

Paper & Paperboard Testing Program

Summary Report #4421 - May 2026

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

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

<u>Analysis</u>	<u>Analysis Name</u>
3101	Thickness (Caliper), Printing papers
3111	Bursting Strength - Printing Papers
3113	Tearing Strength - Printing Papers
3115	Tensile Breaking Strength - Printing Papers
3116	Tensile Energy Absorption - Printing Papers
3117	Elongation to Break - Printing Papers
3121	Air Resistance - Gurley Oil Type
3131	Roughness - Print Surf Method - 2.5 to 6.0 Microns
3133	Roughness - Sheffield Type
3135	Grammage (Mass per Unit Area)
3141	Opacity (89% Reflectance Backing) - Fine Papers
3145	Directional Brightness of Fluorescent Samples
3146	Fluorescent Component of Directional Brightness
3201	Bending Resistance, Taber Type - 0 to 10 Units
3203	Bending Resistance, Taber Type - 10 to 100 Taber Units
3205	Bending Resistance, Taber Type - 50 to 500 Taber Units - Recycled Paperboard
3207	Z-Direction Tensile, Recycled Paperboard
3209	Z-Direction Tensile
3211	Internal Bond Strength - Modified Scott Mechanics
3213	Internal Bond Strength - Scott Bond Models

The CTS Paper & Paperboard Interlaboratory Program

In 1969, the National Bureau of Standards (now designated the National Institute for Standards and Technology) and the Technical Association of the Pulp and Paper Industry (TAPPI) developed an interlaboratory program for paper and paperboard testing. Since 1971, Collaborative Testing Services has operated the Collaborative Reference Program for Paper and Paperboard. With hundreds of organizations from around the world participating in these tests, this program has become one of the largest of its kind. The program allows laboratories to compare the performance of their testing with that of other participating laboratories, and provides a realistic picture of the state of paper testing.

About CTS

Founded in 1971, Collaborative Testing Services, Inc. (CTS) is a privately - owned company that specializes in interlaboratory tests for a variety of 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 #4421, May 2026

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

WebCode	Data Flag	Sample CP53			Sample CP54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3WU8C4_AL		4.030	0.036	0.42	4.020	0.025	0.26
4JZBMB		4.030	0.036	0.42	4.036	0.041	0.43
6UGEA2		3.974	-0.020	-0.23	3.949	-0.046	-0.48
78MPE3		4.004	0.011	0.12	3.994	-0.001	-0.01
7QXK79		4.080	0.086	0.99	4.059	0.064	0.67
7TZK87		4.014	0.020	0.23	4.049	0.054	0.56
9QQEHA	*	3.969	-0.025	-0.29	3.868	-0.127	-1.32
9RGDXU		3.948	-0.046	-0.53	3.934	-0.061	-0.64
AHBTBR		4.000	0.006	0.07	3.956	-0.039	-0.41
AQ6ZRC		3.993	-0.001	-0.01	4.010	0.015	0.15
BL6CNA		4.044	0.050	0.58	4.063	0.068	0.71
DBXB32		4.010	0.016	0.19	4.059	0.064	0.67
FM38ZZ		4.094	0.100	1.15	4.087	0.092	0.96
GF4YFT		3.839	-0.155	-1.78	3.831	-0.164	-1.71
GFXQ6K		4.013	0.019	0.22	4.004	0.009	0.09
H9DV2V		4.067	0.073	0.84	4.006	0.011	0.11
JCBVEX		3.990	-0.004	-0.04	3.970	-0.025	-0.26
JD7CQU		4.168	0.174	2.00	4.199	0.204	2.13
K4AX4Z		3.986	-0.008	-0.09	3.966	-0.029	-0.30
K4BVEV		3.997	0.003	0.04	4.003	0.008	0.08
K4YWKM		4.123	0.129	1.49	4.193	0.198	2.06
N6Y4DP		3.980	-0.014	-0.16	4.010	0.015	0.16
PG32KM		3.977	-0.017	-0.19	4.069	0.074	0.77
PK8G8T		3.959	-0.035	-0.40	3.997	0.002	0.02
PU96YP		4.064	0.070	0.80	4.057	0.062	0.65
PYNFDT_AL		4.150	0.156	1.80	4.121	0.126	1.31
Q676CT		3.899	-0.095	-1.09	3.877	-0.118	-1.23
RRHK8Q		3.970	-0.024	-0.27	3.990	-0.005	-0.05
RYHYUD		4.000	0.006	0.07	4.008	0.013	0.13
UH3HZF		3.963	-0.031	-0.35	3.917	-0.078	-0.81
X7YNV8		3.930	-0.064	-0.73	3.953	-0.042	-0.44
XT9W9H		3.966	-0.028	-0.32	4.011	0.016	0.16
Y4N4KD		3.841	-0.152	-1.75	3.834	-0.161	-1.67
YL9MNC	*	3.717	-0.277	-3.19	3.728	-0.267	-2.78



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

Summary Statistics	Sample CP53	Sample CP54
Grand Means	3.99 mils	3.99 mils
Stnd Dev Btwn Labs	0.09 mils	0.10 mils
Statistics based on 34 of 34 reporting participants.		

Key to Instrument Codes Reported by Participants

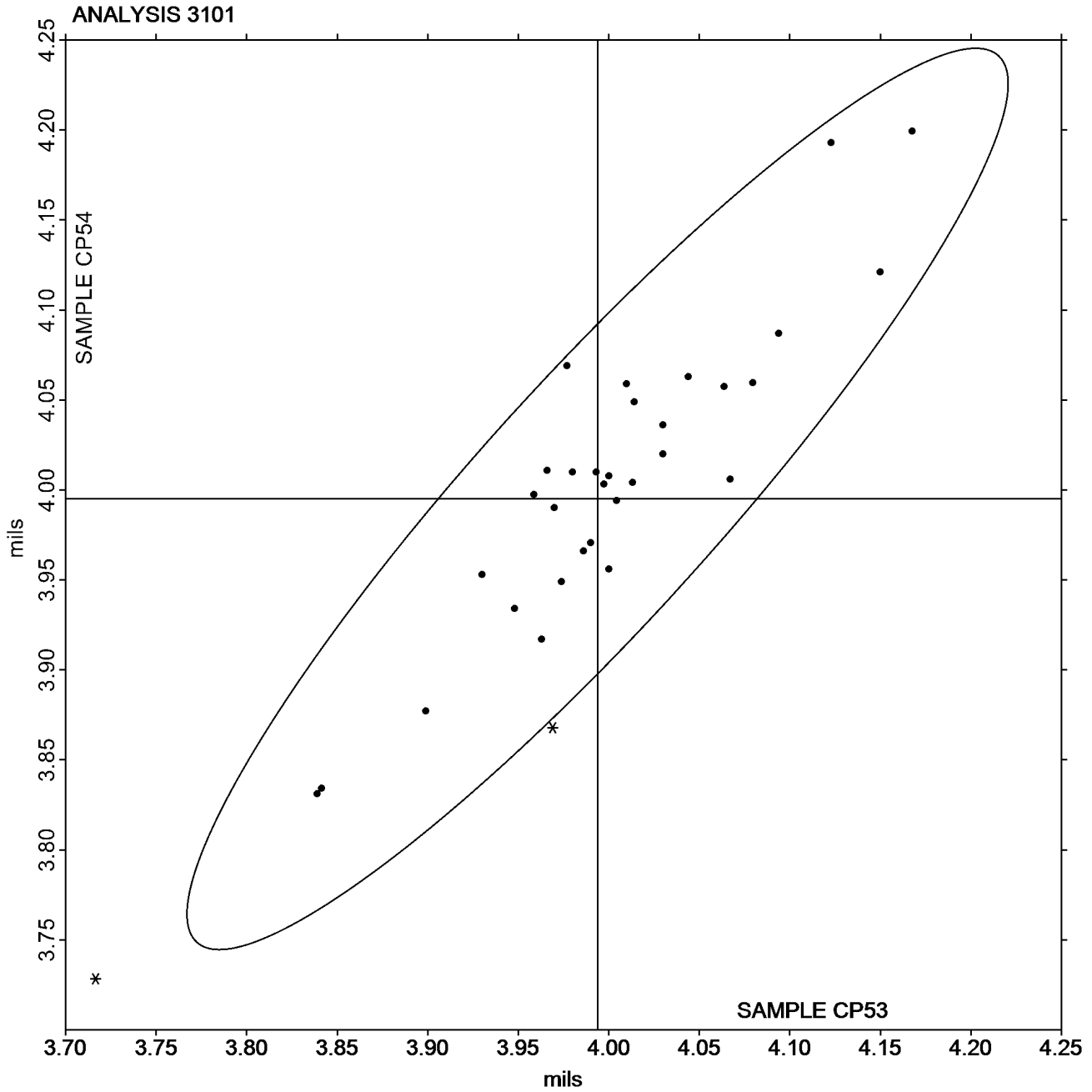
EM	Emveco	LA	L & W Autoline
LB	L & W Autoline 600	LC	L & W Autoline 400
LW	L & W	MS	Messmer
PP	Technidyne Profile/Plus	TA	Thwing-Albert
TM	TMI		



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

Grand Mean Sample CP53 = 3.9938
mils

Grand Mean Sample CP54 = 3.9950
mils





Report #4421, May 2026

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

WebCode	Data Flag	Sample BP53			Sample BP54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3GF2Z6		23.25	1.00	0.60	24.03	1.82	1.04
3N4M77		21.70	-0.55	-0.33	22.60	0.39	0.22
66X2GG		25.02	2.77	1.67	24.49	2.28	1.31
7QXK79		22.47	0.22	0.13	21.36	-0.85	-0.48
7TZK87	*	17.70	-4.55	-2.74	16.85	-5.36	-3.07
AHBTBR		21.74	-0.51	-0.31	22.64	0.43	0.25
AQ6ZRC		22.09	-0.16	-0.10	22.13	-0.08	-0.04
BL6CNA		20.90	-1.35	-0.81	21.10	-1.11	-0.64
EVYNCY		22.83	0.58	0.35	22.47	0.26	0.15
GF4YFT		25.01	2.76	1.66	24.92	2.71	1.55
GFXQ6K		22.25	0.00	0.00	22.83	0.62	0.35
GT87BQ		23.13	0.88	0.53	23.91	1.70	0.98
J4FTB2		22.38	0.12	0.08	22.35	0.14	0.08
JD7CQU		21.36	-0.89	-0.53	20.54	-1.67	-0.96
K4YWKM		21.36	-0.89	-0.53	23.64	1.43	0.82
KYF2GU		23.78	1.53	0.92	23.17	0.96	0.55
N6Y4DP		20.71	-1.54	-0.93	20.22	-1.99	-1.14
PG32KM		20.01	-2.24	-1.35	20.75	-1.46	-0.84
PUAYKG		21.50	-0.75	-0.45	20.50	-1.71	-0.98
Q676CT		22.97	0.72	0.44	21.94	-0.27	-0.15
RFLCNN		23.40	1.15	0.69	23.10	0.89	0.51
RRHK8Q		24.70	2.45	1.47	23.20	0.99	0.57
UH3HZF	X	31.60	9.35	5.62	31.30	9.09	5.21
XT9W9H		21.49	-0.76	-0.46	22.07	-0.14	-0.08

Summary Statistics	Sample BP53	Sample BP54
Grand Means	22.25 psi	22.21 psi
Std Dev Btwn Labs	1.66 psi	1.74 psi
Statistics based on 23 of 24 reporting participants.		

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Comments on Assigned Data Flags for Test #3111

UH3HZF (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.

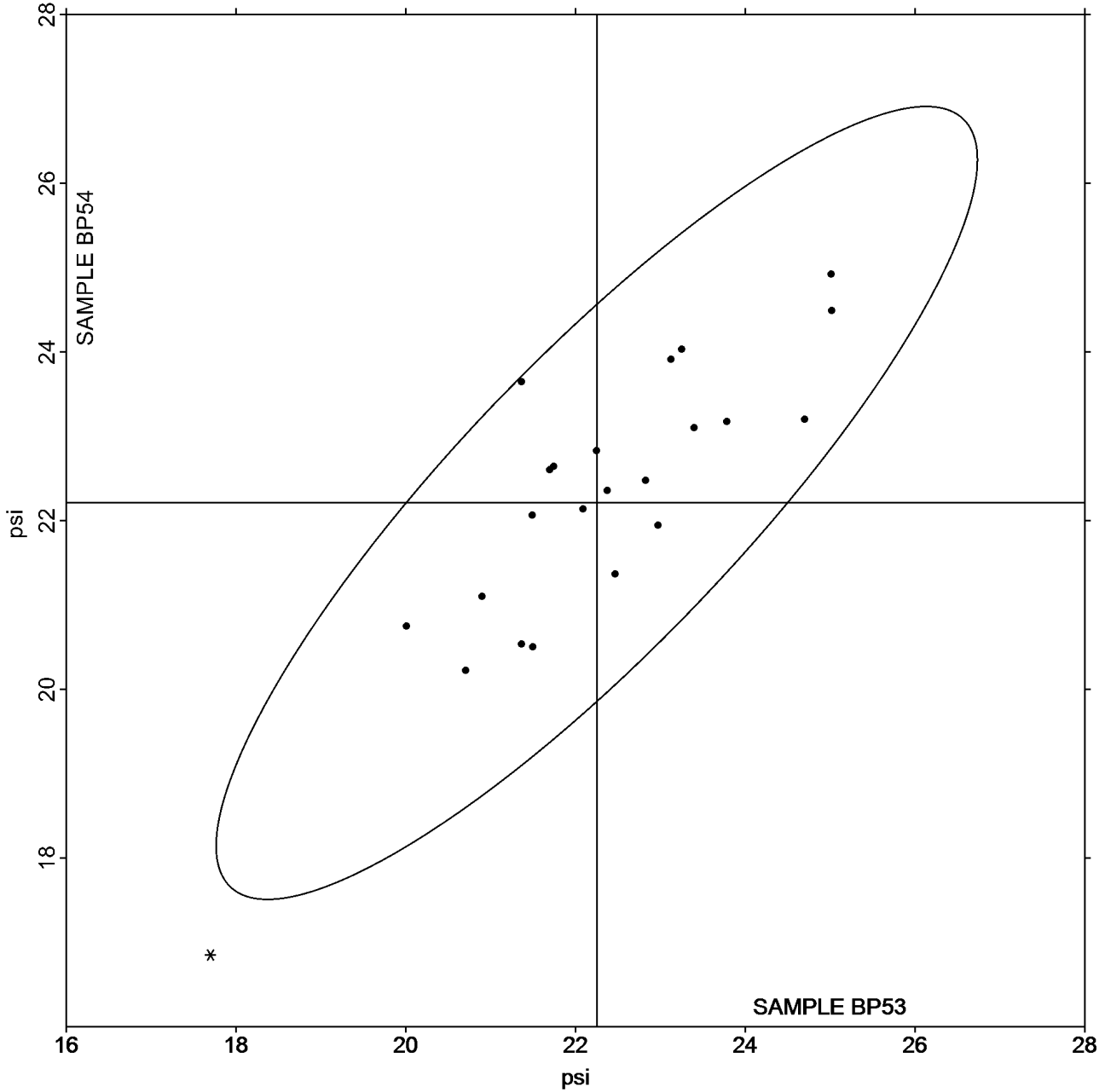


Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3111
Bursting Strength - Printing Papers
TAPPI Official Test Method T403

Grand Mean Sample BP53 = 22.250
psi

Grand Mean Sample BP54 = 22.209
psi

ANALYSIS 3111





Analysis 3113

Tearing Strength - Printing Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample RP53			Sample RP54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
22R8BA		60.01	1.48	0.25	60.85	2.50	0.44
2362QA		61.63	3.10	0.52	63.76	5.41	0.96
2FQBFZ		57.46	-1.07	-0.18	57.18	-1.17	-0.21
3WU8C4_AL	*	41.20	-17.33	-2.93	42.70	-15.65	-2.78
464WMH		59.37	0.84	0.14	58.12	-0.23	-0.04
4JZBMB		54.10	-4.43	-0.75	54.12	-4.23	-0.75
66X2GG	X	58.76	0.23	0.04	78.10	19.75	3.50
7QXK79		59.51	0.97	0.17	59.13	0.78	0.14
7TZK87	*	66.82	8.29	1.40	62.96	4.61	0.82
9QQEHA	X	64.79	6.26	1.06	72.17	13.81	2.45
AHBTBR		50.06	-8.47	-1.43	50.70	-7.65	-1.36
AQ6ZRC		60.04	1.51	0.26	58.98	0.63	0.11
BL6CNA		62.48	3.95	0.67	61.53	3.18	0.56
CJZTBZ		61.50	2.97	0.50	60.90	2.55	0.45
D2R7FQ		57.45	-1.08	-0.18	55.60	-2.76	-0.49
DBXB32		53.54	-4.99	-0.85	52.53	-5.82	-1.03
EVYNCY	X	6.53	-52.00	-8.81	7.04	-51.31	-9.11
FM38ZZ		57.90	-0.63	-0.11	58.60	0.25	0.04
GF4YFT		56.48	-2.05	-0.35	57.44	-0.91	-0.16
GFXQ6K		59.55	1.02	0.17	59.33	0.97	0.17
H9DV2V		53.16	-5.37	-0.91	52.34	-6.01	-1.07
JD7CQU		56.60	-1.93	-0.33	56.77	-1.59	-0.28
K4AX4Z		53.20	-5.33	-0.90	53.24	-5.11	-0.91
K4BVEV		57.56	-0.97	-0.16	58.30	-0.05	-0.01
KYF2GU		63.08	4.55	0.77	61.02	2.67	0.47
N6Y4DP		60.04	1.51	0.26	59.30	0.95	0.17
PG32KM		71.20	12.67	2.15	70.78	12.42	2.21
PYNFDT_AL		69.60	11.07	1.87	69.80	11.45	2.03
Q676CT		52.00	-6.53	-1.11	53.36	-4.99	-0.89
RFLCNN		68.60	10.07	1.71	68.80	10.45	1.85
RRHK8Q		56.80	-1.73	-0.29	55.70	-2.65	-0.47
RYHYUD	*	59.59	1.06	0.18	63.16	4.81	0.85
T8QVCN		61.78	3.25	0.55	59.76	1.40	0.25
XRCGWL		54.87	-3.66	-0.62	55.58	-2.77	-0.49
XT9W9H		55.80	-2.73	-0.46	54.97	-3.38	-0.60



Analysis 3113

Tearing Strength - Printing Papers

TAPPI Official Test Method T414

Summary Statistics	Sample RP53	Sample RP54
Grand Means	58.53 Grams	58.35 Grams
Stnd Dev Btwn Labs	5.91 Grams	5.63 Grams

Statistics based on 32 of 35 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Comments on Assigned Data Flags for Test #3113

66X2GG (X) - Data for sample RP54 are high. Inconsistent within the determinations of sample RP54.

9QQEHA (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample RP54.

EVYNCY (X) - Extreme Data.

Analysis Notes:

CJZTBZ - Data appear to be reported as gf, not mN as indicated on data entry form. CTS will not correct the Units going forward.

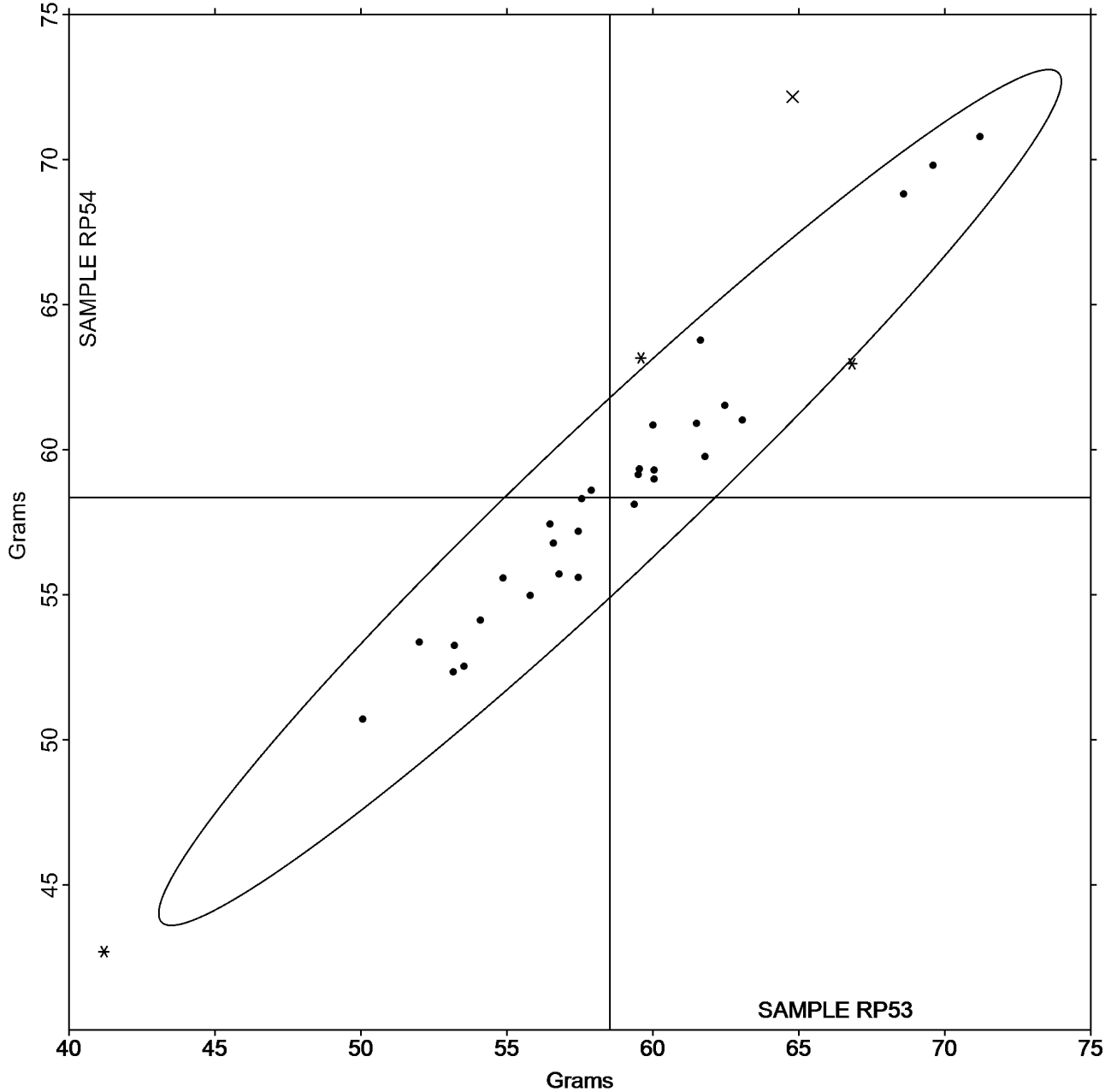


Analysis 3113
Tearing Strength - Printing Papers
TAPPI Official Test Method T414

Grand Mean Sample RP53 = 58.531
Grams

Grand Mean Sample RP54 = 58.353
Grams

ANALYSIS 3113





Report #4421, May 2026

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

WebCode	Data Flag	Sample NP53			Sample NP54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2FQBFZ		3.350	-0.202	-0.45	3.380	-0.260	-0.52
3WU8C4_AL	*	4.869	1.317	2.94	4.834	1.194	2.38
464WMH		3.454	-0.098	-0.22	3.459	-0.181	-0.36
4JZBMB		3.398	-0.154	-0.34	3.454	-0.186	-0.37
66X2GG	*	3.282	-0.270	-0.60	3.914	0.274	0.55
6UGEA2		4.040	0.488	1.09	4.403	0.763	1.52
7QXK79		3.650	0.098	0.22	3.759	0.119	0.24
7TZK87		3.956	0.404	0.90	4.126	0.486	0.97
8K4373		3.272	-0.280	-0.63	3.012	-0.628	-1.25
9QQEHA		4.187	0.635	1.42	4.274	0.634	1.26
AQ6ZRC		3.446	-0.106	-0.24	3.581	-0.059	-0.12
BL6CNA		3.436	-0.116	-0.26	3.436	-0.204	-0.41
DBXB32		3.558	0.006	0.01	3.428	-0.212	-0.42
FM38ZZ		3.708	0.157	0.35	3.732	0.093	0.18
GF4YFT		3.299	-0.253	-0.57	3.860	0.220	0.44
GFXQ6K		3.442	-0.110	-0.25	3.607	-0.032	-0.06
H9DV2V		3.622	0.070	0.16	3.525	-0.115	-0.23
JD7CQU		3.531	-0.021	-0.05	3.493	-0.147	-0.29
K4AX4Z		3.823	0.271	0.61	3.898	0.258	0.52
KYF2GU		3.505	-0.047	-0.11	3.557	-0.083	-0.17
N6Y4DP		3.700	0.148	0.33	3.852	0.212	0.42
P4YKQE		3.513	-0.039	-0.09	3.685	0.045	0.09
PG32KM		3.533	-0.019	-0.04	3.591	-0.049	-0.10
PYNFDT_AL	*	2.102	-1.450	-3.24	2.074	-1.566	-3.12
Q676CT		3.899	0.347	0.77	4.131	0.491	0.98
RYHYUD		3.017	-0.535	-1.19	2.884	-0.756	-1.51
WG3JED		3.540	-0.012	-0.03	3.851	0.211	0.42
XRCGWL		3.637	0.085	0.19	3.502	-0.138	-0.28
XT9W9H		3.239	-0.313	-0.70	3.255	-0.385	-0.77

Summary Statistics	Sample NP53	Sample NP54
Grand Means	3.55 kN/m	3.64 kN/m
Std Dev Btwn Labs	0.45 kN/m	0.50 kN/m
Statistics based on 29 of 29 reporting participants.		



Key to Instrument Codes Reported by Participants

IO	Instron 5900 Series	LA	L & W Tensile - Autoline 300
LB	L & W Tensile - Autoline 400	LE	L & W Tensile Tester 066
LI	L & W Tensile Tester SE 062	LJ	L & W Tensile Tester SE 063
LX	L & W (model not specified)	MA	MTS Criterion Model 43
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TJ	Thwing-Albert QC II-XS	TO	Thwing-Albert QC-1000
TQ	Thwing-Albert QC 3A	TR	Testometric 220D
TT	Tinius Olsen H10KT	TV	Thwing-Albert Vantage NX
VM	Valmet PaperLab (was Kajaani/Robotest)		

Analysis Notes:

DBXB32 - One determination removed from the Lab Mean of Sample NP54 per Grubb's Test at 1% risk (TAPPI 1205).

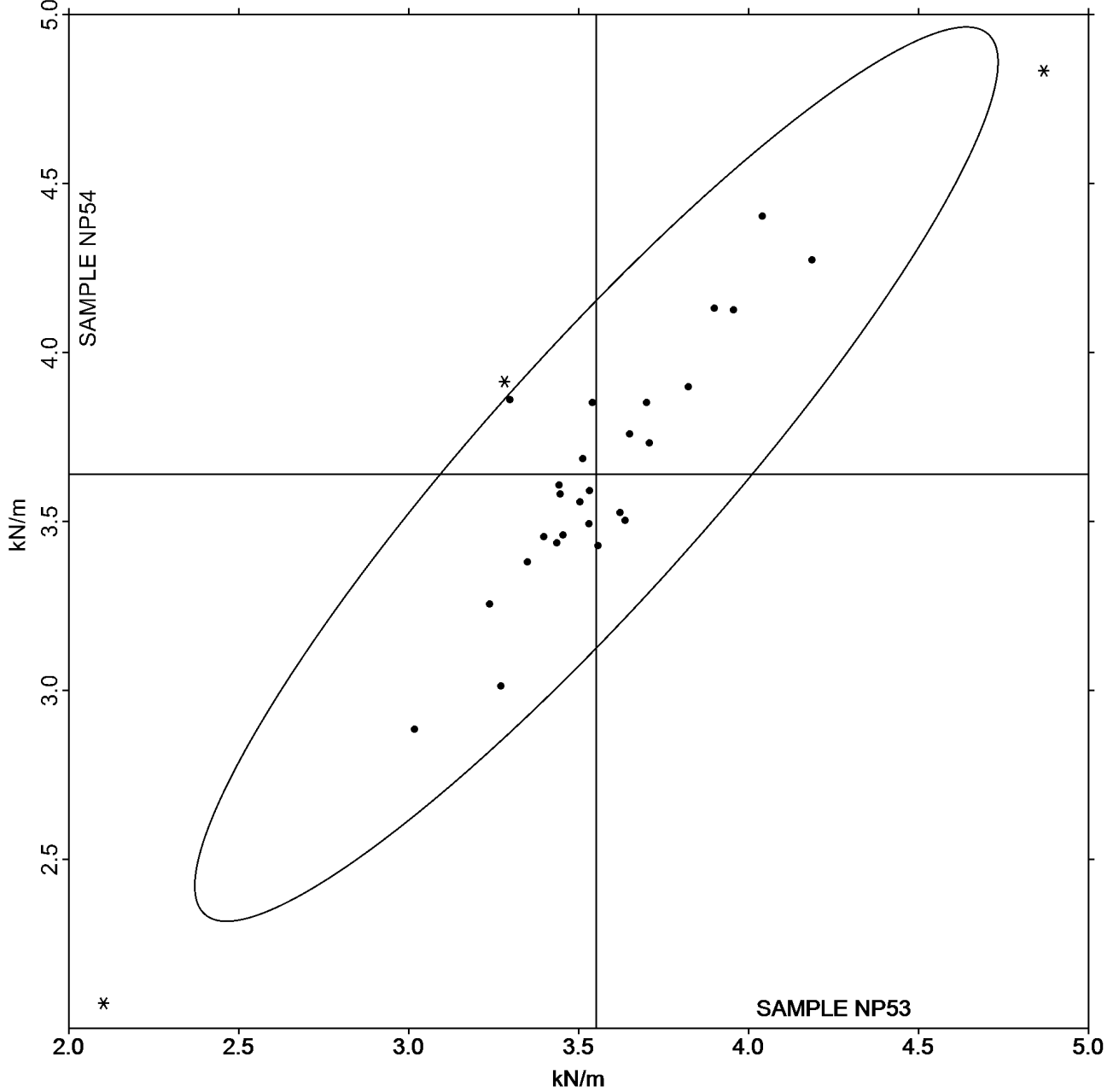


Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3115
Tensile Breaking Strength - Printing Papers
TAPPI Official Test Method T494

Grand Mean Sample NP53 = 3.5520
kN/m

Grand Mean Sample NP54 = 3.6399
kN/m

ANALYSIS 3115





Analysis 3116

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NP53			Sample NP54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2FQBFZ		40.39	0.28	0.04	40.76	-0.45	-0.07
3WU8C4_AL		31.67	-8.44	-1.28	30.21	-11.00	-1.63
7QXK79		43.20	3.09	0.47	42.47	1.26	0.19
7TZK87		42.64	2.53	0.39	44.74	3.54	0.53
8K4373		33.94	-6.17	-0.94	31.98	-9.23	-1.37
9QQEHA		34.69	-5.42	-0.82	40.10	-1.10	-0.16
AQ6ZRC		40.47	0.36	0.05	45.64	4.43	0.66
BL6CNA		37.24	-2.86	-0.44	38.88	-2.33	-0.35
DBXB32	X	34.37	-5.74	-0.87	3.52	-37.69	-5.60
FM38ZZ		42.82	2.71	0.41	43.48	2.27	0.34
GF4YFT	*	27.74	-12.37	-1.88	44.26	3.06	0.45
JD7CQU		40.29	0.18	0.03	35.75	-5.46	-0.81
KYF2GU		39.94	-0.17	-0.03	39.41	-1.80	-0.27
N6Y4DP		49.72	9.61	1.46	53.29	12.08	1.80
PG32KM		42.91	2.80	0.43	42.91	1.70	0.25
PYNFDT_AL	*	58.70	18.59	2.83	56.40	15.19	2.26
Q676CT		37.53	-2.58	-0.39	37.48	-3.73	-0.55
RYHYUD		35.46	-4.65	-0.71	32.84	-8.37	-1.24
WG3JED		44.74	4.64	0.71	48.83	7.62	1.13
XRCGWL		38.53	-1.58	-0.24	34.62	-6.59	-0.98
XT9W9H		39.55	-0.56	-0.09	40.11	-1.09	-0.16

Summary Statistics	Sample NP53	Sample NP54
Grand Means	40.11 Joules/sq m	41.21 Joules/sq m
Std Dev Btwn Labs	6.58 Joules/sq m	6.73 Joules/sq m
Statistics based on 20 of 21 reporting participants.		

Key to Instrument Codes Reported by Participants

IO	Instron 5900 Series	LA	L & W Tensile - Autoline 300
LB	L & W Tensile - Autoline 400	LE	L & W Tensile Tester 066
LI	L & W Tensile Tester SE 062	LJ	L & W Tensile Tester SE 063
LX	L & W (model not specified)	MA	MTS Criterion Model 43
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TO	Thwing-Albert QC-1000	TQ	Thwing-Albert QC 3A
TT	Tinius Olsen H10KT	TV	Thwing-Albert Vantage NX

Comments on Assigned Data Flags for Test #3116

DBXB32 (X) - Data for sample NP54 are low.



Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3116
Tensile Energy Absorption - Printing Papers
TAPPI Official Test Method T494

Analysis Notes:

- 3WU8C4_AL - Data appear to be reported as ft-lb/sq ft, not J/sq m as indicated on data entry form. CTS will not correct the Units going forward.
- 7TZK87 - Data appear to be reported as ft-lb/sq ft, not J/sq m as indicated on data entry form. CTS will not correct the Units going forward.

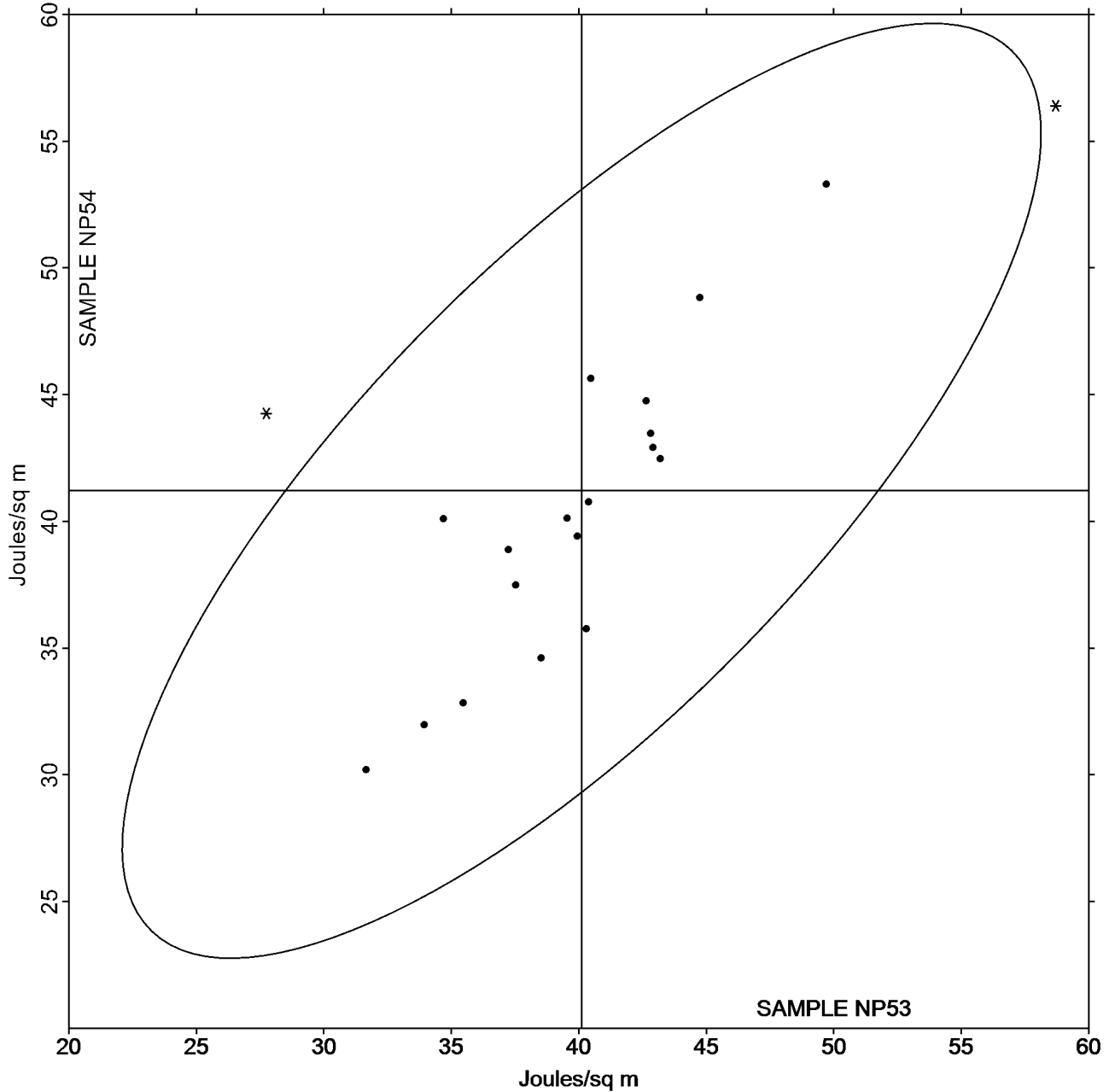


Analysis 3116
Tensile Energy Absorption - Printing Papers
TAPPI Official Test Method T494

Grand Mean Sample NP53 = 40.109
Joules/sq m

Grand Mean Sample NP54 = 41.207
Joules/sq m

ANALYSIS 3116





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

WebCode	Data Flag	Sample NP53			Sample NP54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2FQBFZ		1.799	0.125	0.61	1.813	0.125	0.55
3WU8C4_AL	X	4.450	2.776	13.49	4.330	2.642	11.55
4JZBMB		1.547	-0.127	-0.62	1.595	-0.093	-0.41
7QXK79		1.717	0.043	0.21	1.660	-0.028	-0.12
7TZK87		1.501	-0.173	-0.84	1.583	-0.105	-0.46
8K4373		1.667	-0.007	-0.04	1.659	-0.029	-0.13
9QQEHA		1.528	-0.146	-0.71	1.681	-0.007	-0.03
AQ6ZRC		1.727	0.053	0.26	1.859	0.171	0.75
BL6CNA		1.591	-0.083	-0.41	1.662	-0.026	-0.11
DBXB32		1.476	-0.198	-0.96	1.424	-0.264	-1.15
FM38ZZ		1.720	0.046	0.22	1.754	0.066	0.29
GF4YFT	*	1.470	-0.204	-0.99	1.837	0.149	0.65
H9DV2V		1.528	-0.146	-0.71	1.585	-0.103	-0.45
JD7CQU		1.671	-0.003	-0.02	1.541	-0.147	-0.64
K4AX4Z		1.280	-0.394	-1.92	1.120	-0.568	-2.48
KYF2GU		1.686	0.012	0.06	1.638	-0.051	-0.22
N6Y4DP		2.104	0.430	2.09	2.148	0.460	2.01
PG32KM		1.830	0.156	0.76	1.793	0.105	0.46
PYNFDT_AL	X	3.649	1.975	9.59	3.446	1.758	7.69
Q676CT		1.473	-0.201	-0.98	1.410	-0.278	-1.22
RYHYUD		1.986	0.312	1.51	1.968	0.280	1.22
WG3JED		2.076	0.402	1.95	2.085	0.397	1.73
XRCGWL		1.629	-0.045	-0.22	1.519	-0.169	-0.74
XT9W9H		1.830	0.156	0.76	1.806	0.118	0.52

Summary Statistics	Sample NP53	Sample NP54
Grand Means	1.67 Percent	1.69 Percent
Std Dev Btwn Labs	0.21 Percent	0.23 Percent
Statistics based on 22 of 24 reporting participants.		

Key to Instrument Codes Reported by Participants

IO	Instron 5900 Series	LA	L & W Tensile - Autoline 300
LB	L & W Tensile - Autoline 400	LE	L & W Tensile Tester 066
LI	L & W Tensile Tester SE 062	LJ	L & W Tensile Tester SE 063
LX	L & W (model not specified)	MA	MTS Criterion Model 43
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TO	Thwing-Albert QC-1000	TQ	Thwing-Albert QC 3A
TT	Tinius Olsen H10KT	TV	Thwing-Albert Vantage NX
VM	Valmet PaperLab (was Kajaani/Robotest)		



Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3117
Elongation to Break - Printing Papers
TAPPI Official Test Method T494

Comments on Assigned Data Flags for Test #3117

PYNFDT_AL (X) - Extreme Data.

3WU8C4_AL (X) - Extreme Data.

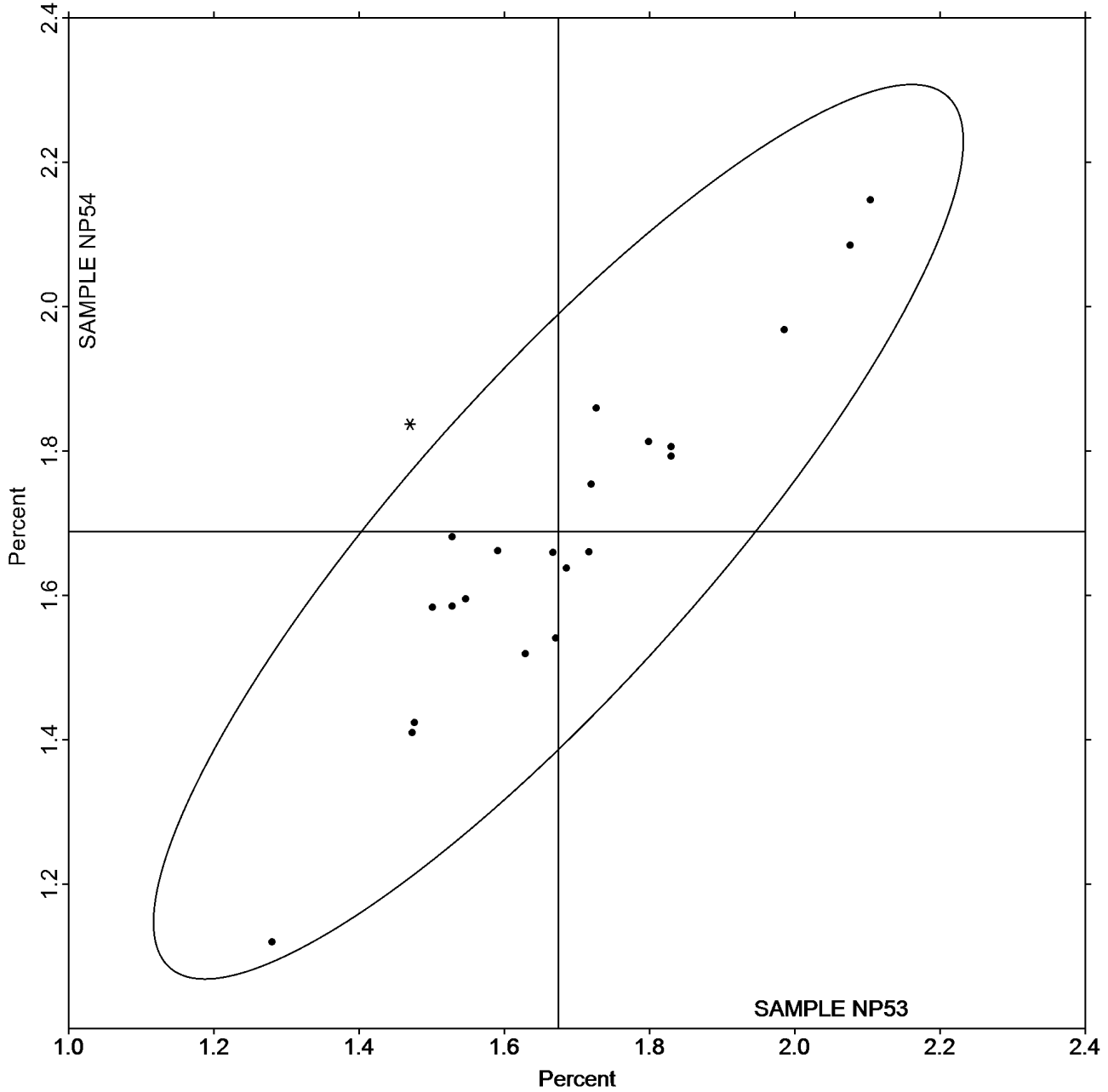


Analysis 3117
Elongation to Break - Printing Papers
TAPPI Official Test Method T494

Grand Mean Sample NP53 = 1.6744
Percent

Grand Mean Sample NP54 = 1.6881
Percent

ANALYSIS 3117





Analysis 3121

Air Resistance - Gurley Oil Type

TAPPI Official Test Method T460

WebCode	Data Flag	Sample PP53			Sample PP54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2362QA	*	11.950	2.337	2.92	11.570	1.694	2.03
3GF2Z6		10.530	0.917	1.15	9.530	-0.346	-0.42
3N4M77		8.953	-0.660	-0.82	9.256	-0.620	-0.74
3WU8C4_AL		9.400	-0.213	-0.27	8.740	-1.136	-1.36
4JZBMB		9.813	0.200	0.25	9.107	-0.769	-0.92
66X2GG		9.462	-0.151	-0.19	9.983	0.107	0.13
8R82P6		9.471	-0.142	-0.18	10.242	0.366	0.44
9RGDXU		9.480	-0.133	-0.17	9.674	-0.202	-0.24
AHBTBR		8.790	-0.823	-1.03	8.752	-1.124	-1.35
EVYNCY		9.427	-0.186	-0.23	9.234	-0.642	-0.77
FM38ZZ		9.074	-0.539	-0.67	10.239	0.363	0.44
GF4YFT	X	16.505	6.892	8.61	16.765	6.889	8.27
GT87BQ		9.529	-0.084	-0.10	10.744	0.868	1.04
H9DV2V		9.433	-0.180	-0.22	10.558	0.682	0.82
J4FTB2		8.970	-0.643	-0.80	9.000	-0.876	-1.05
JD7CQU		9.687	0.074	0.09	9.524	-0.352	-0.42
K3EF3Y		8.290	-1.323	-1.65	10.000	0.124	0.15
K4AX4Z		10.423	0.810	1.01	10.092	0.216	0.26
KYF2GU		10.190	0.577	0.72	9.220	-0.656	-0.79
N6Y4DP		10.053	0.440	0.55	9.690	-0.186	-0.22
PG32KM		9.521	-0.092	-0.11	10.016	0.140	0.17
PYNFDT_AL		10.505	0.892	1.11	10.371	0.495	0.59
Q676CT		9.370	-0.243	-0.30	10.200	0.324	0.39
RFLCNN		10.300	0.687	0.86	9.200	-0.676	-0.81
RRHK8Q		9.730	0.117	0.15	11.360	1.484	1.78
RYHYUD	*	10.921	1.308	1.63	12.063	2.187	2.63
TQG6AJ		8.770	-0.843	-1.05	9.610	-0.266	-0.32
WG3JED		8.474	-1.139	-1.42	9.629	-0.247	-0.30
X8TCCH		8.640	-0.973	-1.22	8.920	-0.956	-1.15

Summary Statistics	Sample PP53	Sample PP54
Grand Means	9.61 sec/100 cc	9.88 sec/100 cc
Std Dev Btwn Labs	0.80 sec/100 cc	0.83 sec/100 cc

Statistics based on 28 of 29 reporting participants.



Analysis 3121

Air Resistance - Gurley Oil Type

TAPPI Official Test Method T460

Key to Instrument Codes Reported by Participants

GA	Gurley Precision #4340 Automatic Densometer	GG	Gurley Precision Model #4320
GL	Gurley #4110	GS	Gurley-Hill S-P-S Tester #4190
HG	Technidyne - Hagerty Model #1	LA	L & W Autoline
LP	L & W Densometer, Air Permeance	LR	L & W Air Permeance
PP	Technidyne Profile/Plus	TL	Gurley Densometer #4110, Oil Flotation
WG	W & LE Gurley Tester	XX	Instrument make/model not specified by lab

Comments on Assigned Data Flags for Test #3121

GF4YFT (X) - Extreme Data.



Report #4421, May 2026

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 PH53			Sample PH54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4YZ3E8		3.410	-0.492	-1.71	4.109	-0.788	-2.26
8R82P6		3.807	-0.095	-0.33	4.908	0.011	0.03
BL6CNA		4.382	0.480	1.67	5.300	0.403	1.16
DFEF2W		3.467	-0.435	-1.51	4.421	-0.476	-1.37
EVYNCY		4.233	0.331	1.15	5.203	0.306	0.88
JCBVEX		3.893	-0.009	-0.03	5.072	0.175	0.50
K4BVEV		4.064	0.162	0.56	5.071	0.174	0.50
KYF2GU		3.945	0.043	0.15	4.885	-0.012	-0.03
PG32KM		3.968	0.066	0.23	5.043	0.146	0.42
PK8G8T		3.801	-0.101	-0.35	4.809	-0.088	-0.25
RBV64U		3.956	0.054	0.19	5.046	0.149	0.43

Summary Statistics	Sample PH53	Sample PH54
Grand Means	3.90 Microns	4.90 Microns
Std Dev Btwn Labs	0.29 Microns	0.35 Microns
Statistics based on 11 of 11 reporting participants.		

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



Analysis 3131

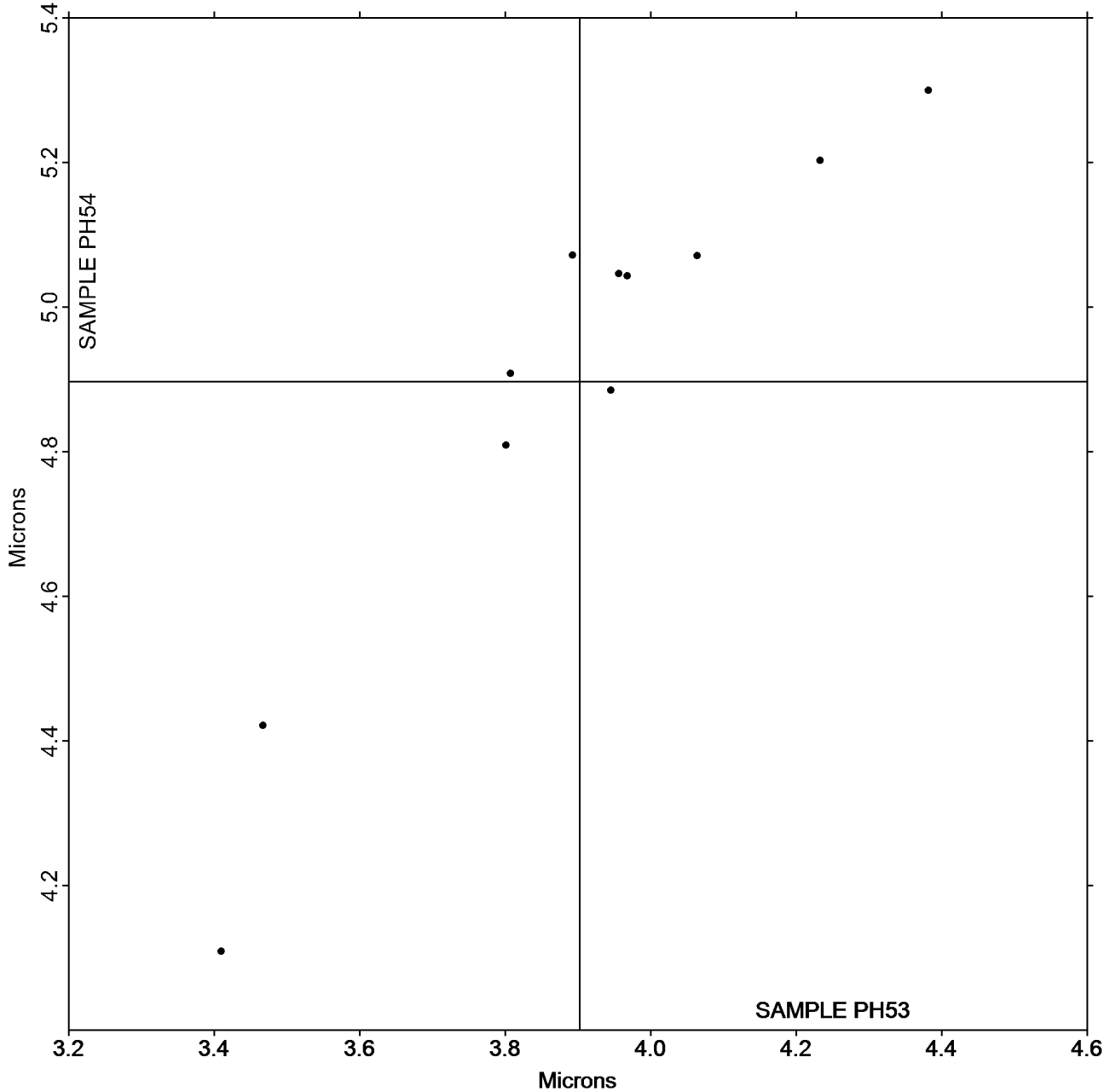
Roughness - Print Surf Method - 2.5 to 6.0 Microns

TAPPI Official Test Method T555

Grand Mean Sample PH53 = 3.9024
Microns

Grand Mean Sample PH54 = 4.8970
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.



Analysis 3133
 Roughness - Sheffield Type
 TAPPI Official Test Method T538

WebCode	Data Flag	Sample SR53			Sample SR54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3GF2Z6		179.8	-15.3	-1.03	185.6	-11.5	-0.87
3N4M77		194.7	-0.4	-0.03	202.9	5.8	0.44
3WU8C4_AL		190.1	-5.0	-0.34	194.0	-3.1	-0.24
4AE8FC	*	242.7	47.6	3.20	231.1	33.9	2.56
4JZBMB		199.6	4.5	0.30	190.0	-7.1	-0.54
4YZ3E8		200.2	5.1	0.34	218.5	21.4	1.62
66X2GG		197.7	2.6	0.17	184.7	-12.5	-0.94
6FKZA8		215.4	20.3	1.36	218.8	21.7	1.64
6UGEA2		174.8	-20.3	-1.36	178.6	-18.5	-1.40
8R82P6		213.0	17.9	1.20	210.6	13.5	1.02
9QQEHA		176.3	-18.8	-1.26	174.6	-22.5	-1.70
9RGDXU		209.0	13.9	0.93	214.6	17.5	1.32
AHBTBR		159.9	-35.2	-2.36	176.1	-21.1	-1.59
BL6CNA		194.7	-0.4	-0.03	206.8	9.6	0.73
CJZTBZ		204.0	8.9	0.60	201.2	4.1	0.31
DFEF2W		200.0	4.9	0.33	193.5	-3.6	-0.27
ELDMU4		185.1	-10.0	-0.67	186.4	-10.7	-0.81
EVYNCY		200.2	5.1	0.34	193.3	-3.8	-0.29
FM38ZZ		184.0	-11.1	-0.75	197.7	0.6	0.04
H9DV2V		188.0	-7.1	-0.48	184.7	-12.4	-0.94
JCBVEX		204.2	9.1	0.61	196.0	-1.1	-0.09
K4AX4Z		202.7	7.6	0.51	207.5	10.3	0.78
KYF2GU		164.0	-31.1	-2.09	174.5	-22.6	-1.71
N6Y4DP		186.7	-8.4	-0.56	188.4	-8.7	-0.66
PG32KM		185.8	-9.3	-0.62	200.0	2.9	0.22
PK8G8T		199.2	4.1	0.28	196.4	-0.7	-0.06
PYNFDT_AL		195.6	0.5	0.03	193.6	-3.5	-0.27
RFLCNN		196.1	1.0	0.07	197.4	0.3	0.02
RRHK8Q		199.1	4.1	0.27	190.9	-6.3	-0.48
RYHYUD		178.3	-16.8	-1.13	181.6	-15.5	-1.17
UH3HZF		194.1	-1.0	-0.07	205.0	7.9	0.59
UVPRML	*	213.9	18.9	1.27	191.7	-5.4	-0.41
WEU8WB		202.2	7.1	0.48	215.2	18.1	1.37
WG3JED		190.8	-4.3	-0.29	198.3	1.1	0.09
WLCFJM		201.9	6.8	0.46	211.3	14.1	1.07
X8TCCH		196.1	1.0	0.07	201.9	4.8	0.36
XHBWWE		198.3	3.2	0.22	200.7	3.6	0.27



Report #4421, May 2026

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

Summary Statistics	Sample SR53	Sample SR54
Grand Means	195.09 Sheffield	197.13 Sheffield
Stnd Dev Btwn Labs	14.88 Sheffield	13.23 Sheffield
Statistics based on 37 of 37 reporting participants.		

Key to Instrument Codes Reported by Participants

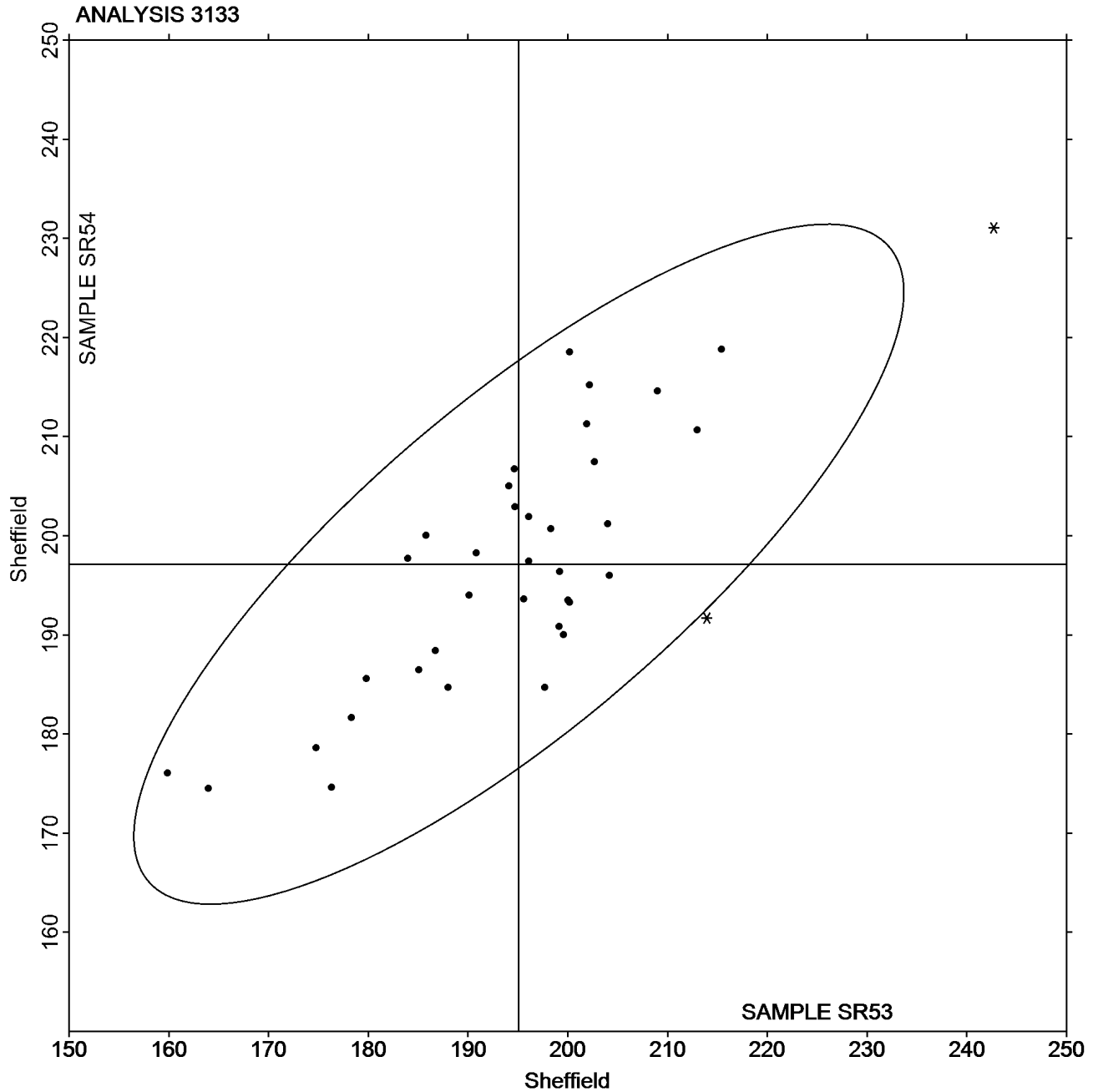
HM	Technidyne - Hagerty Model #538	LA	L & W Roughness Sheffield - Autoline
LB	L & W - Autoline 600	LC	L & W Autoline 400
LW	L & W Roughness Tester	PG	Precision Gage Smoothcheck
PP	Technidyne Profile/Plus	SH	Sheffield (Bendix Precisionaire)
ST	Sheffield Smoothness Tester	VM	Valmet PaperLab (was Kajaani\Robotest)
XX	Instrument make/model not specified by lab		



Analysis 3133
Roughness - Sheffield Type
TAPPI Official Test Method T538

Grand Mean Sample SR53 = 195.09
Sheffield

Grand Mean Sample SR54 = 197.13
Sheffield





Report #4421, May 2026

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

WebCode	Data Flag	Sample GM53			Sample GM54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2FQBFZ		87.29	0.40	0.62	87.33	0.55	1.01
4JZBMB		88.10	1.21	1.88	87.04	0.26	0.48
8K4373		87.60	0.72	1.11	87.80	1.02	1.86
AHBTBR		87.08	0.19	0.30	86.94	0.16	0.30
EAK2QU		86.87	-0.02	-0.02	86.85	0.07	0.13
FGXCGZ		86.68	-0.20	-0.32	86.67	-0.11	-0.20
GFXQ6K		86.31	-0.58	-0.90	86.25	-0.53	-0.97
GL8PXY		87.15	0.26	0.41	86.86	0.08	0.15
H9DV2V		86.60	-0.29	-0.45	85.86	-0.92	-1.68
HFF3HJ		86.16	-0.73	-1.14	85.85	-0.93	-1.70
K4BVEV		86.50	-0.39	-0.60	86.62	-0.16	-0.29
K4YWKM		86.43	-0.46	-0.71	86.51	-0.27	-0.49
PYNFDT		86.43	-0.46	-0.71	86.24	-0.54	-0.98
QBB2VT		88.18	1.29	2.00	87.54	0.77	1.40
RRHK8Q	X	23.04	-63.85	-99.12	23.01	-63.77	-116.65
XM34EM		87.14	0.25	0.39	87.43	0.65	1.19
XT9W9H		86.76	-0.13	-0.20	86.69	-0.09	-0.16
YL9MNC		85.67	-1.22	-1.89	86.42	-0.36	-0.66
ZMVTBF		87.03	0.15	0.23	87.11	0.33	0.60

Summary Statistics	Sample GM53	Sample GM54
Grand Means	86.89 g/sq m	86.78 g/sq m
Std Dev Btwn Labs	0.64 g/sq m	0.55 g/sq m
Statistics based on 18 of 19 reporting participants.		

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Comments on Assigned Data Flags for Test #3135

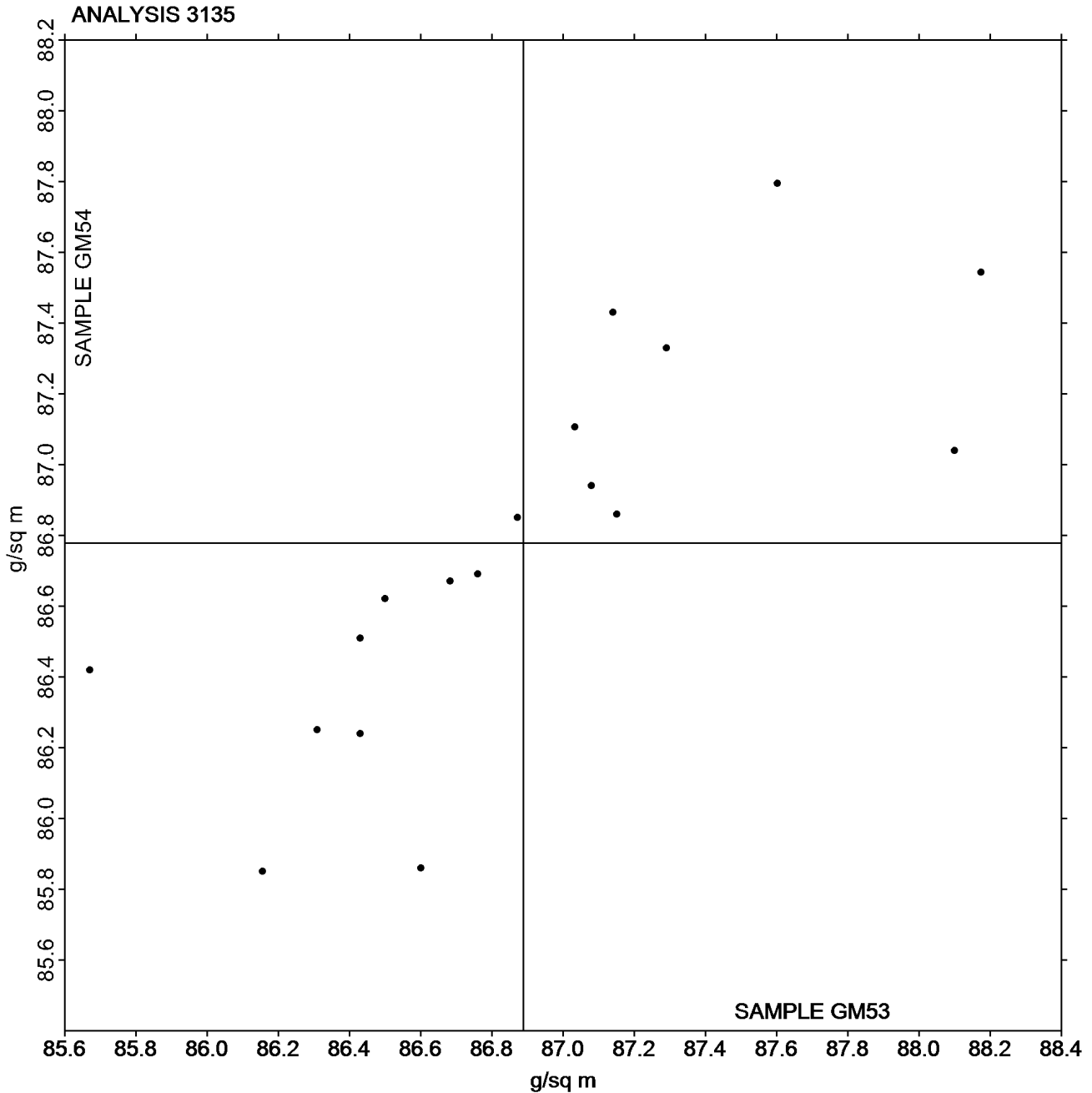
RRHK8Q (X) - Extreme Data.



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

Grand Mean Sample GM53 = 86.888
g/sq m

Grand Mean Sample GM54 = 86.778
g/sq m



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



Report #4421, May 2026

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

WebCode	Data Flag	<u>Sample VR53</u>			<u>Sample VR54</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3WU8C4		92.66	-0.54	-1.38	93.06	-0.12	-0.30
4JZBMB		92.34	-0.86	-2.20	92.17	-1.01	-2.62
66X2GG		93.35	0.15	0.38	93.25	0.07	0.18
6UGEA2		94.07	0.87	2.23	93.82	0.64	1.68
78MPE3		93.23	0.03	0.08	93.12	-0.06	-0.15
7TZK87		93.36	0.16	0.41	93.46	0.28	0.73
9RGDXU		92.95	-0.25	-0.64	93.21	0.03	0.09
AHBTBR		93.23	0.03	0.07	93.17	-0.01	-0.02
BL6CNA		93.27	0.07	0.18	93.22	0.05	0.12
CJZTBZ		93.72	0.52	1.33	93.79	0.61	1.60
GL8PXY		93.41	0.21	0.54	93.49	0.31	0.82
H9DV2V		93.01	-0.19	-0.49	92.81	-0.37	-0.95
N6Y4DP		93.15	-0.05	-0.13	92.98	-0.20	-0.52
PG32KM		93.35	0.15	0.39	93.16	-0.01	-0.04
PYNFDT		93.18	-0.02	-0.05	93.04	-0.14	-0.35
RFLCNN		92.64	-0.56	-1.44	92.60	-0.58	-1.51
RRHK8Q		93.01	-0.19	-0.49	93.16	-0.02	-0.04
RYHYUD		93.39	0.19	0.50	93.45	0.28	0.72
XRCGWL		93.47	0.27	0.70	93.39	0.21	0.55

Summary Statistics	<u>Sample VR53</u>	<u>Sample VR54</u>
Grand Means	93.20 Percent	93.18 Percent
Std Dev Btwn Labs	0.39 Percent	0.38 Percent
Statistics based on 19 of 19 reporting participants.		

Key to Instrument Codes Reported by Participants

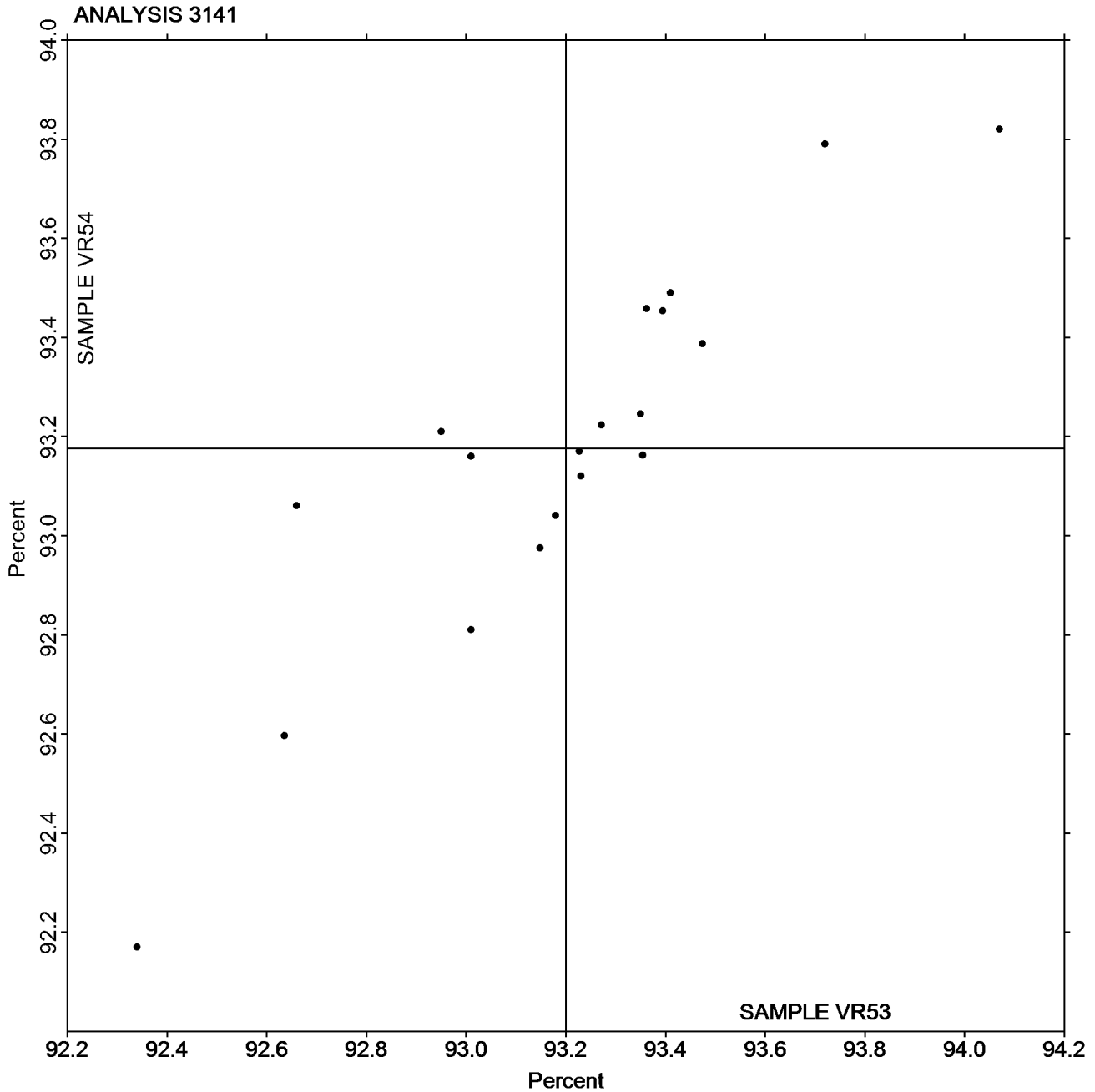
ZZ Instruments No Longer Tracked



Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3141
Opacity (89% Reflectance Backing) - Fine Papers
TAPPI Official Test Method T425

Grand Mean Sample VR53 = 93.200
Percent

Grand Mean Sample VR54 = 93.176
Percent



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



Report #4421, May 2026

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

WebCode	Data Flag	<u>Sample BF53</u>			<u>Sample BF54</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
66X2GG		88.70	1.87	1.26	86.72	-0.19	-0.13
7TZK87		86.95	0.12	0.08	86.93	0.02	0.01
9QQEHA		86.45	-0.37	-0.25	87.45	0.54	0.39
AHBTBR		87.20	0.38	0.25	87.57	0.66	0.47
GF4YFT		86.28	-0.54	-0.36	87.29	0.38	0.27
GL8PXY		87.76	0.93	0.63	87.80	0.89	0.64
PG32KM		86.95	0.13	0.08	86.96	0.05	0.04
RYHYUD		87.43	0.60	0.40	87.72	0.81	0.58
UG8WAA		82.78	-4.04	-2.72	82.83	-4.08	-2.92
UH3HZF		87.38	0.56	0.37	87.50	0.59	0.42
XRCGWL		87.18	0.36	0.24	87.24	0.32	0.23

Summary Statistics	<u>Sample BF53</u>	<u>Sample BF54</u>
Grand Means	86.82 Percent	86.91 Percent
Std Dev Btwn Labs	1.49 Percent	1.40 Percent
Statistics based on 11 of 11 reporting participants.		

Key to Instrument Codes Reported by Participants

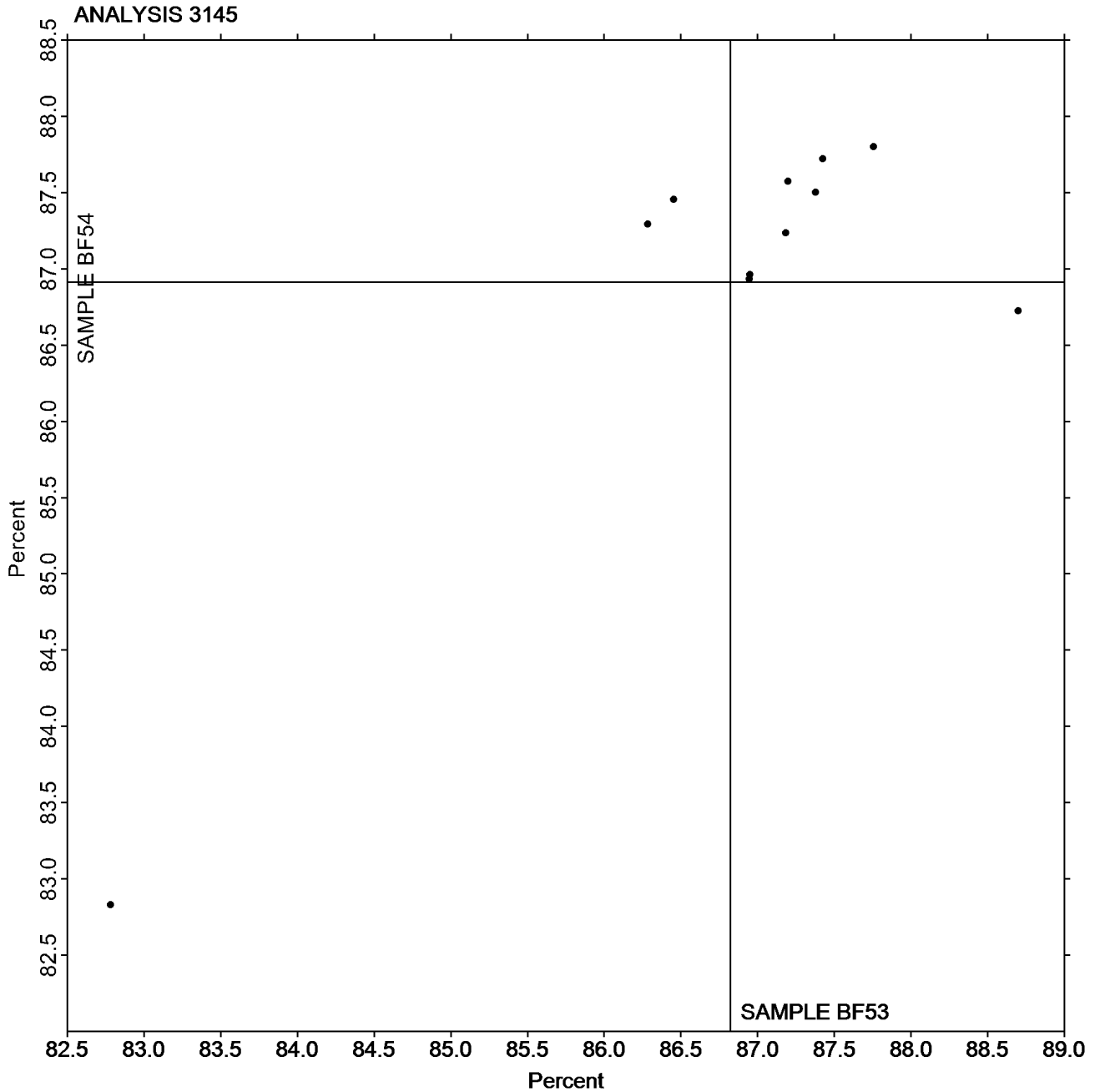
LE	L & W Elrepho	PP	Technidyne Profile/Plus
TC	Technidyne Color Touch Series	TD	Technidyne Color Touch X-45
TE	Technidyne TEST/Plus TAPPI Brightness	TS	Technidyne Brightimeter Micro S-5
TT	Technidyne Brightimeter Micro S4-M	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3145
Directional Brightness of Fluorescent Samples
TAPPI Official Test Method T452

Grand Mean Sample BF53 = 86.824
Percent

Grand Mean Sample BF54 = 86.911
Percent



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



Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3146
Fluorescent Component of Directional Brightness
TAPPI Official Test Method T452

WebCode	Data Flag	Sample BF53			Sample BF54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
7TZK87		4.232	-0.258	-0.80	4.184	-0.421	-1.27
9QQEHA		4.210	-0.280	-0.87	4.194	-0.411	-1.24
AHBTBR		4.586	0.096	0.30	4.926	0.321	0.97
GF4YFT		4.034	-0.456	-1.42	4.392	-0.213	-0.64
PG32KM		4.960	0.470	1.46	4.964	0.359	1.08
RYHYUD		4.822	0.332	1.03	4.964	0.359	1.08
UG8WAA	X	8.280	3.790	11.77	8.286	3.681	11.12
UH3HZF		4.420	-0.070	-0.22	4.520	-0.085	-0.26
XRCGWL		4.656	0.166	0.52	4.694	0.089	0.27

Summary Statistics	Sample BF53	Sample BF54
Grand Means	4.49 Percent	4.60 Percent
Stnd Dev Btwn Labs	0.32 Percent	0.33 Percent
Statistics based on 8 of 9 reporting participants.		

Key to Instrument Codes Reported by Participants

LE	L & W Elrepho	PP	Technidyne Profile/Plus
TD	Technidyne Color Touch X-45	TE	Technidyne TEST/Plus TAPPI Brightness
TS	Technidyne Brightimeter Micro S-5	XX	Instrument make/model not specified by lab

Comments on Assigned Data Flags for Test #3146

UG8WAA (X) - Extreme Data.

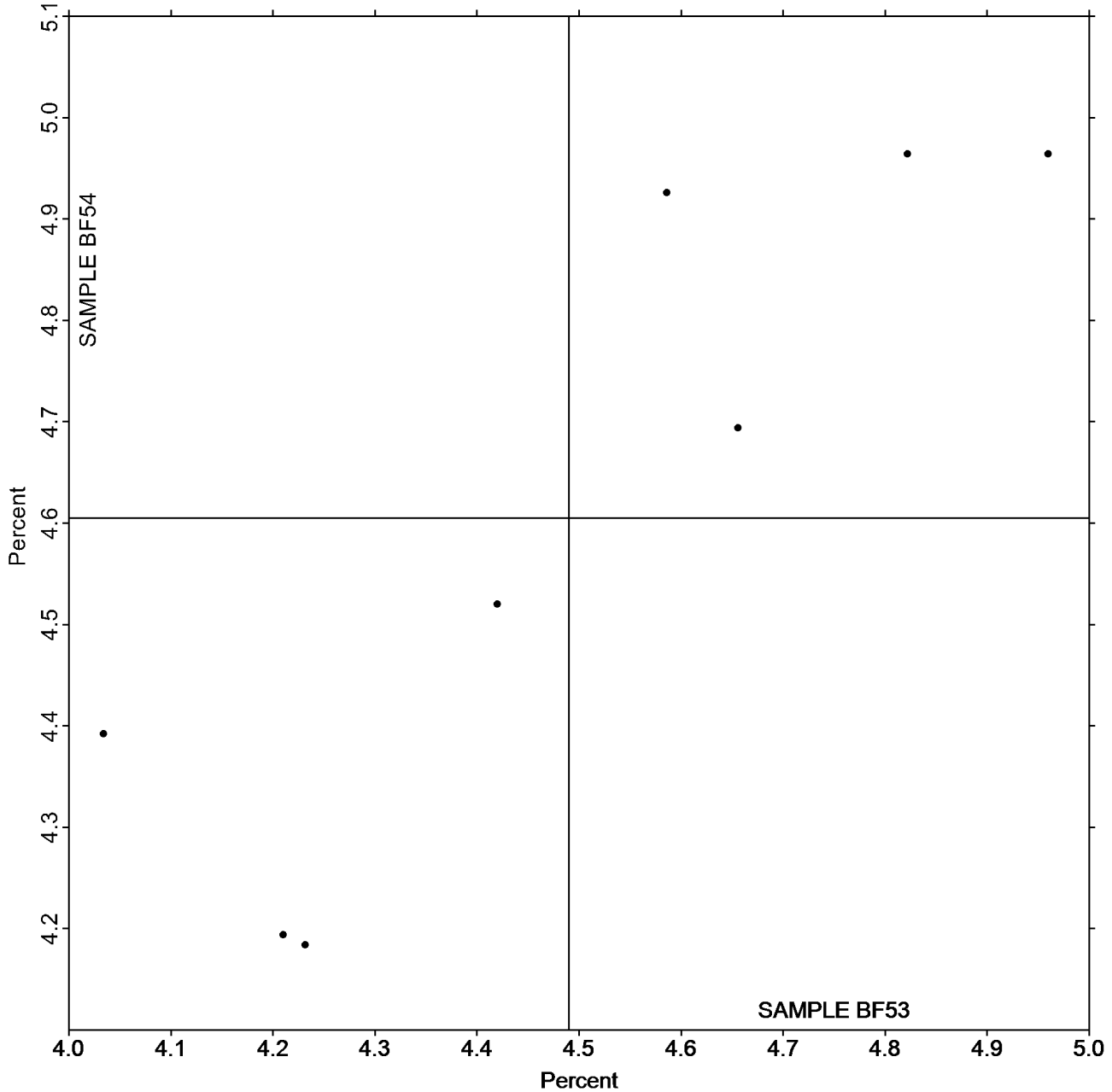


Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3146
Fluorescent Component of Directional Brightness
TAPPI Official Test Method T452

Grand Mean Sample BF53 = 4.4900
Percent

Grand Mean Sample BF54 = 4.6048
Percent

ANALYSIS 3146



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



Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3201
Bending Resistance, Taber Type - 0 to 10 Units
TAPPI Official Test Method T566

WebCode	Data Flag	<u>Sample TP53</u>			<u>Sample TP54</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
66X2GG		1.755	-0.167	-0.47	1.928	-0.045	-0.15
6UGEA2		2.571	0.649	1.84	2.490	0.517	1.75
AQ6ZRC		2.083	0.161	0.46	2.128	0.155	0.52
PG32KM		1.777	-0.145	-0.41	1.817	-0.157	-0.53
RFLCNN		1.630	-0.292	-0.83	1.680	-0.293	-1.00
RYHYUD		1.714	-0.208	-0.59	1.798	-0.175	-0.60

Summary Statistics	<u>Sample TP53</u>	<u>Sample TP54</u>
Grand Means	1.92 Taber Units	1.97 Taber Units
Std Dev Btwn Labs	0.35 Taber Units	0.29 Taber Units
<small>Statistics based on 6 of 6 reporting participants.</small>		

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



Analysis 3201

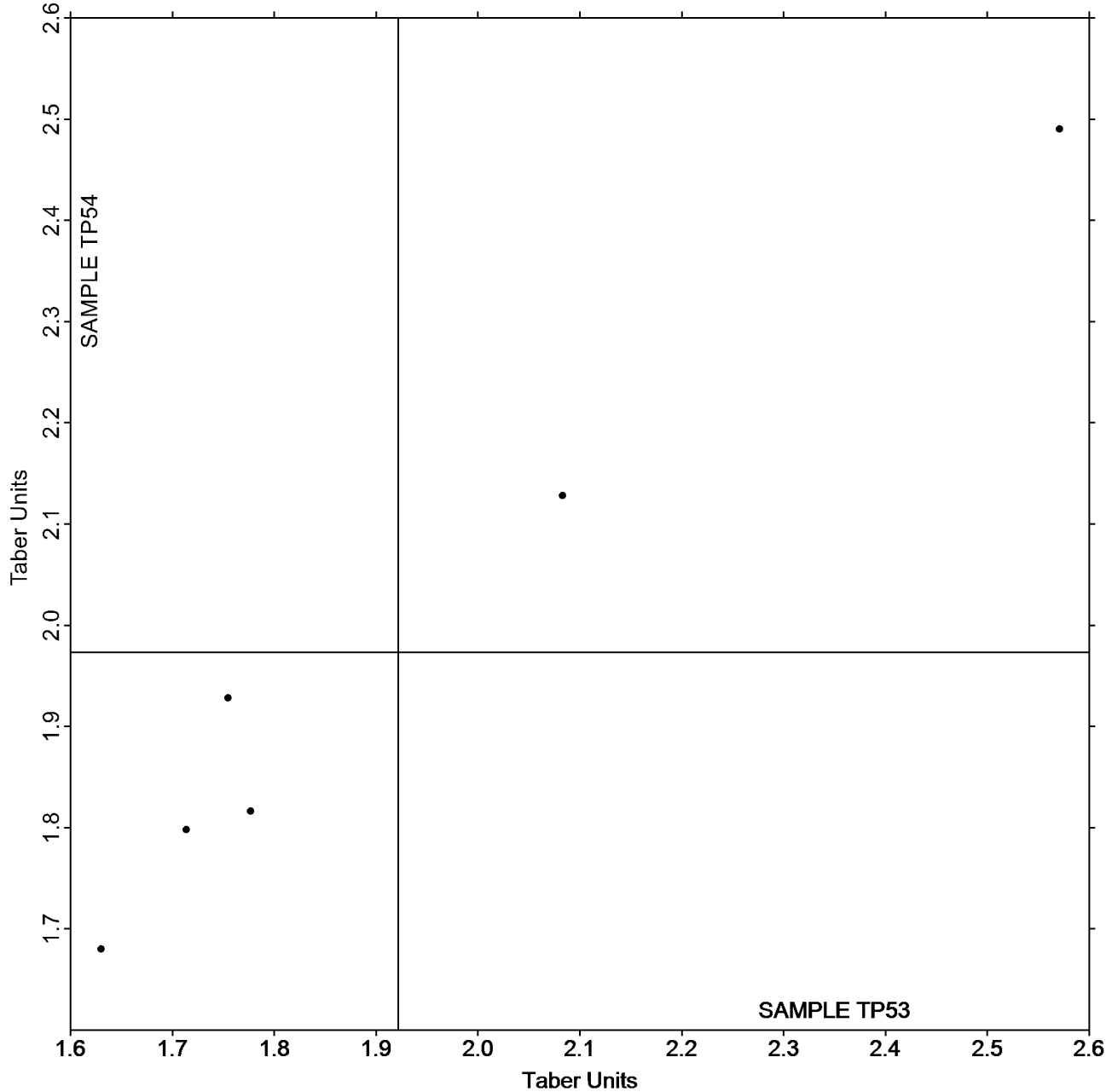
Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

Grand Mean Sample TP53 = 1.9217
Taber Units

Grand Mean Sample TP54 = 1.9734
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.



Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3203
Bending Resistance, Taber Type - 10 to 100 Taber Units
TAPPI Official Test Method T489

WebCode	Data Flag	Sample TC53			Sample TC54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
7TZK87		28.91	-2.43	-1.47	28.89	-2.77	-1.77
8R82P6		30.70	-0.64	-0.39	31.10	-0.56	-0.36
BB6GRZ		29.60	-1.74	-1.05	30.10	-1.56	-1.00
JCBVEX		32.50	1.16	0.70	32.97	1.31	0.84
KYF2GU		30.72	-0.62	-0.38	31.51	-0.15	-0.10
PK8G8T		31.66	0.32	0.19	32.19	0.53	0.34
RBV64U		30.79	-0.55	-0.33	31.26	-0.40	-0.26
UVPRML		33.21	1.87	1.13	32.99	1.33	0.85
WLCFJM		33.99	2.65	1.60	33.92	2.26	1.45

Summary Statistics	Sample TC53	Sample TC54
Grand Means	31.34 Taber Units	31.66 Taber Units
Std Dev Btwn Labs	1.66 Taber Units	1.56 Taber Units
Statistics based on 9 of 9 reporting participants.		

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Analysis Notes:

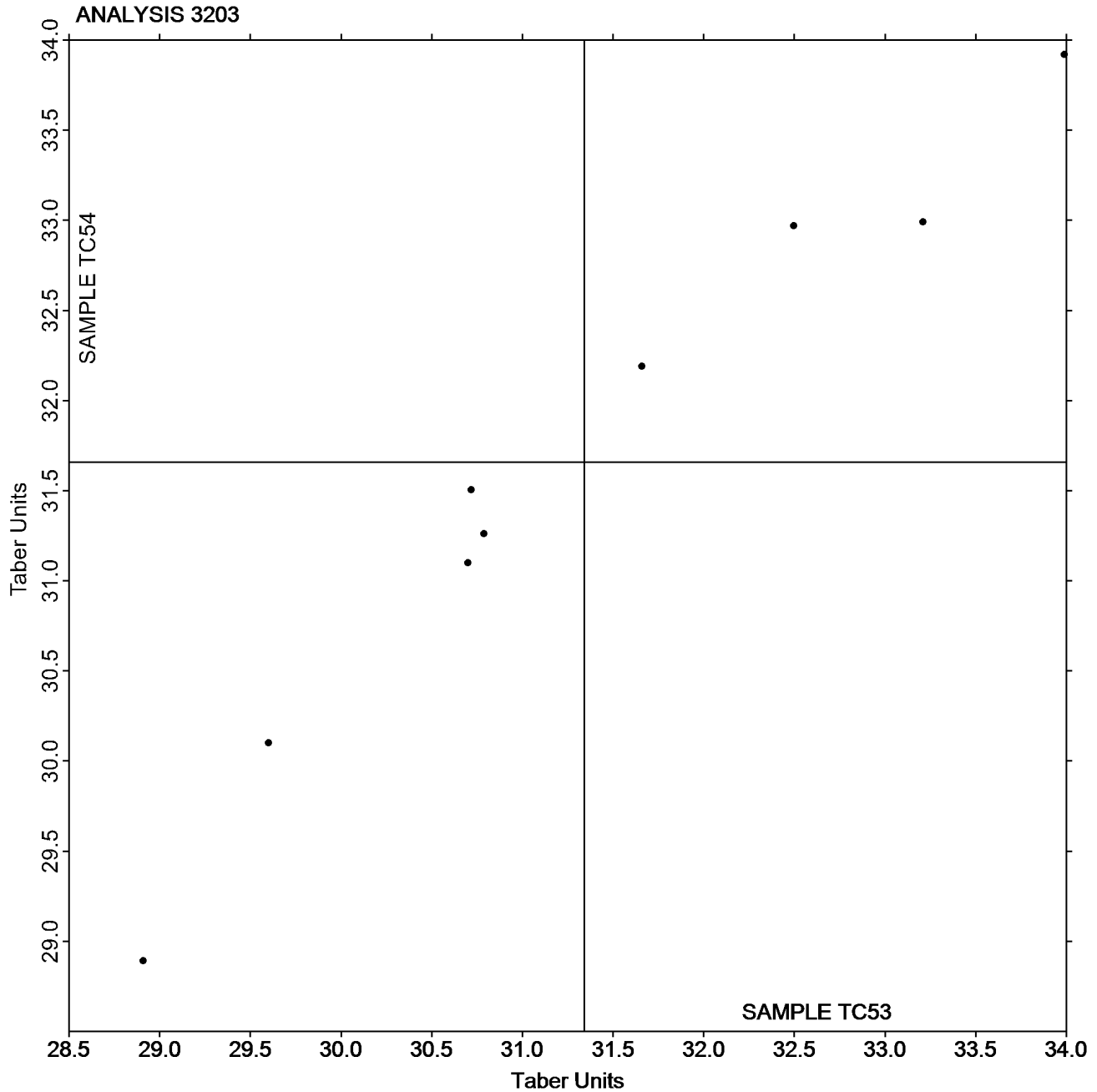
PK8G8T - Data appear to be reported as g-cm, not mN-m as indicated on data entry form. CTS will not correct the Units going forward.



Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3203
Bending Resistance, Taber Type - 10 to 100 Taber Units
TAPPI Official Test Method T489

Grand Mean Sample TC53 = 31.342
Taber Units

Grand Mean Sample TC54 = 31.658
Taber Units



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 TR53</u>			<u>Sample TR54</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4YZ3E8		250.5	62.9	2.69	250.3	63.0	2.74
6FKZA8		191.5	3.9	0.16	187.2	-0.1	0.00
BBQ6X2		176.2	-11.4	-0.49	182.4	-4.9	-0.21
CJZTBZ		175.1	-12.6	-0.54	172.4	-14.9	-0.65
ELDMU4		170.4	-17.3	-0.74	175.1	-12.2	-0.53
EVYNCY		194.5	6.9	0.29	190.0	2.7	0.12
JCBVEX		182.9	-4.8	-0.20	186.9	-0.4	-0.02
KYF2GU		181.9	-5.8	-0.25	177.4	-9.9	-0.43
NWLCPD	X	360.6	173.0	7.40	166.3	-21.0	-0.91
PK8G8T		180.5	-7.1	-0.31	179.0	-8.3	-0.36
WEU8WB		173.0	-14.6	-0.63	172.1	-15.2	-0.66

Summary Statistics	<u>Sample TR53</u>	<u>Sample TR54</u>
Grand Means	187.64 Taber Units	187.27 Taber Units
Std Dev Btwn Labs	23.38 Taber Units	23.02 Taber Units
Statistics based on 10 of 11 reporting participants.		

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Comments on Assigned Data Flags for Test #3205

NWLCPD (X) - Extreme Data for sample TR53. Inconsistent within the determinations of both samples.

Analysis Notes:

PK8G8T - 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.



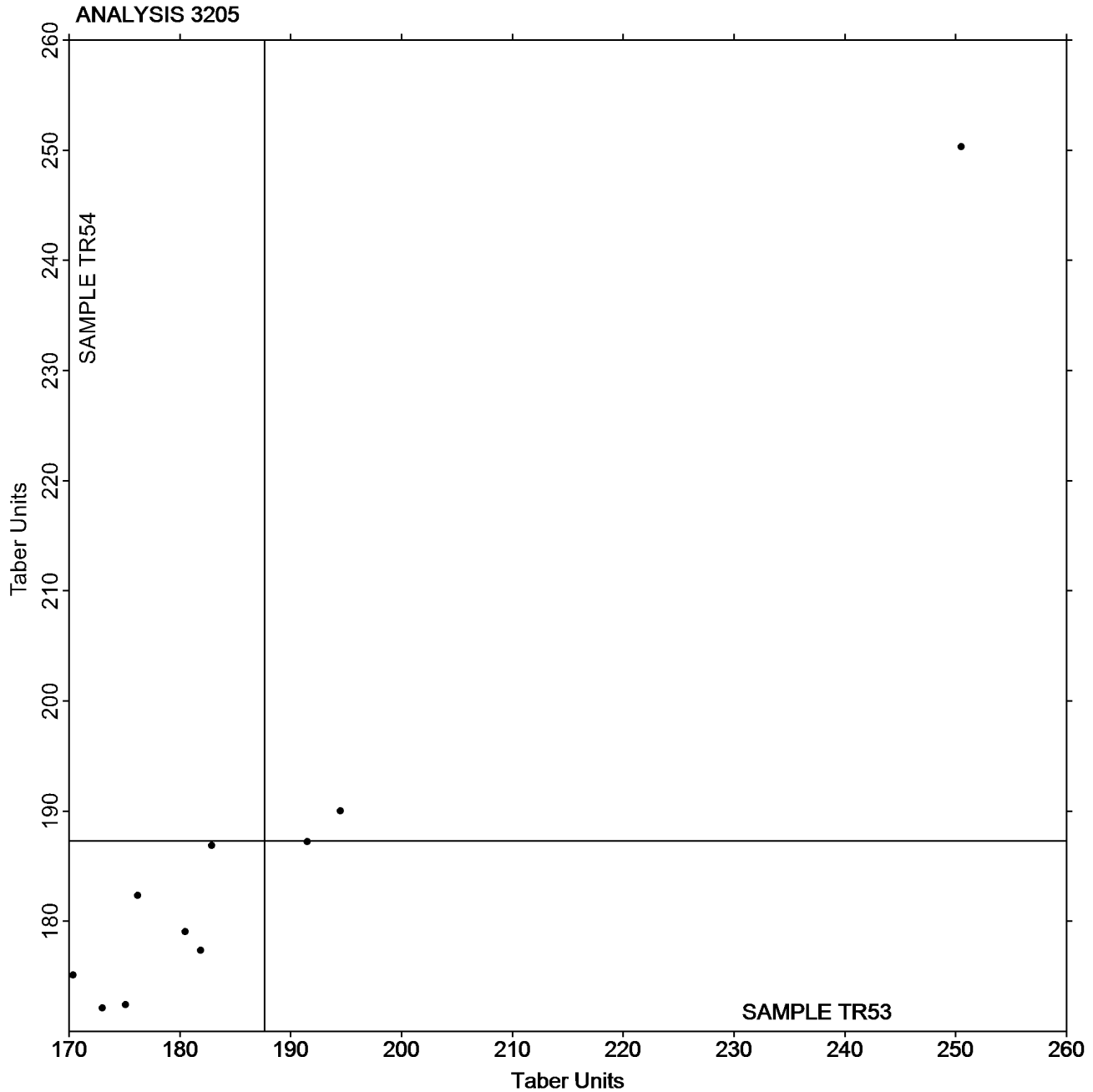
Analysis 3205

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

TAPPI Official Test Method T489

Grand Mean Sample TR53 = 187.64
Taber Units

Grand Mean Sample TR54 = 187.27
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 #4421, May 2026

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

WebCode	Data Flag	<u>Sample ZR53</u>			<u>Sample ZR54</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4YZ3E8		50.80	-1.68	-0.37	52.20	-0.49	-0.11
CJZTBZ		47.24	-5.24	-1.16	50.40	-2.29	-0.52
DFEF2W		54.24	1.76	0.39	54.44	1.75	0.40
EVYNCY		52.24	-0.24	-0.05	52.44	-0.25	-0.06
KYF2GU		52.24	-0.24	-0.05	52.12	-0.57	-0.13
NAAGVN	*	63.96	11.48	2.53	65.04	12.35	2.80
PK4XKP		51.48	-1.00	-0.22	51.18	-1.51	-0.34
PK8G8T		54.42	1.94	0.43	54.30	1.61	0.36
PU96YP		51.40	-1.08	-0.24	50.20	-2.49	-0.56
QQR2U		48.64	-3.84	-0.85	49.70	-2.99	-0.68
TQG6AJ		46.30	-6.19	-1.36	46.76	-5.93	-1.34
WEU8WB		50.64	-1.84	-0.41	50.76	-1.93	-0.44
WKNWNG		60.06	7.58	1.67	59.34	6.65	1.51
X7XTAG		50.74	-1.74	-0.38	50.14	-2.55	-0.58
YZNVG3		52.84	0.36	0.08	51.38	-1.31	-0.30

Summary Statistics	<u>Sample ZR53</u>	<u>Sample ZR54</u>
Grand Means	52.48 psi	52.69 psi
Std Dev Btwn Labs	4.54 psi	4.41 psi
Statistics based on 15 of 15 reporting participants.		

Key to Instrument Codes Reported by Participants

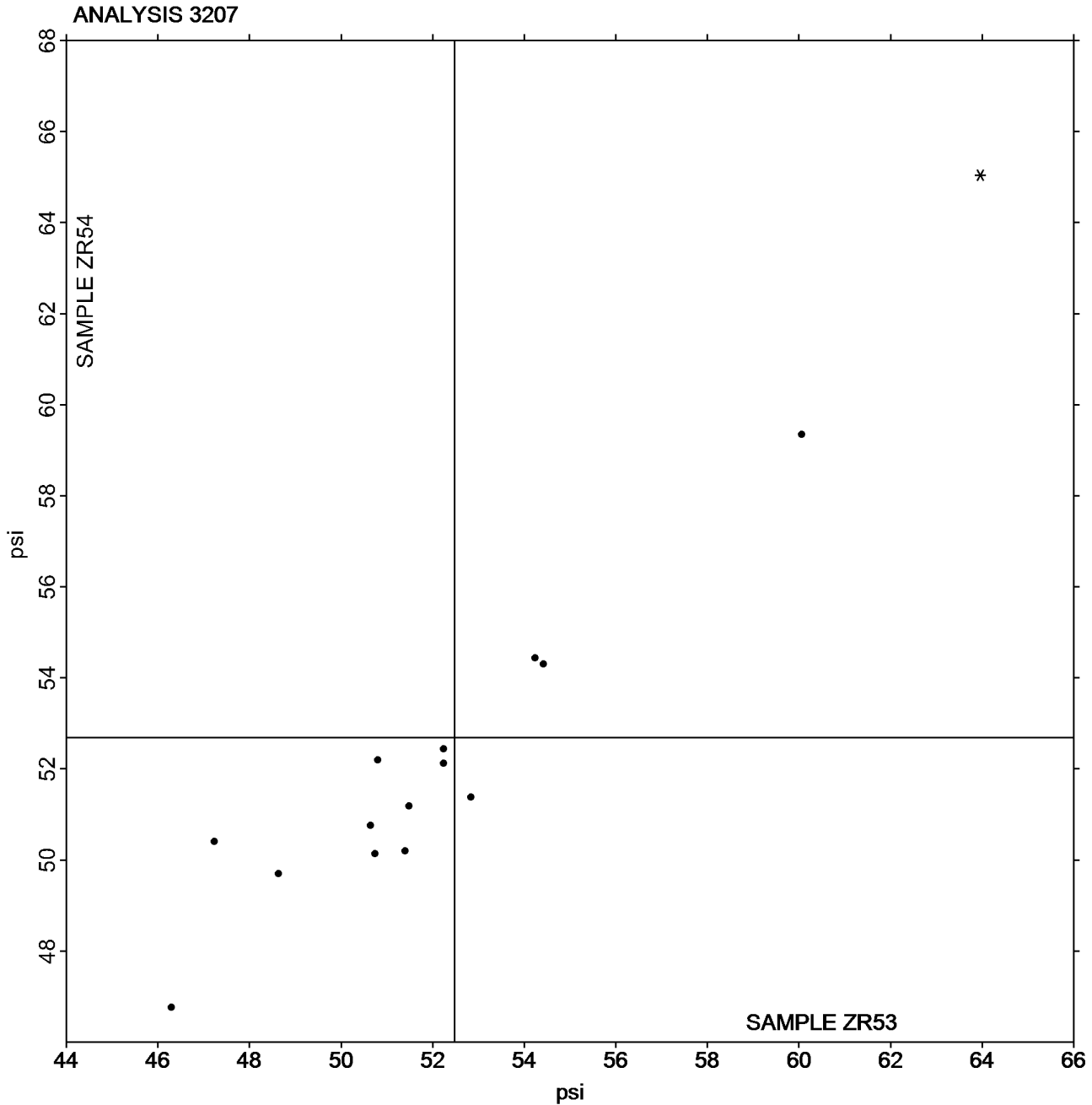
CA	CSI CS-163	CD	CSI CS-163D
CH	Chatillon Ametek	DT	Dek-Tron DCS-163D ZDT Tester
LW	L & W ZD Tensile Tester	TA	Thwing-Albert Tensile Tester
XX	Instrument make/model not specified by lab		



Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3207
Z-Direction Tensile, Recycled Paperboard
TAPPI Official Test Method T541

Grand Mean Sample ZR53 = 52.482
psi

Grand Mean Sample ZR54 = 52.694
psi



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



Report #4421, May 2026

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

WebCode	Data Flag	<u>Sample SM53</u>			<u>Sample SM54</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
6FKZA8		108.4	-13.4	-1.62	120.2	-49.7	-2.44
AHBTBR		110.2	-11.6	-1.40	152.4	-17.5	-0.86
AQ6ZRC		112.2	-9.6	-1.16	156.6	-13.4	-0.66
BB6GRZ		126.8	5.0	0.61	177.6	7.7	0.38
EVYNCY		120.4	-1.4	-0.17	185.2	15.3	0.75
FM38ZZ		118.8	-3.0	-0.36	170.6	0.7	0.03
K4AX4Z		128.0	6.2	0.76	190.9	20.9	1.03
N6Y4DP		122.2	0.4	0.05	161.6	-8.3	-0.41
PK8G8T		121.2	-0.6	-0.07	183.2	13.3	0.65
UH3HZF		128.2	6.4	0.78	188.0	18.1	0.89
UVPRML		131.4	9.6	1.17	186.6	16.7	0.82
WLCFJM		133.4	11.6	1.41	166.4	-3.5	-0.17

Summary Statistics	<u>Sample SM53</u>	<u>Sample SM54</u>
Grand Means	121.76 1000th ft-lbs	169.94 1000th ft-lbs
Std Dev Btwn Labs	8.26 1000th ft-lbs	20.34 1000th ft-lbs
Statistics based on 12 of 12 reporting participants.		

Key to Instrument Codes Reported by Participants

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

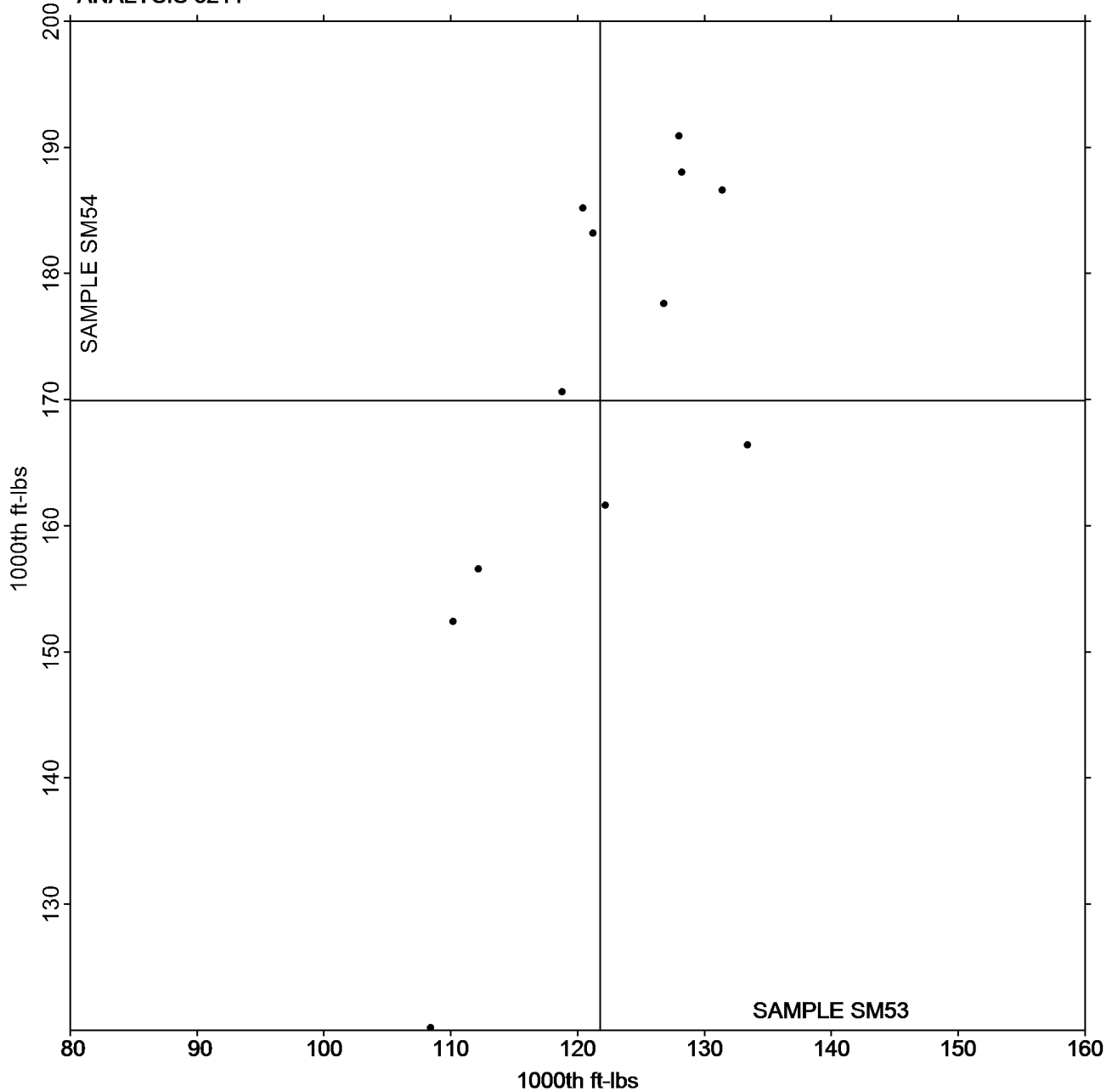


Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3211
Internal Bond Strength - Modified Scott Mechanics
TAPPI Provisional Test Method T569

Grand Mean Sample SM53 = 121.76
1000th ft-lbs

Grand Mean Sample SM54 = 169.94
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 #4421, May 2026

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

WebCode	Data Flag	Sample SB53			Sample SB54		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3GF2Z6		117.2	1.0	0.06	250.0	66.9	1.81
3N4M77		119.0	2.8	0.18	161.8	-21.3	-0.57
3WU8C4		125.4	9.2	0.59	192.8	9.7	0.26
78MPE3		127.4	11.2	0.72	183.4	0.3	0.01
8R82P6		121.0	4.8	0.31	191.0	7.9	0.21
GDR7EZ		141.4	25.2	1.63	223.9	40.8	1.10
N6Y4DP		112.6	-3.6	-0.23	194.2	11.1	0.30
RB77PT		82.8	-33.5	-2.16	127.3	-55.7	-1.50
RFM7AE		109.0	-7.2	-0.47	136.2	-46.8	-1.26
RYHYUD		106.4	-9.8	-0.63	170.0	-13.1	-0.35

Summary Statistics	<u>Sample SB53</u>	<u>Sample SB54</u>
Grand Means	116.22 1000th ft-lbs	183.06 1000th ft-lbs
Std Dev Btwn Labs	15.48 1000th ft-lbs	37.04 1000th ft-lbs
Statistics based on 10 of 10 reporting participants.		

Key to Instrument Codes Reported by Participants

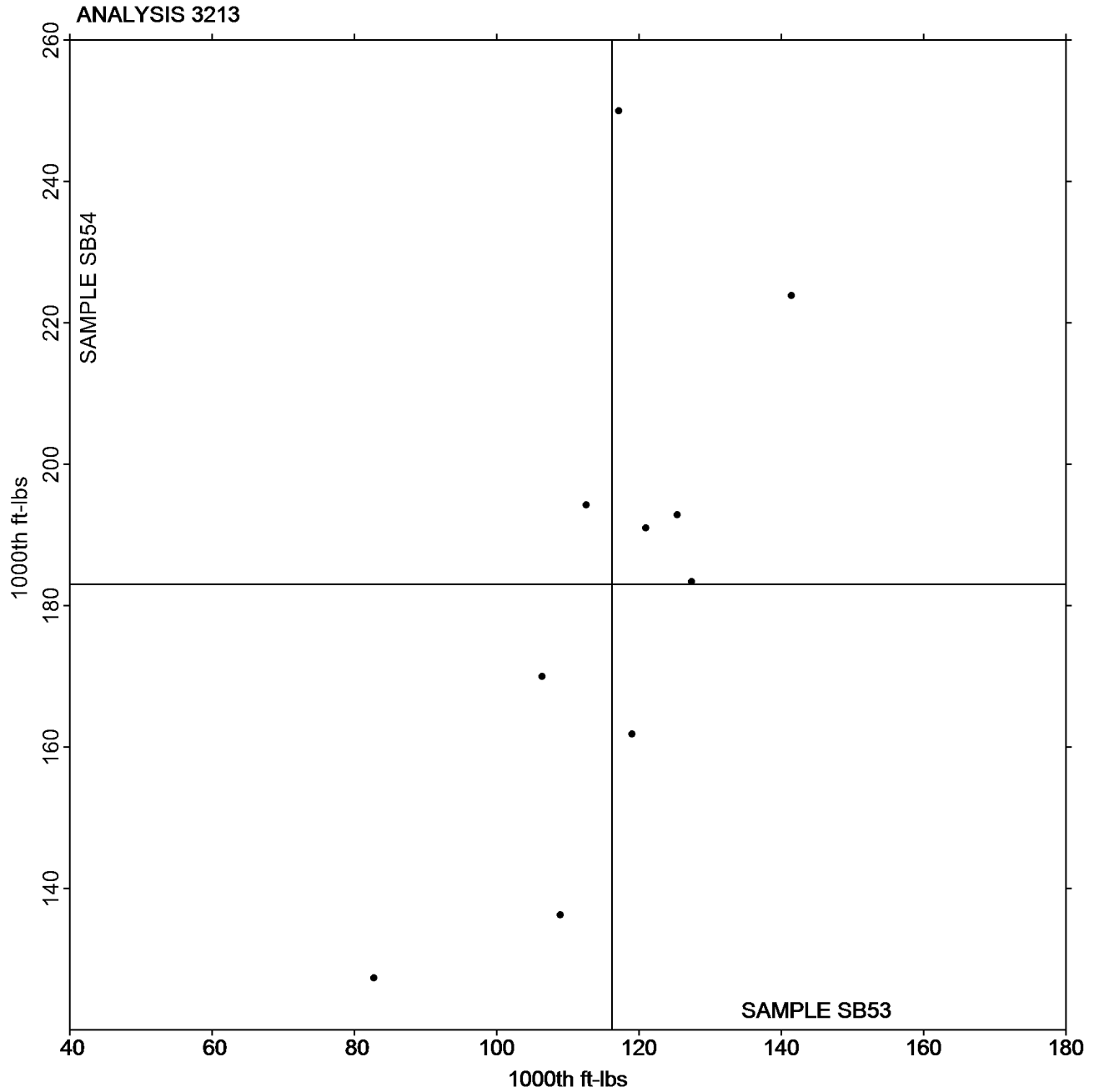
ID	IDM Internal Bond Tester	SC	Scott Internal Bond Tester (Manual)
TM	TMI Monitor/Internal Bond Tester	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program Report #4421, May 2026
Analysis 3213
Internal Bond Strength - Scott Bond Models
TAPPI Provisional Test Method T569

Grand Mean Sample SB53 = 116.22
1000th ft-lbs

Grand Mean Sample SB54 = 183.06
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-