Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #4352 - April 2025

Analysis	Analysis Name
3501	Thickness (Caliper), Packaging papers
3511	Bursting Strength - Packaging Papers
3513	Tearing Strength - Packaging Papers
3515	Tensile Breaking Strength - Packaging Papers
3516	Tensile Energy Absorption - Packaging Papers
3517	Elongation to Break - Packaging Papers
3531	Roughness - Print Surf Method - 0.5 to 4.0 Microns
3545	Directional Brightness
3547	Diffuse Brightness
3549	Color & Color Difference - Near White Papers - C/2deg obs
3551	Color & Color Difference - Near White Papers - D65/10deg obs
3553	Specular Gloss at 75 Degrees - High Range
3555	Specular Gloss at 75 Degrees - Low Range
3601	Folding Endurance (MIT) - Double Folds
3603	Bending Resistance, Gurley Type
3611	Coefficient of Static Friction - Horizontal Plane Method - Printing Papers
3612	Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers
3613	Moisture in Paper
3615	Sizing Test (Hercules Type)

The CTS Paper & Paperboard Interlaboratory Program

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

About CTS

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

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

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

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

Key for Web Summary Reports (Page 1 of 2)

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

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

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

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

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

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

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

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

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

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

Common Problems Highlighted in Footnotes

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

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

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

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

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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3501

Thickness (Caliper), Packaging papers

TAPPI Official Test Method T411

CTS determined that during sample production, a number of samples were inadvertently swapped. In order to ensure that published statistics are meaningful, CTS transposed data for those samples incorrectly packaged. This adjustment is unique to Test 3501 and no further remediation is required by participants. A Lab Note is included in the individual report for those labs that were affected. If you have any questions, please contact CTS.

		Sample CK39			Sample CK40			
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	Instr Code
3FMYGZ		13.64	-0.12	-0.65	10.85	-0.04	-0.22	XX
4NB94Z		13.67	-0.10	-0.50	10.77	-0.12	-0.72	LW
4YCWVW		13.91	0.15	0.77	10.91	0.02	0.14	OK
6ABUGB		13.92	0.15	0.78	10.98	0.10	0.62	LW
6DB3PR		13.78	0.01	0.05	10.88	0.00	0.00	EM
6QVHTR		14.03	0.26	1.37	11.03	0.15	0.93	LB
6UUUNR		13.93	0.16	0.84	10.98	0.10	0.60	LW
7Y9QUT		13.41	-0.35	-1.85	10.61	-0.27	-1.71	XX
87K8Y9		13.81	0.05	0.24	10.90	0.02	0.10	XX
8987RW		13.91	0.14	0.72	11.02	0.13	0.84	PP
9UMQPX		13.67	-0.10	-0.51	10.84	-0.05	-0.28	EM
AL8Q77		13.68	-0.09	-0.46	10.85	-0.03	-0.18	LW
AUWCDP		13.89	0.12	0.65	10.95	0.07	0.42	LW
BV9EX3		13.59	-0.18	-0.92	10.80	-0.09	-0.54	MS
CTGU8P		13.62	-0.15	-0.78	10.72	-0.16	-1.02	TB
CY2VM2	X	13.80	0.04	0.20	12.82	1.94	12.11	LC
FDULYG		13.92	0.15	0.79	11.08	0.20	1.25	EM
H42VQE		14.05	0.29	1.50	11.13	0.25	1.57	LW
JALCKG		13.85	0.08	0.44	10.93	0.05	0.30	LC
JRG66E		13.35	-0.42	-2.20	10.57	-0.31	-1.95	OK
M473KA		13.88	0.12	0.61	11.03	0.15	0.94	EM
MA9AZC		13.42	-0.34	-1.79	10.56	-0.32	-2.02	PP
MCVU6G		13.83	0.06	0.32	10.91	0.02	0.15	LA
MQTZYC		13.68	-0.09	-0.47	10.81	-0.08	-0.47	XX
PBYXTR		13.90	0.13	0.67	10.98	0.09	0.58	TA
QVJECC		13.70	-0.07	-0.37	10.87	-0.02	-0.10	LW
RQ43WM		13.54	-0.23	-1.19	10.62	-0.26	-1.63	LW
W8QDM6	X	13.97	0.20	1.05	10.84	-0.04	-0.26	PP
XLNJGZ		13.67	-0.10	-0.50	10.82	-0.06	-0.39	XX
XMJ3J2		13.96	0.19	1.02	11.05	0.16	1.02	XX
ZR8QR4		14.04	0.27	1.44	11.17	0.29	1.80	PP

Summary Statistics	Sample CK39	Sample CK40
Grand Means	13.77 mils	10.88 mils
Stnd Dev Btwn Labs	0.19 mils	0.16 mils

Statistics based on 29 of 31 reporting participants.

Comments on Assigned Data Flags for Test #3501

CY2VM2 (X) - Extreme Data for Sample CK40.

W8QDM6 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample CK39.

Analysis Notes:

3FMYGZ - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

4NB94Z - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

4YCWVW - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

6DB3PR - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

6QVHTR - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

6UUUNR - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

7Y9QUT - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

AUWCDP - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

CTGU8P - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

FDULYG - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

JALCKG - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

JRG66E - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

M473KA - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

MA9AZC - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

MCVU6G - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

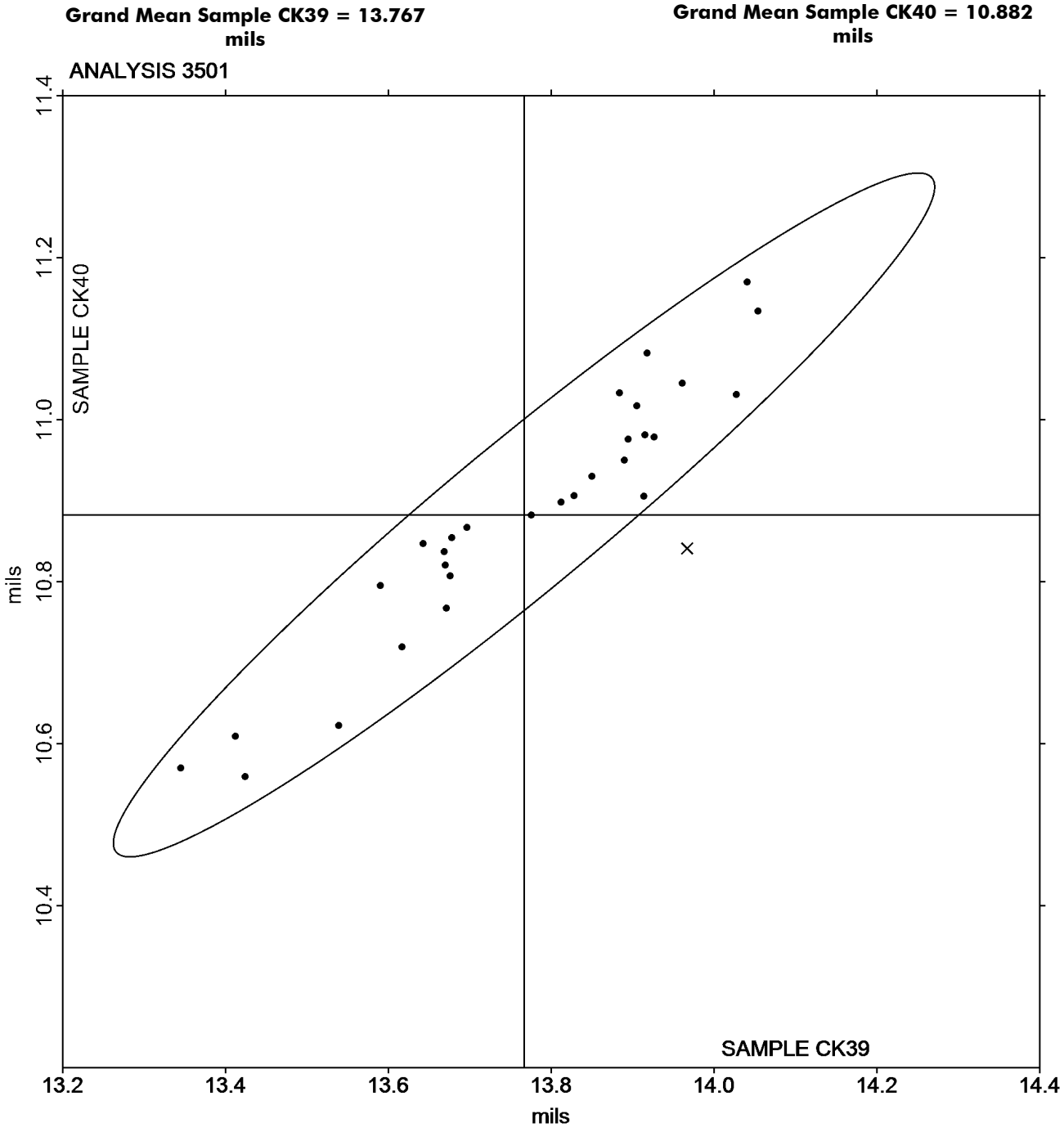
QVJECC - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

W8QDM6 - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

ZR8QR4 - Data for Sample CK39 & CK40 were transposed by CTS to correct sample packaging error.

Key to Instrument Codes Reported by Participants

EM	Emveco	LA	L & W Autoline
LB	L & W Autoline 600	LC	L & W Autoline 400
LW	L & W	MS	Messmer
OK	Oakland	PP	Technidyne Profile/Plus
TA	Thwing-Albert	TB	Thwing-Albert 89-100
XX	Instrument make/model not specified by lab		



Paper & Paperboard Interlaboratory Testing Program

Analysis 3511

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

WebCode	Data Flag	Sample BK39 Lab Mean	Sample BK39 Diff from Grand Mean	Sample BK39 CPV	Sample BK40 Lab Mean	Sample BK40 Diff from Grand Mean	Sample BK40 CPV	Instr Code
6ABUGB		58.48	-9.26	-1.12	61.84	-7.90	-0.98	ZZ
737DKV		72.85	5.11	0.62	72.50	2.77	0.34	ZZ
9UMQPX		64.55	-3.19	-0.39	68.65	-1.09	-0.14	ZZ
AL8Q77		65.60	-2.14	-0.26	65.62	-4.12	-0.51	ZZ
CTGU8P		70.30	2.56	0.31	70.00	0.26	0.03	ZZ
DPVB2K		60.87	-6.87	-0.83	62.82	-6.92	-0.86	ZZ
H42VQE		62.39	-5.35	-0.65	63.04	-6.69	-0.83	ZZ
L7BBAU		59.40	-8.34	-1.01	64.20	-5.54	-0.69	ZZ
TMW646	*	75.50	7.76	0.94	87.70	17.96	2.23	ZZ
W26HL2		65.85	-1.89	-0.23	66.57	-3.17	-0.39	ZZ
W8QDM6		88.00	20.26	2.45	82.70	12.96	1.61	ZZ
X64TH2		69.09	1.35	0.16	71.21	1.47	0.18	ZZ

Summary Statistics	Sample BK39	Sample BK40
Grand Means	67.74 psi	69.74 psi
Stnd Dev Btwn Labs	8.28 psi	8.06 psi

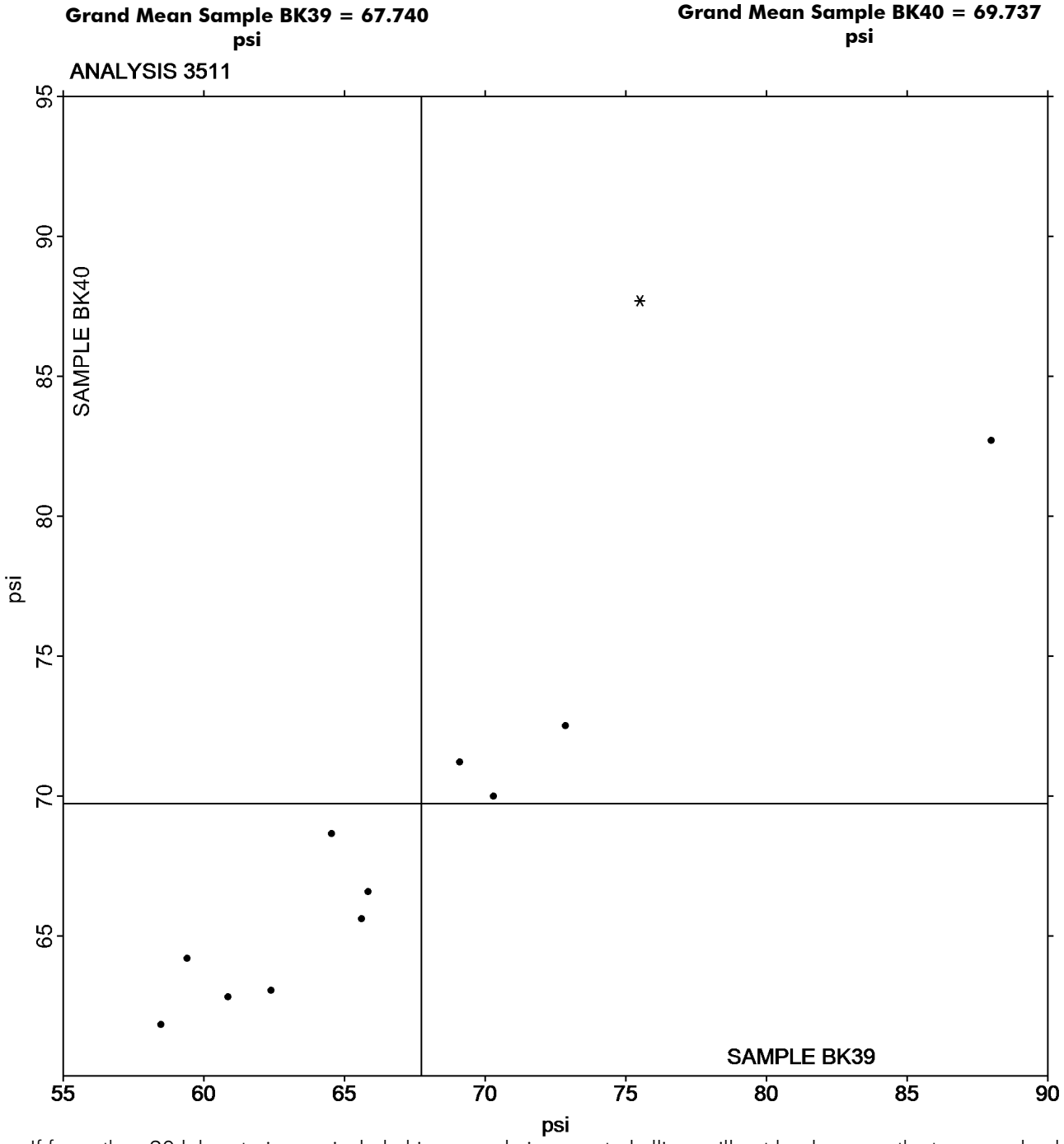
Statistics based on 12 of 12 reporting participants.

Analysis Notes:

AL8Q77 - Data appear to be reported as kPa, not psi 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



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 3513

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample RK39 Lab Mean	Sample RK39 Diff from Grand Mean	Sample RK39 CPV	Sample RK40 Lab Mean	Sample RK40 Diff from Grand Mean	Sample RK40 CPV	Instr Code
268MPW		157.8	-1.5	-0.12	153.6	-5.6	-0.47	ZZ
4M24QC		166.1	6.8	0.54	166.9	7.7	0.65	ZZ
4NB94Z		164.7	5.4	0.43	161.0	1.8	0.15	ZZ
6ABUGB		174.3	15.0	1.19	177.9	18.7	1.57	ZZ
6DB3PR		139.3	-20.0	-1.58	140.5	-18.7	-1.57	ZZ
9C8GNW		155.6	-3.7	-0.29	157.5	-1.7	-0.14	ZZ
AL8Q77	X	295.9	136.7	10.82	274.3	115.2	9.67	ZZ
BW4WY4		152.5	-6.8	-0.54	156.2	-3.0	-0.25	ZZ
DPVB2K		153.0	-6.3	-0.50	150.6	-8.6	-0.72	ZZ
DYK2MR		135.8	-23.4	-1.86	141.7	-17.5	-1.47	ZZ
H42VQE		177.2	17.9	1.42	176.5	17.3	1.45	ZZ
HD3FRL		182.8	23.6	1.87	182.4	23.2	1.95	ZZ
JRG66E		157.3	-2.0	-0.16	155.4	-3.8	-0.32	ZZ
KFLB9B		152.6	-6.6	-0.52	154.9	-4.3	-0.36	ZZ
L7BBAU		162.3	3.1	0.24	160.2	1.1	0.09	ZZ
M473KA		169.9	10.6	0.84	167.3	8.1	0.68	ZZ
MCVU6G		151.7	-7.6	-0.60	157.4	-1.8	-0.15	ZZ
PBYXTR		155.2	-4.1	-0.32	157.3	-1.9	-0.16	ZZ
PTUPEQ		157.8	-1.5	-0.12	155.1	-4.1	-0.34	ZZ
QVJECC	X	159.6	0.3	0.03	203.2	44.0	3.70	ZZ
RQ43WM	*	142.1	-17.2	-1.36	134.0	-25.2	-2.11	ZZ
W26HL2		152.1	-7.2	-0.57	152.9	-6.2	-0.52	ZZ
W8QDM6		149.8	-9.5	-0.75	154.5	-4.7	-0.40	ZZ
XLNJGZ		186.0	26.7	2.12	177.6	18.4	1.55	ZZ
XMJ3J2		165.4	6.2	0.49	168.1	8.9	0.75	ZZ
ZR8QR4		161.3	2.0	0.16	160.8	1.6	0.14	ZZ

Summary Statistics	Sample RK39	Sample RK40
Grand Means	159.27 Grams	159.17 Grams
Stnd Dev Btwn Labs	12.63 Grams	11.91 Grams

Statistics based on 24 of 26 reporting participants.

Comments on Assigned Data Flags for Test #3513

AL8Q77 (X) - Extreme Data.

QVJECC (X) - Data for sample RK40 are high. Inconsistent within the determinations of sample RK40.

Analysis Notes:

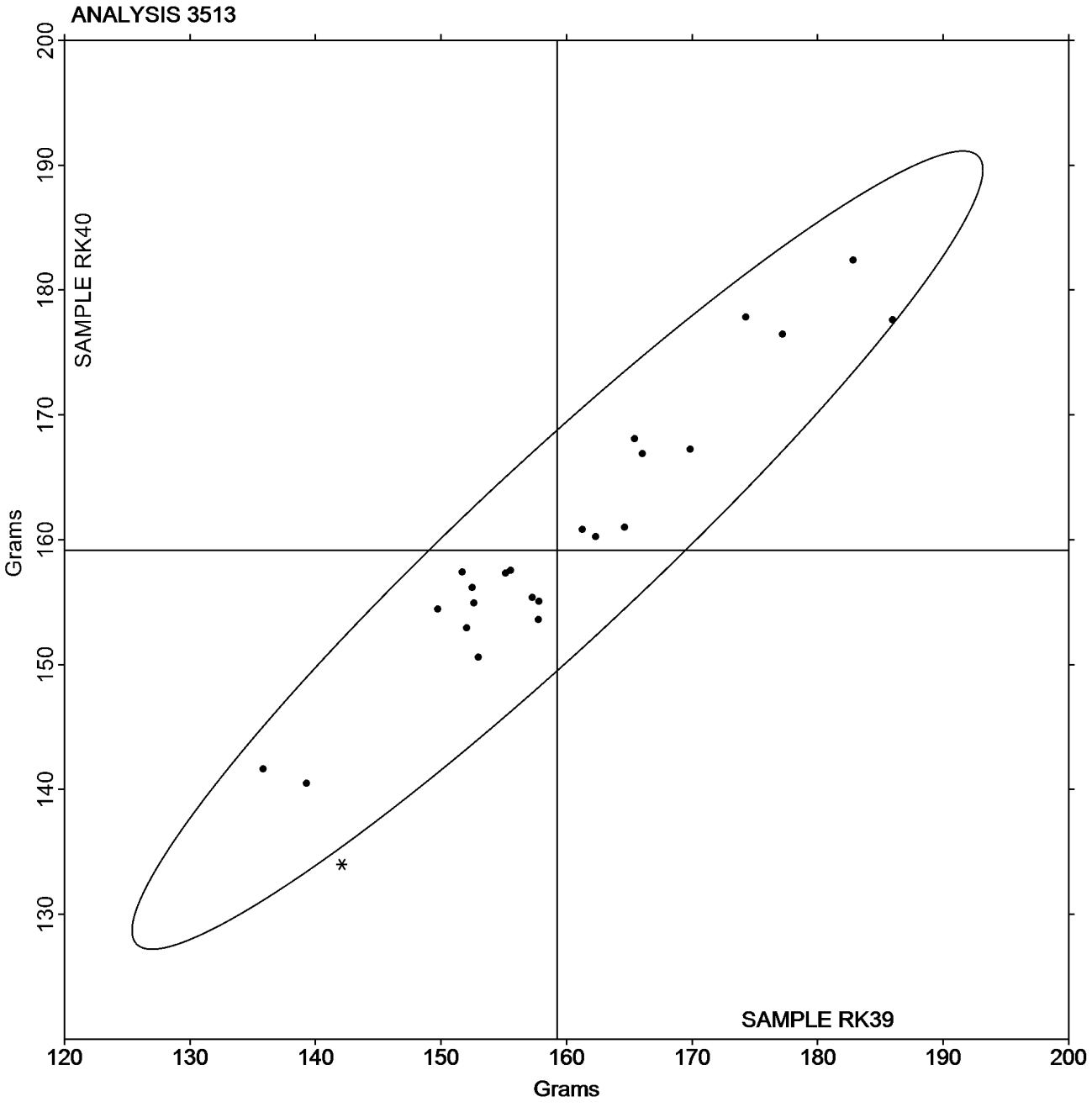
268MPW - One determination removed from the Lab Mean of Sample RK39 per Grubb's Test at 1% risk (TAPPI 1205).

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample RK39 = 159.27 Grams

Grand Mean Sample RK40 = 159.17 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK39 Lab Mean	Sample NK39 Diff from Grand Mean	Sample NK39 CPV	Sample NK40 Lab Mean	Sample NK40 Diff from Grand Mean	Sample NK40 CPV	Instr Code
268MPW	*	9.65	-1.09	-1.60	13.77	-0.19	-0.21	XX
2R2VL4		11.49	0.76	1.11	15.33	1.37	1.55	LE
3FMYGZ		10.86	0.12	0.18	13.85	-0.10	-0.11	TB
4M24QC		10.13	-0.61	-0.90	13.32	-0.64	-0.72	LE
4NB94Z		11.07	0.33	0.48	13.93	-0.02	-0.03	LE
6ABUGB		10.15	-0.59	-0.86	12.80	-1.16	-1.30	IM
6QVHTR		12.44	1.70	2.49	15.65	1.70	1.91	LC
6UUUNR		10.49	-0.25	-0.37	13.72	-0.23	-0.26	LW
7Z6AVU		11.98	1.24	1.82	15.52	1.57	1.76	LA
AL8Q77		10.51	-0.23	-0.34	14.38	0.42	0.48	LW
AUWCDP		10.41	-0.33	-0.48	14.11	0.15	0.17	TH
BW4WY4		11.38	0.64	0.94	13.77	-0.18	-0.21	IN
CTGU8P		11.30	0.56	0.82	14.74	0.79	0.89	TV
DPVB2K		10.15	-0.59	-0.86	12.87	-1.09	-1.23	TX
DYZHGK		10.95	0.21	0.31	14.78	0.82	0.93	DM
FDULYG		11.57	0.83	1.22	15.25	1.29	1.46	LE
H42VQE		9.94	-0.80	-1.17	12.63	-1.33	-1.49	LE
HRPR4V		9.75	-0.99	-1.45	12.15	-1.80	-2.03	IM
JPDCAV		9.65	-1.08	-1.59	12.59	-1.36	-1.53	TS
KFLB9B		10.24	-0.50	-0.73	13.44	-0.51	-0.58	LH
L7BBAU		10.70	-0.04	-0.06	14.20	0.25	0.28	LE
MCVU6G		11.30	0.56	0.82	14.32	0.36	0.41	LA
MQTZYC		10.53	-0.21	-0.31	13.75	-0.21	-0.23	XX
NL2XTQ		10.78	0.04	0.06	14.12	0.16	0.18	IR
PBYXTR		10.20	-0.54	-0.79	14.00	0.04	0.05	TB
PTUPEQ		10.40	-0.34	-0.49	13.23	-0.73	-0.82	LE
QVJECC		10.98	0.24	0.36	14.90	0.94	1.06	TX
RQ43WM		10.71	-0.03	-0.04	13.82	-0.14	-0.15	LW
TYQLR7		11.91	1.18	1.72	14.96	1.00	1.13	LI
W26HL2		11.12	0.38	0.56	13.33	-0.63	-0.71	LH
W8QDM6		10.41	-0.32	-0.48	13.38	-0.58	-0.65	TA
XLNJGZ		11.02	0.28	0.41	14.75	0.79	0.89	XX
XMJ3J2		10.22	-0.52	-0.76	13.18	-0.77	-0.87	ID

Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample NK39	Sample NK40
Grand Means	10.74 kN/m	13.96 kN/m
Stnd Dev Btwn Labs	0.68 kN/m	0.89 kN/m

Statistics based on 33 of 33 reporting participants.

Analysis Notes:

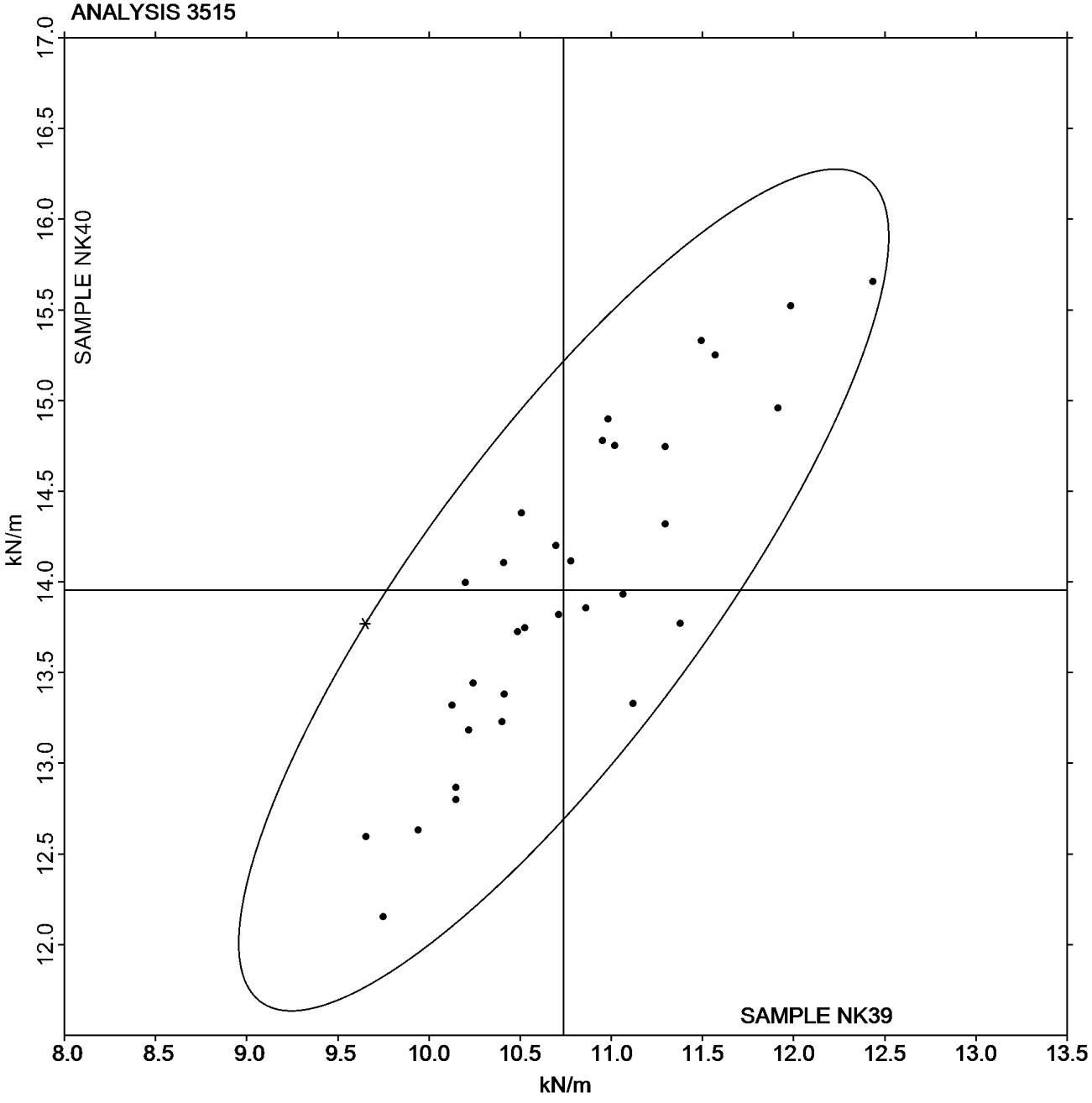
W8QDM6 - Data appear to be reported as lb/inch, not kN/m as indicated on data entry form. CTS will not correct the Units going forward.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	ID	Instron 4200 Series
IM	Instron 5500 Series	IN	Instron 3360 Series
IR	Instron 5900 Series	LA	L & W Autoline
LC	L & W Tensile - Autoline 600	LE	L & W Tensile Tester 066
LH	L & W Alwetron TH1 (Horizontal) SE 060	LI	LLoyds Instruments
LW	L & W Tensile Tester SE062	TA	Thwing-Albert Tensile Tester
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TS	TMI Horizontal Tensile Tester 84-58	TV	Thwing-Albert Vantage NX
TX	Thwing-Albert (model not specified)	XX	Instrument make/model not specified by lab

Grand Mean Sample NK39 = 10.739 kN/m

Grand Mean Sample NK40 = 13.956 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 3516

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK39 Lab Mean	Sample NK39 Diff from Grand Mean	Sample NK39 CPV	Sample NK40 Lab Mean	Sample NK40 Diff from Grand Mean	Sample NK40 CPV	Instr Code
2R2VL4		128.8	2.8	0.22	184.3	5.6	0.30	LE
3FMYGZ		130.5	4.5	0.35	178.6	-0.1	0.00	TB
4M24QC		115.2	-10.8	-0.85	172.3	-6.4	-0.34	LE
4NB94Z		121.5	-4.5	-0.35	167.0	-11.7	-0.63	LE
6ABUGB		131.0	4.9	0.39	197.0	18.3	0.98	IM
6QVHTR		144.6	18.5	1.45	192.1	13.4	0.72	LC
6UUUNR		118.4	-7.7	-0.60	177.2	-1.5	-0.08	LW
7Z6AVU		143.4	17.4	1.36	199.4	20.7	1.11	LA
AL8Q77		113.9	-12.1	-0.95	173.6	-5.1	-0.27	LE
AUWCDP		130.6	4.6	0.36	207.5	28.8	1.55	TH
BW4WY4		127.3	1.2	0.10	164.0	-14.7	-0.79	IN
CTGU8P		135.3	9.2	0.72	208.2	29.5	1.59	TV
DPVB2K		135.3	9.3	0.73	178.0	-0.7	-0.04	TX
DYZHGK	X	173.6	47.5	3.72	285.5	106.8	5.75	DM
FDULYG		146.0	20.0	1.56	215.9	37.2	2.00	LE
H42VQE		119.9	-6.1	-0.48	162.8	-15.9	-0.86	LE
HRPR4V		112.0	-14.0	-1.10	149.7	-29.0	-1.56	IM
JPDCAV		123.6	-2.5	-0.19	181.1	2.4	0.13	TS
KFLB9B		112.2	-13.8	-1.08	159.7	-19.0	-1.03	LH
MCVU6G	*	160.2	34.2	2.68	205.6	26.9	1.45	LA
MQTZYC		103.0	-23.0	-1.80	142.7	-36.0	-1.94	TH
NL2XTQ		115.0	-11.1	-0.87	164.0	-14.7	-0.79	IR
PTUPEQ		126.7	0.6	0.05	169.6	-9.1	-0.49	LE
QVJECC		135.3	9.3	0.72	178.5	-0.2	-0.01	TH
RQ43WM		114.9	-11.1	-0.87	159.1	-19.6	-1.06	LW
W26HL2		121.3	-4.8	-0.37	164.7	-14.0	-0.76	LH
W8QDM6		120.7	-5.4	-0.42	186.5	7.8	0.42	TA
XLNJGZ		116.7	-9.4	-0.74	186.0	7.3	0.39	XX

Summary Statistics	Sample NK39	Sample NK40
Grand Means	126.05 Joules/sq m	178.70 Joules/sq m
Stnd Dev Btwn Labs	12.76 Joules/sq m	18.57 Joules/sq m

Statistics based on 27 of 28 reporting participants.

Comments on Assigned Data Flags for Test #3516

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

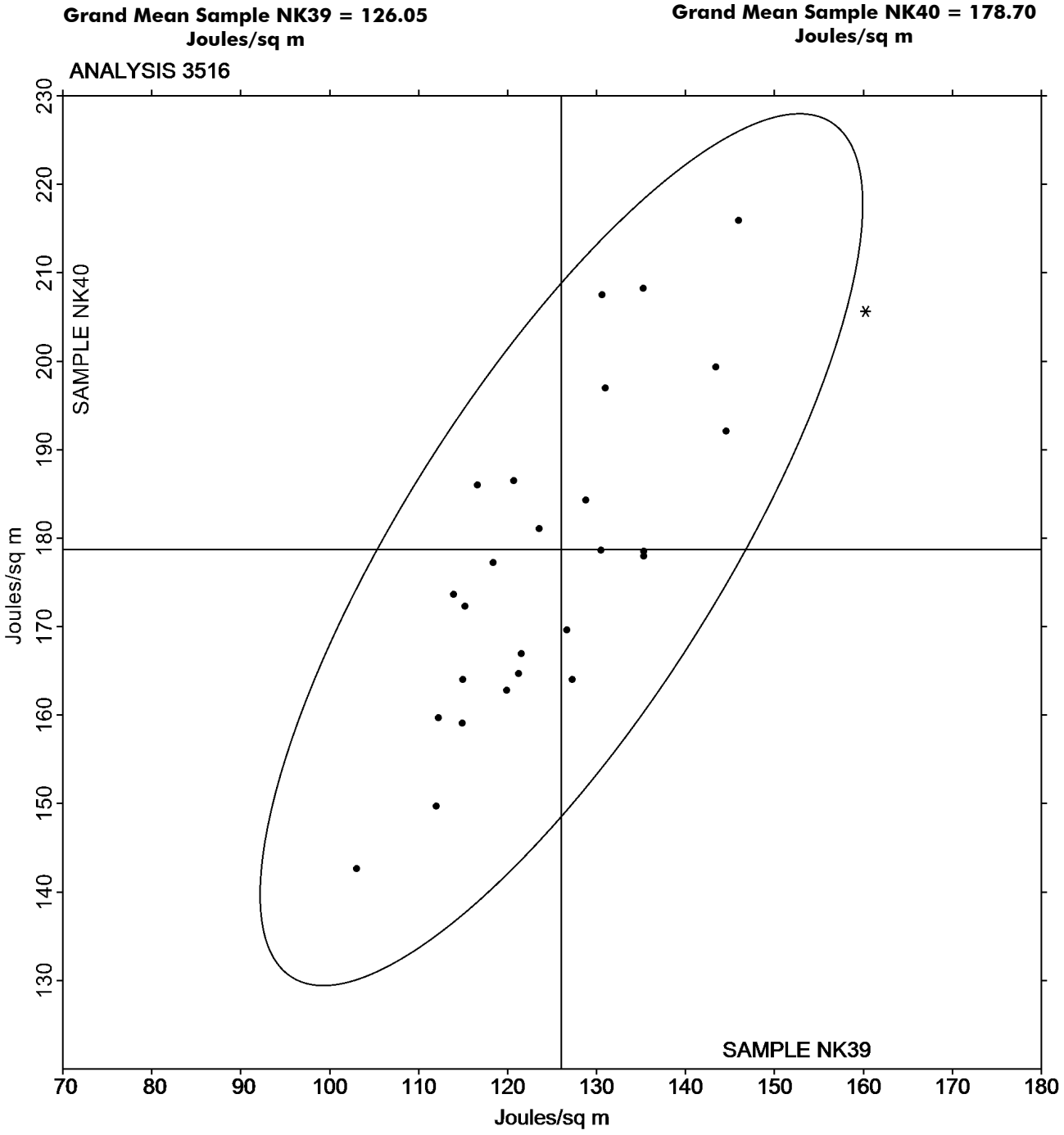
Analysis Notes:

AL8Q77 - One determination removed from the Lab Mean of Sample NK39 per Grubb's Test at 1% risk (TAPPI 1205).

W8QDM6 - 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

DM	IDM MTC-100 Tensile Tester	IM	Instron 5500 Series
IN	Instron 3360 Series	IR	Instron 5900 Series
LA	L & W Autoline	LC	L & W Tensile - Autoline 600
LE	L & W Tensile Tester 066	LH	L & W Alwetron TH1 (Horizontal) SE 060
LW	L & W Tensile Tester SE062	TA	Thwing-Albert Tensile Tester
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TS	TMI Horizontal Tensile Tester 84-58	TV	Thwing-Albert Vantage NX
TX	Thwing-Albert (model not specified)	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program

Analysis 3517

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK39 Lab Mean	Sample NK39 Diff from Grand Mean	Sample NK39 CPV	Sample NK40 Lab Mean	Sample NK40 Diff from Grand Mean	Sample NK40 CPV	Instr Code
2R2VL4		1.786	-0.079	-0.50	1.911	-0.134	-0.71	LE
3FMYGZ		1.926	0.061	0.38	2.049	0.004	0.02	XX
4M24QC		1.732	-0.133	-0.84	1.968	-0.077	-0.41	LE
4NB94Z		1.721	-0.144	-0.90	1.875	-0.170	-0.90	LE
6ABUGB		2.054	0.189	1.18	2.357	0.312	1.64	IM
6QVHTR		1.713	-0.152	-0.95	1.811	-0.234	-1.23	LC
6UUUNR		1.769	-0.096	-0.60	1.963	-0.082	-0.43	LW
7Z6AVU		1.820	-0.045	-0.28	1.937	-0.108	-0.57	XX
AL8Q77		1.660	-0.205	-1.29	1.900	-0.145	-0.77	LW
AUWCDP		2.012	0.147	0.92	2.389	0.344	1.81	TH
BW4WY4		1.794	-0.071	-0.45	1.903	-0.142	-0.75	IN
CTGU8P		2.019	0.154	0.96	2.357	0.312	1.64	TV
DPVB2K		2.073	0.208	1.30	2.165	0.120	0.63	TX
DYZHGK	X	2.538	0.672	4.21	3.068	1.023	5.39	DM
FDULYG		1.956	0.091	0.57	2.187	0.142	0.75	LE
H42VQE		1.846	-0.019	-0.12	1.980	-0.065	-0.34	LE
HRPR4V		2.108	0.243	1.52	2.225	0.180	0.95	IM
JPDCAV		2.021	0.156	0.97	2.285	0.240	1.26	TS
KFLB9B		1.750	-0.115	-0.72	1.870	-0.175	-0.92	LH
MCVU6G		2.152	0.287	1.79	2.283	0.238	1.25	LX
MQTZYC		1.675	-0.190	-1.19	1.791	-0.254	-1.34	XX
NL2XTQ		1.685	-0.180	-1.13	1.823	-0.222	-1.17	XX
PBYXTR	M	No data reported for this sample			2.117	0.072	0.38	TB
PTUPEQ		1.880	0.015	0.09	1.960	-0.085	-0.45	LE
QVJECC		2.160	0.295	1.84	2.189	0.144	0.76	LX
RQ43WM		1.675	-0.190	-1.19	1.823	-0.222	-1.17	LW
W26HL2		1.695	-0.170	-1.07	1.911	-0.134	-0.71	LX
W8QDM6		1.928	0.062	0.39	2.277	0.232	1.22	TA
XLNJGZ		1.722	-0.144	-0.90	1.960	-0.086	-0.45	XX
XMJ3J2		1.901	0.036	0.22	2.120	0.075	0.39	XX

Summary Statistics	Sample NK39	Sample NK40
Grand Means	1.87 Percent	2.05 Percent
Stnd Dev Btwn Labs	0.16 Percent	0.19 Percent

Statistics based on 28 of 30 reporting participants.

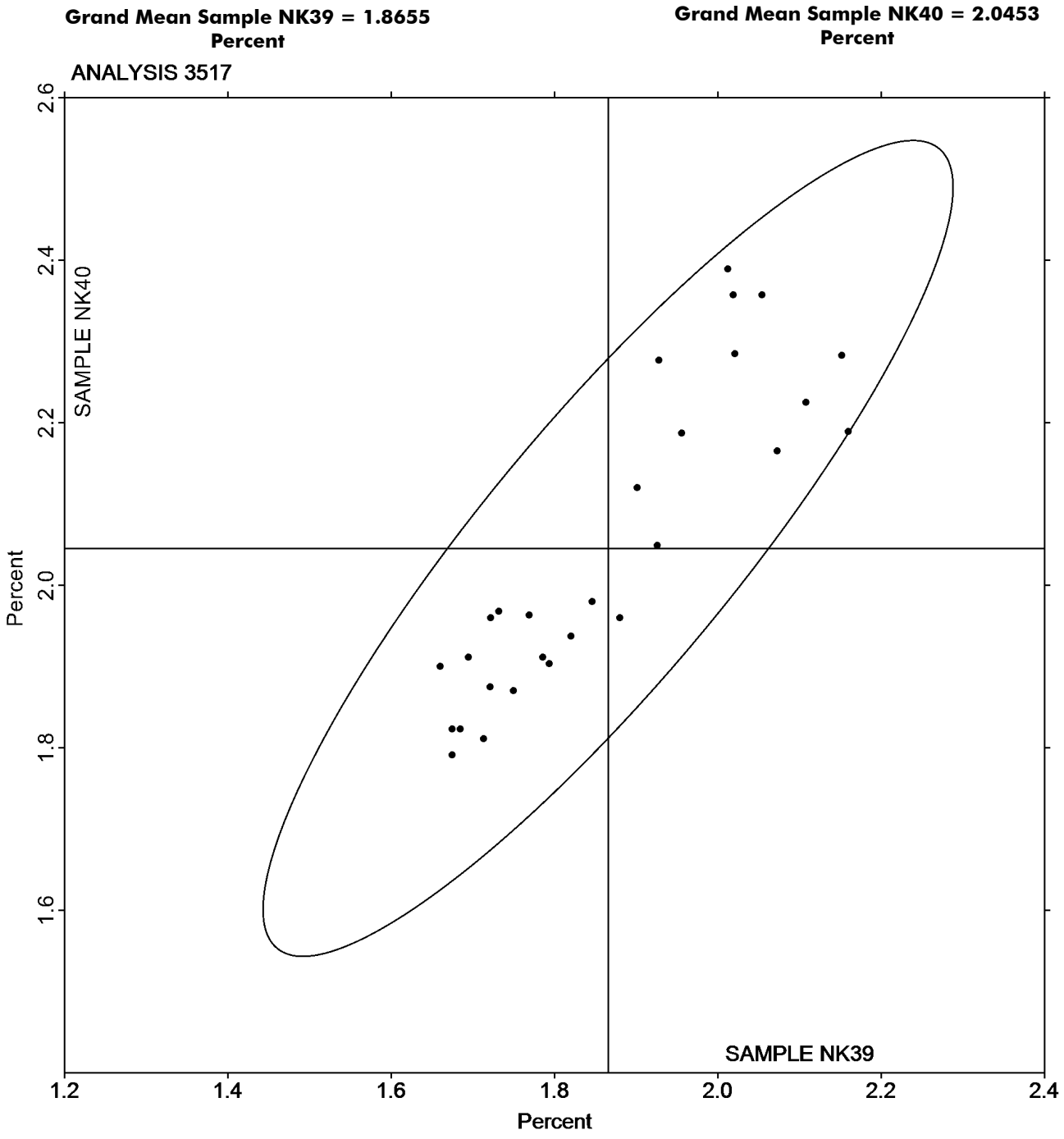
Comments on Assigned Data Flags for Test #3517

PBYXTR (M) - Participant did not submit data for sample NK39.

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

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	IM	Instron 5500 Series
IN	Instron 3360 Series	LC	L & W Tensile - Autoline 600
LE	L & W Tensile Tester 066	LH	L & W Alwetron TH1 (Horizontal) SE 060
LW	L & W Tensile Tester SE062	LX	L & W (model not specified)
TA	Thwing-Albert Tensile Tester	TB	Thwing-Albert EJA/1000
TH	Thwing-Albert QC-3A	TS	TMI Horizontal Tensile Tester 84-58
TV	Thwing-Albert Vantage NX	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		



Paper & Paperboard Interlaboratory Testing Program

Analysis 3531

Roughness - Print Surf Method - 0.5 to 4.0 Microns

TAPPI Official Test Method T555

WebCode	Data Flag	Sample PS39 Lab Mean	Sample PS39 Diff from Grand Mean	Sample PS39 CPV	Sample PS40 Lab Mean	Sample PS40 Diff from Grand Mean	Sample PS40 CPV	Instr Code
32H3VC		1.228	0.111	0.91	1.171	0.052	0.44	ZZ
3E72NZ		1.113	-0.004	-0.03	1.151	0.031	0.27	ZZ
3FMYGZ		1.080	-0.037	-0.30	1.122	0.003	0.02	ZZ
46GDRC		1.189	0.072	0.59	1.163	0.044	0.38	ZZ
4YCWVW		1.061	-0.056	-0.46	1.075	-0.044	-0.38	ZZ
6DB3PR		1.124	0.007	0.06	1.125	0.006	0.05	ZZ
6QVHTR		1.044	-0.073	-0.59	1.071	-0.048	-0.42	ZZ
6UUUNR		1.007	-0.110	-0.90	1.029	-0.090	-0.78	ZZ
6VQCQT		1.041	-0.076	-0.62	1.088	-0.031	-0.27	ZZ
AUWCDP		1.108	-0.009	-0.07	1.090	-0.029	-0.25	ZZ
C3P6YN		1.240	0.123	1.00	1.269	0.150	1.29	ZZ
FDULYG		1.104	-0.013	-0.11	1.112	-0.008	-0.06	ZZ
HD8WPK		1.116	-0.001	-0.01	1.088	-0.031	-0.27	ZZ
JALCKG		1.131	0.014	0.11	1.183	0.064	0.55	ZZ
JPDCAV		1.243	0.126	1.03	1.211	0.091	0.79	ZZ
JRG66E		1.111	-0.006	-0.05	1.118	-0.002	-0.01	ZZ
M473KA		1.171	0.054	0.44	1.162	0.042	0.37	ZZ
MUFK6F		1.200	0.083	0.68	1.170	0.050	0.44	ZZ
MVB37G	*	0.717	-0.400	-3.26	0.720	-0.400	-3.45	ZZ
U3LUC8		1.369	0.252	2.05	1.352	0.233	2.01	ZZ
YZ472H		1.040	-0.077	-0.63	1.030	-0.089	-0.77	ZZ
ZG69G2		1.135	0.018	0.15	1.129	0.010	0.08	ZZ

Summary Statistics	Sample PS39	Sample PS40
Grand Means	1.12 Microns	1.12 Microns
Stnd Dev Btwn Labs	0.12 Microns	0.12 Microns

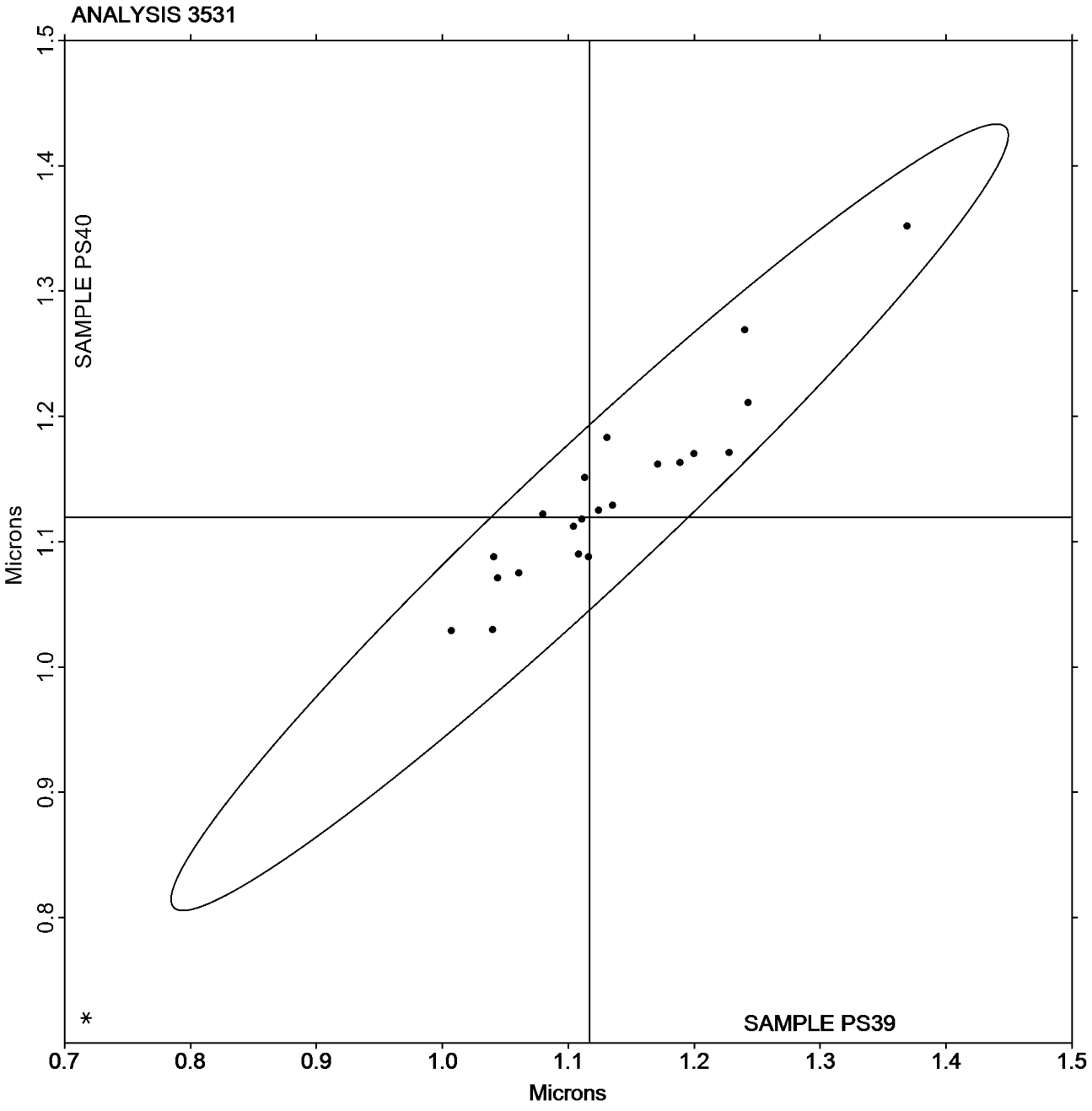
Statistics based on 22 of 22 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample PS39 = 1.1169 Microns

Grand Mean Sample PS40 = 1.1195 Microns



Paper & Paperboard Interlaboratory Testing Program

Analysis 3545
Directional Brightness
TAPPI Official Test Method T452

WebCode	Data Flag	Sample BR39 Lab Mean	Sample BR39 Diff from Grand Mean	Sample BR39 CPV	Sample BR40 Lab Mean	Sample BR40 Diff from Grand Mean	Sample BR40 CPV	Instr Code
3B8N2B		78.19	2.04	0.56	78.10	2.13	0.58	TT
3NWMRD	X	75.91	-0.24	-0.07	66.28	-9.69	-2.66	XX
46GDRC		75.34	-0.81	-0.22	75.35	-0.62	-0.17	PP
4YCWVW		77.64	1.49	0.41	77.68	1.71	0.47	HG
6DB3PR		78.72	2.57	0.71	78.71	2.73	0.75	TP
6UUUNR		78.26	2.11	0.59	77.44	1.46	0.40	TP
AUWCDP		76.10	-0.05	-0.01	75.98	0.00	0.00	TP
BR9323		77.98	1.83	0.51	77.48	1.51	0.41	TP
CY2VM2		71.46	-4.69	-1.30	71.57	-4.41	-1.21	LA
FDULYG		80.05	3.90	1.08	79.83	3.85	1.06	HG
FRWV3Q		79.26	3.11	0.86	79.40	3.43	0.94	TP
JPDCAV		75.89	-0.26	-0.07	75.83	-0.14	-0.04	TS
JRG66E	*	64.44	-11.71	-3.24	64.69	-11.28	-3.10	TD
M473KA		79.95	3.80	1.05	79.68	3.71	1.02	HG
MA9AZC	*	71.18	-4.97	-1.38	69.64	-6.33	-1.74	TP
MVB37G		76.46	0.31	0.08	76.23	0.25	0.07	HZ
PBYXTR		76.44	0.29	0.08	76.69	0.71	0.20	XD
RQ43WM		76.52	0.37	0.10	76.16	0.19	0.05	TS
XLNJGZ		77.63	1.48	0.41	77.88	1.91	0.52	XX
Y9XA8Z		75.60	-0.55	-0.15	75.41	-0.56	-0.15	TS
ZG69G2		75.89	-0.26	-0.07	75.74	-0.24	-0.06	TP

Summary Statistics	Sample BR39	Sample BR40
Grand Means	76.15 Percent	75.97 Percent
Stnd Dev Btwn Labs	3.61 Percent	3.64 Percent

Statistics based on 20 of 21 reporting participants.

Comments on Assigned Data Flags for Test #3545

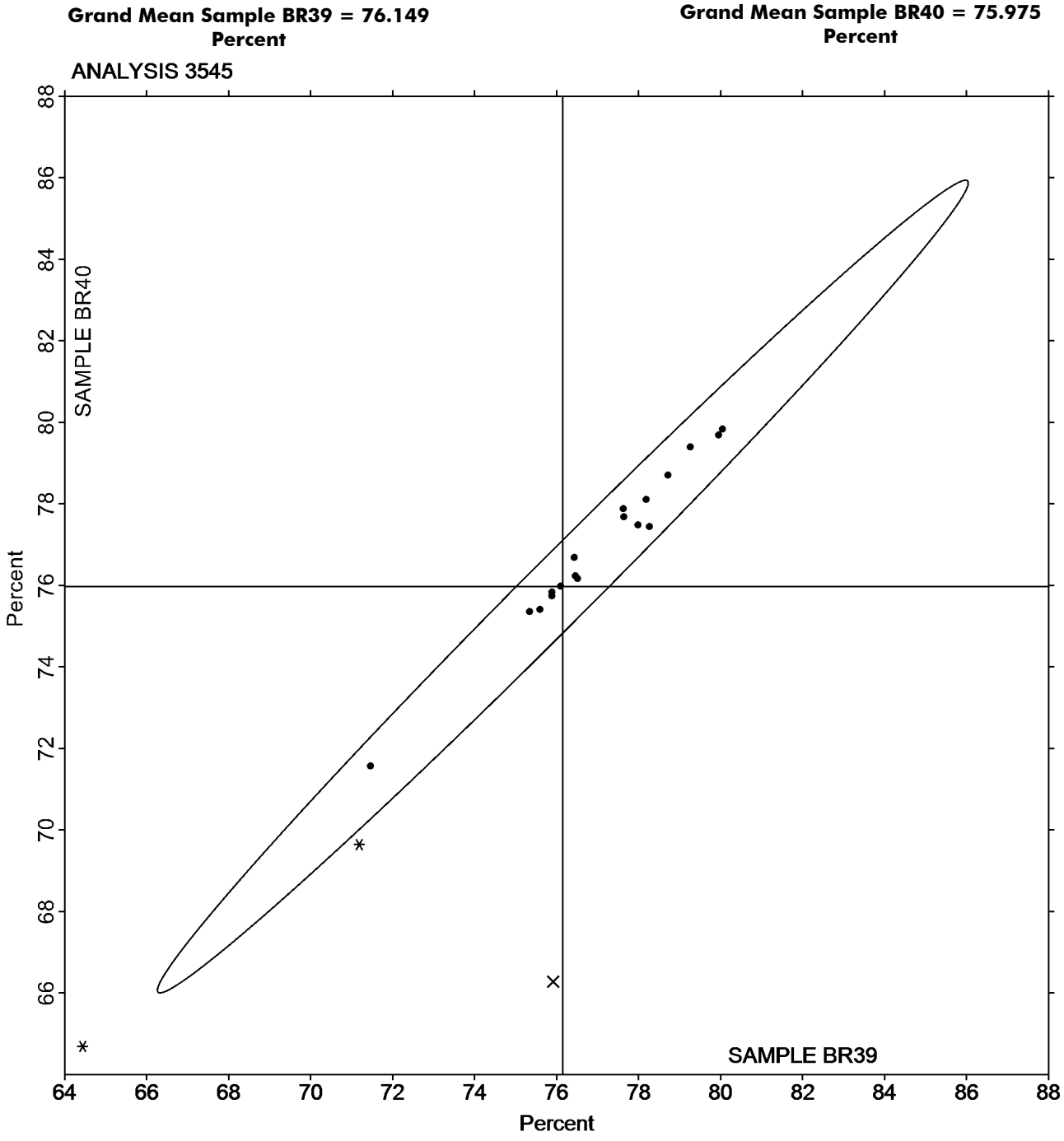
3NWMRD (X) - Data for sample BR40 are low. Inconsistent within the determinations of sample BR40.

Analysis Notes:

Y9XA8Z - One determination removed from the Lab Mean of Sample BR39 per Grubb's Test at 1% risk (TAPPI 1205).

Key to Instrument Codes Reported by Participants

HG	Hunter Labscan / XE	HZ	Hunter Lab ColorFlex EZ Series
LA	L & W Elrepho - Autoline	PP	Technidyne Profile/Plus
TD	Technidyne Color Touch 45X	TP	Technidyne Test/Plus
TS	Technidyne Brightimeter Micro S-5	TT	Technidyne Brightimeter Micro S4-M
XD	X-Rite Color Ci7600	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program

Analysis 3547
Diffuse Brightness
TAPPI Official Test Method T525

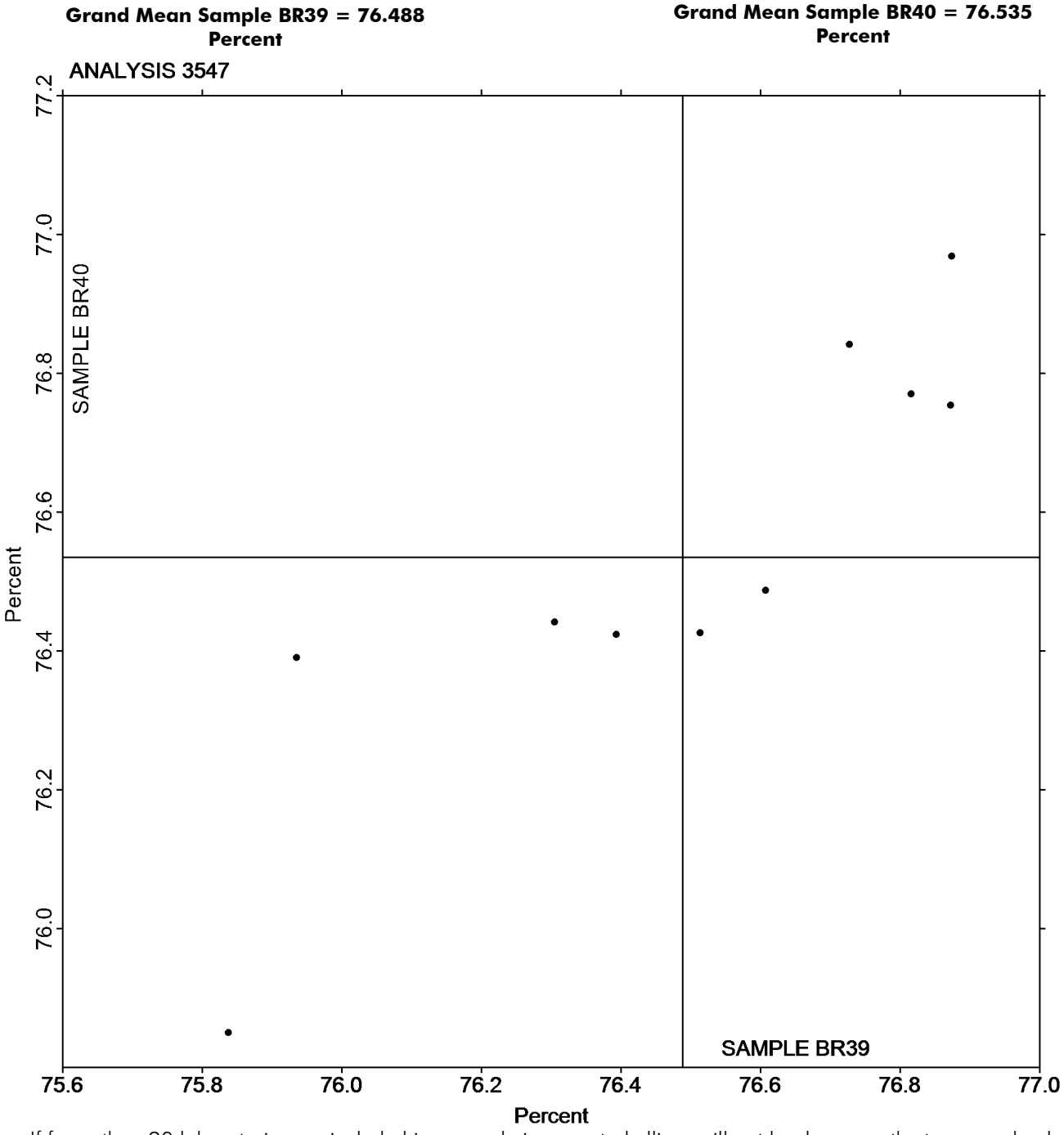
WebCode	Data Flag	Sample BR39 Lab Mean	Sample BR39 Diff from Grand Mean	Sample BR39 CPV	Sample BR40 Lab Mean	Sample BR40 Diff from Grand Mean	Sample BR40 CPV	Instr Code
32H3VC		76.73	0.24	0.64	76.84	0.31	0.96	TC
4YCWVW		76.31	-0.18	-0.49	76.44	-0.09	-0.30	TC
6DB3PR		75.94	-0.55	-1.49	76.39	-0.15	-0.46	TC
6UUUNR		76.39	-0.09	-0.25	76.42	-0.11	-0.35	EA
7G4L3A		76.87	0.38	1.03	76.75	0.22	0.69	XX
AL8Q77		76.61	0.12	0.32	76.49	-0.05	-0.15	LT
AUWCDP		75.84	-0.65	-1.75	75.85	-0.69	-2.15	LT
JPDCAV		76.87	0.39	1.04	76.97	0.43	1.36	LT
JZBBYF		76.82	0.33	0.88	76.77	0.23	0.74	LE
ZEHPBX		76.51	0.03	0.07	76.43	-0.11	-0.34	LA

Summary Statistics	Sample BR39	Sample BR40
Grand Means	76.49 Percent	76.54 Percent
Stnd Dev Btwn Labs	0.37 Percent	0.32 Percent

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

EA	Datacolor Elrepho	LA	L & W Elrepho - Autoline
LE	L & W Elrepho	LT	L & W Elrepho SE 071
TC	Technidyne Color Touch Series	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

Report #4352, April 2025

Analysis 3549

Color & Color Difference - Near White Papers - C/2deg obs

Hunter L,a,b - Illuminant C - 2 Degree Observer

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L	a	b	Color Difference Values ΔL	Δa	Δb	ΔE	Instr Code
46GDRC		CA39	86.96	0.16	0.02	-0.10	0.06	-0.22	0.25	TC
		CA40	86.86	0.23	-0.20					
4YCWVW		CA39	87.51	0.74	-0.33	-0.24	0.08	-0.24	0.35	HK
		CA40	87.27	0.81	-0.58					
6DB3PR		CA39	86.97	0.17	-0.05	-0.12	0.10	-0.31	0.34	TC
		CA40	86.85	0.27	-0.36					
7G4L3A		CA39	89.70	-0.53	-0.14	0.00	0.02	-0.08	0.08	TC
		CA40	89.71	-0.52	-0.21					
9UMQPX		CA39	89.64	0.56	-0.46	0.02	0.00	0.05	0.05	TC
		CA40	89.66	0.56	-0.42					
C3P6YN		CA39	89.62	0.30	-0.34	0.07	-0.02	0.07	0.10	TC
		CA40	89.69	0.29	-0.27					
CY2VM2		CA39	86.92	-0.49	0.26	0.02	0.00	0.02	0.02	XX
		CA40	86.94	-0.49	0.28					
FDULYG		CA39	87.64	0.73	-0.58	-0.07	0.05	-0.15	0.18	HK
		CA40	87.57	0.78	-0.74					
HD8WPK		CA39	88.63	0.82	-0.93	-0.16	0.02	-0.09	0.18	TC
		CA40	88.47	0.85	-1.02					
JPDCAV		CA39	85.65	2.08 *	-1.16	-0.23	0.07	-0.36	0.43	TS
		CA40	85.42	2.15	-1.52					
JRG66E		CA39	79.94 *	0.43	-0.88	0.11	0.00	0.03	0.11	TC
		CA40	80.05	0.43	-0.85					
LPQHNB		CA39	89.75	-0.39	0.24	-0.19	0.08	-0.31	0.37	NH
		CA40	89.56	-0.31	-0.07					
M473KA		CA39	87.06	0.66	-0.61	0.20	-0.09	0.28	0.36	HK
		CA40	87.26	0.57	-0.34					
MUFK6F		CA39	85.46	0.80	-1.06	-0.34	0.08	-0.14	0.38	TC
		CA40	85.12	0.88	-1.20					
TR7K9M		CA39	86.04	1.78	-0.66	0.05	-0.10	0.27	0.29	TS
		CA40	86.09	1.68	-0.39					
XLNJGZ		CA39	90.24	0.28	-0.29	-0.01	0.02	-0.08	0.08	XX
		CA40	90.23	0.30	-0.37					

Paper & Paperboard Interlaboratory Testing Program

Analysis 3549

Color & Color Difference - Near White Papers - C/2deg obs

Hunter L,a,b - Illuminant C - 2 Degree Observer

Summary Statistics

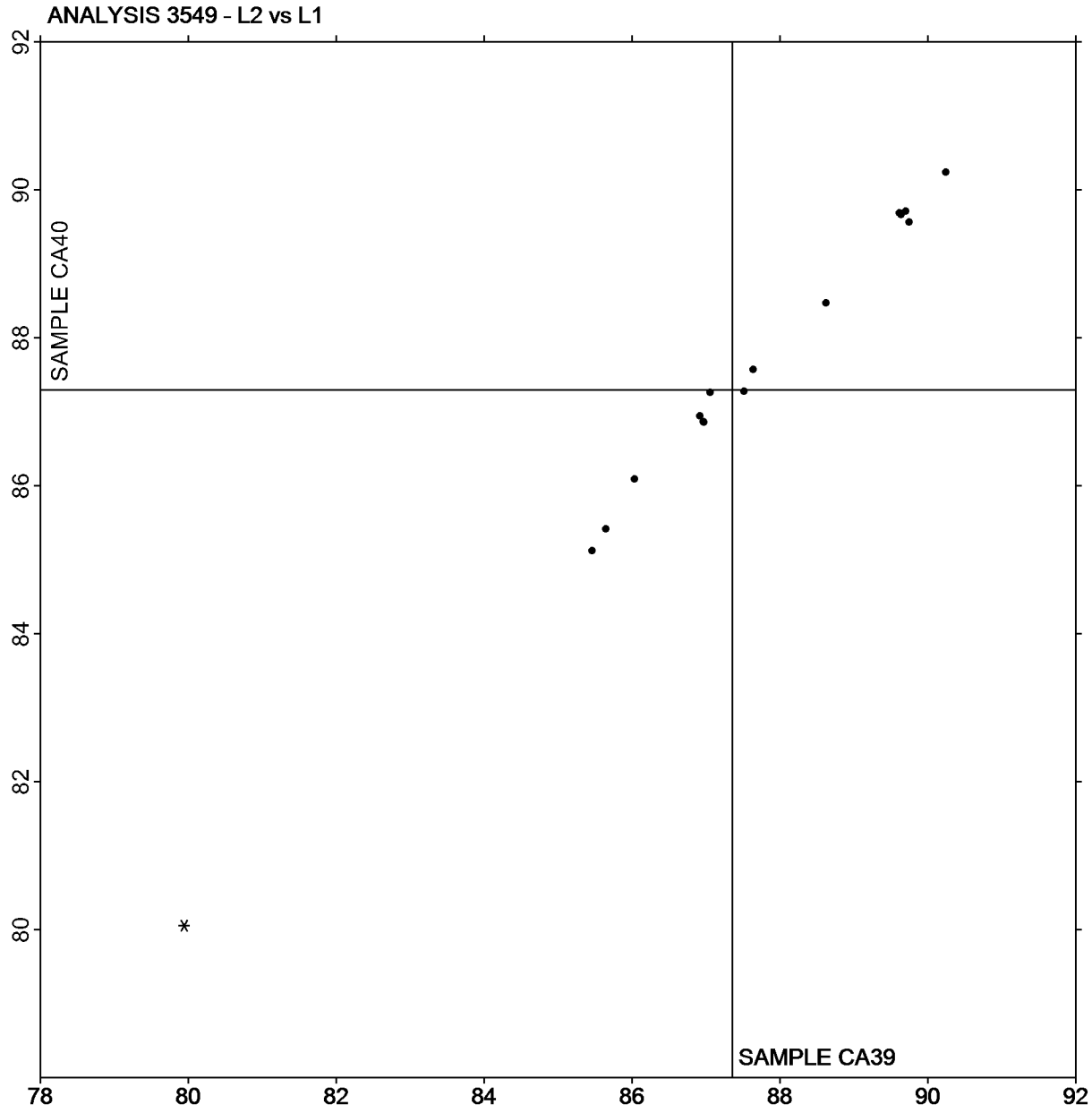
Grand Means							
CA39	87.358	0.507	-0.436	-0.060	0.024	-0.079	0.224
CA40	87.298	0.530	-0.515				
Stnd Dev Btwn Labs							
CA39	2.522	0.713	0.439	0.145	0.058	0.191	0.138
CA40	2.517	0.704	0.454				

Statistics based on 16 of 16 reporting participants

Key to Instrument Codes Reported by Participants

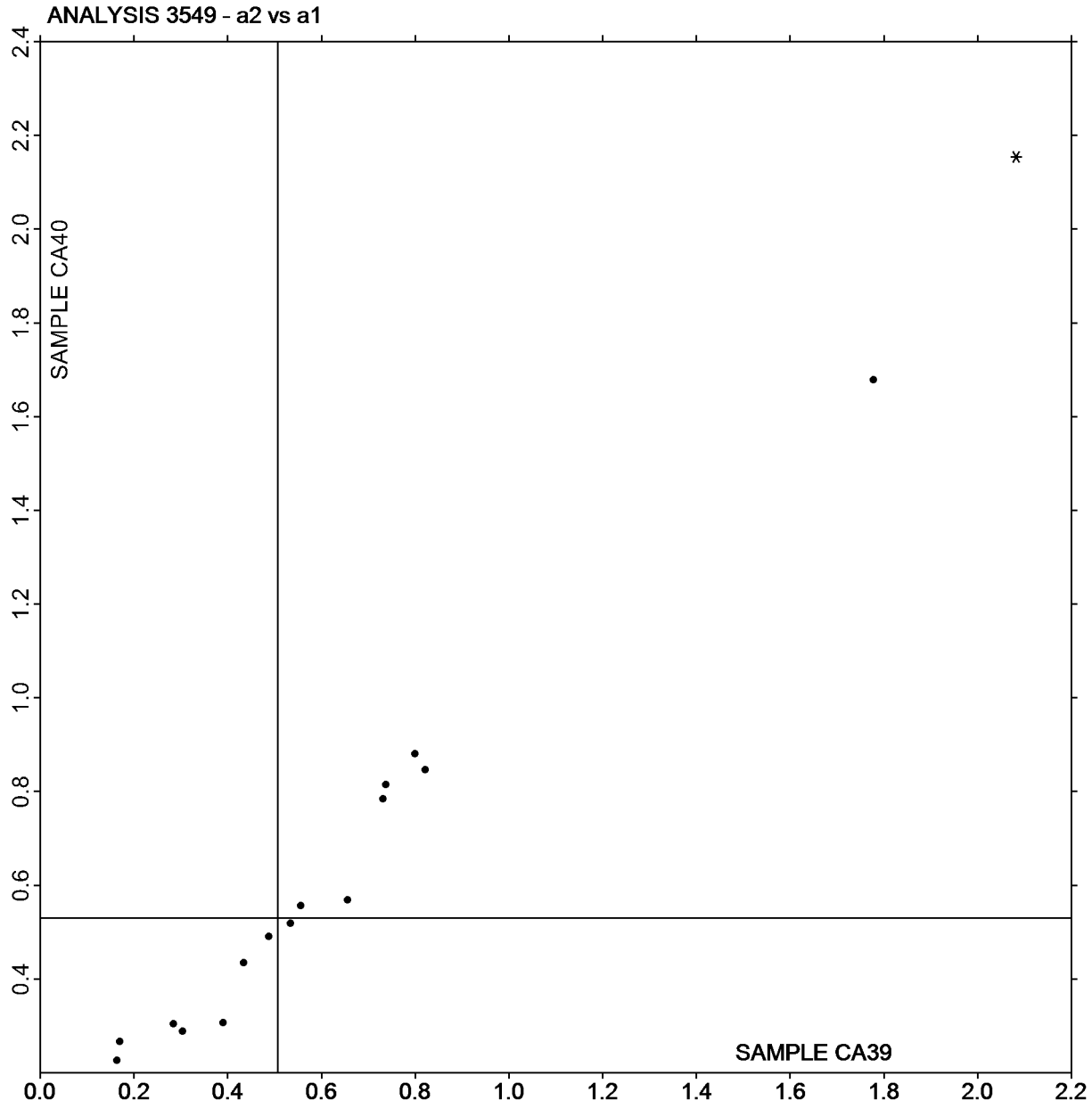
HK	Hunter LabScan XE	NH	Minolta CM-3700A Spectrophotometer
TC	Technidyne Color Touch Series	TS	Technidyne Brightimeter Micro S-5
XX	Instrument make/model not specified by lab		

Plot of L values CA40 vs L values CA39



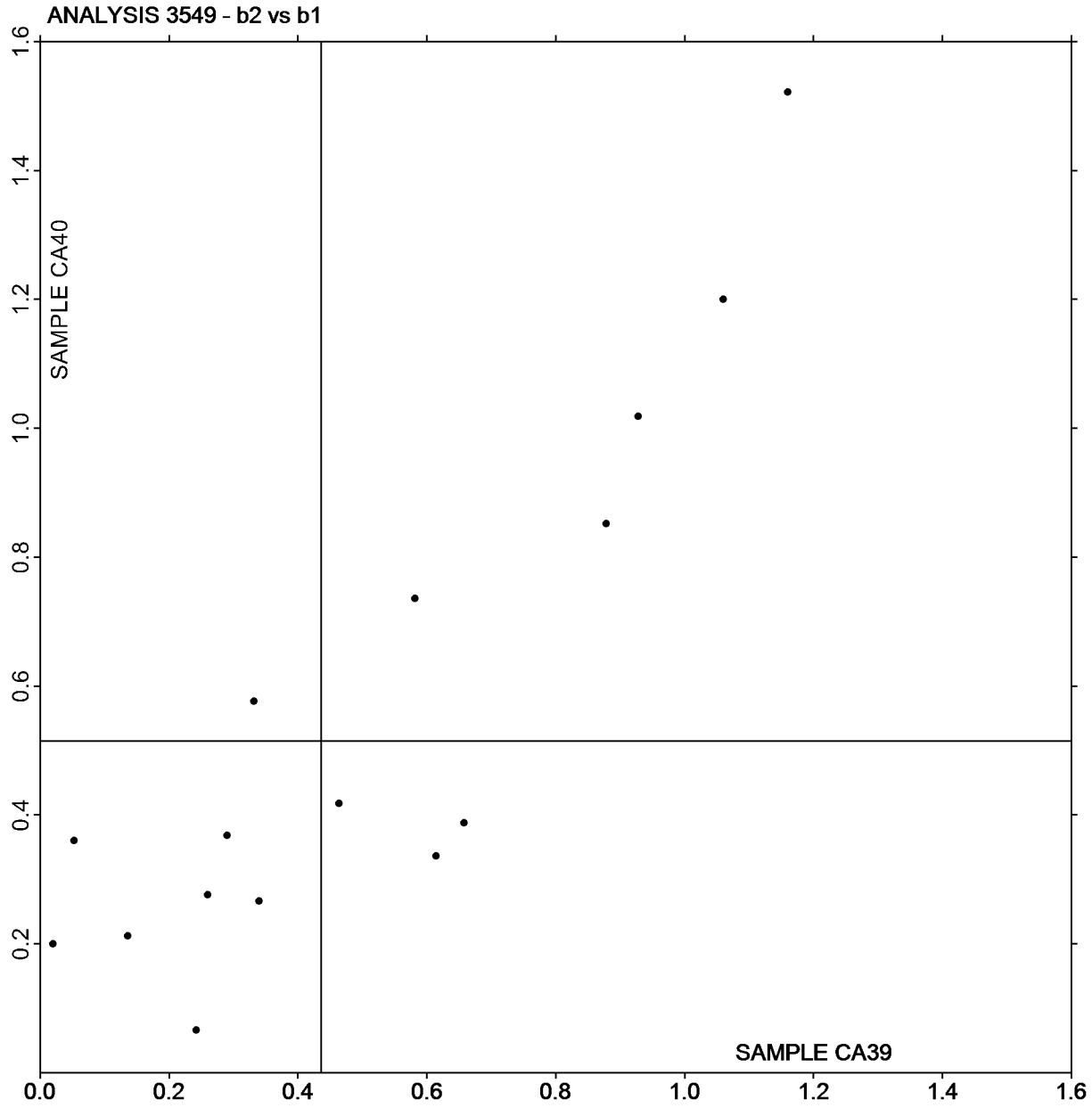
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA40 vs a values CA39



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

Plot of b values CA40 vs b values CA39



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

Paper & Paperboard Interlaboratory Testing Program

Report #4352, April 2025

Analysis 3551

Color & Color Difference - Near White Papers - D65/10deg obs

Hunter L,a,b - Illuminant D65 - 10 Degree Observer

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L	a	b	Color Difference Values ΔL	Δa	Δb	ΔE	Instr Code
3B8N2B		**CA39**	90.21	-0.20	1.12	-0.04	-0.02	0.06	0.07	XB
		CA40	90.17	-0.22	1.18					
4YCWVW		**CA39**	87.01	-0.63	0.12	-0.14	0.07	-0.39	0.42	TC
		CA40	86.87	-0.55	-0.27					
6UUUNR		**CA39**	89.62	-0.53	0.02	0.13	-0.02	0.31	0.34	EG
		CA40	89.75	-0.56	0.34					
8987RW		**CA39**	89.82	-0.48	0.46	-0.03	0.02	-0.14	0.15	NH
		CA40	89.79	-0.46	0.31					
AL8Q77		**CA39**	89.64	0.29	-0.34	-0.18	0.13	-0.44	0.50	LS
		CA40	89.46	0.43	-0.78					
AUWCDP		**CA39**	89.79	-0.48	-0.04	-0.13	-0.01	-0.01	0.13	LT
		CA40	89.66	-0.49	-0.05					
HKNDKF		**CA39**	90.00	-0.53	0.10	0.02	0.00	0.02	0.03	XX
		CA40	90.02	-0.53	0.12					
J6RD7L		**CA39**	89.82	-0.58	-0.02	0.17	0.16	-0.15	0.27	TC
		CA40	89.99	-0.42	-0.17					
TMW646		**CA39**	90.31	-0.44	-0.16	0.04	0.05	-0.06	0.09	NF
		CA40	90.35	-0.39	-0.21					
UG7AE7		**CA39**	89.72	-0.56	0.11	0.17	-0.01	0.16	0.23	XX
		CA40	89.89	-0.57	0.27					
ZG69G2		**CA39**	87.92	-0.55	0.06	-0.04	0.03	-0.10	0.11	HL
		CA40	87.88	-0.52	-0.03					

Summary Statistics

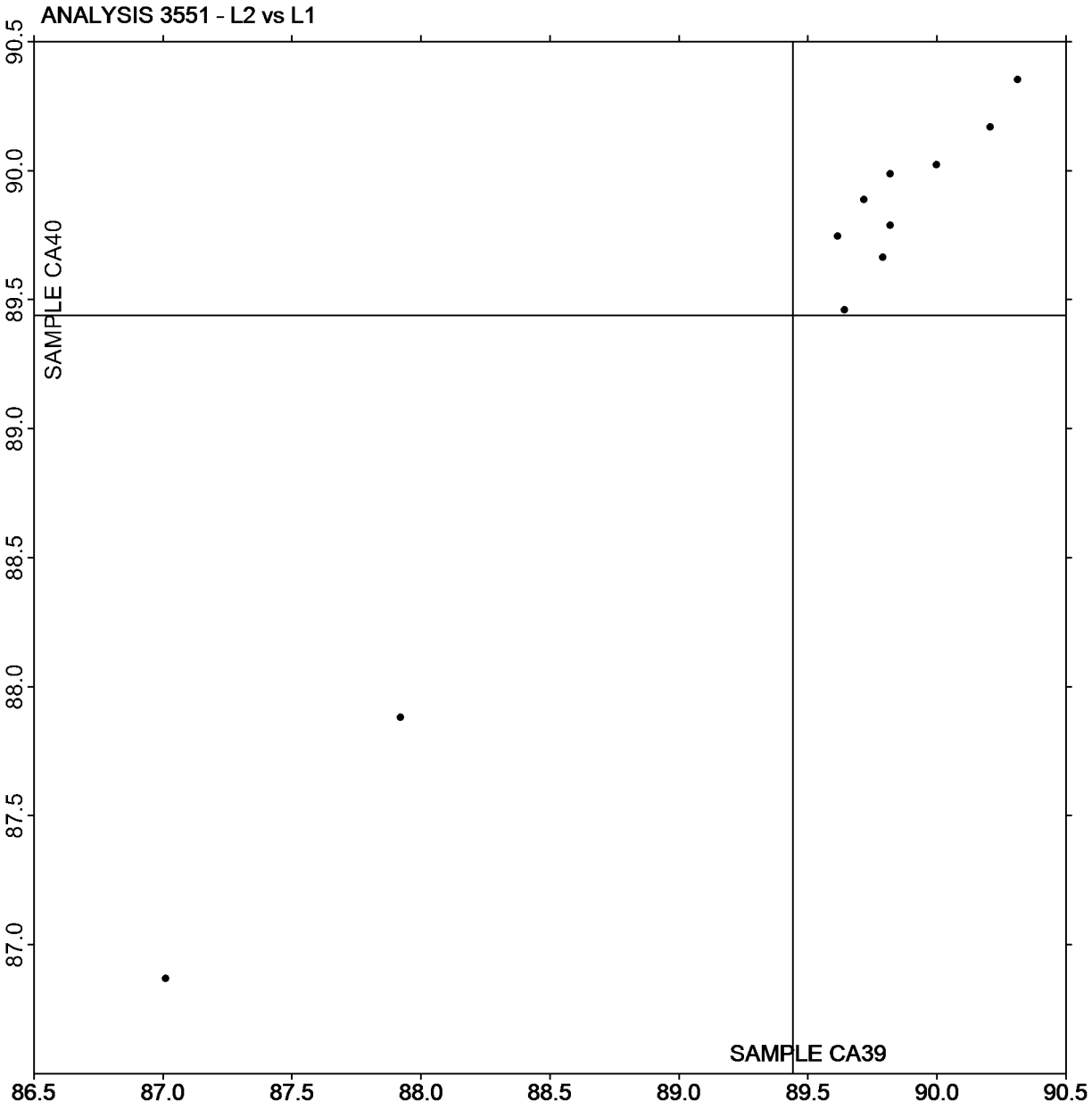
Grand Means							
CA39	89.441	-0.425	0.131	-0.002	0.037	-0.066	0.213
CA40	89.439	-0.389	0.065				
Stnd Dev Btwn Labs							
CA39	1.021	0.263	0.383	0.122	0.062	0.219	0.153
CA40	1.073	0.288	0.492				

Statistics based on 11 of 11 reporting participants

Key to Instrument Codes Reported by Participants

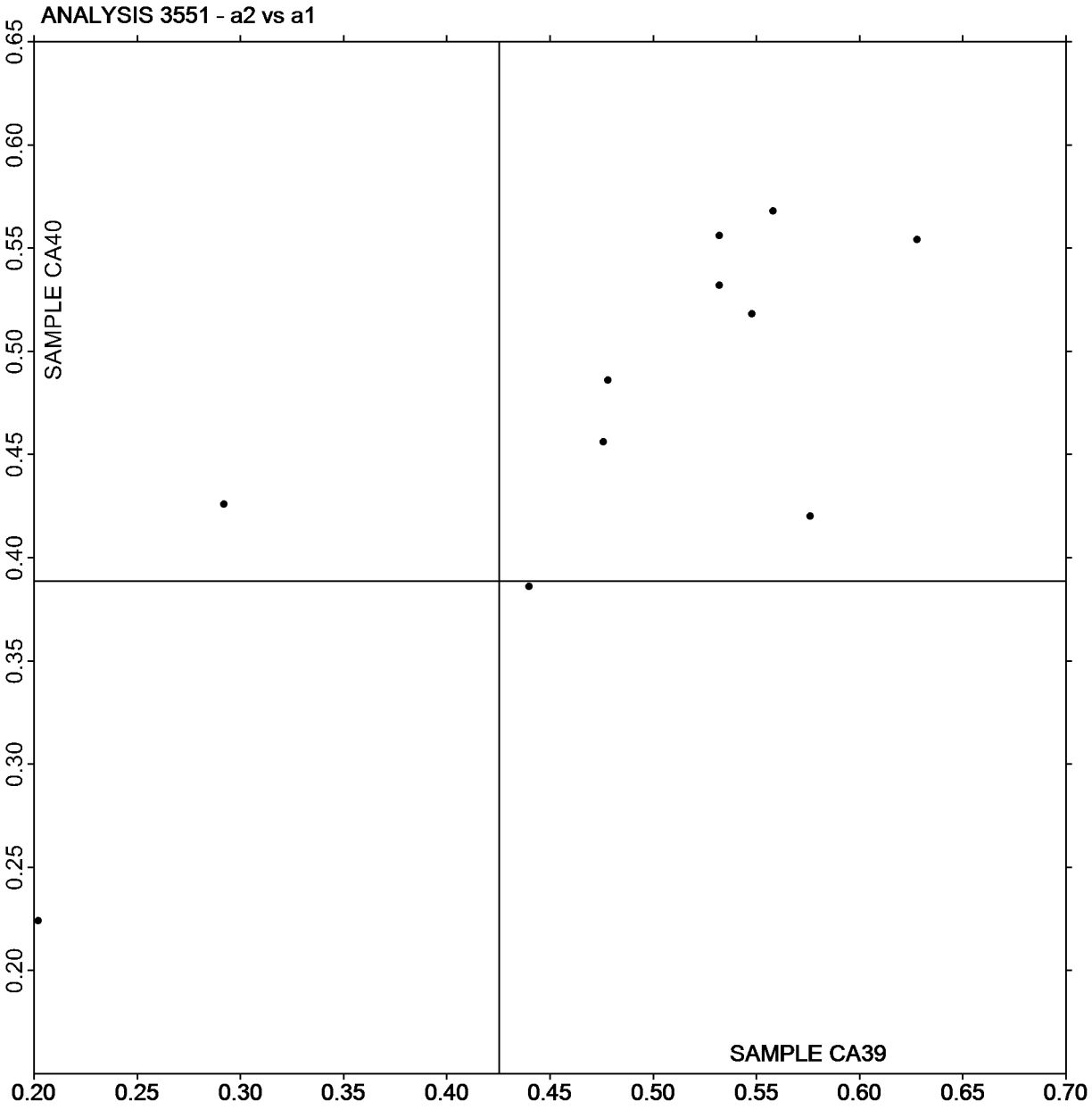
EG	Datacolor Elrepho	HL	Hunter Agera
LS	L & W Elrepho SE 070	LT	L & W Elrepho SE 071
NF	Minolta CM-3600d Spectrophotometer	NH	Minolta CM-3700A Spectrophotometer
TC	Technidyne Color Touch Series	XB	X-Rite Ci7
XX	Instrument make/model not specified by lab		

Plot of L values CA40 vs L values CA39



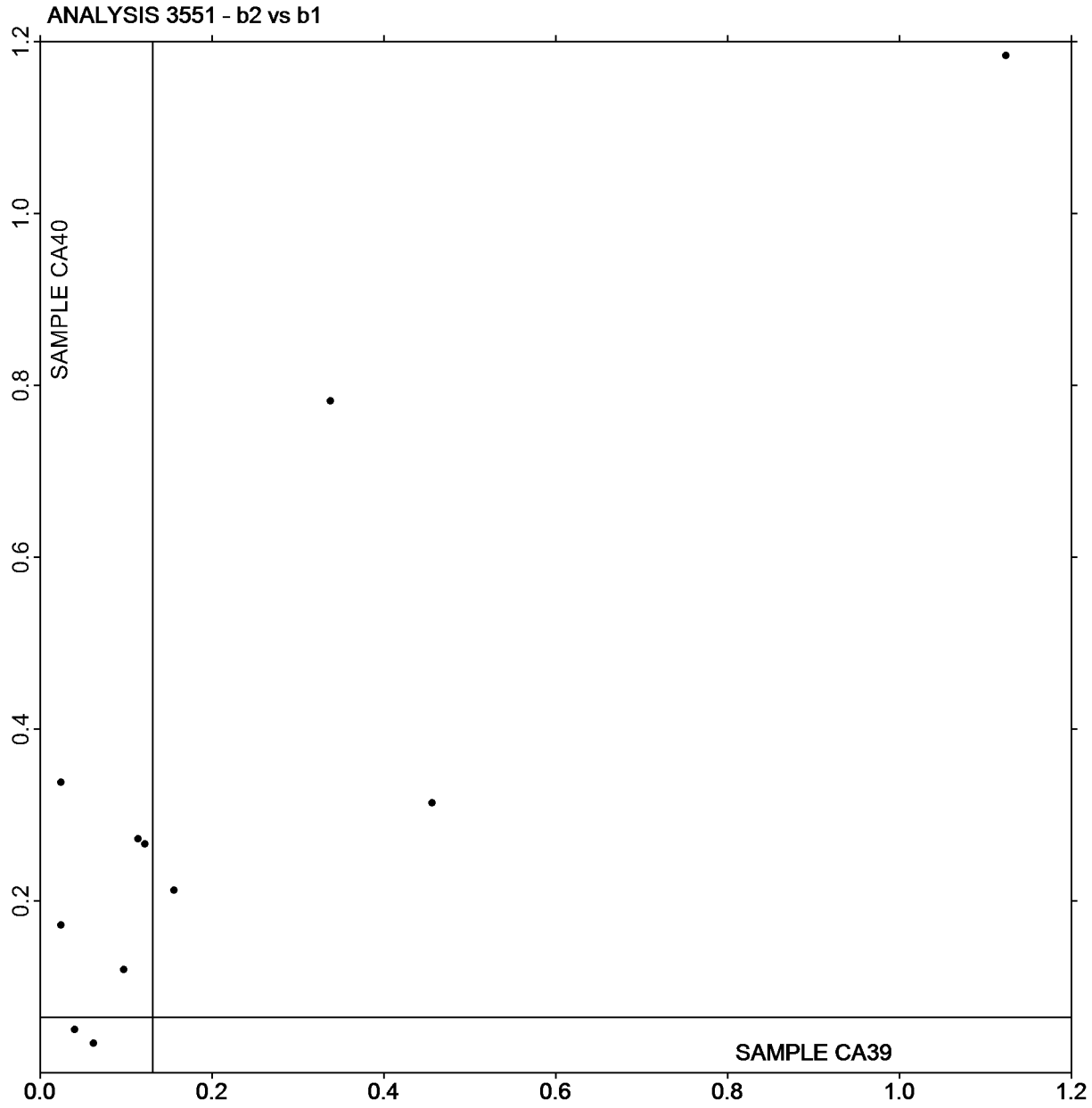
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA40 vs a values CA39



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

Plot of b values CA40 vs b values CA39



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 3553

Specular Gloss at 75 Degrees - High Range

TAPPI Official Test Method T480

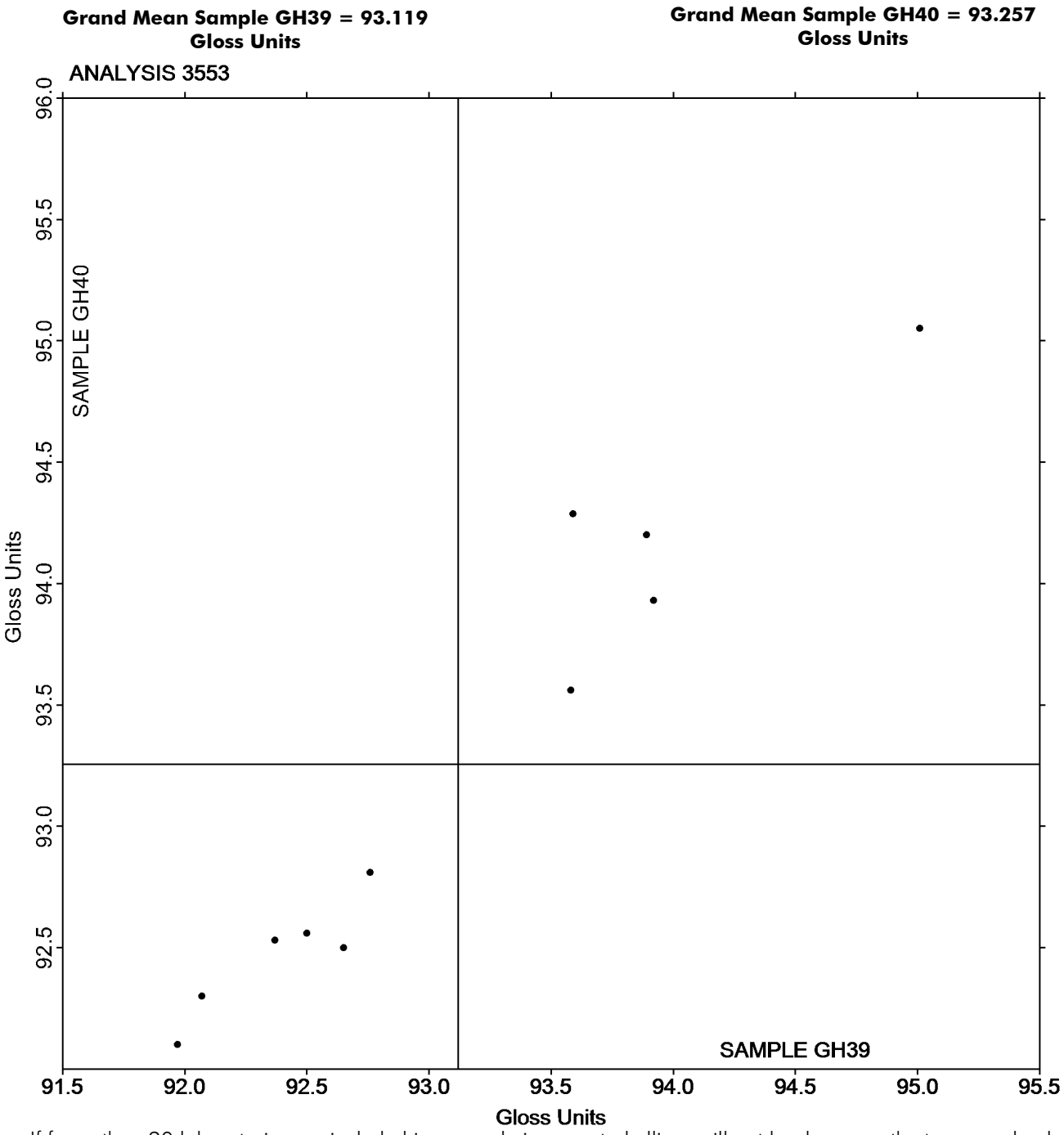
WebCode	Data Flag	Sample GH39 Lab Mean	Sample GH39 Diff from Grand Mean	Sample GH39 CPV	Sample GH40 Lab Mean	Sample GH40 Diff from Grand Mean	Sample GH40 CPV	Instr Code
46GDRC		93.89	0.77	0.81	94.20	0.94	0.96	PP
6DB3PR		92.76	-0.36	-0.38	92.81	-0.45	-0.45	GM
6QVHTR		93.58	0.46	0.49	93.56	0.30	0.31	LG
6UUUNR		93.59	0.47	0.50	94.29	1.03	1.04	TH
AUWCDP		92.07	-1.05	-1.11	92.30	-0.96	-0.97	GA
C3P6YN		92.37	-0.75	-0.79	92.53	-0.73	-0.74	LF
FDULYG		92.50	-0.62	-0.65	92.56	-0.70	-0.71	PP
JALCKG		95.01	1.89	2.00	95.05	1.79	1.82	LF
M473KA		91.97	-1.15	-1.21	92.10	-1.16	-1.17	TP
MQF99F		92.65	-0.47	-0.50	92.50	-0.76	-0.77	GM
YZ472H		93.92	0.80	0.85	93.93	0.67	0.68	VM

Summary Statistics	Sample GH39	Sample GH40
Grand Means	93.12 Gloss Units	93.26 Gloss Units
Stnd Dev Btwn Labs	0.95 Gloss Units	0.99 Gloss Units

Statistics based on 11 of 11 reporting participants.

Key to Instrument Codes Reported by Participants

GA	BYK-Gardner (model not specified)	GM	BYK-Gardner micro-gloss
LF	L & W Autoline 400	LG	L & W Autoline 600
PP	Technidyne Profile/Plus	TH	Technidyne T480A
TP	Technidyne Profile Plus	VM	Valmet PaperLab (was Kajaani/Robotest)



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 3555

Specular Gloss at 75 Degrees - Low Range

TAPPI Official Test Method T480

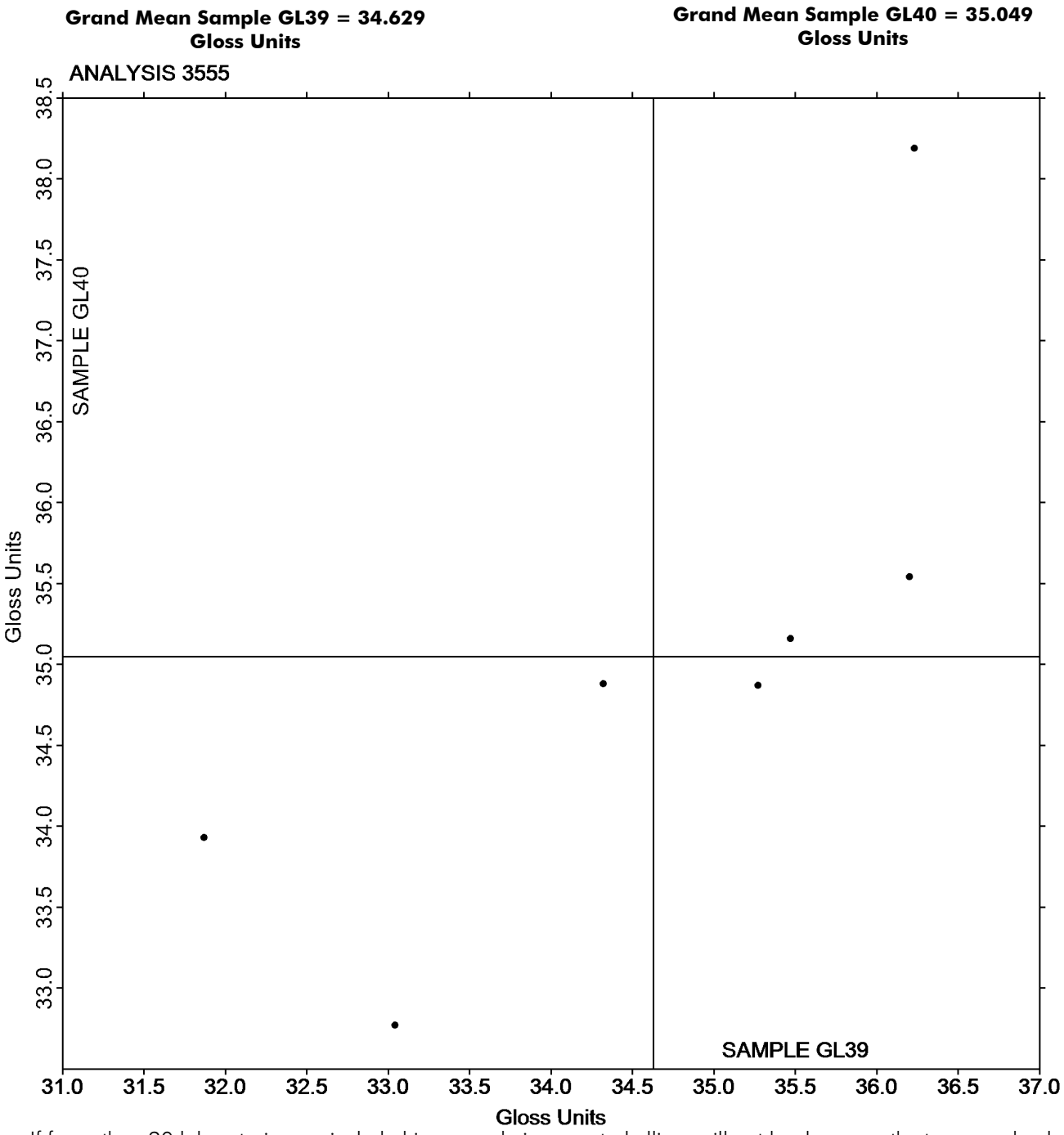
WebCode	Data Flag	Sample GL39 Lab Mean	Sample GL39 Diff from Grand Mean	Sample GL39 CPV	Sample GL40 Lab Mean	Sample GL40 Diff from Grand Mean	Sample GL40 CPV	Instr Code
3B8N2B		36.20	1.57	0.95	35.54	0.49	0.30	TH
4NB94Z		35.27	0.64	0.39	34.87	-0.18	-0.11	GM
4YCWVW		36.23	1.60	0.97	38.19	3.14	1.89	PP
MVB37G		34.32	-0.31	-0.19	34.88	-0.17	-0.10	GS
PBYXTR		33.04	-1.59	-0.96	32.77	-2.28	-1.37	TH
TR7K9M		35.47	0.84	0.51	35.16	0.11	0.07	TP
X64TH2		31.87	-2.76	-1.67	33.93	-1.12	-0.67	WJ

Summary Statistics	Sample GL39	Sample GL40
Grand Means	34.63 Gloss Units	35.05 Gloss Units
Stnd Dev Btwn Labs	1.65 Gloss Units	1.66 Gloss Units

Statistics based on 7 of 7 reporting participants.

Key to Instrument Codes Reported by Participants

GM	BYK-Gardner micro-gloss	GS	BYK-Gardner Glossgard II
PP	Technidyne Profile/Plus	TH	Technidyne T480A
TP	Technidyne Profile Plus	WJ	Zehntner ZLR 1020



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 3601

Folding Endurance (MIT) - Double Folds

TAPPI Official Test Method T511

WebCode	Data Flag	Sample MT39 Lab Mean	Sample MT39 Diff from Grand Mean	Sample MT39 CPV	Sample MT40 Lab Mean	Sample MT40 Diff from Grand Mean	Sample MT40 CPV	Instr Code
3B8N2B		37.20	-15.78	-1.22	35.90	-14.95	-1.18	MT
6ABUGB		41.50	-11.48	-0.88	38.50	-12.35	-0.98	MT
6UUUNR		59.80	6.82	0.53	56.90	6.05	0.48	MT
AUWCDP		39.50	-13.48	-1.04	37.90	-12.95	-1.02	MT
CQC8UK		78.60	25.62	1.97	78.70	27.85	2.20	MT
CYLC36		64.30	11.32	0.87	52.50	1.65	0.13	XX
HKNDKF		59.10	6.12	0.47	50.20	-0.65	-0.05	XX
P2NV9R		56.10	3.12	0.24	59.30	8.45	0.67	MT
PBYXTR		46.40	-6.58	-0.51	47.90	-2.95	-0.23	MT
YZ472H		47.30	-5.68	-0.44	50.71	-0.14	-0.01	MT

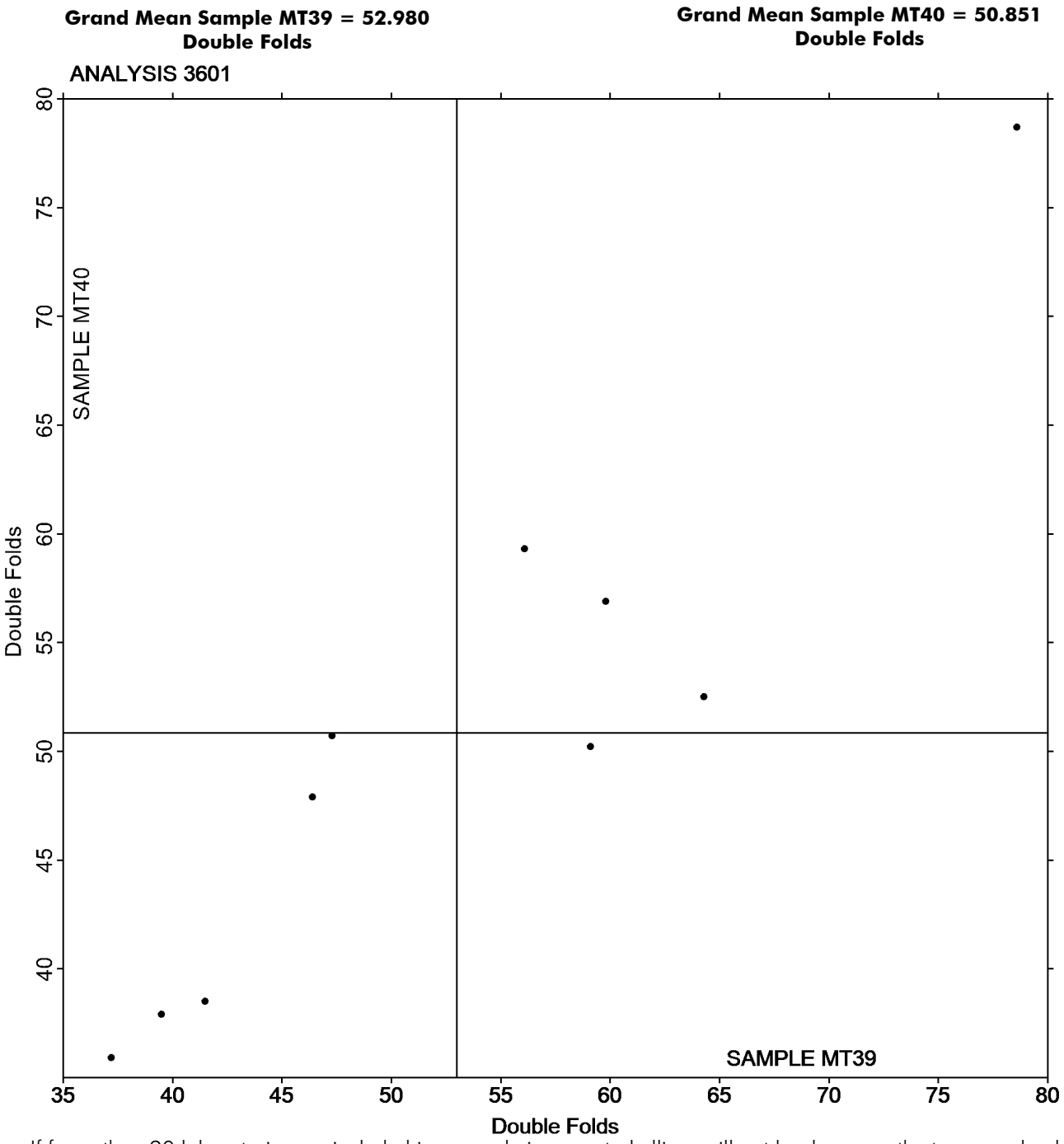
Summary Statistics	Sample MT39	Sample MT40
Grand Means	52.98 Double Folds	50.85 Double Folds
Stnd Dev Btwn Labs	12.98 Double Folds	12.65 Double Folds

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

MT MIT - Tinius Olsen

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 3603
Bending Resistance, Gurley Type
TAPPI Official Test Method T543

WebCode	Data Flag	Sample BG39 Lab Mean	Sample BG39 Diff from Grand Mean	Sample BG39 CPV	Sample BG40 Lab Mean	Sample BG40 Diff from Grand Mean	Sample BG40 CPV	Instr Code
32H3VC		138.5	25.2	0.77	130.5	17.2	0.53	ZZ
3B8N2B		71.0	-42.3	-1.30	71.9	-41.4	-1.27	ZZ
3NWMRD		134.3	21.0	0.64	139.3	25.9	0.79	ZZ
6VQCQT		121.4	8.1	0.25	125.1	11.7	0.36	ZZ
8987RW		61.5	-51.8	-1.59	57.8	-55.5	-1.70	ZZ
BENNY4		119.0	5.7	0.17	119.4	6.1	0.19	ZZ
LPQHNB	X	4.2	-109.1	-3.35	4.3	-109.1	-3.34	ZZ
P2NV9R		117.9	4.6	0.14	122.1	8.7	0.27	ZZ
PBYXTR		140.1	26.8	0.82	148.1	34.7	1.06	ZZ
YZ472H		74.9	-38.4	-1.18	75.5	-37.9	-1.16	ZZ
ZG69G2		154.5	41.2	1.26	143.9	30.5	0.93	ZZ

Summary Statistics	Sample BG39	Sample BG40
Grand Means	113.32 Gurley Units	113.36 Gurley Units
Stnd Dev Btwn Labs	32.59 Gurley Units	32.64 Gurley Units

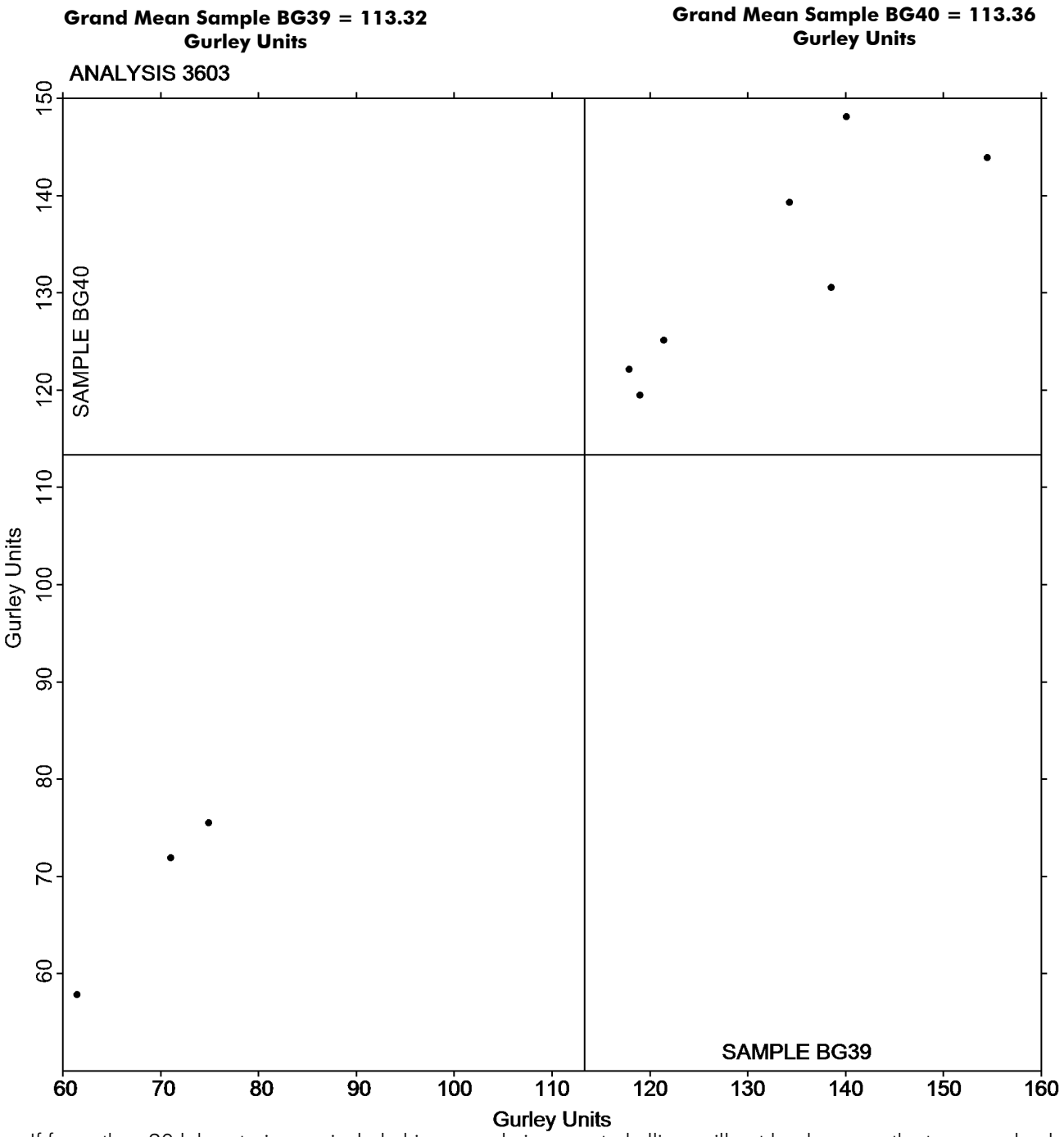
Statistics based on 10 of 11 reporting participants.

Comments on Assigned Data Flags for Test #3603

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

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 3611

Coefficient of Static Friction - Horizontal Plane Method - Printing Papers

TAPPI Official Test Method T549

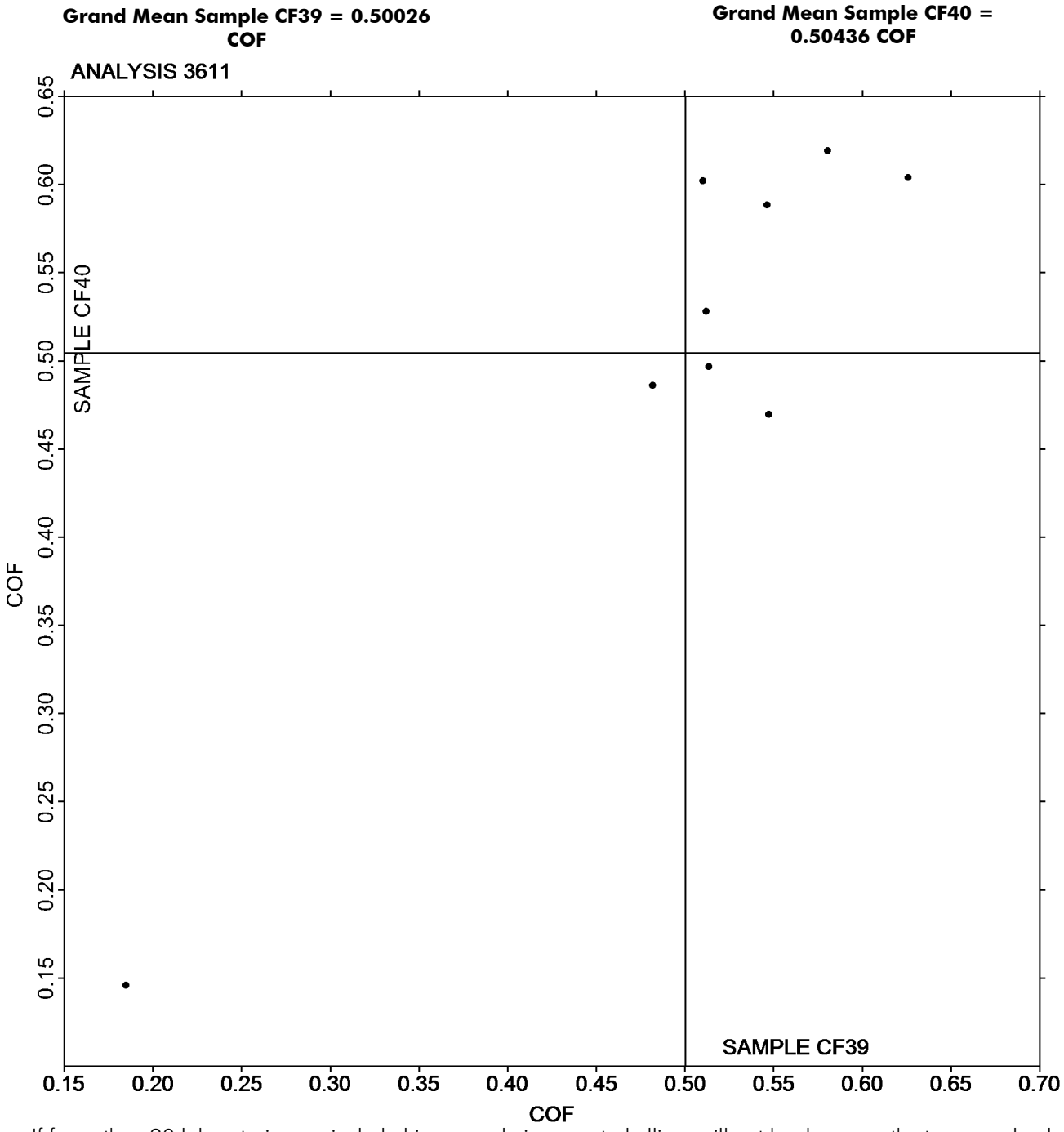
WebCode	Data Flag	Sample CF39 Lab Mean	Sample CF39 Diff from Grand Mean	Sample CF39 CPV	Sample CF40 Lab Mean	Sample CF40 Diff from Grand Mean	Sample CF40 CPV	Instr Code
6ABUGB		0.5464	0.0461	0.37	0.5882	0.0838	0.57	TM
6VQCQT		0.6258	0.1255	1.00	0.6040	0.0996	0.68	TA
8987RW		0.5100	0.0097	0.08	0.6020	0.0976	0.67	TP
BENNY4		0.5120	0.0117	0.09	0.5280	0.0236	0.16	TA
JPDCAV		0.4818	-0.0185	-0.15	0.4860	-0.0184	-0.13	TA
LPQHNB		0.1848	-0.3155	-2.51	0.1458	-0.3586	-2.46	TX
MZ7UEE		0.5473	0.0471	0.37	0.4696	-0.0347	-0.24	TN
TR7K9M		0.5806	0.0803	0.64	0.6190	0.1146	0.79	TA
XLNJGZ		0.5136	0.0133	0.11	0.4966	-0.0078	-0.05	XX

Summary Statistics	Sample CF39	Sample CF40
Grand Means	0.50 COF	0.50 COF
Stnd Dev Btwn Labs	0.13 COF	0.15 COF

Statistics based on 9 of 9 reporting participants.

Key to Instrument Codes Reported by Participants

TA	Thwing-Albert Friction Tester	TM	TMI 32-06 Monitor/Slip and Friction
TN	TMI 32-07 Monitor/Slip and Friction	TP	TMI 32-25 COF Tester (Inclined Plane)
TX	TMI (model not specified)	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 3612

Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers

TAPPI Official Test Method T549

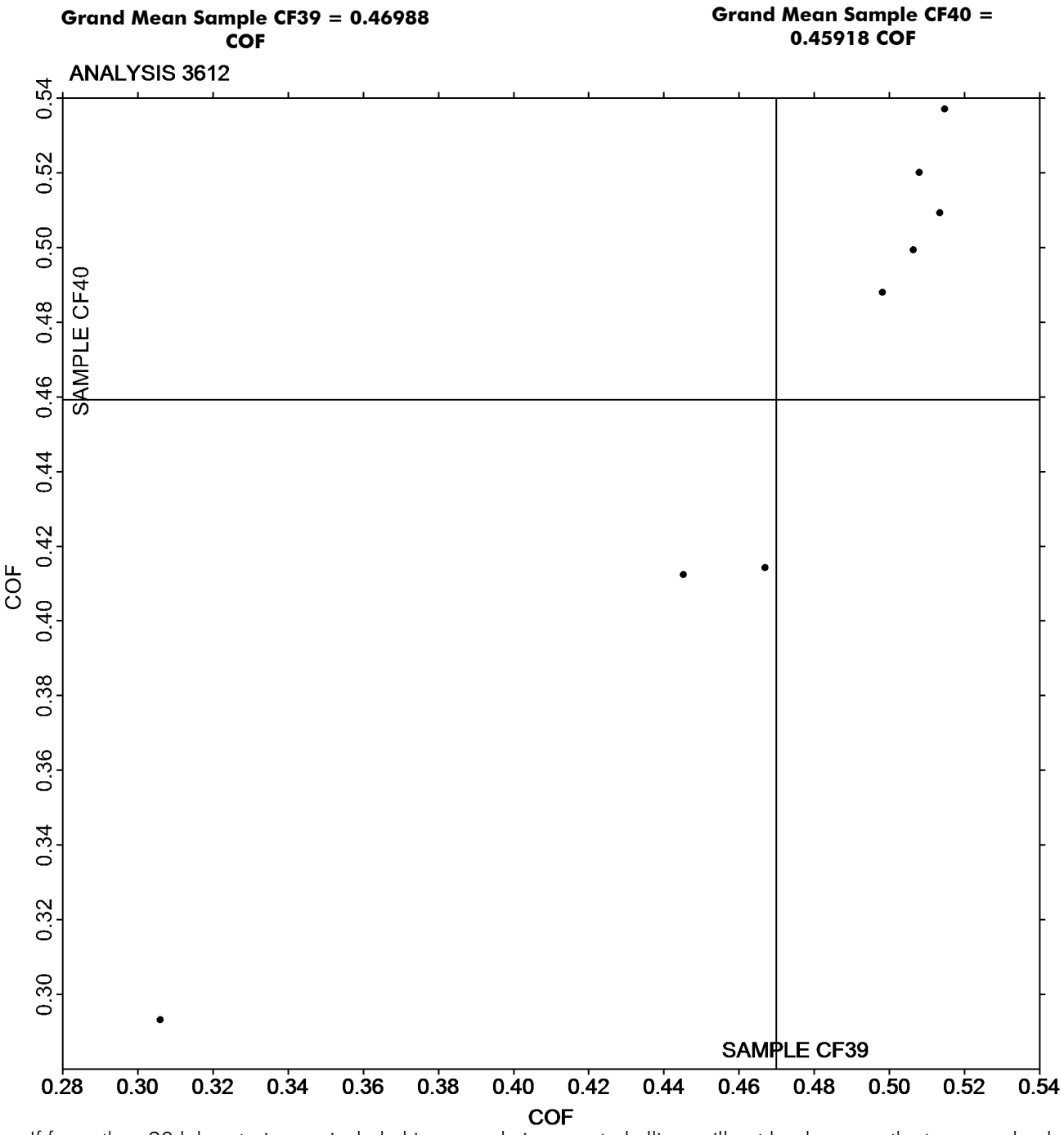
WebCode	Data Flag	Sample CF39 Lab Mean	Sample CF39 Diff from Grand Mean	Sample CF39 CPV	Sample CF40 Lab Mean	Sample CF40 Diff from Grand Mean	Sample CF40 CPV	Instr Code
6ABUGB		0.5134	0.0435	0.62	0.5092	0.0500	0.61	TM
6VQCQT		0.5064	0.0365	0.52	0.4994	0.0402	0.49	TA
BENNY4		0.5080	0.0381	0.54	0.5200	0.0608	0.75	TA
JPDCAV		0.3060	-0.1639	-2.32	0.2932	-0.1660	-2.04	TA
LPQHNB		0.4452	-0.0247	-0.35	0.4124	-0.0468	-0.57	TX
MZ7UEE		0.4670	-0.0029	-0.04	0.4142	-0.0450	-0.55	TN
TR7K9M		0.5148	0.0449	0.64	0.5370	0.0778	0.96	TA
XLNJGZ		0.4982	0.0283	0.40	0.4880	0.0288	0.35	XX

Summary Statistics	Sample CF39	Sample CF40
Grand Means	0.47 COF	0.46 COF
Stnd Dev Btwn Labs	0.07 COF	0.08 COF

Statistics based on 8 of 8 reporting participants.

Key to Instrument Codes Reported by Participants

TA	Thwing-Albert Friction Tester	TM	TMI 32-06 Monitor/Slip and Friction
TN	TMI 32-07 Monitor/Slip and Friction	TX	TMI (model not specified)
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 3613
Moisture in Paper
TAPPI Official Test Method T412

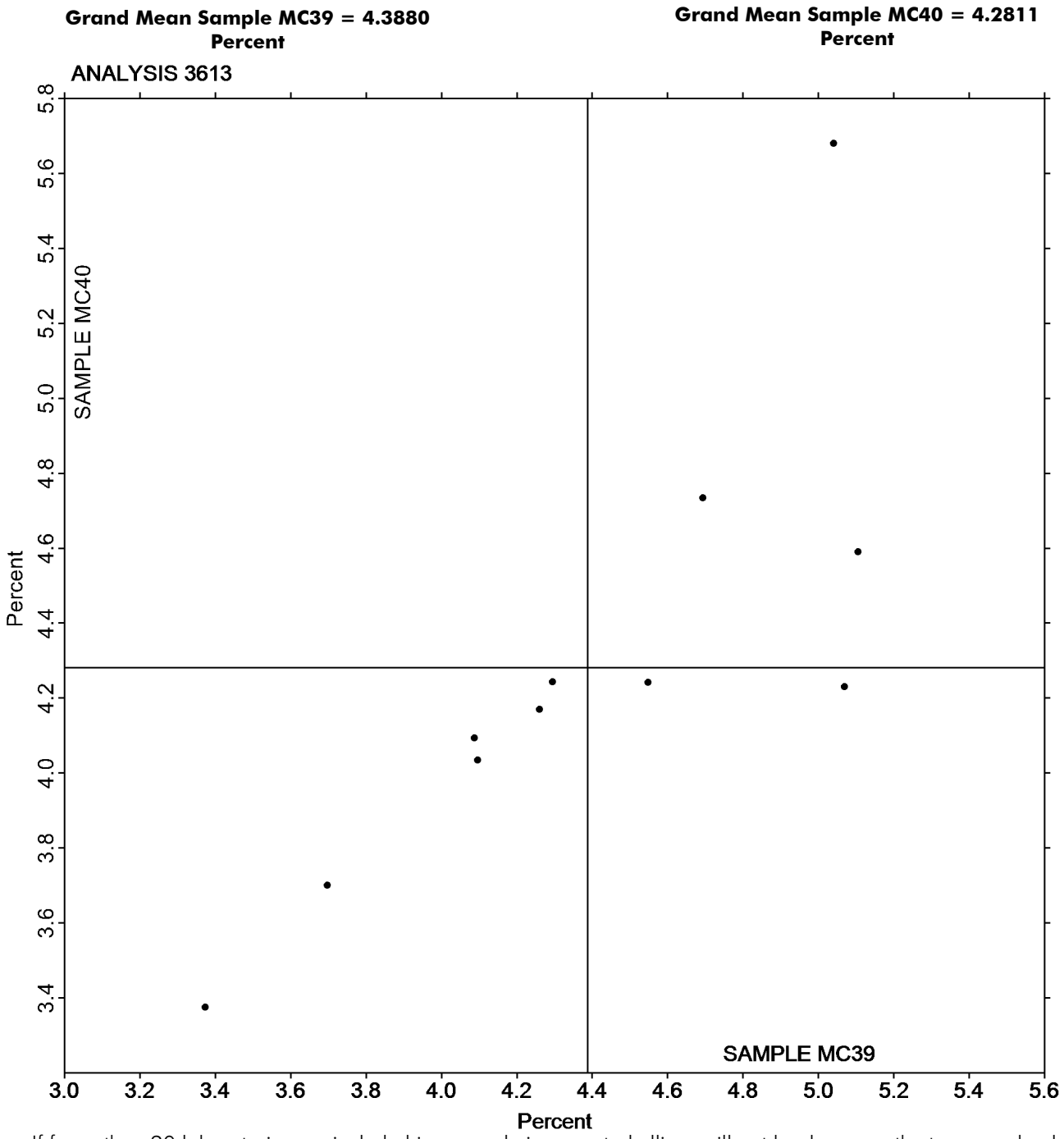
WebCode	Data Flag	Sample MC39 Lab Mean	Sample MC39 Diff from Grand Mean	Sample MC39 CPV	Sample MC40 Lab Mean	Sample MC40 Diff from Grand Mean	Sample MC40 CPV	Instr Code
2R2VL4		4.694	0.306	0.54	4.734	0.453	0.76	ZZ
4UYUA2		4.088	-0.300	-0.53	4.093	-0.188	-0.32	ZZ
BENNY4		4.097	-0.291	-0.51	4.035	-0.246	-0.41	ZZ
FAFT9N		4.295	-0.093	-0.16	4.243	-0.038	-0.06	ZZ
NX92UF		5.070	0.682	1.20	4.230	-0.051	-0.09	ZZ
P2NV9R		5.105	0.717	1.26	4.590	0.309	0.52	ZZ
PTUPEQ		5.040	0.652	1.15	5.680	1.399	2.35	ZZ
TMW646		4.260	-0.128	-0.23	4.170	-0.111	-0.19	ZZ
VNKHF9		3.373	-1.015	-1.79	3.375	-0.906	-1.53	ZZ
X64TH2		3.698	-0.691	-1.22	3.700	-0.581	-0.98	ZZ
XMJ3J2		4.548	0.160	0.28	4.242	-0.039	-0.07	ZZ

Summary Statistics	Sample MC39	Sample MC40
Grand Means	4.39 Percent	4.28 Percent
Stnd Dev Btwn Labs	0.57 Percent	0.59 Percent

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 3615
Sizing Test (Hercules Type)
TAPPI Official Test Method T530

WebCode	Data Flag	Sample HS39 Lab Mean	Sample HS39 Diff from Grand Mean	Sample HS39 CPV	Sample HS40 Lab Mean	Sample HS40 Diff from Grand Mean	Sample HS40 CPV	Instr Code
32H3VC		97.47	51.21	1.71	91.08	47.19	1.57	HE
3NWMRD		84.66	38.40	1.28	78.26	34.37	1.15	XX
4NB94Z		80.70	34.44	1.15	82.80	38.91	1.30	HE
8987RW		16.83	-29.43	-0.98	18.18	-25.71	-0.86	HE
9UMQPX		10.53	-35.73	-1.19	9.76	-34.13	-1.14	HE
BENNY4		50.90	4.64	0.15	46.49	2.60	0.09	HE
BW4WY4		19.35	-26.91	-0.90	18.00	-25.89	-0.86	HE
C3P6YN		18.91	-27.35	-0.91	15.65	-28.24	-0.94	HE
J6RD7L	*	44.60	-1.66	-0.06	28.30	-15.59	-0.52	HE
JPDCAV		16.76	-29.50	-0.98	13.89	-30.00	-1.00	HE
L7BBAU		39.61	-6.65	-0.22	36.16	-7.73	-0.26	HE
LPQHNB		35.20	-11.06	-0.37	34.90	-8.99	-0.30	HE
MCVU6G		62.90	16.64	0.55	66.90	23.01	0.77	HE
TBKZR4		19.40	-26.86	-0.89	19.30	-24.59	-0.82	HE
TR7K9M		73.69	27.43	0.91	68.85	24.96	0.83	HE
Y9XA8Z		42.74	-3.52	-0.12	42.57	-1.32	-0.04	HE
YZ472H		18.87	-27.39	-0.91	17.60	-26.29	-0.88	HE
ZG69G2		99.57	53.31	1.78	101.39	57.50	1.92	HE

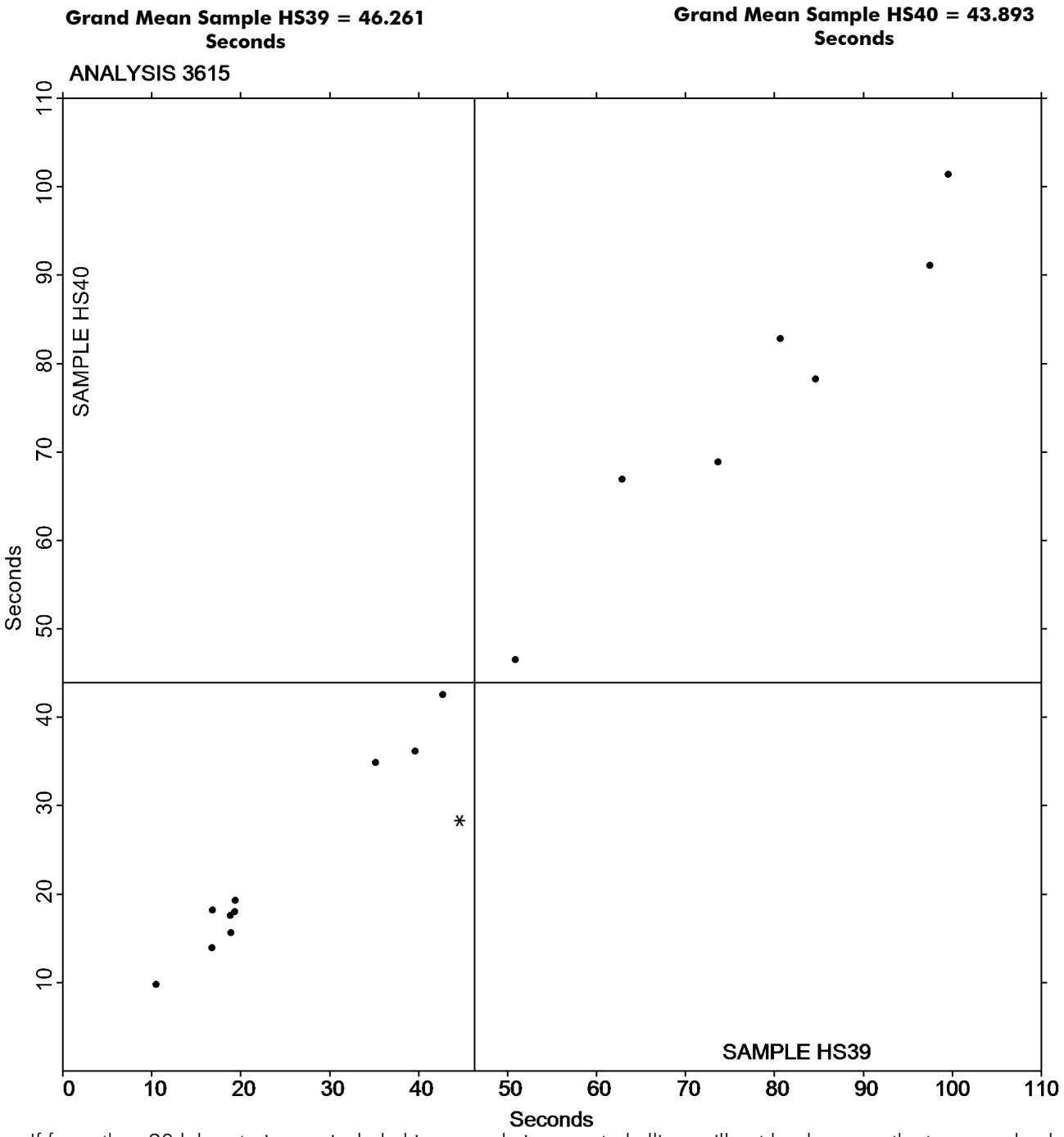
Summary Statistics	Sample HS39	Sample HS40
Grand Means	46.26 Seconds	43.89 Seconds
Stnd Dev Btwn Labs	30.01 Seconds	29.96 Seconds

Statistics based on 18 of 18 reporting participants.

Key to Instrument Codes Reported by Participants

HE Hercules Sizing 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.

-End of Report-