Paper & Paperboard Testing Program

Summary Report #4311 - July 2024

Introduction to the Paper & Paperboard Interlaboratory Program

Explanation of Tables and Definitions of Terms

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The CTS Paper & Paperboard Interlaboratory Program

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

About CTS

Founded in 1971, Collaborative Testing Services, Inc. (CTS) is a privately - owned company that specializes in interlaboratory tests for a variety of industries including color, rubber, plastics, fasteners and metals, containerboard, paper, agriculture, hemp, and wine, as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality assurance objectives. Labs from the U.S., as well as more than 100 countries, currently participate in the CTS programs.

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

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WebCode Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Paper Report published on the CTS Website. The WebCode for each analysis can be found on the datasheets and in the Performance Analysis Report mailed to each participant.

Lab Mean The average of the values obtained for each sample by the participant.

Grand Mean The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.

Difference from Grand Mean The difference of the LAB MEAN from the GRAND MEAN.

Between-Lab Standard Deviation An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).

Comparative Performance Value An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa). The critical value for each CPV will vary depending on the number of labs participating in a test.

Inst Code A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section), if instruments are tracked.

Data Flag DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

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

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

Common Problems Highlighted in Footnotes

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

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

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

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

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

WebCode	Data Flag	Sample CP31			Sample CP32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2GLUCP		4.371	-0.161	-2.05	4.407	-0.133	-1.73
32N6VH		4.594	0.062	0.80	4.594	0.054	0.71
36MGRH		4.602	0.070	0.89	4.568	0.028	0.37
3NDJHR		4.556	0.025	0.32	4.576	0.037	0.48
484AWH		4.602	0.071	0.90	4.579	0.039	0.51
4HRY3H		4.632	0.100	1.28	4.618	0.078	1.02
6467RG		4.545	0.014	0.18	4.536	-0.003	-0.04
6W6UTY		4.527	-0.005	-0.06	4.540	0.000	0.00
7E2CKE	X	4.558	0.027	0.34	4.448	-0.092	-1.20
7QCA3N		4.519	-0.013	-0.16	4.570	0.030	0.40
87MACJ		4.412	-0.119	-1.53	4.384	-0.155	-2.03
8JQH9F		4.531	0.000	0.00	4.555	0.015	0.20
9VGPMV		4.491	-0.041	-0.52	4.485	-0.055	-0.71
AEP24K		4.450	-0.082	-1.04	4.466	-0.074	-0.96
AW7DKH		4.515	-0.017	-0.21	4.552	0.012	0.16
EAJ4BL		4.455	-0.077	-0.98	4.473	-0.067	-0.87
FAXTBD		4.600	0.068	0.87	4.570	0.030	0.40
GH9EXM		4.531	-0.001	-0.01	4.560	0.021	0.27
GP6AX7		4.539	0.007	0.09	4.526	-0.014	-0.18
HA7U36		4.621	0.089	1.14	4.660	0.120	1.57
J9WY4J		4.587	0.055	0.70	4.579	0.039	0.51
JRLDH9		4.628	0.096	1.23	4.650	0.110	1.44
K6QVU9		4.522	-0.010	-0.12	4.522	-0.018	-0.23
KALM26	*	4.290	-0.242	-3.09	4.300	-0.240	-3.13
L7GEBZ		4.512	-0.020	-0.25	4.522	-0.017	-0.23
LCJNE8	*	4.400	-0.132	-1.68	4.485	-0.055	-0.71
ME6PXZ		4.664	0.132	1.69	4.674	0.134	1.76
MQKJBE		4.488	-0.044	-0.56	4.494	-0.046	-0.60
N6T2EY		4.602	0.070	0.90	4.657	0.117	1.53
NTL84A		4.546	0.014	0.18	4.577	0.037	0.49
PHWKPX		4.551	0.019	0.25	4.538	-0.002	-0.02
QQ8JHZ		4.459	-0.073	-0.93	4.459	-0.081	-1.05
RQHHDA		4.480	-0.052	-0.66	4.458	-0.082	-1.07
U7CPLU		4.604	0.072	0.92	4.612	0.073	0.95
U7PJYA		4.534	0.002	0.03	4.519	-0.021	-0.27
UB4UEY		4.603	0.071	0.91	4.604	0.064	0.84
UH77BV		4.533	0.001	0.02	4.526	-0.014	-0.18
VQQWAT		4.658	0.126	1.61	4.634	0.095	1.24
W9Q7R6		4.561	0.029	0.38	4.579	0.039	0.51
WPBWQ4		4.487	-0.045	-0.57	4.489	-0.051	-0.66

WebCode	Data Flag	Sample CP31			Sample CP32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
Y2V6DV		4.498	-0.034	-0.43	4.483	-0.057	-0.74
Z2BU3T	X	4.637	0.105	1.35	4.510	-0.030	-0.39
ZE2ND2		4.498	-0.034	-0.43	4.545	0.005	0.07

Summary Statistics	Sample CP31	Sample CP32
Grand Means	4.53 mils	4.54 mils
Stnd Dev Btwn Labs	0.08 mils	0.08 mils

Statistics based on 41 of 43 reporting participants.

Comments on Assigned Data Flags for Test #3101

7E2CKE (X) - Inconsistent in testing between samples.

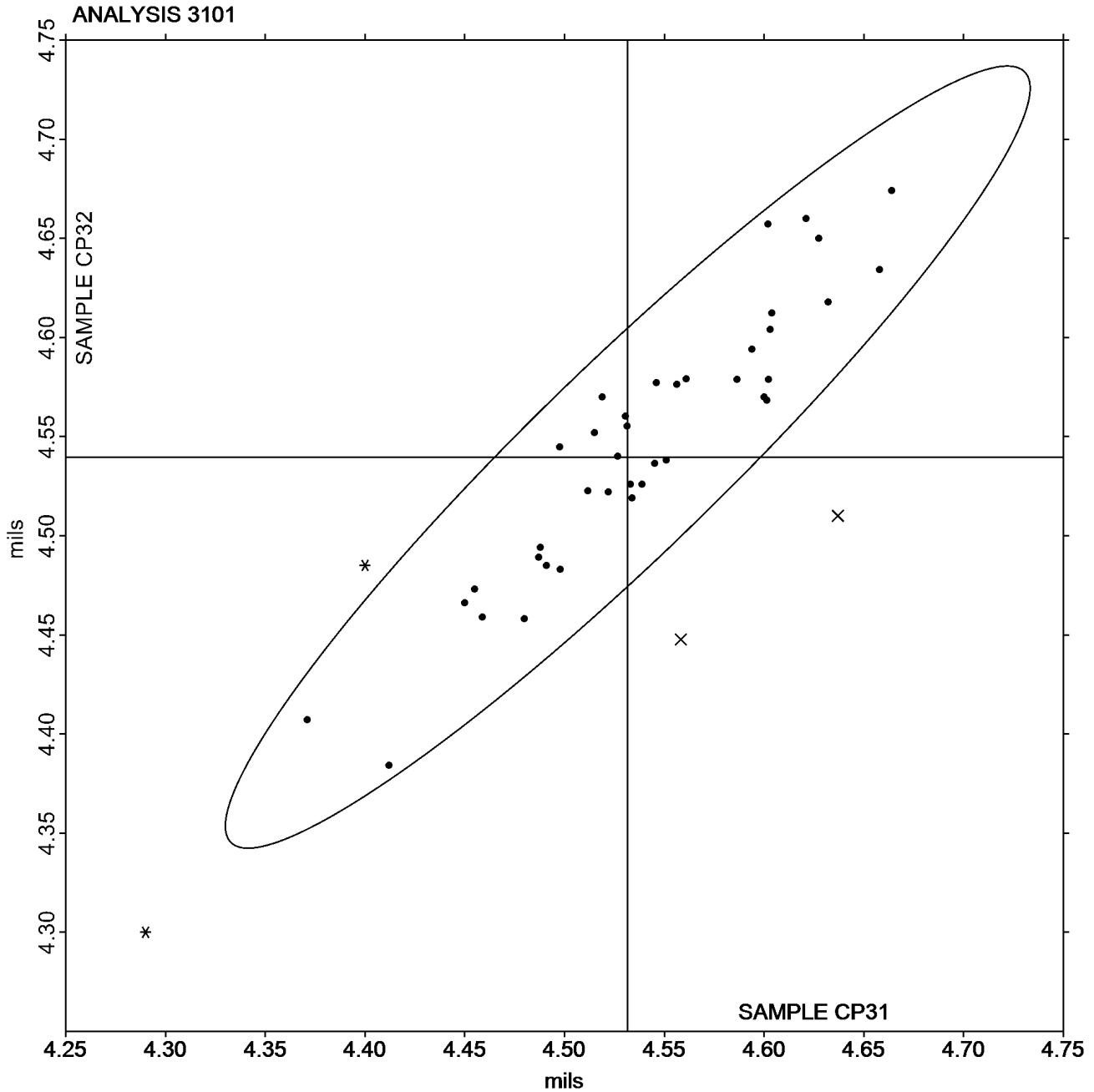Z2BU3T (X) - Inconsistent in testing between samples.

Analysis Notes:

4HRY3H - One determination removed from the Lab Mean of Sample CP31 per Grubb's Test at 1% risk (TAPPI 1205).

7QCA3N - One determination removed from the Lab Mean of Sample CP31 per Grubb's Test at 1% risk (TAPPI 1205).

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

Report #4311, July 2024

Grand Mean Sample CP31 = 4.5316 mils

Grand Mean Sample CP32 = 4.5397 mils

ANALYSIS 3101

SAMPLE CP32

mils

SAMPLE CP31

mils

WebCode	Data Flag	Sample BP31			Sample BP32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2GLUCP		37.00	6.40	2.49	37.10	6.45	2.27
36MGRH		30.02	-0.58	-0.23	30.69	0.04	0.01
3NDJHR		28.88	-1.72	-0.67	28.91	-1.74	-0.61
4HRY3H		27.54	-3.06	-1.19	27.51	-3.14	-1.11
77QBYE		33.50	2.90	1.13	33.30	2.65	0.93
7QCA3N		31.57	0.97	0.38	31.07	0.41	0.15
A8RE3C		31.15	0.55	0.21	30.46	-0.19	-0.07
D3PEGC		29.50	-1.10	-0.43	29.40	-1.25	-0.44
FMK3XJ		30.43	-0.17	-0.07	30.73	0.08	0.03
FZRX99		31.17	0.57	0.22	29.97	-0.68	-0.24
GJGVN6	*	37.25	6.65	2.59	39.20	8.55	3.01
HA7U36		30.30	-0.30	-0.12	30.00	-0.65	-0.23
K2PWB3		30.53	-0.07	-0.03	32.43	1.78	0.63
NTL84A		29.59	-1.01	-0.39	29.57	-1.08	-0.38
RQHHDA		29.40	-1.20	-0.47	29.70	-0.95	-0.34
U7CPLU		28.59	-2.01	-0.78	28.41	-2.24	-0.79
UB4UEY		28.74	-1.86	-0.72	29.23	-1.42	-0.50
UH77BV	X	26.91	-3.69	-1.44	30.78	0.12	0.04
VQQWAT		26.76	-3.84	-1.49	26.75	-3.91	-1.38
W9Q7R6		29.50	-1.10	-0.43	29.80	-0.85	-0.30
WPBWQ4		31.83	1.23	0.48	30.48	-0.17	-0.06
Y2V6DV		30.83	0.23	0.09	30.83	0.17	0.06
ZE2ND2		29.15	-1.45	-0.56	28.82	-1.83	-0.65

Summary Statistics	Sample BP31	Sample BP32
Grand Means	30.60 psi	30.65 psi
Stnd Dev Btwn Labs	2.57 psi	2.84 psi

Statistics based on 22 of 23 reporting participants.

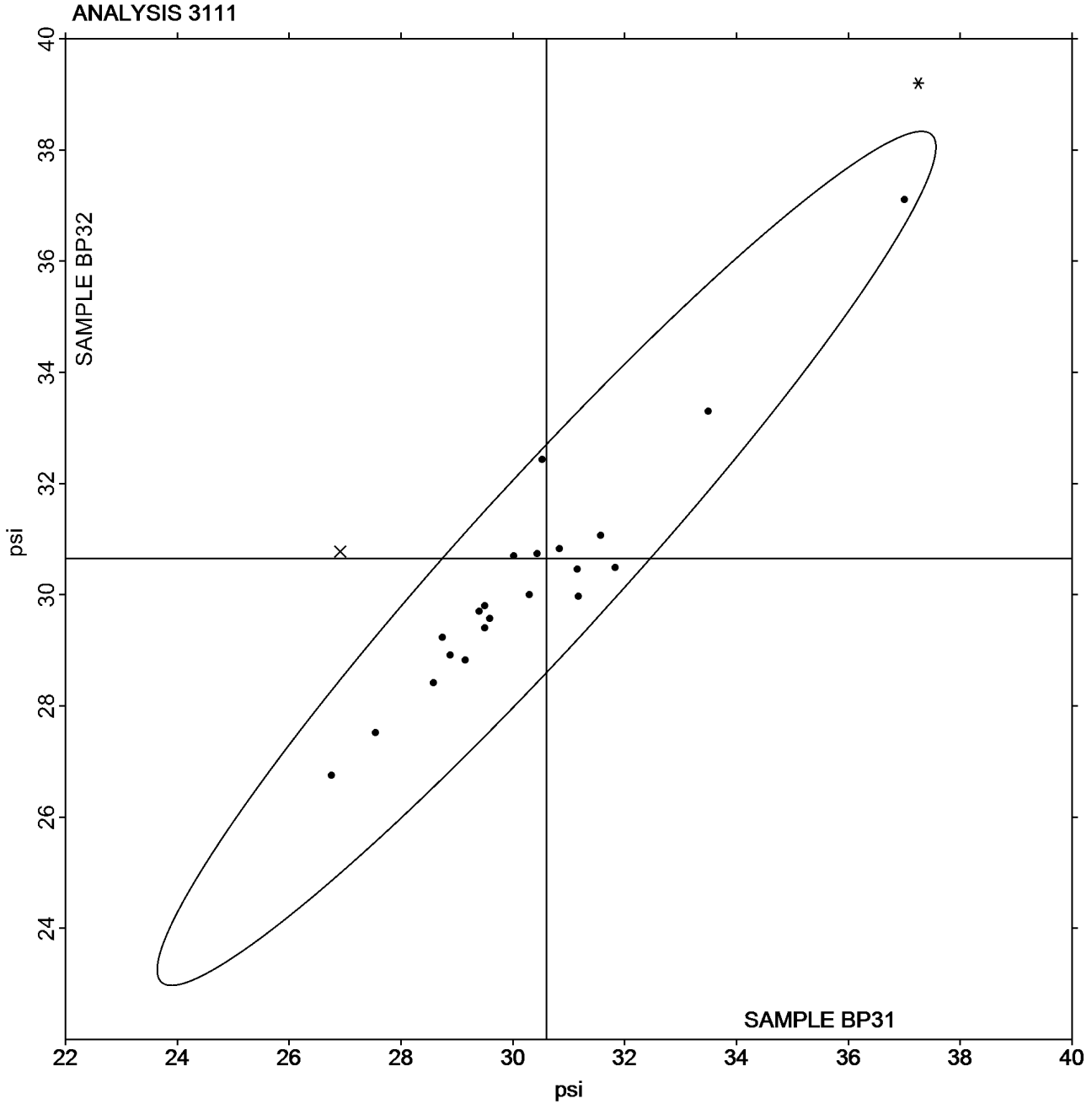**Comments on Assigned Data Flags for Test #3111**

UH77BV (X) - Inconsistent in testing between samples.

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

Report #4311, July 2024

Grand Mean Sample BP31 = 30.602 psi

Grand Mean Sample BP32 = 30.653 psi

ANALYSIS 3111

SAMPLE BP32

SAMPLE BP31

psi

psi

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

WebCode	Data Flag	Sample RP31			Sample RP32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2CAT8K	X	0.57	-56.62	-9.87	0.58	-56.81	-10.33
2GLUCP		67.68	10.48	1.83	66.52	9.13	1.66
32N6VH		55.00	-2.20	-0.38	55.60	-1.79	-0.33
36MGRH		55.06	-2.13	-0.37	56.69	-0.70	-0.13
3NDJHR		51.30	-5.90	-1.03	50.85	-6.54	-1.19
484AWH		61.21	4.02	0.70	63.30	5.92	1.08
4HRY3H		62.05	4.86	0.85	63.40	6.01	1.09
62ZL2V		58.40	1.20	0.21	56.76	-0.63	-0.11
6467RG		57.06	-0.14	-0.02	56.78	-0.61	-0.11
6W6UTY	X	63.45	6.25	1.09	69.50	12.11	2.20
77QBYE		62.40	5.20	0.91	62.20	4.81	0.88
7K7F9R		57.38	0.18	0.03	58.00	0.61	0.11
A8RE3C		57.74	0.54	0.09	55.80	-1.59	-0.29
AW7DKH		47.72	-9.48	-1.65	48.50	-8.89	-1.62
DU942Q		61.58	4.38	0.76	61.55	4.16	0.76
EAJ4BL		46.64	-10.56	-1.84	47.60	-9.79	-1.78
FAXTBD		48.38	-8.82	-1.54	48.76	-8.63	-1.57
GJGVN6	X	19.45	-37.75	-6.58	20.25	-37.14	-6.76
GP6AX7		47.40	-9.80	-1.71	49.42	-7.97	-1.45
HA7U36	*	76.00	18.80	3.28	75.00	17.61	3.20
J9WY4J	X	63.20	6.00	1.05	67.90	10.51	1.91
JRLDH9		57.40	0.20	0.04	59.36	1.97	0.36
L7GEBZ		55.00	-2.20	-0.38	55.94	-1.44	-0.26
LCJNE8		51.60	-5.60	-0.98	50.42	-6.97	-1.27
MDVMAF		53.53	-3.67	-0.64	54.77	-2.62	-0.48
MP4MJE		60.87	3.67	0.64	61.17	3.78	0.69
MQKJBE		58.00	0.80	0.14	58.30	0.91	0.17
NTL84A		54.37	-2.83	-0.49	55.06	-2.33	-0.42
QQ8JHZ		54.26	-2.94	-0.51	55.58	-1.81	-0.33
RQHHDA		55.40	-1.80	-0.31	55.20	-2.19	-0.40
U7CPLU		61.42	4.22	0.74	61.36	3.97	0.72
U7PJYA		60.70	3.50	0.61	63.00	5.61	1.02
UB4UEY		56.30	-0.90	-0.16	58.70	1.31	0.24
UH77BV		60.32	3.12	0.54	59.88	2.49	0.45
VQQWAT		61.40	4.20	0.73	61.32	3.93	0.71
W9Q7R6		63.39	6.19	1.08	62.72	5.33	0.97
WPBWQ4		53.62	-3.58	-0.62	54.65	-2.74	-0.50
WXMX4R		50.73	-6.47	-1.13	52.00	-5.39	-0.98
XT8ZVV		59.74	2.54	0.44	59.41	2.02	0.37
Z2BU3T		59.46	2.26	0.39	56.80	-0.59	-0.11

		Sample RP31			Sample RP32		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
Z2ZRGU		56.81	-0.39	-0.07	54.30	-3.09	-0.56
ZE2ND2		56.14	-1.06	-0.18	54.10	-3.29	-0.60

Summary Statistics	Sample RP31	Sample RP32
Grand Means	57.20 Grams	57.39 Grams
Stnd Dev Btwn Labs	5.74 Grams	5.50 Grams
	Statistics based on 38 of 42 reporting participants.	

Comments on Assigned Data Flags for Test #3113

J9WY4J (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.

6W6UTY (X) - Inconsistent in testing between samples.
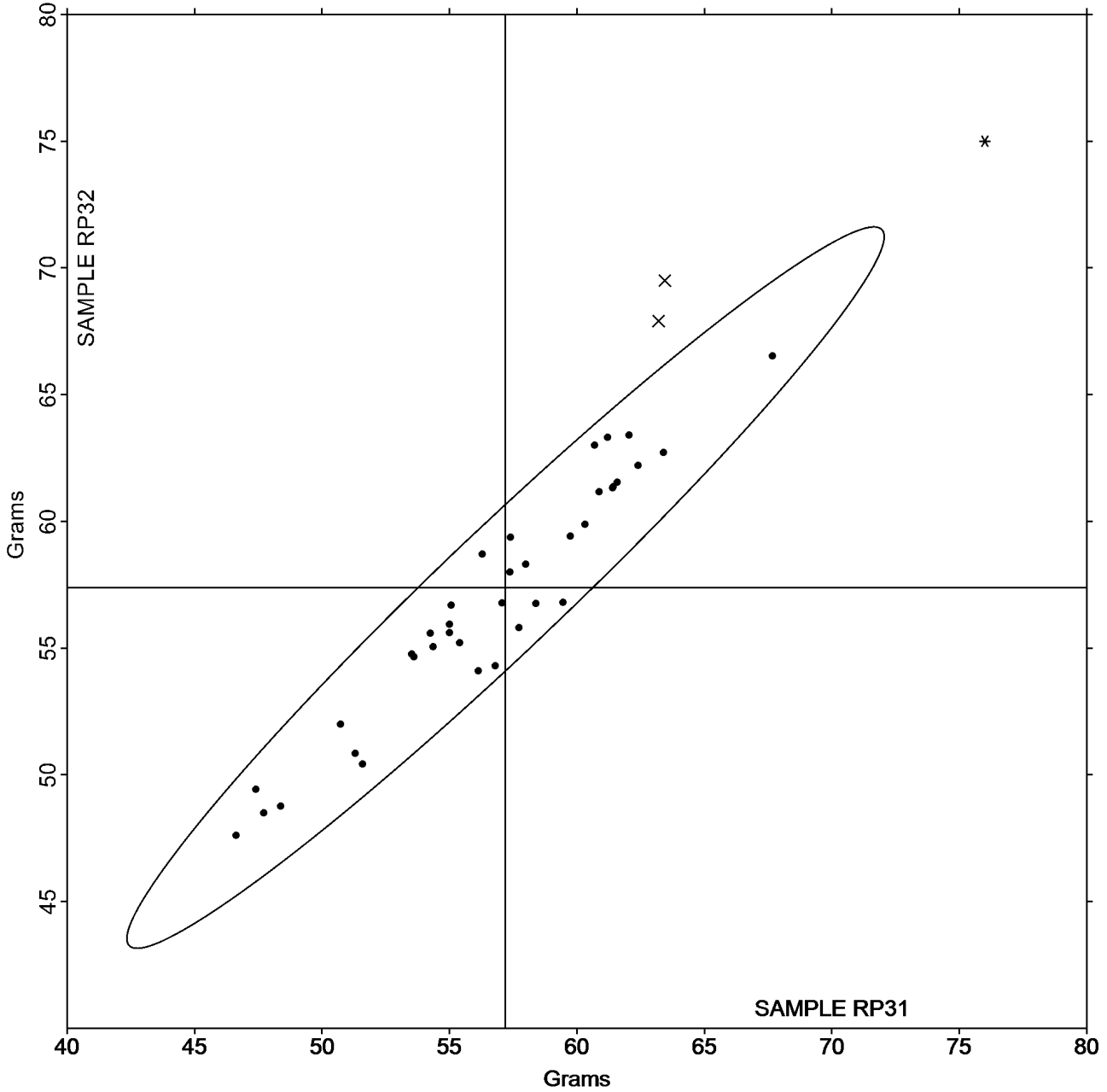
2CAT8K (X) - Extreme Data.

GJGVN6 (X) - Extreme Data.

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

Report #4311, July 2024

Grand Mean Sample RP31 = 57.196 Grams

Grand Mean Sample RP32 = 57.388 Grams

ANALYSIS 3113

SAMPLE RP32

Grams

SAMPLE RP31

Grams

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

WebCode	Data Flag	Sample NP31			Sample NP32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2GLUCP		5.235	0.108	0.43	5.347	0.193	0.53
32N6VH		5.163	0.037	0.15	5.199	0.044	0.12
36MGRH		5.344	0.217	0.87	5.148	-0.006	-0.02
3NDJHR		5.228	0.101	0.41	5.185	0.031	0.09
484AWH	*	4.450	-0.677	-2.71	4.483	-0.671	-1.85
4HRY3H		5.174	0.047	0.19	5.052	-0.102	-0.28
62ZL2V		5.037	-0.090	-0.36	4.738	-0.416	-1.15
6467RG		5.214	0.087	0.35	5.253	0.099	0.27
6W6UTY		5.374	0.248	0.99	5.402	0.248	0.69
7QCA3N		5.510	0.383	1.53	5.871	0.716	1.98
7WJDDV		4.897	-0.230	-0.92	4.819	-0.335	-0.93
8JQH9F		4.998	-0.129	-0.52	5.220	0.066	0.18
9VGPMV		4.929	-0.197	-0.79	5.179	0.025	0.07
A8RE3C		4.863	-0.264	-1.05	4.869	-0.285	-0.79
AJ7C8G		5.019	-0.108	-0.43	4.620	-0.534	-1.48
AW7DKH	*	5.016	-0.110	-0.44	4.373	-0.781	-2.16
CBZG3D		5.171	0.044	0.18	5.112	-0.042	-0.12
EAJ4BL		5.229	0.103	0.41	5.142	-0.013	-0.03
FAXTBD		4.930	-0.197	-0.79	5.090	-0.064	-0.18
GH9EXM		5.580	0.453	1.81	5.781	0.627	1.73
GP6AX7		4.758	-0.369	-1.48	4.901	-0.253	-0.70
HA7U36		4.914	-0.213	-0.85	4.904	-0.250	-0.69
J9WY4J		5.198	0.071	0.28	5.184	0.030	0.08
JRLDH9		4.841	-0.286	-1.14	4.839	-0.315	-0.87
K6QVU9		5.375	0.248	0.99	5.431	0.276	0.76
LCJNE8	X	6.108	0.981	3.92	6.097	0.942	2.60
MDVMAF		5.312	0.185	0.74	5.349	0.195	0.54
MP4MJE		5.226	0.100	0.40	5.229	0.075	0.21
NTL84A		5.281	0.155	0.62	5.119	-0.035	-0.10
QQ8JHZ	*	5.805	0.679	2.72	6.114	0.960	2.65
RQHHDA		4.789	-0.338	-1.35	4.763	-0.391	-1.08
U7CPLU		5.152	0.025	0.10	5.337	0.183	0.50
U7PJYA		4.919	-0.208	-0.83	5.064	-0.090	-0.25
UH77BV		4.963	-0.163	-0.65	5.055	-0.099	-0.27
VQQWAT	X	3.160	-1.967	-7.87	3.261	-1.893	-5.23
W9Q7R6		4.911	-0.215	-0.86	4.801	-0.354	-0.98
WPBWQ4		5.263	0.136	0.54	5.536	0.381	1.05
WXMX4R		5.160	0.033	0.13	5.050	-0.104	-0.29
Z2BU3T	*	5.145	0.018	0.07	5.767	0.613	1.69
ZE2ND2		5.288	0.161	0.65	5.448	0.294	0.81

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

Report #4311, July 2024

		Sample NP31			Sample NP32		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
ZUC6LP		5.283	0.156	0.63	5.241	0.087	0.24

Summary Statistics	Sample NP31	Sample NP32
Grand Means	5.13 kN/m	5.15 kN/m
Stnd Dev Btwn Labs	0.25 kN/m	0.36 kN/m

Statistics based on 39 of 41 reporting participants.

Comments on Assigned Data Flags for Test #3115

VQQWAT (X) - Extreme Data.

LCJNE8 (X) - Data for sample NP31 are high.
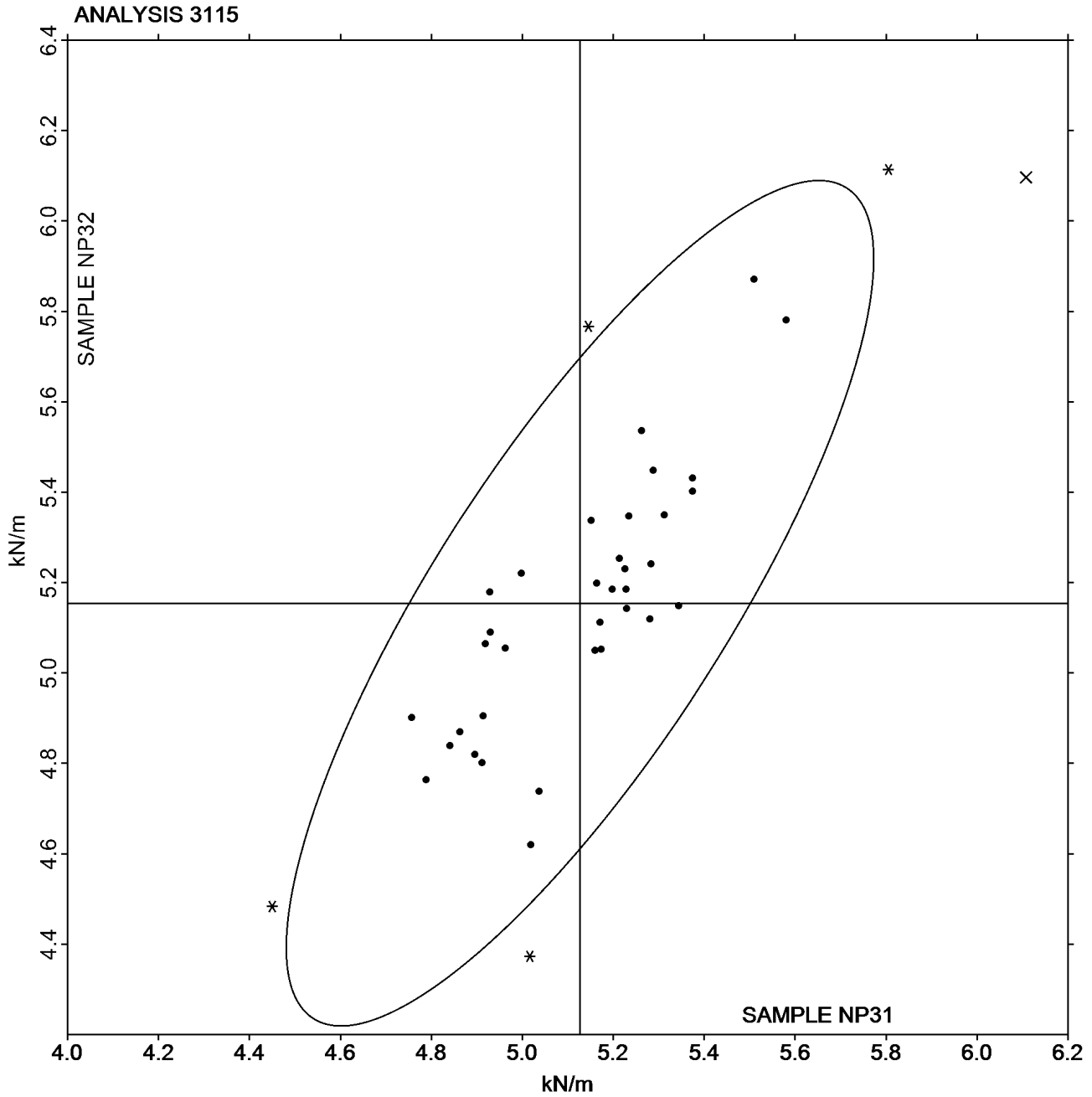
Analysis Notes:

7QCA3N - One determination removed from the Lab Mean of Sample NP32 per Grubb's Test at 1% risk (TAPPI 1205).

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

Report #4311, July 2024

Grand Mean Sample NP31 = 5.1268 kN/m

Grand Mean Sample NP32 = 5.1543 kN/m

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

WebCode	Data Flag	Sample NP31 Lab Mean	Sample NP31 Diff from Grand Mean	Sample NP31 CPV	Sample NP32 Lab Mean	Sample NP32 Diff from Grand Mean	Sample NP32 CPV
2GLUCP		68.56	2.59	0.31	71.47	4.63	0.55
32N6VH		70.33	4.36	0.52	69.19	2.35	0.28
36MGRH		73.97	8.00	0.96	68.71	1.87	0.22
484AWH		58.08	-7.89	-0.95	59.54	-7.30	-0.86
4HRY3H		69.26	3.29	0.40	65.83	-1.01	-0.12
6467RG		62.48	-3.49	-0.42	62.48	-4.36	-0.52
6W6UTY		72.88	6.91	0.83	73.44	6.59	0.78
8JQH9F		74.50	8.52	1.03	77.49	10.65	1.26
9VGPMV		59.50	-6.47	-0.78	65.29	-1.55	-0.18
A8RE3C		62.18	-3.79	-0.46	62.69	-4.15	-0.49
AJ7C8G		61.95	-4.02	-0.48	56.28	-10.56	-1.25
CBZG3D		75.34	9.37	1.13	74.41	7.57	0.89
FAXTBD		65.90	-0.07	-0.01	68.80	1.96	0.23
GH9EXM		67.56	1.59	0.19	71.73	4.89	0.58
HA7U36		50.64	-15.33	-1.84	52.66	-14.18	-1.68
JRLDH9		58.50	-7.47	-0.90	59.84	-7.00	-0.83
LCJNE8		79.36	13.39	1.61	73.22	6.38	0.75
MDVMAF		66.81	0.84	0.10	67.02	0.18	0.02
MP4MJE		61.98	-3.99	-0.48	60.29	-6.55	-0.77
NTL84A		73.20	7.23	0.87	70.75	3.91	0.46
QQ8JHZ		77.90	11.93	1.44	78.19	11.35	1.34
RQHHDA		63.39	-2.58	-0.31	62.47	-4.37	-0.52
U7CPLU		69.24	3.27	0.39	72.10	5.26	0.62
U7PJYA		52.89	-13.08	-1.57	58.30	-8.54	-1.01
UH77BV		69.70	3.73	0.45	73.34	6.50	0.77
VQQWAT	*	40.10	-25.87	-3.11	42.61	-24.23	-2.86
W9Q7R6		65.05	-0.93	-0.11	59.35	-7.49	-0.88
WXMX4R		65.40	-0.57	-0.07	62.69	-4.15	-0.49
Z2BU3T	*	68.93	2.96	0.36	82.22	15.38	1.82
ZE2ND2		66.39	0.42	0.05	72.82	5.98	0.71
ZUC6LP		73.12	7.15	0.86	76.85	10.01	1.18

Summary Statistics	Sample NP31	Sample NP32
Grand Means	65.97 Joules/sq m	66.84 Joules/sq m
Stnd Dev Btwn Labs	8.31 Joules/sq m	8.46 Joules/sq m

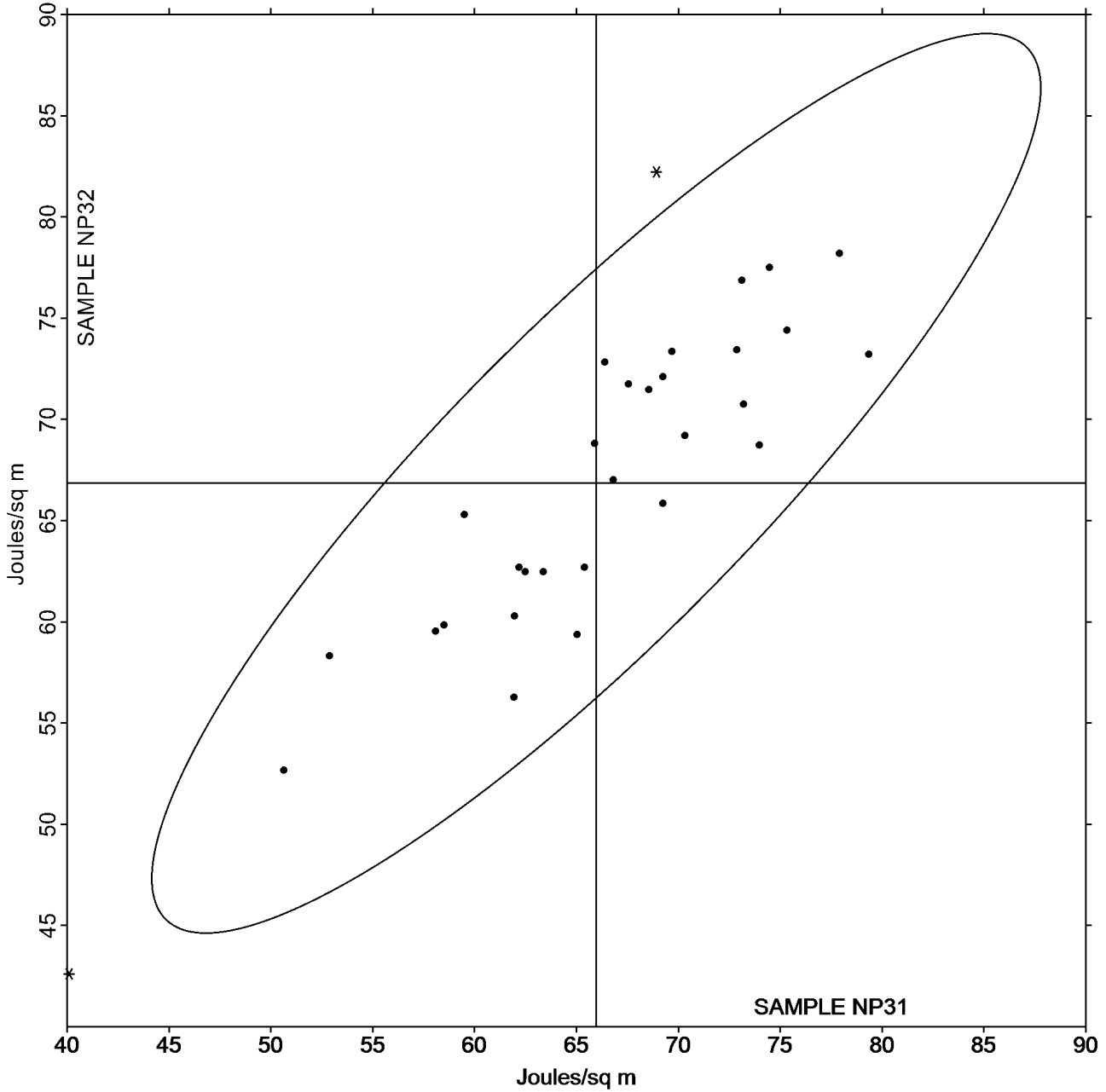Statistics based on 31 of 31 reporting participants.

Grand Mean Sample NP31 = 65.971 Joules/sq m

Grand Mean Sample NP32 = 66.842 Joules/sq m

ANALYSIS 3116

SAMPLE NP32

Joules/sq m

SAMPLE NP31

Joules/sq m

WebCode	Data Flag	Sample NP31			Sample NP32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2GLUCP		1.959	-0.027	-0.13	1.995	-0.004	-0.02
32N6VH		2.129	0.143	0.70	2.153	0.154	0.71
36MGRH		2.010	0.024	0.12	1.995	-0.004	-0.02
484AWH		2.153	0.167	0.82	2.119	0.120	0.55
4HRY3H		1.996	0.010	0.05	1.965	-0.034	-0.16
6467RG		1.818	-0.168	-0.82	1.804	-0.195	-0.90
6W6UTY		2.308	0.322	1.57	2.417	0.418	1.93
7WJDDV		2.050	0.064	0.31	2.080	0.081	0.37
8JQH9F		1.609	-0.377	-1.84	1.695	-0.304	-1.41
9VGPMV		1.864	-0.122	-0.59	1.940	-0.059	-0.27
A8RE3C		1.925	-0.060	-0.29	1.928	-0.071	-0.33
AJ7C8G		1.969	-0.017	-0.08	1.940	-0.059	-0.27
AW7DKH	X	1.842	-0.144	-0.70	1.526	-0.473	-2.19
CBZG3D		2.409	0.423	2.06	2.403	0.404	1.87
EAJ4BL		1.710	-0.276	-1.34	1.640	-0.359	-1.66
FAXTBD		1.830	-0.156	-0.76	1.850	-0.149	-0.69
GH9EXM		1.830	-0.156	-0.76	1.876	-0.123	-0.57
GP6AX7		1.862	-0.124	-0.60	1.875	-0.124	-0.57
HA7U36		2.284	0.298	1.46	2.325	0.326	1.51
JRLDH9		1.813	-0.173	-0.84	1.850	-0.149	-0.69
LCJNE8		1.997	0.011	0.06	1.887	-0.112	-0.52
MDVMAF		1.895	-0.091	-0.44	1.878	-0.121	-0.56
MP4MJE		1.839	-0.147	-0.72	1.796	-0.203	-0.94
NTL84A		2.110	0.124	0.61	2.102	0.103	0.48
QQ8JHZ		1.884	-0.102	-0.50	1.867	-0.132	-0.61
RQHHDA		2.049	0.063	0.31	2.028	0.029	0.13
U7CPLU		2.021	0.035	0.17	2.025	0.026	0.12
U7PJYA		1.647	-0.339	-1.65	1.728	-0.271	-1.25
UH77BV		2.286	0.301	1.47	2.348	0.348	1.61
VQQWAT		1.797	-0.189	-0.92	1.844	-0.155	-0.72
W9Q7R6		1.983	-0.003	-0.01	1.868	-0.131	-0.61
WXMX4R		1.910	-0.076	-0.37	1.950	-0.049	-0.23
Z2BU3T	*	2.478	0.492	2.40	2.564	0.565	2.61
ZE2ND2		1.892	-0.094	-0.46	2.004	0.005	0.02
ZUC6LP		2.196	0.210	1.02	2.229	0.230	1.06

Summary Statistics	Sample NP31	Sample NP32
Grand Means	1.99 Percent	2.00 Percent
Stnd Dev Btwn Labs	0.21 Percent	0.22 Percent
		Statistics based on 34 of 35 reporting participants.

Comments on Assigned Data Flags for Test #3117

AW7DKH (X) - Inconsistent in testing between samples.

Analysis Notes:

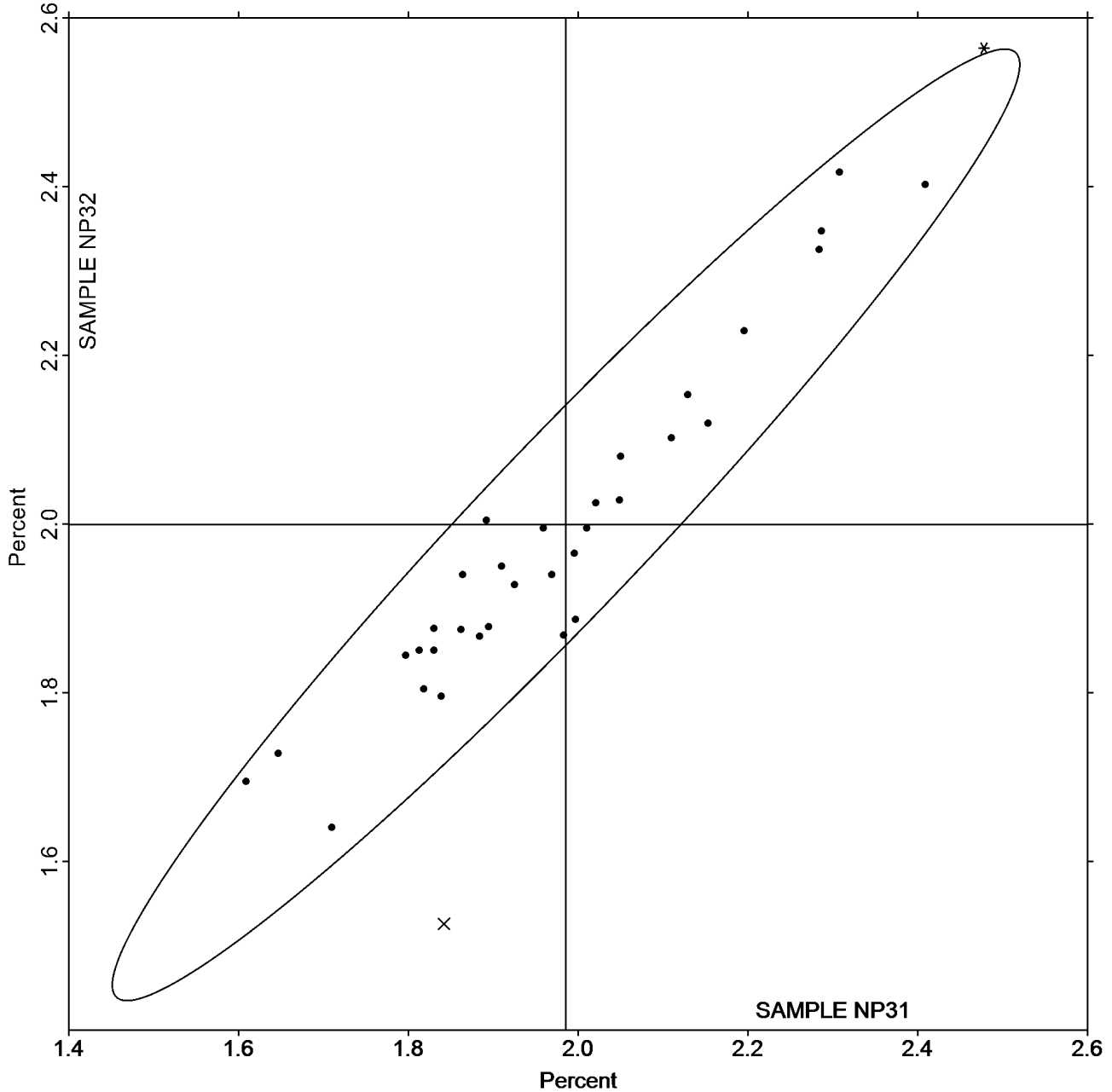ZUC6LP - One determination removed from the Lab Mean of Sample NP31 per Grubb's Test at 1% risk (TAPPI 1205).

Grand Mean Sample NP31 = 1.9856 Percent

Grand Mean Sample NP32 = 1.9990 Percent

ANALYSIS 3117

SAMPLE NP32

Percent

SAMPLE NP31

Percent

		Sample PP31			Sample PP32		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2GLUCP		9.722	-0.120	-0.26	9.651	-0.325	-0.73
32N6VH		9.373	-0.469	-1.02	9.695	-0.281	-0.63
3Q8HKW		9.430	-0.412	-0.90	9.870	-0.106	-0.24
3YHK7X		10.320	0.478	1.04	10.060	0.084	0.19
484AWH		10.423	0.581	1.27	10.939	0.963	2.17
77QBYE		10.500	0.658	1.43	10.300	0.324	0.73
A2LL9G		10.100	0.258	0.56	10.070	0.094	0.21
A8RE3C		9.600	-0.242	-0.53	10.170	0.194	0.44
AEP24K		9.726	-0.116	-0.25	9.623	-0.353	-0.80
AW7DKH		10.025	0.183	0.40	10.257	0.281	0.63
CBZG3D		9.488	-0.354	-0.77	9.655	-0.321	-0.72
EAJ4BL		10.486	0.644	1.40	9.975	-0.001	0.00
EGKJX9		10.260	0.418	0.91	10.470	0.494	1.11
F63YDC		9.571	-0.271	-0.59	9.687	-0.289	-0.65
FMK3XJ		9.190	-0.652	-1.42	9.590	-0.386	-0.87
FZRX99		10.161	0.319	0.70	10.198	0.222	0.50
GP6AX7		10.416	0.574	1.25	10.496	0.520	1.17
HA7U36		9.212	-0.630	-1.37	9.519	-0.457	-1.03
J9WY4J		9.400	-0.442	-0.96	10.100	0.124	0.28
JKLYVL		9.661	-0.181	-0.39	9.479	-0.497	-1.12
JRLDH9		9.580	-0.262	-0.57	9.848	-0.128	-0.29
K2PWB3		10.270	0.428	0.93	10.290	0.314	0.71
LCJNE8		9.962	0.120	0.26	9.576	-0.400	-0.90
ME6PXZ		9.090	-0.752	-1.64	9.470	-0.506	-1.14
MQKJBE		10.110	0.268	0.58	10.370	0.394	0.89
NTL84A		10.437	0.595	1.30	10.705	0.729	1.64
PUTLAF		9.620	-0.222	-0.48	9.790	-0.186	-0.42
QUNNEA		10.546	0.704	1.54	10.341	0.365	0.82
RQHHDA		9.980	0.138	0.30	9.910	-0.066	-0.15
U7CPLU		9.680	-0.162	-0.35	9.900	-0.076	-0.17
UH77BV		10.384	0.542	1.18	10.923	0.947	2.13
VKPHM7		8.920	-0.922	-2.01	8.930	-1.046	-2.35
VQQWAT		9.850	0.008	0.02	9.780	-0.196	-0.44
WPBWQ4		9.669	-0.173	-0.38	10.186	0.210	0.47
WXMX4R		9.310	-0.532	-1.16	9.350	-0.626	-1.41

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

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Summary Statistics	Sample PP31	Sample PP32
Grand Means	9.84 sec/100 cc	9.98 sec/100 cc
Stnd Dev Btwn Labs	0.46 sec/100 cc	0.44 sec/100 cc

Statistics based on 35 of 35 reporting participants.

Grand Mean Sample PP31 = 9.8421 sec/100 cc

Grand Mean Sample PP32 = 9.9764 sec/100 cc
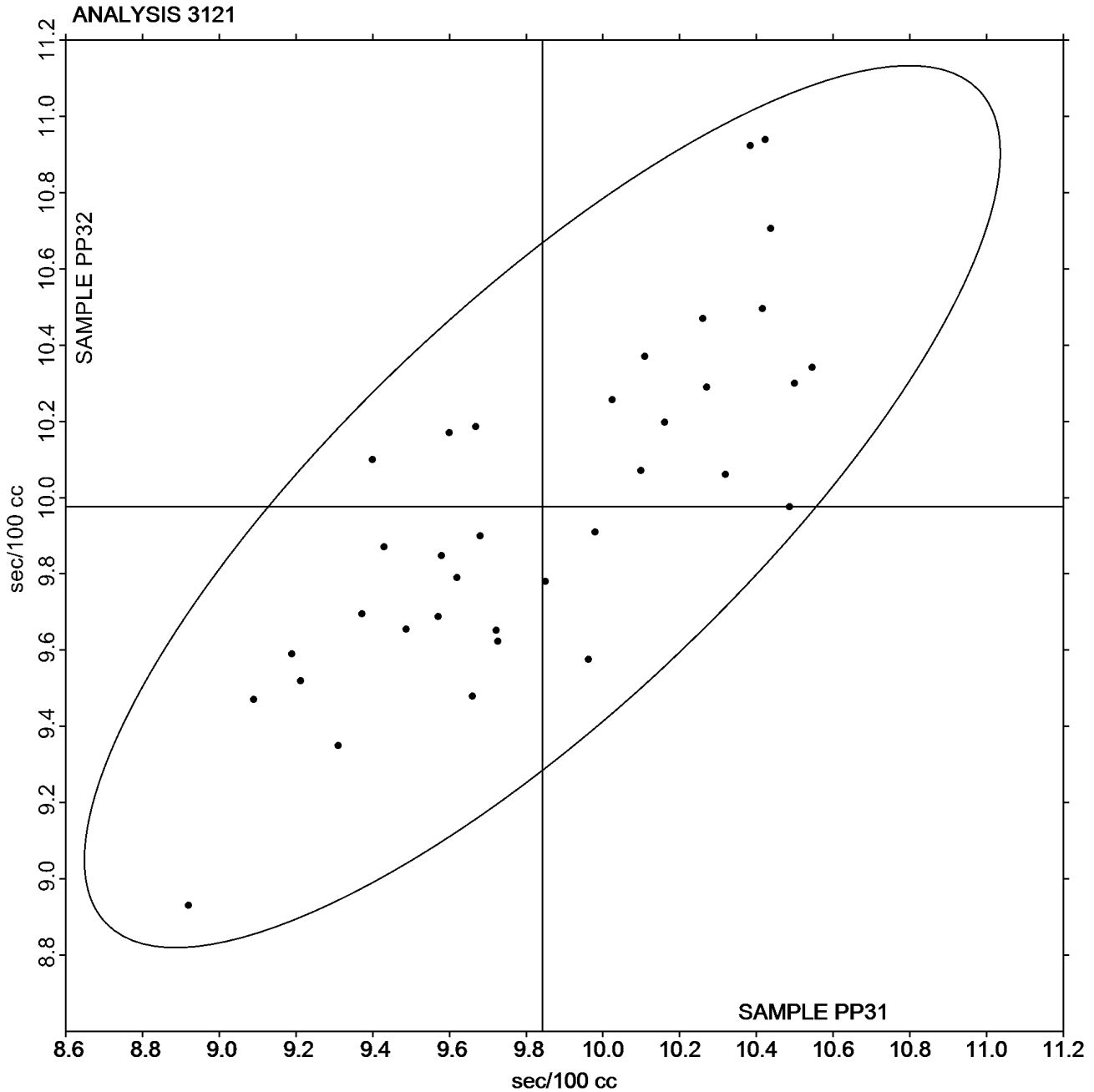
ANALYSIS 3121

SAMPLE PP32

sec/100 cc

SAMPLE PP31

sec/100 cc

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

WebCode	Data Flag	Sample PP31 Lab Mean	Sample PP31 Diff from Grand Mean	Sample PP31 CPV	Sample PP32 Lab Mean	Sample PP32 Diff from Grand Mean	Sample PP32 CPV
77QBYE		221.6	-16.3	-0.73	218.0	-21.0	-0.74
7QCA3N	X	9.0	-228.9	-10.20	9.1	-229.9	-8.14
MQKJBE		228.6	-9.3	-0.41	227.9	-11.1	-0.39
U7PJYA		263.5	25.6	1.14	271.1	32.1	1.14
Y2V6DV	X	18.6	-219.3	-9.77	19.2	-219.8	-7.78

Summary Statistics	Sample PP31	Sample PP32
Grand Means	237.90 Sheffield Units	239.00 Sheffield Units
Stnd Dev Btwn Labs	22.44 Sheffield Units	28.24 Sheffield Units
		Statistics based on 3 of 5 reporting participants.

Comments on Assigned Data Flags for Test #3123
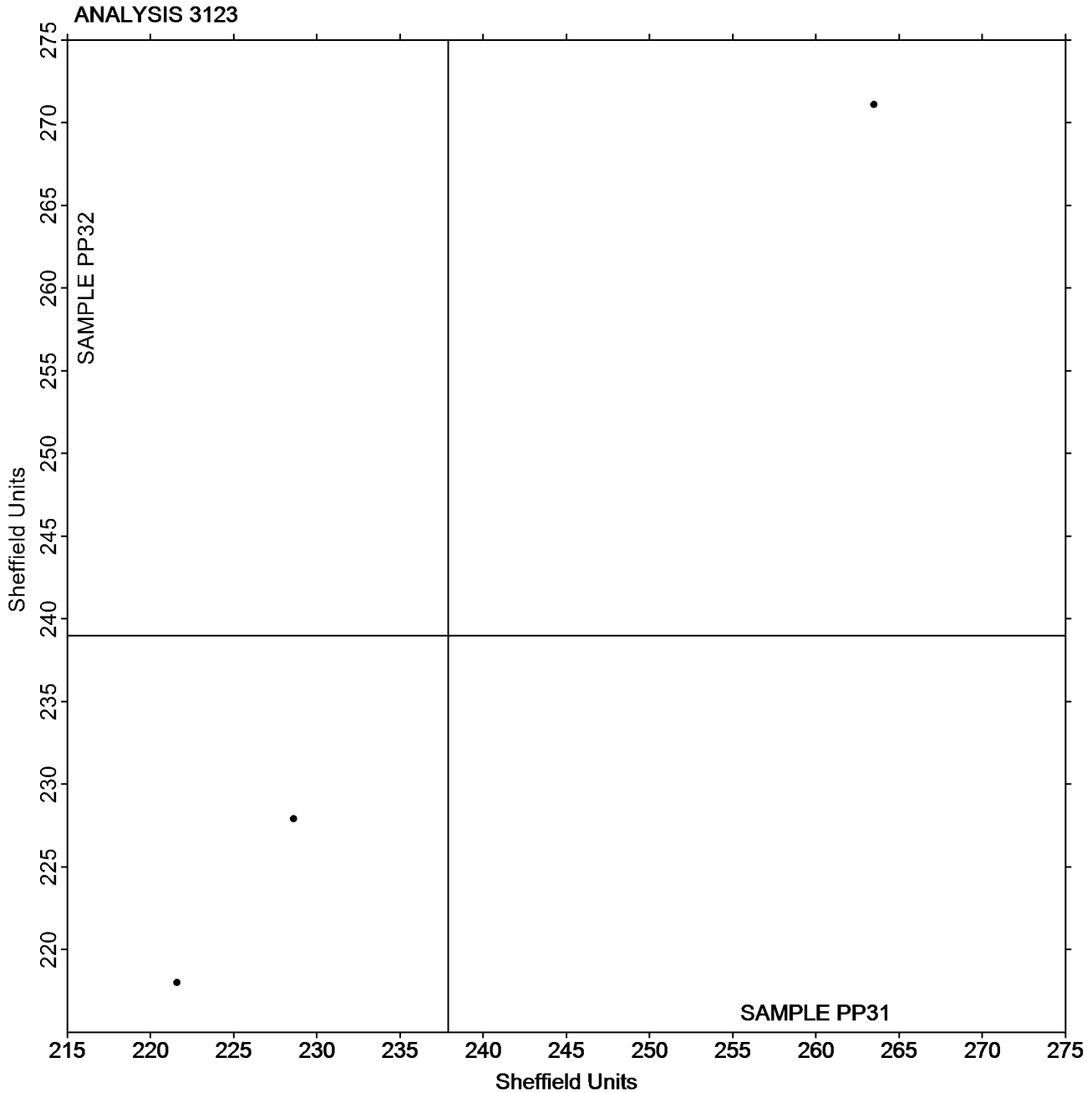
7QCA3N (X) - Extreme Data.

Y2V6DV (X) - Extreme Data.

Grand Mean Sample PP31 = 237.90 Sheffield Units

Grand Mean Sample PP32 = 239.00 Sheffield Units

ANALYSIS 3123

SAMPLE PP32

Sheffield Units

SAMPLE PP31

Sheffield Units

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

WebCode	Data Flag	Sample PH31			Sample PH32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3Q8HKW		5.266	-0.350	-0.57	5.147	-0.399	-0.71
9VGPMV		5.560	-0.056	-0.09	5.557	0.011	0.02
A2LL9G		3.831	-1.785	-2.92	3.943	-1.603	-2.86
A8RE3C		5.583	-0.033	-0.05	5.509	-0.037	-0.07
F63YDC		6.267	0.651	1.06	6.136	0.590	1.06
GH9EXM		5.758	0.142	0.23	5.754	0.208	0.37
HA7U36		5.805	0.189	0.31	5.751	0.205	0.37
KHRRPF		5.814	0.198	0.32	5.629	0.083	0.15
L7GEBZ		5.841	0.225	0.37	5.586	0.040	0.07
NTL84A		5.864	0.248	0.40	5.844	0.298	0.53
W9Q7R6		5.965	0.349	0.57	5.812	0.266	0.48
XJ3TFV		5.841	0.225	0.37	5.880	0.334	0.60

Summary Statistics	Sample PH31	Sample PH32
Grand Means	5.62 Microns	5.55 Microns
Stnd Dev Btwn Labs	0.61 Microns	0.56 Microns
	Statistics based on 12 of 12 reporting participants.	

Analysis Notes:

XJ3TFV - One determination removed from the Lab Mean of Sample PH31 per Grubb's Test at 1% risk (TAPPI 1205).

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

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Grand Mean Sample PH31 = 5.6163 Microns

Grand Mean Sample PH32 = 5.5457 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.

		Sample SR31			Sample SR32		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
23LTYN		107.8	-4.0	-0.55	109.2	-3.8	-0.49
32N6VH		109.7	-2.2	-0.30	113.8	0.8	0.10
3M88QH	X	243.5	131.7	17.93	253.5	140.5	17.85
3Q8HKW		116.8	4.9	0.67	113.9	0.8	0.11
484AWH		113.2	1.4	0.19	107.2	-5.8	-0.74
6W6UTY		122.0	10.2	1.39	116.4	3.3	0.43
77QBYE		100.1	-11.7	-1.60	103.2	-9.8	-1.25
7K7F9R		114.5	2.7	0.36	117.0	4.0	0.50
9VGPMV		108.9	-2.9	-0.40	103.3	-9.7	-1.24
A8RE3C		126.3	14.5	1.97	129.1	16.1	2.04
AEP24K		112.0	0.2	0.02	113.5	0.5	0.06
AW7DKH		109.3	-2.5	-0.34	116.2	3.2	0.40
BU26TC		112.9	1.1	0.15	114.6	1.6	0.20
CBZG3D		130.2	18.4	2.51	127.6	14.6	1.86
DG6KPQ		112.9	1.1	0.15	101.1	-11.9	-1.52
EAJ4BL		108.3	-3.5	-0.48	109.0	-4.0	-0.51
F63YDC		111.6	-0.2	-0.03	125.3	12.3	1.56
FL7H69		116.4	4.6	0.62	120.4	7.4	0.94
FZRX99		110.2	-1.6	-0.22	109.6	-3.4	-0.44
GH9EXM		107.3	-4.5	-0.62	111.6	-1.4	-0.18
GP6AX7		116.3	4.5	0.61	110.1	-2.9	-0.37
HA7U36		117.8	5.9	0.81	120.6	7.5	0.96
J9WY4J	X	193.3	81.5	11.09	192.7	79.7	10.13
JE2VP6	X	170.5	58.7	7.99	171.4	58.4	7.42
K2PWB3		104.1	-7.7	-1.05	104.4	-8.6	-1.10
K6QVU9		99.4	-12.4	-1.69	103.8	-9.3	-1.18
KALM26		119.0	7.2	0.98	112.5	-0.5	-0.07
KU8E22		116.0	4.2	0.57	120.9	7.9	1.00
LCJNE8		108.9	-2.9	-0.40	104.7	-8.3	-1.06
ME6PXZ	*	112.8	1.0	0.13	128.7	15.7	1.99
MQKJBE	X	430.9	319.1	43.44	430.1	317.1	40.30
NTL84A		106.4	-5.4	-0.74	107.9	-5.2	-0.66
PMD3T2		102.3	-9.5	-1.30	100.9	-12.2	-1.54
QHXV62		121.4	9.5	1.30	119.5	6.5	0.83
QUNNEA		103.8	-8.1	-1.10	105.0	-8.0	-1.02
RQHHDA		118.8	7.0	0.95	115.1	2.0	0.26
U7CPLU	X	139.1	27.3	3.71	156.0	43.0	5.46
U7PJYA		105.2	-6.6	-0.90	107.6	-5.4	-0.69
UH77BV		109.5	-2.3	-0.31	110.3	-2.8	-0.35
W9Q7R6		108.2	-3.6	-0.49	116.8	3.8	0.48

WebCode	Data Flag	Sample SR31			Sample SR32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
WPBWQ4		111.1	-0.7	-0.10	115.1	2.1	0.27
WVFTCP		125.0	13.2	1.79	125.9	12.9	1.64
XJ3TFV		110.7	-1.2	-0.16	119.6	6.6	0.83
Y2V6DV		95.2	-16.6	-2.26	103.9	-9.2	-1.17
Z2BU3T		110.9	-0.9	-0.12	106.3	-6.8	-0.86

Summary Statistics	Sample SR31	Sample SR32
Grand Means	111.83 Sheffield	113.04 Sheffield
Stnd Dev Btwn Labs	7.34 Sheffield	7.87 Sheffield

Statistics based on 40 of 45 reporting participants.

Comments on Assigned Data Flags for Test #3133

J9WY4J (X) - Extreme Data.

MQKJBE (X) - Extreme Data.

3M88QH (X) - Extreme Data.

U7CPLU (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.

JE2VP6 (X) - Extreme Data.

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

Report #4311, July 2024

Grand Mean Sample SR31 = 111.83 Sheffield

Grand Mean Sample SR32 = 113.04 Sheffield
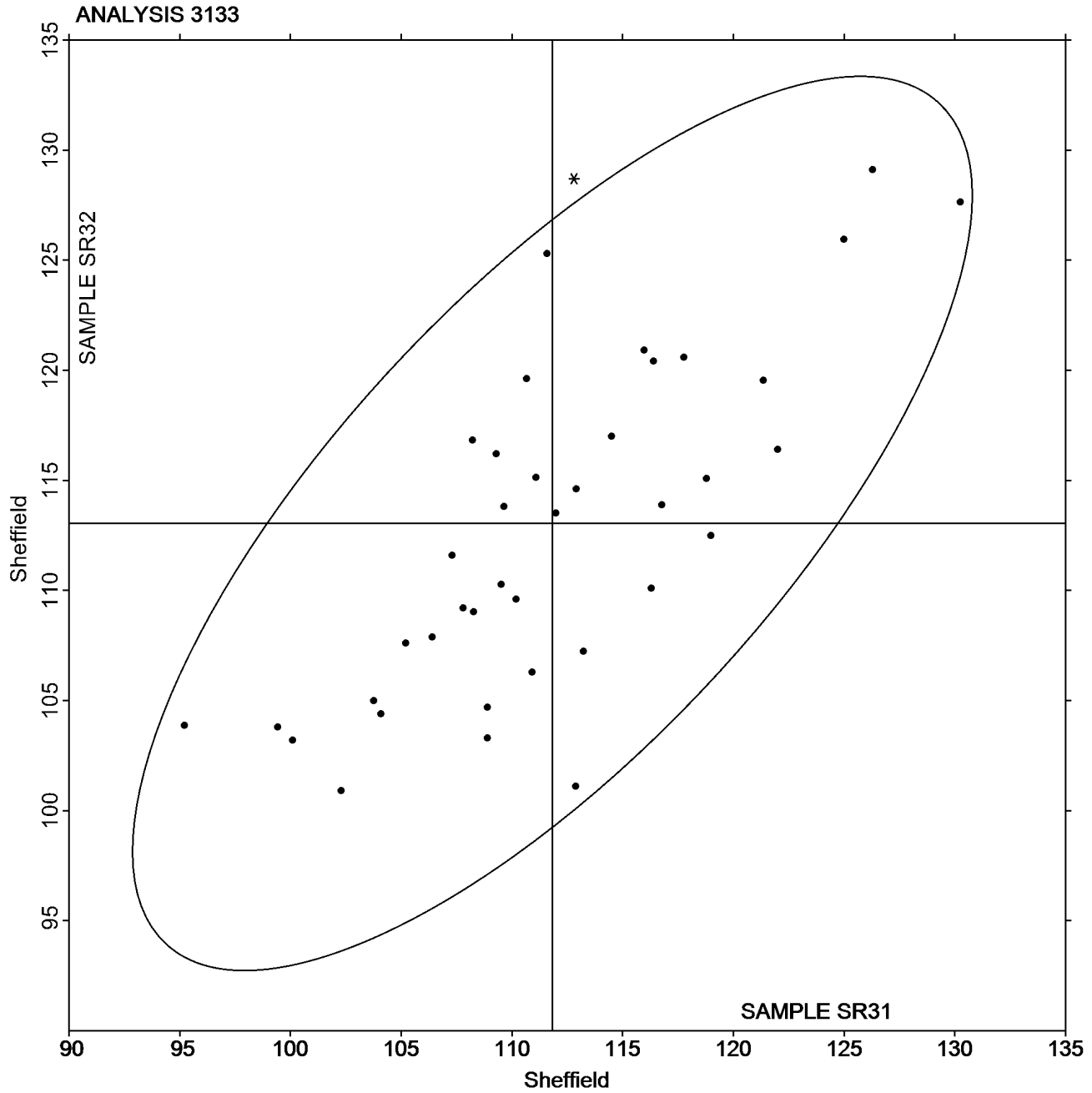
Paper & Paperboard Interlaboratory Testing Program
Analysis 3135
Grammage (Mass per Unit Area)
TAPPI Official Test Method T410

Report #4311, July 2024

WebCode	Data Flag	Sample GM31			Sample GM32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2TUMVN		75.82	0.45	1.17	104.1	0.3	0.46
36MGRH		75.47	0.10	0.27	104.0	0.2	0.29
3NDJHR		75.29	-0.07	-0.18	104.3	0.5	0.77
42894J		75.44	0.08	0.20	103.6	-0.2	-0.29
4UKFRJ		74.92	-0.44	-1.15	103.9	0.1	0.18
7WJDDV		75.45	0.08	0.22	104.9	1.1	1.70
8JQH9F		74.96	-0.40	-1.04	103.5	-0.2	-0.39
AJ7C8G		75.99	0.62	1.62	103.3	-0.5	-0.74
AW7DKH		74.92	-0.45	-1.15	102.9	-0.9	-1.48
GP6AX7		75.20	-0.17	-0.43	103.5	-0.3	-0.43
J9WY4J		75.10	-0.27	-0.69	102.4	-1.3	-2.14
K6QVU9		74.50	-0.87	-2.24	103.0	-0.7	-1.19
K7M9EF		75.08	-0.29	-0.74	104.2	0.5	0.72
L7GEBZ		75.60	0.24	0.62	103.8	0.0	-0.06
MQKJBE		75.75	0.38	0.99	104.0	0.2	0.36
NMDTDX		75.29	-0.08	-0.19	103.8	0.0	0.06
PHH9VZ		75.52	0.15	0.40	103.9	0.2	0.25
QLQ2EX		76.11	0.75	1.93	105.1	1.4	2.15
RQHHDA		75.20	-0.16	-0.42	104.3	0.5	0.79
TARXAU		75.11	-0.26	-0.66	103.5	-0.3	-0.48
U7CPLU		75.82	0.45	1.18	104.7	0.9	1.41
U7PJYA	X	74.38	-0.99	-2.55	99.8	-4.0	-6.33
VPYXWV	X	79.41	4.04	10.45	107.7	3.9	6.14
WLUP36		75.79	0.42	1.10	103.8	0.0	-0.05
WXMX4R		75.29	-0.08	-0.19	103.2	-0.6	-0.90
Y2V6DV		75.13	-0.23	-0.61	103.2	-0.6	-1.01

Summary Statistics	Sample GM31	Sample GM32
Grand Means	75.37 g/sq m	103.79 g/sq m
Stnd Dev Btwn Labs	0.39 g/sq m	0.63 g/sq m

Statistics based on 24 of 26 reporting participants.

Comments on Assigned Data Flags for Test #3135
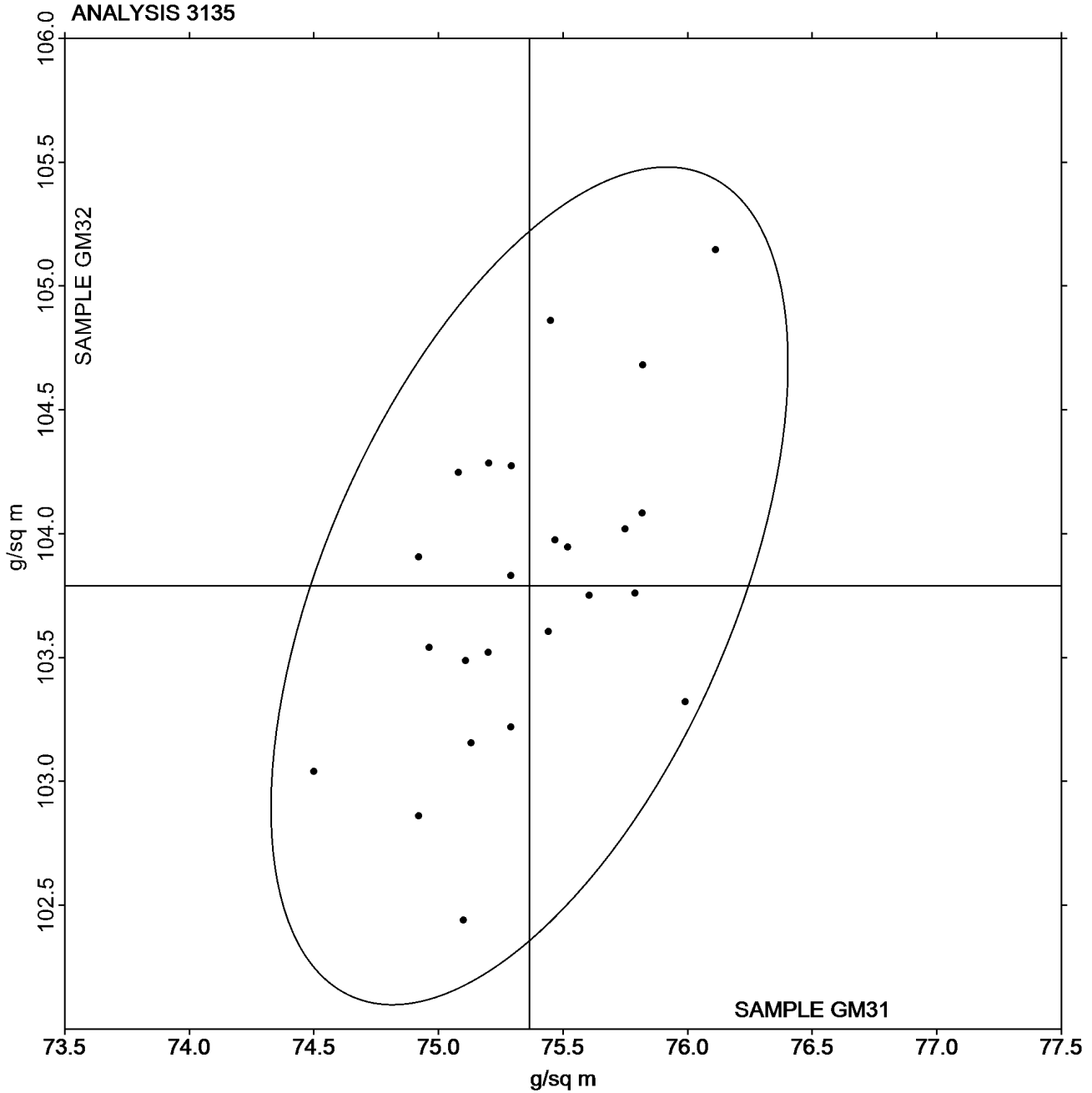
U7PJYA (X) - Extreme Data for Sample GM32.

VPYXWV (X) - Extreme Data.

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

Report #4311, July 2024

Grand Mean Sample GM31 = 75.365 g/sq m

Grand Mean Sample GM32 = 103.79 g/sq m

Paper & Paperboard Interlaboratory Testing Program

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

WebCode	Data Flag	Sample VR31 Lab Mean	Sample VR31 Diff from Grand Mean	Sample VR31 CPV	Sample VR32 Lab Mean	Sample VR32 Diff from Grand Mean	Sample VR32 CPV
42894J		92.76	0.46	1.15	92.57	0.23	0.63
484AWH		92.46	0.15	0.38	92.43	0.09	0.24
77QBYE		92.06	-0.25	-0.63	91.80	-0.53	-1.44
7K7F9R		93.26	0.95	2.41	93.29	0.95	2.56
7QCA3N		92.62	0.31	0.79	92.61	0.27	0.73
AEP24K		91.67	-0.64	-1.60	91.88	-0.46	-1.23
AW7DKH		92.12	-0.19	-0.47	91.94	-0.40	-1.07
GP6AX7		91.52	-0.79	-1.98	91.56	-0.78	-2.09
HA7U36		92.09	-0.22	-0.56	92.27	-0.07	-0.18
J9WY4J	X	93.24	0.93	2.36	93.96	1.62	4.36
K6QVU9		92.19	-0.12	-0.29	92.64	0.30	0.81
KALM26	X	94.91	2.60	6.57	94.23	1.89	5.08
MP4MJE		92.37	0.06	0.16	92.47	0.13	0.35
MQKJBE		92.40	0.09	0.24	92.37	0.03	0.08
NTL84A		92.38	0.08	0.19	92.57	0.23	0.63
QQ8JHZ		92.80	0.49	1.24	92.64	0.30	0.82
RQHHDA		92.42	0.11	0.29	92.26	-0.08	-0.21
U7PJYA		91.88	-0.43	-1.07	92.15	-0.19	-0.51
UH77BV		91.97	-0.34	-0.85	92.24	-0.10	-0.28
W9Q7R6		92.32	0.01	0.03	92.38	0.04	0.12
WPBWQ4		92.09	-0.22	-0.54	92.09	-0.25	-0.68
XJ3TFV		92.59	0.28	0.72	92.63	0.29	0.79
Y2V6DV		92.46	0.15	0.39	92.31	-0.03	-0.07

Summary Statistics	Sample VR31	Sample VR32
Grand Means	92.31 Percent	92.34 Percent
Stnd Dev Btwn Labs	0.40 Percent	0.37 Percent

Statistics based on 21 of 23 reporting participants.

Comments on Assigned Data Flags for Test #3141
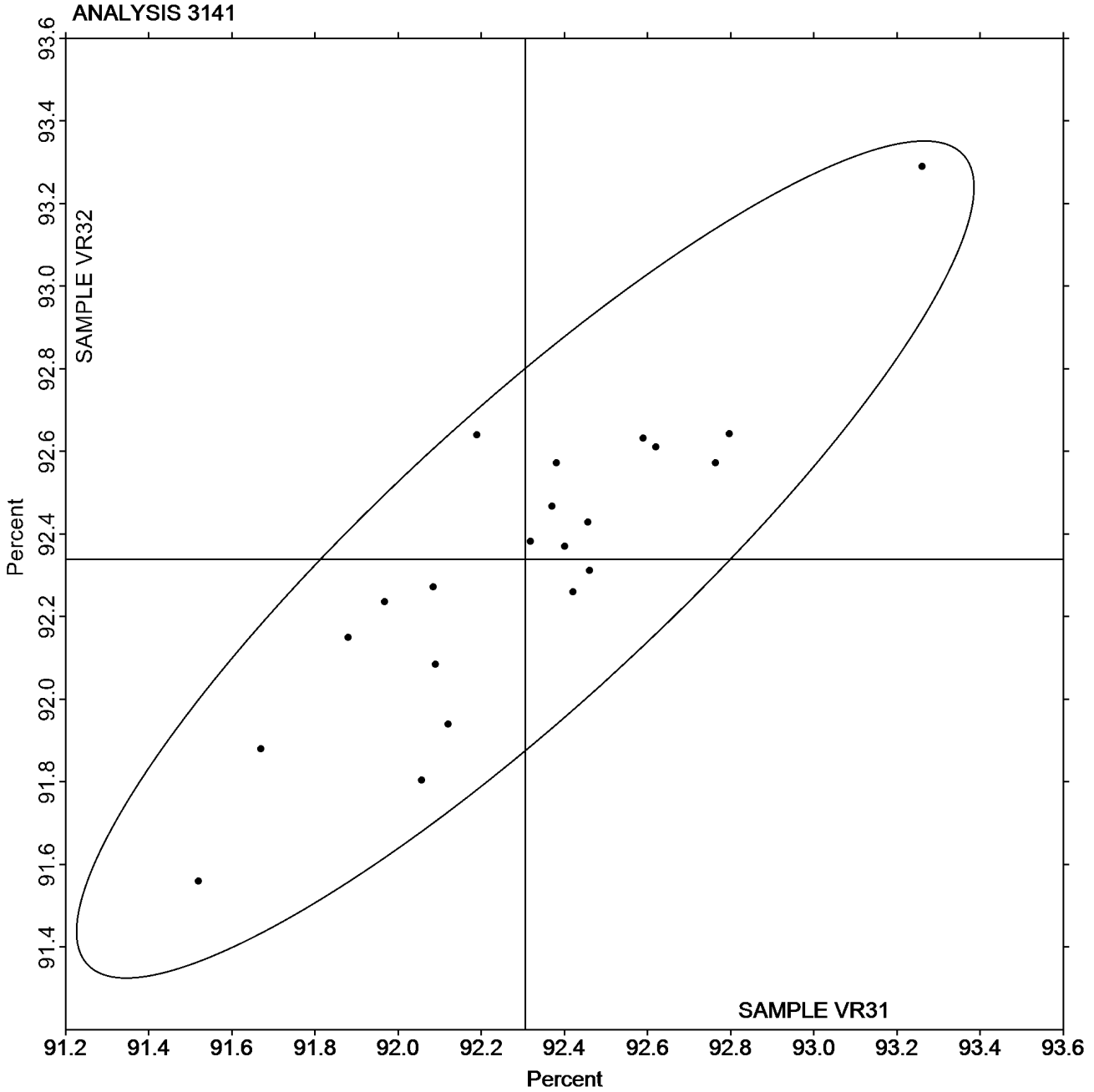
J9WY4J (X) - Data for sample VR32 are high.

KALM26 (X) - Extreme Data.

Grand Mean Sample VR31 = 92.305 Percent

Grand Mean Sample VR32 = 92.338 Percent

ANALYSIS 3141

SAMPLE VR32

Percent

SAMPLE VR31

Percent

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

Report #4311, July 2024

WebCode	Data Flag	Sample VP31			Sample VP32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
36MGRH		92.52	-0.05	-1.01	92.42	-0.02	-0.25
JRLDH9		92.64	0.06	1.26	92.45	0.01	0.09
U7CPLU		92.55	-0.03	-0.55	92.36	-0.09	-1.12
WXMX4R		92.59	0.02	0.31	92.54	0.10	1.29

Summary Statistics	Sample VP31	Sample VP32
Grand Means	92.57 Percent	92.44 Percent
Stnd Dev Btwn Labs	0.05 Percent	0.08 Percent

Statistics based on 4 of 4 reporting participants.

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

Report #4311, July 2024

Grand Mean Sample VP31 = 92.574 Percent

Grand Mean Sample VP32 = 92.442 Percent

ANALYSIS 3143

SAMPLE VP32

SAMPLE VP31

Percent

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

Analysis 3145
Directional Brightness of Fluorescent Samples
TAPPI Official Test Method T452

		Sample BF31			Sample BF32		
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
42894J		98.61	0.94	0.51	98.15	0.64	0.34
484AWH		94.63	-3.04	-1.65	94.33	-3.18	-1.68
6W6UTY		94.91	-2.76	-1.50	94.57	-2.94	-1.55
7QCA3N		97.34	-0.33	-0.18	97.16	-0.35	-0.18
HA7U36		99.00	1.33	0.73	98.66	1.15	0.61
J9WY4J		96.02	-1.65	-0.90	95.64	-1.87	-0.99
ME6PXZ		98.56	0.89	0.48	98.62	1.11	0.59
MP4MJE		97.68	0.01	0.01	97.36	-0.15	-0.08
NTL84A		98.57	0.91	0.49	98.57	1.06	0.56
QQ8JHZ		98.66	1.00	0.54	98.20	0.69	0.36
RQHHDA		98.72	1.05	0.57	99.32	1.81	0.96
WPBWQ4		94.85	-2.82	-1.53	95.13	-2.38	-1.25
XJ3TFV		99.91	2.24	1.22	100.42	2.91	1.54
Y2V6DV		99.88	2.22	1.21	99.00	1.49	0.79

Summary Statistics	Sample BF31	Sample BF32
Grand Means	97.67 Percent	97.51 Percent
Stnd Dev Btwn Labs	1.84 Percent	1.89 Percent

Statistics based on 14 of 14 reporting participants.

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

Report #4311, July 2024

Grand Mean Sample BF31 = 97.667 Percent

Grand Mean Sample BF32 = 97.509 Percent

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

WebCode	Data Flag	Sample BF31 Lab Mean	Sample BF31 Diff from Grand Mean	Sample BF31 CPV	Sample BF32 Lab Mean	Sample BF32 Diff from Grand Mean	Sample BF32 CPV
484AWH		7.718	-0.110	-0.29	7.744	-0.109	-0.26
6W6UTY		7.094	-0.734	-1.92	7.080	-0.773	-1.87
HA7U36		8.420	0.592	1.55	8.480	0.627	1.52
ME6PXZ		8.050	0.222	0.58	8.076	0.223	0.54
MP4MJE		7.538	-0.290	-0.76	7.482	-0.371	-0.90
NTL84A		7.936	0.108	0.28	7.944	0.091	0.22
QQ8JHZ		8.088	0.260	0.68	7.970	0.117	0.28
RQHHDA		8.100	0.272	0.71	8.228	0.375	0.91
WPBWQ4		7.478	-0.350	-0.92	7.478	-0.375	-0.91
Y2V6DV		7.854	0.026	0.07	8.044	0.191	0.46

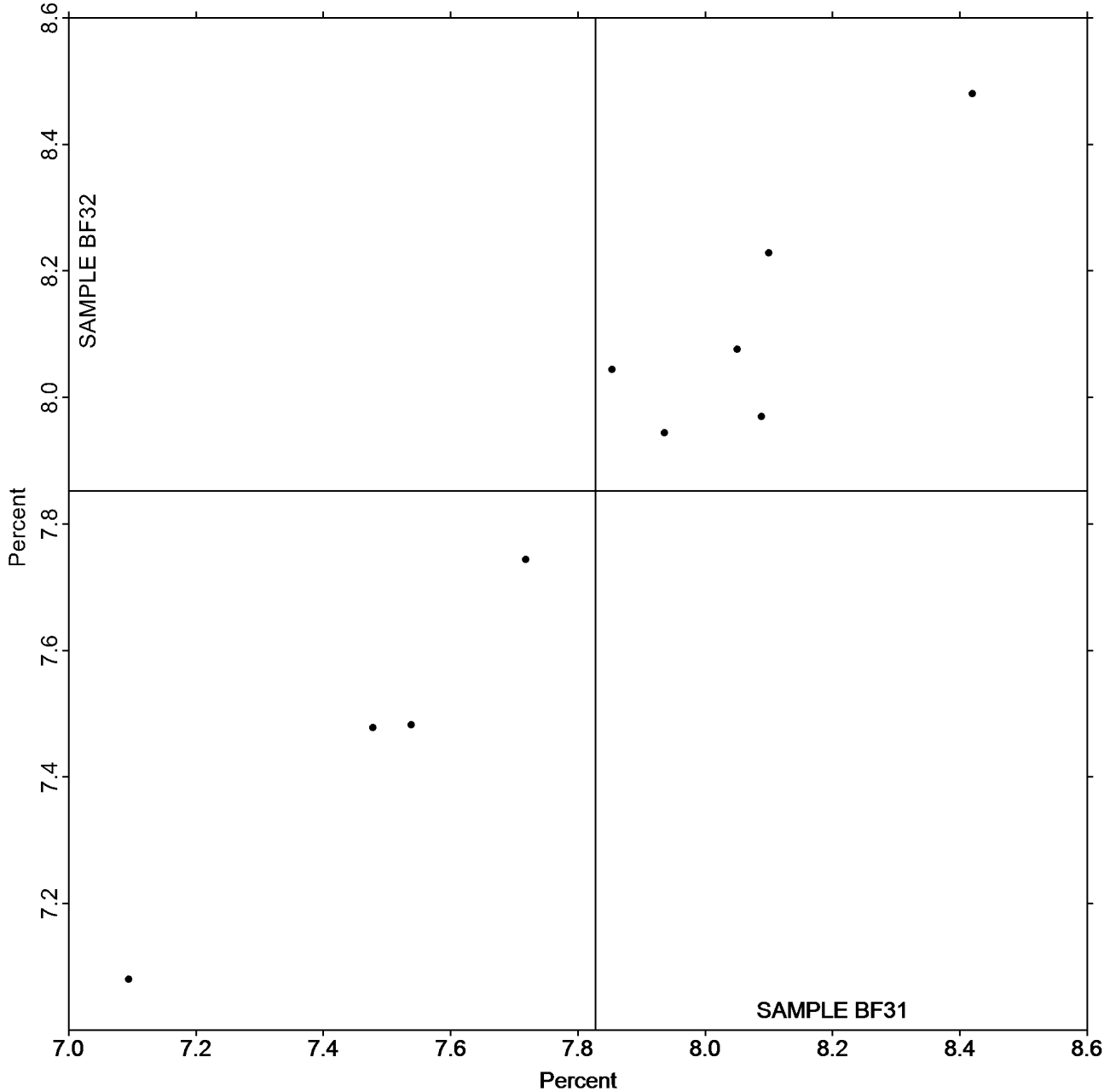| Summary Statistics	Sample BF31	Sample BF32
Grand Means	7.83 Percent	7.85 Percent
Stnd Dev Btwn Labs	0.38 Percent	0.41 Percent

Statistics based on 10 of 10 reporting participants.

Grand Mean Sample BF31 = 7.8276 Percent

Grand Mean Sample BF32 = 7.8526 Percent

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

WebCode	Data Flag	Sample TP31			Sample TP32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
484AWH	X	31.397	28.366	83.99	32.213	29.207	89.88
77QBYE		3.470	0.439	1.30	3.460	0.454	1.40
HA7U36		2.954	-0.077	-0.23	3.056	0.050	0.15
K6QVU9		3.259	0.228	0.67	3.086	0.080	0.25
NTL84A		3.010	-0.021	-0.06	3.020	0.014	0.04
QUNNEA		2.645	-0.386	-1.14	2.721	-0.285	-0.88
U7PJYA		3.459	0.428	1.27	3.409	0.403	1.24
WPBWQ4		2.850	-0.182	-0.54	2.755	-0.251	-0.77
Y2V6DV	X	2,074.110	2,071.079	6,132.06	2,074.110	2,071.105	6,373.17
ZE2ND2		2.604	-0.427	-1.27	2.540	-0.466	-1.43

Summary Statistics	**Sample TP31**	**Sample TP32**
Grand Means	3.03 Taber Units	3.01 Taber Units
Stnd Dev Btwn Labs	0.34 Taber Units	0.32 Taber Units

Statistics based on 8 of 10 reporting participants.

Comments on Assigned Data Flags for Test #3201

484AWH (X) - Extreme Data.
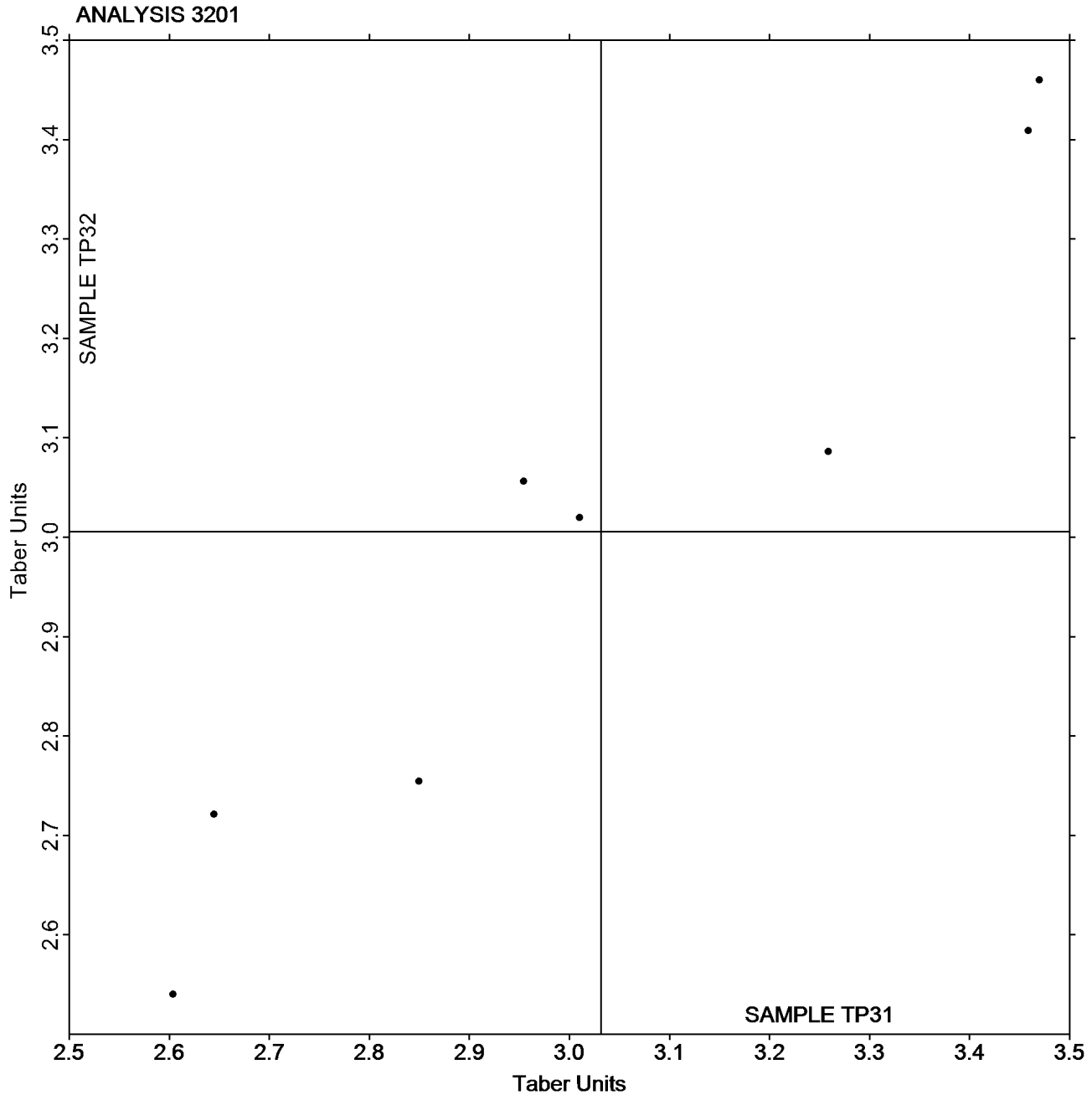
Y2V6DV (X) - Extreme Data.

Analysis Notes:

HA7U36 - Data appear to be reported as mN-m, not g-cm as indicated on data entry form. CTS will not correct the Units going forward.

U7PJYA - Data appear to be off by a factor of 10 (/10). CTS will not correct going forward.

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

Report #4311, July 2024

Grand Mean Sample TP31 = 3.0313 Taber Units

Grand Mean Sample TP32 = 3.0058 Taber Units

ANALYSIS 3201

SAMPLE TP32

Taber Units

SAMPLE TP31

Taber Units

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

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

Report #4311, July 2024

WebCode	Data Flag	Sample TC31 Lab Mean	Sample TC31 Diff from Grand Mean	Sample TC31 CPV	Sample TC32 Lab Mean	Sample TC32 Diff from Grand Mean	Sample TC32 CPV
3Q8HKW		49.00	1.14	0.38	53.45	4.47	1.47
9VGPMV		45.00	-2.86	-0.94	49.85	0.87	0.28
A8RE3C		47.75	-0.11	-0.04	49.86	0.88	0.29
GDRA2C		47.00	-0.86	-0.28	47.00	-1.98	-0.65
GH9EXM		51.21	3.35	1.10	49.92	0.93	0.31
HA7U36		43.30	-4.56	-1.50	43.90	-5.08	-1.67
KHRRPF		46.74	-1.12	-0.37	47.89	-1.09	-0.36
KU8E22		51.58	3.72	1.22	51.87	2.89	0.95
RQHHDA		44.94	-2.92	-0.96	44.87	-4.11	-1.35
WVFTCP		52.06	4.20	1.38	51.23	2.25	0.74

Summary Statistics	Sample TC31	Sample TC32
Grand Means	47.86 Taber Units	48.98 Taber Units
Stnd Dev Btwn Labs	3.05 Taber Units	3.05 Taber Units

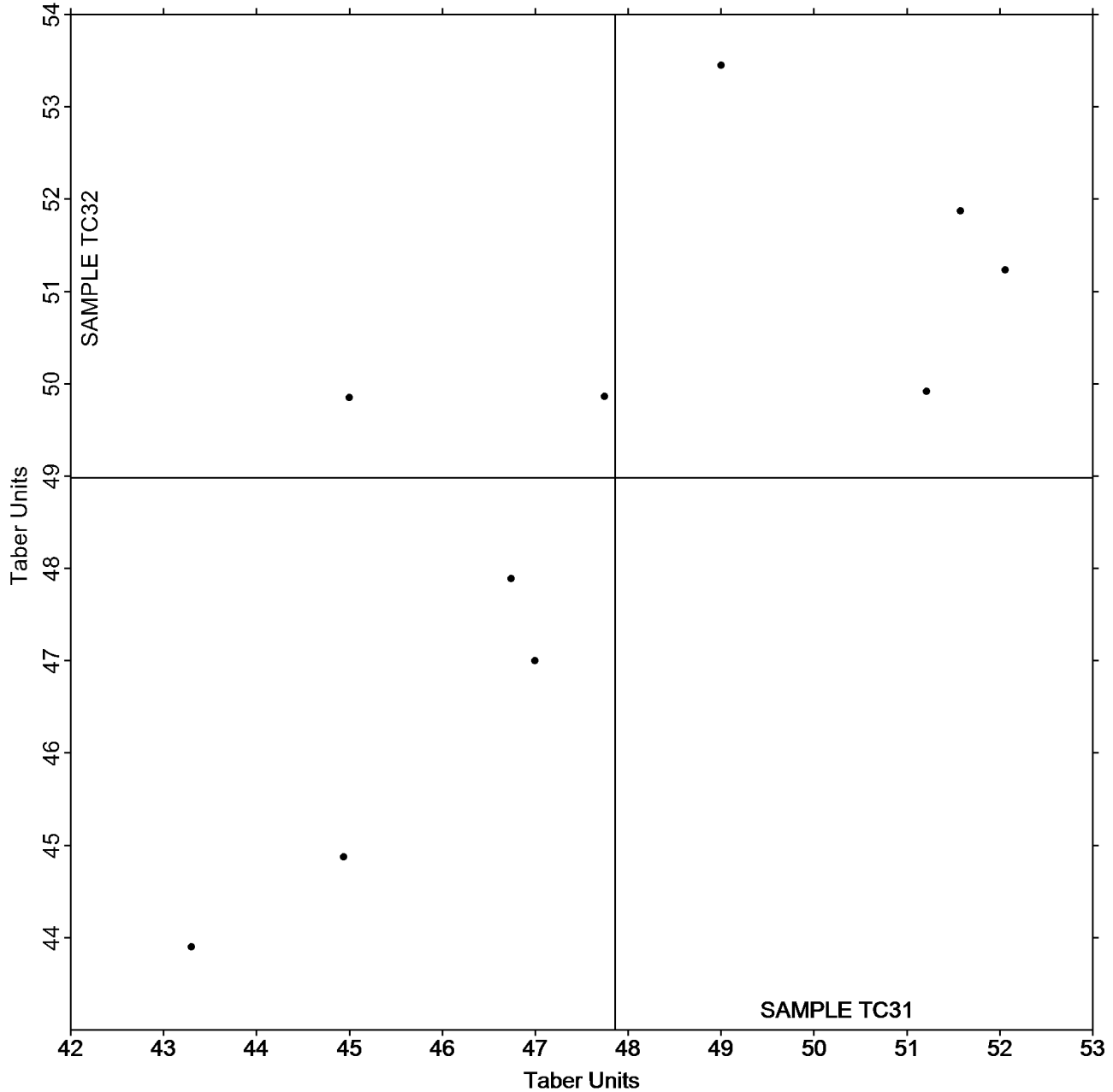Statistics based on 10 of 10 reporting participants.

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

Report #4311, July 2024

Grand Mean Sample TC31 = 47.858 Taber Units

Grand Mean Sample TC32 = 48.984 Taber Units

ANALYSIS 3203

SAMPLE TC32

Taber Units

SAMPLE TC31

Taber Units

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

WebCode	Data Flag	Sample TR31			Sample TR32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3M88QH		172.0	-2.9	-0.57	179.3	3.5	0.64
4REXTN		181.8	6.8	1.35	181.0	5.3	0.95
7K7F9R		167.6	-7.4	-1.45	173.3	-2.4	-0.43
994UWD		174.6	-0.3	-0.07	175.3	-0.4	-0.08
9VGPMV		176.0	1.1	0.22	176.3	0.6	0.11
A8RE3C		177.4	2.4	0.48	173.0	-2.8	-0.50
BU26TC		170.4	-4.5	-0.90	171.4	-4.3	-0.78
DG6KPQ		174.0	-0.9	-0.18	171.4	-4.3	-0.78
F63YDC		173.5	-1.5	-0.29	170.0	-5.7	-1.04
FL7H69		171.8	-3.1	-0.62	173.0	-2.7	-0.49
GH9EXM		185.2	10.3	2.04	189.0	13.2	2.39

Summary Statistics	Sample TR31	Sample TR32
Grand Means	174.93 Taber Units	175.72 Taber Units
Stnd Dev Btwn Labs	5.06 Taber Units	5.54 Taber Units

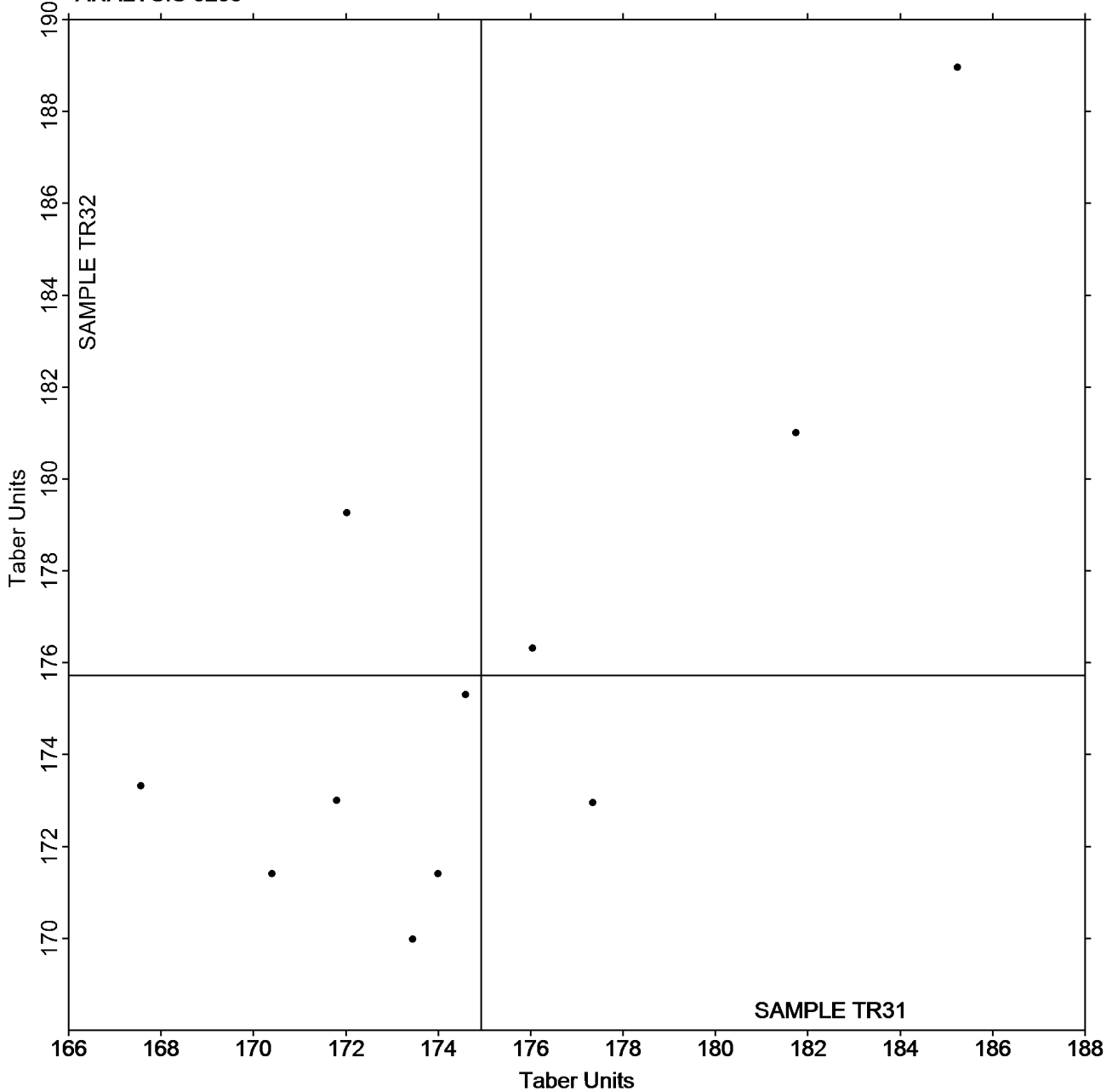Statistics based on 11 of 11 reporting participants.

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

Report #4311, July 2024

Grand Mean Sample TR31 = 174.93 Taber Units

Grand Mean Sample TR32 = 175.72 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

WebCode	Data Flag	Sample ZR31 Lab Mean	Sample ZR31 Diff from Grand Mean	Sample ZR31 CPV	Sample ZR32 Lab Mean	Sample ZR32 Diff from Grand Mean	Sample ZR32 CPV
3M88QH		57.08	5.42	1.25	54.80	3.21	0.94
3YHK7X		57.30	5.64	1.30	56.18	4.59	1.35
4REXTN		51.75	0.09	0.02	51.63	0.05	0.01
73P88R		57.42	5.76	1.32	56.38	4.79	1.41
7E2CKE		52.80	1.14	0.26	49.80	-1.79	-0.52
7K7F9R		50.52	-1.14	-0.26	47.08	-4.51	-1.32
8G86DX		49.40	-2.26	-0.52	49.20	-2.39	-0.70
994UWD		52.00	0.34	0.08	52.00	0.41	0.12
9VGPMV		53.18	1.52	0.35	53.98	2.39	0.70
A8RE3C		51.18	-0.48	-0.11	50.92	-0.67	-0.20
AEQ4JG		49.68	-1.98	-0.45	48.66	-2.93	-0.86
DEXCBE		47.95	-3.71	-0.85	49.27	-2.32	-0.68
EGKJX9	*	38.85	-12.81	-2.94	45.56	-6.03	-1.77
F63YDC		50.00	-1.66	-0.38	52.00	0.41	0.12
FL7H69		50.82	-0.84	-0.19	51.08	-0.51	-0.15
PMD3T2		53.00	1.34	0.31	49.60	-1.99	-0.58
RFN3PT		49.70	-1.96	-0.45	53.60	2.01	0.59
UV8283		58.28	6.62	1.52	59.00	7.41	2.18
Y89WR3		50.60	-1.06	-0.24	49.40	-2.19	-0.64
ZPZBGR	X	298.62	246.96	56.77	303.34	251.75	73.98

Summary Statistics	Sample ZR31	Sample ZR32
Grand Means	51.66 psi	51.59 psi
Stnd Dev Btwn Labs	4.35 psi	3.40 psi

Statistics based on 19 of 20 reporting participants.

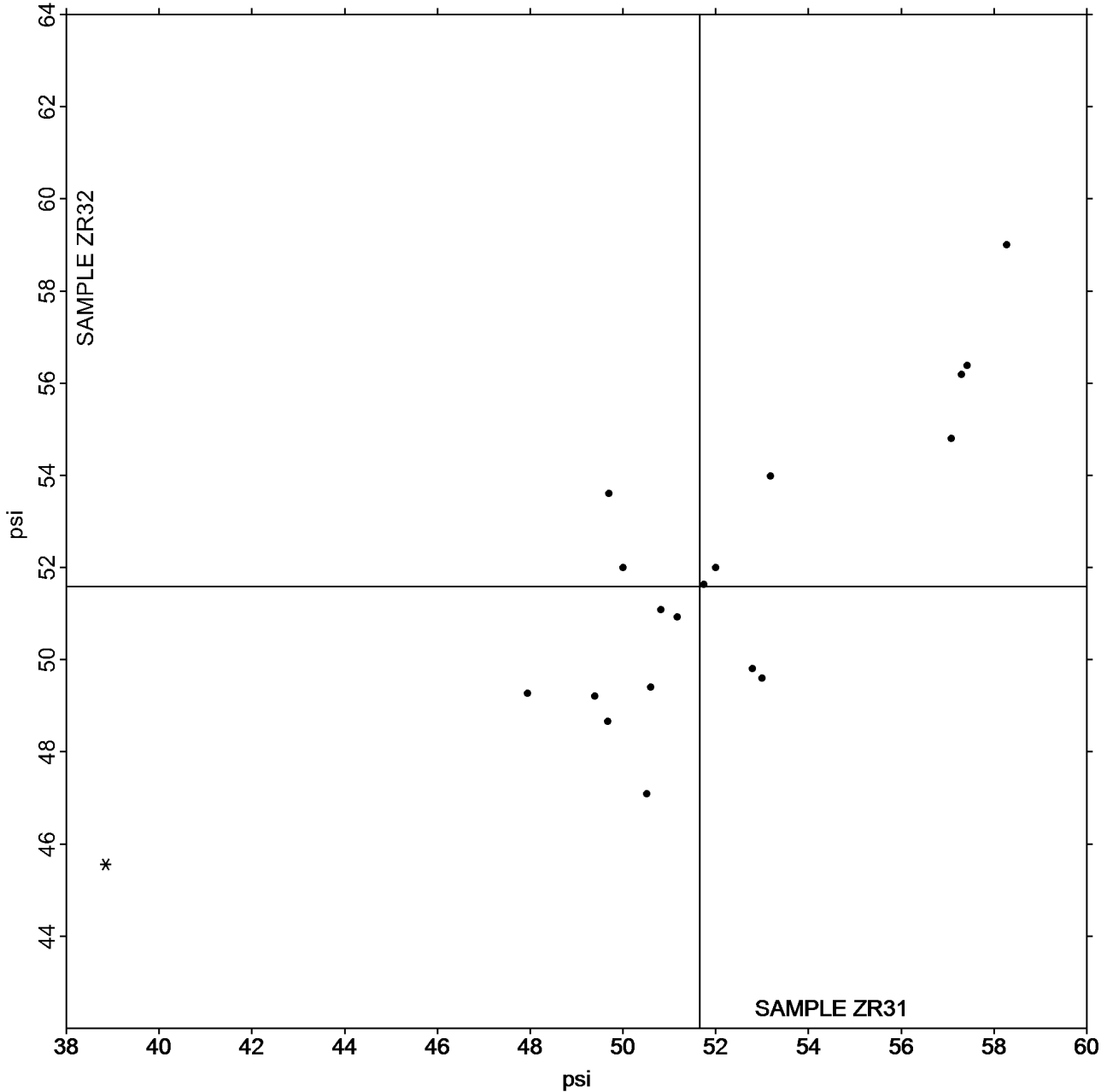## Comments on Assigned Data Flags for Test #3207

ZPZBGR (X) - Extreme Data.

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

Report #4311, July 2024

Grand Mean Sample ZR31 = 51.658 psi

Grand Mean Sample ZR32 = 51.586 psi

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

WebCode	Data Flag	Sample ZP31			Sample ZP32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
24XTUW		73.72	-10.91	-0.86	61.32	-12.80	-1.79
9VGPMV		106.58	21.95	1.74	87.00	12.88	1.80
BU26TC		93.40	8.77	0.69	74.96	0.84	0.12
CD6AUQ		85.96	1.33	0.11	78.16	4.04	0.57
DG6KPQ		86.60	1.97	0.16	79.40	5.28	0.74
GDRA2C		87.20	2.57	0.20	78.00	3.88	0.54
KHRRPF		69.80	-14.83	-1.17	66.68	-7.44	-1.04
KU8E22		90.72	6.09	0.48	76.28	2.16	0.30
U7CPLU		61.64	-22.99	-1.82	68.14	-5.98	-0.84
WVFTCP		94.72	10.09	0.80	75.92	1.80	0.25
YYTDAN		80.56	-4.07	-0.32	69.50	-4.62	-0.65

Summary Statistics	Sample ZP31	Sample ZP32
Grand Means	84.63 psi	74.12 psi
Stnd Dev Btwn Labs	12.62 psi	7.14 psi

Statistics based on 11 of 11 reporting participants.

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

Report #4311, July 2024

Grand Mean Sample ZP31 = 84.627 psi

Grand Mean Sample ZP32 = 74.124 psi

ANALYSIS 3209

SAMPLE ZP32

SAMPLE ZP31

psi

psi

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

WebCode	Data Flag	Sample SM31 Lab Mean	Sample SM31 Diff from Grand Mean	Sample SM31 CPV	Sample SM32 Lab Mean	Sample SM32 Diff from Grand Mean	Sample SM32 CPV
2GLUCP		92.4	-8.2	-0.87	100.8	-0.5	-0.06
32N6VH		99.4	-1.2	-0.13	99.0	-2.3	-0.24
7K7F9R		105.8	5.2	0.55	107.8	6.5	0.66
9VGPMV		109.8	9.2	0.98	111.2	9.9	1.01
BU26TC		86.8	-13.8	-1.47	84.4	-16.9	-1.73
EAJ4BL		114.8	14.2	1.51	111.8	10.5	1.07
F63YDC		100.6	0.0	0.00	104.6	3.3	0.33
GDRA2C		104.0	3.4	0.36	106.2	4.9	0.50
KU8E22		112.6	12.0	1.28	112.0	10.7	1.09
UH77BV		90.4	-10.2	-1.09	90.4	-10.9	-1.12
WVFTCP		108.0	7.4	0.79	109.6	8.3	0.85
Y2V6DV		94.2	-6.4	-0.68	91.2	-10.2	-1.04
ZE2ND2		89.1	-11.5	-1.23	88.5	-12.9	-1.32

Summary Statistics	Sample SM31	Sample SM32
Grand Means	100.61 1000th ft-lbs	101.34 1000th ft-lbs
Stnd Dev Btwn Labs	9.40 1000th ft-lbs	9.77 1000th ft-lbs

Statistics based on 13 of 13 reporting participants.

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

Report #4311, July 2024

Grand Mean Sample SM31 = 100.61
1000th ft-lbs

Grand Mean Sample SM32 = 101.34
1000th ft-lbs

ANALYSIS 3211

SAMPLE SM32

1000th ft-lbs

SAMPLE SM31

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.

WebCode	Data Flag	Sample SB31 Lab Mean	Diff from Grand Mean	CPV	Sample SB32 Lab Mean	Diff from Grand Mean	CPV
36MGRH		95.95	1.05	0.09	93.58	-1.29	-0.10
3Q8HKW		100.74	5.84	0.51	99.28	4.40	0.35
484AWH		83.40	-11.50	-1.00	80.60	-14.28	-1.14
EGKJX9		110.20	15.30	1.33	118.00	23.12	1.85
FAXTBD		106.40	11.50	1.00	108.40	13.52	1.08
FZRX99		91.80	-3.10	-0.27	97.80	2.92	0.23
HA7U36		103.60	8.70	0.76	105.00	10.12	0.81
K2PWB3		108.60	13.70	1.19	99.60	4.72	0.38
MJZJV2		88.68	-6.22	-0.54	88.84	-6.04	-0.48
NTL84A		84.40	-10.50	-0.91	85.40	-9.48	-0.76
QHXV62		72.60	-22.30	-1.94	72.80	-22.08	-1.76
UH77BV		92.40	-2.50	-0.22	89.20	-5.68	-0.45

Summary Statistics	Sample SB31	Sample SB32
Grand Means	94.90 1000th ft-lbs	94.88 1000th ft-lbs
Stnd Dev Btwn Labs	11.52 1000th ft-lbs	12.51 1000th ft-lbs

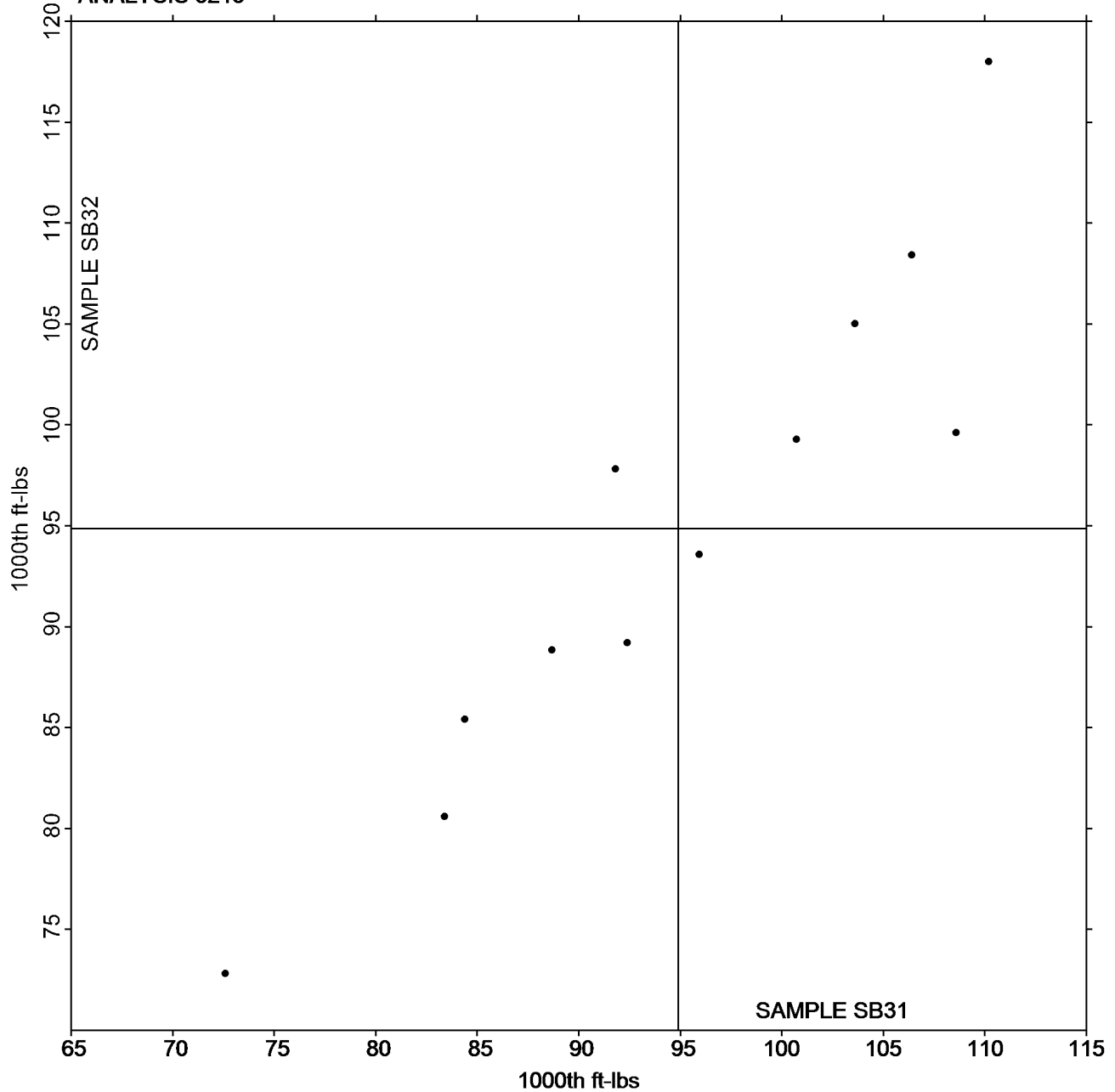Statistics based on 12 of 12 reporting participants.

Grand Mean Sample SB31 = 94.897 1000th ft-lbs

Grand Mean Sample SB32 = 94.875 1000th ft-lbs

ANALYSIS 3213

SAMPLE SB32

1000th ft-lbs

SAMPLE SB31

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-