Paper & Paperboard Testing Program

Summary Report #4321 - September 2024

Introduction to the Paper & Paperboard Interlaboratory Program

Explanation of Tables and Definitions of Terms

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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.

If there are any questions on the report or testing program, please contact:

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Office Hours: 8:00 a.m. - 4:30 p.m. ET

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:

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

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

Common Problems Highlighted in Footnotes

1. ***Extreme data*** - The laboratory's results for one or both samples are so inconsistent with those of the other participants that the lab mean(s) fall outside the plot. The participant is advised to immediately review his data and/or testing procedure.

2. ***Systematic bias*** - The laboratory's results are either consistently high or low for both samples when compared to the other participants (the plotted point falls near the top or bottom of the ellipse). This indicates that the participant is performing the test with a constant bias. Causes of systematic errors include improper calibration, the particular make/model of equipment or a modification to the testing procedure.

3. ***Inconsistency in testing between samples/sample sets*** - The laboratory's results indicate that there are differences in the way the two samples tested (the plotted point falls to the side of the ellipse). This type of error may be attributed to the analyst deviating from the procedure when testing one of the samples or a material interaction occurrence with the instrument or room conditions. The inconsistency is reflected in the CPVs for the two samples, such as a +1.5 CPV for sample A and a -2.2 CPV for sample B. CTS also will specify if the laboratory's data for one sample are high/low compared to the other participants. If this inconsistency is slight, the lab's plotted point will be an * that falls on the edge of the ellipse.

4. ***Inconsistency in testing within a sample*** - The laboratory's within-lab standard deviation for a specified sample is high when compared to the other participants, often causing the lab's plotted point to fall outside of the ellipse.

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

Paper & Paperboard Interlaboratory Testing Program
Report #4321,
September 2024

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

WebCode	Data Flag	Sample CP33			Sample CP34		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2BX62X		4.158	0.133	2.05	4.108	0.088	1.66
2EKN73		4.086	0.061	0.94	4.071	0.051	0.97
4KCZUU		4.089	0.064	0.99	4.097	0.078	1.46
4MLQKX		3.964	-0.061	-0.94	4.017	-0.003	-0.05
4YHWDW	*	3.854	-0.171	-2.63	3.907	-0.113	-2.11
6C2X9U		4.092	0.067	1.03	4.069	0.049	0.93
6ER322		3.941	-0.084	-1.29	4.019	-0.001	-0.01
8PYUH7		4.046	0.021	0.32	4.012	-0.008	-0.14
9G3BHN		4.014	-0.011	-0.16	4.031	0.012	0.22
A633DQ		3.894	-0.131	-2.01	3.910	-0.109	-2.05
ALPK47		4.037	0.012	0.19	3.995	-0.025	-0.46
AX6FJ6		4.021	-0.004	-0.06	4.021	0.001	0.03
BVVPVM		4.076	0.051	0.79	4.050	0.030	0.57
C4J39R		3.988	-0.037	-0.56	3.980	-0.039	-0.74
CTMUPN		4.002	-0.023	-0.35	4.007	-0.013	-0.24
EC8DVR		4.082	0.057	0.88	4.050	0.030	0.57
F4PLHY	*	3.920	-0.105	-1.61	4.012	-0.008	-0.14
F722CZ		4.056	0.031	0.48	4.030	0.010	0.20
GFZGDN		4.076	0.051	0.78	4.098	0.078	1.47
GW7JDG		4.113	0.088	1.36	4.064	0.044	0.83
HV9PTH		4.037	0.012	0.19	4.009	-0.011	-0.20
KJNXHD		4.006	-0.019	-0.29	4.028	0.009	0.16
L3XE2H		4.115	0.090	1.39	4.085	0.065	1.23
LQKGVT		4.079	0.054	0.83	4.047	0.028	0.52
LX84RJ		4.024	-0.001	-0.01	3.988	-0.032	-0.59
N3CM4H		3.959	-0.066	-1.01	3.907	-0.113	-2.11
N6GC7Q		3.980	-0.045	-0.69	3.996	-0.024	-0.44
N8LZLF		4.028	0.003	0.04	4.043	0.024	0.45
NG922Q		3.948	-0.077	-1.18	3.948	-0.071	-1.34
P7QGJE		4.040	0.015	0.23	4.080	0.060	1.13
RAZE48		3.989	-0.036	-0.55	4.000	-0.020	-0.37
RC72GB		4.016	-0.009	-0.14	3.992	-0.028	-0.52
RRVACN		3.985	-0.040	-0.61	3.975	-0.045	-0.84
RU2RD6		4.023	-0.002	-0.03	3.994	-0.026	-0.49
T7DEYB		3.901	-0.124	-1.91	3.926	-0.094	-1.76
THQEV4		4.106	0.081	1.25	4.092	0.073	1.36
TJYU3A		4.060	0.035	0.54	4.029	0.009	0.18
U9FCA4		4.035	0.010	0.16	4.068	0.049	0.92
UQXD67		4.072	0.047	0.73	4.002	-0.018	-0.33
WN2Y77		4.074	0.049	0.76	4.037	0.017	0.33

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

**Report #4321,
September 2024**

WebCode	Data Flag	Sample CP33			Sample CP34		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
WWC2R7		4.016	-0.009	-0.14	3.941	-0.079	-1.48
ZGTGMV		4.043	0.018	0.28	4.085	0.065	1.23
ZKRTJV	X	3.814	-0.211	-3.24	3.796	-0.224	-4.20

Summary Statistics	Sample CP33	Sample CP34
Grand Means	4.02 mils	4.02 mils
Stnd Dev Btwn Labs	0.07 mils	0.05 mils

Statistics based on 42 of 43 reporting participants.

Comments on Assigned Data Flags for Test #3101

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

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

Report #4321, September 2024

Grand Mean Sample CP33 = 4.0249 mils

Grand Mean Sample CP34 = 4.0196 mils

ANALYSIS 3101

SAMPLE CP34

mils

SAMPLE CP33

mils

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

WebCode	Data Flag	Sample BP33			Sample BP34		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
46MVM2		23.00	0.51	0.33	21.50	-0.89	-0.50
4KCZUU		22.41	-0.08	-0.05	22.09	-0.30	-0.17
4MLQKX	X	30.50	8.01	5.19	30.60	8.21	4.55
67XW9Z		22.70	0.21	0.14	22.10	-0.29	-0.16
6C2X9U		21.10	-1.38	-0.90	20.28	-2.12	-1.18
8PYUH7		21.41	-1.08	-0.70	19.24	-3.15	-1.75
8VP4UP		23.73	1.24	0.81	22.15	-0.24	-0.14
AX6FJ6		22.50	0.01	0.01	23.60	1.21	0.67
CTMUPN		19.73	-2.76	-1.79	21.92	-0.47	-0.26
CVAEUT		23.81	1.32	0.86	23.23	0.84	0.46
EC8DVR		21.96	-0.53	-0.34	23.92	1.53	0.85
F722CZ		21.80	-0.69	-0.44	21.00	-1.39	-0.77
GFZGDN		22.84	0.36	0.23	22.88	0.49	0.27
HCV6WE	*	26.60	4.11	2.67	27.00	4.61	2.56
L3XE2H		21.83	-0.66	-0.42	21.63	-0.76	-0.42
N3CM4H		22.53	0.05	0.03	22.77	0.38	0.21
N6GC7Q		22.87	0.38	0.25	21.71	-0.68	-0.38
NG922Q		21.77	-0.72	-0.46	21.96	-0.44	-0.24
RAZE48		21.86	-0.63	-0.41	22.06	-0.33	-0.18
RQMWUM		21.05	-1.44	-0.93	22.40	0.01	0.01
RRVACN		25.60	3.11	2.02	26.30	3.91	2.17
THQEV4		21.22	-1.27	-0.82	19.64	-2.76	-1.53
WN2Y77		23.90	1.41	0.92	24.50	2.11	1.17
WWC2R7		20.19	-2.30	-1.49	20.90	-1.49	-0.83
Z43KLX		23.25	0.77	0.50	22.67	0.28	0.15

Summary Statistics	Sample BP33	Sample BP34
Grand Means	22.49 psi	22.39 psi
Stnd Dev Btwn Labs	1.54 psi	1.80 psi

Statistics based on 24 of 25 reporting participants.

Comments on Assigned Data Flags for Test #3111
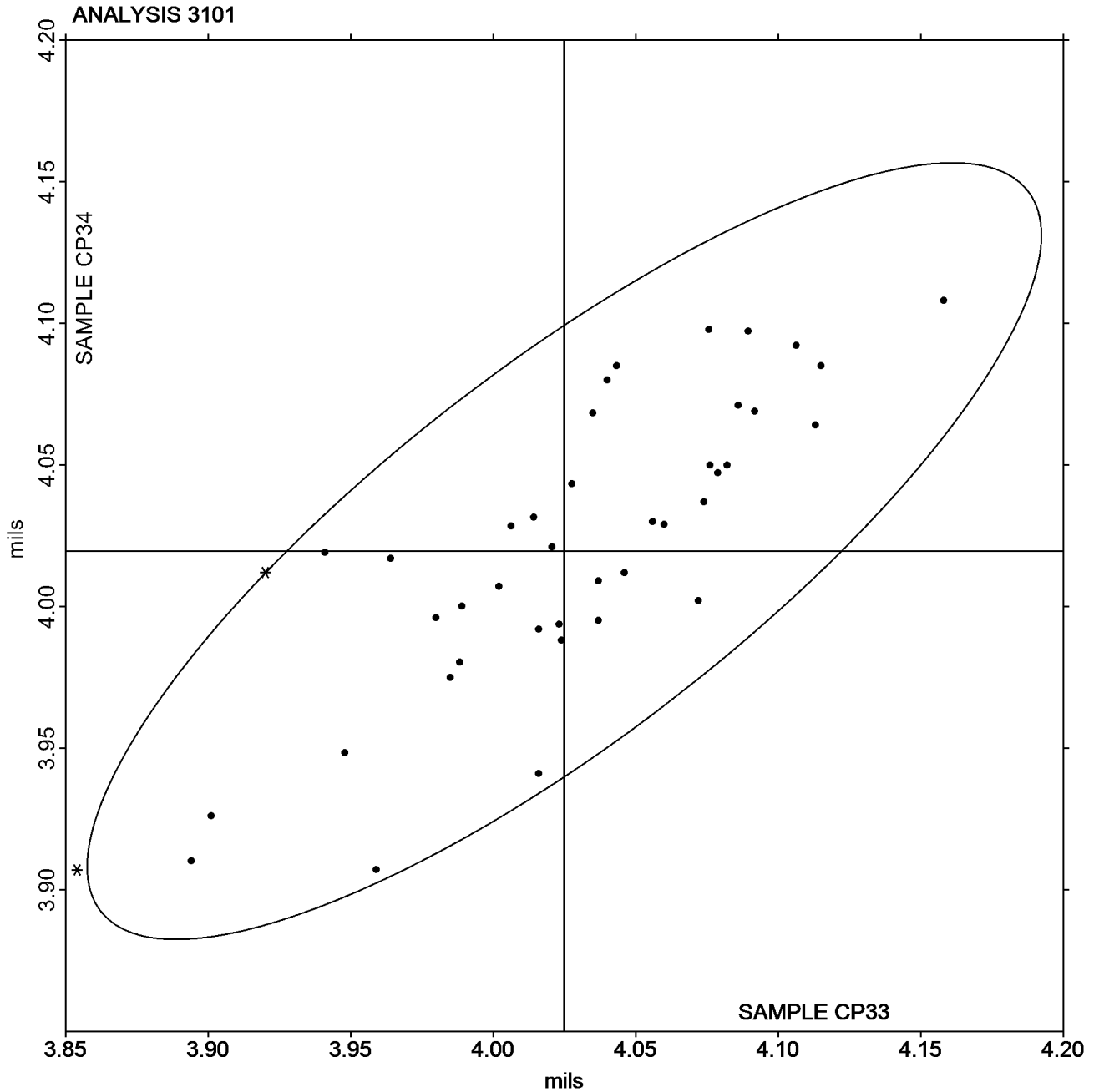
4MLQKX (X) - Data for both samples are high. Inconsistent within the determinations of sample BP34.

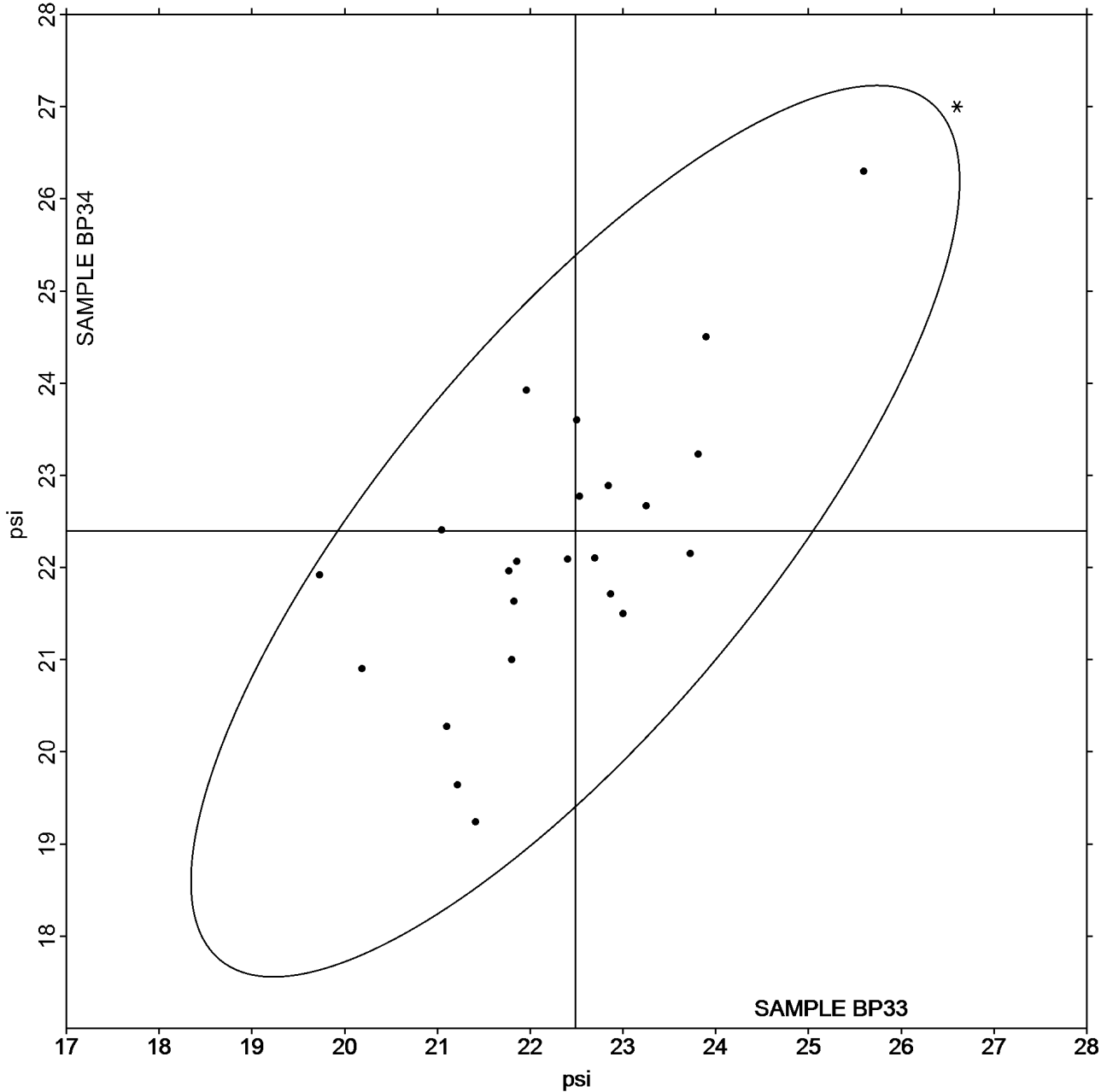**Paper & Paperboard Interlaboratory Testing Program**
Analysis 3111
Bursting Strength - Printing Papers
TAPPI Official Test Method T403

Report #4321,
September 2024

Grand Mean Sample BP33 = 22.486 psi

Grand Mean Sample BP34 = 22.394 psi

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

WebCode	Data Flag	Sample RP33			Sample RP34		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2EKN73	X	63.82	4.03	0.81	55.11	-4.61	-0.91
2FR73C		67.60	7.81	1.58	66.24	6.52	1.29
2JEH44		51.16	-8.63	-1.75	50.41	-9.30	-1.84
46MVM2		59.50	-0.29	-0.06	57.60	-2.12	-0.42
4KCZUU		57.20	-2.60	-0.53	57.53	-2.19	-0.43
4MLQKX		68.24	8.45	1.71	67.60	7.88	1.56
4YHWDW		60.42	0.63	0.13	60.88	1.16	0.23
6C2X9U		59.73	-0.07	-0.01	59.25	-0.47	-0.09
8PYUH7		62.52	2.73	0.55	62.66	2.94	0.58
8VP4UP		68.24	8.45	1.71	68.35	8.63	1.71
9G3BHN		55.88	-3.91	-0.79	57.30	-2.42	-0.48
AEE6W7		58.36	-1.43	-0.29	58.28	-1.44	-0.29
ALPK47	X	73.00	13.21	2.67	61.20	1.48	0.29
AX6FJ6		61.30	1.51	0.30	60.40	0.68	0.13
B89PQU		56.42	-3.37	-0.68	55.60	-4.12	-0.82
BDFJH6		61.73	1.94	0.39	62.03	2.31	0.46
BVVPVM		57.96	-1.83	-0.37	56.66	-3.06	-0.61
CTMUPN	*	61.44	1.65	0.33	65.38	5.66	1.12
E4HPZP	*	48.64	-11.15	-2.26	46.86	-12.86	-2.55
EC8DVR		62.00	2.21	0.45	61.60	1.88	0.37
F4PLHY	X	50.10	-9.69	-1.96	58.80	-0.92	-0.18
F722CZ		60.88	1.09	0.22	61.84	2.12	0.42
GFZGDN		55.50	-4.29	-0.87	55.13	-4.59	-0.91
GW7JDG		53.60	-6.19	-1.25	54.00	-5.72	-1.13
GW9B6X		54.09	-5.70	-1.15	53.47	-6.25	-1.24
HCV6WE		70.20	10.41	2.10	70.20	10.48	2.08
HV9PTH		54.88	-4.91	-0.99	57.22	-2.50	-0.50
KJNXHD		61.36	1.57	0.32	63.90	4.18	0.83
L3XE2H	X	78.74	18.95	3.83	83.77	24.05	4.76
LQKGVT		65.80	6.01	1.21	63.00	3.28	0.65
N6GC7Q		62.20	2.41	0.49	62.22	2.50	0.50
N8LZLF		64.82	5.03	1.02	62.12	2.40	0.48
NG922Q		56.47	-3.32	-0.67	55.34	-4.38	-0.87
P7QGJE		64.44	4.64	0.94	64.43	4.71	0.93
RAZE48		55.33	-4.46	-0.90	55.20	-4.52	-0.90
RRVACN		55.00	-4.79	-0.97	55.50	-4.22	-0.84
THQEV4		60.31	0.52	0.10	60.63	0.91	0.18
TJYU3A	X	21.18	-38.61	-7.81	29.46	-30.26	-5.99
U9FCA4		57.88	-1.91	-0.39	59.23	-0.49	-0.10
V4K66Z		53.44	-6.35	-1.28	52.59	-7.13	-1.41

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

Report #4321,
September 2024

WebCode	Data Flag	Sample RP33			Sample RP34		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
WN2Y77		60.40	0.61	0.12	62.80	3.08	0.61
XCPTV4		63.25	3.46	0.70	62.24	2.52	0.50
Z43KLX		63.96	4.17	0.84	63.68	3.96	0.78

Summary Statistics	Sample RP33	Sample RP34
Grand Means	59.79 Grams	59.72 Grams
Stnd Dev Btwn Labs	4.95 Grams	5.05 Grams

Statistics based on 38 of 43 reporting participants.

Comments on Assigned Data Flags for Test #3113

F4PLHY (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample RP33.

ALPK47 (X) - Inconsistent in testing between samples.

2EKN73 (X) - Inconsistent in testing between samples.

L3XE2H (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.

TJYU3A (X) - Extreme Data.

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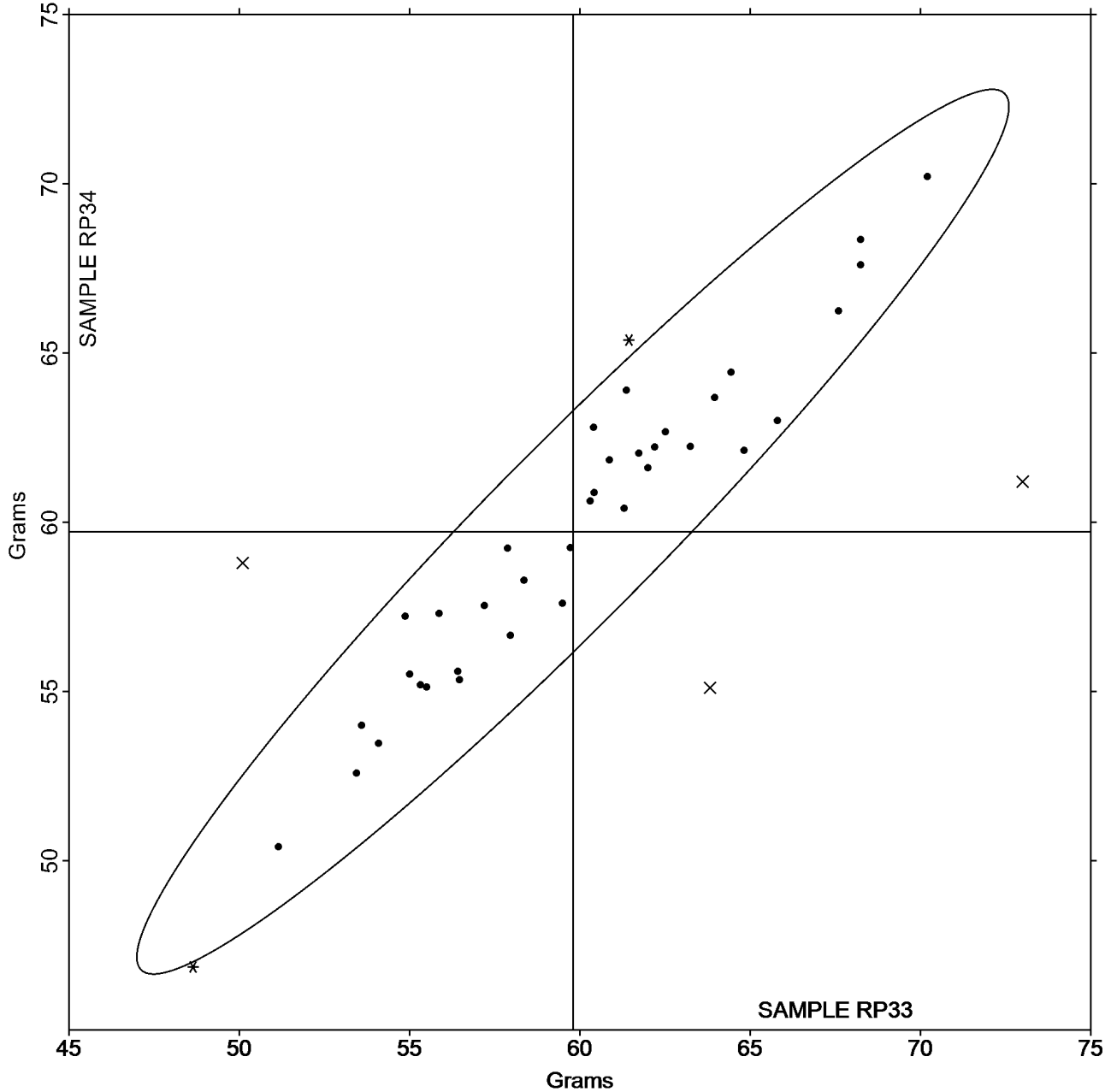**Tearing Strength - Printing Papers**
TAPPI Official Test Method T414

**Report #4321,
September 2024**

**Grand Mean Sample RP33 = 59.793
Grams**

**Grand Mean Sample RP34 = 59.720
Grams**

ANALYSIS 3113

SAMPLE RP34

Grams

SAMPLE RP33

Grams

Paper & Paperboard Interlaboratory Testing Program

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

WebCode	Data Flag	Sample NP33			Sample NP34		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2EKN73		3.700	0.129	0.46	3.550	0.024	0.09
2JEH44		3.450	-0.121	-0.43	3.500	-0.026	-0.10
4KCZUU		3.423	-0.148	-0.52	3.593	0.067	0.25
4MLQKX		4.093	0.522	1.85	3.830	0.303	1.13
4YHWDW		3.731	0.160	0.57	3.537	0.011	0.04
6C2X9U		3.548	-0.023	-0.08	3.631	0.105	0.39
8PYUH7		3.705	0.134	0.47	3.507	-0.019	-0.07
8VP4UP		3.211	-0.360	-1.28	3.515	-0.011	-0.04
9G3BHN		3.507	-0.064	-0.23	3.376	-0.150	-0.56
AEE6W7		3.228	-0.343	-1.22	2.891	-0.635	-2.37
ALPK47		4.082	0.511	1.81	4.012	0.486	1.81
BVVPVM		3.234	-0.337	-1.20	3.674	0.148	0.55
C4J39R		3.351	-0.220	-0.78	3.415	-0.111	-0.41
CTMUPN		3.711	0.140	0.50	3.342	-0.184	-0.69
E9PBNL		3.661	0.090	0.32	3.403	-0.123	-0.46
EC8DVR		3.925	0.354	1.26	3.496	-0.030	-0.11
F4PLHY		3.961	0.390	1.38	3.932	0.406	1.51
F722CZ		3.353	-0.218	-0.77	3.390	-0.136	-0.51
GFZGDN		3.526	-0.045	-0.16	3.484	-0.042	-0.16
GW7JDG		3.637	0.066	0.23	3.424	-0.102	-0.38
GW9B6X		3.948	0.377	1.34	3.981	0.455	1.69
HV9PTH		3.222	-0.349	-1.24	3.584	0.058	0.22
LQKGVT		3.400	-0.171	-0.61	3.367	-0.159	-0.59
N6GC7Q		3.828	0.257	0.91	3.685	0.159	0.59
N8LZLF		3.189	-0.382	-1.35	2.993	-0.533	-1.99
NG922Q		3.693	0.122	0.43	3.512	-0.014	-0.05
P7QGJE		3.650	0.079	0.28	3.440	-0.086	-0.32
RAZE48		3.284	-0.287	-1.02	3.376	-0.150	-0.56
RC72GB		3.982	0.411	1.46	4.063	0.537	2.00
RRVACN		3.204	-0.367	-1.30	3.466	-0.060	-0.22
THQEV4		3.492	-0.079	-0.28	3.532	0.006	0.02
TJYU3A		3.581	0.010	0.04	3.191	-0.335	-1.25
U9FCA4		3.595	0.024	0.09	3.677	0.151	0.56
UL84U8		2.950	-0.621	-2.20	3.259	-0.267	-0.99
UQXD67		3.338	-0.233	-0.83	3.325	-0.201	-0.75
V4K66Z		3.921	0.350	1.24	3.720	0.194	0.72
WN2Y77		3.516	-0.055	-0.20	3.450	-0.076	-0.28
WWC2R7		3.650	0.079	0.28	3.278	-0.248	-0.93
Z43KLX		3.564	-0.007	-0.03	3.381	-0.145	-0.54
ZGTGMV	*	4.047	0.476	1.69	4.295	0.769	2.86

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

Report #4321,
September 2024

WebCode	Data Flag	Sample NP33			Sample NP34		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
ZKRTJV		3.319	-0.252	-0.89	3.493	-0.033	-0.12

Summary Statistics	Sample NP33	Sample NP34
Grand Means	3.57 kN/m	3.53 kN/m
Stnd Dev Btwn Labs	0.28 kN/m	0.27 kN/m

Statistics based on 41 of 41 reporting participants.

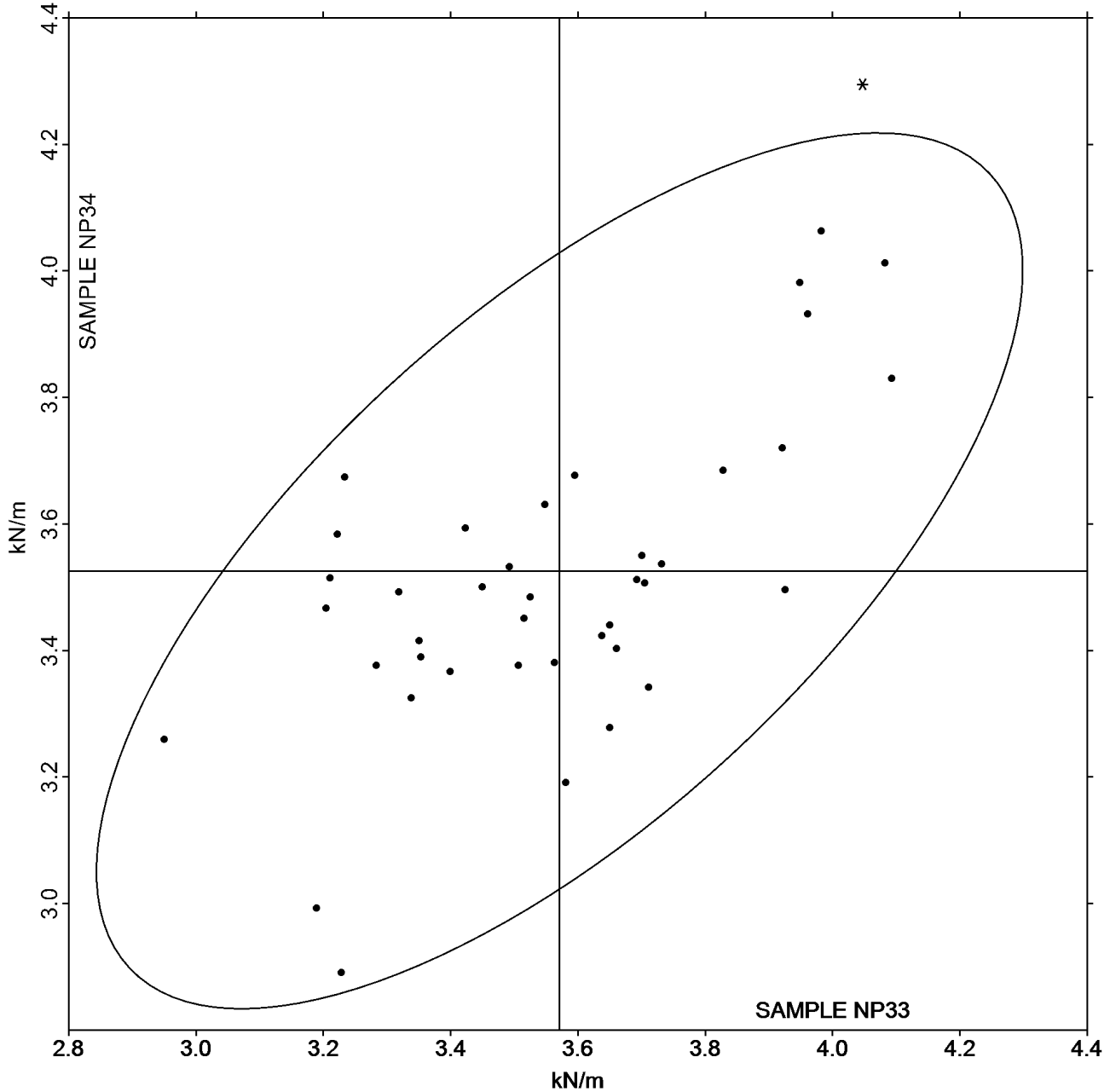# Paper & Paperboard Interlaboratory Testing Program
Analysis 3115
Tensile Breaking Strength - Printing Papers
TAPPI Official Test Method T494

Report #4321, September 2024

Grand Mean Sample NP33 = 3.5710 kN/m

Grand Mean Sample NP34 = 3.5260 kN/m

Paper & Paperboard Interlaboratory Testing Program
Analysis 3116
Tensile Energy Absorption - Printing Papers
TAPPI Official Test Method T494

**Report #4321,
September 2024**

		Sample NP33				Sample NP34		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV		Lab Mean	Diff from Grand Mean	CPV
2EKN73		47.14	5.74	1.41		41.59	1.25	0.36
2JEH44		40.66	-0.74	-0.18		40.93	0.58	0.17
4KCZUU		42.61	1.21	0.30		44.77	4.42	1.28
4MLQKX		39.96	-1.44	-0.35		41.87	1.52	0.44
4YHWDW		46.80	5.41	1.33		42.57	2.22	0.64
6C2X9U		42.05	0.65	0.16		43.52	3.17	0.92
8PYUH7		44.66	3.26	0.80		40.98	0.63	0.18
8VP4UP	X	0.08	-41.32	-10.17		0.08	-40.27	-11.63
9G3BHN		39.21	-2.18	-0.54		37.21	-3.13	-0.90
ALPK47		43.48	2.08	0.51		45.69	5.35	1.54
C4J39R	X	56.87	15.48	3.81		57.79	17.45	5.04
CTMUPN		48.93	7.53	1.86		43.89	3.54	1.02
E9PBNL		44.41	3.02	0.74		41.61	1.26	0.36
EC8DVR		37.79	-3.60	-0.89		34.24	-6.10	-1.76
F722CZ		36.02	-5.38	-1.32		39.49	-0.86	-0.25
GW7JDG		42.13	0.74	0.18		34.73	-5.61	-1.62
GW9B6X		39.16	-2.24	-0.55		37.55	-2.80	-0.81
N8LZLF		36.92	-4.47	-1.10		31.52	-8.82	-2.55
NG922Q		42.22	0.82	0.20		40.66	0.31	0.09
P7QGJE		42.80	1.40	0.35		41.80	1.45	0.42
RAZE48		39.98	-1.42	-0.35		40.04	-0.31	-0.09
RRVACN		36.70	-4.69	-1.16		40.05	-0.30	-0.09
THQEV4		41.49	0.09	0.02		41.27	0.92	0.27
TJYU3A		48.70	7.30	1.80		41.58	1.23	0.36
U9FCA4		37.83	-3.57	-0.88		38.99	-1.36	-0.39
UL84U8		32.39	-9.01	-2.22		39.13	-1.21	-0.35
UQXD67		39.05	-2.34	-0.58		38.00	-2.35	-0.68
V4K66Z		44.42	3.02	0.74		42.78	2.43	0.70
Z43KLX		41.17	-0.23	-0.06		39.05	-1.30	-0.37
ZGTGMV		46.06	4.66	1.15		47.76	7.42	2.14
ZKRTJV		35.77	-5.63	-1.39		36.76	-3.58	-1.03

Summary Statistics	Sample NP33	Sample NP34
Grand Means	41.40 Joules/sq m	40.35 Joules/sq m
Stnd Dev Btwn Labs	4.06 Joules/sq m	3.46 Joules/sq m

Statistics based on 29 of 31 reporting participants.

Paper & Paperboard Interlaboratory Testing Program
Analysis 3116
Tensile Energy Absorption - Printing Papers
TAPPI Official Test Method T494

Report #4321,
September 2024

Comments on Assigned Data Flags for Test #3116

8VP4UP (X) - Extreme Data.

C4J39R (X) - Data for both samples are high.

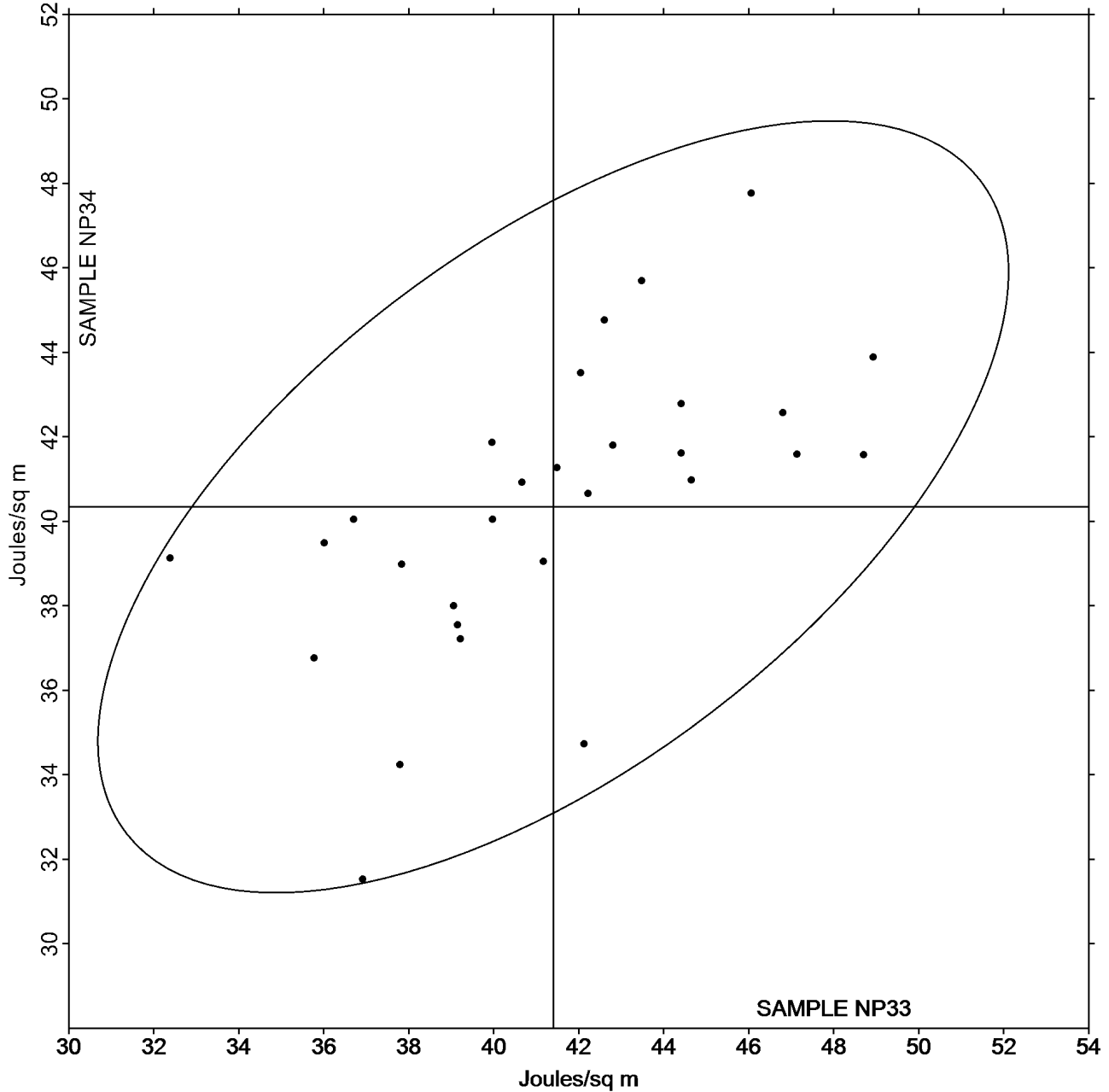**Paper & Paperboard Interlaboratory Testing Program**
Analysis 3116
Tensile Energy Absorption - Printing Papers
TAPPI Official Test Method T494

**Report #4321,
September 2024**

**Grand Mean Sample NP33 = 41.397
Joules/sq m**

**Grand Mean Sample NP34 = 40.346
Joules/sq m**

ANALYSIS 3116

SAMPLE NP34

Joules/sq m

SAMPLE NP33

Joules/sq m

Paper & Paperboard Interlaboratory Testing Program
Analysis 3117
Elongation to Break - Printing Papers
TAPPI Official Test Method T494

Report #4321,
September 2024

		Sample NP33			Sample NP34		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2EKN73	*	2.348	0.643	2.91	2.154	0.434	2.33
2JEH44		1.740	0.035	0.16	1.730	0.010	0.06
4KCZUU		1.758	0.053	0.24	1.776	0.056	0.30
4MLQKX		1.460	-0.245	-1.11	1.605	-0.115	-0.61
4YHWDW		1.748	0.043	0.19	1.709	-0.011	-0.06
6C2X9U		1.656	-0.049	-0.22	1.667	-0.053	-0.28
8PYUH7		1.858	0.153	0.69	1.797	0.077	0.41
8VP4UP	X	2.916	1.211	5.48	2.933	1.214	6.51
9G3BHN		1.794	0.089	0.40	1.767	0.047	0.25
ALPK47		1.349	-0.356	-1.61	1.453	-0.267	-1.43
BVVPVM		1.408	-0.297	-1.35	1.577	-0.143	-0.77
C4J39R	*	1.359	-0.347	-1.57	1.627	-0.092	-0.49
CTMUPN		2.158	0.453	2.05	2.103	0.384	2.06
E9PBNL		1.993	0.288	1.30	2.016	0.296	1.59
EC8DVR		2.064	0.359	1.62	2.070	0.350	1.88
F4PLHY		1.470	-0.235	-1.07	1.420	-0.300	-1.61
F722CZ		1.589	-0.116	-0.53	1.693	-0.027	-0.14
GW7JDG		1.824	0.119	0.54	1.676	-0.044	-0.23
GW9B6X		1.497	-0.208	-0.94	1.439	-0.281	-1.50
HV9PTH		1.500	-0.205	-0.93	1.517	-0.203	-1.09
N8LZLF		1.907	0.202	0.91	2.052	0.332	1.78
NG922Q		1.707	0.002	0.01	1.715	-0.005	-0.03
P7QGJE		1.570	-0.135	-0.61	1.630	-0.090	-0.48
RAZE48		1.538	-0.167	-0.76	1.577	-0.143	-0.77
RRVACN		1.727	0.022	0.10	1.756	0.036	0.19
THQEV4		1.738	0.033	0.15	1.692	-0.028	-0.15
TJYU3A		1.918	0.213	0.96	1.817	0.097	0.52
U9FCA4		1.565	-0.140	-0.64	1.577	-0.143	-0.77
UL84U8		1.761	0.056	0.25	1.932	0.212	1.14
UQXD67		1.711	0.006	0.03	1.673	-0.047	-0.25
V4K66Z		1.668	-0.037	-0.17	1.678	-0.042	-0.22
WN2Y77		1.671	-0.034	-0.16	1.722	0.002	0.01
Z43KLX		1.702	-0.003	-0.01	1.702	-0.018	-0.09
ZGTGMV		1.594	-0.111	-0.50	1.569	-0.151	-0.81
ZKRTJV		1.631	-0.074	-0.34	1.581	-0.139	-0.74

Paper & Paperboard Interlaboratory Testing Program
Analysis 3117
Elongation to Break - Printing Papers
TAPPI Official Test Method T494

**Report #4321,
September 2024**

Summary Statistics	Sample NP33	Sample NP34
Grand Means	1.71 Percent	1.72 Percent
Stnd Dev Btwn Labs	0.22 Percent	0.19 Percent
	Statistics based on 34 of 35 reporting participants.	

Comments on Assigned Data Flags for Test #3117

8VP4UP (X) - Extreme Data.
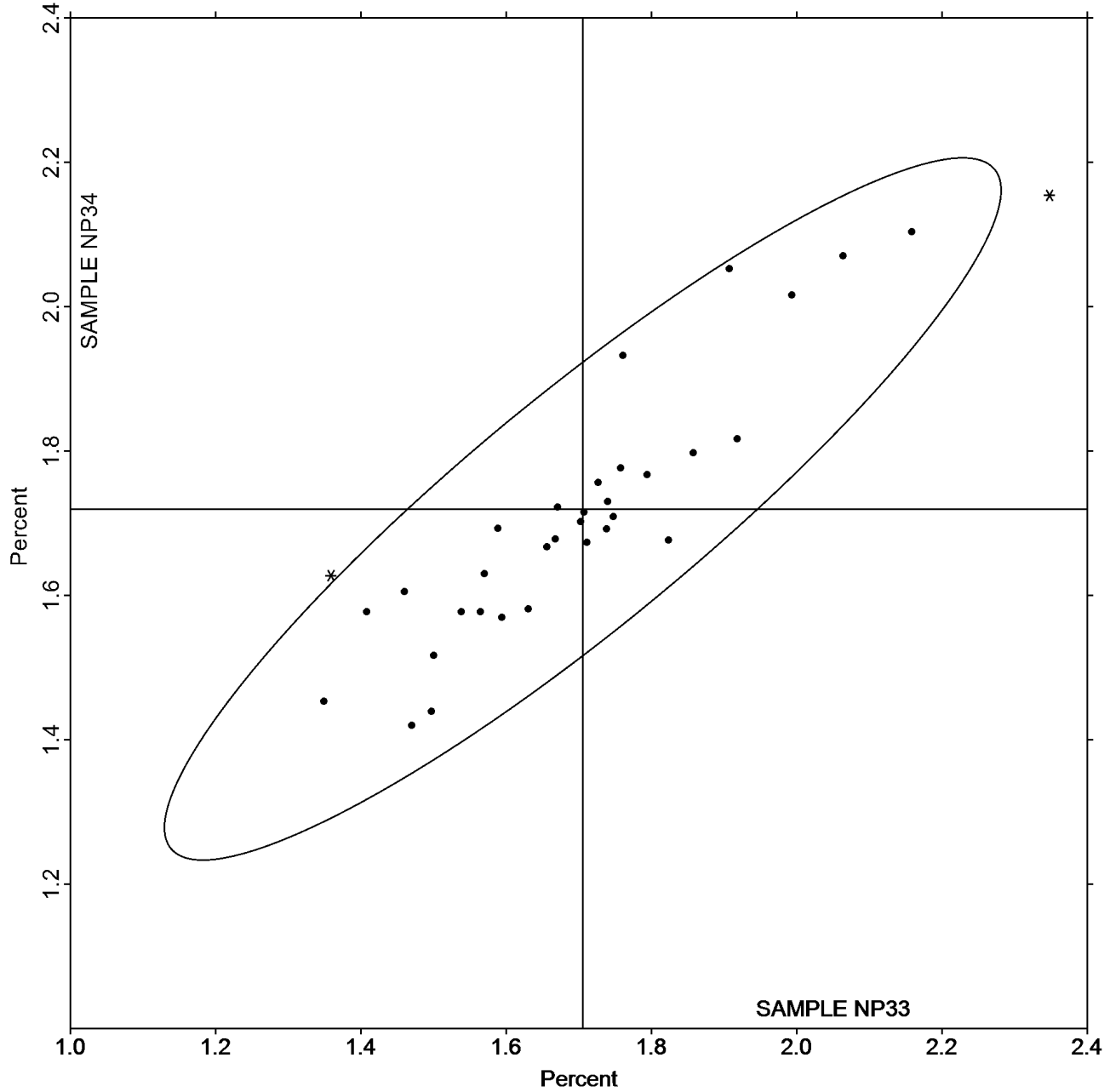
Paper & Paperboard Interlaboratory Testing Program
Analysis 3117
Elongation to Break - Printing Papers
TAPPI Official Test Method T494

Report #4321,
September 2024

Grand Mean Sample NP33 = 1.7053 Percent

Grand Mean Sample NP34 = 1.7197 Percent

ANALYSIS 3117

SAMPLE NP34

Percent

SAMPLE NP33

Percent

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

WebCode	Data Flag	Sample PP33			Sample PP34		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2BX62X		9.930	0.142	0.35	9.930	0.058	0.12
2JEH44		9.110	-0.678	-1.65	8.920	-0.952	-1.93
4KCZUU		9.630	-0.158	-0.38	9.770	-0.102	-0.21
4MLQKX		9.782	-0.006	-0.01	9.059	-0.813	-1.65
62YJLA		9.220	-0.568	-1.38	8.880	-0.992	-2.01
67XW9Z		10.040	0.252	0.61	9.850	-0.022	-0.04
6C2X9U		10.010	0.222	0.54	10.050	0.178	0.36
6ER322		9.654	-0.134	-0.33	9.979	0.107	0.22
8PYUH7		10.011	0.223	0.54	9.880	0.008	0.02
8VP4UP	X	13.760	3.972	9.67	7.523	-2.349	-4.77
AX6FJ6		10.130	0.342	0.83	10.410	0.538	1.09
BVVPVM		10.339	0.551	1.34	10.102	0.230	0.47
CTMUPN		9.580	-0.208	-0.51	10.440	0.568	1.15
CVAEUT		9.640	-0.148	-0.36	9.910	0.038	0.08
E9PBNL		9.895	0.107	0.26	9.310	-0.562	-1.14
EC8DVR		9.413	-0.375	-0.91	9.321	-0.551	-1.12
F4PLHY		9.950	0.162	0.40	10.100	0.228	0.46
GW7JDG		9.821	0.033	0.08	9.462	-0.410	-0.83
HCV6WE		10.500	0.712	1.73	10.400	0.528	1.07
HDC6CX		10.348	0.560	1.36	10.256	0.384	0.78
HV9PTH		10.309	0.521	1.27	10.237	0.365	0.74
LQKGVT		9.200	-0.588	-1.43	9.800	-0.072	-0.15
N6GC7Q		9.746	-0.042	-0.10	10.087	0.215	0.44
N8LZLF	*	10.286	0.498	1.21	11.157	1.285	2.61
RQMWUM		8.870	-0.918	-2.24	9.500	-0.372	-0.75
RRVACN		9.920	0.132	0.32	10.200	0.328	0.67
TJYU3A		9.228	-0.560	-1.36	9.232	-0.640	-1.30
U3RUU8		9.903	0.115	0.28	9.975	0.103	0.21
UGBH2J		10.100	0.312	0.76	10.310	0.438	0.89
WMCB9K		9.533	-0.255	-0.62	9.408	-0.464	-0.94
WQCL76	X	12.220	2.432	5.92	11.600	1.728	3.51
WUQGL3		10.080	0.292	0.71	10.150	0.278	0.56
YH9G3E		9.140	-0.648	-1.58	9.930	0.058	0.12
Z43KLX		9.890	0.102	0.25	9.880	0.008	0.02

Summary Statistics	Sample PP33	Sample PP34
Grand Means	9.79 sec/100 cc	9.87 sec/100 cc
Stnd Dev Btwn Labs	0.41 sec/100 cc	0.49 sec/100 cc

Statistics based on 32 of 34 reporting participants.

Paper & Paperboard Interlaboratory Testing Program
Analysis 3121
Air Resistance - Gurley Oil Type
TAPPI Official Test Method T460

Report #4321,
September 2024

Comments on Assigned Data Flags for Test #3121

8VP4UP (X) - Extreme Data.

WQCL76 (X) - Data for both samples are high.
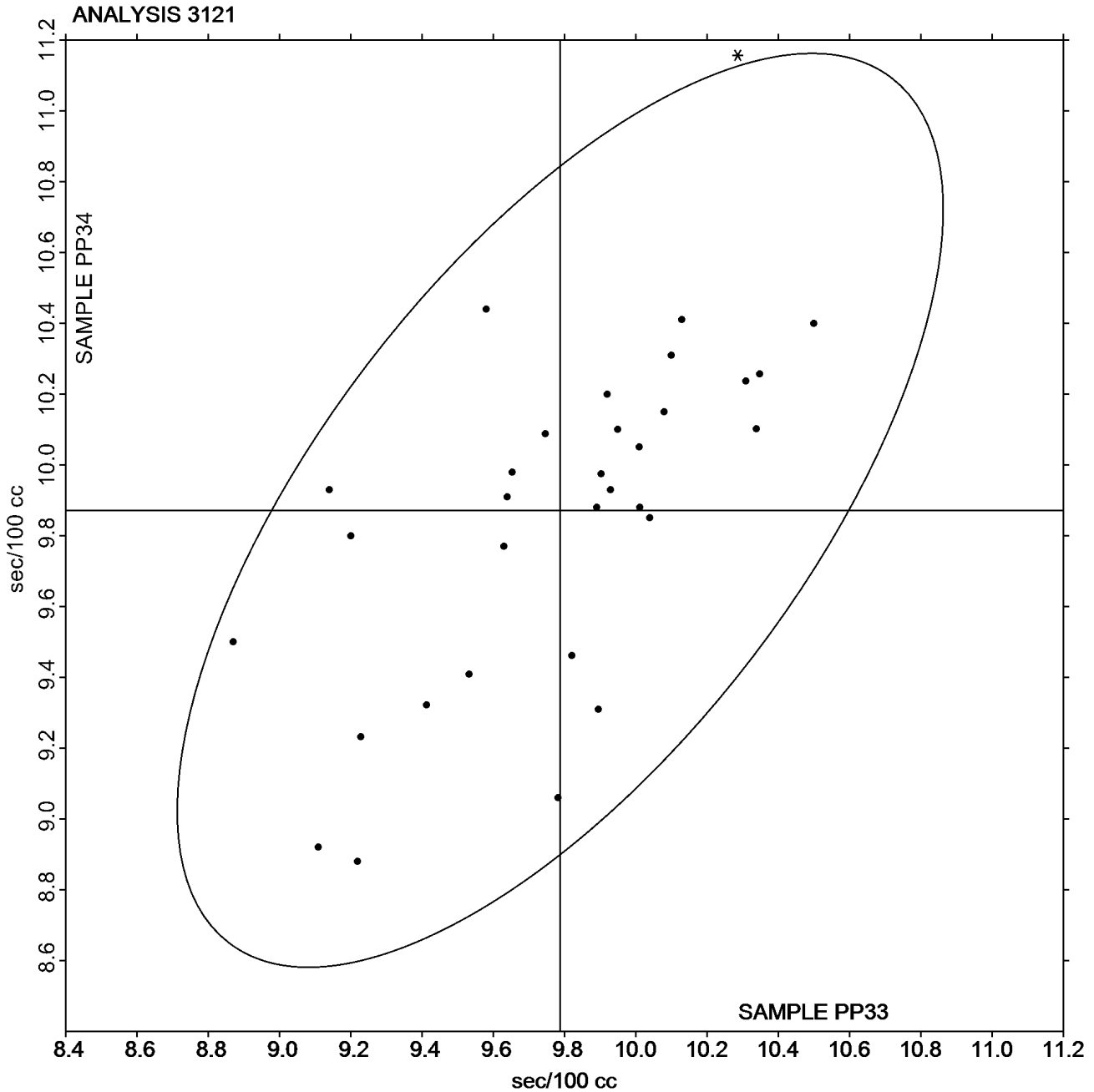
Paper & Paperboard Interlaboratory Testing Program
Analysis 3121
Air Resistance - Gurley Oil Type
TAPPI Official Test Method T460

Report #4321,
September 2024

Grand Mean Sample PP33 = 9.7878
sec/100 cc

Grand Mean Sample PP34 = 9.8717
sec/100 cc

ANALYSIS 3121

SAMPLE PP34

sec/100 cc

SAMPLE PP33

sec/100 cc

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

Report #4321, September 2024

WebCode	Data Flag	Sample PP33 Lab Mean	Sample PP33 Diff from Grand Mean	Sample PP33 CPV	Sample PP34 Lab Mean	Sample PP34 Diff from Grand Mean	Sample PP34 CPV
ALPK47		266.1	12.4	0.51	275.0	18.8	0.77
AX6FJ6		227.9	-25.8	-1.05	228.6	-27.6	-1.14
HCV6WE		253.8	0.1	0.01	252.6	-3.6	-0.15
N3CM4H		232.9	-20.8	-0.85	238.3	-17.8	-0.73
WWC2R7		287.6	33.9	1.39	286.4	30.2	1.24

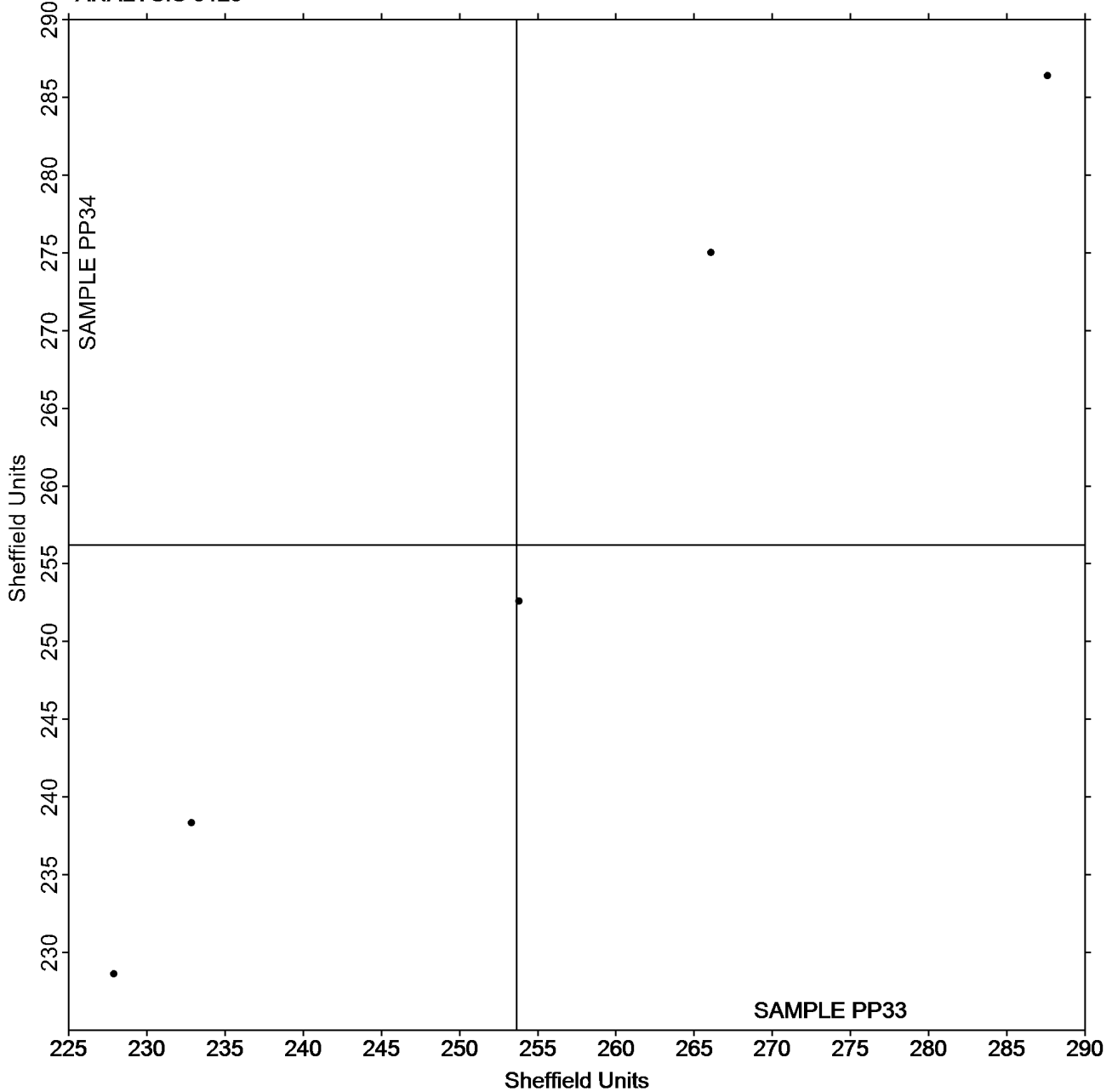| Summary Statistics	Sample PP33	Sample PP34
Grand Means	253.65 Sheffield Units	256.19 Sheffield Units
Stnd Dev Btwn Labs	24.51 Sheffield Units	24.29 Sheffield Units

Statistics based on 5 of 5 reporting participants.

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

Report #4321,
September 2024

Grand Mean Sample PP33 = 253.65
Sheffield Units

Grand Mean Sample PP34 = 256.19
Sheffield Units

ANALYSIS 3123

SAMPLE PP34

Sheffield Units

SAMPLE PP33

Sheffield Units

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

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

WebCode	Data Flag	Sample PH33 Lab Mean	Sample PH33 Diff from Grand Mean	Sample PH33 CPV	Sample PH34 Lab Mean	Sample PH34 Diff from Grand Mean	Sample PH34 CPV
8PYUH7		6.150	0.546	0.57	5.987	0.423	0.45
8TZX88		5.694	0.090	0.09	5.659	0.095	0.10
EC8DVR		6.014	0.410	0.43	5.855	0.291	0.31
F722CZ		6.104	0.500	0.52	5.989	0.425	0.45
KJNXHD		5.797	0.193	0.20	5.684	0.120	0.13
TMX6XA		6.050	0.446	0.47	6.302	0.738	0.78
U3RUU8		6.219	0.615	0.64	6.087	0.523	0.56
WQCL76	*	2.700	-2.904	-3.04	2.720	-2.844	-3.02
YH9G3E		5.222	-0.382	-0.40	5.187	-0.377	-0.40
Z43KLX		5.832	0.228	0.24	5.662	0.098	0.10
ZGTGMV		5.672	0.068	0.07	6.033	0.469	0.50
ZKRTJV		5.793	0.189	0.20	5.604	0.040	0.04

Summary Statistics	Sample PH33	Sample PH34
Grand Means	5.60 Microns	5.56 Microns
Stnd Dev Btwn Labs	0.95 Microns	0.94 Microns

Statistics based on 12 of 12 reporting participants.

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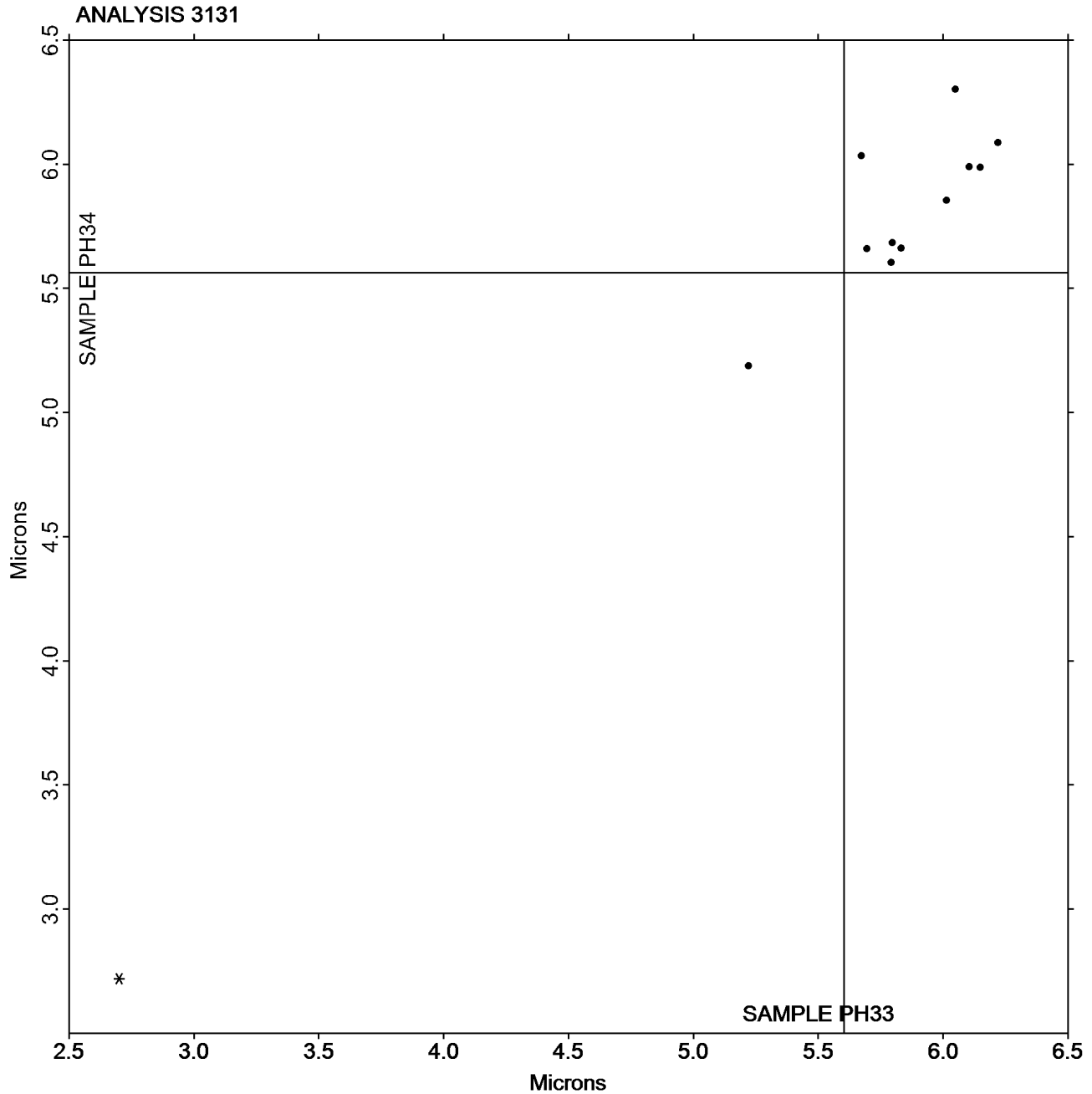**Roughness - Print Surf Method - 2.5 to 6.0 Microns**
TAPPI Official Test Method T555

Report #4321,
September 2024

Grand Mean Sample PH33 = 5.6039 Microns

Grand Mean Sample PH34 = 5.5641 Microns

ANALYSIS 3131

SAMPLE PH34

SAMPLE PH33

Microns

Microns

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

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

Report #4321, September 2024

		Sample SR33			Sample SR34		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2BX62X	*	182.0	-12.1	-0.96	202.9	9.3	0.70
2EKN73		172.7	-21.4	-1.69	168.3	-25.3	-1.91
2FR73C		201.9	7.8	0.61	190.4	-3.2	-0.24
3FRKQW		208.9	14.8	1.16	205.9	12.3	0.93
4F3MCV		207.7	13.6	1.07	208.3	14.7	1.11
4KCZUU	X	259.9	65.8	5.18	296.5	102.9	7.77
67XW9Z		206.3	12.2	0.96	194.3	0.7	0.05
6ER322		200.5	6.4	0.50	206.0	12.4	0.94
8PYUH7		187.6	-6.5	-0.51	199.0	5.4	0.41
9G3BHN	X	71.0	-123.1	-9.70	22.6	-171.0	-12.90
ALPK47		192.3	-1.8	-0.15	184.4	-9.2	-0.70
AX6FJ6		189.0	-5.1	-0.41	191.2	-2.4	-0.18
BNW44M		201.3	7.1	0.56	209.7	16.1	1.21
BVVPVM		197.8	3.7	0.29	200.7	7.1	0.54
CTMUPN		191.0	-3.2	-0.25	190.1	-3.5	-0.27
CVAEUT		185.2	-8.9	-0.71	185.6	-8.0	-0.60
E9PBNL		199.7	5.5	0.44	185.9	-7.7	-0.58
EC8DVR		212.5	18.3	1.44	212.3	18.7	1.41
F4PLHY		204.7	10.6	0.83	190.8	-2.8	-0.21
F722CZ		200.2	6.0	0.48	195.5	1.8	0.14
F7ET6G		185.6	-8.5	-0.67	185.0	-8.6	-0.65
GW7JDG		190.1	-4.1	-0.32	188.6	-5.0	-0.38
HCV6WE		169.4	-24.7	-1.95	167.6	-26.0	-1.96
HDC6CX		183.3	-10.8	-0.85	185.1	-8.5	-0.64
HV9PTH		197.0	2.9	0.22	196.8	3.2	0.24
JJDVVE		203.3	9.1	0.72	210.8	17.2	1.30
LQKGVT	*	158.7	-35.4	-2.79	154.9	-38.7	-2.92
N3CM4H		191.0	-3.1	-0.25	188.2	-5.4	-0.41
N6GC7Q		199.3	5.2	0.41	193.9	0.3	0.02
N8LZLF		189.0	-5.1	-0.41	201.8	8.2	0.62
ND7XDA		165.7	-28.4	-2.24	170.0	-23.6	-1.78
P4ZFFC		189.5	-4.6	-0.37	179.3	-14.3	-1.08
RC72GB		195.3	1.2	0.09	184.7	-8.9	-0.67
RRVACN		181.7	-12.4	-0.98	186.0	-7.6	-0.57
TJMXX7	X	250.0	55.9	4.40	254.5	60.9	4.60
TJYU3A		209.1	14.9	1.18	199.8	6.2	0.47
TMX6XA		197.1	2.9	0.23	201.6	7.9	0.60
U3RUU8		201.8	7.7	0.60	206.0	12.4	0.94
VBHWB9		194.6	0.5	0.04	201.4	7.8	0.59
XLBX34		213.5	19.4	1.53	203.5	9.9	0.75

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

**Report #4321,
September 2024**

WebCode	Data Flag	Sample SR33			Sample SR34		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
XYY3AZ		202.2	8.1	0.64	204.3	10.6	0.80
YH9G3E		216.0	21.9	1.73	209.7	16.0	1.21
Z43KLX		201.5	7.4	0.58	216.0	22.4	1.69
ZGTGMV		182.9	-11.2	-0.89	185.6	-8.0	-0.60
ZKRTJV		195.3	1.2	0.09	189.8	-3.8	-0.29

Summary Statistics	Sample SR33	Sample SR34
Grand Means	194.15 Sheffield	193.61 Sheffield
Stnd Dev Btwn Labs	12.69 Sheffield	13.25 Sheffield

Statistics based on 42 of 45 reporting participants.

Comments on Assigned Data Flags for Test #3133

9G3BHN (X) - Extreme Data.

TJMXX7 (X) - Data for both samples are high. Possible Systematic Error.

4KCZUU (X) - Extreme Data.

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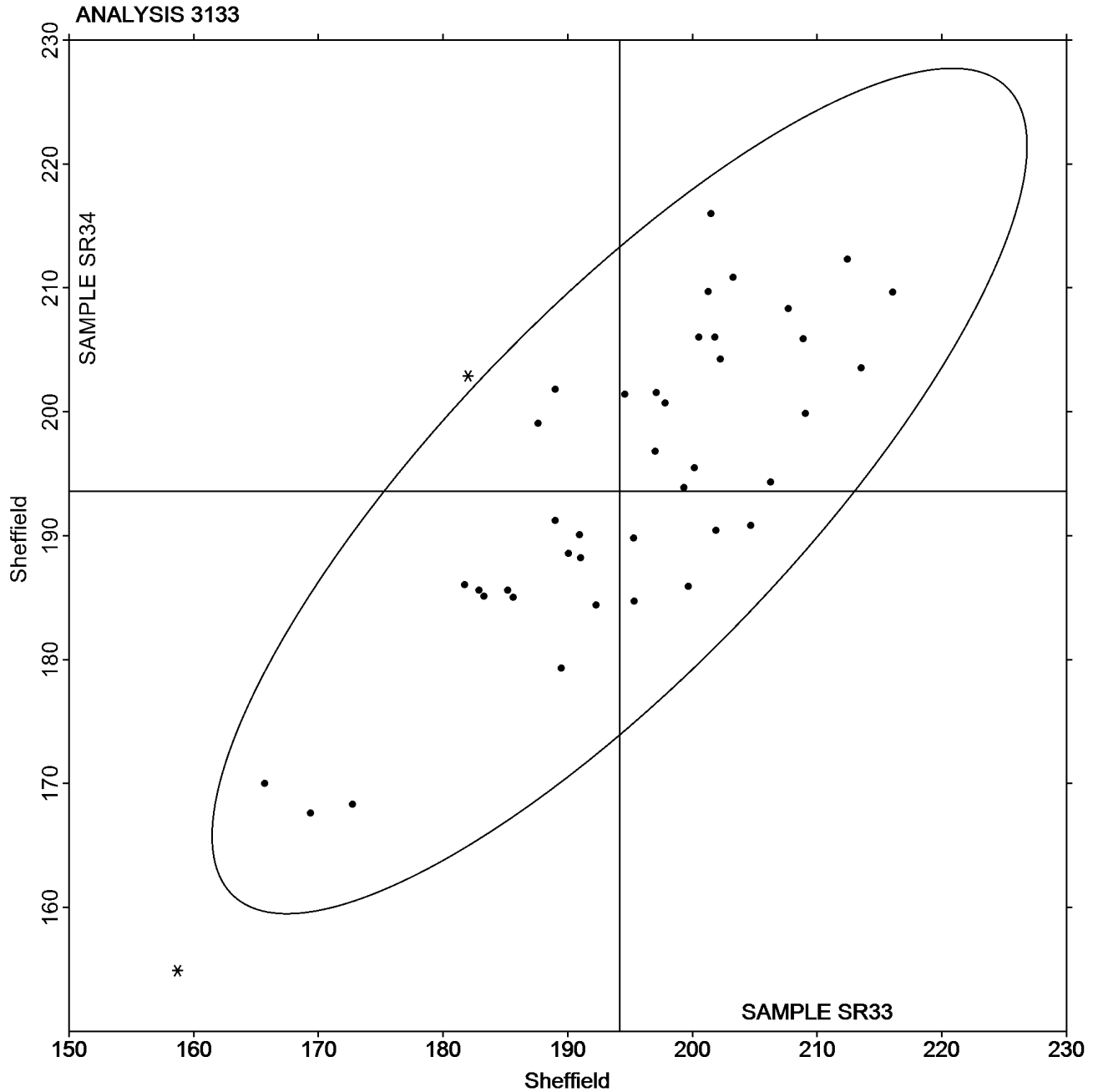**Roughness - Sheffield Type**
TAPPI Official Test Method T538

Report #4321,
September 2024

Grand Mean Sample SR33 = 194.15
Sheffield

Grand Mean Sample SR34 = 193.61
Sheffield

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

Report #4321, September 2024

WebCode	Data Flag	Sample GM33 Lab Mean	Sample GM33 Diff from Grand Mean	Sample GM33 CPV	Sample GM34 Lab Mean	Sample GM34 Diff from Grand Mean	Sample GM34 CPV
28YT6X		75.30	-0.06	-0.16	75.46	0.12	0.27
2JEH44	X	76.87	1.51	3.91	75.32	-0.02	-0.05
4KCZUU		75.86	0.50	1.29	75.97	0.63	1.43
4YG4HA	*	74.26	-1.10	-2.87	74.39	-0.95	-2.17
9ZFX6V	*	75.39	0.03	0.07	74.44	-0.90	-2.05
ALPK47		75.92	0.56	1.44	75.87	0.53	1.21
AX6FJ6		75.23	-0.13	-0.35	75.49	0.15	0.34
BVVPVM		75.14	-0.22	-0.58	75.60	0.26	0.59
C4J39R		74.96	-0.41	-1.06	75.31	-0.03	-0.06
GFZGDN		75.48	0.12	0.31	76.03	0.69	1.57
HV9PTH		74.98	-0.38	-1.00	74.54	-0.80	-1.83
KJNXHD		75.48	0.12	0.30	75.29	-0.05	-0.12
L3XE2H		75.46	0.10	0.25	75.97	0.63	1.43
LERVQJ		75.69	0.33	0.85	75.34	0.00	0.00
LQKGVT		74.81	-0.55	-1.44	75.09	-0.25	-0.57
LT8TWJ		75.56	0.20	0.51	75.32	-0.02	-0.04
N3CM4H		75.73	0.37	0.96	75.55	0.21	0.47
QLYQY9		75.33	-0.04	-0.10	75.02	-0.32	-0.74
QVMLYN		75.63	0.27	0.69	75.61	0.27	0.61
RAZE48		75.74	0.38	0.99	75.30	-0.04	-0.09
RRVACN		75.30	-0.06	-0.17	75.45	0.11	0.24
UH8TY8		74.86	-0.51	-1.32	75.10	-0.24	-0.56
UL84U8		75.75	0.38	0.99	75.21	-0.13	-0.30
UQXD67		75.11	-0.25	-0.66	75.04	-0.30	-0.68
WN2Y77		75.56	0.20	0.51	75.71	0.37	0.84
Y2LXCY		75.58	0.21	0.55	75.43	0.09	0.20

Summary Statistics	Sample GM33	Sample GM34
Grand Means	75.36 g/sq m	75.34 g/sq m
Stnd Dev Btwn Labs	0.39 g/sq m	0.44 g/sq m

Statistics based on 25 of 26 reporting participants.

Comments on Assigned Data Flags for Test #3135
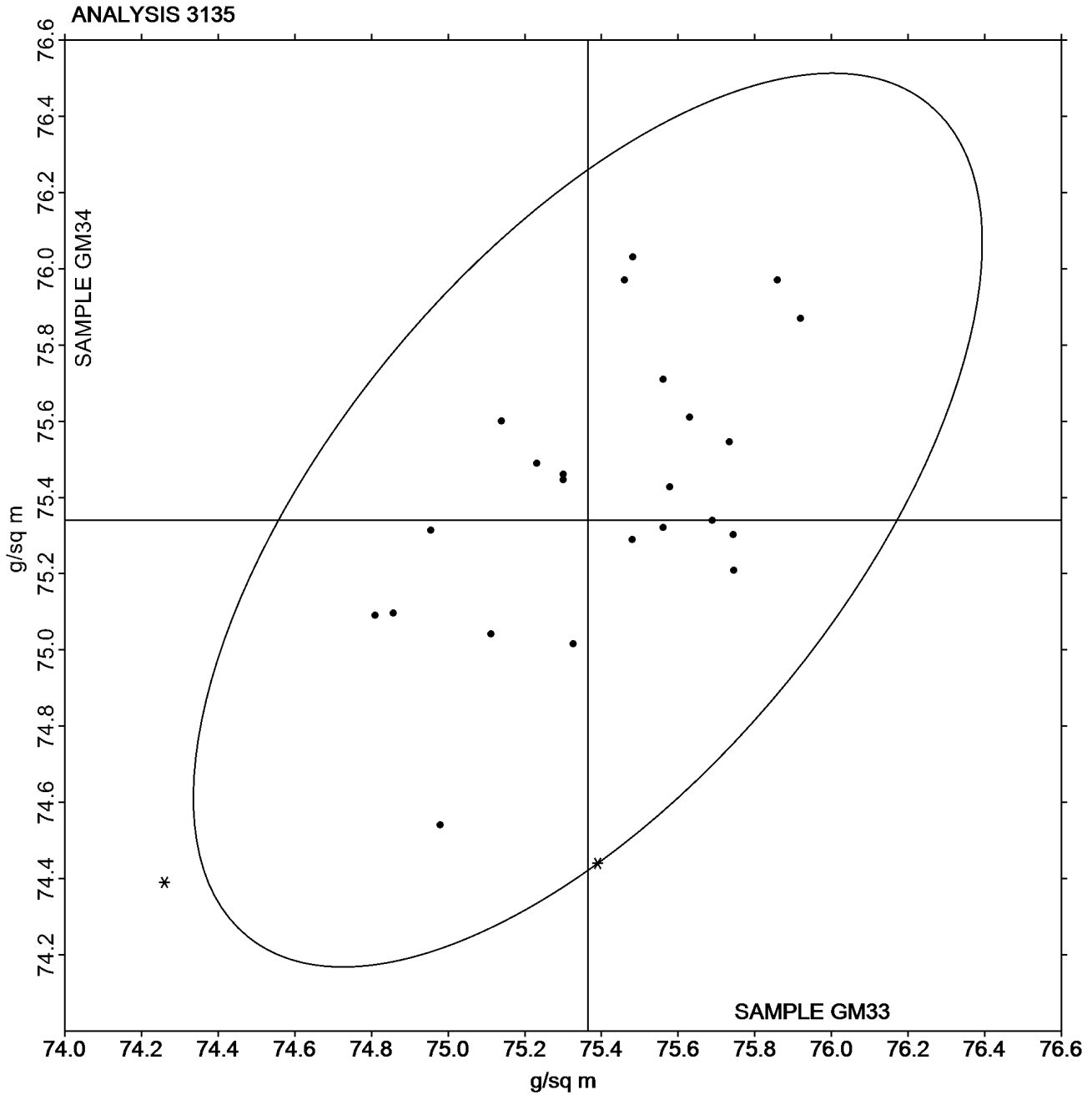
2JEH44 (X) - Data for sample GM33 are high.

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

Report #4321,
September 2024

Grand Mean Sample GM33 = 75.364 g/sq m

Grand Mean Sample GM34 = 75.341 g/sq m

ANALYSIS 3135

SAMPLE GM34

g/sq m

SAMPLE GM33

g/sq m

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

WebCode	Data Flag	Sample VR33 Lab Mean	Sample VR33 Diff from Grand Mean	Sample VR33 CPV	Sample VR34 Lab Mean	Sample VR34 Diff from Grand Mean	Sample VR34 CPV
2FR73C		89.70	-0.30	-0.61	89.97	0.01	0.02
4YHWDW		90.22	0.22	0.44	90.32	0.35	0.80
6ER322		89.14	-0.86	-1.73	89.50	-0.46	-1.05
8PYUH7		89.42	-0.58	-1.16	89.92	-0.04	-0.10
ALPK47		90.11	0.11	0.21	89.73	-0.23	-0.53
AX6FJ6		89.97	-0.03	-0.07	89.76	-0.20	-0.46
BVVPVM	X	78.48	-11.52	-23.08	78.39	-11.57	-26.23
CTMUPN		89.40	-0.60	-1.21	89.67	-0.29	-0.65
EC8DVR		90.26	0.25	0.51	90.08	0.12	0.27
F722CZ		90.27	0.26	0.53	89.83	-0.13	-0.30
GW9B6X		90.15	0.15	0.29	90.28	0.32	0.71
HCV6WE		90.63	0.62	1.25	90.04	0.07	0.17
HV9PTH		89.25	-0.75	-1.51	89.21	-0.75	-1.71
LQKGVT	*	91.32	1.32	2.64	91.04	1.08	2.44
N3CM4H		89.93	-0.07	-0.15	89.22	-0.74	-1.69
N6GC7Q		89.98	-0.02	-0.05	90.30	0.34	0.77
N8LZLF		90.03	0.03	0.05	90.12	0.15	0.35
RC72GB		89.78	-0.22	-0.45	90.72	0.76	1.72
RRVACN		89.87	-0.13	-0.27	89.93	-0.03	-0.07
TMX6XA		90.42	0.41	0.83	89.77	-0.19	-0.44
WWC2R7	X	81.69	-8.31	-16.65	81.84	-8.12	-18.41
Y2LXCY		90.22	0.22	0.43	89.86	-0.10	-0.23

Summary Statistics	Sample VR33	Sample VR34
Grand Means	90.00 Percent	89.96 Percent
Stnd Dev Btwn Labs	0.50 Percent	0.44 Percent
	Statistics based on 20 of 22 reporting participants.	

Comments on Assigned Data Flags for Test #3141

BVVPVM (X) - Extreme Data.

WWC2R7 (X) - Extreme Data.
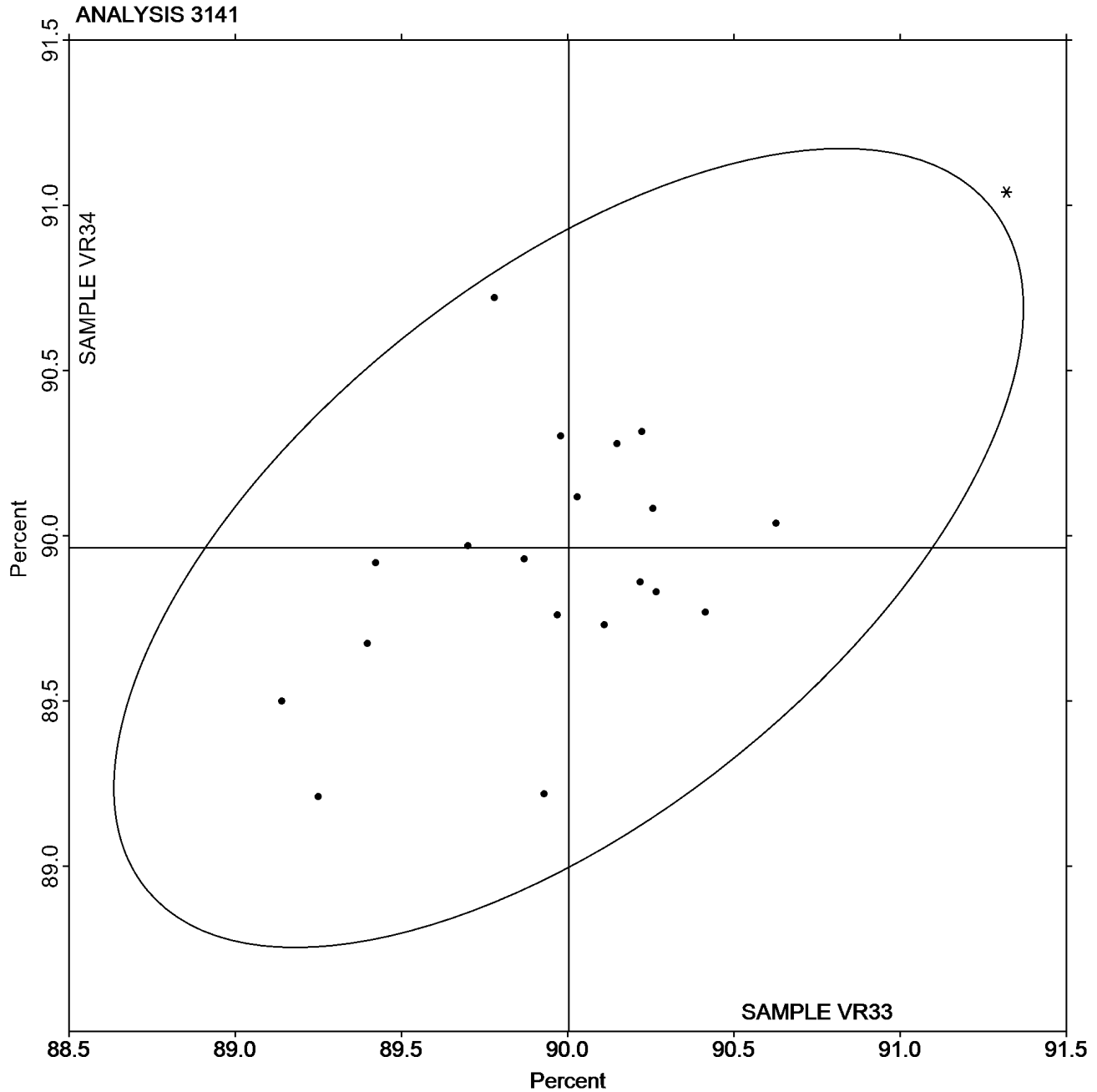
Paper & Paperboard Interlaboratory Testing Program
Analysis 3141
Opacity (89% Reflectance Backing) - Fine Papers
TAPPI Official Test Method T425

Report #4321,
September 2024

Grand Mean Sample VR33 = 90.003
Percent

Grand Mean Sample VR34 = 89.963
Percent

ANALYSIS 3141

SAMPLE VR34

Percent

SAMPLE VR33

Percent

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

Report #4321,
September 2024

WebCode	Data Flag	Sample VP33 Lab Mean	Sample VP33 Diff from Grand Mean	Sample VP33 CPV	Sample VP34 Lab Mean	Sample VP34 Diff from Grand Mean	Sample VP34 CPV
2JEH44		91.70	4.20	0.44	91.50	4.12	0.44
4KCZUU		92.75	5.25	0.56	92.41	5.02	0.54
8VP4UP		73.33	-14.17	-1.50	73.52	-13.86	-1.50
RAZE48		92.23	4.72	0.50	92.11	4.72	0.51

Summary Statistics	Sample VP33	Sample VP34
Grand Means	87.50 Percent	87.38 Percent
Stnd Dev Btwn Labs	9.46 Percent	9.25 Percent

Statistics based on 4 of 4 reporting participants.

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

Report #4321,
September 2024

Grand Mean Sample VP33 = 87.503 Percent

Grand Mean Sample VP34 = 87.384 Percent

ANALYSIS 3143

SAMPLE VP34

Percent

SAMPLE VP33

Percent

If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.
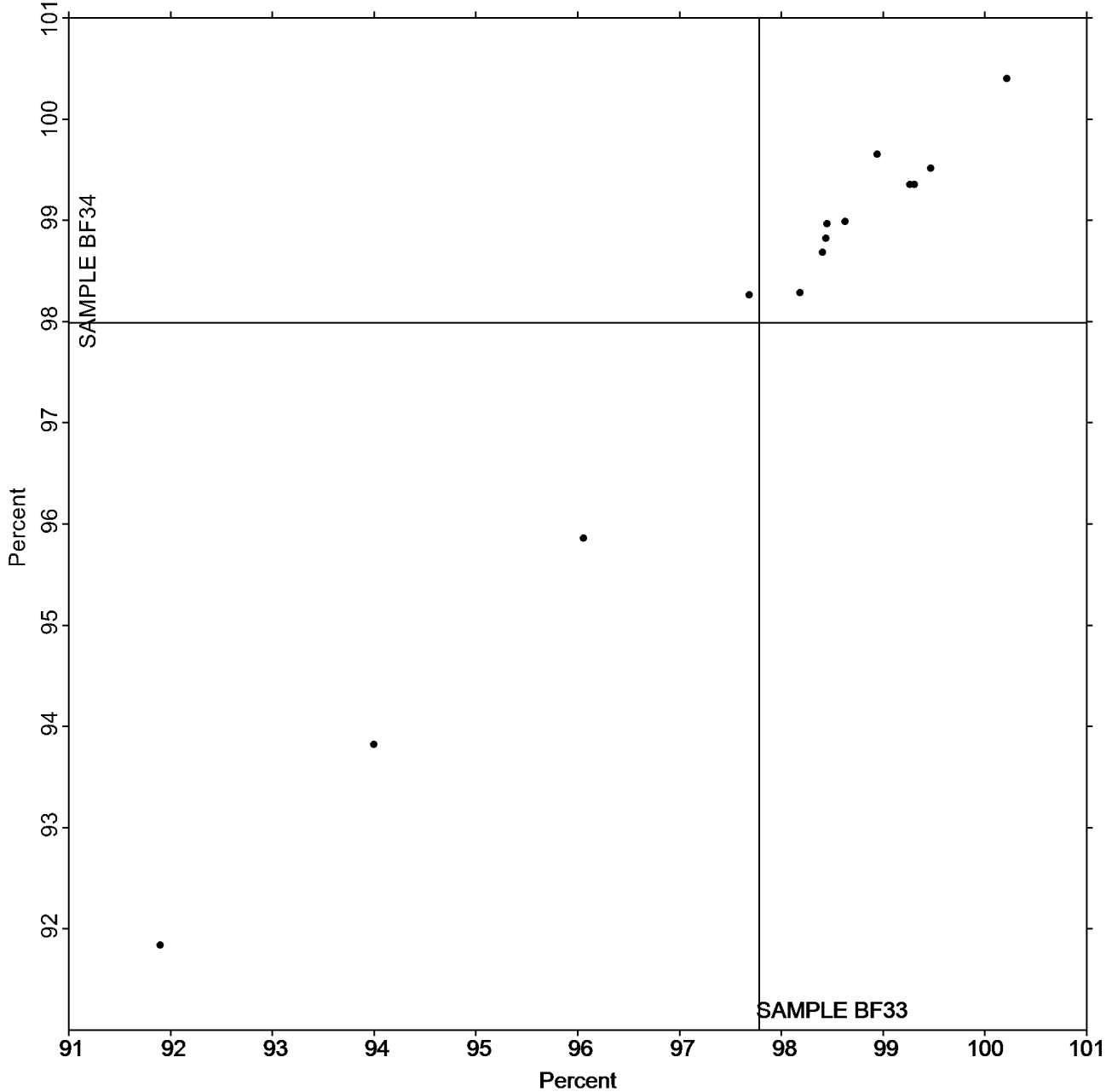
Paper & Paperboard Interlaboratory Testing Program
Analysis 3145
Directional Brightness of Fluorescent Samples
TAPPI Official Test Method T452

Report #4321,
September 2024

WebCode	Data Flag	Sample BF33 Lab Mean	Sample BF33 Diff from Grand Mean	Sample BF33 CPV	Sample BF34 Lab Mean	Sample BF34 Diff from Grand Mean	Sample BF34 CPV
2BX62X		98.44	0.66	0.29	98.82	0.83	0.34
4YHWDW		98.41	0.63	0.27	98.68	0.70	0.29
8PYUH7		98.63	0.85	0.37	98.99	1.00	0.41
9G3BHN		99.47	1.69	0.73	99.51	1.53	0.63
EC8DVR		94.00	-3.78	-1.65	93.82	-4.17	-1.70
GW9B6X		97.69	-0.10	-0.04	98.26	0.28	0.11
LQKGVT		96.06	-1.72	-0.75	95.86	-2.13	-0.87
N3CM4H		99.31	1.53	0.66	99.35	1.36	0.56
N6GC7Q		98.94	1.16	0.50	99.65	1.67	0.68
N8LZLF		98.45	0.67	0.29	98.96	0.98	0.40
RRVACN		99.26	1.48	0.64	99.35	1.37	0.56
TMX6XA		100.21	2.43	1.06	100.40	2.41	0.99
WWC2R7		91.90	-5.88	-2.56	91.84	-6.15	-2.51
Y2LXCY		98.18	0.40	0.17	98.29	0.30	0.12

Summary Statistics	Sample BF33	Sample BF34
Grand Means	97.78 Percent	97.99 Percent
Stnd Dev Btwn Labs	2.30 Percent	2.44 Percent

Statistics based on 14 of 14 reporting participants.

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

**Report #4321,
September 2024**

**Grand Mean Sample BF33 = 97.783
Percent**

**Grand Mean Sample BF34 = 97.985
Percent**

ANALYSIS 3145

SAMPLE BF34

SAMPLE BF33

Percent

Percent

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

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

Report #4321,
September 2024

WebCode	Data Flag	Sample BF33			Sample BF34		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2BX62X		7.960	0.081	0.25	8.060	0.162	0.48
4YHWDW		7.732	-0.147	-0.46	8.032	0.134	0.40
8PYUH7		7.796	-0.083	-0.26	7.896	-0.002	-0.01
EC8DVR		7.240	-0.639	-2.01	7.340	-0.558	-1.66
GW9B6X		7.526	-0.353	-1.11	7.594	-0.304	-0.90
N3CM4H		7.872	-0.007	-0.02	7.914	0.016	0.05
N6GC7Q		8.112	0.233	0.73	7.442	-0.456	-1.35
N8LZLF		8.160	0.281	0.88	8.370	0.472	1.40
RRVACN		8.268	0.389	1.22	8.158	0.260	0.77
TMX6XA		8.124	0.245	0.77	8.174	0.276	0.82

Summary Statistics	Sample BF33	Sample BF34
Grand Means	7.88 Percent	7.90 Percent
Stnd Dev Btwn Labs	0.32 Percent	0.34 Percent

Statistics based on 10 of 10 reporting participants.

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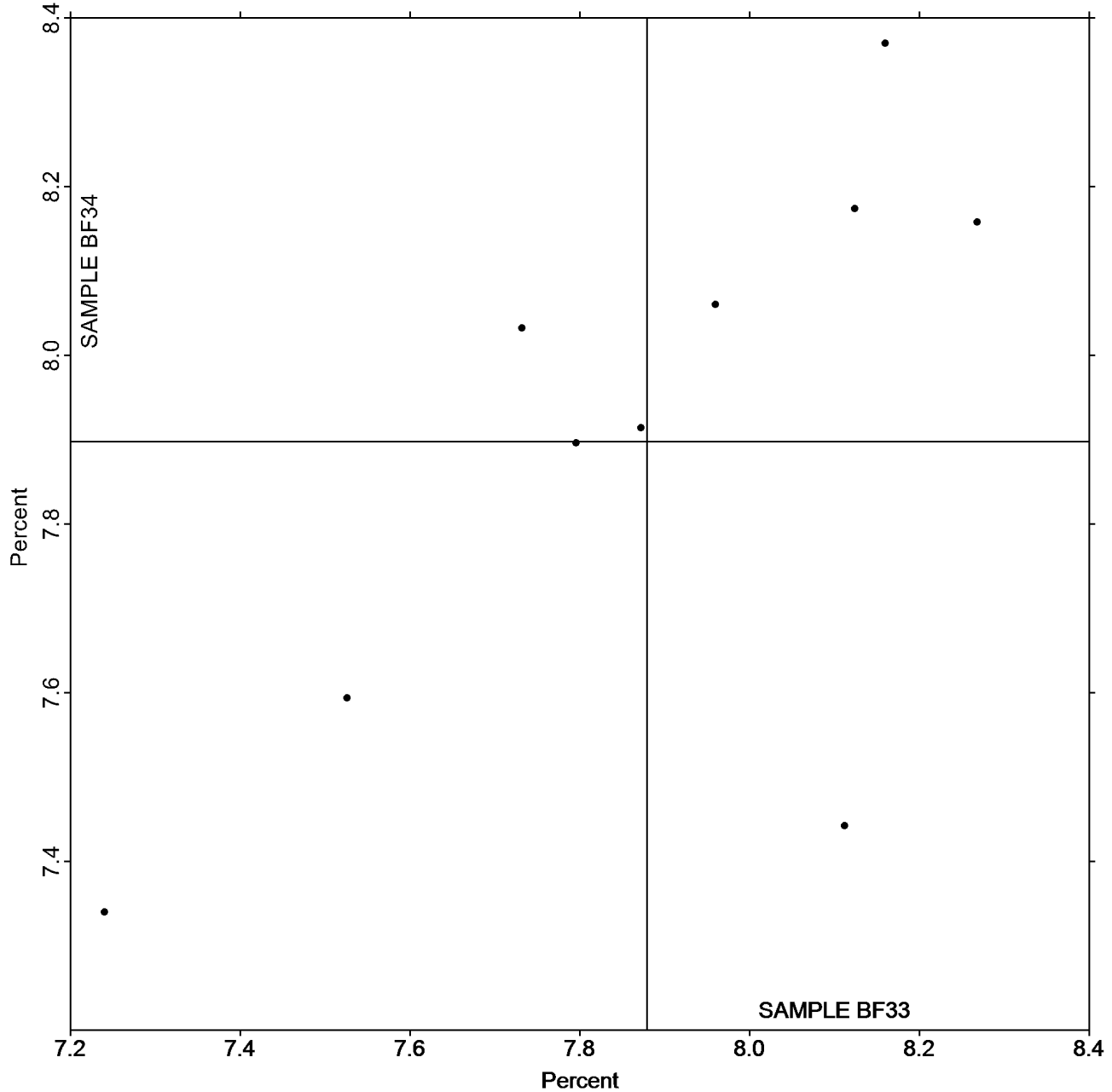**Fluorescent Component of Directional Brightness**
TAPPI Official Test Method T452

Report #4321,
September 2024

Grand Mean Sample BF33 = 7.8790 Percent

Grand Mean Sample BF34 = 7.8980 Percent

ANALYSIS 3146

SAMPLE BF34

SAMPLE BF33

Percent

Percent

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

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

WebCode	Data Flag	Sample TP33 Lab Mean	Sample TP33 Diff from Grand Mean	Sample TP33 CPV	Sample TP34 Lab Mean	Sample TP34 Diff from Grand Mean	Sample TP34 CPV
8PYUH7		1.934	0.084	0.22	1.954	0.112	0.36
EC8DVR		1.928	0.078	0.20	1.968	0.126	0.40
HCV6WE		2.110	0.260	0.68	2.050	0.208	0.66
HDC6CX		1.192	-0.658	-1.71	1.223	-0.619	-1.97
N3CM4H	X	137.600	135.750	353.32	139.500	137.658	438.83
N6GC7Q		1.437	-0.413	-1.08	1.694	-0.148	-0.47
N8LZLF		1.729	-0.121	-0.32	1.649	-0.193	-0.62
NG922Q		2.101	0.251	0.65	1.957	0.115	0.37
RC72GB		2.371	0.521	1.36	2.244	0.402	1.28

Summary Statistics	Sample TP33	Sample TP34
Grand Means	1.85 Taber Units	1.84 Taber Units
Stnd Dev Btwn Labs	0.38 Taber Units	0.31 Taber Units

Statistics based on 8 of 9 reporting participants.

Comments on Assigned Data Flags for Test #3201

N3CM4H (X) - Extreme Data.

Analysis Notes:

N8LZLF - Data appear to be reported as g-cm, not mN-m as indicated on data entry form. CTS will not correct the Units going forward.

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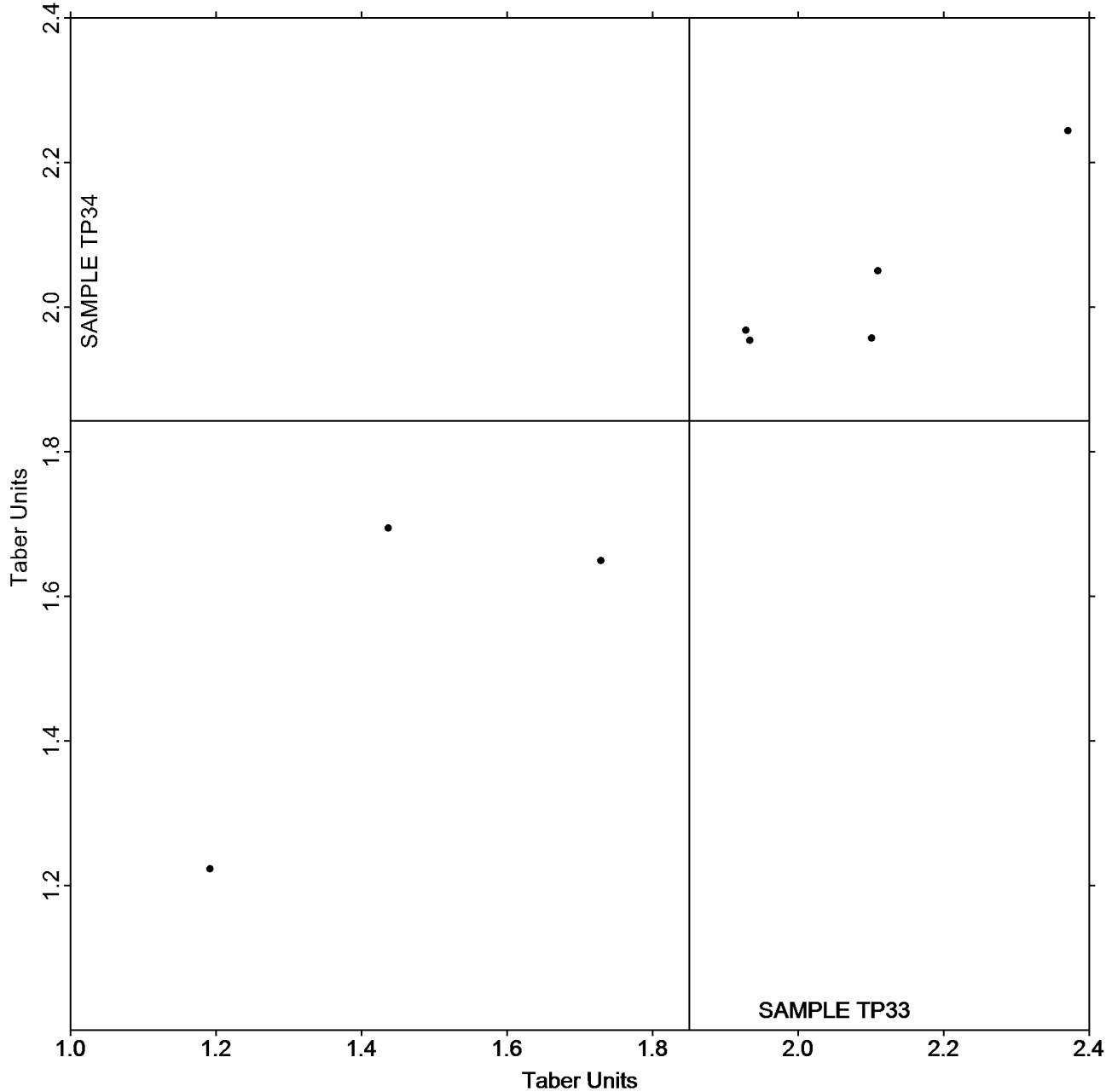**Bending Resistance, Taber Type - 0 to 10 Units**
TAPPI Official Test Method T566

Report #4321,
September 2024

Grand Mean Sample TP33 = 1.8503
Taber Units

Grand Mean Sample TP34 = 1.8424
Taber Units

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

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

Report #4321,
September 2024

WebCode	Data Flag	Sample TC33 Lab Mean	Sample TC33 Diff from Grand Mean	Sample TC33 CPV	Sample TC34 Lab Mean	Sample TC34 Diff from Grand Mean	Sample TC34 CPV
8TZX88		45.93	-2.59	-0.85	46.53	-1.86	-0.67
BNW44M		52.23	3.71	1.23	51.13	2.74	0.98
EC8DVR		47.35	-1.17	-0.39	47.07	-1.32	-0.47
R3H7FA		45.27	-3.25	-1.07	46.08	-2.31	-0.83
RRVACN		45.25	-3.27	-1.08	45.54	-2.85	-1.02
WN2Y77		49.12	0.60	0.20	48.44	0.05	0.02
XYY3AZ		52.55	4.03	1.33	52.74	4.35	1.56
YH9G3E		44.25	-4.27	-1.41	43.85	-4.54	-1.63
Z43KLX		51.14	2.62	0.86	49.65	1.25	0.45
ZGTGMV		50.84	2.33	0.77	51.15	2.75	0.99
ZKRTJV		49.77	1.25	0.41	50.17	1.78	0.64

Summary Statistics	Sample TC33	Sample TC34
Grand Means	48.52 Taber Units	48.39 Taber Units
Stnd Dev Btwn Labs	3.03 Taber Units	2.79 Taber Units

Statistics based on 11 of 11 reporting participants.

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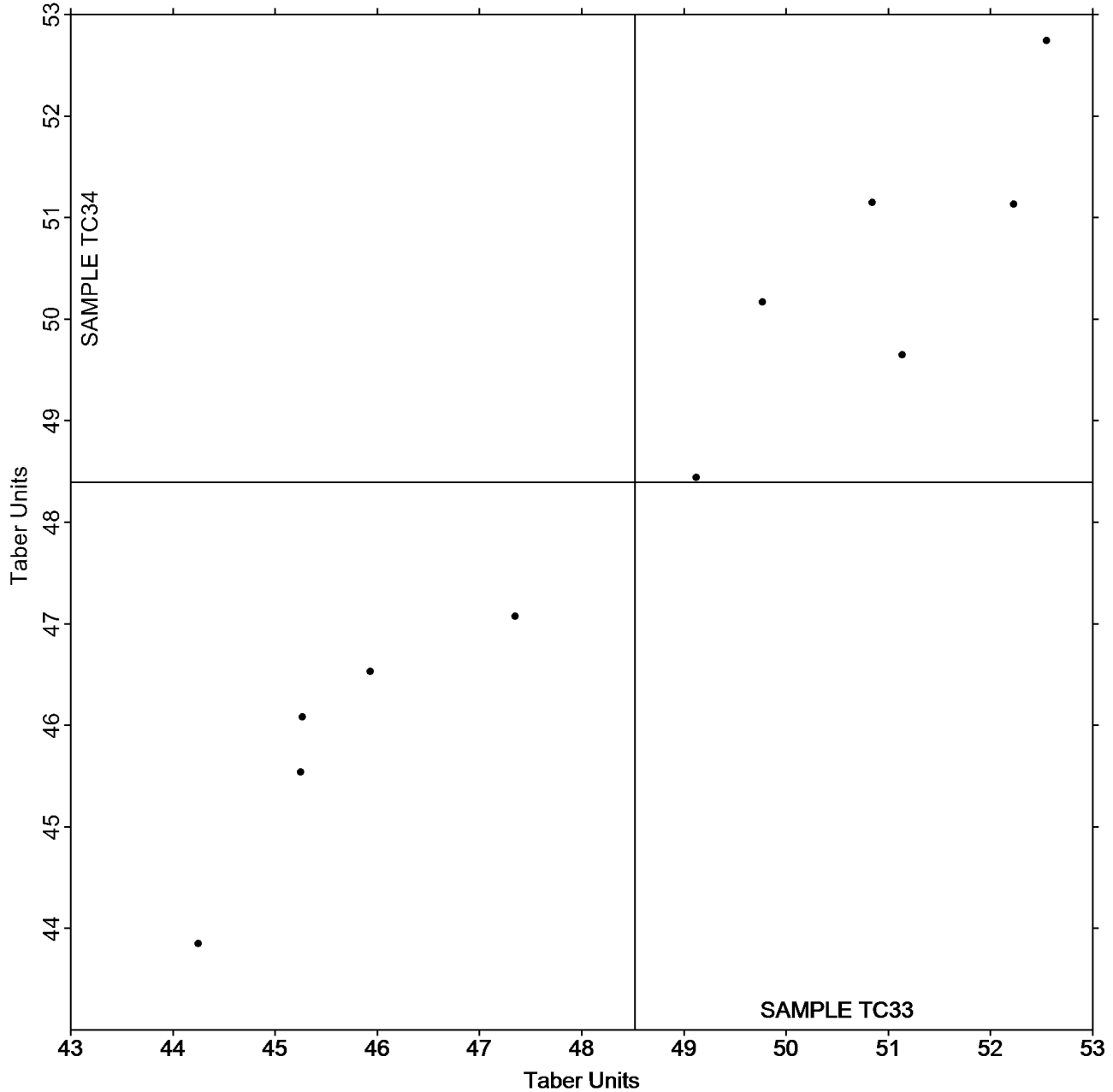**Bending Resistance, Taber Type - 10 to 100 Taber Units**
TAPPI Official Test Method T489

Report #4321,
September 2024

Grand Mean Sample TC33 = 48.518
Taber Units

Grand Mean Sample TC34 = 48.395
Taber Units

ANALYSIS 3203

SAMPLE TC34

Taber Units

SAMPLE TC33

Taber Units

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

Paper & Paperboard Interlaboratory Testing Program
Analysis 3205
Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard
TAPPI Official Test Method T489

Report #4321,
September 2024

WebCode	Data Flag	Sample TR33 Lab Mean	Sample TR33 Diff from Grand Mean	Sample TR33 CPV	Sample TR34 Lab Mean	Sample TR34 Diff from Grand Mean	Sample TR34 CPV
2FR73C		173.9	-4.3	-0.74	173.4	-3.6	-0.69
4F3MCV		180.8	2.6	0.45	182.2	5.2	0.98
98EH8Q		170.6	-7.6	-1.31	170.1	-6.9	-1.29
EHD4ZH		179.9	1.7	0.29	178.7	1.7	0.32
F7ET6G		177.0	-1.2	-0.21	177.4	0.4	0.07
TJMXX7		185.5	7.3	1.26	183.2	6.2	1.17
U3RUU8		169.9	-8.3	-1.43	170.8	-6.2	-1.17
VBHWB9		173.0	-5.2	-0.90	170.2	-6.8	-1.28
Z43KLX		184.2	6.0	1.04	178.1	1.1	0.21
ZGTGMV		186.1	7.9	1.36	185.1	8.1	1.52
ZKRTJV		179.4	1.2	0.20	177.8	0.8	0.15

Summary Statistics	Sample TR33	Sample TR34
Grand Means	178.21 Taber Units	177.01 Taber Units
Stnd Dev Btwn Labs	5.79 Taber Units	5.31 Taber Units

Statistics based on 11 of 11 reporting participants.

Paper & Paperboard Interlaboratory Testing Program
Analysis 3205
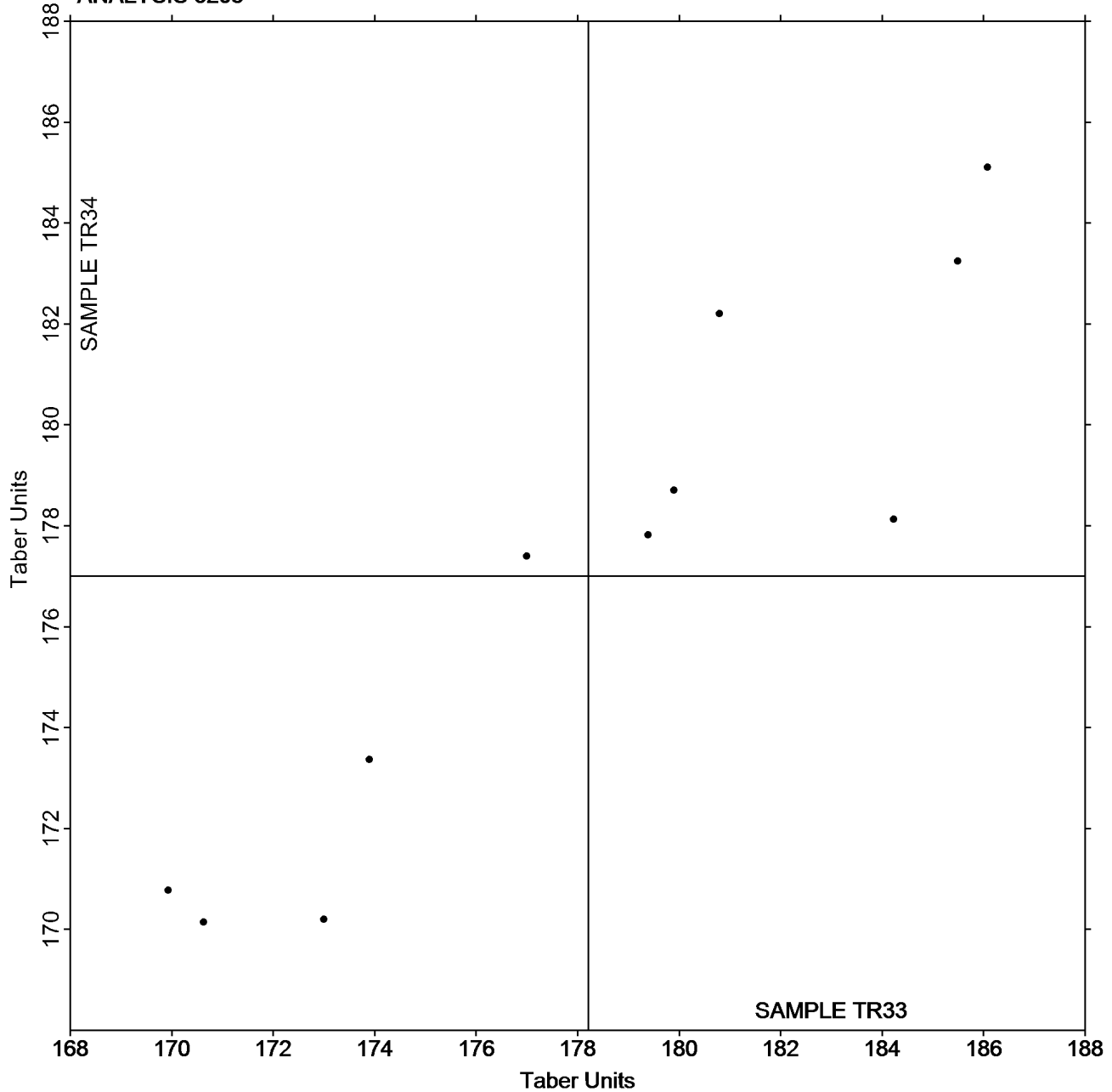### Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard
TAPPI Official Test Method T489

**Report #4321,
September 2024**

CTS

**Grand Mean Sample TR33 = 178.21
Taber Units**

**Grand Mean Sample TR34 = 177.01
Taber Units**

ANALYSIS 3205

SAMPLE TR34

Taber Units

SAMPLE TR33

Taber Units

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

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

Report #4321,
September 2024

WebCode	Data Flag	Sample ZR33 Lab Mean	Sample ZR33 Diff from Grand Mean	Sample ZR33 CPV	Sample ZR34 Lab Mean	Sample ZR34 Diff from Grand Mean	Sample ZR34 CPV
2FR73C		47.08	-5.31	-1.23	49.60	-2.99	-0.83
73982R		50.50	-1.89	-0.44	52.70	0.11	0.03
98EH8Q	*	47.84	-4.55	-1.05	45.28	-7.31	-2.02
D2VQ8Z		59.62	7.23	1.68	58.02	5.43	1.50
EHD4ZH		50.80	-1.59	-0.37	50.20	-2.39	-0.66
GNFX8J		50.50	-1.89	-0.44	51.80	-0.79	-0.22
P4ZFFC		60.04	7.65	1.78	60.02	7.43	2.05
RU2RD6		50.20	-2.19	-0.51	49.60	-2.99	-0.83
TJMXX7		51.88	-0.51	-0.12	52.16	-0.43	-0.12
U3RUU8		49.40	-2.99	-0.69	49.40	-3.19	-0.88
UGBH2J		56.54	4.15	0.96	55.90	3.31	0.91
URB9MR		48.36	-4.03	-0.93	49.56	-3.03	-0.84
VBHWB9		51.60	-0.79	-0.18	52.14	-0.45	-0.13
W9UKAH		53.40	1.01	0.24	54.00	1.41	0.39
WPEB9G		60.50	8.11	1.88	56.70	4.11	1.13
WQAUBH		47.38	-5.01	-1.16	49.36	-3.23	-0.89
WUQGL3		57.05	4.66	1.08	56.10	3.50	0.97
Z43KLX		50.58	-1.81	-0.42	53.40	0.81	0.22
ZKRTJV		52.06	-0.33	-0.08	53.32	0.73	0.20

Summary Statistics	Sample ZR33	Sample ZR34
Grand Means	52.39 psi	52.59 psi
Stnd Dev Btwn Labs	4.31 psi	3.62 psi

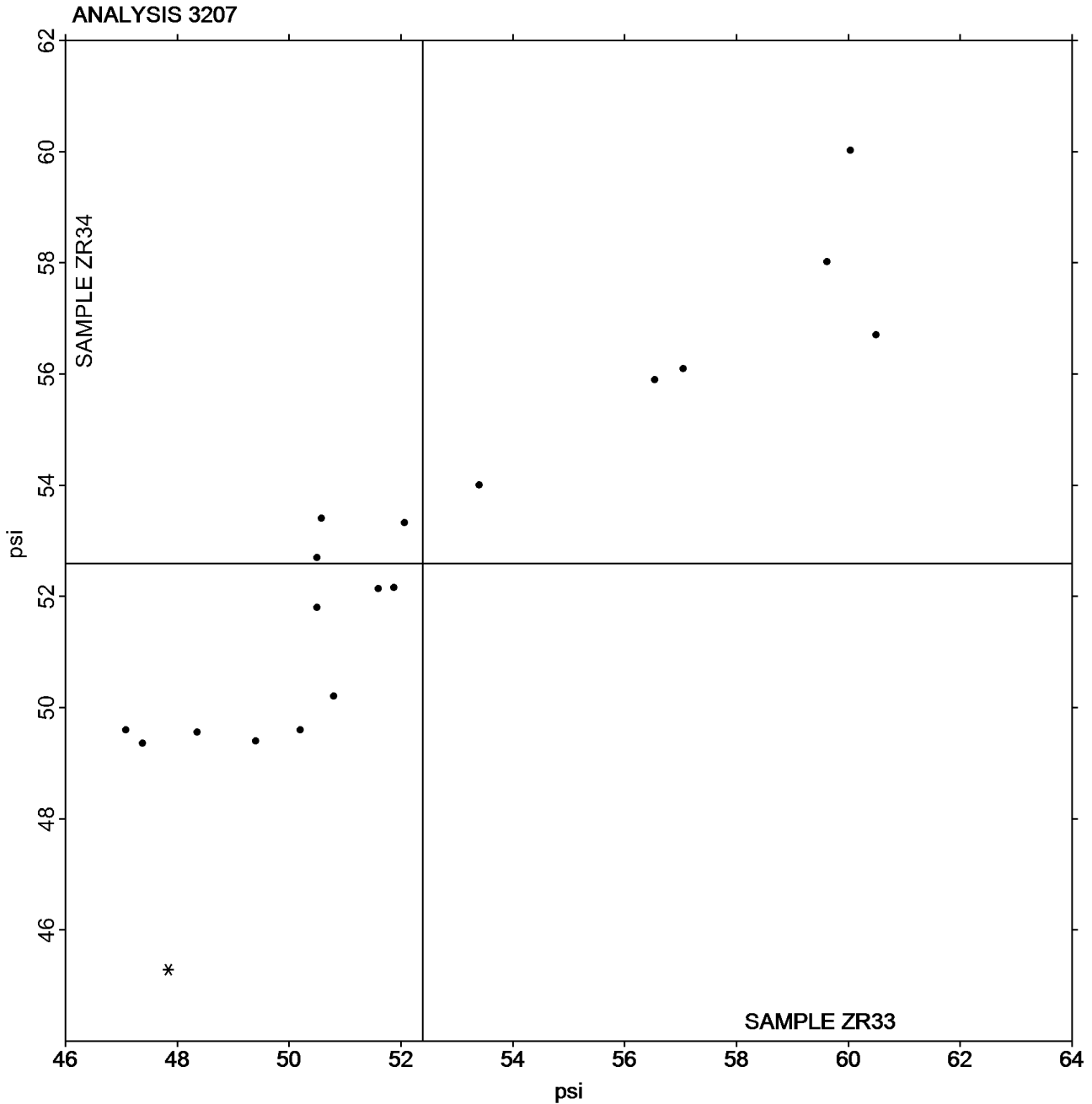Statistics based on 19 of 19 reporting participants.

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

Report #4321,
September 2024

Grand Mean Sample ZR33 = 52.386 psi

Grand Mean Sample ZR34 = 52.593 psi

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

Paper & Paperboard Interlaboratory Testing Program
Analysis 3209
Z-Direction Tensile
TAPPI Official Test Method T541

Report #4321,
September 2024

| WebCode | Data Flag | Sample ZP33 | | | Sample ZP34 | | |
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4F3MCV		87.40	5.50	0.56	87.30	6.67	0.80
4KCZUU		68.11	-13.79	-1.41	68.72	-11.91	-1.44
6UKWER		74.16	-7.74	-0.79	75.20	-5.43	-0.65
8TZX88		70.00	-11.90	-1.21	69.66	-10.97	-1.32
AWRL46		70.60	-11.30	-1.15	72.40	-8.23	-0.99
BNW44M		85.36	3.46	0.35	83.56	2.93	0.35
F7ET6G		87.00	5.10	0.52	83.60	2.97	0.36
KRJ3BE		84.14	2.24	0.23	80.70	0.07	0.01
R3H7FA		85.00	3.10	0.32	83.20	2.57	0.31
XYY3AZ		90.24	8.34	0.85	87.24	6.61	0.80
ZKRTJV		98.92	17.02	1.74	95.38	14.75	1.78

Summary Statistics	Sample ZP33	Sample ZP34
Grand Means	81.90 psi	80.63 psi
Stnd Dev Btwn Labs	9.81 psi	8.30 psi

Statistics based on 11 of 11 reporting participants.

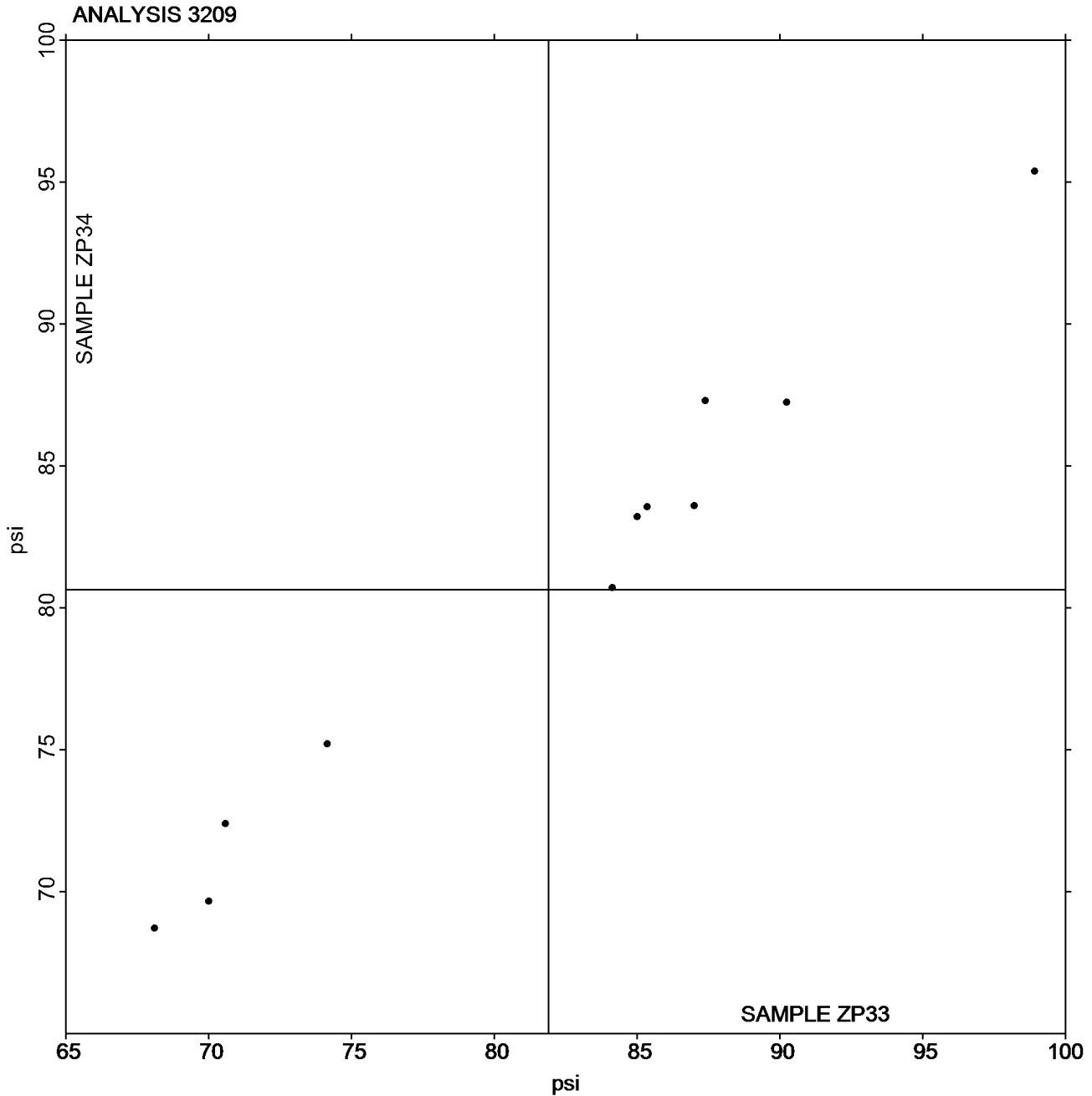**Paper & Paperboard Interlaboratory Testing Program**
Analysis 3209
Z-Direction Tensile
TAPPI Official Test Method T541

Report #4321, September 2024

Grand Mean Sample ZP33 = 81.903 psi

Grand Mean Sample ZP34 = 80.633 psi

ANALYSIS 3209

SAMPLE ZP34

psi

SAMPLE ZP33

psi

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

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

Report #4321,
September 2024

		Sample SM33			Sample SM34		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2FR73C		106.00	6.17	0.79	106.40	6.75	0.72
4F3MCV		85.20	-14.63	-1.87	80.60	-19.05	-2.03
4MLQKX		96.80	-3.03	-0.39	96.20	-3.45	-0.37
AWRL46		92.20	-7.63	-0.98	91.40	-8.25	-0.88
BNW44M		104.60	4.77	0.61	103.60	3.95	0.42
CTMUPN		91.40	-8.43	-1.08	92.40	-7.25	-0.77
F4PLHY		109.20	9.37	1.20	110.40	10.75	1.14
GW7JDG		102.20	2.37	0.30	102.40	2.75	0.29
N3CM4H		93.40	-6.43	-0.82	92.40	-7.25	-0.77
NG922Q		92.76	-7.07	-0.90	91.12	-8.53	-0.91
R3H7FA		103.20	3.37	0.43	106.40	6.75	0.72
U3RUU8		103.40	3.57	0.46	99.20	-0.45	-0.05
XYY3AZ		111.60	11.77	1.51	114.80	15.15	1.61
ZKRTJV		105.60	5.77	0.74	107.80	8.15	0.87

Summary Statistics	Sample SM33	Sample SM34
Grand Means	99.83 1000th ft-lbs	99.65 1000th ft-lbs
Stnd Dev Btwn Labs	7.82 1000th ft-lbs	9.39 1000th ft-lbs

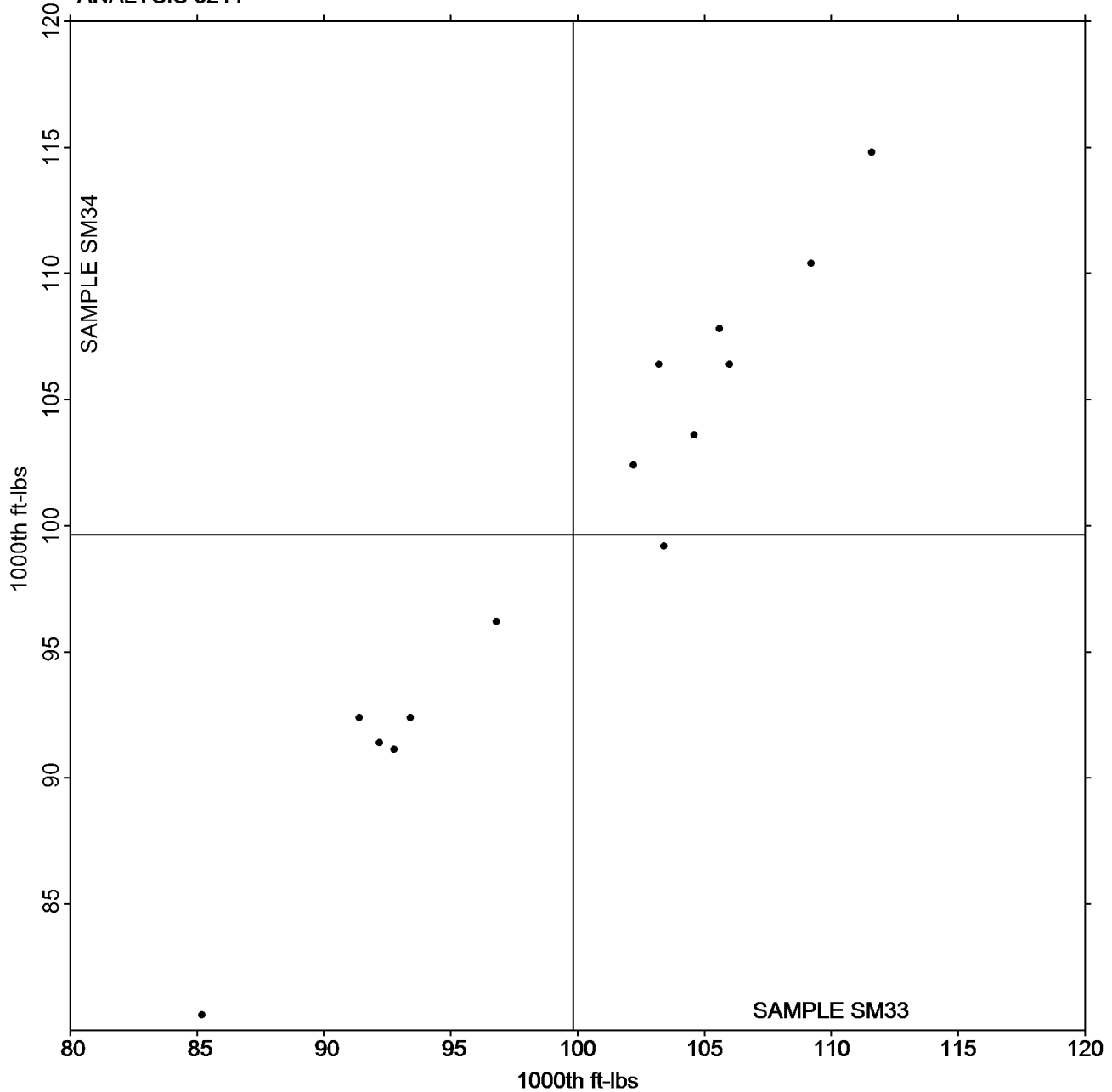Statistics based on 14 of 14 reporting participants.

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

**Report #4321,
September 2024**

**Grand Mean Sample SM33 = 99.826
1000th ft-lbs**

**Grand Mean Sample SM34 = 99.651
1000th ft-lbs**

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

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

WebCode	Data Flag	Sample SB33 Lab Mean	Sample SB33 Diff from Grand Mean	Sample SB33 CPV	Sample SB34 Lab Mean	Sample SB34 Diff from Grand Mean	Sample SB34 CPV
67XW9Z		104.60	11.35	0.77	99.60	8.94	0.69
8PYUH7	X	0.08	-93.18	-6.35	0.08	-90.58	-7.04
BP9XJM		80.00	-13.25	-0.90	76.36	-14.30	-1.11
CVAEUT		69.60	-23.65	-1.61	71.00	-19.66	-1.53
EC8DVR		105.00	11.75	0.80	103.20	12.54	0.97
N8LZLF		97.20	3.95	0.27	91.40	0.74	0.06
P7QGJE		109.20	15.95	1.09	105.60	14.94	1.16
RAZE48		102.78	9.53	0.65	94.03	3.37	0.26
WUQGL3		102.00	8.75	0.60	98.60	7.94	0.62
XLBX34		71.00	-22.25	-1.52	72.00	-18.66	-1.45
YH9G3E		91.16	-2.09	-0.14	94.80	4.14	0.32

Summary Statistics	Sample SB33	Sample SB34
Grand Means	93.25 1000th ft-lbs	90.66 1000th ft-lbs
Stnd Dev Btwn Labs	14.68 1000th ft-lbs	12.87 1000th ft-lbs

Statistics based on 10 of 11 reporting participants.

Comments on Assigned Data Flags for Test #3213

8PYUH7 (X) - Extreme Data.
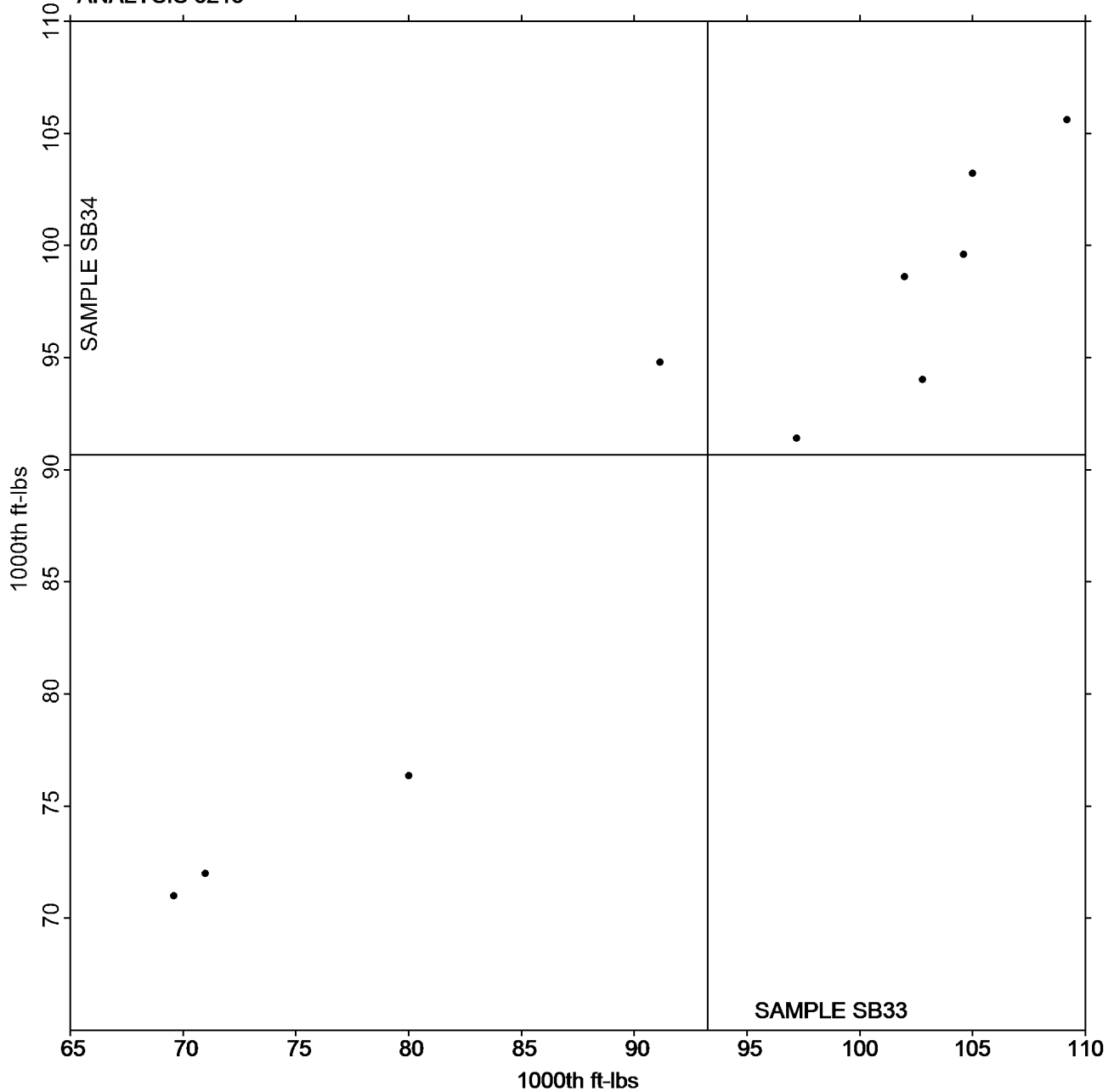
Paper & Paperboard Interlaboratory Testing Program
Analysis 3213
Internal Bond Strength - Scott Bond Models
TAPPI Provisional Test Method T569

**Report #4321,
September 2024**

**Grand Mean Sample SB33 = 93.254
1000th ft-lbs**

**Grand Mean Sample SB34 = 90.659
1000th ft-lbs**

ANALYSIS 3213

SAMPLE SB34

1000th ft-lbs

SAMPLE SB33

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.

-End of Report-