Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #4361 - May 2025

Analysis	Analysis Name
3101	Thickness (Caliper), Printing papers
3111	Bursting Strength - Printing Papers
3113	Tearing Strength - Printing Papers
3115	Tensile Breaking Strength - Printing Papers
3116	Tensile Energy Absorption - Printing Papers
3117	Elongation to Break - Printing Papers
3121	Air Resistance - Gurley Oil Type
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3131	Roughness - Print Surf Method - 2.5 to 6.0 Microns
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3141	Opacity (89% Reflectance Backing) - Fine Papers
3143	Opacity (Paper Backing) - Fine Papers and Newsprint
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The CTS Paper & Paperboard Interlaboratory Program

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

About CTS

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

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Key for Web Summary Reports (Page 1 of 2)

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

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

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

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

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

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

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

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

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 CP41 Lab Mean	Sample CP41 Diff from Grand Mean	Sample CP41 CPV	Sample CP42 Lab Mean	Sample CP42 Diff from Grand Mean	Sample CP42 CPV	Instr Code
2QYQQW	*	3.837	-0.168	-2.56	3.832	-0.169	-2.53	LW
2TKAVZ		4.050	0.045	0.69	3.994	-0.007	-0.11	TA
3NP3PW		4.019	0.014	0.22	4.006	0.005	0.07	PP
3QUVHA		4.008	0.003	0.05	3.995	-0.006	-0.10	TA
4JNDLU		4.032	0.027	0.42	4.011	0.010	0.14	EM
4V2G78		4.028	0.023	0.35	4.006	0.005	0.07	PP
7J3MNU	X	5.002	0.997	15.19	4.222	0.221	3.30	LB
877ZU4	X	0.789	-3.215	-48.99	0.792	-3.210	-47.98	LW
882JW6		3.946	-0.059	-0.90	3.962	-0.039	-0.59	TA
8LJ9V8		4.099	0.094	1.44	4.089	0.088	1.31	EM
8WJYEU		3.925	-0.080	-1.22	3.934	-0.067	-1.01	EM
93RK3R		3.947	-0.058	-0.88	4.006	0.005	0.07	TM
CEQMTP		3.988	-0.017	-0.26	3.966	-0.036	-0.53	LW
DFX6PZ		4.062	0.057	0.87	4.028	0.027	0.40	EM
E9TMUK		4.009	0.004	0.06	4.012	0.011	0.16	LW
EELPVY	X	3.669	-0.336	-5.12	3.731	-0.270	-4.04	TA
EZ32NM		3.968	-0.037	-0.56	4.021	0.020	0.29	EM
GTBX9F		4.148	0.143	2.18	4.130	0.129	1.92	TM
HVC2YG		3.993	-0.012	-0.18	3.997	-0.004	-0.07	LA
JBM6VV		4.060	0.055	0.85	4.070	0.069	1.03	TM
KFC4MV		4.097	0.092	1.41	4.110	0.109	1.62	PP
KWYJQR		3.902	-0.103	-1.57	3.884	-0.117	-1.75	TA
LWVENN		3.862	-0.143	-2.17	3.831	-0.171	-2.55	MS
MFMKWE		4.028	0.023	0.35	4.028	0.026	0.39	PP
P3NNMC		3.950	-0.055	-0.83	3.920	-0.081	-1.22	EM
PH3TWQ		4.041	0.036	0.55	4.085	0.083	1.24	TA
QFWTBJ		4.067	0.062	0.95	4.034	0.033	0.49	EM
QGMW4Q		4.013	0.008	0.12	4.005	0.004	0.06	MS
QKNX6N		3.970	-0.035	-0.53	4.015	0.014	0.20	LW
QR9ZCQ		4.012	0.007	0.11	3.991	-0.010	-0.15	LW
VXY2J7		4.024	0.019	0.29	4.059	0.058	0.86	TM
WUXDF4		4.020	0.015	0.23	4.020	0.019	0.28	PP
WZK7PH		4.034	0.029	0.45	4.022	0.021	0.31	LW
XHYYTC		4.001	-0.004	-0.06	4.003	0.002	0.02	TM
YTBLG4		4.061	0.056	0.86	4.004	0.003	0.04	PP
ZDFNTD		4.001	-0.004	-0.06	3.984	-0.017	-0.26	LB
ZGEYND		3.916	-0.089	-1.35	3.923	-0.078	-1.17	LW
ZQZ7M3		4.050	0.045	0.69	4.072	0.071	1.06	EM

Summary Statistics	Sample CP41	Sample CP42
Grand Means	4.00 mils	4.00 mils
Stnd Dev Btwn Labs	0.07 mils	0.07 mils

Statistics based on 35 of 38 reporting participants.

Comments on Assigned Data Flags for Test #3101

877ZU4 (X) - Extreme Data.

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

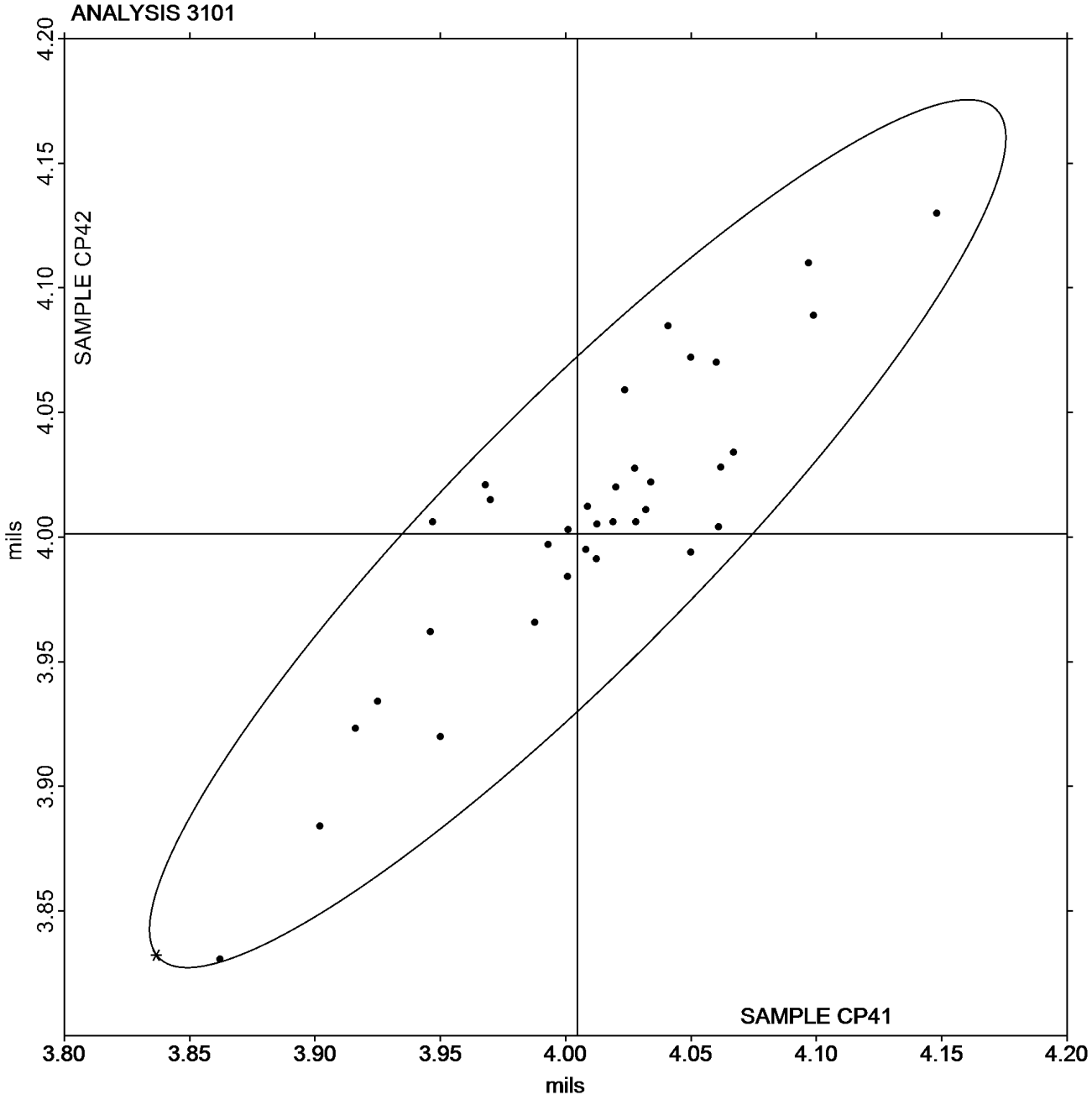
7J3MNU (X) - Extreme Data for Sample CP41. Inconsistent within the determinations of both samples.

Key to Instrument Codes Reported by Participants

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

Grand Mean Sample CP41 = 4.0048 mils

Grand Mean Sample CP42 = 4.0014 mils



Paper & Paperboard Interlaboratory Testing Program

Analysis 3111

Bursting Strength - Printing Papers

TAPPI Official Test Method T403

WebCode	Data Flag	Sample BP41 Lab Mean	Sample BP41 Diff from Grand Mean	Sample BP41 CPV	Sample BP42 Lab Mean	Sample BP42 Diff from Grand Mean	Sample BP42 CPV	Instr Code
2DCLFE		22.30	-0.44	-0.28	22.00	-0.47	-0.32	ZZ
3NP3PW		19.29	-3.45	-2.20	19.34	-3.13	-2.13	ZZ
4V2G78		23.54	0.80	0.51	24.32	1.85	1.26	ZZ
7J3MNU		22.80	0.06	0.04	22.86	0.39	0.27	ZZ
877ZU4		21.38	-1.36	-0.87	21.19	-1.28	-0.87	ZZ
882JW6	*	25.30	2.56	1.63	22.50	0.03	0.02	ZZ
8WJYEU		22.94	0.20	0.13	23.00	0.53	0.36	ZZ
93RK3R	X	35.30	12.56	8.01	34.00	11.53	7.85	ZZ
A6BY7R		22.33	-0.41	-0.26	22.29	-0.18	-0.12	ZZ
BGKVNZ		23.65	0.91	0.58	22.11	-0.36	-0.24	ZZ
C8Q873		24.18	1.44	0.92	23.78	1.31	0.89	ZZ
CEQMTP		22.86	0.12	0.07	22.84	0.37	0.25	ZZ
DFX6PZ		21.20	-1.54	-0.98	20.80	-1.67	-1.13	ZZ
E9TMUK		22.22	-0.52	-0.33	23.02	0.55	0.37	ZZ
JBM6VV		21.78	-0.96	-0.61	21.49	-0.97	-0.66	ZZ
KWYJQR		22.90	0.16	0.10	22.00	-0.47	-0.32	ZZ
PL36UC		22.20	-0.54	-0.35	22.90	0.43	0.29	ZZ
QFWTBJ		21.32	-1.42	-0.91	20.89	-1.58	-1.07	ZZ
V6ZDF3		23.54	0.80	0.51	22.22	-0.25	-0.17	ZZ
VNDXC7		23.80	1.06	0.68	22.50	0.03	0.02	ZZ
XHYYTC	*	26.66	3.92	2.50	26.76	4.29	2.92	ZZ
ZQZ7M3		21.38	-1.36	-0.87	23.00	0.53	0.36	ZZ

Summary Statistics	Sample BP41	Sample BP42
Grand Means	22.74 psi	22.47 psi
Stnd Dev Btwn Labs	1.57 psi	1.47 psi

Statistics based on 21 of 22 reporting participants.

Comments on Assigned Data Flags for Test #3111

93RK3R (X) - Extreme Data.

Analysis Notes:

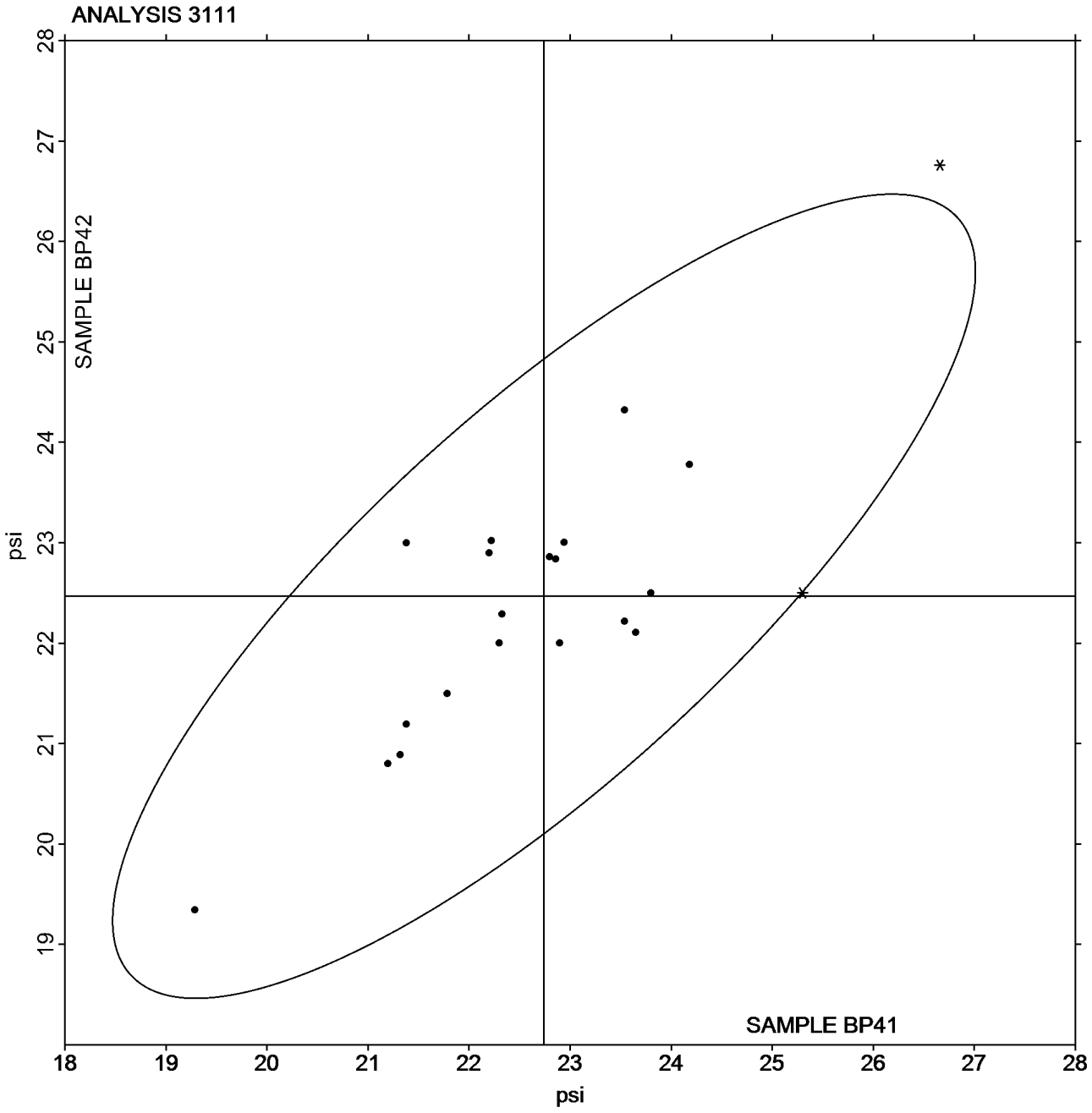
4V2G78 - Data appear to be reported as psi, not kPa as indicated on data entry form. CTS will not correct the Units going forward.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample BP41 = 22.742 psi

Grand Mean Sample BP42 = 22.467 psi



WebCode	Data Flag	Sample RP41 Lab Mean	Sample RP41 Diff from Grand Mean	Sample RP41 CPV	Sample RP42 Lab Mean	Sample RP42 Diff from Grand Mean	Sample RP42 CPV	Instr Code
2DCLFE		75.20	15.39	2.01	73.40	13.09	1.63	ZZ
3NP3PW		58.36	-1.45	-0.19	62.96	2.65	0.33	ZZ
3QUVHA		53.10	-6.71	-0.87	54.70	-5.61	-0.70	ZZ
4GJTWA		61.35	1.53	0.20	62.41	2.10	0.26	ZZ
4JNDLU		52.42	-7.39	-0.96	52.54	-7.77	-0.97	ZZ
4V2G78		62.70	2.89	0.38	57.86	-2.45	-0.31	ZZ
7J3MNU	*	76.27	16.46	2.14	81.25	20.94	2.62	ZZ
877ZU4		61.43	1.62	0.21	59.09	-1.22	-0.15	ZZ
882JW6		52.00	-7.81	-1.02	53.60	-6.71	-0.84	ZZ
8LJ9V8		52.52	-7.29	-0.95	55.84	-4.47	-0.56	ZZ
8WJYEU		52.14	-7.67	-1.00	50.91	-9.40	-1.17	ZZ
ABYGK3		59.28	-0.53	-0.07	59.36	-0.95	-0.12	ZZ
C8Q873		65.22	5.41	0.70	69.34	9.03	1.13	ZZ
CEQMTP		57.98	-1.84	-0.24	59.03	-1.28	-0.16	ZZ
DFX6PZ		60.86	1.05	0.14	61.83	1.52	0.19	ZZ
E9TMUK		59.10	-0.71	-0.09	58.10	-2.20	-0.28	ZZ
EELPVY	*	49.12	-10.69	-1.39	55.68	-4.63	-0.58	ZZ
EZ32NM		67.56	7.74	1.01	66.97	6.66	0.83	ZZ
HVC2YG		63.00	3.19	0.42	64.36	4.05	0.51	ZZ
JBM6VV		60.51	0.69	0.09	59.54	-0.76	-0.10	ZZ
K7P6WQ		63.56	3.75	0.49	62.18	1.87	0.23	ZZ
KFC4MV		65.30	5.49	0.72	65.10	4.79	0.60	ZZ
KWYJQR		55.50	-4.31	-0.56	56.90	-3.41	-0.43	ZZ
LYJQPF		52.03	-7.79	-1.01	52.77	-7.54	-0.94	ZZ
MFMKWE		58.61	-1.20	-0.16	57.57	-2.73	-0.34	ZZ
QFWTBJ		65.64	5.83	0.76	67.32	7.01	0.88	ZZ
QKNX6N		50.68	-9.13	-1.19	47.49	-12.82	-1.60	ZZ
QR9ZCQ		62.39	2.57	0.34	63.73	3.42	0.43	ZZ
TDJ3YK		51.07	-8.74	-1.14	52.04	-8.27	-1.03	ZZ
V6ZDF3		64.94	5.13	0.67	65.68	5.37	0.67	ZZ
WUXDF4		63.21	3.40	0.44	57.88	-2.43	-0.30	ZZ
WZK7PH		55.46	-4.35	-0.57	56.36	-3.95	-0.49	ZZ
XHYYTC		53.29	-6.52	-0.85	54.10	-6.21	-0.78	ZZ
YJLXL2		55.98	-3.83	-0.50	56.12	-4.19	-0.52	ZZ
ZL7AXC		52.26	-7.55	-0.98	51.83	-8.48	-1.06	ZZ
ZQZ7M3	*	83.25	23.44	3.05	85.25	24.94	3.11	ZZ

Summary Statistics	Sample RP41	Sample RP42
Grand Means	59.81 Grams	60.31 Grams
Stnd Dev Btwn Labs	7.67 Grams	8.01 Grams

Statistics based on 36 of 36 reporting participants.

Analysis Notes:

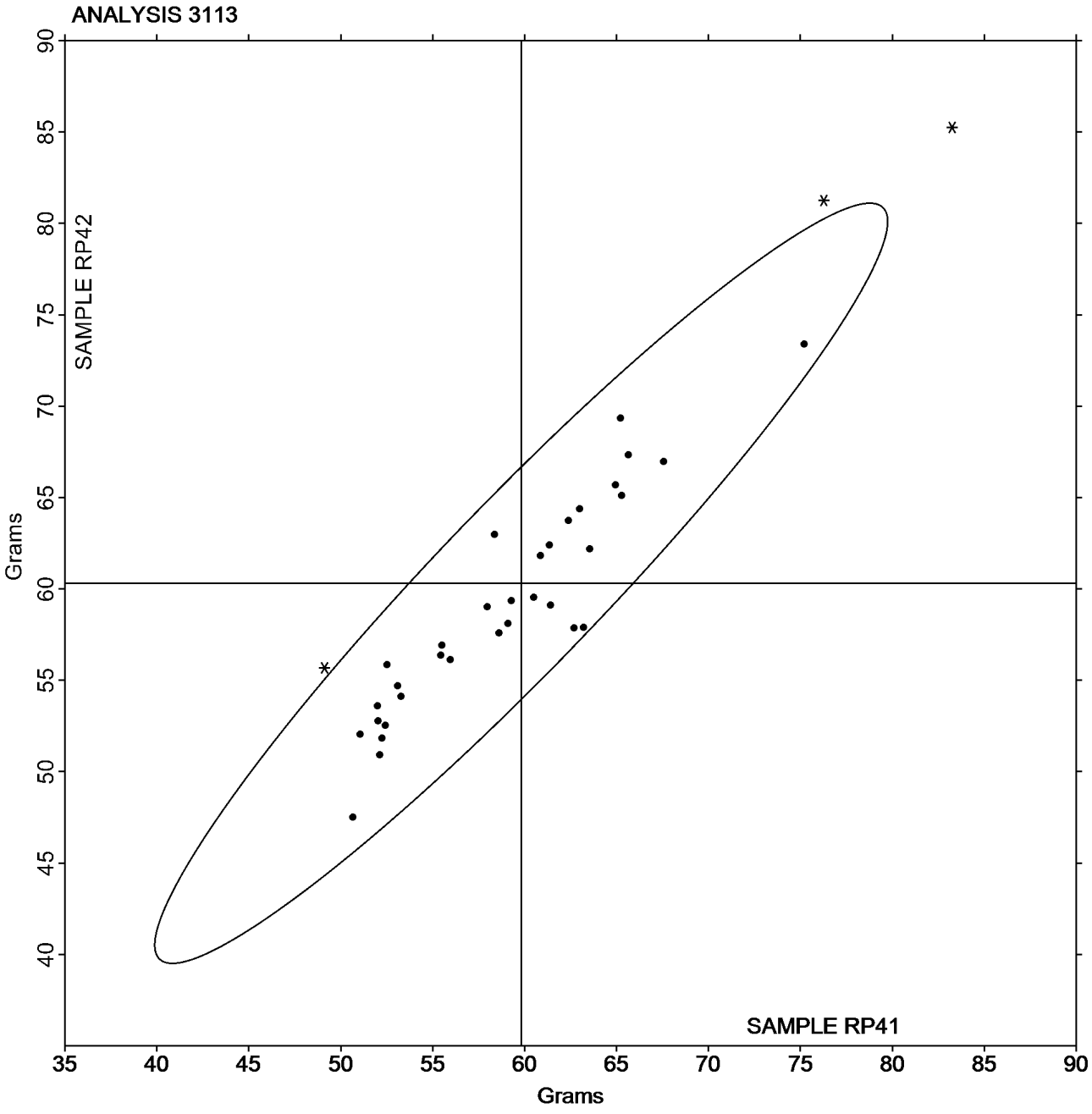
8WJYEU - Data appear to be reported as gf, not mN as indicated on data entry form. CTS will not correct the Units going forward.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample RP41 = 59.813 Grams

Grand Mean Sample RP42 = 60.308 Grams



Paper & Paperboard Interlaboratory Testing Program

Report #4361, May 2025

Analysis 3115

Tensile Breaking Strength - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NP41 Lab Mean	Sample NP41 Diff from Grand Mean	Sample NP41 CPV	Sample NP42 Lab Mean	Sample NP42 Diff from Grand Mean	Sample NP42 CPV	Instr Code
3NP3PW		3.746	0.081	0.27	3.635	-0.011	-0.04	TF
3QUVHA		3.710	0.045	0.15	3.612	-0.034	-0.11	LB
4JNDLU		3.834	0.169	0.57	3.478	-0.168	-0.57	TF
4V2G78		4.132	0.467	1.58	4.007	0.361	1.22	TQ
877ZU4		3.619	-0.046	-0.16	3.643	-0.003	-0.01	LE
8LJ9V8		3.452	-0.213	-0.72	3.640	-0.006	-0.02	TF
9JCB2Q		3.664	-0.002	-0.01	3.727	0.082	0.27	TV
ABYGK3		3.201	-0.464	-1.58	3.278	-0.368	-1.24	LE
C8Q873		3.364	-0.301	-1.02	3.379	-0.266	-0.90	IO
CEQMTP		3.543	-0.122	-0.41	3.666	0.020	0.07	TR
DFX6PZ		3.371	-0.294	-1.00	3.497	-0.149	-0.50	LE
E9TMUK		3.490	-0.175	-0.59	3.242	-0.404	-1.36	LI
EELPVY	*	4.474	0.809	2.75	4.627	0.981	3.31	VM
EZ32NM		3.928	0.263	0.89	4.064	0.419	1.41	XX
HVC2YG		3.635	-0.030	-0.10	4.015	0.370	1.25	LB
JBM6VV		3.532	-0.133	-0.45	3.725	0.080	0.27	LI
KFC4MV		3.427	-0.238	-0.81	3.287	-0.358	-1.21	TQ
KWYJQR		3.377	-0.288	-0.98	3.604	-0.042	-0.14	TQ
LYJQPF		3.460	-0.205	-0.70	3.620	-0.026	-0.09	LH
MFMKWE		3.334	-0.331	-1.12	3.193	-0.453	-1.53	TO
QFWTBJ		3.397	-0.268	-0.91	3.465	-0.181	-0.61	TB
QGMW4Q		3.511	-0.154	-0.52	3.540	-0.106	-0.36	LF
QKNX6N		4.004	0.339	1.15	4.028	0.382	1.29	LX
TDJ3YK		3.955	0.290	0.98	3.923	0.277	0.93	LJ
UUHCHH		3.257	-0.408	-1.38	3.375	-0.271	-0.91	IM
VXY2J7		3.492	-0.173	-0.59	3.468	-0.178	-0.60	LY
WUXDF4		4.070	0.405	1.37	3.660	0.014	0.05	LA
WZK7PH		3.800	0.135	0.46	3.477	-0.169	-0.57	LI
XHYYTC		3.792	0.127	0.43	3.414	-0.232	-0.78	IN
ZDFNTD		4.164	0.499	1.69	3.851	0.205	0.69	LC
ZGEYND		3.558	-0.107	-0.36	3.432	-0.213	-0.72	LI
ZL7AXC		3.841	0.176	0.60	3.859	0.214	0.72	LI
ZQZ7M3		3.812	0.147	0.50	3.879	0.233	0.78	TO

Summary Statistics	Sample NP41	Sample NP42
Grand Means	3.67 kN/m	3.65 kN/m
Stnd Dev Btwn Labs	0.29 kN/m	0.30 kN/m

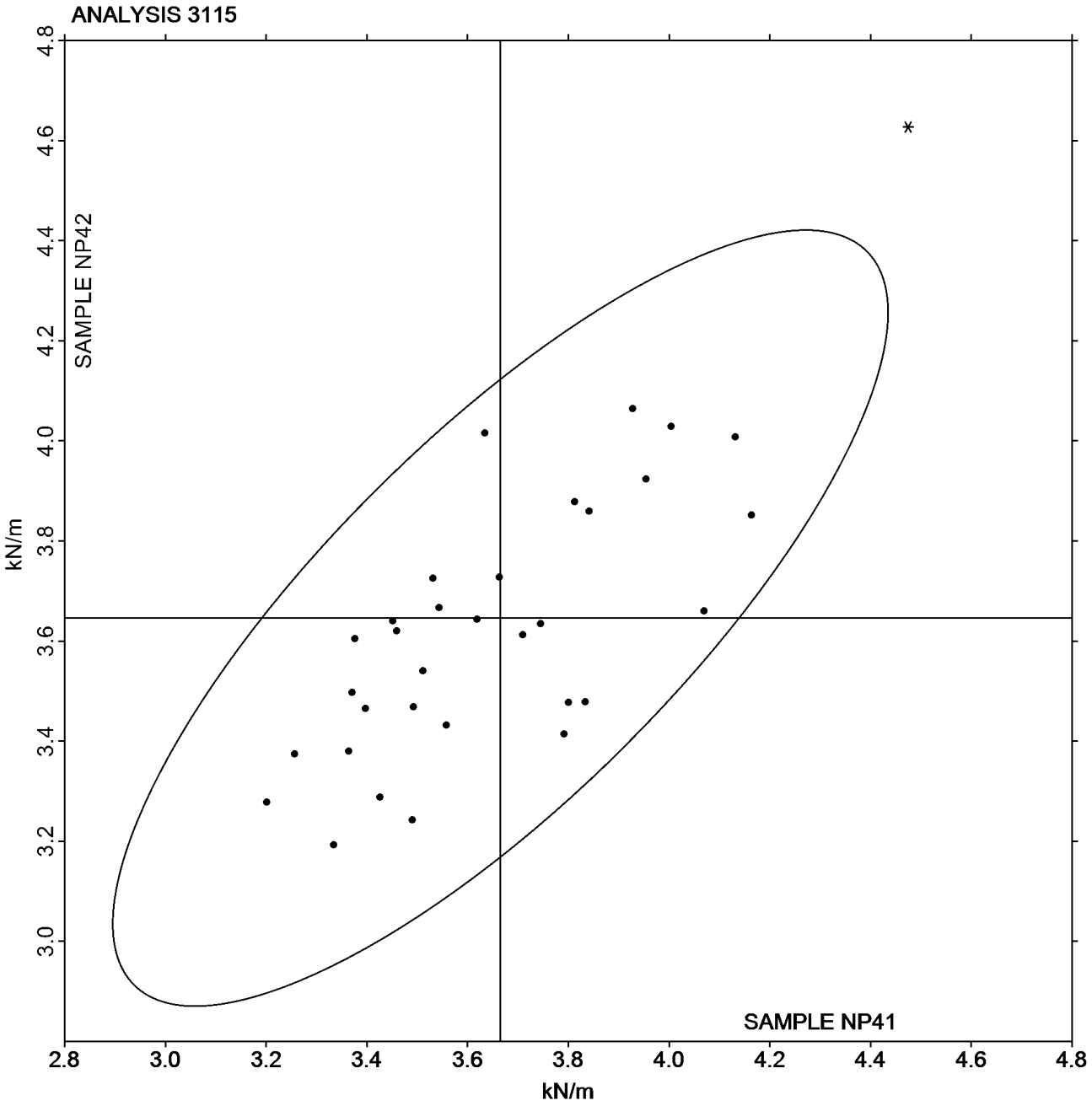
Statistics based on 33 of 33 reporting participants.

Key to Instrument Codes Reported by Participants

IM	Instron 5500 Series	IN	Instron 3340 series
IO	Instron 5900 Series	LA	L & W Tensile - Autoline 300
LB	L & W Tensile - Autoline 400	LC	L & W Tensile - Autoline 600
LE	L & W Tensile Tester 066	LF	L & W Tensile/Fracture Toughness Tester SE 064
LH	L & W Alwetron TH1 (Horizontal) SE 060/065F	LI	L & W Tensile Tester SE 062
LJ	L & W Tensile Tester SE 063	LX	L & W (model not specified)
LY	Lloyd TCD500	TB	Thwing-Albert EJA/1000
TF	Thwing-Albert EJA Vantage-1	TO	Thwing-Albert QC-1000
TQ	Thwing-Albert QC 3A	TR	Testometric 220D
TV	Thwing-Albert Vantage NX	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		

Grand Mean Sample NP41 = 3.6651 kN/m

Grand Mean Sample NP42 = 3.6458 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 3116

Tensile Energy Absorption - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NP41 Lab Mean	Sample NP41 Diff from Grand Mean	Sample NP41 CPV	Sample NP42 Lab Mean	Sample NP42 Diff from Grand Mean	Sample NP42 CPV	Instr Code
3NP3PW		48.12	5.37	0.90	44.80	3.37	0.56	TF
3QUVHA		35.60	-7.15	-1.20	35.34	-6.09	-1.02	LB
4V2G78		48.10	5.35	0.89	46.66	5.23	0.88	TQ
877ZU4		41.84	-0.91	-0.15	43.46	2.03	0.34	LE
9JCB2Q		48.58	5.83	0.97	48.51	7.08	1.18	TV
C8Q873		42.74	-0.01	0.00	41.88	0.46	0.08	IO
DFX6PZ		35.55	-7.20	-1.20	36.56	-4.87	-0.81	LH
E9TMUK		38.61	-4.15	-0.69	34.31	-7.12	-1.19	LI
EZ32NM		42.38	-0.37	-0.06	42.53	1.10	0.18	XX
HVC2YG		43.61	0.85	0.14	47.72	6.30	1.05	LB
JBM6VV		43.25	0.50	0.08	43.84	2.41	0.40	LI
KFC4MV		49.44	6.69	1.12	48.19	6.76	1.13	TQ
KWYJQR		38.66	-4.09	-0.68	40.47	-0.96	-0.16	TQ
LYJQPF		40.72	-2.03	-0.34	41.98	0.55	0.09	LH
MFMKWE		45.10	2.34	0.39	37.65	-3.77	-0.63	TO
QFWTBJ		44.31	1.56	0.26	43.78	2.36	0.39	TB
QGMW4Q		37.16	-5.59	-0.93	39.24	-2.19	-0.37	LF
QKNX6N		48.52	5.77	0.97	44.69	3.26	0.55	LX
TDJ3YK		42.24	-0.51	-0.09	39.77	-1.65	-0.28	LJ
VXY2J7	*	61.30	18.54	3.10	60.64	19.22	3.21	LY
WUXDF4		45.50	2.75	0.46	39.40	-2.03	-0.34	LA
WZK7PH		39.11	-3.64	-0.61	36.25	-5.17	-0.87	LI
XHYYTC		38.97	-3.78	-0.63	33.93	-7.50	-1.25	IN
ZDFNTD		47.11	4.35	0.73	41.81	0.39	0.06	LC
ZGEYND		40.99	-1.76	-0.29	35.30	-6.12	-1.02	LI
ZL7AXC		32.35	-10.40	-1.74	32.30	-9.13	-1.53	LI
ZQZ7M3		34.43	-8.32	-1.39	37.50	-3.93	-0.66	TO

Summary Statistics	Sample NP41	Sample NP42
Grand Means	42.75 Joules/sq m	41.43 Joules/sq m
Stnd Dev Btwn Labs	5.98 Joules/sq m	5.98 Joules/sq m

Statistics based on 27 of 27 reporting participants.

Analysis Notes:

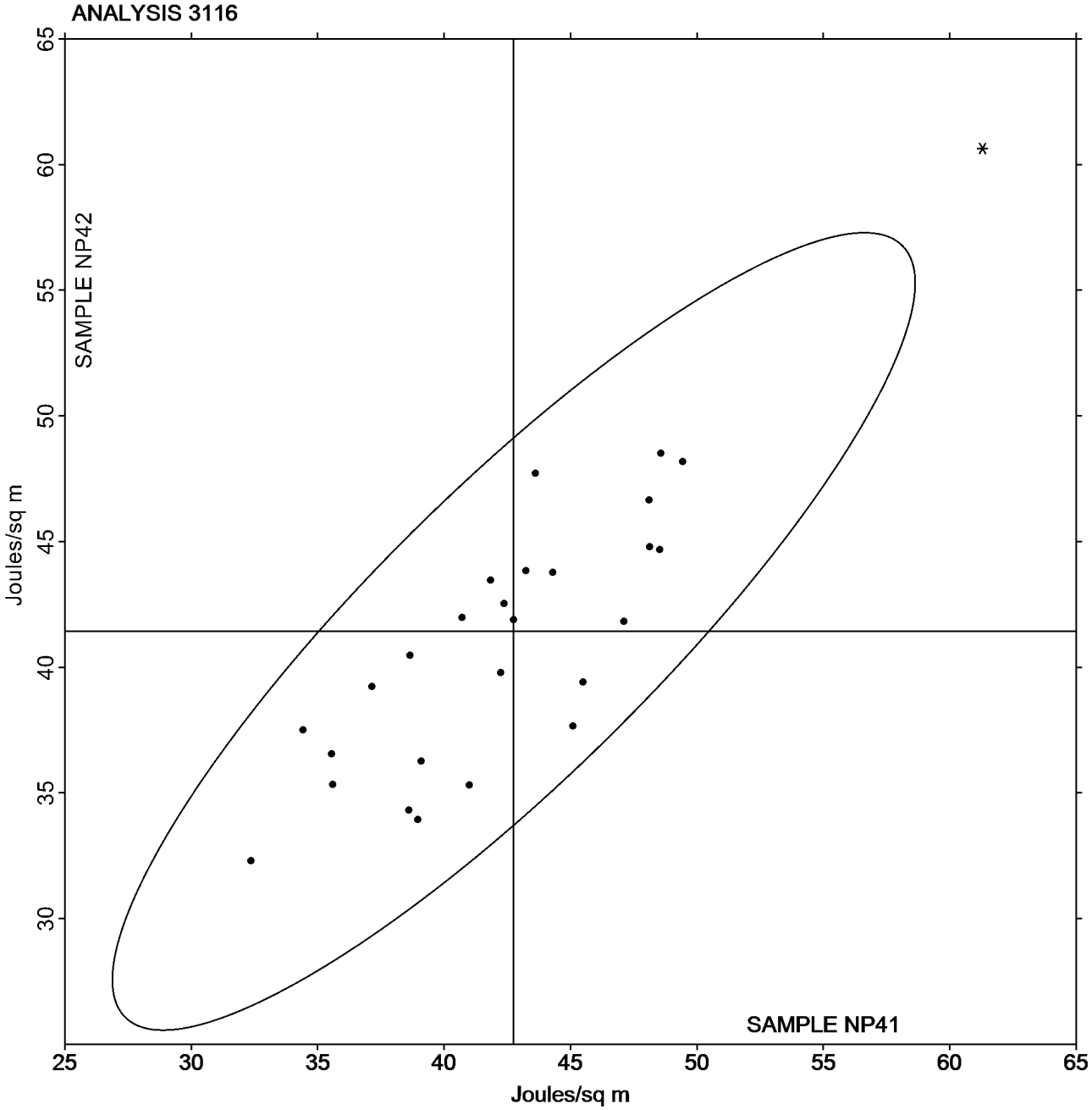
4V2G78 - Data appear to be reported as ft-lb/sq ft, not J/sq m as indicated on data entry form. CTS will not correct the Units going forward.

Key to Instrument Codes Reported by Participants

IN	Instron 3340 series	IO	Instron 5900 Series
LA	L & W Tensile - Autoline 300	LB	L & W Tensile - Autoline 400
LC	L & W Tensile - Autoline 600	LE	L & W Tensile Tester 066
LF	L & W Tensile/Fracture Toughness Tester SE 064	LH	L & W Alwetron TH1 (Horizontal) SE 060/065F
LI	L & W Tensile Tester SE 062	LJ	L & W Tensile Tester SE 063
LX	L & W (model not specified)	LY	Lloyd TCD500
TB	Thwing-Albert EJA/1000	TF	Thwing-Albert EJA Vantage-1
TO	Thwing-Albert QC-1000	TQ	Thwing-Albert QC 3A
TV	Thwing-Albert Vantage NX	XX	Instrument make/model not specified by lab

Grand Mean Sample NP41 = 42.752 Joules/sq m

Grand Mean Sample NP42 = 41.426 Joules/sq m



Paper & Paperboard Interlaboratory Testing Program

Analysis 3117

Elongation to Break - Printing Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NP41 Lab Mean	Sample NP41 Diff from Grand Mean	Sample NP41 CPV	Sample NP42 Lab Mean	Sample NP42 Diff from Grand Mean	Sample NP42 CPV	Instr Code
3NP3PW		2.141	0.401	1.61	2.089	0.376	1.49	TF
3QUVHA		1.456	-0.283	-1.13	1.496	-0.217	-0.86	LB
4JNDLU		1.672	-0.067	-0.27	1.565	-0.148	-0.59	TF
4V2G78		1.947	0.208	0.83	1.796	0.083	0.33	TQ
877ZU4		1.717	-0.022	-0.09	1.788	0.075	0.30	LE
8LJ9V8		1.503	-0.236	-0.95	1.633	-0.080	-0.32	TF
9JCB2Q		2.163	0.424	1.70	2.123	0.410	1.62	TV
C8Q873		1.848	0.109	0.44	1.796	0.083	0.33	IO
CEQMTP		1.625	-0.114	-0.46	1.692	-0.021	-0.08	TR
DFX6PZ		1.534	-0.205	-0.82	1.530	-0.183	-0.72	LH
E9TMUK		1.618	-0.121	-0.49	1.565	-0.148	-0.59	LI
EELPVY		1.410	-0.329	-1.32	1.370	-0.343	-1.36	VM
EZ32NM		1.666	-0.073	-0.29	1.564	-0.149	-0.59	XX
HVC2YG		1.657	-0.082	-0.33	1.692	-0.021	-0.08	LB
JBM6VV		1.778	0.039	0.15	1.723	0.010	0.04	LI
KFC4MV		2.178	0.439	1.76	2.192	0.479	1.89	TQ
KWYJQR		1.731	-0.008	-0.03	1.704	-0.009	-0.04	TQ
LYJQPF		1.700	-0.039	-0.16	1.740	0.027	0.11	LH
MFMKWE		2.014	0.275	1.10	1.977	0.264	1.04	TO
QFWTBJ		1.932	0.193	0.77	1.884	0.171	0.67	TB
QGMW4Q		1.584	-0.155	-0.62	1.654	-0.059	-0.23	LF
QKNX6N		2.070	0.331	1.32	1.928	0.215	0.85	LX
TDJ3YK		1.573	-0.166	-0.67	1.505	-0.208	-0.82	LJ
UUHCHH	X	1.780	0.041	0.16	2.170	0.457	1.81	IM
VXY2J7		1.650	-0.090	-0.36	1.572	-0.141	-0.56	LY
WUXDF4		1.530	-0.209	-0.84	1.480	-0.233	-0.92	LA
WZK7PH		1.548	-0.191	-0.77	1.562	-0.151	-0.60	LI
XHYYTC		1.690	-0.049	-0.20	1.649	-0.064	-0.25	IN
ZDFNTD		1.600	-0.139	-0.56	1.534	-0.179	-0.71	LC
ZGEYND		1.710	-0.029	-0.12	1.541	-0.172	-0.68	LI
ZL7AXC		1.317	-0.422	-1.69	1.301	-0.412	-1.63	LI
ZQZ7M3	*	2.361	0.622	2.49	2.465	0.752	2.97	TO

Summary Statistics	Sample NP41	Sample NP42
Grand Means	1.74 Percent	1.71 Percent
Stnd Dev Btwn Labs	0.25 Percent	0.25 Percent

Statistics based on 31 of 32 reporting participants.

Comments on Assigned Data Flags for Test #3117

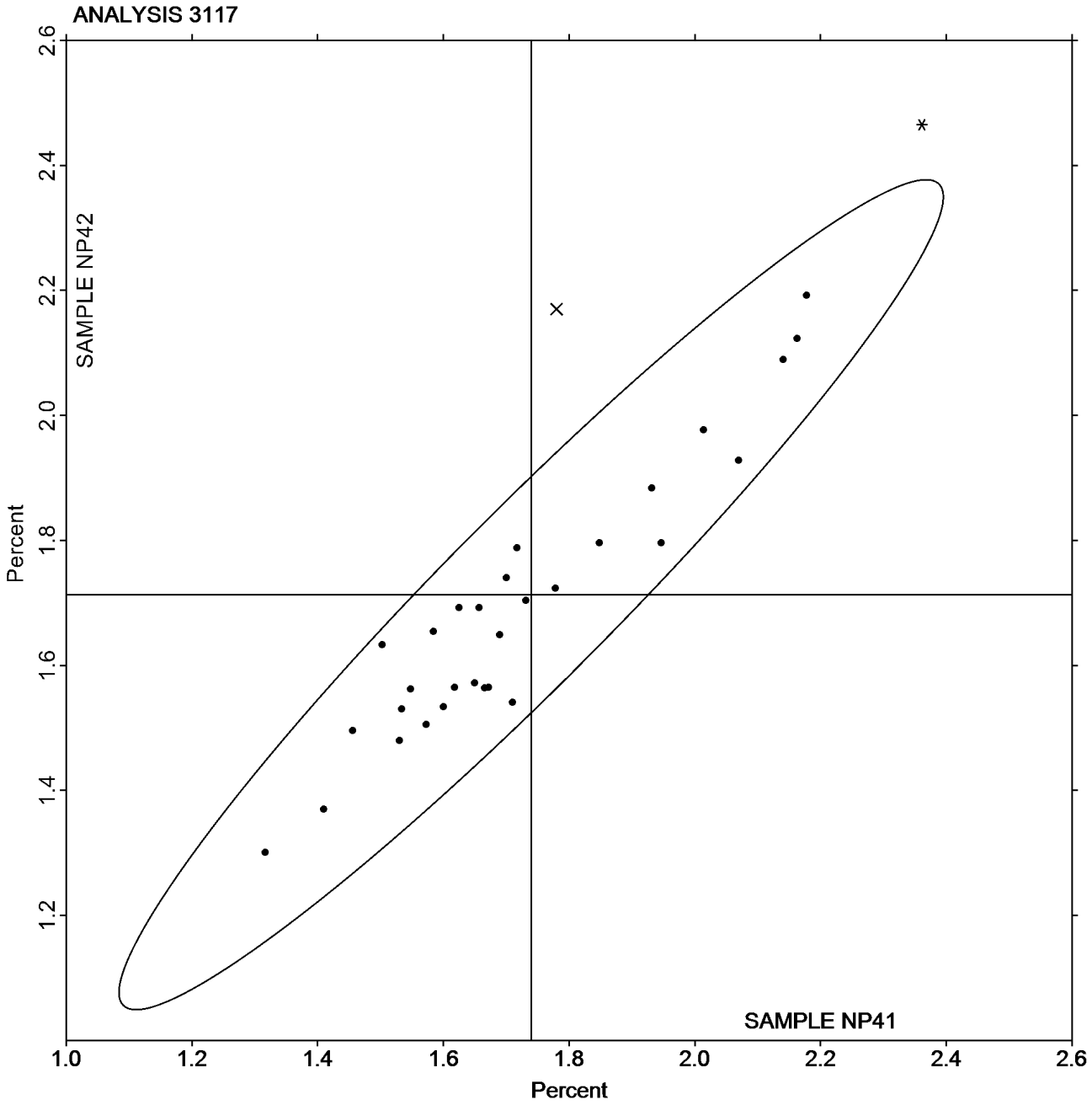
UUHCHH (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample NP42.

Key to Instrument Codes Reported by Participants

IM	Instron 5500 Series	IN	Instron 3340 Series
IO	Instron 5900 Series	LA	L & W Tensile - Autoline 300
LB	L & W Tensile - Autoline 400	LC	L & W Tensile - Autoline 600
LE	L & W Tensile Tester 066	LF	L & W Tensile/Fracture Toughness Tester SE 064
LH	L & W Alwetron TH1 (Horizontal) SE 060/065F	LI	L & W Tensile Tester SE 062
LJ	L & W Tensile Tester SE 063	LX	L & W (model not specified)
LY	Lloyd TCD500	TB	Thwing-Albert EJA/1000
TF	Thwing-Albert EJA Vantage-1	TO	Thwing-Albert QC-1000
TQ	Thwing-Albert QC 3A	TR	Testometric 220D
TV	Thwing-Albert Vantage NX	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		

Grand Mean Sample NP41 = 1.7394 Percent

Grand Mean Sample NP42 = 1.7132 Percent



Paper & Paperboard Interlaboratory Testing Program

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

WebCode	Data Flag	Sample PP41 Lab Mean	Sample PP41 Diff from Grand Mean	Sample PP41 CPV	Sample PP42 Lab Mean	Sample PP42 Diff from Grand Mean	Sample PP42 CPV	Instr Code
28JGPV		10.390	0.618	0.93	9.900	0.275	0.46	GL
2DCLFE		10.500	0.728	1.10	9.800	0.175	0.29	GS
3NP3PW		9.718	-0.054	-0.08	8.979	-0.646	-1.09	PP
4JNDLU		9.867	0.095	0.14	9.897	0.272	0.46	PP
4V2G78	X	21.176	11.404	17.23	19.141	9.516	15.98	PP
882JW6		10.580	0.808	1.22	9.680	0.055	0.09	PP
8LJ9V8		10.154	0.382	0.58	9.942	0.317	0.53	PP
9JCB2Q		10.091	0.319	0.48	10.053	0.428	0.72	PP
A6BY7R		9.950	0.178	0.27	10.000	0.375	0.63	LA
BGKVNZ		9.330	-0.442	-0.67	8.980	-0.645	-1.08	GG
C8Q873		9.920	0.148	0.22	9.680	0.055	0.09	WG
E9TMUK		10.050	0.278	0.42	9.770	0.145	0.24	LP
EELPVY		9.787	0.015	0.02	9.472	-0.153	-0.26	PP
EZ32NM		9.561	-0.211	-0.32	9.629	0.004	0.01	PP
GTBX9F		9.300	-0.472	-0.71	9.280	-0.345	-0.58	HG
GVWHEJ		9.462	-0.310	-0.47	9.711	0.086	0.14	LR
H87FWR		9.460	-0.312	-0.47	9.730	0.105	0.18	PP
KFC4MV		9.969	0.197	0.30	9.429	-0.196	-0.33	PP
KWYJQR		9.880	0.108	0.16	9.940	0.315	0.53	GA
LYJQPF		9.030	-0.742	-1.12	9.360	-0.265	-0.45	LP
M4RCCR		9.717	-0.055	-0.08	9.571	-0.054	-0.09	LP
MFMKWE	*	11.611	1.839	2.78	11.550	1.925	3.23	PP
NRWHEN		8.310	-1.462	-2.21	8.880	-0.745	-1.25	GA
P3NNMC	*	8.041	-1.731	-2.62	7.979	-1.646	-2.77	WG
PL36UC		10.058	0.286	0.43	9.699	0.074	0.12	LR
QFWTBJ		10.196	0.424	0.64	10.381	0.756	1.27	PP
RMPKWH		9.270	-0.502	-0.76	9.060	-0.565	-0.95	GL
V6ZDF3		9.582	-0.190	-0.29	9.765	0.140	0.23	PP
XCBGCF		10.260	0.488	0.74	10.010	0.385	0.65	TL
XHYYTC		9.337	-0.435	-0.66	9.639	0.014	0.02	PP
ZQZ7M3		9.793	0.021	0.03	8.987	-0.638	-1.07	PP

Summary Statistics	Sample PP41	Sample PP42
Grand Means	9.77 sec/100 cc	9.63 sec/100 cc
Stnd Dev Btwn Labs	0.66 sec/100 cc	0.60 sec/100 cc

Statistics based on 30 of 31 reporting participants.

Comments on Assigned Data Flags for Test #3121

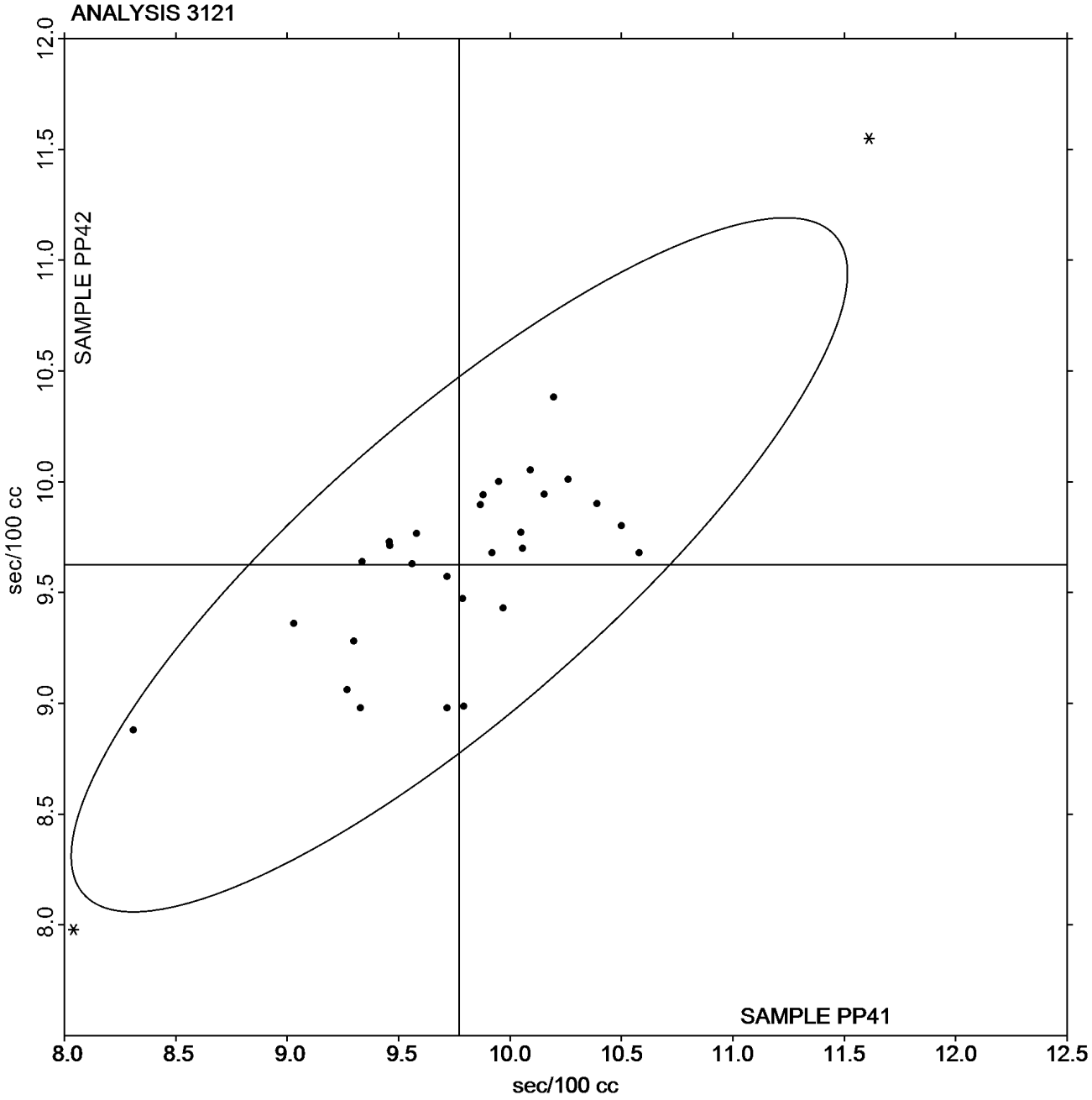
4V2G78 (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

GA	Gurley Precision #4340 Automatic Densometer	GG	Gurley Precision Model #4320
GL	Gurley #4110	GS	Gurley-Hill S-P-S Tester #4190
HG	Technidyne - Hagerty Model #1	LA	L & W Autoline
LP	L & W Densometer, Air Permeance	LR	L & W Air Permeance
PP	Technidyne Profile/Plus	TL	Gurley Densometer #4110, Oil Flotation
WG	W & LE Gurley Tester		

Grand Mean Sample PP41 = 9.7725 sec/100 cc

Grand Mean Sample PP42 = 9.6251 sec/100 cc



Paper & Paperboard Interlaboratory Testing Program

Analysis 3123

Porosity - Sheffield Type - Sheffield Units for 3/4 inch Diameter Orifice

TAPPI Official Test Method T547

WebCode	Data Flag	Sample PP41 Lab Mean	Sample PP41 Diff from Grand Mean	Sample PP41 CPV	Sample PP42 Lab Mean	Sample PP42 Diff from Grand Mean	Sample PP42 CPV	Instr Code
2DCLFE		218.8	-21.7	-0.79	208.2	-29.5	-0.88	SH
3QUVHA		271.4	30.9	1.12	274.5	36.8	1.09	LB
882JW6		231.4	-9.2	-0.33	230.5	-7.2	-0.21	PP
WUXDF4	X	0.4	-240.1	-8.74	0.4	-237.3	-7.03	PP

Summary Statistics	Sample PP41	Sample PP42
Grand Means	240.52 Sheffield Units	237.73 Sheffield Units
Stnd Dev Btwn Labs	27.47 Sheffield Units	33.74 Sheffield Units

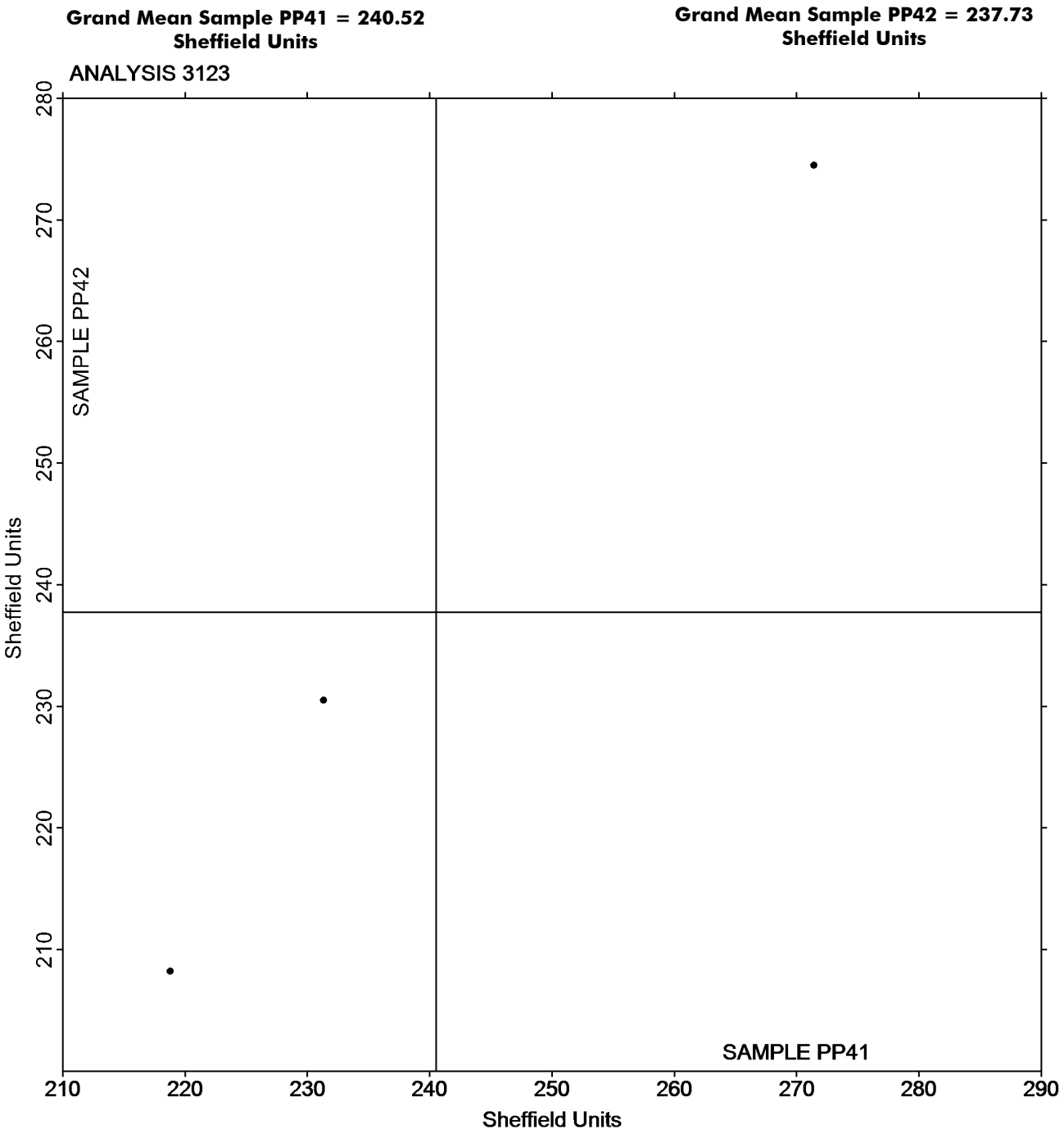
Statistics based on 3 of 4 reporting participants.

Comments on Assigned Data Flags for Test #3123

WUXDF4 (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

LB	L & W Air Permeance - Autoline	PP	Technidyne Profile/Plus
SH	Sheffield		



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3131

Roughness - Print Surf Method - 2.5 to 6.0 Microns

TAPPI Official Test Method T555

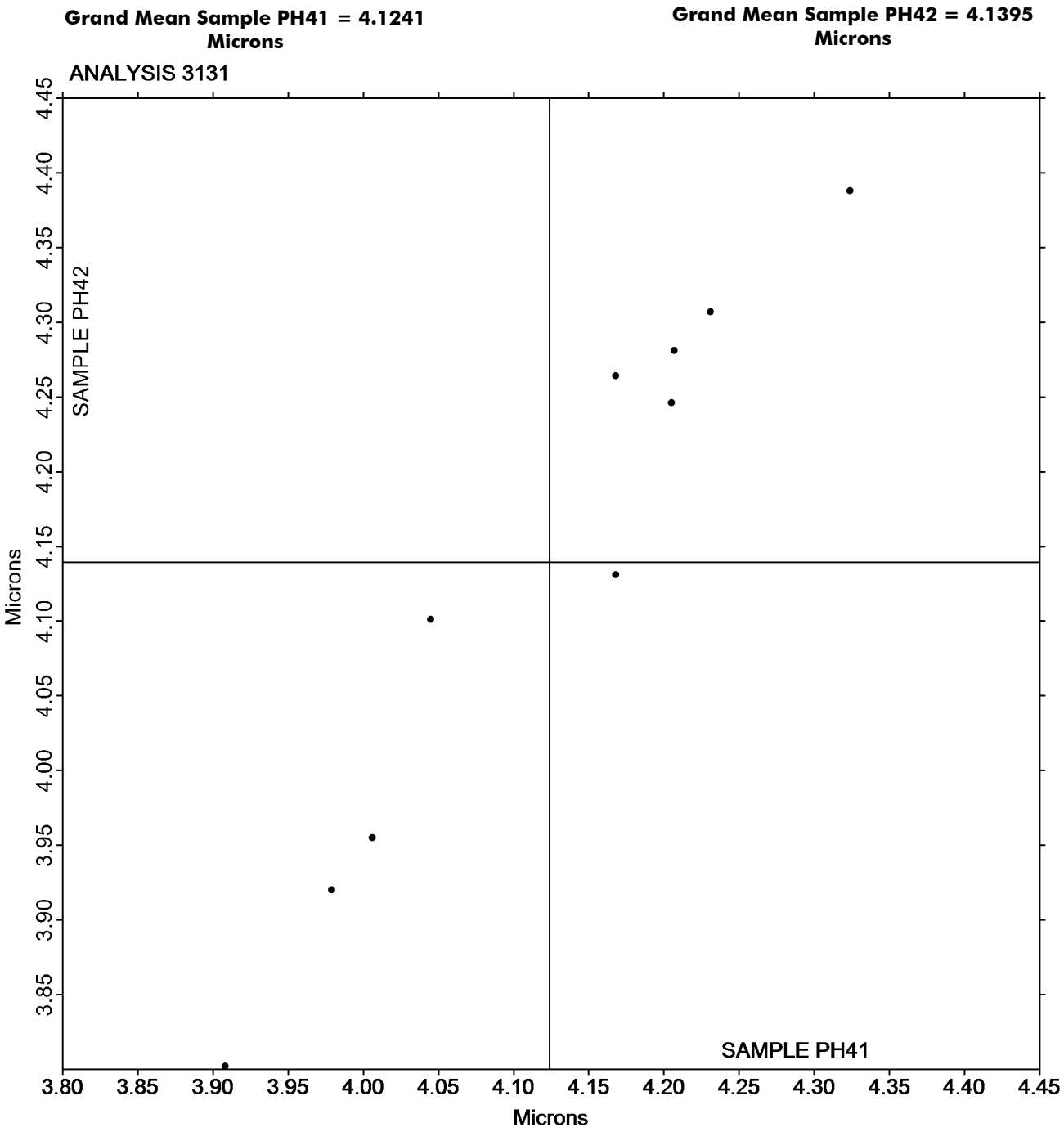
WebCode	Data Flag	Sample PH41 Lab Mean	Sample PH41 Diff from Grand Mean	Sample PH41 CPV	Sample PH42 Lab Mean	Sample PH42 Diff from Grand Mean	Sample PH42 CPV	Instr Code
2TKAVZ		4.324	0.200	1.52	4.388	0.249	1.29	ZZ
8PLAV6		4.168	0.044	0.33	4.131	-0.008	-0.04	ZZ
C8Q873		3.979	-0.145	-1.10	3.920	-0.219	-1.14	ZZ
DFX6PZ		4.168	0.044	0.33	4.264	0.125	0.65	ZZ
H87FWR		4.045	-0.079	-0.60	4.101	-0.039	-0.20	ZZ
QFWTBJ		4.205	0.081	0.61	4.246	0.107	0.55	ZZ
QR9ZCQ		4.207	0.083	0.63	4.281	0.142	0.73	ZZ
V6ZDF3		4.231	0.107	0.81	4.307	0.167	0.87	ZZ
ZDFNTD		4.006	-0.118	-0.90	3.955	-0.184	-0.96	ZZ
ZGEYND		3.908	-0.216	-1.64	3.802	-0.338	-1.75	ZZ

Summary Statistics	Sample PH41	Sample PH42
Grand Means	4.12 Microns	4.14 Microns
Stnd Dev Btwn Labs	0.13 Microns	0.19 Microns

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



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 SR41 Lab Mean	Sample SR41 Diff from Grand Mean	Sample SR41 CPV	Sample SR42 Lab Mean	Sample SR42 Diff from Grand Mean	Sample SR42 CPV	Instr Code
2DCLFE		177.8	-15.3	-1.04	173.2	-19.4	-1.24	XX
2N626F	*	225.0	31.9	2.17	234.8	42.1	2.68	VM
3NP3PW		191.4	-1.7	-0.11	198.5	5.9	0.38	PP
3QUVHA		173.0	-20.1	-1.36	174.4	-18.2	-1.16	LA
4JNDLU		197.5	4.4	0.30	185.2	-7.4	-0.47	SH
882JW6		185.7	-7.4	-0.50	187.1	-5.6	-0.35	PP
8LJ9V8		192.2	-0.9	-0.06	196.5	3.9	0.25	SH
9JCB2Q		192.1	-1.0	-0.07	181.9	-10.7	-0.68	PP
A6BY7R		187.8	-5.3	-0.36	179.7	-12.9	-0.82	LA
AXCCC7	X	250.5	57.4	3.90	264.5	71.9	4.58	GL
C8Q873		167.5	-25.6	-1.74	160.1	-32.5	-2.07	PG
DFX6PZ		198.2	5.2	0.35	187.5	-5.1	-0.32	PP
EELPVY		200.0	6.9	0.47	197.0	4.4	0.28	PP
EZ32NM	X	156.0	-37.1	-2.52	76.0	-116.6	-7.42	HM
GTBX9F		199.1	6.0	0.41	206.6	14.0	0.89	PP
GTTPHZ		184.5	-8.6	-0.58	196.5	3.9	0.25	GA
H3F7NF		202.0	8.9	0.61	196.9	4.3	0.27	LA
H87FWR		226.8	33.7	2.29	214.6	22.0	1.40	PP
K7P6WQ		198.8	5.7	0.39	194.3	1.7	0.11	HM
KFC4MV		187.1	-5.9	-0.40	180.9	-11.7	-0.75	PP
KWYJQR		181.1	-11.9	-0.81	179.8	-12.8	-0.81	GA
MFMKWE		195.1	2.1	0.14	195.8	3.2	0.20	PP
NJJQNQ		204.3	11.3	0.76	207.0	14.3	0.91	PP
P3NNMC		228.5	35.4	2.41	224.5	31.9	2.03	SS
PL36UC		184.2	-8.8	-0.60	174.2	-18.4	-1.17	LW
QFWTBJ		184.9	-8.2	-0.56	203.7	11.1	0.70	PP
QKNX6N		184.8	-8.3	-0.56	174.5	-18.1	-1.15	PP
R736TL		181.4	-11.6	-0.79	179.8	-12.8	-0.81	PP
RXU9BB		200.3	7.2	0.49	198.6	6.0	0.38	LW
TPARW7		176.1	-17.0	-1.15	180.7	-11.9	-0.76	LW
V6ZDF3		192.6	-0.5	-0.03	191.5	-1.1	-0.07	LW
WQCTAZ		200.8	7.7	0.53	200.2	7.6	0.48	PP
X68AXD		160.9	-32.2	-2.18	171.2	-21.4	-1.36	LA
XHYYTC		206.6	13.5	0.92	210.7	18.1	1.15	PP
YVDLFF		196.1	3.0	0.20	202.3	9.6	0.61	PP
ZDFNTD		184.4	-8.7	-0.59	194.9	2.3	0.15	LB
ZGEYND		199.3	6.2	0.42	189.3	-3.3	-0.21	LW
ZQZ7M3		202.5	9.5	0.64	209.9	17.3	1.10	PP

Summary Statistics	Sample SR41	Sample SR42
Grand Means	193.07 Sheffield	192.62 Sheffield
Stnd Dev Btwn Labs	14.73 Sheffield	15.71 Sheffield

Statistics based on 36 of 38 reporting participants.

Comments on Assigned Data Flags for Test #3133

AXCCC7 (X) - Data for both samples are high. Possible Systematic Error.

EZ32NM (X) - Extreme Data for sample SR42.

Analysis Notes:

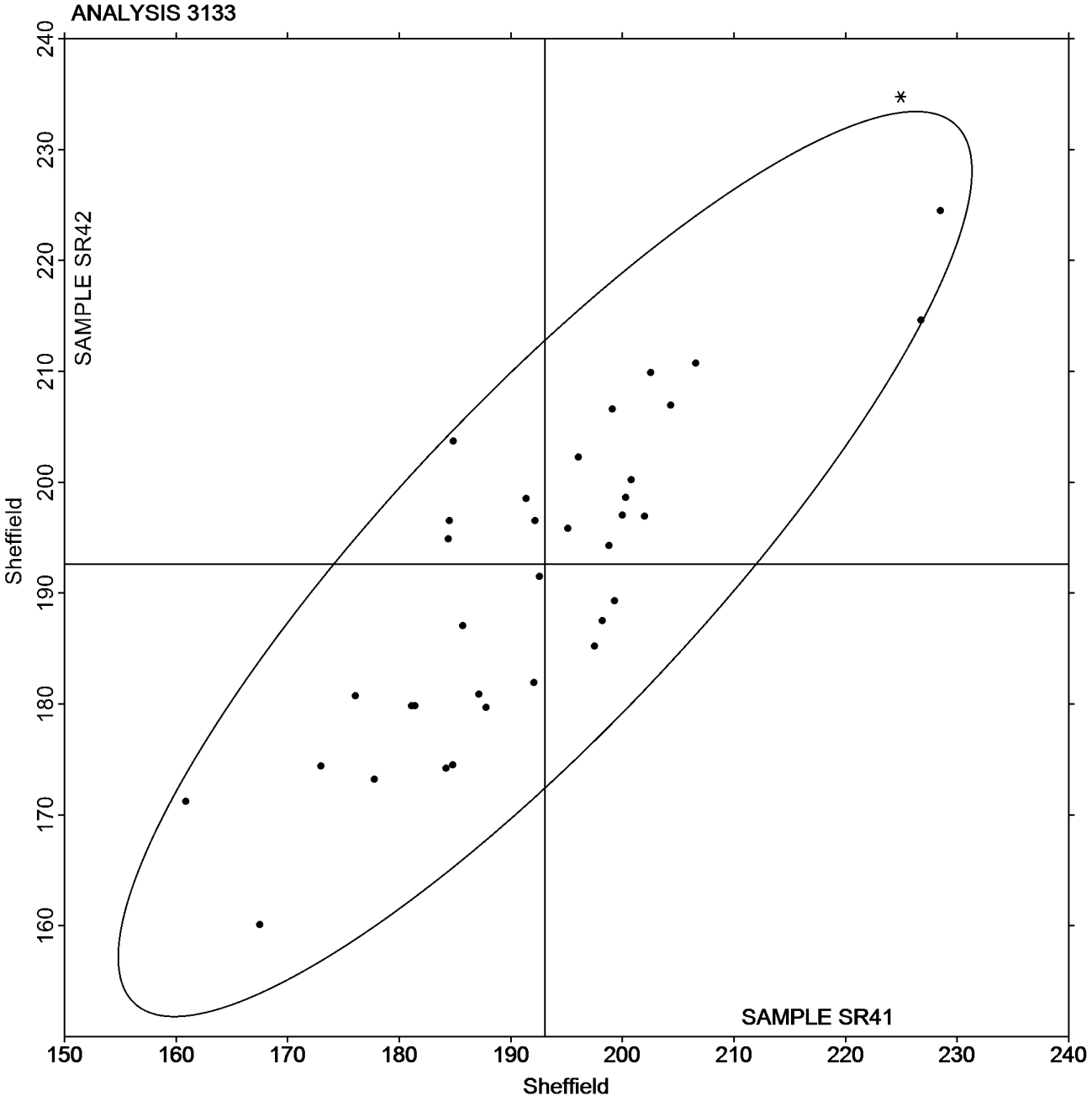
PL36UC - One determination removed from the Lab Mean of Sample SR41 per Grubb's Test at 1% risk (TAPPI 1205).

Key to Instrument Codes Reported by Participants

GA	Gurley Precision #4340 Automatic Densometer	GL	Giddings and Lewis Sheffield
HM	Technidyne - Hagerty Model #538	LA	L & W Roughness Sheffield - Autoline
LB	L & W - Autoline 600	LW	L & W Roughness Tester
PG	Precision Gage Smoothcheck	PP	Technidyne Profile/Plus
SH	Sheffield (Bendix Precisionaire)	SS	Sheffield Smoothchek Tester
VM	Valmet PaperLab (was Kajaani\Robotest)	XX	Instrument make/model not specified by lab

Grand Mean Sample SR41 = 193.07
Sheffield

Grand Mean Sample SR42 = 192.62
Sheffield



Paper & Paperboard Interlaboratory Testing Program

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

WebCode	Data Flag	Sample GM41 Lab Mean	Sample GM41 Diff from Grand Mean	Sample GM41 CPV	Sample GM42 Lab Mean	Sample GM42 Diff from Grand Mean	Sample GM42 CPV	Instr Code
3QUVHA		90.21	0.46	0.59	103.6	-0.1	-0.14	ZZ
4JNDLU		88.58	-1.17	-1.48	102.6	-1.1	-1.55	ZZ
68P6EC	X	18.42	-71.33	-90.70	21.3	-82.4	-117.34	ZZ
7J3MNU		89.25	-0.50	-0.63	103.3	-0.4	-0.60	ZZ
882JW6		89.30	-0.45	-0.57	103.4	-0.3	-0.44	ZZ
8LJ9V8	*	91.92	2.17	2.76	104.1	0.4	0.64	ZZ
8WJYEU		88.62	-1.13	-1.44	102.8	-0.9	-1.31	ZZ
B8AU3Z		89.88	0.13	0.17	104.5	0.9	1.24	ZZ
CEQMTP		89.73	-0.02	-0.02	103.7	0.0	-0.01	ZZ
CNBVFX		89.85	0.10	0.13	103.8	0.1	0.20	ZZ
JT3DWW		90.81	1.07	1.36	105.5	1.8	2.56	ZZ
KWYJQR		88.93	-0.82	-1.04	103.3	-0.3	-0.48	ZZ
LWVENN		89.40	-0.35	-0.44	103.1	-0.6	-0.81	ZZ
LYJQPF		89.55	-0.20	-0.25	103.3	-0.3	-0.47	ZZ
QGMW4Q		89.88	0.14	0.18	104.1	0.5	0.68	ZZ
QR9ZCQ		89.63	-0.11	-0.14	104.2	0.5	0.78	ZZ
UMJQT3		89.31	-0.43	-0.55	103.0	-0.7	-1.00	ZZ
UUHCHH		90.51	0.76	0.97	104.1	0.4	0.54	ZZ
VXY2J7		89.55	-0.20	-0.25	103.2	-0.5	-0.70	ZZ
XHYYTC		90.27	0.53	0.67	104.3	0.6	0.88	ZZ

Summary Statistics	Sample GM41	Sample GM42
Grand Means	89.75 g/sq m	103.67 g/sq m
Stnd Dev Btwn Labs	0.79 g/sq m	0.70 g/sq m

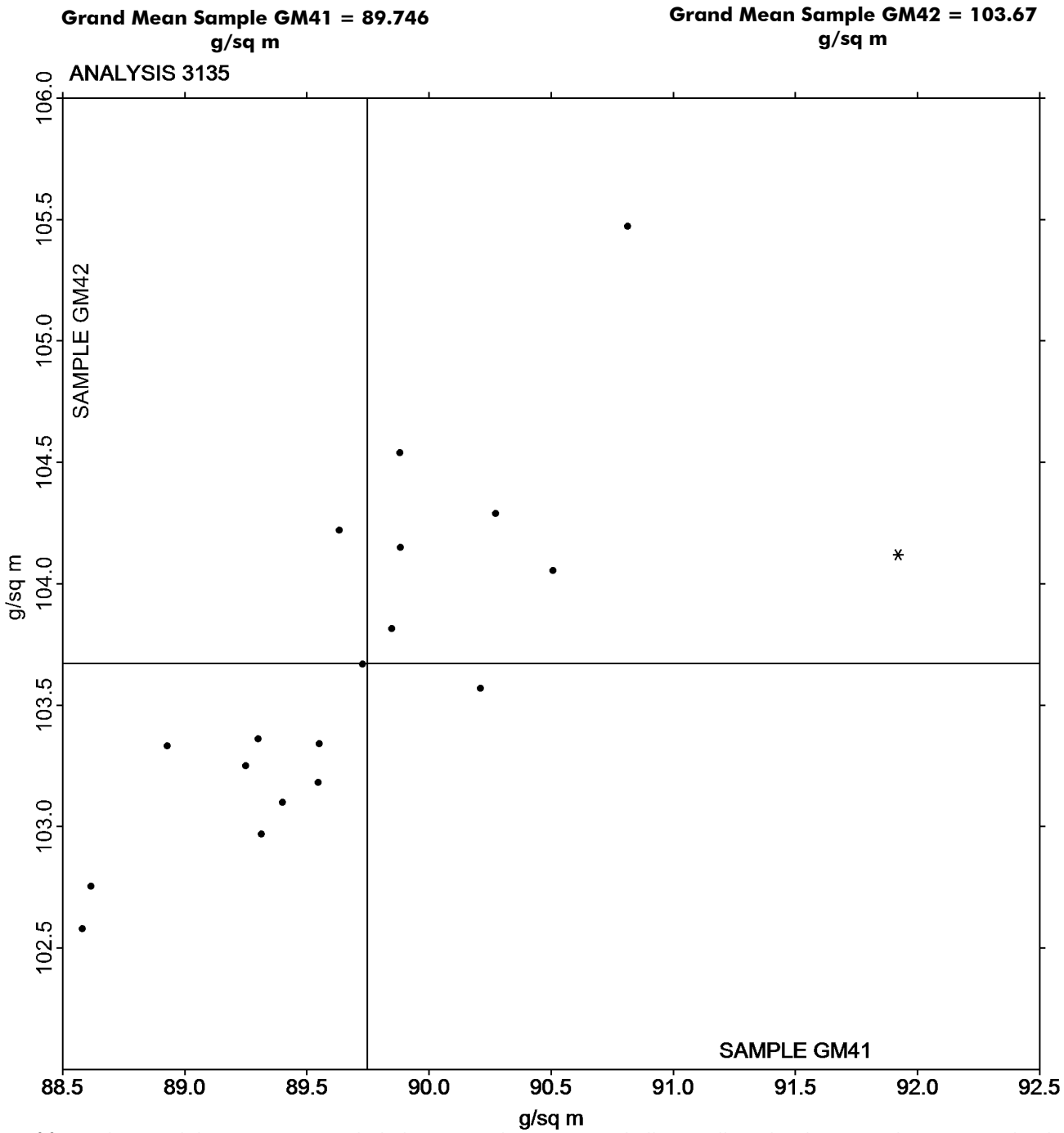
Statistics based on 19 of 20 reporting participants.

Comments on Assigned Data Flags for Test #3135

68P6EC (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



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 3141

Opacity (89% Reflectance Backing) - Fine Papers

TAPPI Official Test Method T425

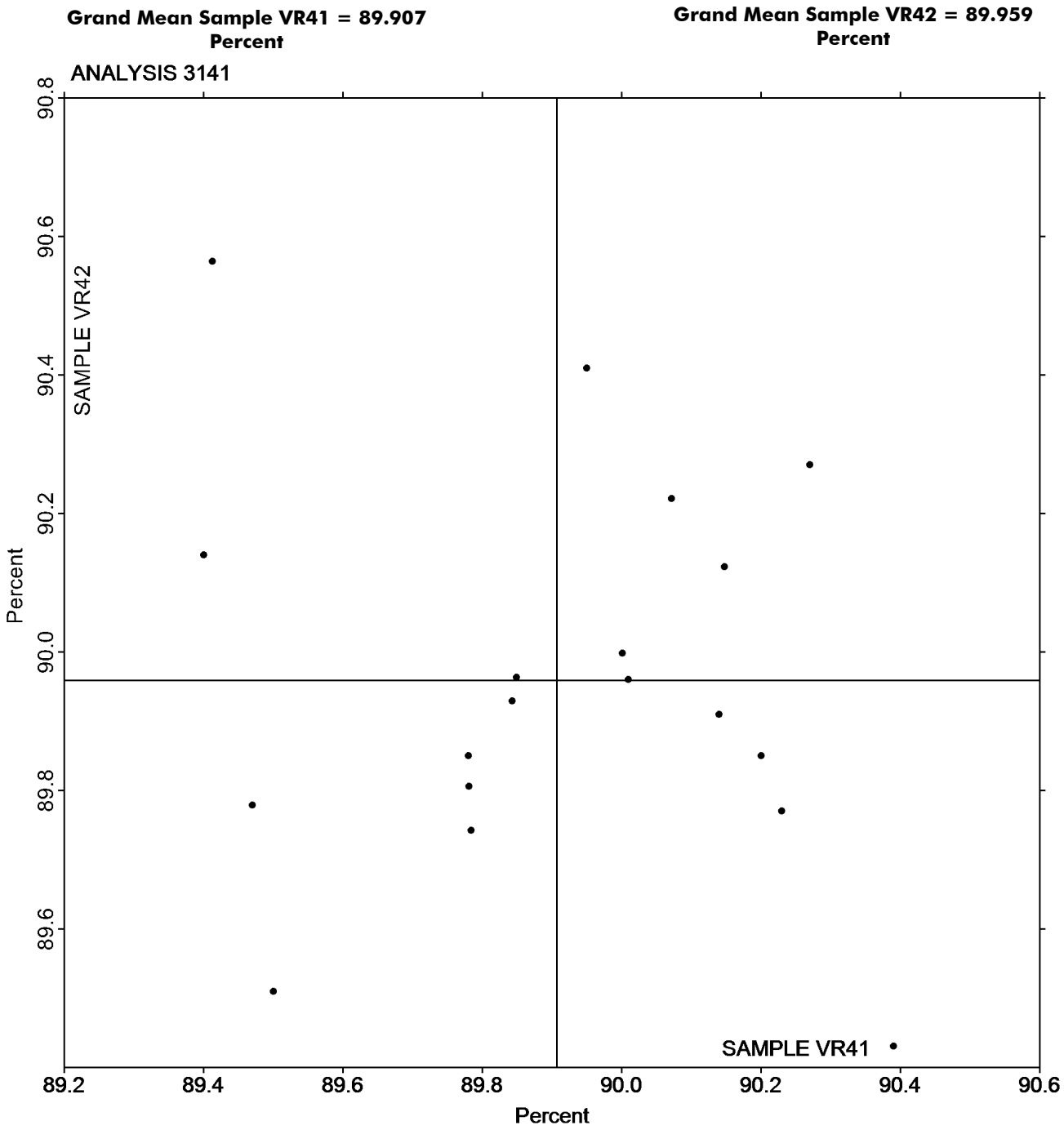
WebCode	Data Flag	Sample VR41 Lab Mean	Sample VR41 Diff from Grand Mean	Sample VR41 CPV	Sample VR42 Lab Mean	Sample VR42 Diff from Grand Mean	Sample VR42 CPV	Instr Code
2DCLFE		90.00	0.09	0.31	90.00	0.04	0.14	ZZ
3NP3PW		90.15	0.24	0.80	90.12	0.16	0.58	ZZ
3QUVHA		89.95	0.04	0.14	90.41	0.45	1.59	ZZ
4JNDLU		90.14	0.23	0.78	89.91	-0.05	-0.17	ZZ
882JW6		89.40	-0.51	-1.69	90.14	0.18	0.64	ZZ
8LJ9V8		89.50	-0.41	-1.35	89.51	-0.45	-1.59	ZZ
8WJYEU		90.07	0.17	0.55	90.22	0.26	0.92	ZZ
DFX6PZ		89.84	-0.06	-0.21	89.93	-0.03	-0.11	ZZ
HVC2YG		89.41	-0.49	-1.64	90.56	0.60	2.14	ZZ
JT3DWW		89.47	-0.44	-1.45	89.78	-0.18	-0.64	ZZ
K7P6WQ		90.23	0.32	1.07	89.77	-0.19	-0.67	ZZ
KWYJQR		90.01	0.10	0.34	89.96	0.00	0.00	ZZ
MFMKWE		90.39	0.48	1.61	89.43	-0.53	-1.87	ZZ
P3NNMC		90.27	0.36	1.21	90.27	0.31	1.10	ZZ
QFWTBJ		89.85	-0.06	-0.19	89.96	0.00	0.01	ZZ
WUXDF4		89.78	-0.13	-0.42	89.85	-0.11	-0.39	ZZ
XHYYTC		90.20	0.29	0.97	89.85	-0.11	-0.39	ZZ
ZL7AXC		89.78	-0.13	-0.42	89.81	-0.15	-0.54	ZZ
ZQZ7M3		89.78	-0.12	-0.41	89.74	-0.22	-0.77	ZZ

Summary Statistics	Sample VR41	Sample VR42
Grand Means	89.91 Percent	89.96 Percent
Stnd Dev Btwn Labs	0.30 Percent	0.28 Percent

Statistics based on 19 of 19 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



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 3143

Opacity (Paper Backing) - Fine Papers and Newsprint

TAPPI Official Test Method T519

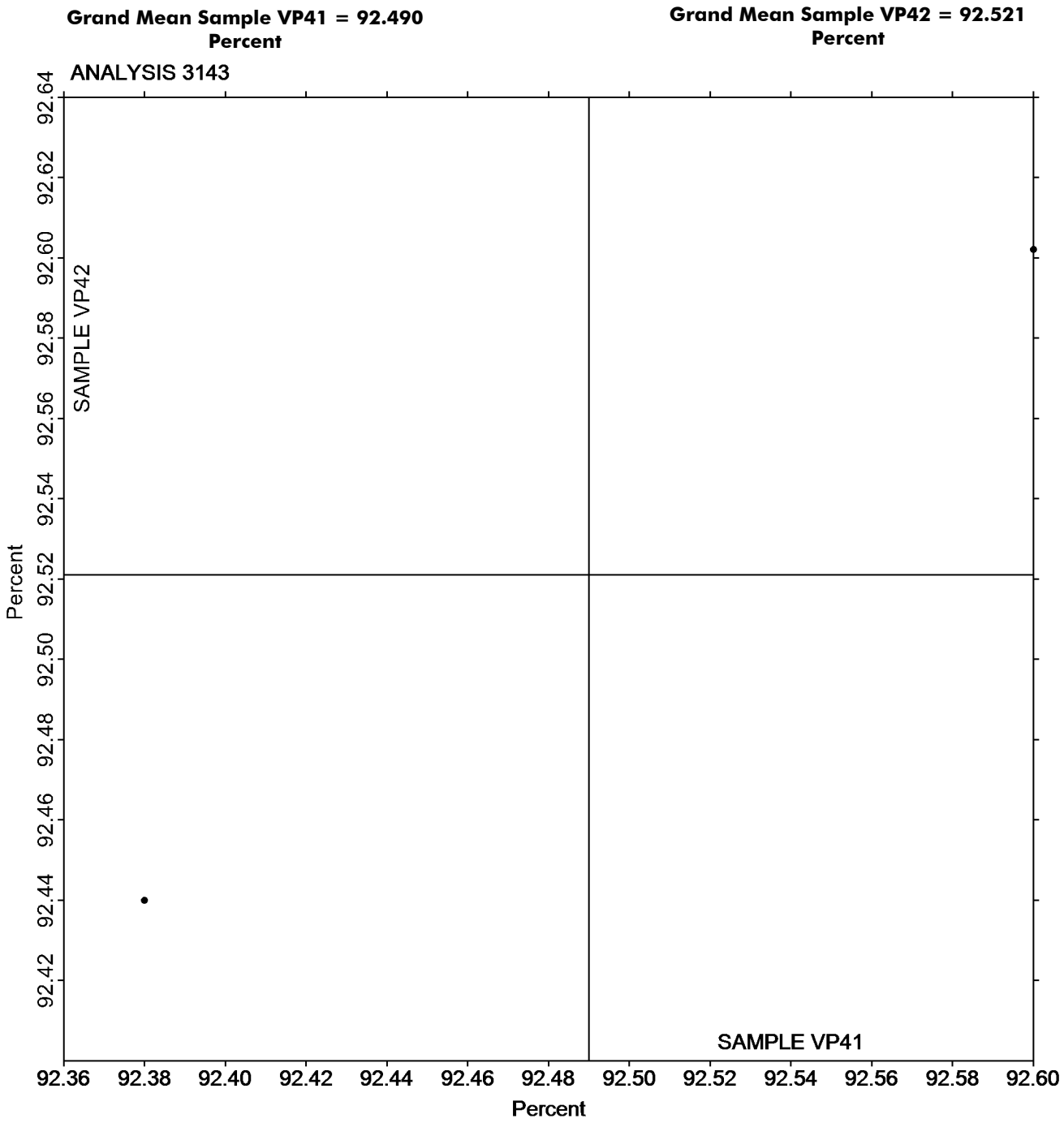
WebCode	Data Flag	Sample VP41 Lab Mean	Sample VP41 Diff from Grand Mean	Sample VP41 CPV	Sample VP42 Lab Mean	Sample VP42 Diff from Grand Mean	Sample VP42 CPV	Instr Code
E9TMUK		92.60	0.11	0.71	92.60	0.08	0.71	ZZ
LYJQPF		92.38	-0.11	-0.71	92.44	-0.08	-0.71	ZZ

Summary Statistics	Sample VP41	Sample VP42
Grand Means	92.49 Percent	92.52 Percent
Stnd Dev Btwn Labs	0.16 Percent	0.11 Percent

Statistics based on 2 of 2 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



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

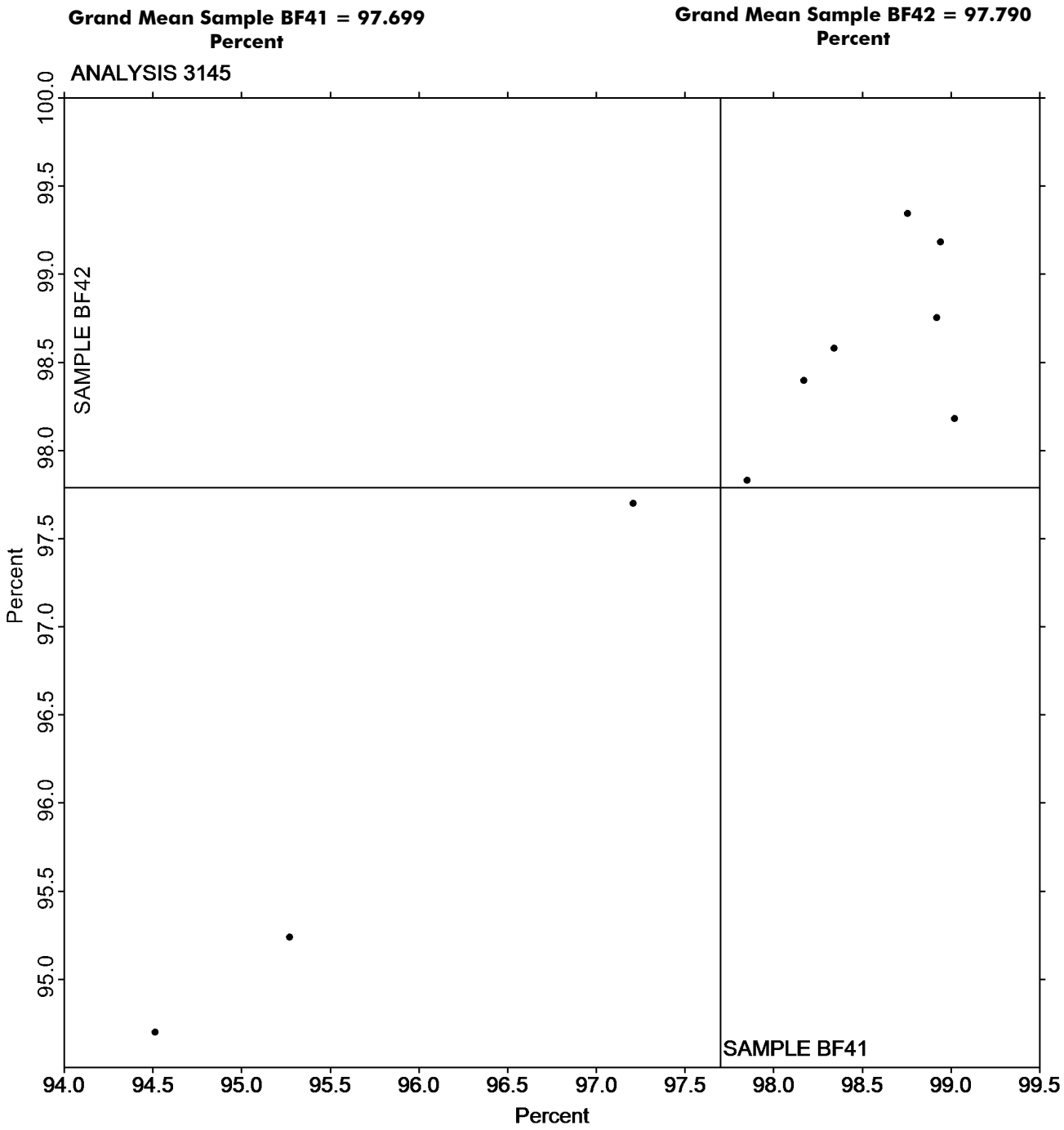
WebCode	Data Flag	Sample BF41 Lab Mean	Sample BF41 Diff from Grand Mean	Sample BF41 CPV	Sample BF42 Lab Mean	Sample BF42 Diff from Grand Mean	Sample BF42 CPV	Instr Code
8WJYEU		98.76	1.06	0.66	99.34	1.55	0.98	TE
93RK3R		98.34	0.64	0.40	98.58	0.79	0.50	TT
HVC2YG		98.17	0.47	0.30	98.40	0.61	0.38	TE
JT3DWW		97.85	0.15	0.09	97.83	0.04	0.03	TS
KWYJQR		98.94	1.24	0.78	99.18	1.39	0.88	TD
MFMKWE		94.51	-3.19	-2.00	94.70	-3.09	-1.96	TE
QFWTBJ		98.92	1.22	0.77	98.75	0.96	0.61	TD
QKNX6N		95.27	-2.43	-1.52	95.24	-2.55	-1.61	TS
WUXDF4		99.02	1.32	0.83	98.18	0.39	0.25	TD
ZL7AXC		97.21	-0.49	-0.31	97.70	-0.09	-0.06	PP

Summary Statistics	Sample BF41	Sample BF42
Grand Means	97.70 Percent	97.79 Percent
Stnd Dev Btwn Labs	1.59 Percent	1.58 Percent

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

PP	Technidyne Profile/Plus
TE	Technidyne TEST/Plus TAPPI Brightness
TT	Technidyne Brightimeter Micro S4-M
TD	Technidyne Color Touch X-45
TS	Technidyne Brightimeter Micro S-5



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

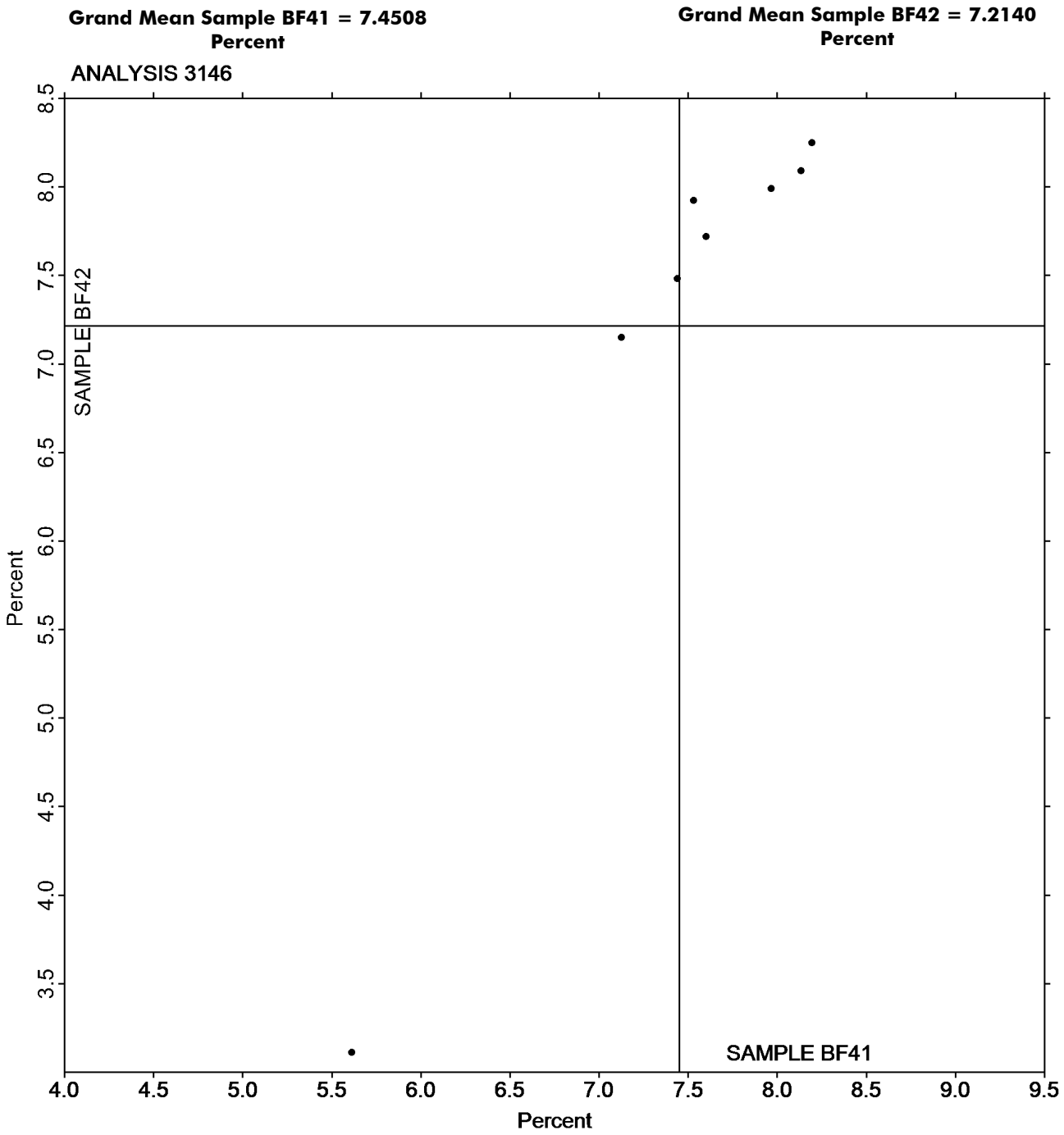
WebCode	Data Flag	Sample BF41 Lab Mean	Sample BF41 Diff from Grand Mean	Sample BF41 CPV	Sample BF42 Lab Mean	Sample BF42 Diff from Grand Mean	Sample BF42 CPV	Instr Code
8WJYEU		7.530	0.079	0.10	7.924	0.710	0.42	TE
93RK3R		7.440	-0.011	-0.01	7.480	0.266	0.16	XX
HVC2YG		7.126	-0.325	-0.39	7.150	-0.064	-0.04	TE
KWYJQR		8.134	0.683	0.82	8.090	0.876	0.52	TD
QFWTBJ		8.196	0.745	0.90	8.248	1.034	0.61	TD
QKNX6N		5.612	-1.839	-2.22	3.110	-4.104	-2.42	TS
WUXDF4		7.600	0.149	0.18	7.720	0.506	0.30	TD
ZL7AXC		7.968	0.517	0.62	7.990	0.776	0.46	PP

Summary Statistics	Sample BF41	Sample BF42
Grand Means	7.45 Percent	7.21 Percent
Stnd Dev Btwn Labs	0.83 Percent	1.70 Percent

Statistics based on 8 of 8 reporting participants.

Key to Instrument Codes Reported by Participants

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



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3201

Bending Resistance, Taber Type - 0 to 10 Units

TAPPI Official Test Method T566

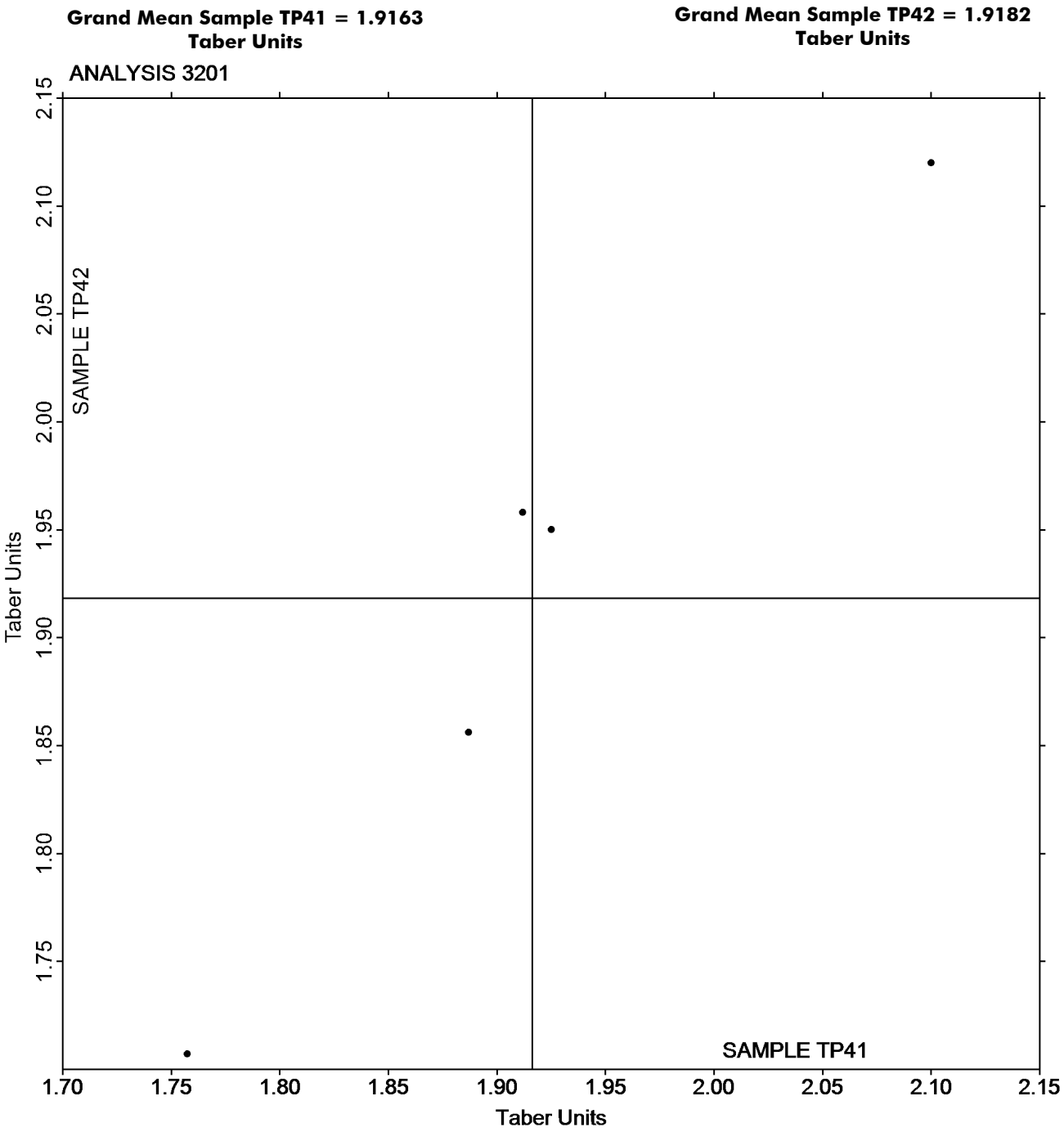
WebCode	Data Flag	Sample TP41 Lab Mean	Sample TP41 Diff from Grand Mean	Sample TP41 CPV	Sample TP42 Lab Mean	Sample TP42 Diff from Grand Mean	Sample TP42 CPV	Instr Code
2DCLFE		2.100	0.184	1.50	2.120	0.202	1.33	ZZ
877ZU4		1.912	-0.004	-0.04	1.958	0.040	0.26	ZZ
MFMKWE		1.925	0.009	0.07	1.950	0.032	0.21	ZZ
QFWTBJ		1.758	-0.159	-1.30	1.707	-0.211	-1.39	ZZ
ZQZ7M3		1.887	-0.029	-0.24	1.856	-0.062	-0.41	ZZ

Summary Statistics	Sample TP41	Sample TP42
Grand Means	1.92 Taber Units	1.92 Taber Units
Stnd Dev Btwn Labs	0.12 Taber Units	0.15 Taber Units

Statistics based on 5 of 5 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



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

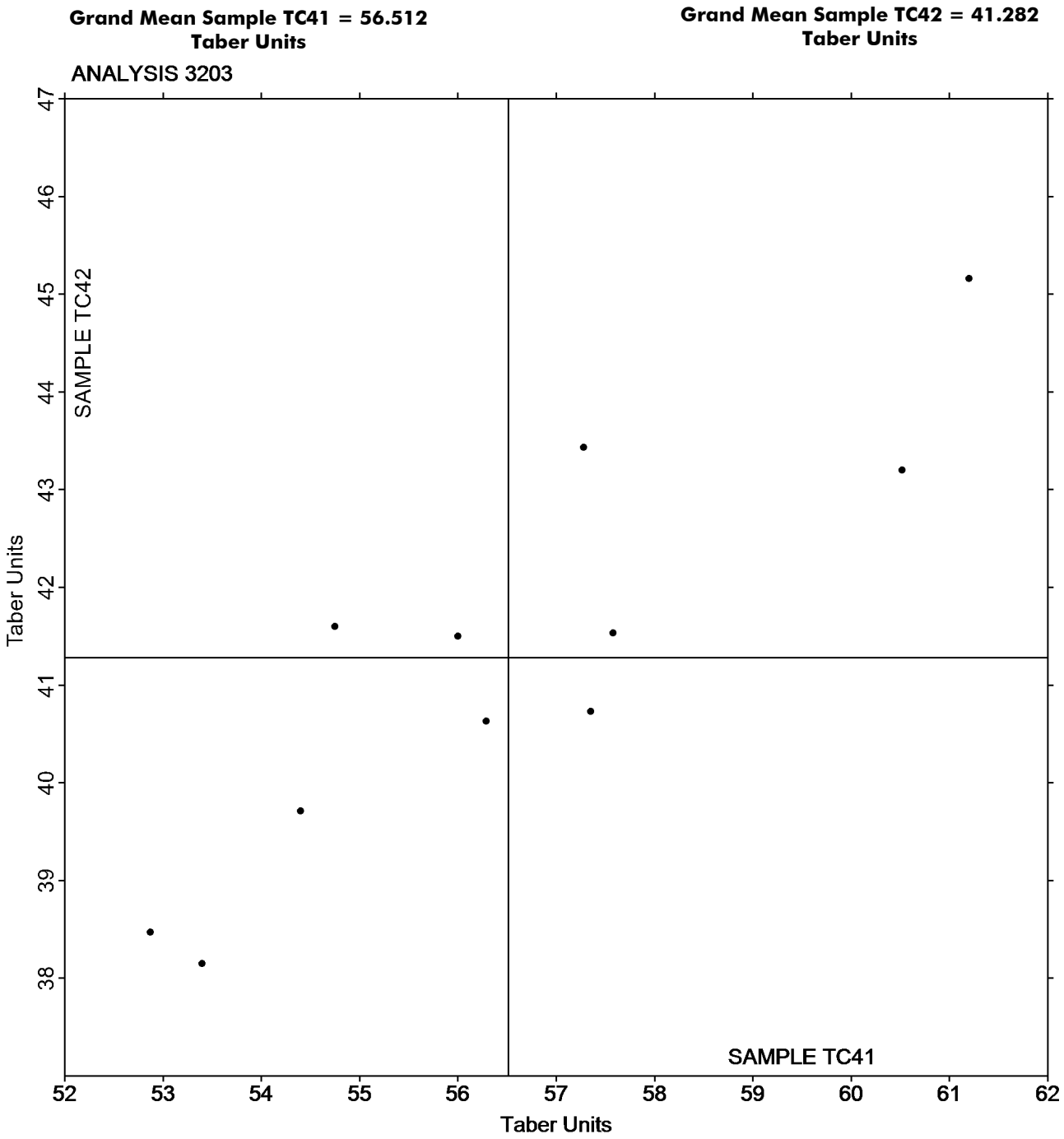
WebCode	Data Flag	Sample TC41 Lab Mean	Sample TC41 Diff from Grand Mean	Sample TC41 CPV	Sample TC42 Lab Mean	Sample TC42 Diff from Grand Mean	Sample TC42 CPV	Instr Code
4KJWNV		56.00	-0.51	-0.19	41.50	0.22	0.10	ZZ
8PLAV6		56.29	-0.22	-0.08	40.63	-0.65	-0.31	ZZ
C8Q873		57.28	0.77	0.29	43.43	2.15	1.02	ZZ
CEQMTP		53.40	-3.12	-1.17	38.15	-3.13	-1.49	ZZ
H87FWR		54.75	-1.76	-0.66	41.60	0.32	0.15	ZZ
KWYJQR		52.87	-3.64	-1.36	38.47	-2.81	-1.33	ZZ
NJJQNQ		60.52	4.01	1.50	43.20	1.92	0.91	ZZ
YVDLFF		61.20	4.69	1.76	45.16	3.88	1.84	ZZ
ZDFNTD		57.35	0.84	0.31	40.73	-0.55	-0.26	ZZ
ZGEYND		57.58	1.07	0.40	41.53	0.25	0.12	ZZ
ZQZ7M3		54.40	-2.11	-0.79	39.71	-1.57	-0.75	ZZ

Summary Statistics	Sample TC41	Sample TC42
Grand Means	56.51 Taber Units	41.28 Taber Units
Stnd Dev Btwn Labs	2.67 Taber Units	2.11 Taber Units

Statistics based on 11 of 11 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3205

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

TAPPI Official Test Method T489

WebCode	Data Flag	Sample TR41 Lab Mean	Sample TR41 Diff from Grand Mean	Sample TR41 CPV	Sample TR42 Lab Mean	Sample TR42 Diff from Grand Mean	Sample TR42 CPV	Instr Code
AXCCC7		201.4	26.4	2.38	199.2	25.6	2.32	ZZ
C8Q873		177.5	2.5	0.22	175.7	2.2	0.20	ZZ
K7P6WQ		161.0	-14.1	-1.27	160.0	-13.6	-1.23	ZZ
R736TL		173.9	-1.1	-0.10	169.9	-3.7	-0.33	ZZ
RXU9BB		167.5	-7.5	-0.68	165.2	-8.4	-0.76	ZZ
V6ZDF3		170.8	-4.3	-0.38	171.1	-2.5	-0.23	ZZ
WQCTAZ		176.2	1.2	0.11	174.0	0.4	0.04	ZZ
ZDFNTD		173.1	-1.9	-0.17	169.3	-4.3	-0.39	ZZ
ZGEYND		173.9	-1.1	-0.10	177.8	4.2	0.38	ZZ

Summary Statistics	Sample TR41	Sample TR42
Grand Means	175.02 Taber Units	173.57 Taber Units
Stnd Dev Btwn Labs	11.08 Taber Units	11.03 Taber Units

Statistics based on 9 of 9 reporting participants.

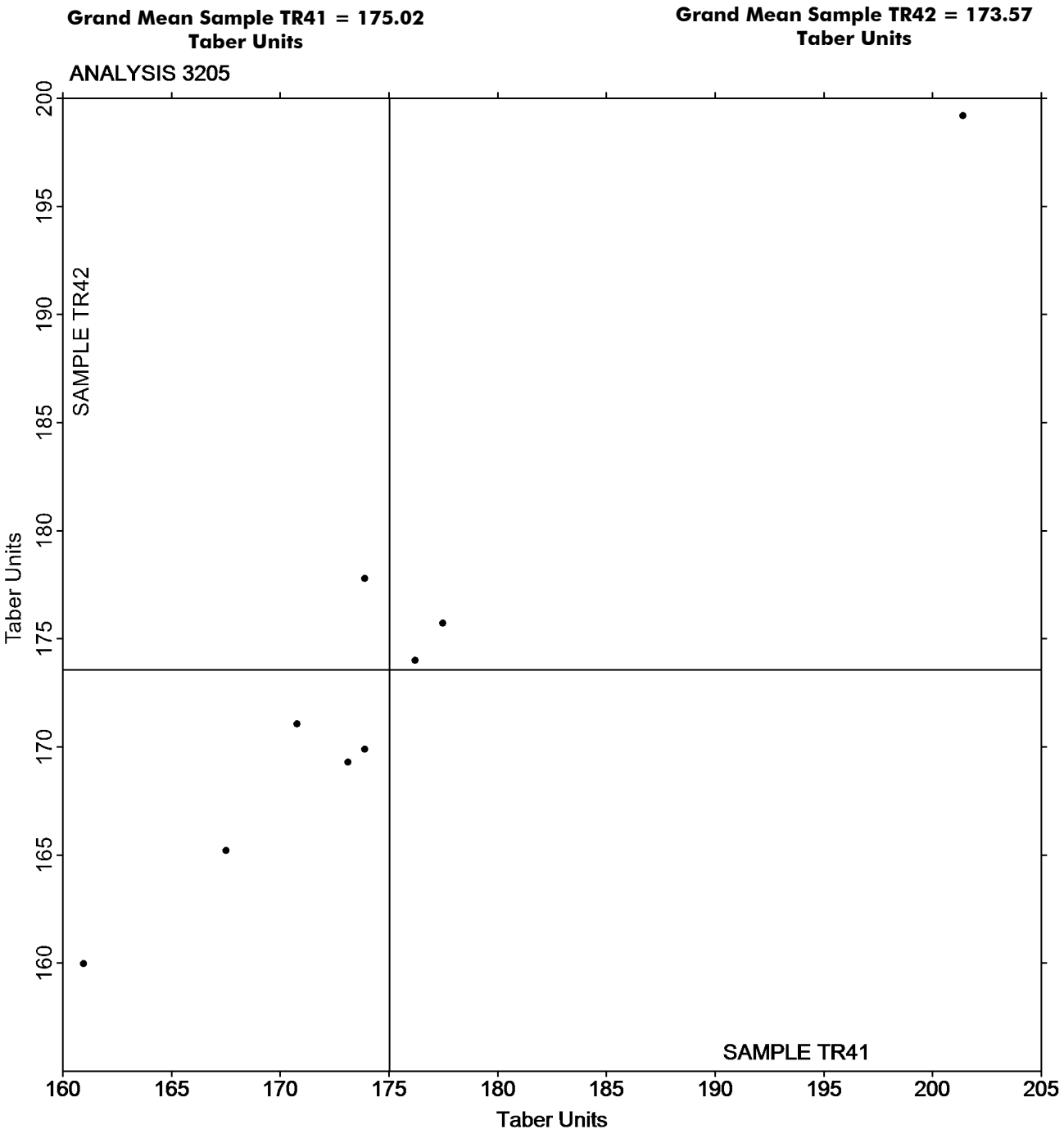
Analysis Notes:

AXCCC7 - 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.

V6ZDF3 - One determination removed from the Lab Mean of Sample TR42 per Grubb's Test at 1% risk (TAPPI 1205).

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



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

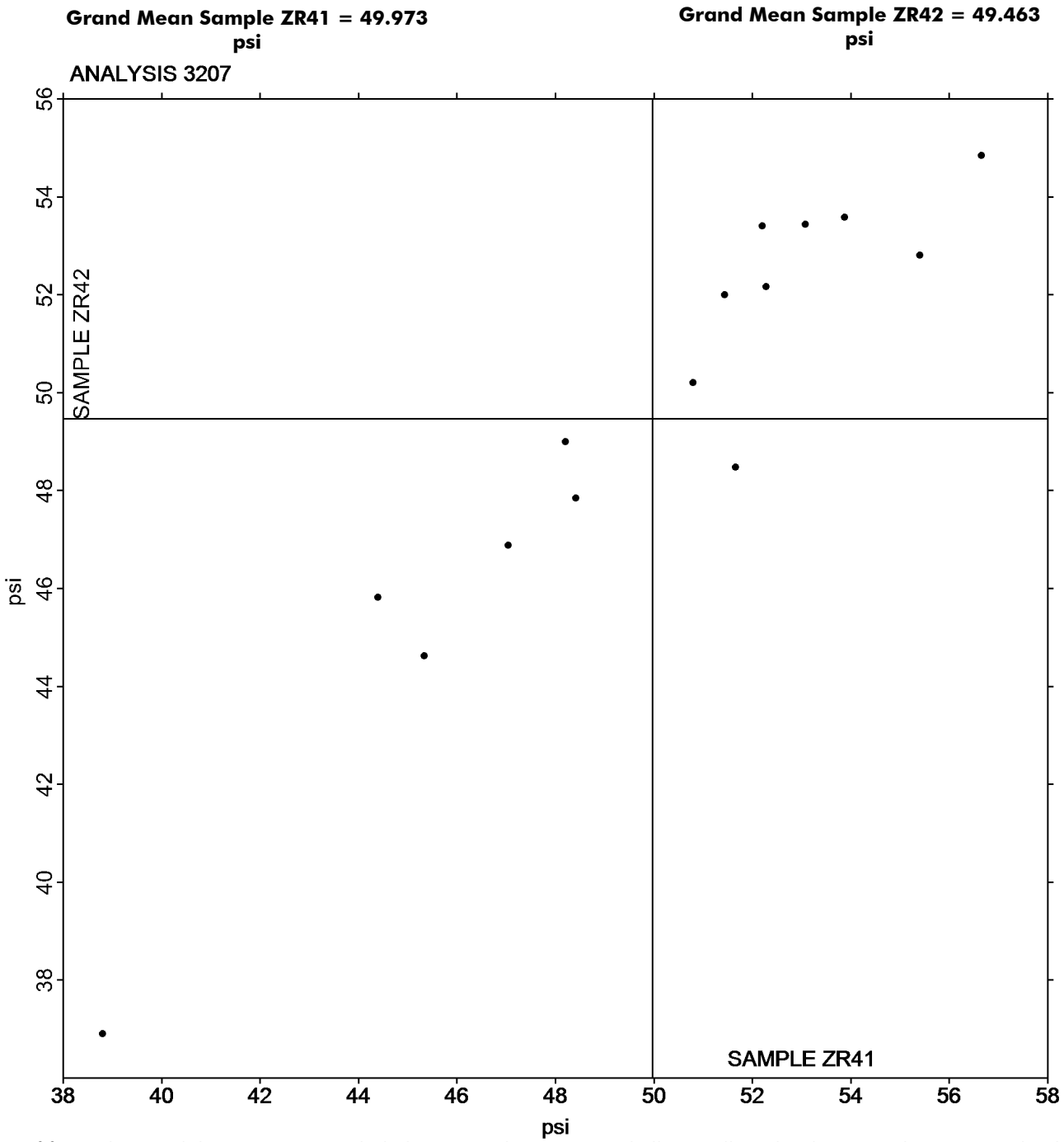
WebCode	Data Flag	Sample ZR41 Lab Mean	Sample ZR41 Diff from Grand Mean	Sample ZR41 CPV	Sample ZR42 Lab Mean	Sample ZR42 Diff from Grand Mean	Sample ZR42 CPV	Instr Code
28JGPV		45.34	-4.63	-0.99	44.62	-4.84	-1.03	CH
66PUKW		48.42	-1.55	-0.33	47.84	-1.62	-0.35	LW
9N9WTT		44.40	-5.57	-1.19	45.81	-3.65	-0.78	LW
9UCZG7		51.66	1.69	0.36	48.48	-0.98	-0.21	XX
AXCCC7		52.28	2.31	0.49	52.16	2.70	0.58	CA
EF8T4W		38.80	-11.17	-2.39	36.90	-12.56	-2.68	LW
FXRJ3V		48.20	-1.77	-0.38	49.00	-0.46	-0.10	CA
K7P6WQ		47.04	-2.93	-0.63	46.88	-2.58	-0.55	CD
NLMJKA		53.88	3.91	0.83	53.58	4.12	0.88	TA
PH3TWQ		52.20	2.23	0.48	53.40	3.94	0.84	DT
RXU9BB		51.44	1.47	0.31	52.00	2.54	0.54	TA
TPARW7		55.40	5.43	1.16	52.80	3.34	0.71	CD
V6ZDF3		53.08	3.11	0.66	53.44	3.98	0.85	CD
X68AXD		50.80	0.83	0.18	50.20	0.74	0.16	CA
ZGEYND		56.66	6.69	1.43	54.84	5.38	1.15	LW

Summary Statistics	Sample ZR41	Sample ZR42
Grand Means	49.97 psi	49.46 psi
Stnd Dev Btwn Labs	4.68 psi	4.69 psi

Statistics based on 15 of 15 reporting participants.

Key to Instrument Codes Reported by Participants

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



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

WebCode	Data Flag	Sample ZP41 Lab Mean	Sample ZP41 Diff from Grand Mean	Sample ZP41 CPV	Sample ZP42 Lab Mean	Sample ZP42 Diff from Grand Mean	Sample ZP42 CPV	Instr Code
4KJWNV		75.80	-10.67	-0.82	71.40	-7.51	-0.88	TA
8PLAV6		70.76	-15.71	-1.21	68.64	-10.27	-1.20	CD
NJJQNQ		90.84	4.37	0.34	80.84	1.93	0.23	CD
R736TL		73.64	-12.83	-0.99	72.80	-6.11	-0.71	CD
WQCTAZ		99.12	12.65	0.97	85.66	6.75	0.79	LW
YVDLFF		91.88	5.41	0.42	80.36	1.45	0.17	CD
ZGEYND		103.26	16.79	1.29	92.66	13.75	1.61	LW

Summary Statistics	Sample ZP41	Sample ZP42
Grand Means	86.47 psi	78.91 psi
Stnd Dev Btwn Labs	13.01 psi	8.56 psi

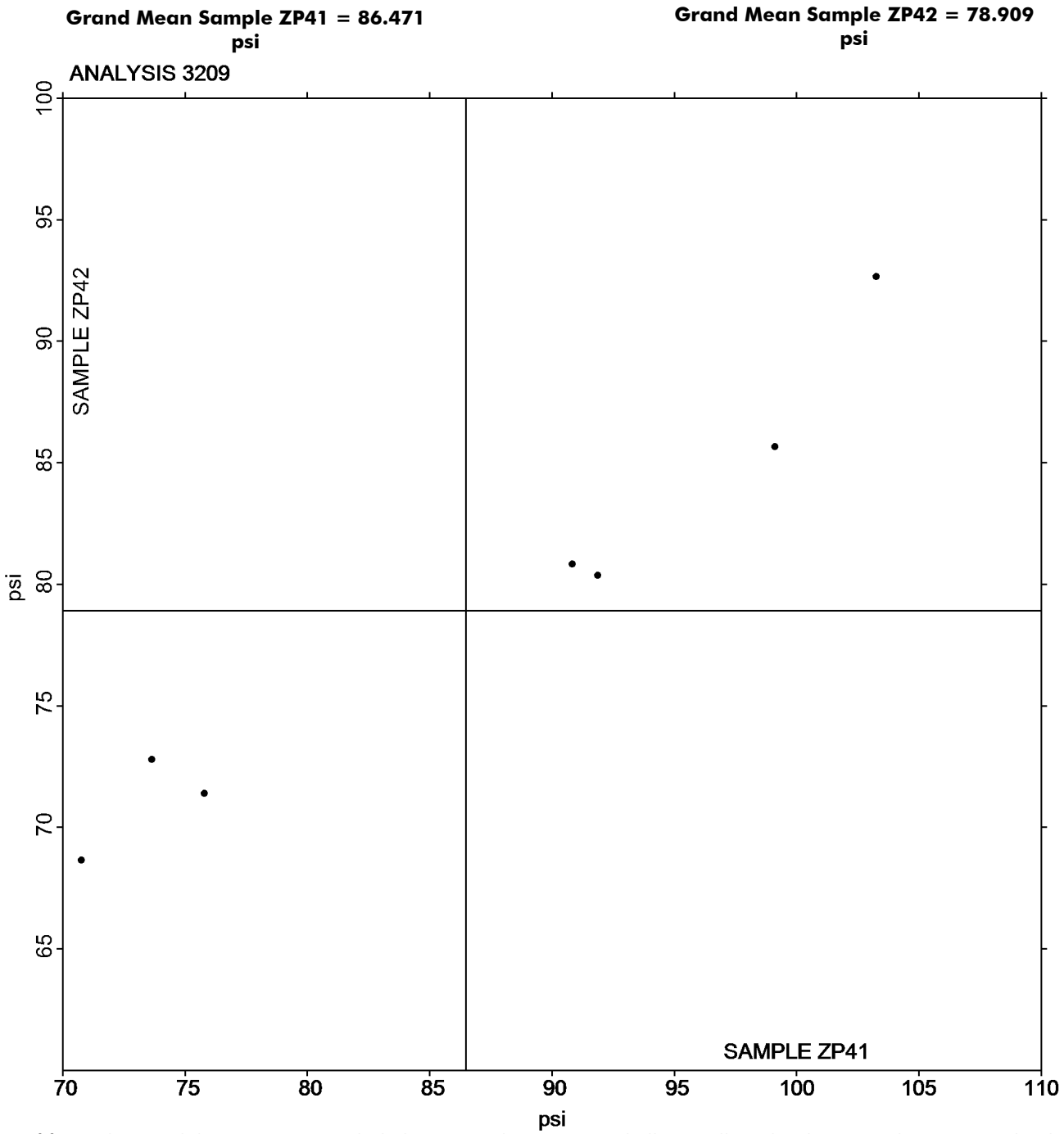
Statistics based on 7 of 7 reporting participants.

Key to Instrument Codes Reported by Participants

CD CSI CS-163D

LW L & W ZD Tensile Tester

TA Thwing-Albert Tensile Tester



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

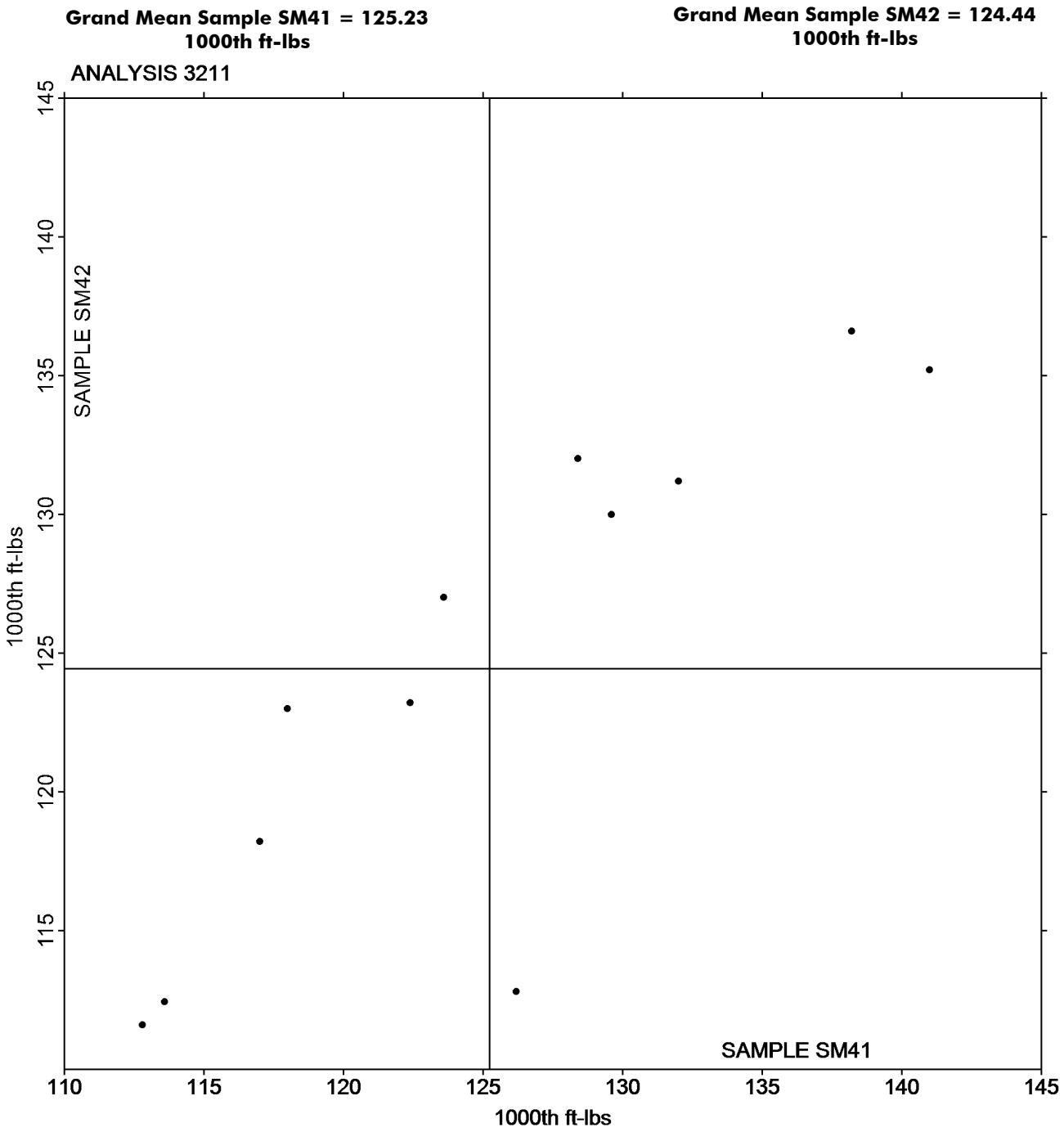
WebCode	Data Flag	Sample SM41 Lab Mean	Sample SM41 Diff from Grand Mean	Sample SM41 CPV	Sample SM42 Lab Mean	Sample SM42 Diff from Grand Mean	Sample SM42 CPV	Instr Code
3NP3PW		122.4	-2.8	-0.31	123.2	-1.2	-0.14	HY
4KJWNV		123.6	-1.6	-0.18	127.0	2.6	0.28	HZ
877ZU4		113.6	-11.6	-1.28	112.4	-12.0	-1.33	KR
8WJYEU		118.0	-7.2	-0.79	123.0	-1.4	-0.16	HX
93RK3R		128.4	3.2	0.35	132.0	7.6	0.84	HX
EELPVY		129.6	4.4	0.48	130.0	5.6	0.62	HY
KFC4MV		117.0	-8.2	-0.90	118.2	-6.2	-0.69	HZ
NJJQNQ		138.2	13.0	1.42	136.6	12.2	1.35	HY
V6ZDF3		126.2	1.0	0.11	112.8	-11.6	-1.29	XX
WQCTAZ		112.8	-12.4	-1.36	111.6	-12.8	-1.43	HZ
YVDLFF		132.0	6.8	0.74	131.2	6.8	0.75	HY
ZGEYND		141.0	15.8	1.73	135.2	10.8	1.20	HZ

Summary Statistics	Sample SM41	Sample SM42
Grand Means	125.23 1000th ft-lbs	124.44 1000th ft-lbs
Stnd Dev Btwn Labs	9.11 1000th ft-lbs	9.00 1000th ft-lbs

Statistics based on 12 of 12 reporting participants.

Key to Instrument Codes Reported by Participants

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



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3213

Internal Bond Strength - Scott Bond Models

TAPPI Provisional Test Method T569

WebCode	Data Flag	Sample SB41 Lab Mean	Sample SB41 Diff from Grand Mean	Sample SB41 CPV	Sample SB42 Lab Mean	Sample SB42 Diff from Grand Mean	Sample SB42 CPV	Instr Code
28JGPV		103.4	-11.4	-0.54	116.6	2.3	0.10	TM
A6BY7R		99.0	-15.8	-0.74	102.4	-11.9	-0.55	TM
H87FWR		123.9	9.1	0.43	123.3	9.0	0.42	ID
MFMKWE		91.2	-23.6	-1.11	91.8	-22.5	-1.05	SC
PL36UC		107.8	-7.0	-0.33	102.8	-11.5	-0.54	TM
QFWTBJ		155.6	40.8	1.92	157.6	43.3	2.01	TM
R7ML9P		104.8	-10.0	-0.47	94.8	-19.5	-0.91	TM
WUXDF4		132.6	17.8	0.84	125.4	11.1	0.51	TM

Summary Statistics	Sample SB41	Sample SB42
Grand Means	114.79 1000th ft-lbs	114.34 1000th ft-lbs
Stnd Dev Btwn Labs	21.21 1000th ft-lbs	21.53 1000th ft-lbs

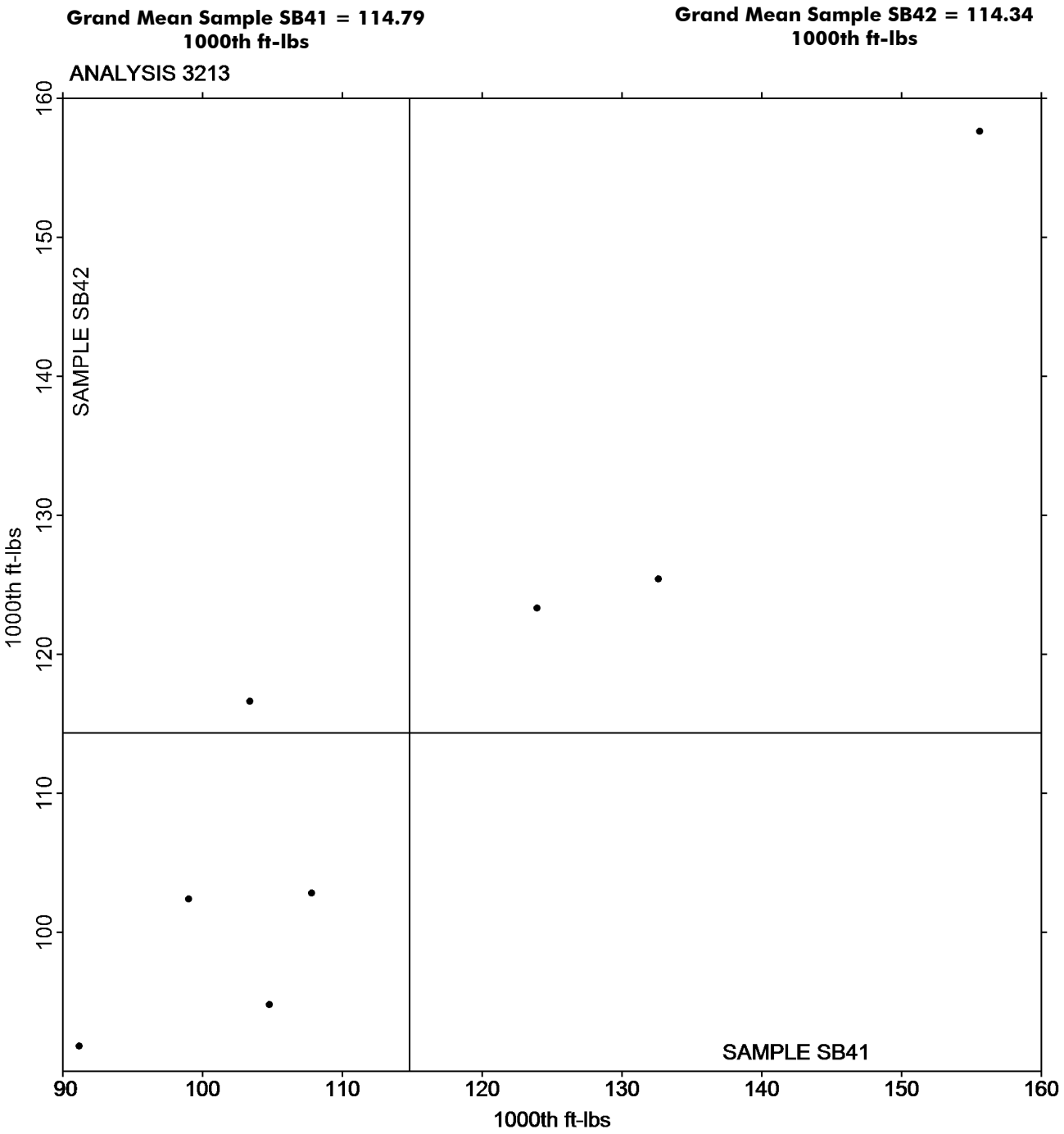
Statistics based on 8 of 8 reporting participants.

Key to Instrument Codes Reported by Participants

ID IDM Internal Bond Tester

SC Scott Internal Bond Tester (Manual)

TM TMI Monitor/Internal Bond Tester



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-