



Paper & Paperboard Testing Program

Summary Report #4261 - September 2023

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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:

Collaborative Testing Services, Inc.
21331 Gentry Drive
Sterling, Virginia 20166 USA
+1-571-434-1925
FAX #: +1-571-434-1937
paper@cts-interlab.com

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

Key for Web Summary Reports (Page 1 of 2)

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

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

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

Common Problems Highlighted in Footnotes

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

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



Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

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

WebCode	Data Flag	Sample CP21			Sample CP22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3DYXD8		3.927	0.040	0.72	3.931	0.053	0.96
3KD7E9		3.957	0.070	1.25	3.912	0.034	0.62
3M6343		3.796	-0.091	-1.63	3.832	-0.046	-0.82
3P9XM6		3.916	0.029	0.52	3.863	-0.015	-0.26
3QPUE6		3.909	0.022	0.39	3.848	-0.030	-0.53
6R7XZ8		3.927	0.040	0.71	3.918	0.041	0.73
7MTFHQ		3.882	-0.005	-0.09	3.869	-0.009	-0.15
8WEZY9	X	3.660	-0.227	-4.06	3.620	-0.258	-4.63
9T9UYT		3.957	0.070	1.25	3.937	0.059	1.07
AW3BNR		3.951	0.064	1.14	3.981	0.103	1.86
AXK6P2		3.827	-0.060	-1.08	3.764	-0.114	-2.04
BAMDKP		3.827	-0.060	-1.07	3.786	-0.092	-1.64
BJURQX		3.920	0.033	0.59	3.856	-0.022	-0.39
CD4W6J		3.860	-0.027	-0.48	3.846	-0.032	-0.57
CVLXWZ		3.875	-0.012	-0.22	3.866	-0.012	-0.21
E6L8GV		3.870	-0.017	-0.30	3.849	-0.029	-0.52
FE7YGT		3.816	-0.071	-1.27	3.827	-0.051	-0.91
FMY72J		3.958	0.071	1.27	3.915	0.037	0.67
FPTQBX		3.878	-0.009	-0.16	3.911	0.033	0.60
FYAJGY		3.867	-0.020	-0.35	3.854	-0.024	-0.43
G6WKHX		3.900	0.013	0.23	3.912	0.034	0.62
G9UAFW		3.870	-0.017	-0.30	3.884	0.006	0.12
GMETBK	*	4.025	0.138	2.47	3.953	0.075	1.36
JCAJKD		3.894	0.007	0.12	3.907	0.030	0.53
KFZDUK		3.909	0.022	0.39	3.886	0.008	0.15
KJ6W2T		3.811	-0.076	-1.36	3.838	-0.040	-0.71
LDQM6G		3.912	0.025	0.45	3.893	0.015	0.28
LE9G7Q		3.950	0.063	1.13	3.999	0.121	2.18
LJ3B6D	X	3.704	-0.183	-3.28	3.972	0.095	1.71
LWNNGM		3.792	-0.095	-1.70	3.828	-0.050	-0.89
MATG8P		3.898	0.011	0.19	3.902	0.024	0.43
MK6TER		3.952	0.065	1.17	3.932	0.054	0.98
MPL23R		3.974	0.087	1.56	3.986	0.108	1.95
PX82AF		3.918	0.031	0.55	3.893	0.015	0.28
QHCUYK		3.907	0.020	0.36	3.911	0.033	0.60
QVF6KL		3.876	-0.011	-0.20	3.893	0.016	0.28
U9NEED		3.810	-0.077	-1.38	3.841	-0.037	-0.66
UPJUMJ		3.865	-0.022	-0.39	3.820	-0.058	-1.03
V76M3A		3.778	-0.109	-1.95	3.745	-0.133	-2.38
VJTPK3		3.819	-0.068	-1.21	3.819	-0.059	-1.06



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

Report #4261,
September 2023

WebCode	Data Flag	<u>Sample CP21</u>			<u>Sample CP22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
VTFMC8		3.890	0.003	0.05	3.870	-0.007	-0.13
WL8JYE		3.920	0.033	0.60	3.935	0.057	1.03
Y82A8A		3.893	0.006	0.11	3.853	-0.024	-0.43
YKP9YC		3.851	-0.036	-0.64	3.853	-0.025	-0.44
ZKNYHZ		3.808	-0.079	-1.41	3.818	-0.060	-1.07

Summary Statistics	<u>Sample CP21</u>	<u>Sample CP22</u>
Grand Means	3.89 mils	3.88 mils
Std Dev Btwn Labs	0.06 mils	0.06 mils

Statistics based on 43 of 45 reporting participants.

Comments on Assigned Data Flags for Test #3101

8WEZY9 (X) - Data for both samples are low. Possible Systematic Error.

LJ3B6D (X) - Data for sample CP21 are low.

Analysis Notes:

7MTFHQ - Data appear to be reported as mils, not micrometers as indicated on data entry form. CTS will not correct the Units going forward.

AXK6P2 - Data appear to be reported as mm, not micrometers as indicated on data entry form. CTS will not correct the Units going forward.

Y82A8A - One determination removed from the Lab Mean of Sample CP22 per Grubb's Test at 1% risk (TAPPI 1205).



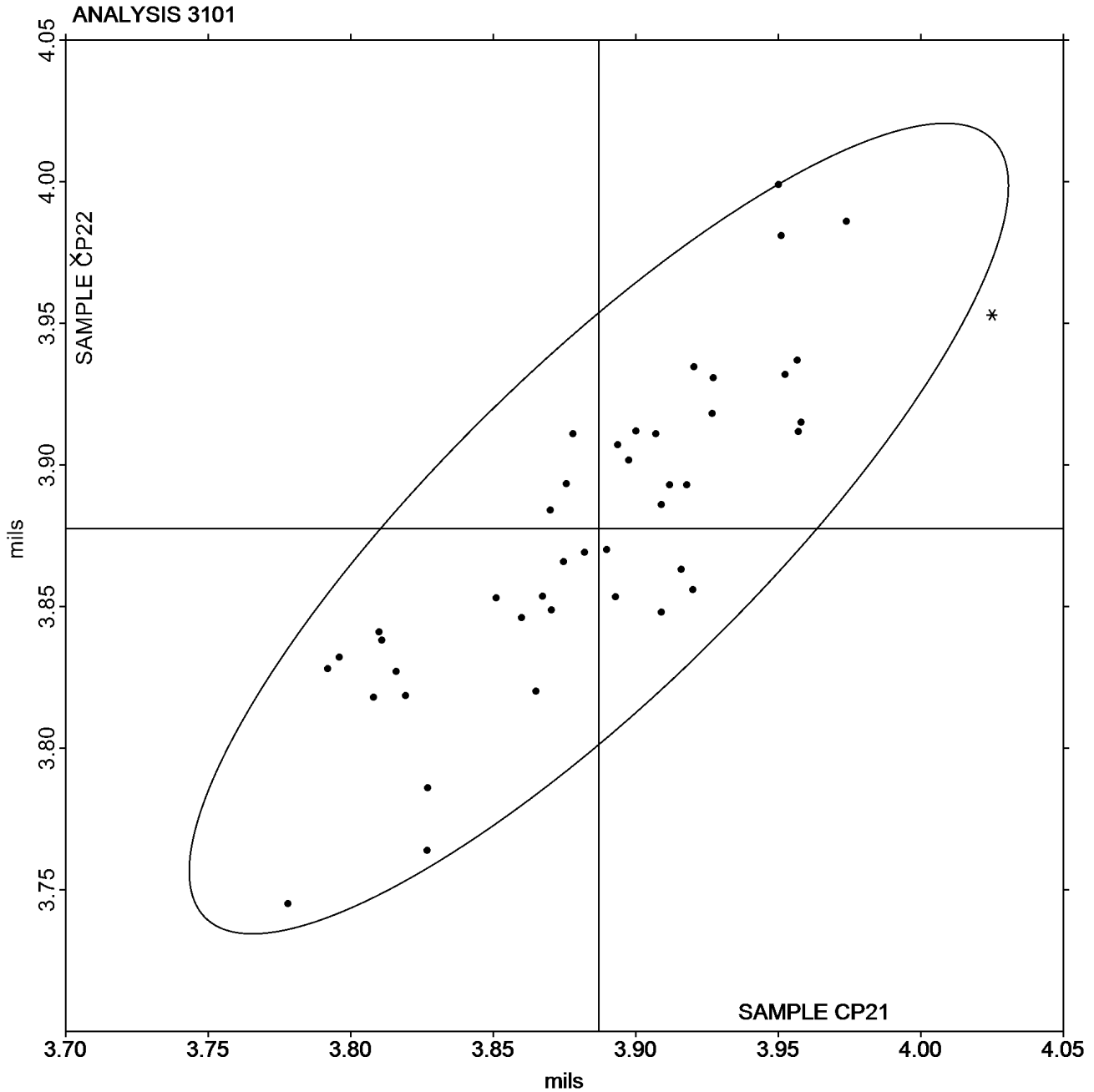
Paper & Paperboard Interlaboratory Testing Program

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September 2023

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

Grand Mean Sample CP21 = 3.8870
mils

Grand Mean Sample CP22 = 3.8775
mils





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

Report #4261,
September 2023

WebCode	Data Flag	Sample BP21			Sample BP22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2ERU32	X	29.70	6.73	5.72	29.50	6.32	5.88
3DYXD8		21.76	-1.21	-1.03	22.25	-0.93	-0.87
3KD7E9		23.15	0.18	0.15	22.99	-0.19	-0.18
3P9XM6		23.50	0.53	0.45	24.00	0.82	0.76
6R7XZ8		23.50	0.53	0.45	22.42	-0.76	-0.70
93ZDD2		23.21	0.24	0.20	23.05	-0.13	-0.12
AW3BNR		22.80	-0.17	-0.14	22.90	-0.28	-0.26
BJURQX		22.40	-0.57	-0.48	23.00	-0.18	-0.17
CD4W6J		21.96	-1.01	-0.86	23.19	0.01	0.01
FE7YGT		25.10	2.13	1.81	25.10	1.92	1.79
FMY72J		22.89	-0.08	-0.07	23.22	0.04	0.04
FPTQBX		22.29	-0.68	-0.57	22.25	-0.93	-0.87
MK6TER		20.89	-2.08	-1.77	21.25	-1.93	-1.80
MPL23R		23.02	0.05	0.04	23.54	0.36	0.33
NLJFQF		21.52	-1.45	-1.23	23.70	0.52	0.48
PX82AF		23.68	0.71	0.60	23.71	0.53	0.49
QHCUYK		22.03	-0.94	-0.80	21.48	-1.70	-1.58
QVF6KL		24.60	1.63	1.39	23.46	0.28	0.26
QZT3R9	X	40.60	17.63	14.97	41.10	17.92	16.67
U7N7A3		22.60	-0.37	-0.31	23.80	0.62	0.58
U9NEED		23.78	0.81	0.69	23.32	0.14	0.13
UPJUMJ	*	25.53	2.56	2.17	26.09	2.91	2.71
V76M3A		21.34	-1.63	-1.38	21.39	-1.79	-1.67
Y8L23F		22.22	-0.75	-0.64	23.37	0.19	0.18
YP38EC		23.02	0.05	0.04	23.14	-0.04	-0.04
ZTEJLD		24.50	1.53	1.30	23.70	0.52	0.48

Summary Statistics	Sample BP21	Sample BP22
Grand Means	22.97 psi	23.18 psi
Std Dev Btwn Labs	1.18 psi	1.08 psi
Statistics based on 24 of 26 reporting participants.		

Comments on Assigned Data Flags for Test #3111

QZT3R9 (X) - Extreme Data.

2ERU32 (X) - Data for both samples are high. Possible Systematic Error.



Paper & Paperboard Interlaboratory Testing Program

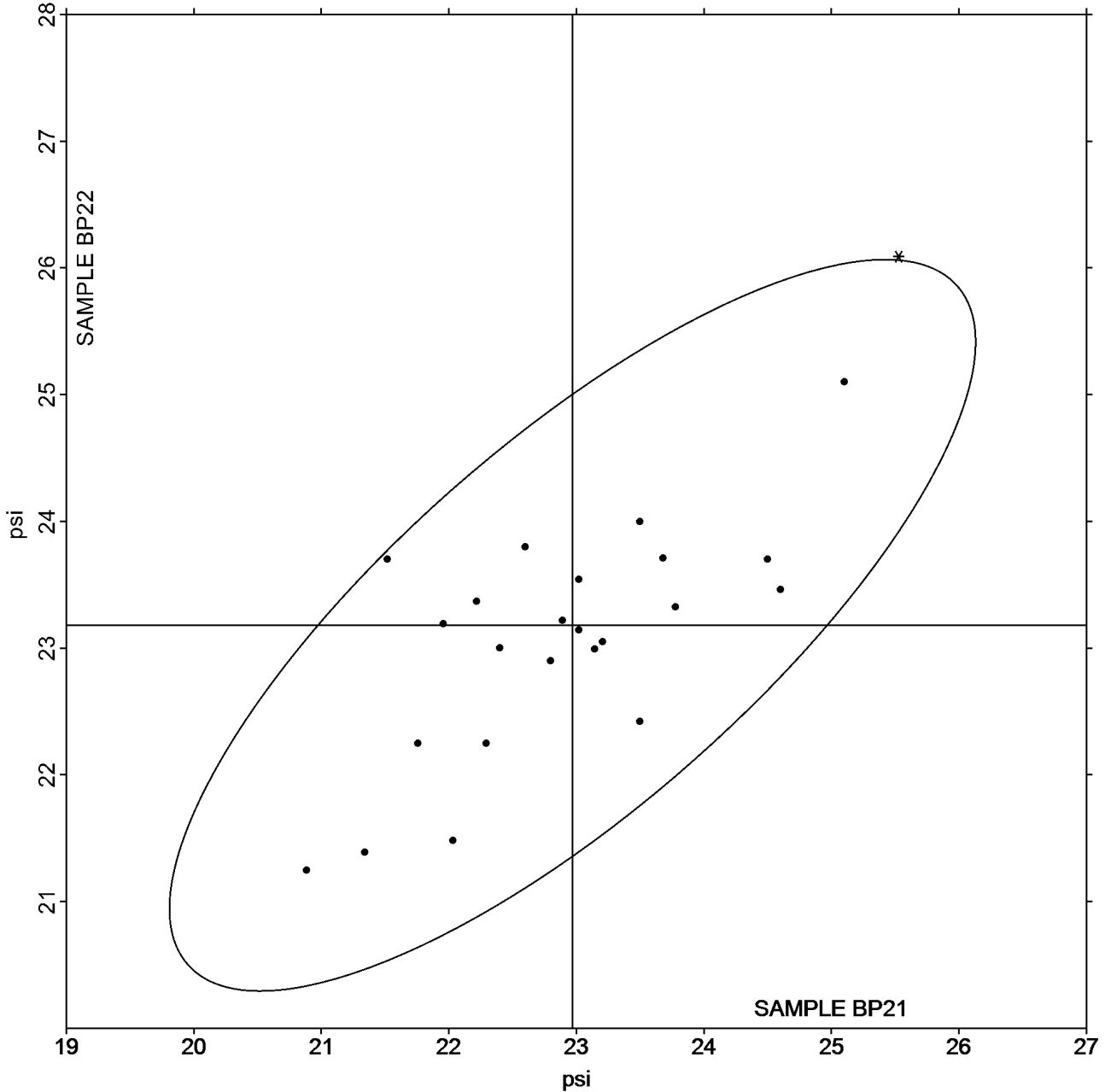
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Analysis 3111 Bursting Strength - Printing Papers TAPPI Official Test Method T403

Grand Mean Sample BP21 = 22.969
psi

Grand Mean Sample BP22 = 23.180
psi

ANALYSIS 3111





Paper & Paperboard Interlaboratory Testing Program

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Analysis 3113

Tearing Strength - Printing Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample RP21			Sample RP22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2MA3QX		56.04	5.56	0.96	56.59	6.49	1.13
3DYXD8		51.30	0.82	0.14	51.32	1.22	0.21
3KD7E9		50.25	-0.23	-0.04	50.46	0.36	0.06
3P9XM6		47.10	-3.38	-0.59	46.30	-3.80	-0.66
4PMLNW		46.91	-3.57	-0.62	46.92	-3.18	-0.55
4UKYRA		42.44	-8.04	-1.40	42.72	-7.38	-1.28
6MEQGY		47.36	-3.12	-0.54	45.86	-4.24	-0.73
7MTFHQ		42.90	-7.58	-1.32	40.92	-9.18	-1.59
7URYHZ		50.31	-0.17	-0.03	50.00	-0.10	-0.02
93ZDD2		48.48	-2.00	-0.35	48.20	-1.90	-0.33
9T9UYT		50.63	0.15	0.03	50.14	0.04	0.01
A7UT3Z		49.16	-1.32	-0.23	48.73	-1.37	-0.24
AW3BNR		49.60	-0.88	-0.15	48.80	-1.30	-0.22
BJURQX		50.45	-0.03	-0.01	50.45	0.35	0.06
C9UGVV	*	67.92	17.44	3.03	66.75	16.65	2.89
CD4W6J		48.54	-1.94	-0.34	48.94	-1.16	-0.20
E6L8GV		46.30	-4.18	-0.73	46.57	-3.53	-0.61
E7D7VT		48.20	-2.28	-0.40	46.66	-3.44	-0.60
FE7YGT		47.50	-2.98	-0.52	46.70	-3.40	-0.59
FPTQBX		50.02	-0.46	-0.08	50.25	0.15	0.03
G9UAFW		42.92	-7.56	-1.31	43.54	-6.56	-1.14
HHXKML		45.95	-4.54	-0.79	45.00	-5.10	-0.88
HVNGNJ		46.60	-3.88	-0.67	45.54	-4.56	-0.79
JCAJKD		47.64	-2.84	-0.49	48.32	-1.78	-0.31
KBTMRE		56.04	5.56	0.96	56.59	6.49	1.13
LDQM6G		63.51	13.03	2.26	63.14	13.04	2.26
LE9G7Q		49.50	-0.98	-0.17	48.20	-1.90	-0.33
LM2M2C		49.64	-0.84	-0.15	49.23	-0.87	-0.15
LWNNGM		50.67	0.19	0.03	50.62	0.52	0.09
MATG8P	*	58.80	8.32	1.44	55.60	5.50	0.95
MK6TER		49.83	-0.65	-0.11	50.22	0.12	0.02
MPL23R		48.26	-2.22	-0.39	47.18	-2.92	-0.51
PX82AF		46.88	-3.60	-0.62	46.73	-3.37	-0.58
QHCUYK		46.16	-4.32	-0.75	45.50	-4.60	-0.80
QVF6KL		45.04	-5.44	-0.94	44.32	-5.78	-1.00
U9NEED	*	67.83	17.34	3.01	66.68	16.58	2.88
UBXEJ		51.40	0.92	0.16	49.80	-0.30	-0.05
UPJUMJ	X	41.60	-8.88	-1.54	45.22	-4.88	-0.85
V76M3A		52.60	2.12	0.37	52.11	2.01	0.35
Y82A8A		50.70	0.22	0.04	52.60	2.50	0.43



Paper & Paperboard Interlaboratory Testing Program

**Report #4261,
September 2023**

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

WebCode	Data Flag	Sample RP21			Sample RP22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
ZKNYHZ	*	57.44	6.96	1.21	59.20	9.10	1.58
ZTEJLD		51.00	0.52	0.09	50.60	0.50	0.09

Summary Statistics	Sample RP21	Sample RP22
Grand Means	50.48 Grams	50.10 Grams
Std Dev Btwn Labs	5.76 Grams	5.77 Grams
Statistics based on 41 of 42 reporting participants.		

Comments on Assigned Data Flags for Test #3113

UPJUMJ (X) - Inconsistent in testing between samples.



Paper & Paperboard Interlaboratory Testing Program

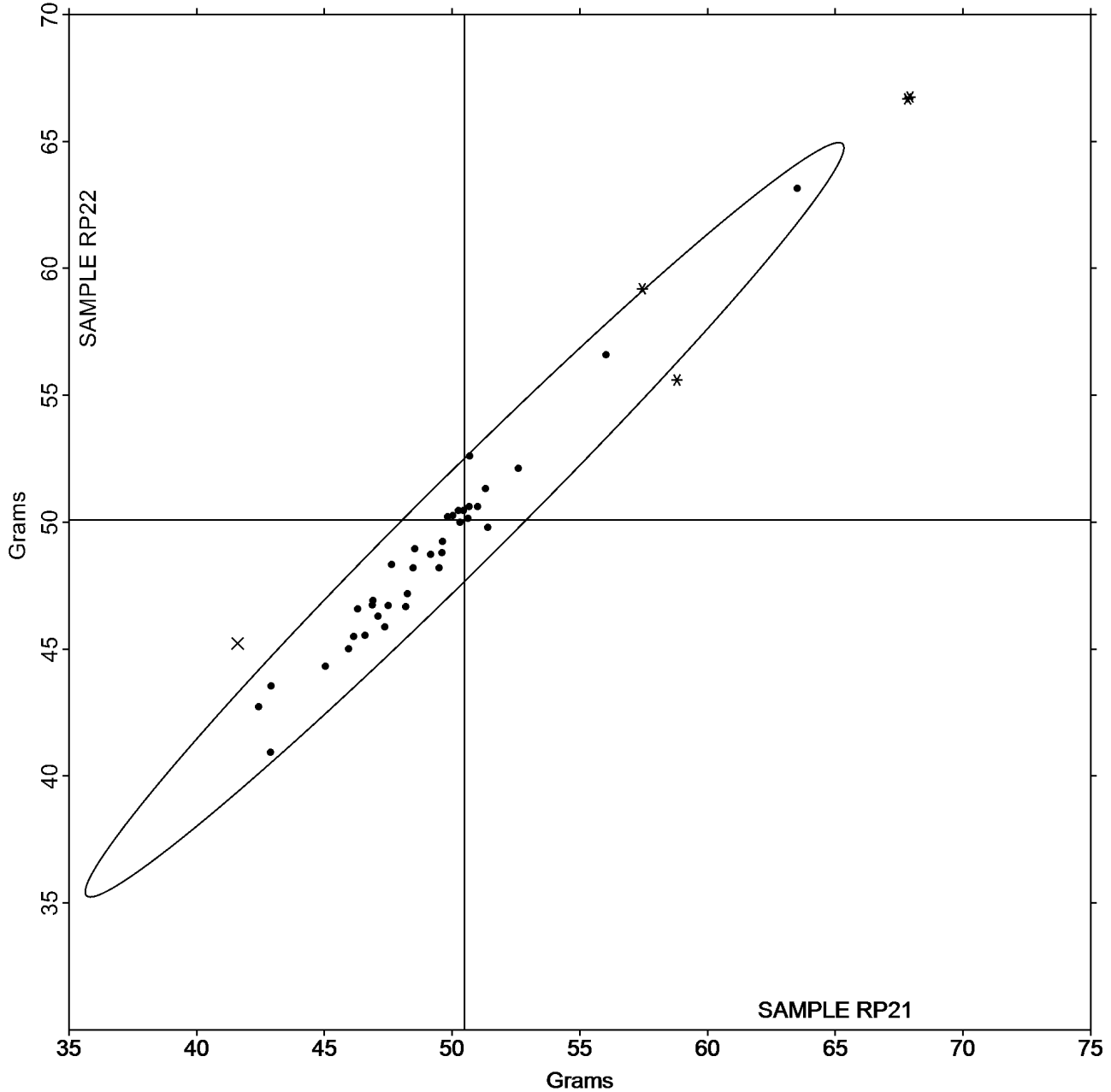
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Analysis 3113 Tearing Strength - Printing Papers TAPPI Official Test Method T414

Grand Mean Sample RP21 = 50.484
Grams

Grand Mean Sample RP22 = 50.097
Grams

ANALYSIS 3113





Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

Analysis 3115

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NP21			Sample NP22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2MA3QX		4.301	0.107	0.37	4.399	0.195	0.67
3DYXD8		4.232	0.038	0.13	4.351	0.147	0.50
3KD7E9		3.889	-0.304	-1.05	3.966	-0.238	-0.82
3QPUE6		3.933	-0.261	-0.90	4.016	-0.187	-0.64
4UKYRA		4.630	0.437	1.50	4.431	0.227	0.78
64MKBU		3.791	-0.403	-1.38	3.855	-0.349	-1.20
6R7XZ8		4.296	0.102	0.35	4.364	0.160	0.55
7MTFHQ		4.215	0.021	0.07	4.141	-0.063	-0.21
8VL84P		3.916	-0.278	-0.95	4.000	-0.204	-0.70
93ZDD2		4.074	-0.120	-0.41	4.002	-0.202	-0.69
9T9UYT		3.560	-0.633	-2.18	3.510	-0.694	-2.38
A7UT3Z		3.990	-0.204	-0.70	4.163	-0.041	-0.14
AW3BNR		4.336	0.142	0.49	4.366	0.162	0.56
AXK6P2		4.512	0.318	1.09	4.350	0.146	0.50
BJURQX		4.241	0.047	0.16	4.194	-0.009	-0.03
C9UGVV		4.467	0.273	0.94	4.412	0.209	0.72
CD4W6J		4.256	0.062	0.21	4.259	0.055	0.19
E6L8GV		4.013	-0.181	-0.62	3.978	-0.226	-0.77
E7D7VT		4.108	-0.086	-0.29	4.072	-0.132	-0.45
E9M8ZZ		3.954	-0.239	-0.82	3.977	-0.227	-0.78
FE7YGT		3.794	-0.400	-1.37	3.865	-0.339	-1.16
FPTQBX		4.200	0.006	0.02	4.204	0.000	0.00
FYAJGY		4.195	0.001	0.00	4.037	-0.167	-0.57
G6WKHX		4.014	-0.180	-0.62	4.093	-0.111	-0.38
G9UAFW		4.011	-0.183	-0.63	3.878	-0.325	-1.12
HHXKML		4.270	0.076	0.26	4.180	-0.024	-0.08
JCAJKD	*	4.581	0.387	1.33	4.814	0.611	2.09
LDQM6G		3.986	-0.208	-0.71	4.098	-0.106	-0.36
LE9G7Q		4.374	0.180	0.62	4.469	0.265	0.91
LJ3B6D		4.133	-0.061	-0.21	4.327	0.124	0.42
LM2M2C		3.970	-0.224	-0.77	4.072	-0.132	-0.45
LWNGM		4.357	0.163	0.56	4.296	0.092	0.32
MATG8P		3.844	-0.350	-1.20	4.034	-0.170	-0.58
MK6TER		4.549	0.355	1.22	4.440	0.236	0.81
PX82AF		4.157	-0.037	-0.13	4.151	-0.053	-0.18
PZ8ADP		4.324	0.130	0.45	4.359	0.155	0.53
QHCUYK		4.115	-0.079	-0.27	4.141	-0.062	-0.21
RVDU49		4.251	0.057	0.20	4.228	0.024	0.08
U9NEED		4.290	0.096	0.33	4.253	0.049	0.17
UPJUMJ		4.546	0.353	1.21	4.686	0.483	1.66



Paper & Paperboard Interlaboratory Testing Program

**Report #4261,
September 2023**

Analysis 3115

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	<u>Sample NP21</u>			<u>Sample NP22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
V76M3A	*	3.489	-0.705	-2.42	3.384	-0.820	-2.81
VTFMC8	X	3.581	-0.613	-2.10	2.952	-1.252	-4.29
WL8JYE		4.773	0.579	1.99	4.760	0.556	1.91
Y82A8A		4.724	0.530	1.82	4.679	0.475	1.63
YWHTF4		4.086	-0.108	-0.37	4.020	-0.184	-0.63
ZEKR3W		4.396	0.202	0.69	4.321	0.117	0.40
ZKNYHZ		4.770	0.576	1.98	4.776	0.573	1.96

Summary Statistics	<u>Sample NP21</u>	<u>Sample NP22</u>
Grand Means	4.19 kN/m	4.20 kN/m
Std Dev Btwn Labs	0.29 kN/m	0.29 kN/m

Statistics based on 46 of 47 reporting participants.

Comments on Assigned Data Flags for Test #3115

VTFMC8 (X) - Data for sample NP22 are low.

Analysis Notes:

AXK6P2 - Data appear to be reported as lb/ .5 inch, not kN/m as indicated on data entry form. CTS will not correct the Unit going forward.



Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

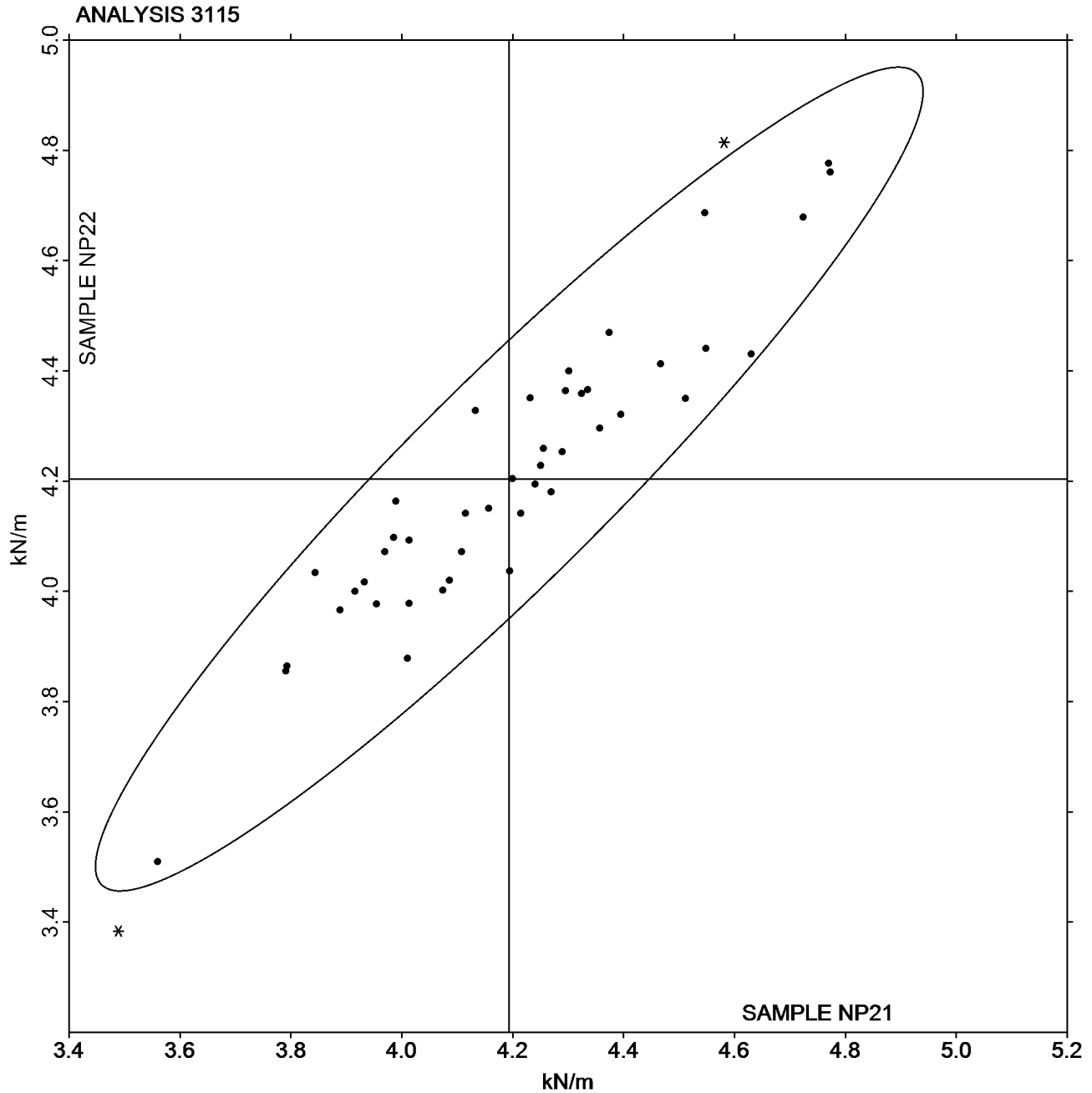
Analysis 3115

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

Grand Mean Sample NP21 = 4.1937
kN/m

Grand Mean Sample NP22 = 4.2037
kN/m





Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

Analysis 3116

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NP21			Sample NP22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3DYXD8		46.20	0.73	0.13	50.50	5.28	0.92
3KD7E9		44.73	-0.74	-0.14	44.92	-0.31	-0.05
3QPUE6		43.48	-1.99	-0.37	43.64	-1.59	-0.28
4UKYRA		42.50	-2.97	-0.55	37.65	-7.57	-1.32
64MKBU		38.19	-7.28	-1.35	38.56	-6.67	-1.16
6R7XZ8		48.83	3.36	0.62	50.79	5.56	0.97
8VL84P		36.56	-8.91	-1.65	38.48	-6.74	-1.18
93ZDD2		45.09	-0.38	-0.07	42.60	-2.63	-0.46
9T9UYT		39.84	-5.63	-1.04	38.09	-7.14	-1.25
A7UT3Z		42.73	-2.74	-0.51	45.12	-0.11	-0.02
AW3BNR		41.43	-4.04	-0.75	40.29	-4.94	-0.86
AXK6P2	*	52.45	6.98	1.29	43.30	-1.93	-0.34
BJURQX		42.45	-3.02	-0.56	41.49	-3.74	-0.65
C9UGVV		36.08	-9.39	-1.74	34.50	-10.73	-1.87
CD4W6J		51.00	5.53	1.02	51.66	6.44	1.12
E6L8GV		42.80	-2.67	-0.49	39.77	-5.45	-0.95
E9M8ZZ		44.57	-0.90	-0.17	43.39	-1.84	-0.32
FE7YGT		38.55	-6.92	-1.28	39.38	-5.85	-1.02
FPTQBX		45.19	-0.28	-0.05	46.11	0.88	0.15
FYAJGY		45.85	0.38	0.07	40.44	-4.78	-0.83
G6WKHX		47.84	2.38	0.44	44.45	-0.78	-0.14
HHXKML		49.21	3.74	0.69	45.96	0.73	0.13
JCAJKD		53.47	8.00	1.48	51.02	5.80	1.01
LDQM6G		47.65	2.18	0.40	48.89	3.66	0.64
LE9G7Q		53.87	8.40	1.55	53.18	7.95	1.39
LJ3B6D		43.07	-2.40	-0.44	48.62	3.40	0.59
LM2M2C		39.72	-5.75	-1.06	42.32	-2.90	-0.51
MK6TER		51.82	6.35	1.17	48.61	3.38	0.59
PZ8ADP		54.87	9.40	1.74	58.06	12.83	2.24
QHCUYK		44.83	-0.64	-0.12	45.88	0.66	0.11
RVDU49		43.94	-1.53	-0.28	43.46	-1.77	-0.31
U9NEED		32.19	-13.28	-2.45	33.58	-11.65	-2.03
V76M3A		49.50	4.03	0.74	54.79	9.56	1.67
VTFMC8	X	63.15	17.68	3.27	53.44	8.22	1.43
WL8JYE		48.97	3.50	0.65	50.57	5.34	0.93
Y82A8A		49.16	3.69	0.68	50.83	5.60	0.98
YWHTF4		51.05	5.58	1.03	49.34	4.11	0.72
ZEKR3W		53.08	7.61	1.41	51.77	6.54	1.14
ZKNYHZ		45.10	-0.37	-0.07	46.63	1.40	0.24



Paper & Paperboard Interlaboratory Testing Program

**Report #4261,
September 2023**

Analysis 3116

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

Summary Statistics	<u>Sample NP21</u>	<u>Sample NP22</u>
Grand Means	45.47 Joules/sq m	45.23 Joules/sq m
Stnd Dev Btwn Labs	5.41 Joules/sq m	5.73 Joules/sq m
Statistics based on 38 of 39 reporting participants.		

Comments on Assigned Data Flags for Test #3116

VTFMC8 (X) - Data for sample NP21 are high.



Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

Analysis 3116

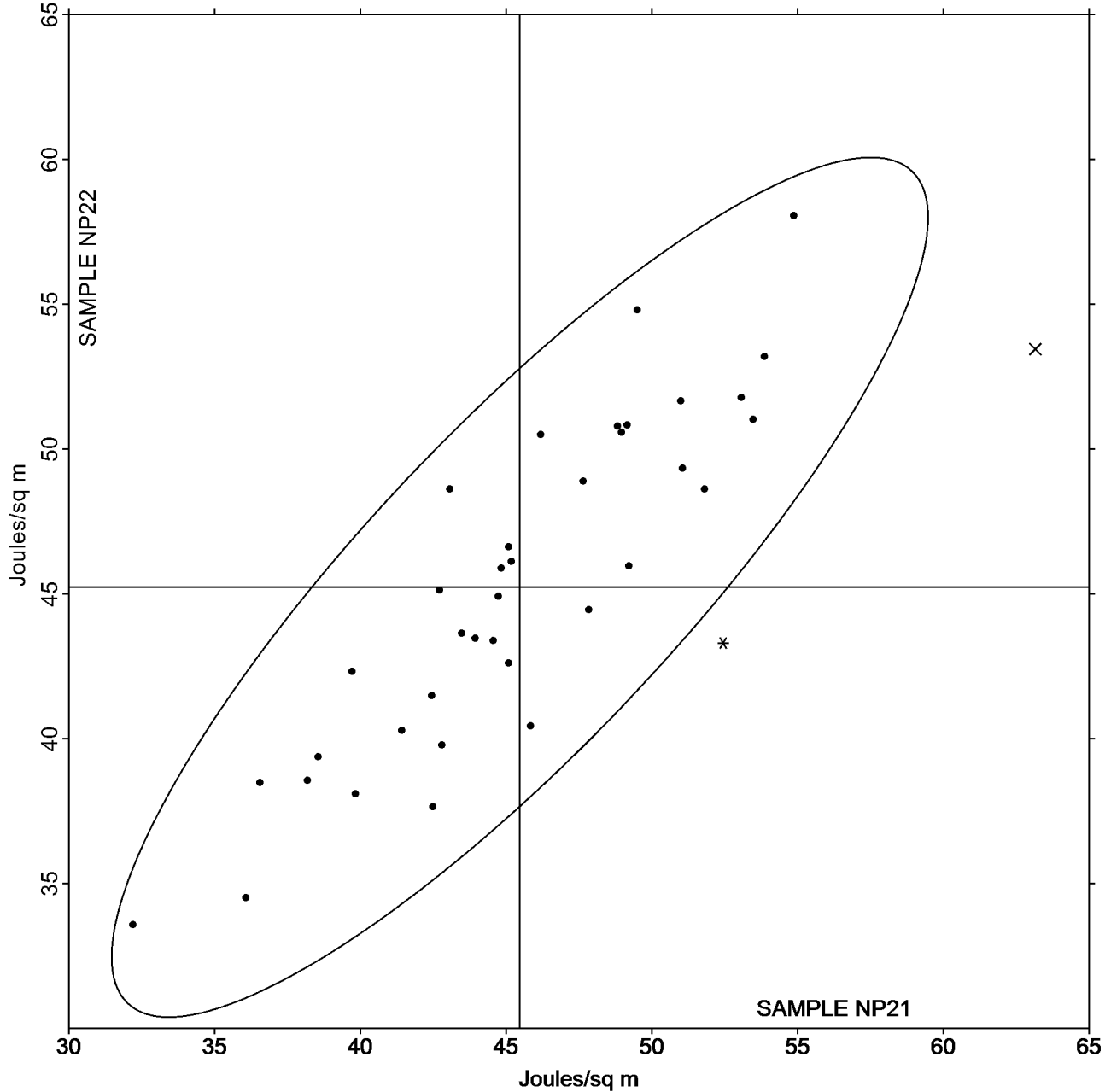
Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

Grand Mean Sample NP21 = 45.470
Joules/sq m

Grand Mean Sample NP22 = 45.227
Joules/sq m

ANALYSIS 3116





Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

Analysis 3117

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NP21			Sample NP22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3DYXD8		1.661	-0.025	-0.15	1.753	0.085	0.48
3KD7E9		1.708	0.022	0.13	1.697	0.029	0.17
3QPUE6	X	0.121	-1.565	-9.27	0.121	-1.547	-8.71
4UKYRA		1.468	-0.218	-1.29	1.380	-0.288	-1.62
64MKBU		1.623	-0.063	-0.37	1.616	-0.051	-0.29
6R7XZ8		1.729	0.043	0.25	1.770	0.102	0.58
7MTFHQ		1.526	-0.160	-0.95	1.429	-0.239	-1.34
8VL84P		1.561	-0.125	-0.74	1.604	-0.064	-0.36
93ZDD2		1.703	0.016	0.10	1.645	-0.023	-0.13
9T9UYT		1.909	0.223	1.32	1.762	0.094	0.53
A7UT3Z		1.623	-0.063	-0.37	1.646	-0.022	-0.12
AW3BNR	*	2.125	0.439	2.60	2.070	0.402	2.27
AXK6P2		1.782	0.096	0.57	1.592	-0.076	-0.43
BJURQX		1.550	-0.136	-0.81	1.536	-0.132	-0.74
C9UGVV		1.561	-0.125	-0.74	1.517	-0.151	-0.85
CD4W6J		1.998	0.312	1.85	2.006	0.338	1.91
E6L8GV		1.650	-0.036	-0.21	1.560	-0.108	-0.61
E9M8ZZ		1.810	0.124	0.73	1.700	0.032	0.18
FE7YGT		1.595	-0.091	-0.54	1.599	-0.069	-0.39
FPTQBX		1.643	-0.043	-0.25	1.665	-0.003	-0.01
FYAJGY		1.671	-0.015	-0.09	1.542	-0.126	-0.71
G6WKHX		1.714	0.027	0.16	1.797	0.130	0.73
G9UAFW		1.557	-0.129	-0.76	1.501	-0.167	-0.94
HHXKML		1.770	0.084	0.50	1.700	0.032	0.18
JCAJKD		1.690	0.004	0.02	1.624	-0.044	-0.25
LDQM6G		1.784	0.098	0.58	1.797	0.129	0.73
LE9G7Q		1.917	0.231	1.37	1.986	0.318	1.79
LJ3B6D		1.689	0.003	0.02	1.793	0.126	0.71
LM2M2C		1.529	-0.157	-0.93	1.580	-0.088	-0.49
MK6TER		1.637	-0.049	-0.29	1.574	-0.094	-0.53
PZ8ADP		1.934	0.248	1.47	1.907	0.239	1.35
QHCUYK		1.742	0.056	0.33	1.756	0.088	0.50
RVDU49		1.579	-0.107	-0.64	1.585	-0.082	-0.46
U9NEED		1.436	-0.250	-1.48	1.504	-0.164	-0.92
V76M3A	X	7.468	5.782	34.24	7.431	5.763	32.46
VTFMC8	*	1.331	-0.355	-2.10	1.199	-0.468	-2.64
WL8JYE		1.534	-0.152	-0.90	1.580	-0.088	-0.49
Y82A8A		1.647	-0.039	-0.23	1.706	0.038	0.22
YWHTF4		1.959	0.273	1.62	1.933	0.265	1.49
ZEKR3W		1.923	0.237	1.41	1.898	0.230	1.30



Paper & Paperboard Interlaboratory Testing Program

**Report #4261,
September 2023**

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

WebCode	Data Flag	<u>Sample NP21</u>			<u>Sample NP22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
ZKNYHZ		1.489	-0.197	-1.17	1.528	-0.140	-0.79

Summary Statistics	<u>Sample NP21</u>	<u>Sample NP22</u>
Grand Means	1.69 Percent	1.67 Percent
Std Dev Btwn Labs	0.17 Percent	0.18 Percent
Statistics based on 39 of 41 reporting participants.		

Comments on Assigned Data Flags for Test #3117

- V76M3A (X) - Extreme Data.
- 3QPUE6 (X) - Extreme Data.

Analysis Notes:

LE9G7Q - One determination removed from the Lab Mean of Sample NP22 per Grubb's Test at 1% risk (TAPPI 1205).



Paper & Paperboard Interlaboratory Testing Program

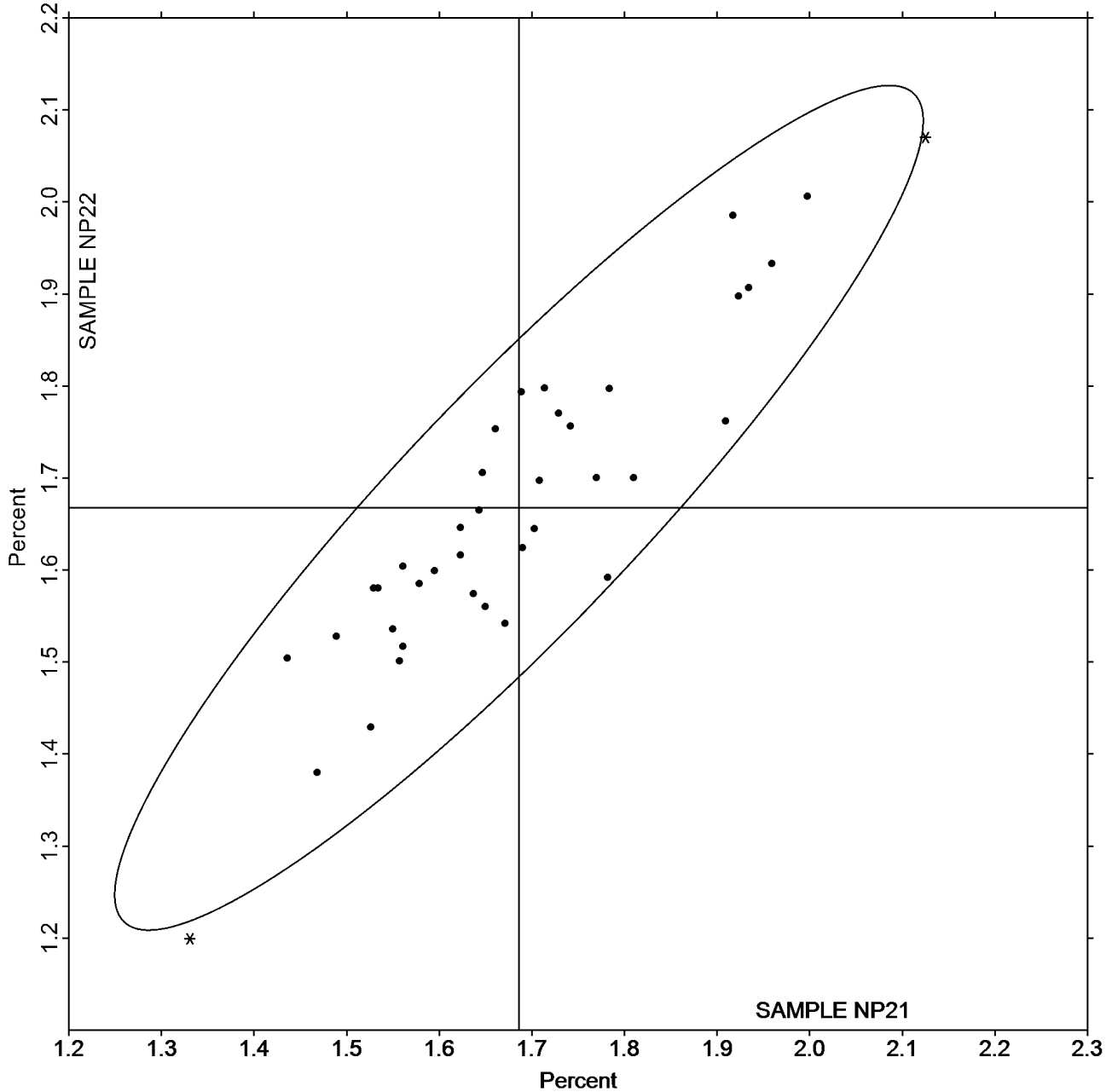
Report #4261,
September 2023

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

Grand Mean Sample NP21 = 1.6860
Percent

Grand Mean Sample NP22 = 1.6676
Percent

ANALYSIS 3117





Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

Analysis 3121

Air Resistance - Gurley Oil Type

TAPPI Official Test Method T460

WebCode	Data Flag	Sample PP21			Sample PP22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2ERU32		25.73	-0.03	-0.02	25.36	-0.62	-0.42
3M6343		23.04	-2.72	-1.73	23.48	-2.50	-1.71
3P9XM6		26.90	1.14	0.73	26.80	0.82	0.56
64MKBU		25.74	-0.02	-0.01	25.74	-0.24	-0.16
6R7XZ8		24.91	-0.85	-0.54	25.27	-0.71	-0.49
74UJH8		27.79	2.03	1.29	26.88	0.90	0.62
7BXGC7		26.36	0.60	0.38	26.15	0.17	0.12
7MTFHQ		26.29	0.53	0.34	26.33	0.35	0.24
93ZDD2		28.32	2.56	1.63	27.84	1.86	1.27
9T9UYT	*	28.57	2.82	1.79	29.65	3.67	2.51
AW3BNR		23.36	-2.40	-1.53	24.95	-1.03	-0.71
AW7TV4		23.91	-1.85	-1.18	23.70	-2.28	-1.56
AXK6P2		27.26	1.50	0.96	27.00	1.02	0.70
CD4W6J		25.99	0.23	0.15	25.09	-0.89	-0.61
CPE8UU		26.82	1.06	0.68	26.35	0.37	0.25
EF6FNW		24.85	-0.91	-0.58	25.94	-0.04	-0.03
FE7YGT		27.87	2.11	1.35	26.78	0.80	0.55
G9UAFW		26.10	0.34	0.22	26.95	0.97	0.66
HHXKML		23.81	-1.95	-1.24	24.17	-1.81	-1.24
K24W6L		24.77	-0.99	-0.63	24.93	-1.05	-0.72
KJ6W2T		26.71	0.95	0.61	27.26	1.28	0.88
LDQM6G		23.80	-1.96	-1.25	23.91	-2.07	-1.42
LE9G7Q		24.94	-0.82	-0.52	25.12	-0.86	-0.59
LWNNGM	*	22.43	-3.33	-2.12	24.56	-1.42	-0.97
MATG8P		25.40	-0.36	-0.23	25.10	-0.88	-0.60
MK6TER		25.08	-0.68	-0.43	25.23	-0.75	-0.51
MPL23R		24.20	-1.56	-0.99	26.15	0.17	0.12
NLJFQF		25.42	-0.34	-0.21	26.90	0.92	0.63
P29ZTK		25.21	-0.55	-0.35	24.35	-1.63	-1.12
QHCUYK		26.16	0.40	0.26	26.92	0.94	0.64
QZT3R9	X	17.82	-7.94	-5.05	18.43	-7.55	-5.17
U9NEED		27.32	1.57	1.00	27.56	1.58	1.08
UM9W92		25.21	-0.55	-0.35	26.23	0.25	0.17
UPJUMJ		24.24	-1.51	-0.96	24.83	-1.15	-0.79
V76M3A	*	28.59	2.83	1.80	29.80	3.82	2.61
YP38EC		25.59	-0.17	-0.11	24.54	-1.44	-0.99
ZEKR3W		27.59	1.83	1.16	27.36	1.38	0.95
ZTEJLD		26.70	0.94	0.60	26.10	0.12	0.08



Paper & Paperboard Interlaboratory Testing Program

**Report #4261,
September 2023**

Analysis 3121

Air Resistance - Gurley Oil Type

TAPPI Official Test Method T460

Summary Statistics	<u>Sample PP21</u>	<u>Sample PP22</u>
Grand Means	25.76 sec/100 cc	25.98 sec/100 cc
Stnd Dev Btwn Labs	1.57 sec/100 cc	1.46 sec/100 cc
Statistics based on 37 of 38 reporting participants.		

Comments on Assigned Data Flags for Test #3121

QZT3R9 (X) - Data for both samples are low. Possible Systematic Error.



Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

Analysis 3121

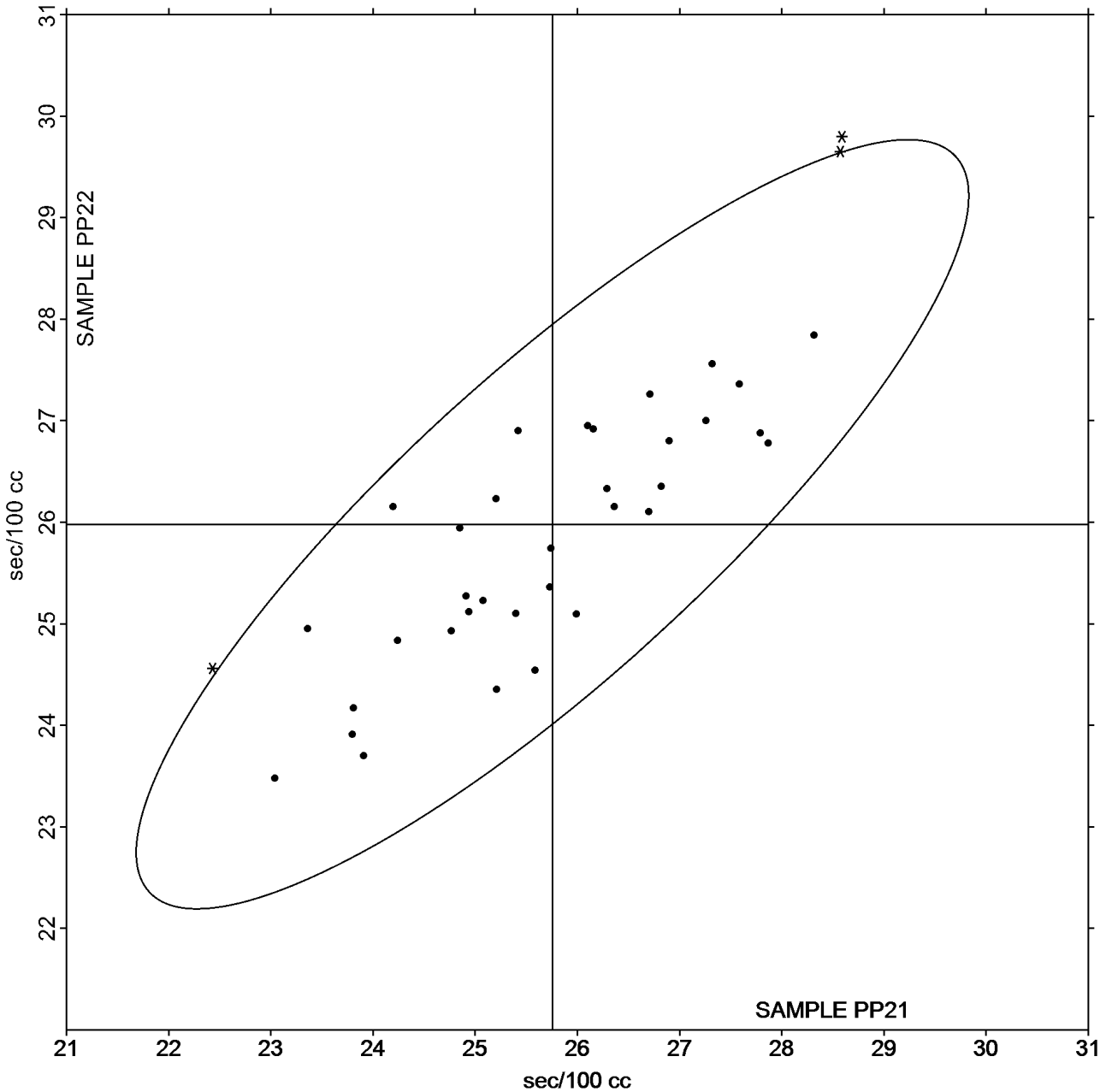
Air Resistance - Gurley Oil Type

TAPPI Official Test Method T460

Grand Mean Sample PP21 = 25.756
sec/100 cc

Grand Mean Sample PP22 = 25.980
sec/100 cc

ANALYSIS 3121





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

Report #4261,
September 2023

WebCode	Data Flag	<u>Sample PP21</u>			<u>Sample PP22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3P9XM6		108.9	-0.5	-0.06	111.4	2.8	0.46
Y82A8A		118.7	9.3	1.03	112.8	4.2	0.69
ZTEJLD		100.7	-8.7	-0.97	101.6	-7.0	-1.15

Summary Statistics	<u>Sample PP21</u>	<u>Sample PP22</u>
Grand Means	109.43 Sheffield Units	108.60 Sheffield Units
Stnd Dev Btwn Labs	9.01 Sheffield Units	6.10 Sheffield Units
		Statistics based on 3 of 3 reporting participants.



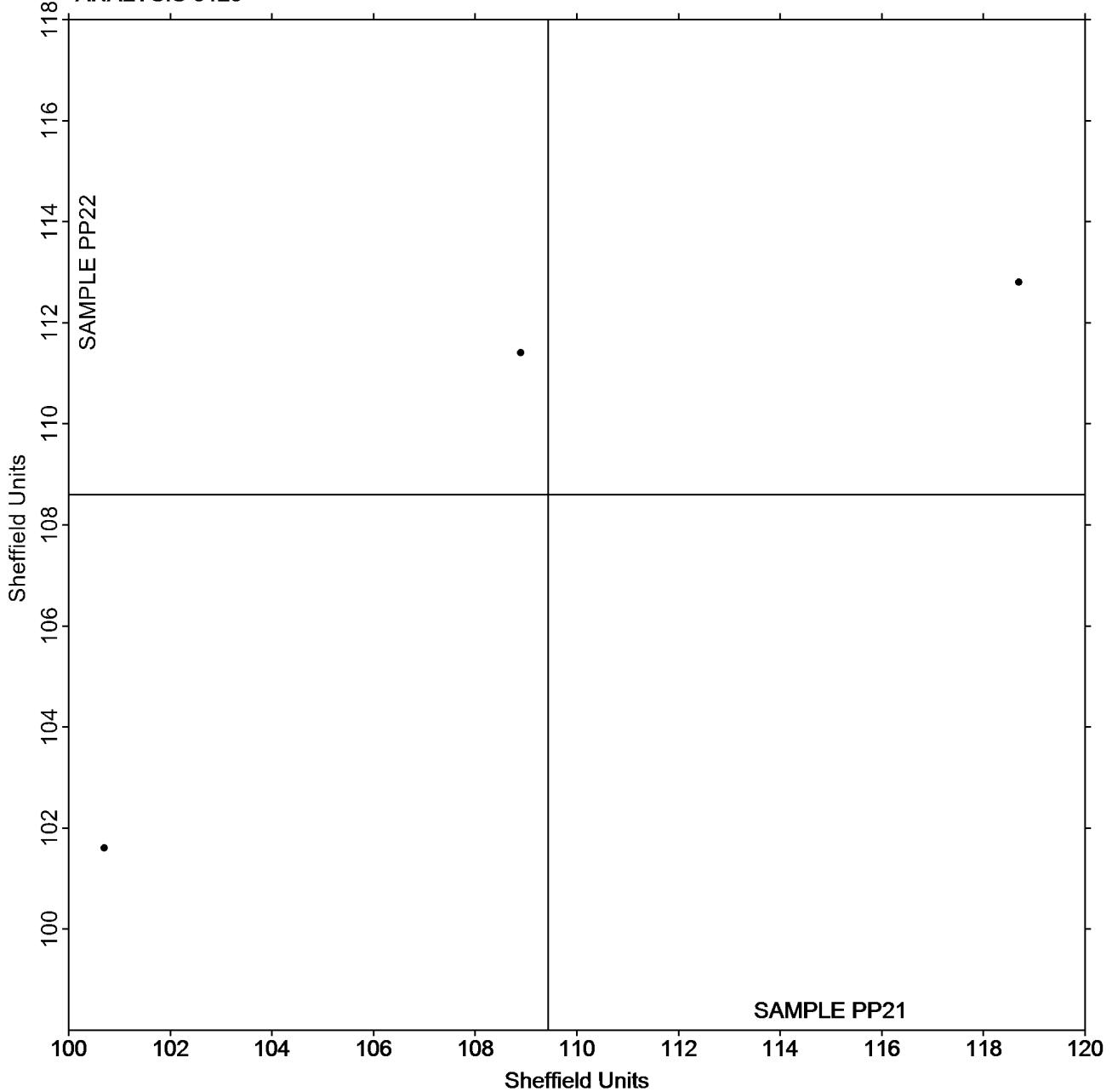
Paper & Paperboard Interlaboratory Testing Program
Analysis 3123
Porosity - Sheffield Type - Sheffield Units for 3/4 inch Diameter Orifice
TAPPI Official Test Method T547

Report #4261,
September 2023

Grand Mean Sample PP21 = 109.43
Sheffield Units

Grand Mean Sample PP22 = 108.60
Sheffield Units

ANALYSIS 3123



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



Paper & Paperboard Interlaboratory Testing Program

**Report #4261,
September 2023**

Analysis 3131

Roughness - Print Surf Method - 2.5 to 6.0 Microns

TAPPI Official Test Method T555

WebCode	Data Flag	<u>Sample PH21</u>			<u>Sample PH22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3QPUE6		5.803	0.018	0.03	5.964	0.097	0.14
93ZDD2		5.646	-0.139	-0.21	5.670	-0.197	-0.29
AW3BNR		5.901	0.116	0.18	6.116	0.249	0.37
AXK6P2		5.579	-0.206	-0.31	5.689	-0.178	-0.26
BE3K9N		6.264	0.479	0.73	6.282	0.415	0.61
BJURQX		6.092	0.307	0.47	6.227	0.360	0.53
CLYY7V		5.975	0.190	0.29	6.024	0.157	0.23
P29ZTK		3.986	-1.799	-2.74	3.943	-1.924	-2.84
QHCUYK		6.187	0.402	0.61	6.336	0.469	0.69
UM9W92		6.468	0.683	1.04	6.307	0.440	0.65
WL8JYE		5.731	-0.054	-0.08	5.977	0.110	0.16

Summary Statistics	<u>Sample PH21</u>	<u>Sample PH22</u>
Grand Means	5.78 Microns	5.87 Microns
Std Dev Btwn Labs	0.66 Microns	0.68 Microns

Statistics based on 11 of 11 reporting participants.



Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

Analysis 3131

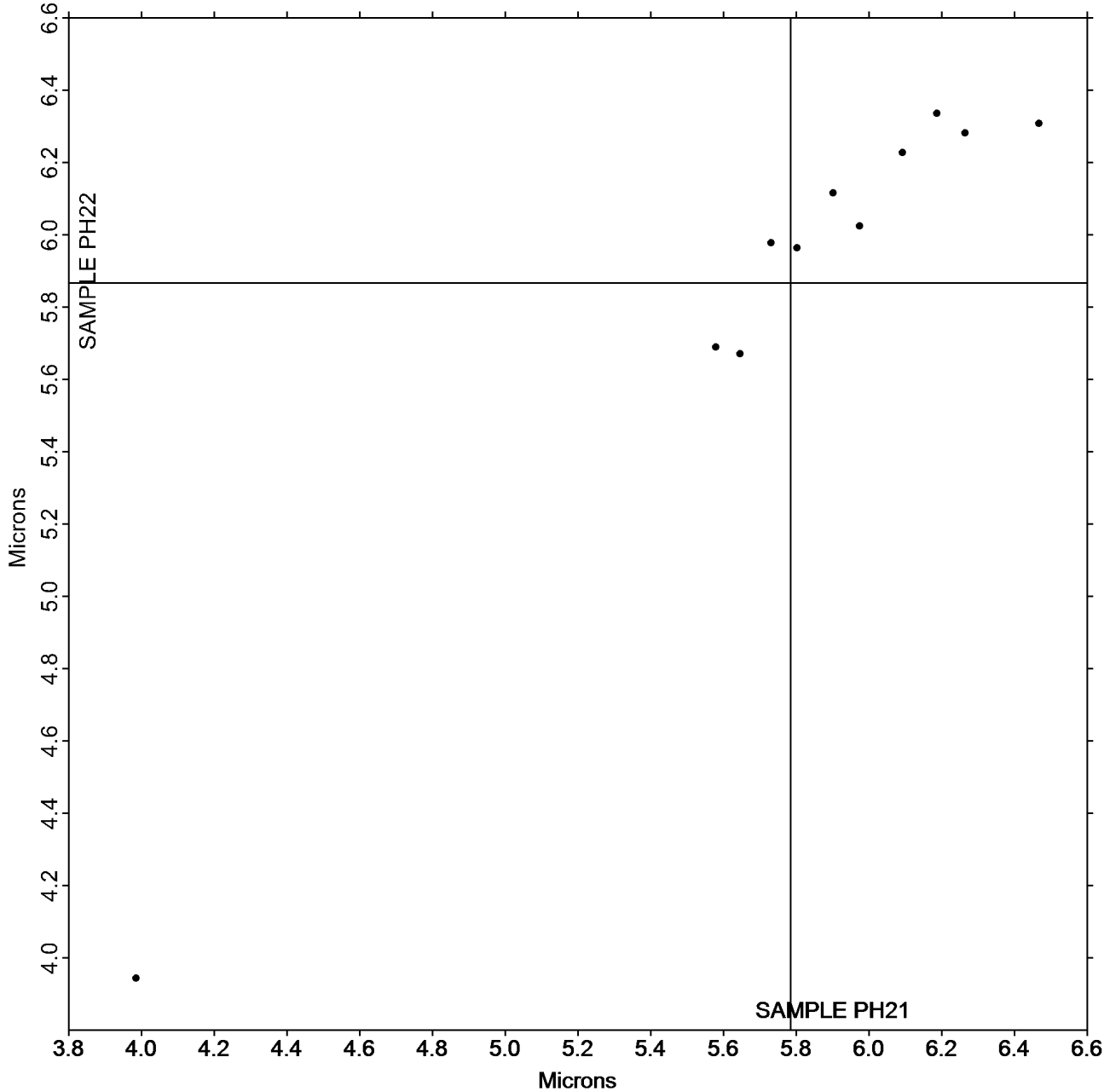
Roughness - Print Surf Method - 2.5 to 6.0 Microns

TAPPI Official Test Method T555

Grand Mean Sample PH21 = 5.7847
Microns

Grand Mean Sample PH22 = 5.8668
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.



Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

Analysis 3133

Roughness - Sheffield Type

TAPPI Official Test Method T538

WebCode	Data Flag	Sample SR21			Sample SR22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2ERU32		129.7	-3.3	-0.31	127.8	-4.7	-0.47
3M6343		133.1	0.1	0.01	127.7	-4.8	-0.48
3P9XM6		132.1	-0.9	-0.08	130.0	-2.5	-0.25
3QPUE6		130.0	-3.0	-0.28	128.6	-3.9	-0.39
6R7XZ8	X	164.3	31.3	2.90	173.3	40.8	4.09
7MTFHQ		127.3	-5.7	-0.53	137.7	5.2	0.53
8HUKV9		143.5	10.5	0.97	135.8	3.3	0.33
8WEZY9		109.5	-23.5	-2.18	111.0	-21.5	-2.15
93ZDD2		154.0	21.0	1.94	157.0	24.5	2.46
9T9UYT		131.0	-2.0	-0.18	128.1	-4.3	-0.43
AW3BNR		151.9	18.9	1.75	142.2	9.7	0.97
AXK6P2		122.6	-10.4	-0.96	123.4	-9.1	-0.91
BE3K9N		127.4	-5.6	-0.52	128.5	-4.0	-0.40
BJURQX		133.4	0.4	0.04	131.5	-1.0	-0.10
C9UGVV		126.2	-6.8	-0.63	124.1	-8.4	-0.84
CD4W6J		125.9	-7.1	-0.66	127.9	-4.5	-0.45
CR84JN		117.9	-15.1	-1.40	122.8	-9.7	-0.97
FBQ7RK	*	162.6	29.6	2.74	160.2	27.7	2.78
FE7YGT		130.8	-2.2	-0.21	128.5	-4.0	-0.40
G6UYMG	X	172.4	39.4	3.65	183.5	51.0	5.11
G9UAFW		135.8	2.8	0.26	139.0	6.5	0.66
GYP3ZW		136.1	3.1	0.29	136.2	3.7	0.38
KJ6W2T		120.0	-13.0	-1.20	125.6	-6.9	-0.69
KY22LJ		138.8	5.8	0.54	138.0	5.5	0.56
LDQM6G		132.4	-0.6	-0.06	128.2	-4.3	-0.43
LE9G7Q	X	440.7	307.7	28.49	439.2	306.7	30.73
LWNNGM		131.1	-1.9	-0.18	135.0	2.5	0.25
MATG8P		129.9	-3.1	-0.29	129.5	-3.0	-0.30
MPL23R		138.6	5.6	0.52	136.7	4.2	0.43
NLJFQF	X	133.1	0.1	0.01	182.7	50.2	5.03
P29ZTK		143.5	10.5	0.97	139.7	7.2	0.72
QHCUYK		128.2	-4.8	-0.45	128.4	-4.1	-0.41
TCTM6H		129.8	-3.2	-0.30	119.5	-13.0	-1.30
U9NEED		112.8	-20.2	-1.87	118.8	-13.7	-1.37
UBXEJ		140.9	7.9	0.73	144.0	11.5	1.16
UM9W92		134.9	1.9	0.18	134.7	2.2	0.22
UPJUMJ		138.6	5.6	0.52	131.1	-1.3	-0.13
V76M3A		123.1	-9.9	-0.91	120.2	-12.3	-1.23
VQNRMD	*	146.3	13.3	1.23	154.1	21.7	2.17
WHDP2D		155.1	22.1	2.04	146.8	14.3	1.44



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

Report #4261,
September 2023

WebCode	Data Flag	<u>Sample SR21</u>			<u>Sample SR22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
WL8JYE		131.5	-1.5	-0.14	133.0	0.5	0.05
Y82A8A	X	127.3	-5.7	-0.53	107.5	-25.0	-2.50
ZEKR3W		129.1	-3.9	-0.36	130.4	-2.1	-0.21
ZKNYHZ		126.5	-6.5	-0.60	130.8	-1.7	-0.17
ZRMK8E		135.5	2.5	0.23	135.6	3.1	0.31
ZTEJLD		120.5	-12.5	-1.16	120.6	-11.9	-1.19
ZZXMTF		138.0	5.0	0.46	134.6	2.1	0.21

Summary Statistics	<u>Sample SR21</u>	<u>Sample SR22</u>
Grand Means	133.00 Sheffield	132.46 Sheffield
Std Dev Btwn Labs	10.80 Sheffield	9.98 Sheffield
Statistics based on 42 of 47 reporting participants.		

Comments on Assigned Data Flags for Test #3133

- Y82A8A (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample SR22.
- LE9G7Q (X) - Extreme Data.
- 6R7XZ8 (X) - Data for both samples are high. Possible Systematic Error.
- G6UYMG (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.
- NLJFQF (X) - Data for sample SR22 are high. Inconsistent within the determinations of sample SR22.



Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

Analysis 3133

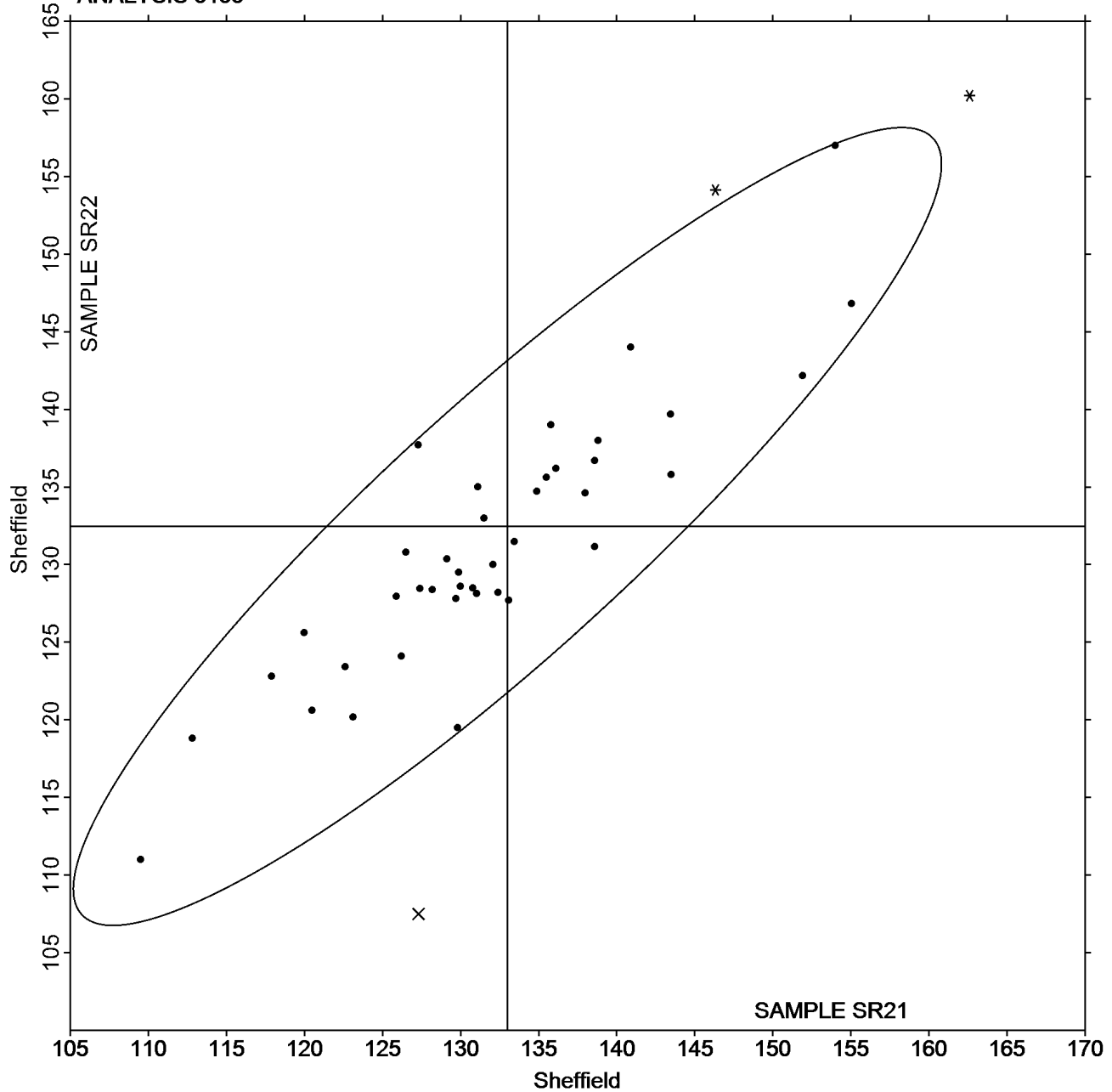
Roughness - Sheffield Type

TAPPI Official Test Method T538

Grand Mean Sample SR21 = 133.00
Sheffield

Grand Mean Sample SR22 = 132.46
Sheffield

ANALYSIS 3133





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

Report #4261,
September 2023

WebCode	Data Flag	Sample GM21			Sample GM22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3KD7E9		75.12	-0.08	-0.20	103.9	0.1	0.10
3P9XM6		75.45	0.25	0.59	103.7	-0.1	-0.14
6MEQGY		75.39	0.19	0.44	104.0	0.2	0.27
6R7XZ8		75.51	0.31	0.73	104.7	0.9	1.50
7MTFHQ		74.32	-0.88	-2.09	103.1	-0.7	-1.18
8VL84P		74.89	-0.31	-0.74	104.3	0.5	0.89
8ZECU9		75.74	0.54	1.27	104.0	0.2	0.31
CCQ6C3		75.16	-0.04	-0.09	104.1	0.3	0.51
EF4PA3		74.61	-0.59	-1.40	103.8	0.0	-0.05
EF6FNW		75.82	0.61	1.45	104.4	0.6	1.09
FBQ7RK		74.70	-0.50	-1.19	102.8	-1.0	-1.74
FE7YGT		74.80	-0.41	-0.96	103.5	-0.3	-0.49
FMY72J		75.18	-0.02	-0.06	103.5	-0.3	-0.54
FYAJGY		75.67	0.47	1.11	104.5	0.7	1.22
G2GCUX		74.85	-0.35	-0.84	103.1	-0.7	-1.17
G6WKHX		75.09	-0.11	-0.26	103.2	-0.6	-1.01
G9UAFW		74.62	-0.58	-1.38	102.8	-1.0	-1.70
HHXKML		75.13	-0.07	-0.17	104.3	0.5	0.86
KFZDUK		74.70	-0.50	-1.19	103.0	-0.8	-1.33
LJ3B6D		75.80	0.59	1.40	104.7	0.9	1.62
MATG8P		75.61	0.41	0.96	105.0	1.2	2.02
PNGHV8		75.09	-0.11	-0.26	103.7	-0.1	-0.20
PX82AF		75.38	0.17	0.41	103.7	-0.1	-0.11
QVF6KL		75.12	-0.09	-0.21	103.7	-0.1	-0.15
VTFMC8		75.48	0.28	0.66	103.5	-0.3	-0.51
Y82A8A		75.35	0.15	0.35	103.7	-0.1	-0.16
YB48H3		75.92	0.71	1.69	103.9	0.1	0.11

Summary Statistics	Sample GM21	Sample GM22
Grand Means	75.20 g/sq m	103.80 g/sq m
Std Dev Btwn Labs	0.42 g/sq m	0.58 g/sq m
Statistics based on 27 of 27 reporting participants.		



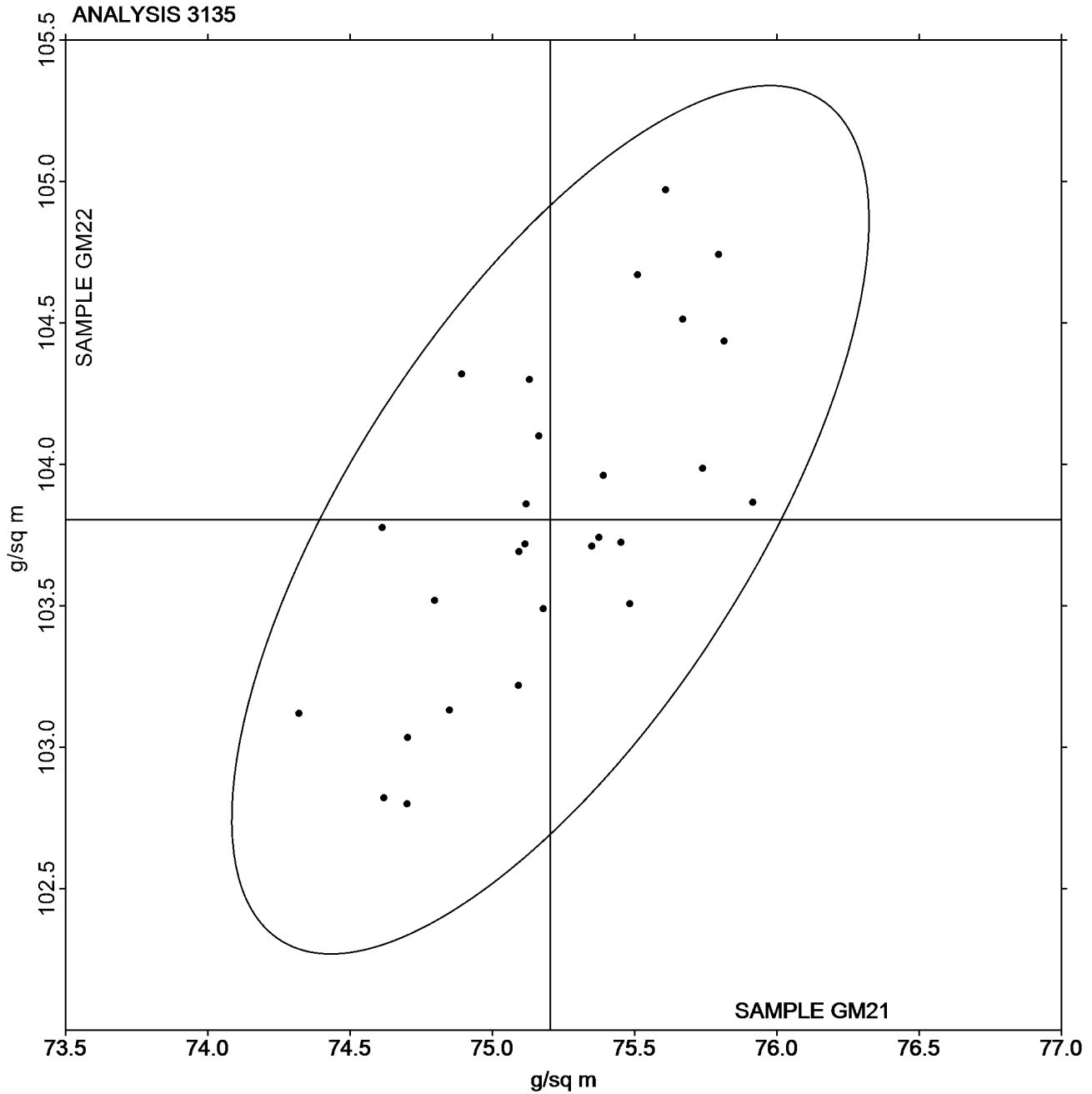
Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

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

Grand Mean Sample GM21 = 75.204
g/sq m

Grand Mean Sample GM22 = 103.80
g/sq m





Paper & Paperboard Interlaboratory Testing Program

**Report #4261,
September 2023**

Analysis 3141

Opacity (89% Reflectance Backing) - Fine Papers

TAPPI Official Test Method T425

WebCode	Data Flag	<u>Sample VR21</u>			<u>Sample VR22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3M6343		88.56	-0.77	-1.23	88.30	-1.00	-1.80
3P9XM6		89.32	-0.01	-0.01	88.67	-0.63	-1.14
4UKYRA		89.33	0.00	0.00	89.47	0.16	0.30
7MTFHQ		89.27	-0.06	-0.09	89.44	0.14	0.24
8WEZY9	*	91.26	1.93	3.09	91.01	1.71	3.06
9T9UYT		89.17	-0.16	-0.26	88.80	-0.50	-0.90
AW3BNR		89.06	-0.27	-0.44	89.02	-0.29	-0.51
BE3K9N		89.51	0.18	0.29	89.54	0.24	0.43
BJURQX		89.56	0.23	0.37	89.12	-0.19	-0.34
CD4W6J		89.08	-0.25	-0.40	89.06	-0.24	-0.44
G9UAFW	*	87.81	-1.52	-2.43	88.92	-0.38	-0.69
JCAJKD		89.29	-0.04	-0.06	89.41	0.11	0.19
KFZDUK		89.31	-0.02	-0.04	89.11	-0.19	-0.34
MATG8P		89.86	0.53	0.85	90.33	1.03	1.84
QHCUYK		89.31	-0.02	-0.04	89.17	-0.14	-0.24
TG9VTG		89.46	0.13	0.20	89.33	0.03	0.05
UBXEJJ		89.89	0.56	0.90	89.38	0.08	0.14
UPJUMJ		89.02	-0.31	-0.50	89.18	-0.12	-0.22
V76M3A		89.43	0.10	0.16	89.46	0.16	0.28
Y82A8A		89.51	0.18	0.29	89.19	-0.11	-0.20
ZTEJLD		88.91	-0.42	-0.67	89.47	0.17	0.30

Summary Statistics	<u>Sample VR21</u>	<u>Sample VR22</u>
Grand Means	89.33 Percent	89.30 Percent
Std Dev Btwn Labs	0.62 Percent	0.56 Percent
Statistics based on 21 of 21 reporting participants.		



Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

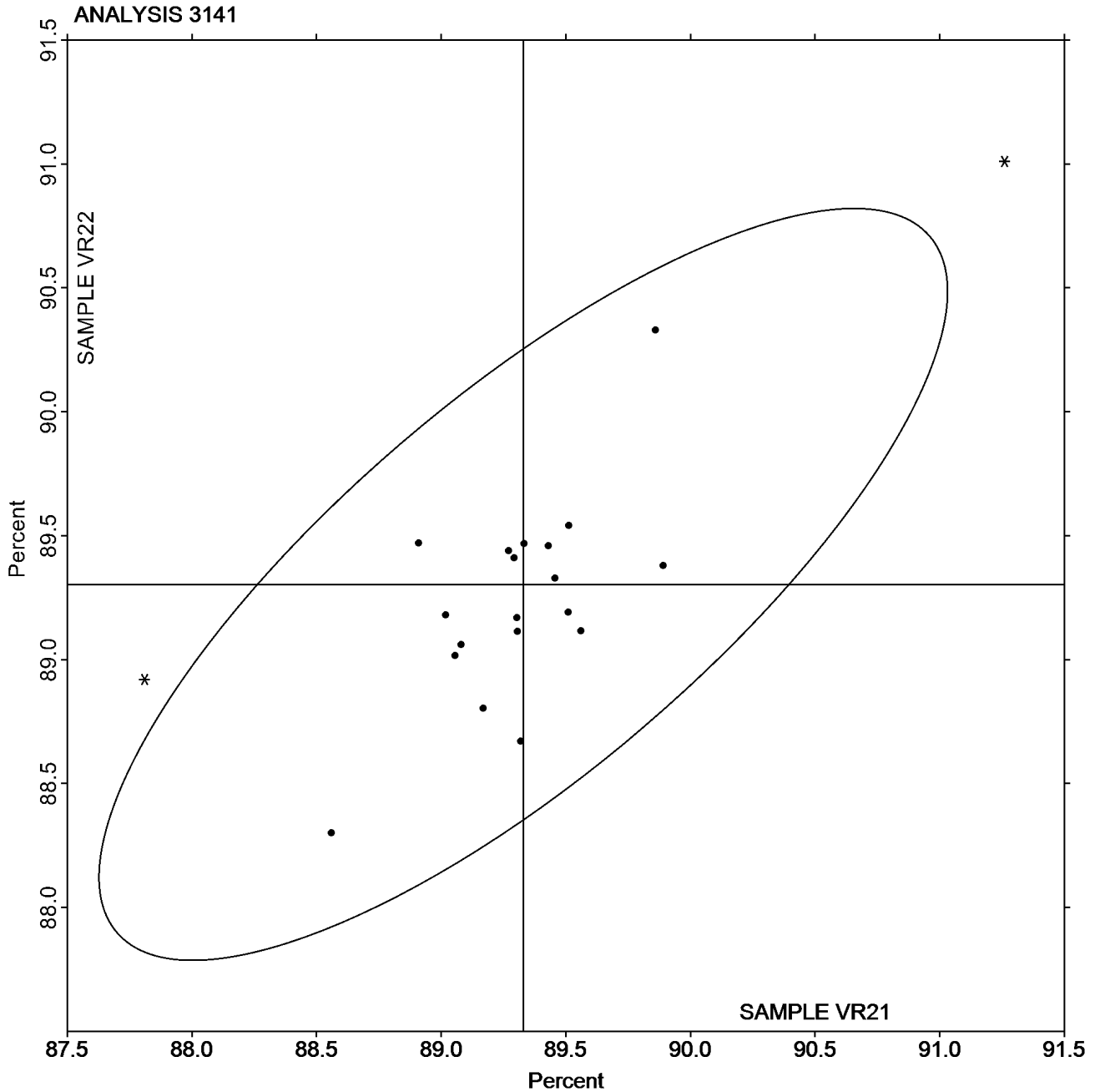
Analysis 3141

Opacity (89% Reflectance Backing) - Fine Papers

TAPPI Official Test Method T425

Grand Mean Sample VR21 = 89.329
Percent

Grand Mean Sample VR22 = 89.304
Percent





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

Report #4261,
September 2023

WebCode	Data Flag	<u>Sample VP21</u>			<u>Sample VP22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3KD7E9		90.15	-0.12	-0.88	90.07	-0.02	-0.23
6R7XZ8		90.50	0.23	1.69	90.02	-0.07	-1.07
CVLXWZ		90.19	-0.07	-0.53	90.17	0.09	1.28
EF6FNW		90.22	-0.04	-0.31	90.04	-0.05	-0.75
HHXKML		90.27	0.00	0.03	90.14	0.05	0.78

Summary Statistics	<u>Sample VP21</u>	<u>Sample VP22</u>
Grand Means	90.27 Percent	90.09 Percent
Std Dev Btwn Labs	0.14 Percent	0.07 Percent

Statistics based on 5 of 5 reporting participants.



Paper & Paperboard Interlaboratory Testing Program

Report #4261,
September 2023

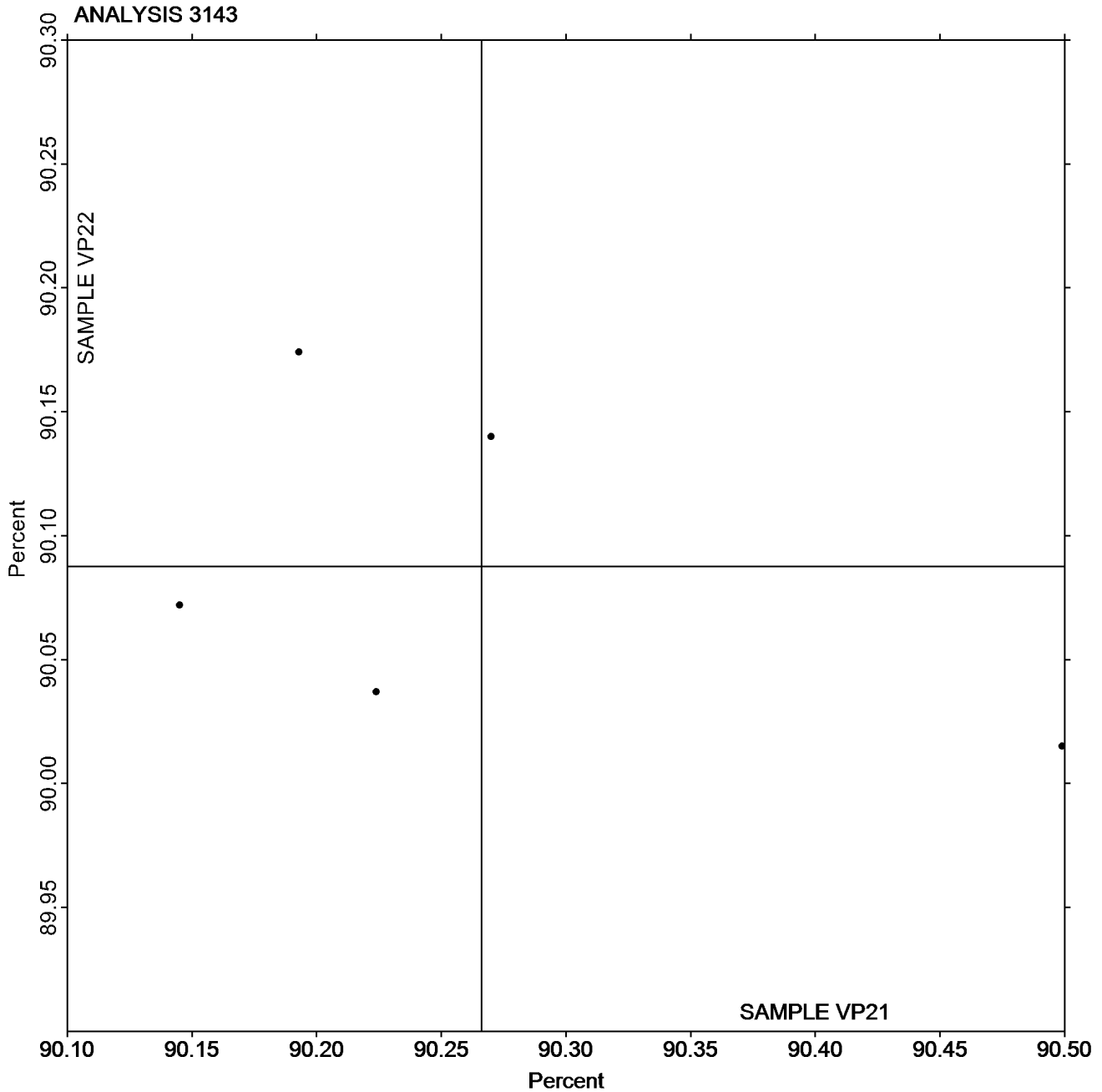
Analysis 3143

Opacity (Paper Backing) - Fine Papers and Newsprint

TAPPI Official Test Method T519

Grand Mean Sample VP21 = 90.266
Percent

Grand Mean Sample VP22 = 90.088
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 #4261,
September 2023

WebCode	Data Flag	Sample BF21			Sample BF22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4UKYRA		92.03	-0.41	-0.18	92.10	-0.44	-0.19
9T9UYT		93.02	0.58	0.25	93.43	0.90	0.39
AW3BNR		92.88	0.44	0.19	92.94	0.41	0.17
BE3K9N		94.50	2.06	0.88	94.44	1.91	0.82
JCAJKD		94.35	1.91	0.82	94.46	1.93	0.83
KFZDUK		92.95	0.51	0.22	93.03	0.50	0.21
MATG8P		92.78	0.34	0.15	92.68	0.15	0.06
MPL23R		92.50	0.06	0.03	92.54	0.01	0.00
QHCUYK		93.28	0.84	0.36	93.22	0.69	0.30
RVDU49		89.85	-2.59	-1.10	89.92	-2.62	-1.13
U9NEED		94.80	2.36	1.01	94.99	2.46	1.06
UPJUMJ		92.94	0.50	0.21	93.18	0.64	0.28
V76M3A		85.82	-6.62	-2.82	86.02	-6.51	-2.80

Summary Statistics	Sample BF21	Sample BF22
Grand Means	92.44 Percent	92.53 Percent
Std Dev Btwn Labs	2.35 Percent	2.33 Percent
Statistics based on 13 of 13 reporting participants.		



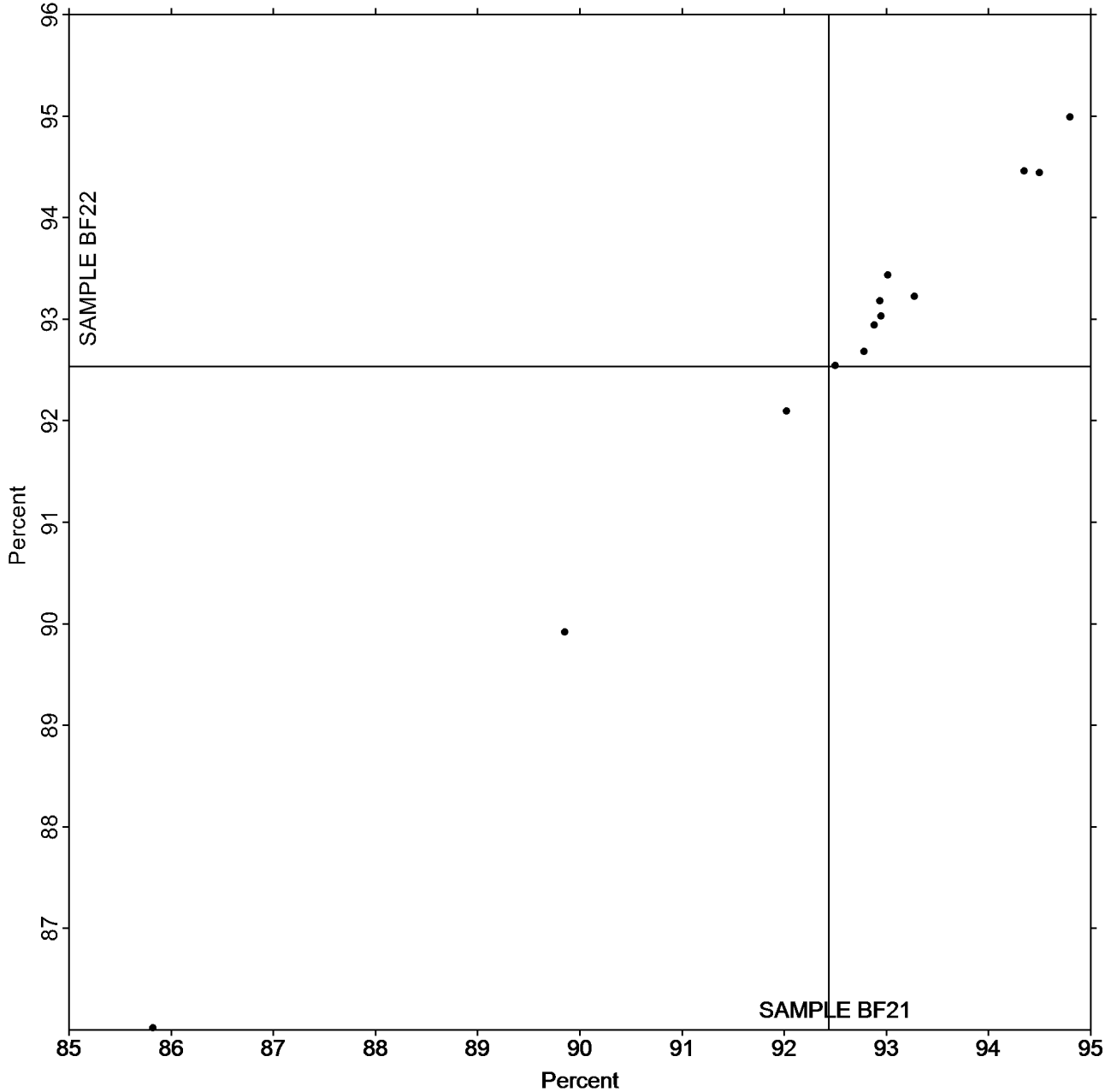
Paper & Paperboard Interlaboratory Testing Program
Analysis 3145
Directional Brightness of Fluorescent Samples
TAPPI Official Test Method T452

Report #4261,
September 2023

Grand Mean Sample BF21 = 92.438
Percent

Grand Mean Sample BF22 = 92.535
Percent

ANALYSIS 3145



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 #4261,
September 2023

WebCode	Data Flag	Sample BF21			Sample BF22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4UKYRA		5.488	-0.537	-1.42	5.504	-0.558	-1.37
9T9UYT	*	6.198	0.173	0.46	6.476	0.414	1.02
AW3BNR		6.360	0.335	0.88	6.420	0.358	0.88
BE3K9N		6.036	0.011	0.03	6.054	-0.008	-0.02
JCAJKD		6.420	0.395	1.04	6.440	0.378	0.93
KFZDUK		6.312	0.287	0.76	6.292	0.230	0.57
MPL23R		6.280	0.255	0.67	6.320	0.258	0.63
QHCUYK		6.004	-0.021	-0.06	6.014	-0.048	-0.12
RVDU49		5.840	-0.185	-0.49	5.860	-0.202	-0.50
U9NEED		6.046	0.021	0.06	6.074	0.012	0.03
UPJUMJ		6.178	0.153	0.40	6.172	0.110	0.27
V76M3A		5.140	-0.885	-2.34	5.120	-0.942	-2.32

Summary Statistics	Sample BF21	Sample BF22
Grand Means	6.03 Percent	6.06 Percent
Std Dev Btwn Labs	0.38 Percent	0.41 Percent

Statistics based on 12 of 12 reporting participants.



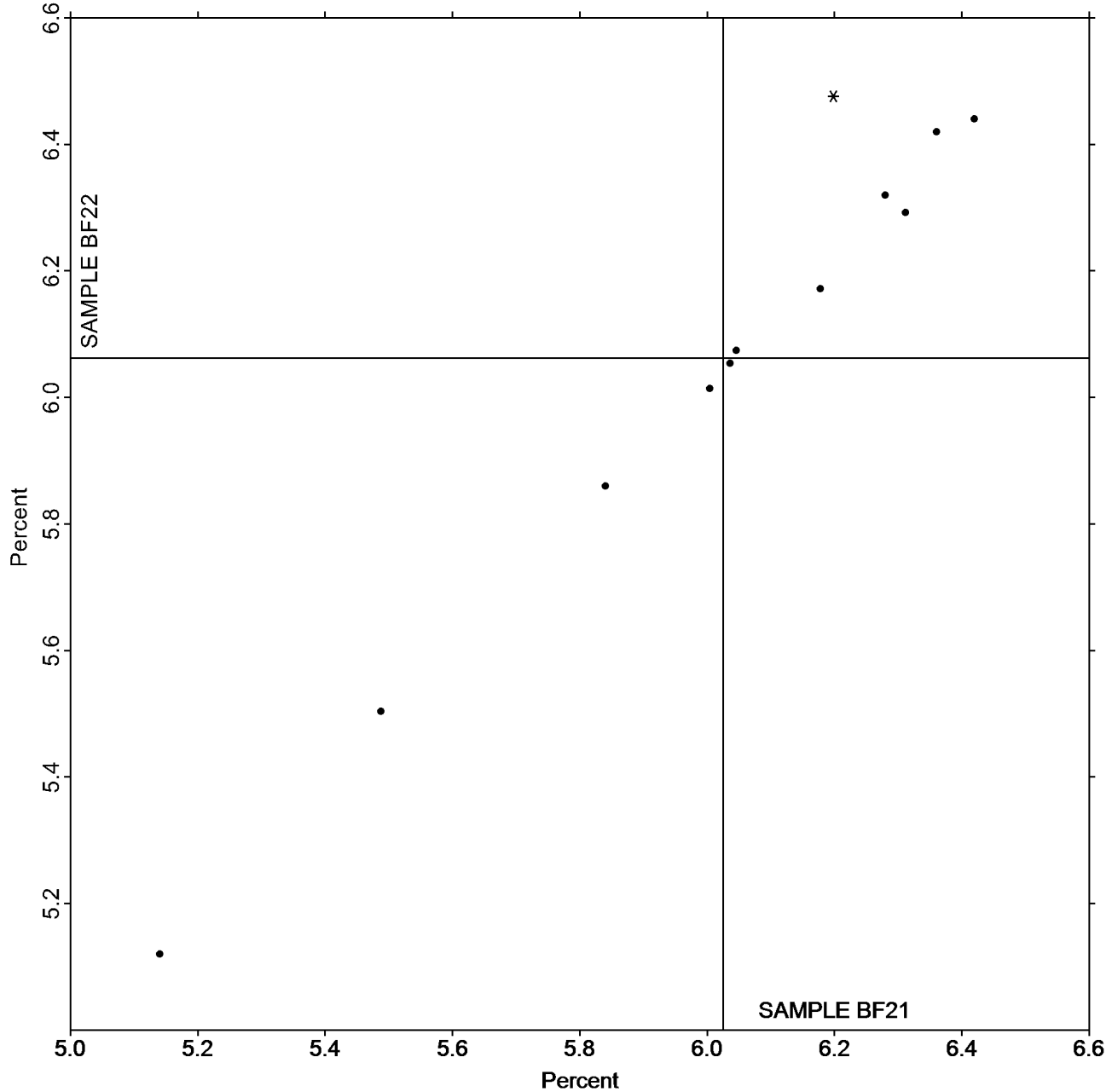
Paper & Paperboard Interlaboratory Testing Program
Analysis 3146
Fluorescent Component of Directional Brightness
TAPPI Official Test Method T452

Report #4261,
September 2023

Grand Mean Sample BF21 = 6.0252
Percent

Grand Mean Sample BF22 = 6.0622
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 #4261,
September 2023**

Analysis 3201

Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

WebCode	Data Flag	Sample TP21			Sample TP22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
9T9UYT	X	21.118	18.817	61.53	21.037	18.709	59.20
AW3BNR		2.226	-0.076	-0.25	2.135	-0.193	-0.61
FPTQBX		2.388	0.086	0.28	2.495	0.167	0.53
KJ6W2T		2.080	-0.222	-0.73	2.040	-0.288	-0.91
QHCUYK		2.069	-0.233	-0.76	2.104	-0.224	-0.71
UPJUMJ		1.989	-0.313	-1.02	2.139	-0.189	-0.60
V76M3A		2.226	-0.076	-0.25	2.242	-0.086	-0.27
Y82A8A		2.927	0.625	2.04	2.987	0.659	2.09
ZTEJLD		2.510	0.208	0.68	2.480	0.152	0.48

Summary Statistics	Sample TP21	Sample TP22
Grand Means	2.30 Taber Units	2.33 Taber Units
Stnd Dev Btwn Labs	0.31 Taber Units	0.32 Taber Units
Statistics based on 8 of 9 reporting participants.		

Comments on Assigned Data Flags for Test #3201

9T9UYT (X) - Extreme Data.



Analysis 3201

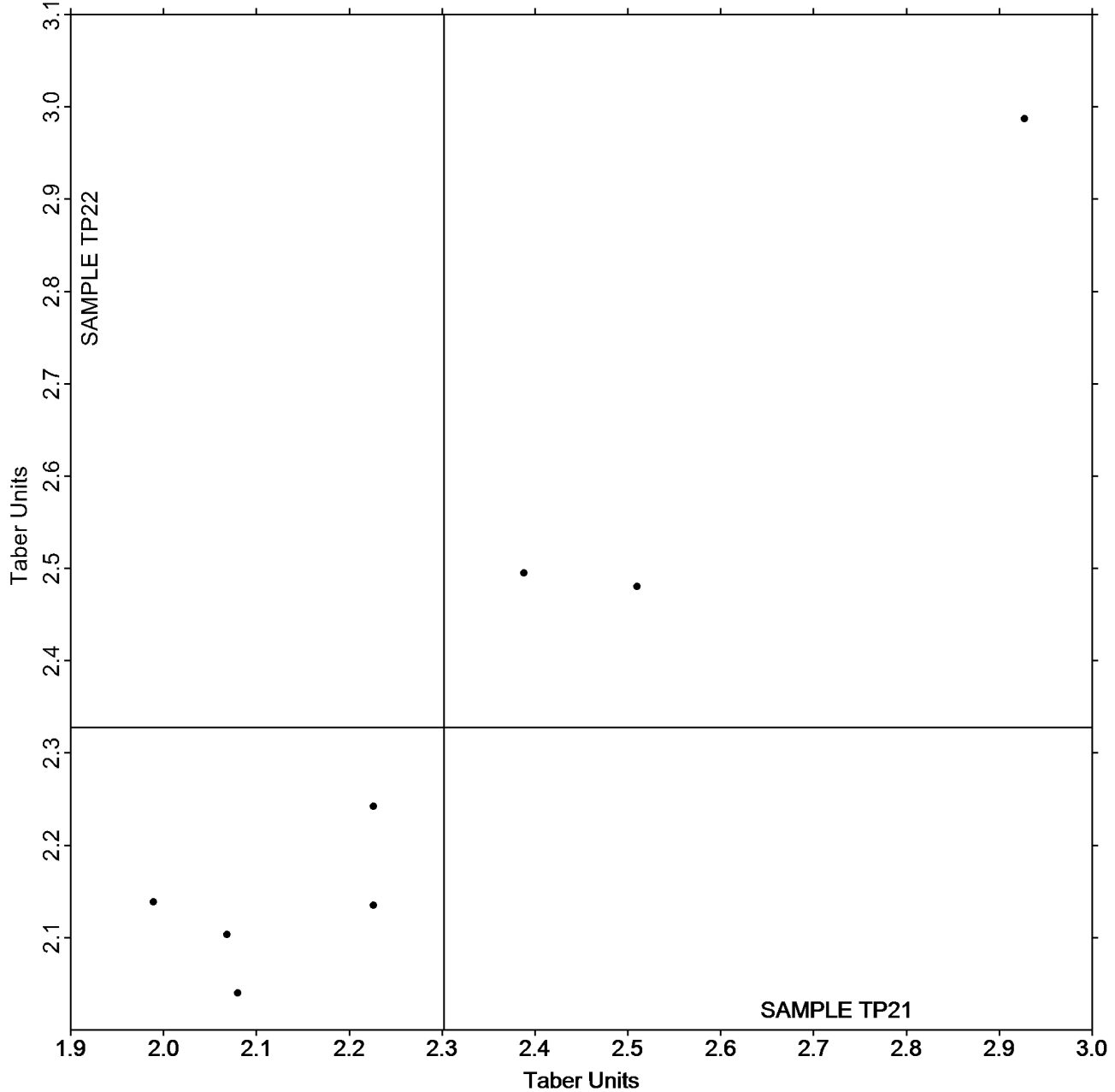
Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

Grand Mean Sample TP21 = 2.3018
Taber Units

Grand Mean Sample TP22 = 2.3276
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
Analysis 3203
Bending Resistance, Taber Type - 10 to 100 Taber Units
TAPPI Official Test Method T489

Report #4261,
September 2023

WebCode	Data Flag	<u>Sample TC21</u>			<u>Sample TC22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3QPUE6		16.39	-1.47	-0.98	27.02	-2.51	-1.19
93ZDD2		18.41	0.54	0.36	30.80	1.27	0.60
AW3BNR		17.61	-0.25	-0.17	29.96	0.43	0.20
AXK6P2		16.82	-1.04	-0.70	26.99	-2.54	-1.21
CLYY7V		16.27	-1.59	-1.06	27.25	-2.28	-1.08
DNGG2K		16.22	-1.64	-1.10	28.45	-1.08	-0.51
E9M8ZZ		18.45	0.59	0.39	31.60	2.07	0.98
FE7YGT		18.07	0.21	0.14	28.84	-0.69	-0.33
P29ZTK	X	29.85	11.99	7.99	31.45	1.92	0.91
VQNRMD		20.08	2.22	1.48	32.00	2.47	1.17
WHDP2D		20.33	2.47	1.64	32.39	2.86	1.36

Summary Statistics	<u>Sample TC21</u>	<u>Sample TC22</u>
Grand Means	17.86 Taber Units	29.53 Taber Units
Std Dev Btwn Labs	1.50 Taber Units	2.11 Taber Units
Statistics based on 10 of 11 reporting participants.		

Comments on Assigned Data Flags for Test #3203

P29ZTK (X) - Extreme Data for Sample TC21.

Analysis Notes:

3QPUE6 - 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 #4261,
September 2023

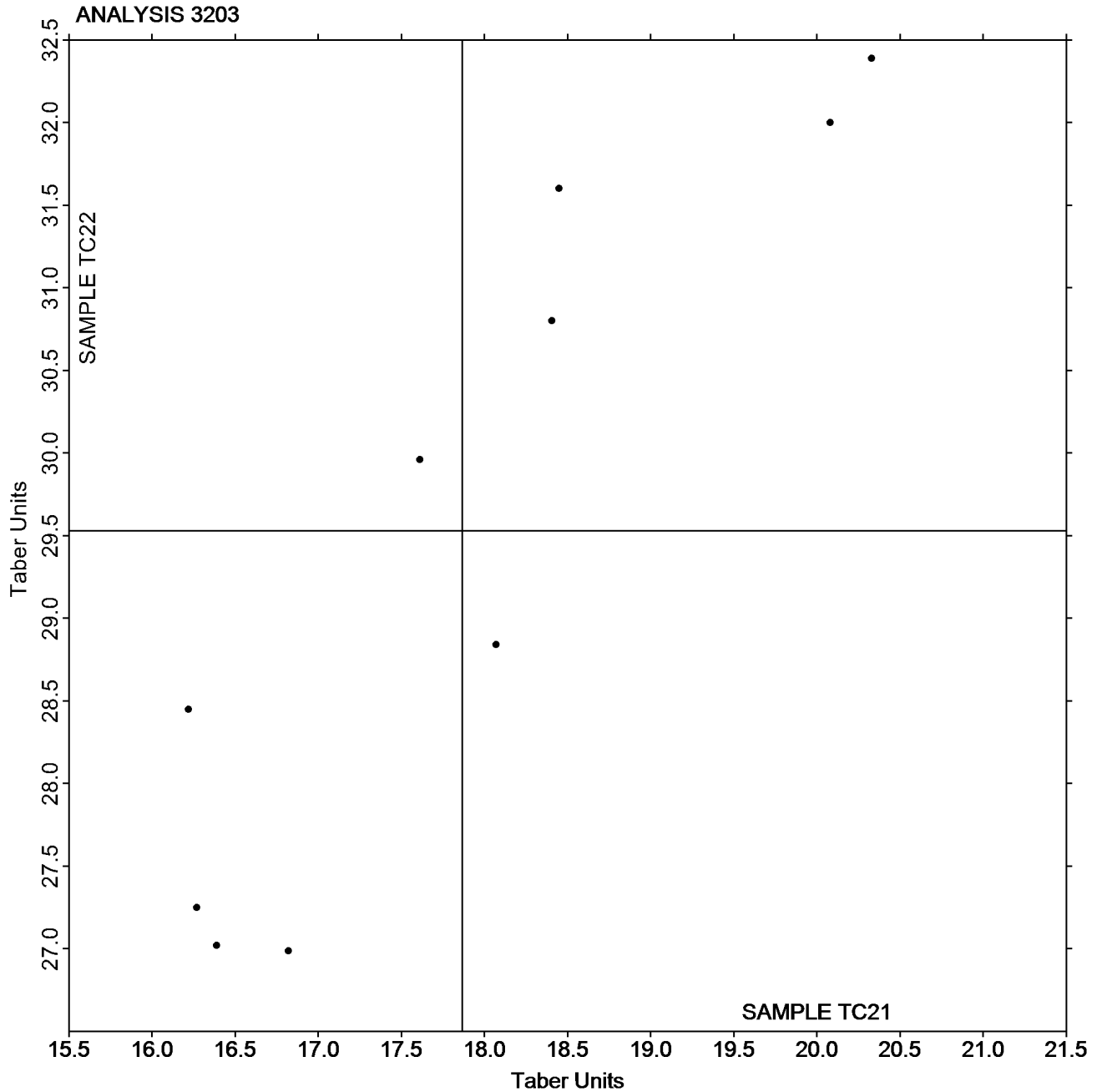
Analysis 3203

Bending Resistance, Taber Type - 10 to 100 Taber Units

TAPPI Official Test Method T489

Grand Mean Sample TC21 = 17.865
Taber Units

Grand Mean Sample TC22 = 29.530
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

Report #4261,
September 2023

Analysis 3205

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

TAPPI Official Test Method T489

WebCode	Data Flag	<u>Sample TR21</u>			<u>Sample TR22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3QPUE6		169.0	-4.2	-0.68	175.5	0.8	0.15
93ZDD2		175.2	2.0	0.33	175.2	0.4	0.08
EF6FNW		162.0	-11.2	-1.81	166.3	-8.4	-1.61
FBQ7RK		166.2	-7.0	-1.12	172.3	-2.4	-0.46
G6UYMG		173.8	0.6	0.09	170.0	-4.8	-0.91
KW96WP		172.6	-0.6	-0.09	173.0	-1.8	-0.34
KY22LJ		172.9	-0.3	-0.05	172.2	-2.6	-0.49
TCTM6H		180.7	7.5	1.21	183.8	9.0	1.72
UBXEJJ		170.9	-2.3	-0.36	172.3	-2.5	-0.47
UM9W92		179.1	5.9	0.95	179.8	5.0	0.96
WL8JYE	X	347.7	174.5	28.15	339.9	165.1	31.44
ZZXMTF		182.7	9.5	1.54	182.0	7.2	1.38

Summary Statistics	<u>Sample TR21</u>	<u>Sample TR22</u>
Grand Means	173.19 Taber Units	174.77 Taber Units
Stnd Dev Btwn Labs	6.20 Taber Units	5.25 Taber Units

Statistics based on 11 of 12 reporting participants.

Comments on Assigned Data Flags for Test #3205

WL8JYE (X) - Extreme Data.

Analysis Notes:

3QPUE6 - 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 #4261,
September 2023

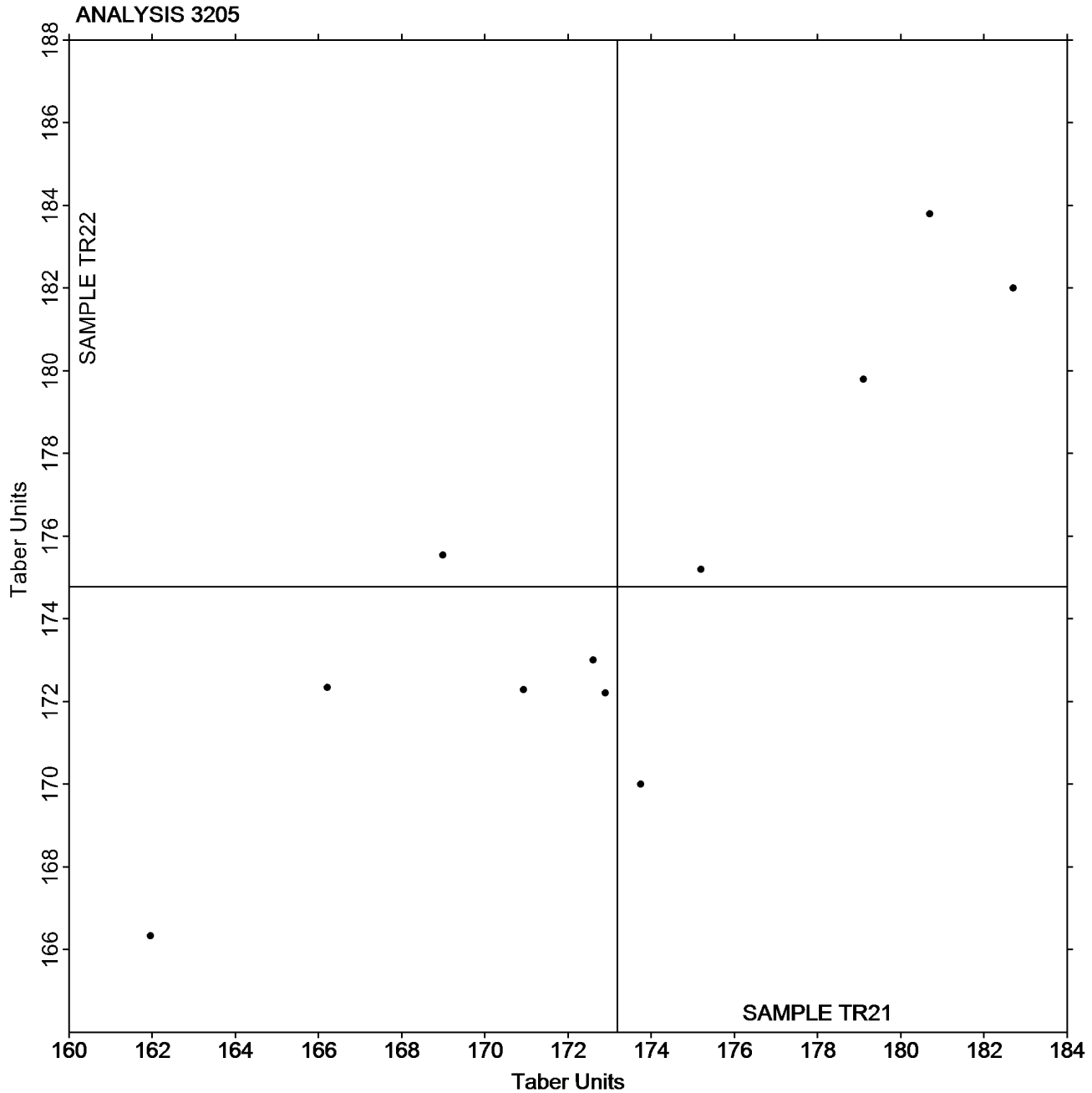
Analysis 3205

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

TAPPI Official Test Method T489

Grand Mean Sample TR21 = 173.19
Taber Units

Grand Mean Sample TR22 = 174.77
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 #4261,
September 2023

WebCode	Data Flag	Sample ZR21			Sample ZR22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3QPUE6		66.16	0.19	0.04	67.70	1.85	0.37
64MKBU		69.38	3.41	0.69	73.30	7.45	1.50
72QNY6		65.20	-0.77	-0.16	62.00	-3.85	-0.77
74UJH8		76.90	10.94	2.21	70.92	5.07	1.02
7BXGC7		69.10	3.13	0.63	73.10	7.25	1.46
93ZDD2		63.68	-2.29	-0.46	62.42	-3.43	-0.69
CR84JN		59.80	-6.17	-1.25	65.20	-0.65	-0.13
CVLXWZ		65.20	-0.77	-0.16	68.00	2.15	0.43
KW96WP		62.88	-3.09	-0.63	63.88	-1.97	-0.40
KY22LJ		60.56	-5.41	-1.09	60.52	-5.33	-1.07
P7YJNN		62.62	-3.35	-0.68	61.16	-4.69	-0.94
TCTM6H		63.60	-2.37	-0.48	64.00	-1.85	-0.37
TDAUDK		59.40	-6.57	-1.33	56.00	-9.85	-1.98
UBXEJJ		66.28	0.31	0.06	62.60	-3.25	-0.65
UM9W92		64.80	-1.17	-0.24	66.00	0.15	0.03
WH9FTD		71.04	5.07	1.03	70.12	4.27	0.86
XL9QPD		74.84	8.87	1.80	72.52	6.67	1.34

Summary Statistics		<u>Sample ZR21</u>	<u>Sample ZR22</u>
Grand Means		65.97 psi	65.85 psi
Std Dev Btwn Labs		4.94 psi	4.98 psi
Statistics based on 17 of 17 reporting participants.			



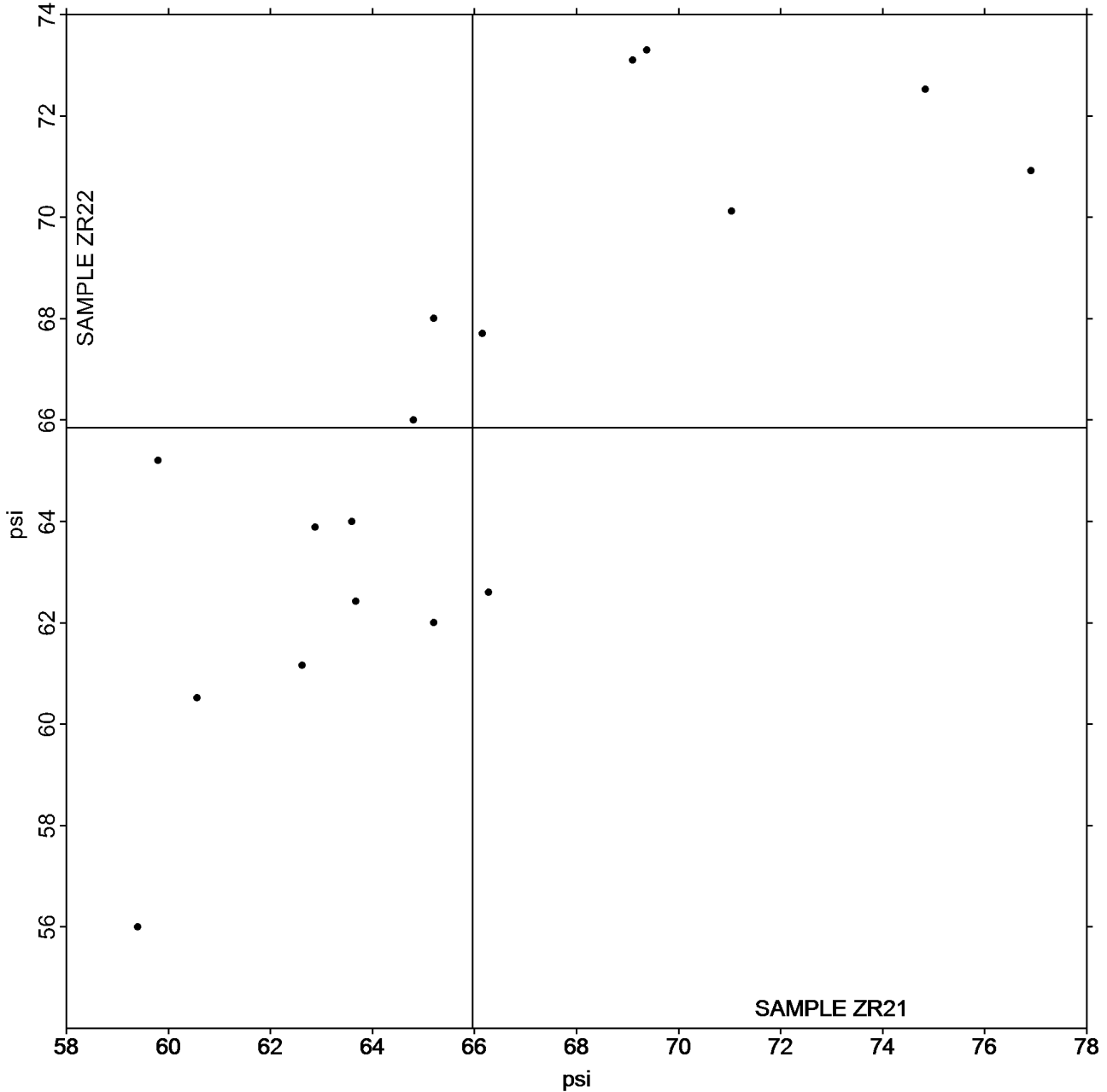
Paper & Paperboard Interlaboratory Testing Program
Analysis 3207
Z-Direction Tensile, Recycled Paperboard
TAPPI Official Test Method T541

Report #4261,
September 2023

Grand Mean Sample ZR21 = 65.967
psi

Grand Mean Sample ZR22 = 65.849
psi

ANALYSIS 3207



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 #4261,
September 2023

WebCode	Data Flag	Sample ZP21			Sample ZP22		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3QPUE6		93.32	16.37	1.45	91.64	14.42	1.31
6R7XZ8		69.18	-7.76	-0.69	71.45	-5.77	-0.52
AXK6P2		82.35	5.41	0.48	79.77	2.56	0.23
CLYY7V		73.96	-2.99	-0.26	74.32	-2.90	-0.26
DNGG2K		81.44	4.49	0.40	81.90	4.68	0.42
FBQ7RK		51.17	-25.78	-2.28	50.47	-26.74	-2.42
G83C2X		74.60	-2.35	-0.21	76.46	-0.76	-0.07
VQNRMD		76.64	-0.31	-0.03	77.84	0.62	0.06
WHDP2D		80.84	3.89	0.34	82.48	5.26	0.48
ZZXMTF		85.96	9.01	0.80	85.84	8.62	0.78

Summary Statistics	Sample ZP21	Sample ZP22
Grand Means	76.95 psi	77.22 psi
Std Dev Btwn Labs	11.32 psi	11.04 psi

Statistics based on 10 of 10 reporting participants.

Analysis Notes:

AXK6P2 - Data appear to be reported as kPa, not psi as indicated on data entry form. CTS will not correct the Units going forward.



Paper & Paperboard Interlaboratory Testing Program

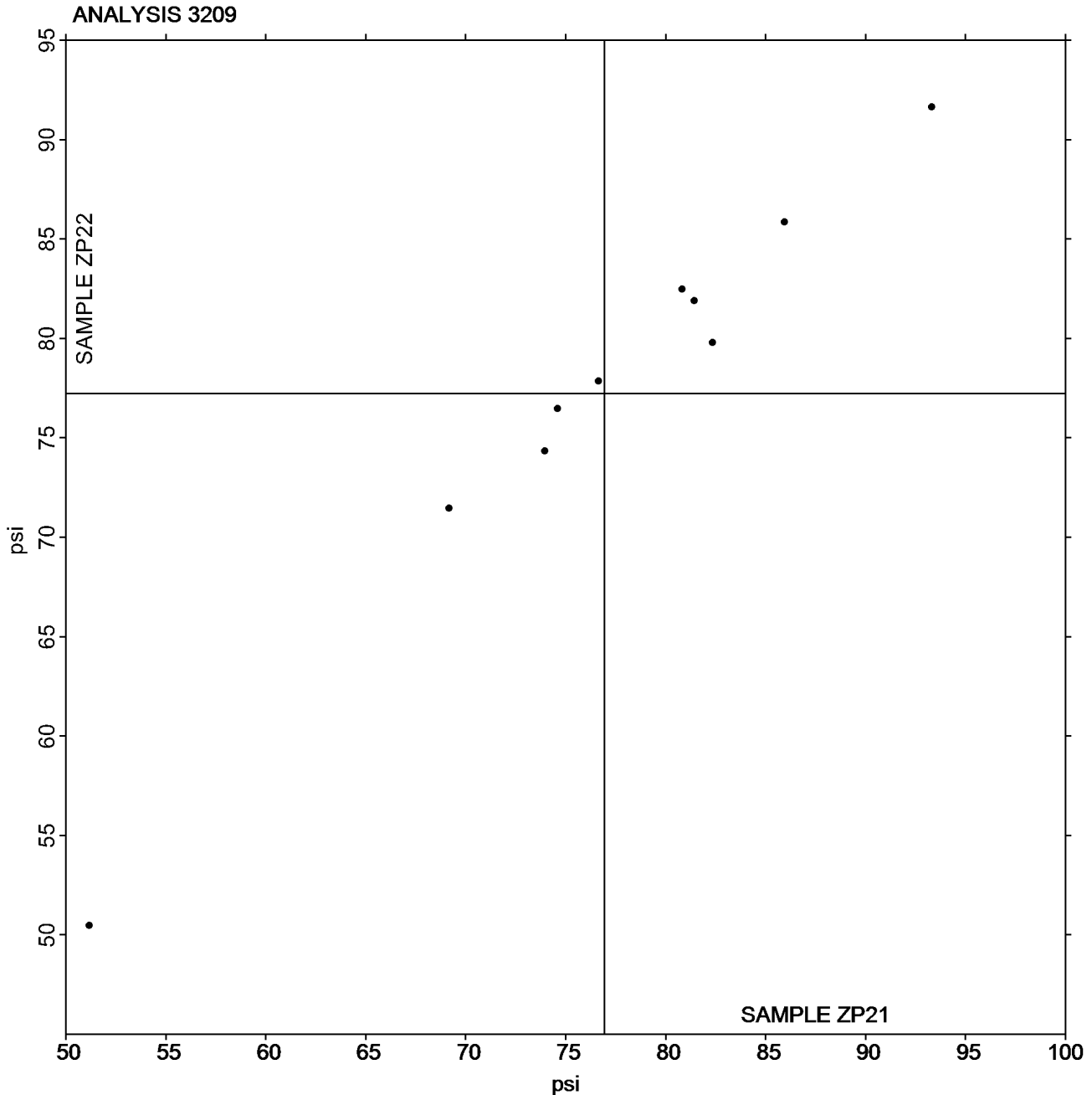
Report #4261,
September 2023

Analysis 3209 Z-Direction Tensile

TAPPI Official Test Method T541

Grand Mean Sample ZP21 = 76.947
psi

Grand Mean Sample ZP22 = 77.217
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 #4261,
September 2023

WebCode	Data Flag	<u>Sample SM21</u>			<u>Sample SM22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3QPUE6		157.4	11.4	1.03	147.8	2.1	0.31
CD4W6J		143.4	-2.6	-0.24	145.8	0.1	0.01
DNGG2K		137.4	-8.6	-0.78	138.8	-6.9	-1.04
FPTQBX		132.0	-14.0	-1.28	136.2	-9.5	-1.43
LE9G7Q		144.6	-1.4	-0.13	141.4	-4.3	-0.65
LWNNGM	X	0.1	-145.9	-13.25	0.2	-145.6	-21.86
UBXEJ		157.0	11.0	1.00	155.8	10.1	1.51
UM9W92		149.4	3.4	0.31	157.0	11.3	1.69
VQNRMD		155.6	9.6	0.87	142.0	-3.7	-0.56
WHDP2D		140.6	-5.4	-0.49	146.2	0.5	0.07
ZKNYHZ		161.0	15.0	1.36	150.4	4.7	0.70
ZZXMTF		128.0	-18.0	-1.64	141.6	-4.1	-0.62

Summary Statistics	<u>Sample SM21</u>	<u>Sample SM22</u>
Grand Means	146.04 1000th ft-lbs	145.73 1000th ft-lbs
Std Dev Btwn Labs	11.01 1000th ft-lbs	6.66 1000th ft-lbs

Statistics based on 11 of 12 reporting participants.

Comments on Assigned Data Flags for Test #3211

LWNNGM (X) - Extreme Data.

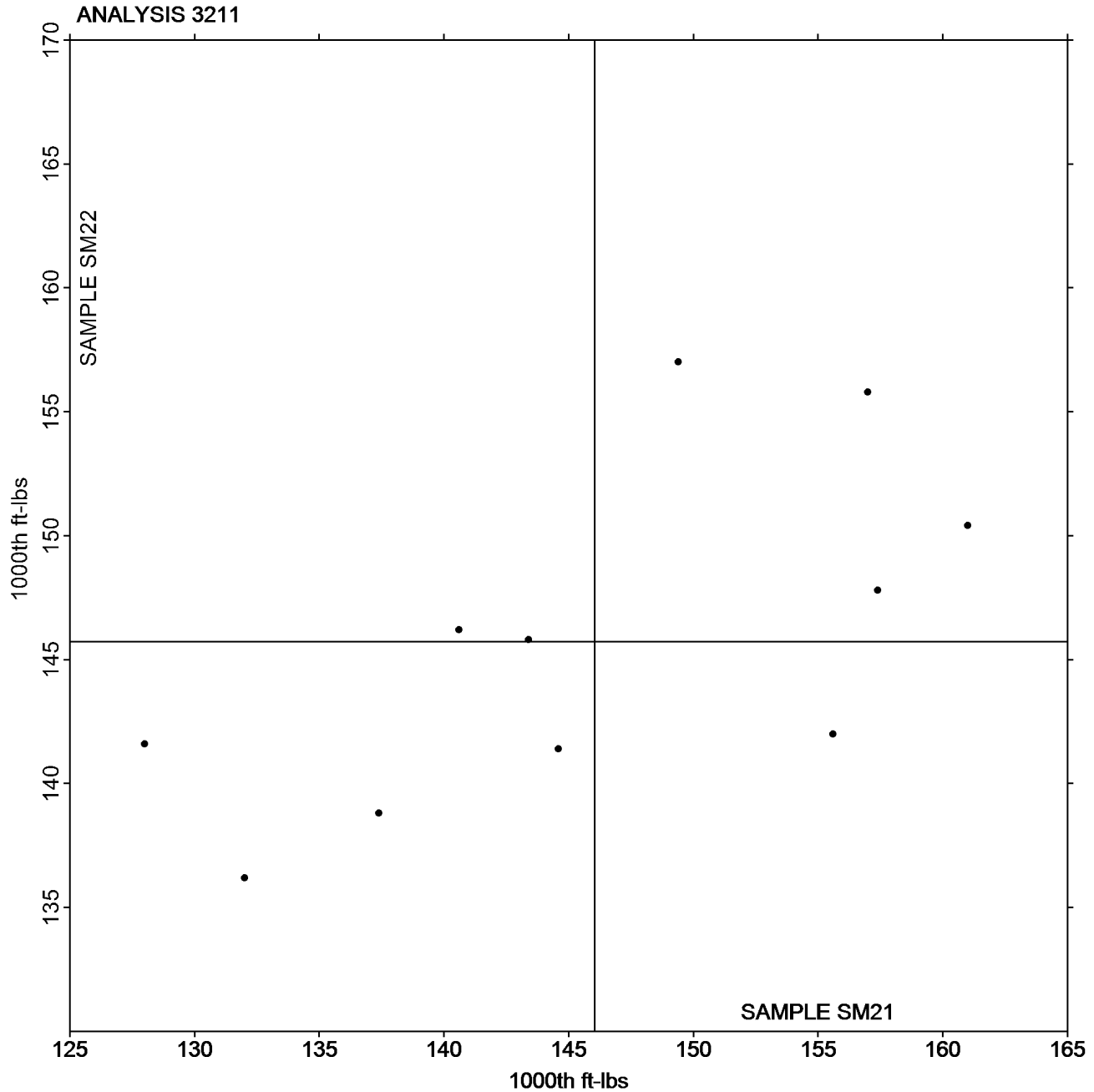


Paper & Paperboard Interlaboratory Testing Program
Analysis 3211
Internal Bond Strength - Modified Scott Mechanics
TAPPI Provisional Test Method T569

Report #4261,
September 2023

Grand Mean Sample SM21 = 146.04
1000th ft-lbs

Grand Mean Sample SM22 = 145.73
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

Report #4261,
September 2023

WebCode	Data Flag	<u>Sample SB21</u>			<u>Sample SB22</u>		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2ERU32		140.6	3.1	0.20	157.8	19.3	1.16
3KD7E9		126.9	-10.6	-0.69	129.3	-9.1	-0.55
74UJH8		163.4	25.9	1.69	164.4	25.9	1.55
9T9UYT		123.0	-14.5	-0.94	127.0	-11.5	-0.69
AW3BNR		132.2	-5.3	-0.34	129.0	-9.5	-0.57
FBQ7RK		122.9	-14.6	-0.95	120.5	-18.0	-1.08
JH97AT		128.2	-9.3	-0.60	125.6	-12.9	-0.77
NLJFQF		140.8	3.3	0.22	138.0	-0.5	-0.03
P29ZTK		152.1	14.6	0.95	151.3	12.8	0.77
QHCUYK		160.8	23.3	1.52	159.8	21.3	1.28
RVDU49		121.2	-16.2	-1.05	120.6	-17.9	-1.07

Summary Statistics	<u>Sample SB21</u>	<u>Sample SB22</u>
Grand Means	137.46 1000th ft-lbs	138.48 1000th ft-lbs
Std Dev Btwn Labs	15.37 1000th ft-lbs	16.67 1000th ft-lbs
Statistics based on 11 of 11 reporting participants.		



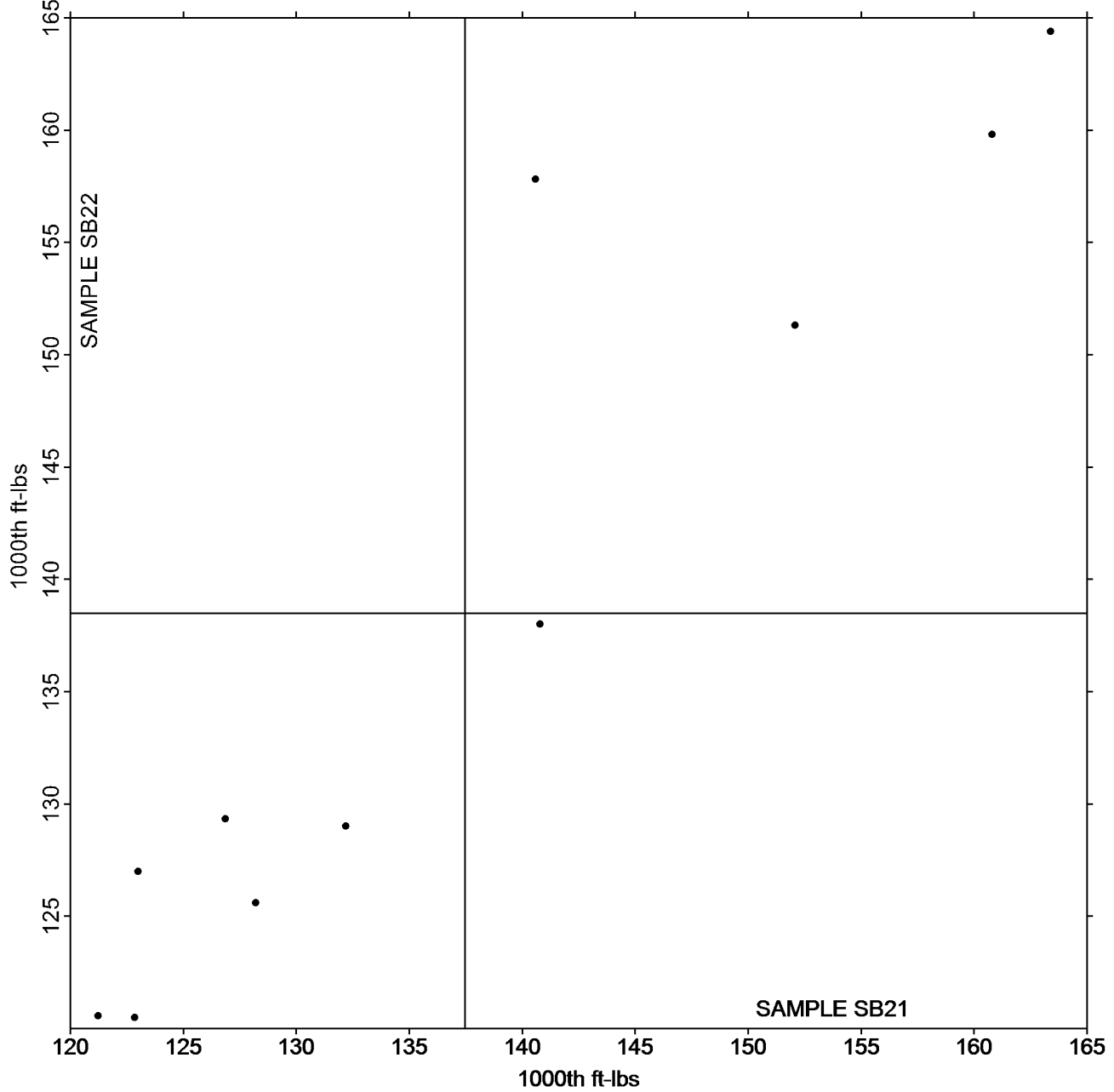
Paper & Paperboard Interlaboratory Testing Program
Analysis 3213
Internal Bond Strength - Scott Bond Models
TAPPI Provisional Test Method T569

Report #4261,
September 2023

Grand Mean Sample SB21 = 137.46
1000th ft-lbs

Grand Mean Sample SB22 = 138.48
1000th ft-lbs

ANALYSIS 3213



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

-End of Report-