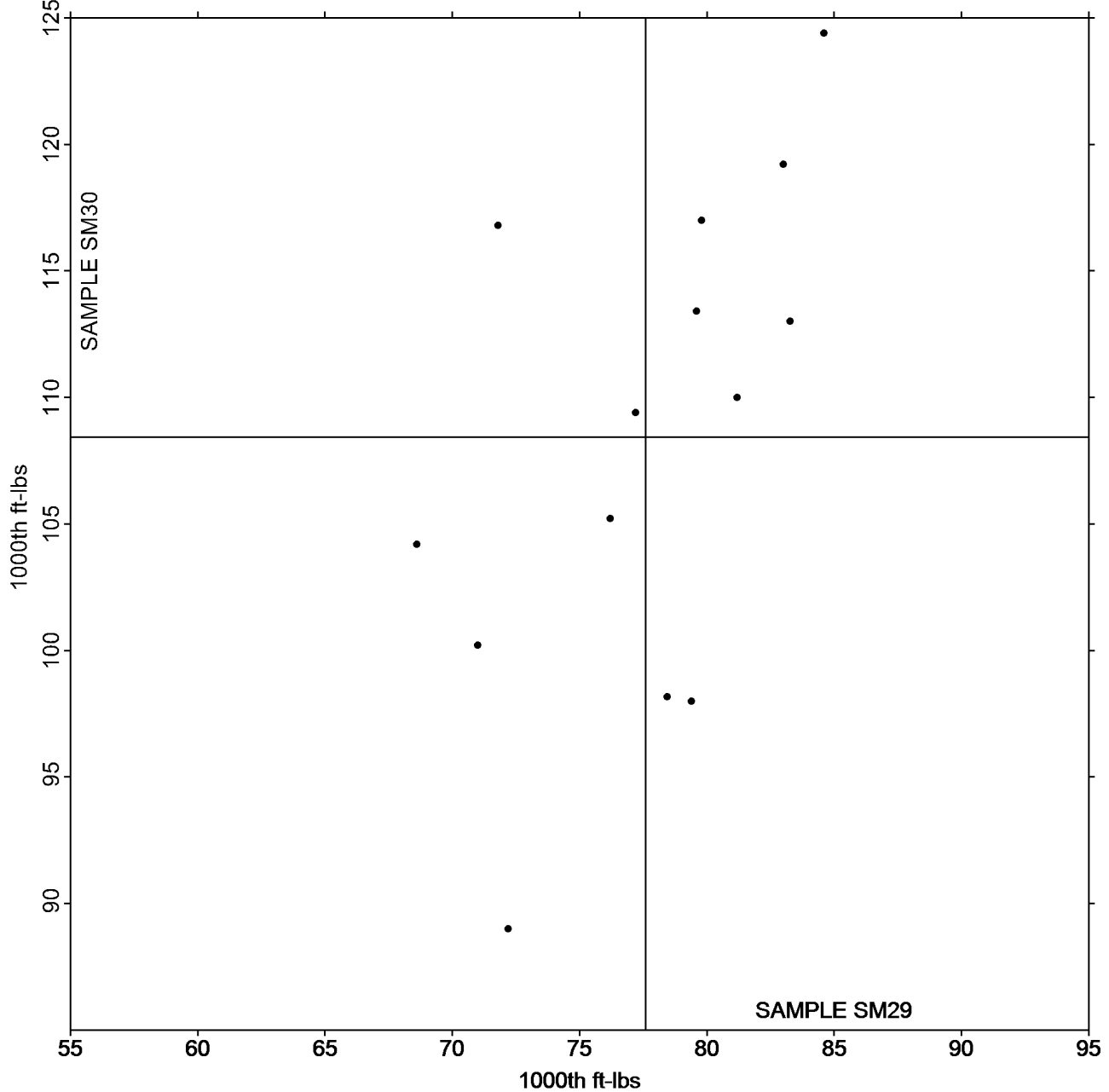


Paper & Paperboard Interlaboratory Testing Program Report #4301, May 2024
Analysis 3211
Internal Bond Strength - Modified Scott Mechanics
TAPPI Provisional Test Method T569

Grand Mean Sample SM29 = 77.594
1000th ft-lbs

Grand Mean Sample SM30 = 108.43
1000th ft-lbs

ANALYSIS 3211



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



Report #4301, May 2024

Paper & Paperboard Interlaboratory Testing Program
Analysis 3213
Internal Bond Strength - Scott Bond Models
TAPPI Provisional Test Method T569

WebCode	Data Flag	<u>Sample SB29</u>			<u>Sample SB30</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
7AWQR2		88.60	8.90	0.27	115.8	8.4	0.29
7HRNJB		66.04	-13.66	-0.41	96.8	-10.6	-0.37
ABHAP6		72.99	-6.70	-0.20	100.4	-7.0	-0.24
AGPZTB		59.00	-20.70	-0.63	81.6	-25.8	-0.90
AJVHQ7		68.40	-11.30	-0.34	95.2	-12.2	-0.42
FB3ZYQ		75.60	-4.10	-0.12	102.8	-4.6	-0.16
J3F94A	*	180.40	100.70	3.06	193.4	86.0	2.99
K2FVTL		54.40	-25.30	-0.77	84.6	-22.8	-0.79
NKYY64		79.32	-0.38	-0.01	110.4	3.0	0.10
PKG64U		73.00	-6.70	-0.20	107.0	-0.4	-0.01
WLJFXA		69.20	-10.50	-0.32	97.6	-9.8	-0.34
Z8VC4B		69.40	-10.30	-0.31	103.2	-4.2	-0.15

Summary Statistics	<u>Sample SB29</u>	<u>Sample SB30</u>
Grand Means	79.70 1000th ft-lbs	107.40 1000th ft-lbs
Stnd Dev Btwn Labs	32.93 1000th ft-lbs	28.77 1000th ft-lbs
Statistics based on 12 of 12 reporting participants.		

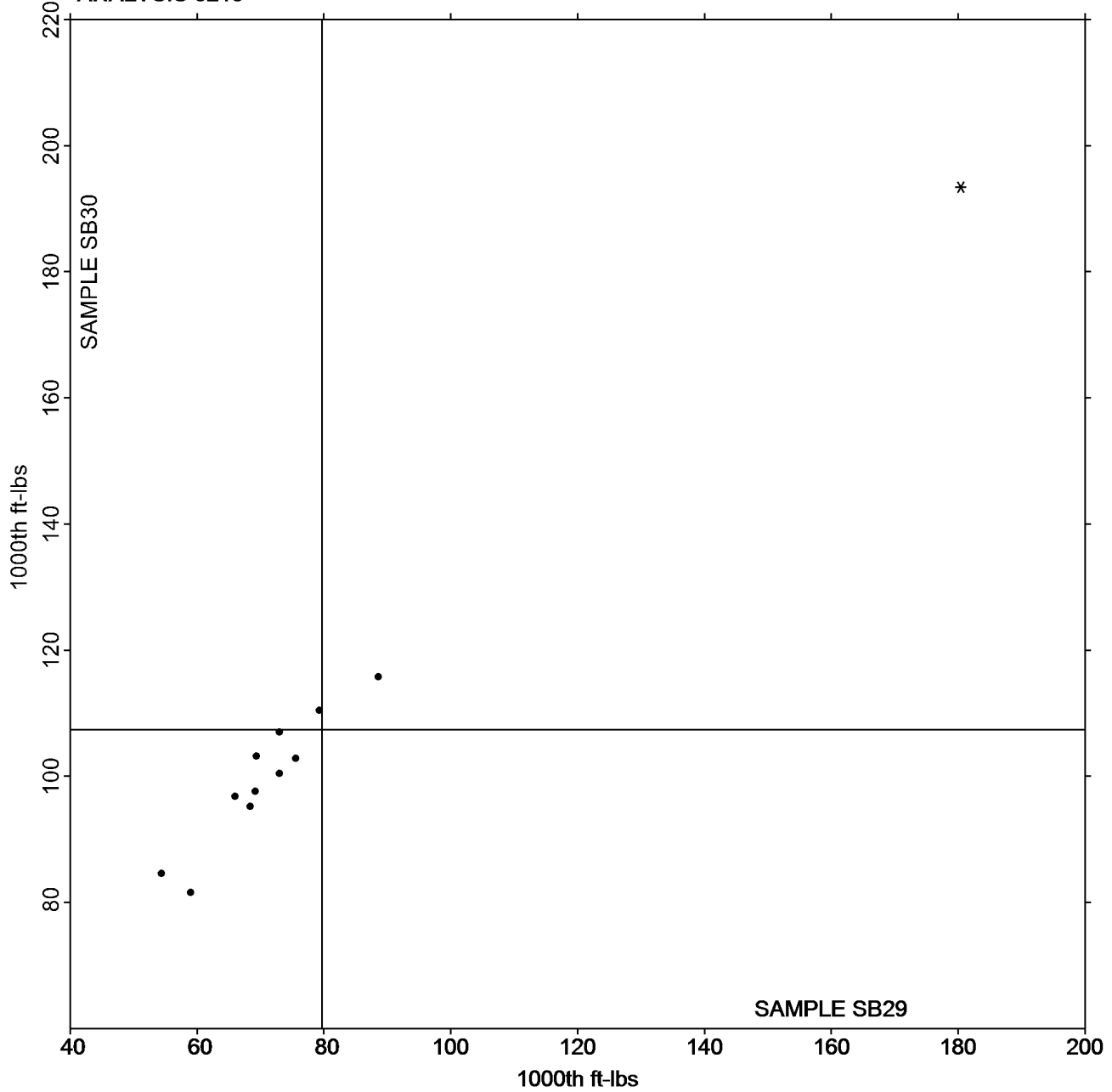


Paper & Paperboard Interlaboratory Testing Program Report #4301, May 2024
Analysis 3213
Internal Bond Strength - Scott Bond Models
TAPPI Provisional Test Method T569

Grand Mean Sample SB29 = 79.696
1000th ft-lbs

Grand Mean Sample SB30 = 107.40
1000th ft-lbs

ANALYSIS 3213



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

-End of Report-