Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #4342 - February 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
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3545	Directional Brightness
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3601	Folding Endurance (MIT) - Double Folds
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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:

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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.

Paper & Paperboard Interlaboratory Testing Program

Analysis 3501
Thickness (Caliper), Packaging papers
TAPPI Official Test Method T411

Report #4342, February 2025

WebCode	Data Flag	Sample CK37 Lab Mean	Sample CK37 Diff from Grand Mean	Sample CK37 CPV	Sample CK38 Lab Mean	Sample CK38 Diff from Grand Mean	Sample CK38 CPV	Instr Code
3BBM7X		13.65	-0.12	-0.72	13.64	-0.14	-0.81	MS
3ERZ3E		13.67	-0.10	-0.63	13.66	-0.11	-0.68	XX
4JVHEC		13.44	-0.34	-2.03	13.50	-0.28	-1.65	PP
4PLRNA		13.59	-0.18	-1.10	13.60	-0.17	-1.04	XX
4WKDWW		13.82	0.04	0.26	13.86	0.08	0.49	LC
69C7ZD		13.55	-0.23	-1.36	13.52	-0.25	-1.49	XX
6Z24ED	X	13.83	0.05	0.32	14.15	0.37	2.21	PP
8TAE89	*	13.32	-0.46	-2.75	13.33	-0.45	-2.67	XX
AUENDB		13.90	0.12	0.74	13.89	0.11	0.67	LA
CBH2M4		13.95	0.18	1.06	13.98	0.20	1.19	XX
CR3RL3		13.88	0.10	0.62	13.91	0.13	0.77	LW
G8LW2L		13.93	0.15	0.92	13.99	0.21	1.26	LW
J33JD4		13.97	0.19	1.14	13.93	0.16	0.92	EM
J66M2K		13.93	0.15	0.90	13.88	0.11	0.64	TA
J89J4Z		13.76	-0.02	-0.11	13.81	0.03	0.20	LW
JLAVYY		13.86	0.08	0.48	13.81	0.03	0.20	OK
K6MZXV		13.92	0.15	0.87	13.90	0.13	0.74	LC
MBHUQE		13.84	0.06	0.37	13.73	-0.05	-0.28	LW
ND29UE		13.75	-0.02	-0.15	13.85	0.07	0.42	LB
NWDX8C		13.69	-0.08	-0.51	13.72	-0.05	-0.30	LC
PRYLLV		14.05	0.27	1.62	14.07	0.29	1.74	PP
Q89U2P		13.73	-0.04	-0.27	13.69	-0.08	-0.50	LW
TE2PCT		13.71	-0.07	-0.42	13.74	-0.03	-0.20	EM
TEKLM8		13.62	-0.15	-0.91	13.64	-0.14	-0.82	LW
TKJCMP	X	9.15	-4.62	-27.65	7.16	-6.61	-39.24	LW
V26DY7		13.98	0.20	1.20	13.95	0.17	1.01	XX
VGM3X9		13.65	-0.13	-0.75	13.62	-0.16	-0.93	LW
VRZK8Q		13.78	0.01	0.05	13.78	0.00	0.02	EM
WNFVJ8		13.84	0.06	0.36	13.78	0.01	0.05	EM
XFCF6J		13.66	-0.11	-0.66	13.57	-0.21	-1.23	TB
XYPY2M		13.83	0.06	0.35	13.90	0.13	0.75	PP
Y6AE6K		13.81	0.04	0.24	13.87	0.10	0.56	LW
Z2U394		13.97	0.20	1.18	13.94	0.16	0.97	LW

Summary Statistics	Sample CK37	Sample CK38
Grand Means	13.77 mils	13.77 mils
Stnd Dev Btwn Labs	0.17 mils	0.17 mils

Statistics based on 31 of 33 reporting participants.

Comments on Assigned Data Flags for Test #3501

6Z24ED (X) - Inconsistent in testing between samples.

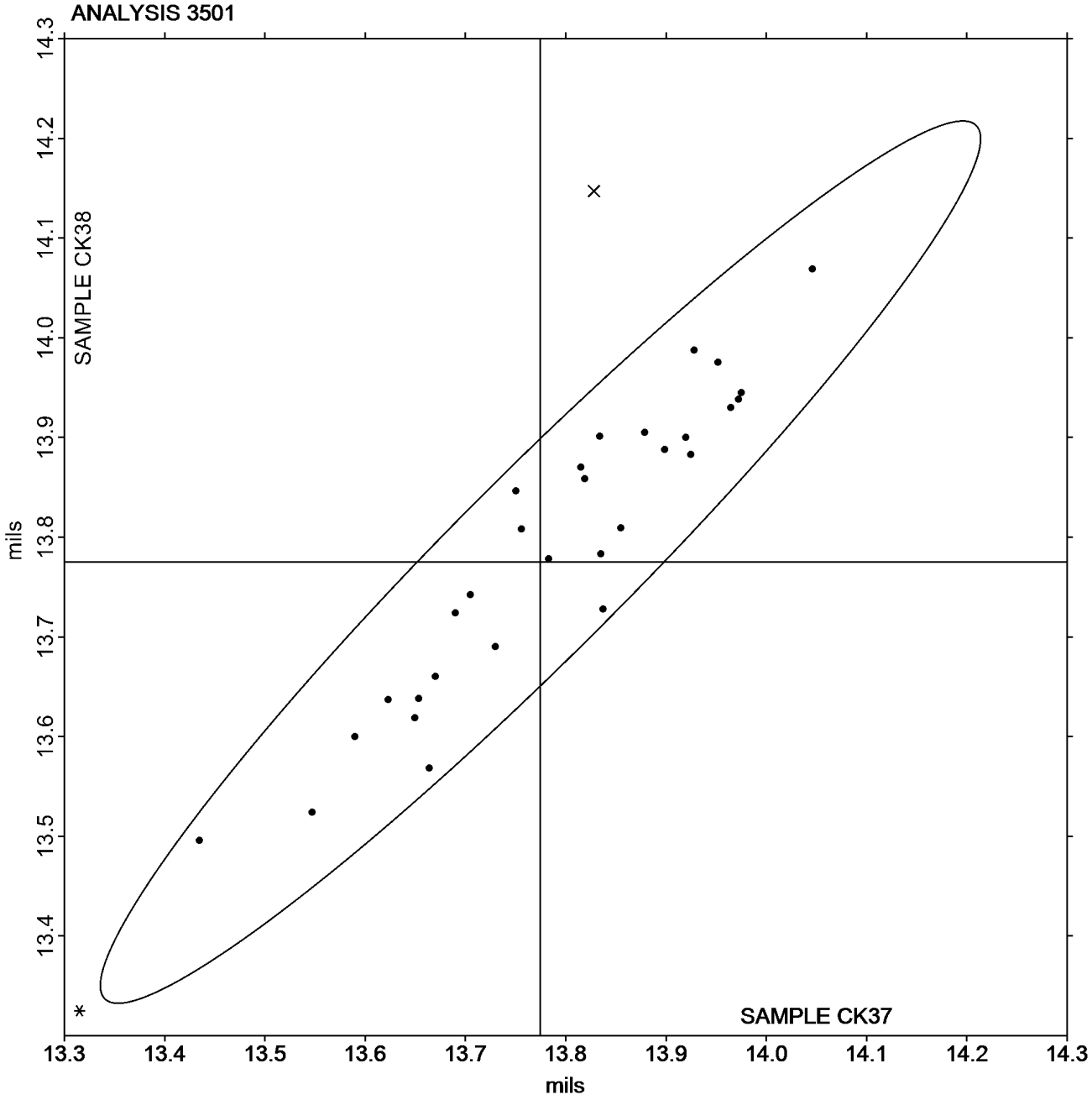
TKJCMP (X) - Extreme Data.

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		

Grand Mean Sample CK37 = 13.775 mils

Grand Mean Sample CK38 = 13.775 mils



Paper & Paperboard Interlaboratory Testing Program

Report #4342, February 2025

Analysis 3511

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

WebCode	Data Flag	Sample BK37 Lab Mean	Sample BK37 Diff from Grand Mean	Sample BK37 CPV	Sample BK38 Lab Mean	Sample BK38 Diff from Grand Mean	Sample BK38 CPV	Instr Code
46XBKG		104.3	-2.9	-0.36	70.16	1.37	0.21	ZZ
6Z24ED	*	123.0	15.8	1.94	89.00	20.20	3.17	ZZ
AJXYE6		98.4	-8.9	-1.09	63.79	-5.00	-0.79	ZZ
CR3RL3		107.8	0.6	0.07	66.91	-1.89	-0.30	ZZ
G8LW2L		108.5	1.2	0.15	68.51	-0.28	-0.04	ZZ
L7EBFG		102.6	-4.6	-0.57	65.20	-3.60	-0.56	ZZ
MBHUQE		115.7	8.5	1.05	66.67	-2.12	-0.33	ZZ
PPXEND		97.5	-9.7	-1.20	66.00	-2.80	-0.44	ZZ
RV9J7N		113.2	6.0	0.73	73.10	4.30	0.68	ZZ
T4H8KL		112.1	4.9	0.60	66.78	-2.02	-0.32	ZZ
TE2PCT		99.9	-7.4	-0.91	68.03	-0.77	-0.12	ZZ
WDBRCN		97.8	-9.4	-1.16	64.28	-4.52	-0.71	ZZ
XFCF6J		112.0	4.8	0.59	72.70	3.90	0.61	ZZ
Y6AE6K		117.1	9.9	1.22	68.70	-0.09	-0.01	ZZ
Z2U394		98.6	-8.6	-1.06	62.11	-6.69	-1.05	ZZ

Summary Statistics	Sample BK37	Sample BK38
Grand Means	107.24 psi	68.80 psi
Stnd Dev Btwn Labs	8.12 psi	6.37 psi

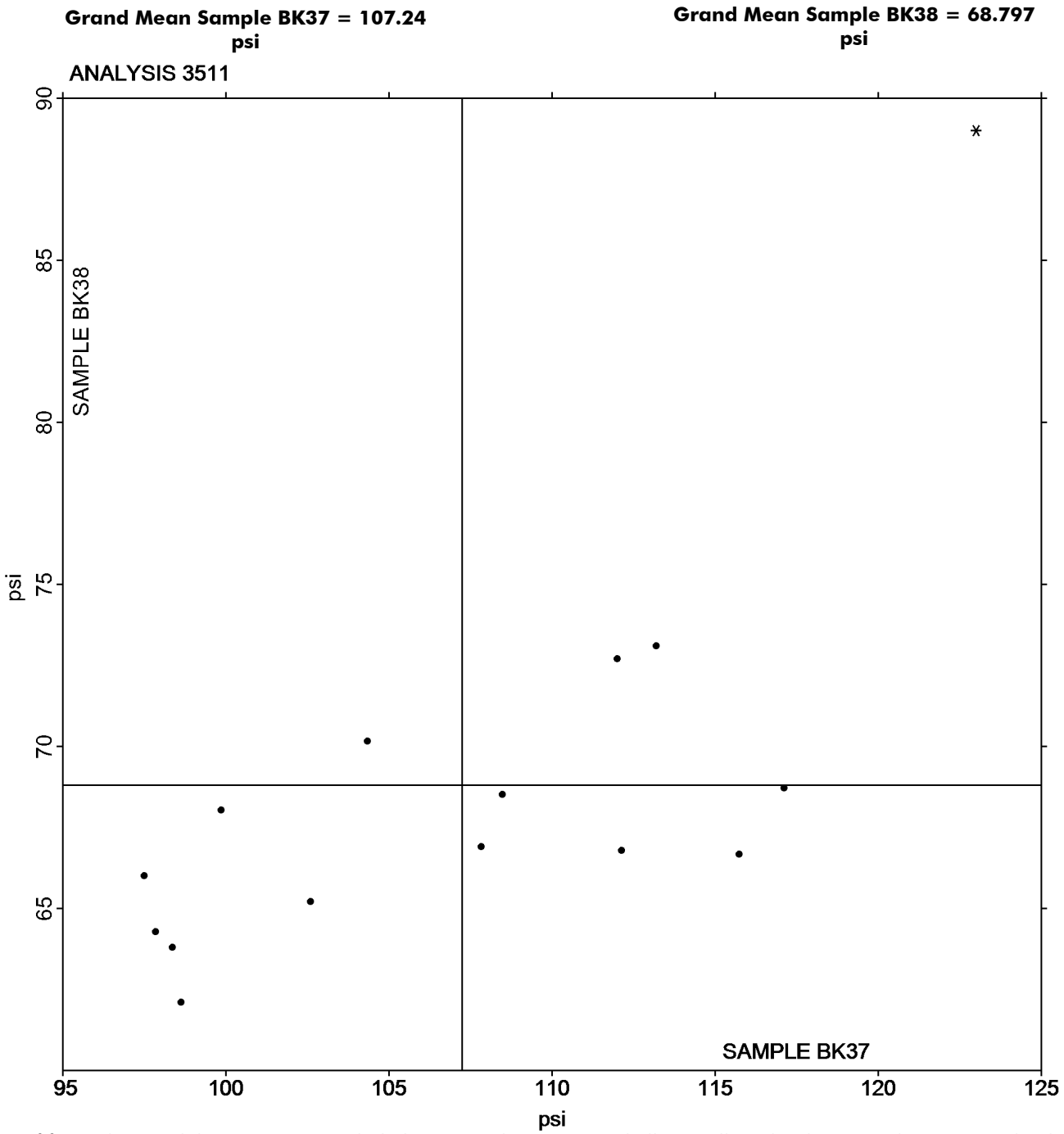
Statistics based on 15 of 15 reporting participants.

Analysis Notes:

MBHUQE - 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 RK37 Lab Mean	Sample RK37 Diff from Grand Mean	Sample RK37 CPV	Sample RK38 Lab Mean	Sample RK38 Diff from Grand Mean	Sample RK38 CPV	Instr Code
4PLRNA		192.8	27.3	1.44	254.4	47.3	1.95	ZZ
4WKDWW		153.4	-12.1	-0.64	188.5	-18.6	-0.77	ZZ
6Z24ED		167.7	2.2	0.12	192.6	-14.6	-0.60	ZZ
9Q3ETT		174.6	9.0	0.48	229.7	22.5	0.93	ZZ
AJXYE6		166.4	0.9	0.05	221.6	14.5	0.60	ZZ
AUENDB		159.7	-5.8	-0.31	194.4	-12.7	-0.52	ZZ
BLZCGP		161.5	-4.0	-0.21	193.7	-13.5	-0.55	ZZ
CBH2M4		195.1	29.6	1.56	224.4	17.3	0.71	ZZ
CR3RL3		169.7	4.2	0.22	212.1	5.0	0.20	ZZ
DPR8B8		164.7	-0.8	-0.04	202.2	-5.0	-0.21	ZZ
G8LW2L		144.3	-21.2	-1.12	177.5	-29.7	-1.22	ZZ
J66M2K		166.8	1.3	0.07	210.6	3.4	0.14	ZZ
J89J4Z		168.3	2.8	0.15	222.7	15.6	0.64	ZZ
L7EBFG		161.8	-3.7	-0.20	206.2	-1.0	-0.04	ZZ
MBHUQE		179.3	13.8	0.73	218.4	11.2	0.46	ZZ
NBVREV	*	123.8	-41.7	-2.21	179.5	-27.6	-1.14	ZZ
NWDX8C	*	106.8	-58.8	-3.11	125.8	-81.3	-3.35	ZZ
PPXEND	X	235.2	69.7	3.69	239.2	32.1	1.32	ZZ
PRYLLV		170.0	4.5	0.24	213.8	6.6	0.27	ZZ
QKWPKB		167.6	2.1	0.11	209.9	2.8	0.11	ZZ
RXE7JR		193.8	28.3	1.50	236.6	29.4	1.21	ZZ
TEKLM8		147.9	-17.6	-0.93	192.8	-14.3	-0.59	ZZ
TKJCMP	X	198.0	32.5	1.72	177.2	-29.9	-1.23	ZZ
VGM3X9		176.4	10.9	0.57	207.9	0.7	0.03	ZZ
VRZK8Q		175.3	9.7	0.52	211.8	4.7	0.19	ZZ
WNFVJ8		167.2	1.7	0.09	189.7	-17.4	-0.72	ZZ
Z2U394		177.0	11.5	0.61	229.6	22.5	0.93	ZZ
ZA2YR2		168.6	3.0	0.16	221.8	14.7	0.60	ZZ
ZRJZM3		168.9	3.3	0.18	224.9	17.7	0.73	ZZ

Summary Statistics	Sample RK37	Sample RK38
Grand Means	165.54 Grams	207.14 Grams
Stnd Dev Btwn Labs	18.90 Grams	24.28 Grams

Statistics based on 27 of 29 reporting participants.

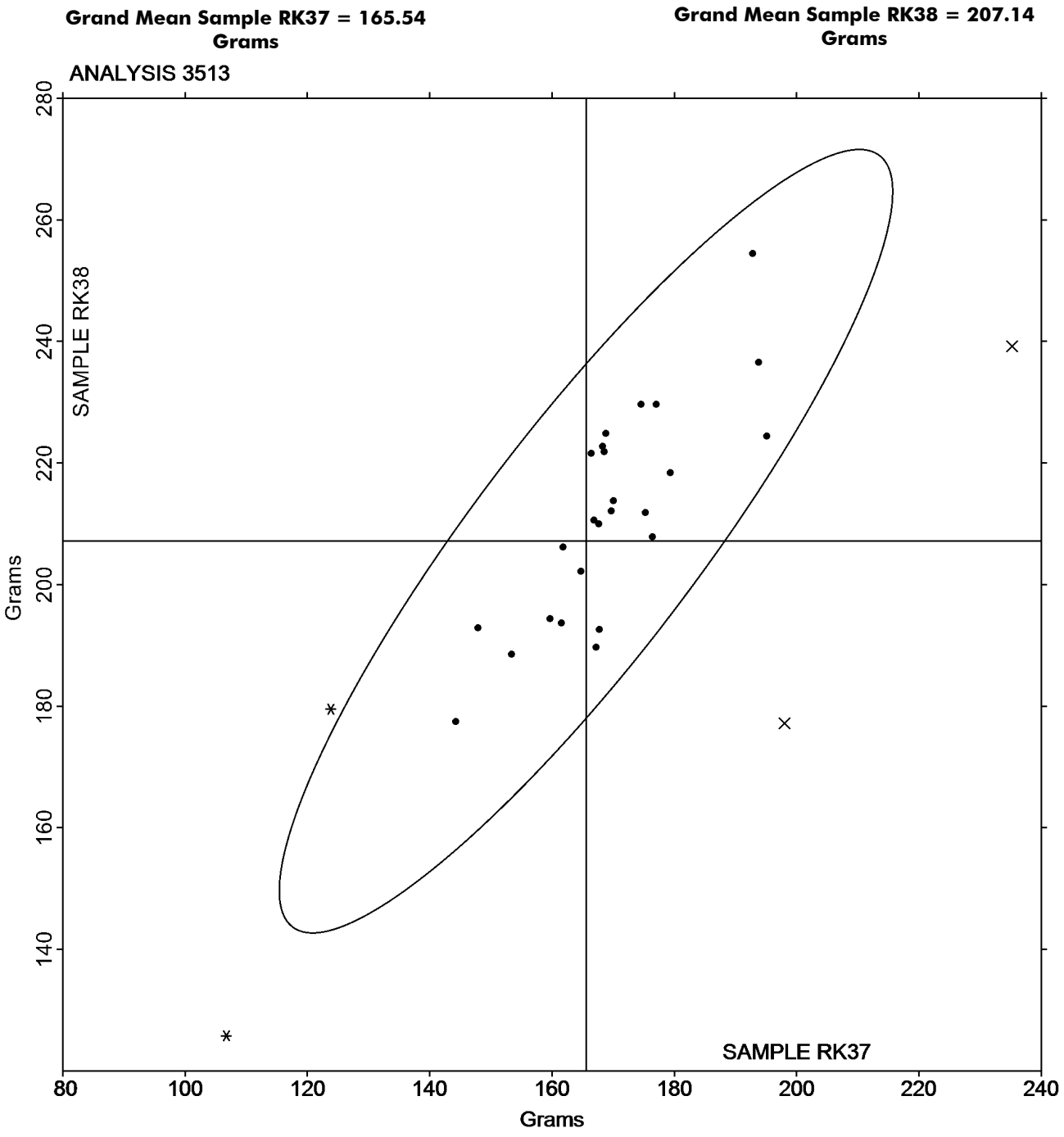
Comments on Assigned Data Flags for Test #3513

PPXEND (X) - Data for sample RK37 are high.

TKJCMP (X) - Inconsistent in testing between samples.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK37 Lab Mean	Sample NK37 Diff from Grand Mean	Sample NK37 CPV	Sample NK38 Lab Mean	Sample NK38 Diff from Grand Mean	Sample NK38 CPV	Instr Code
3ERZ3E		15.17	1.73	1.82	17.57	2.16	1.97	XX
4PLRNA		13.86	0.42	0.45	15.83	0.42	0.38	XX
4WKDWW		13.55	0.11	0.11	14.81	-0.59	-0.54	IN
69C7ZD		13.63	0.19	0.20	16.11	0.70	0.64	TB
6Z24ED		12.98	-0.46	-0.49	14.44	-0.97	-0.88	TA
8KYCL8	*	13.49	0.05	0.06	16.77	1.36	1.24	LI
9Q3ETT		12.30	-1.14	-1.20	14.18	-1.22	-1.11	LE
AJXYE6		12.56	-0.88	-0.93	14.13	-1.28	-1.17	TX
AUENDB		13.33	-0.10	-0.11	14.59	-0.81	-0.74	LA
BMVUJQ		13.59	0.16	0.16	15.24	-0.17	-0.15	IR
CBH2M4		12.89	-0.55	-0.58	14.76	-0.65	-0.59	ID
CR3RL3		13.40	-0.04	-0.04	15.09	-0.32	-0.29	LH
CV6JWN		12.72	-0.72	-0.76	14.34	-1.07	-0.97	TS
DPR8B8	X	12.79	-0.65	-0.68	10.49	-4.92	-4.48	TH
G8LW2L		12.25	-1.18	-1.25	14.06	-1.35	-1.23	IM
GJEMFX		14.80	1.36	1.43	16.59	1.18	1.08	DM
GK6NJ2		12.16	-1.28	-1.35	14.73	-0.68	-0.62	TT
J33JD4		14.53	1.09	1.15	16.35	0.94	0.86	LE
J66M2K		13.13	-0.31	-0.33	14.57	-0.84	-0.77	TB
J89J4Z		13.56	0.13	0.13	15.74	0.33	0.30	LE
MBHUQE		13.31	-0.13	-0.14	15.07	-0.34	-0.31	LW
ND29UE		15.00	1.56	1.65	17.24	1.84	1.67	LC
PRYLLV	X	12.75	-0.69	-0.72	12.87	-2.54	-2.31	TH
Q89U2P		14.30	0.86	0.91	16.30	0.90	0.82	TH
QKWPKB		13.08	-0.36	-0.38	14.93	-0.48	-0.44	LE
TEKLM8		12.91	-0.53	-0.56	15.30	-0.11	-0.10	LW
TKJCMP	X	16.54	3.11	3.28	11.15	-4.26	-3.88	LX
UEXJBP		14.86	1.42	1.50	17.11	1.70	1.55	LA
VGM3X9		12.69	-0.75	-0.79	14.76	-0.65	-0.59	LW
VJP4X6		12.52	-0.91	-0.96	14.64	-0.77	-0.70	IM
WDBRCN		12.87	-0.57	-0.60	14.85	-0.55	-0.50	LW
WVVHBN		14.55	1.11	1.17	16.41	1.00	0.91	LE
XFCF6J		15.28	1.84	1.94	17.45	2.05	1.87	TV
XFYLPJ		14.63	1.19	1.26	17.02	1.62	1.47	LA
Z2U394		12.55	-0.89	-0.94	14.15	-1.26	-1.15	LE
ZA2YR2		12.27	-1.16	-1.23	14.20	-1.20	-1.10	XX
ZRJZM3		12.16	-1.27	-1.34	14.50	-0.91	-0.83	LH

Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample NK37	Sample NK38
Grand Means	13.44 kN/m	15.41 kN/m
Stnd Dev Btwn Labs	0.95 kN/m	1.10 kN/m

Statistics based on 34 of 37 reporting participants.

Comments on Assigned Data Flags for Test #3515

TKJCMP (X) - Data for sample NK37 are high and data for sample NK38 are low.

PRYLLV (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample NK38.

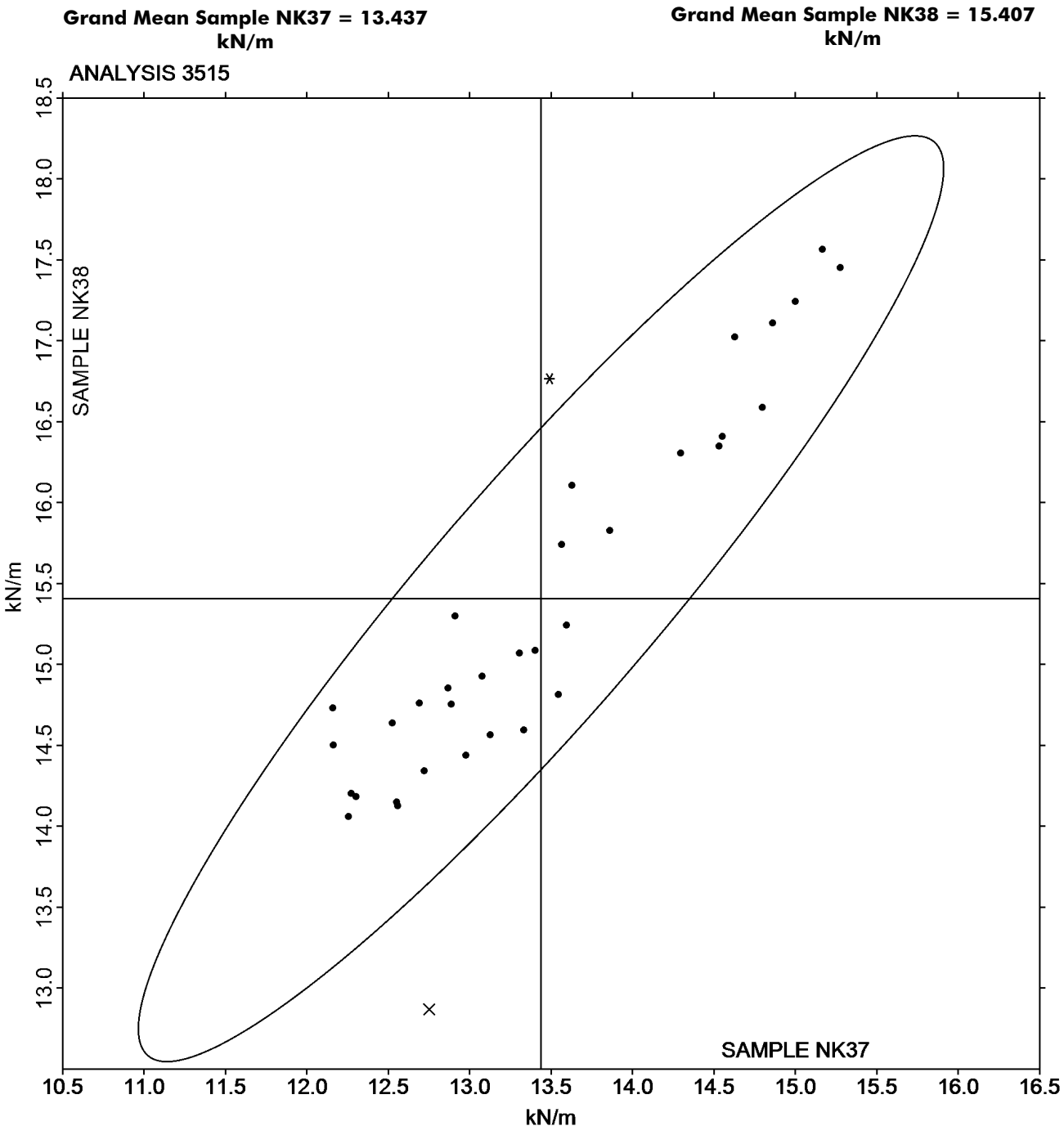
DPR8B8 (X) - Data for sample NK38 are low.

Analysis Notes:

6Z24ED - 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	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
TT	Tinius Olsen Model MHT	TV	Thwing-Albert Vantage NX
TX	Thwing-Albert (model not specified)	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program

Report #4342, February 2025

Analysis 3516

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK37 Lab Mean	Sample NK37 Diff from Grand Mean	Sample NK37 CPV	Sample NK38 Lab Mean	Sample NK38 Diff from Grand Mean	Sample NK38 CPV	Instr Code
3ERZ3E		199.4	-11.0	-0.43	233.4	-9.4	-0.34	TH
4PLRNA	*	275.4	65.0	2.55	296.6	53.8	1.95	XX
4WKDWW		216.3	5.9	0.23	253.8	11.1	0.40	IN
69C7ZD		222.2	11.9	0.47	272.0	29.2	1.06	TB
6Z24ED		207.5	-2.8	-0.11	220.4	-22.4	-0.81	TA
9Q3ETT		185.6	-24.7	-0.97	219.1	-23.7	-0.86	LE
AJXYE6		210.2	-0.2	-0.01	238.5	-4.2	-0.15	TX
AUENDB		223.1	12.8	0.50	239.2	-3.5	-0.13	LA
BMVUJQ		206.8	-3.6	-0.14	240.8	-1.9	-0.07	IR
CR3RL3		191.1	-19.2	-0.76	218.1	-24.6	-0.89	LH
CV6JWN		215.0	4.6	0.18	241.0	-1.8	-0.06	TS
G8LW2L		228.4	18.0	0.71	257.5	14.8	0.54	IM
GJEMFX	*	287.9	77.5	3.04	332.8	90.0	3.26	DM
GK6NJ2		171.5	-38.9	-1.53	219.5	-23.2	-0.84	TT
J33JD4		236.6	26.2	1.03	273.2	30.5	1.10	LE
J89J4Z		197.9	-12.5	-0.49	228.8	-13.9	-0.50	LE
MBHUQE		200.9	-9.5	-0.37	227.2	-15.5	-0.56	LE
ND29UE		209.8	-0.6	-0.02	231.2	-11.5	-0.42	LC
Q89U2P		209.9	-0.4	-0.02	244.0	1.2	0.04	TH
QKWPKB		198.6	-11.7	-0.46	226.4	-16.4	-0.59	LE
TEKLM8		179.2	-31.2	-1.22	227.0	-15.7	-0.57	LW
TKJCMP	X	226.9	16.6	0.65	125.8	-116.9	-4.23	TH
UEXJBP		212.4	2.0	0.08	244.5	1.8	0.06	LC
VGM3X9		190.8	-19.6	-0.77	208.6	-34.1	-1.23	LW
VJP4X6		177.5	-32.9	-1.29	215.5	-27.2	-0.98	IM
WVVHBN		214.7	4.3	0.17	247.7	5.0	0.18	LE
XFCF6J		235.4	25.1	0.98	289.2	46.5	1.68	TV
XFYLPJ		217.7	7.3	0.29	256.8	14.1	0.51	LA
Z2U394		188.9	-21.5	-0.84	216.9	-25.8	-0.93	LE
ZA2YR2		214.2	3.8	0.15	244.9	2.2	0.08	XX
ZRJZM3		186.2	-24.2	-0.95	217.2	-25.5	-0.92	LH

Summary Statistics	Sample NK37	Sample NK38
Grand Means	210.37 Joules/sq m	242.72 Joules/sq m
Stnd Dev Btwn Labs	25.48 Joules/sq m	27.64 Joules/sq m

Statistics based on 30 of 31 reporting participants.

Comments on Assigned Data Flags for Test #3516

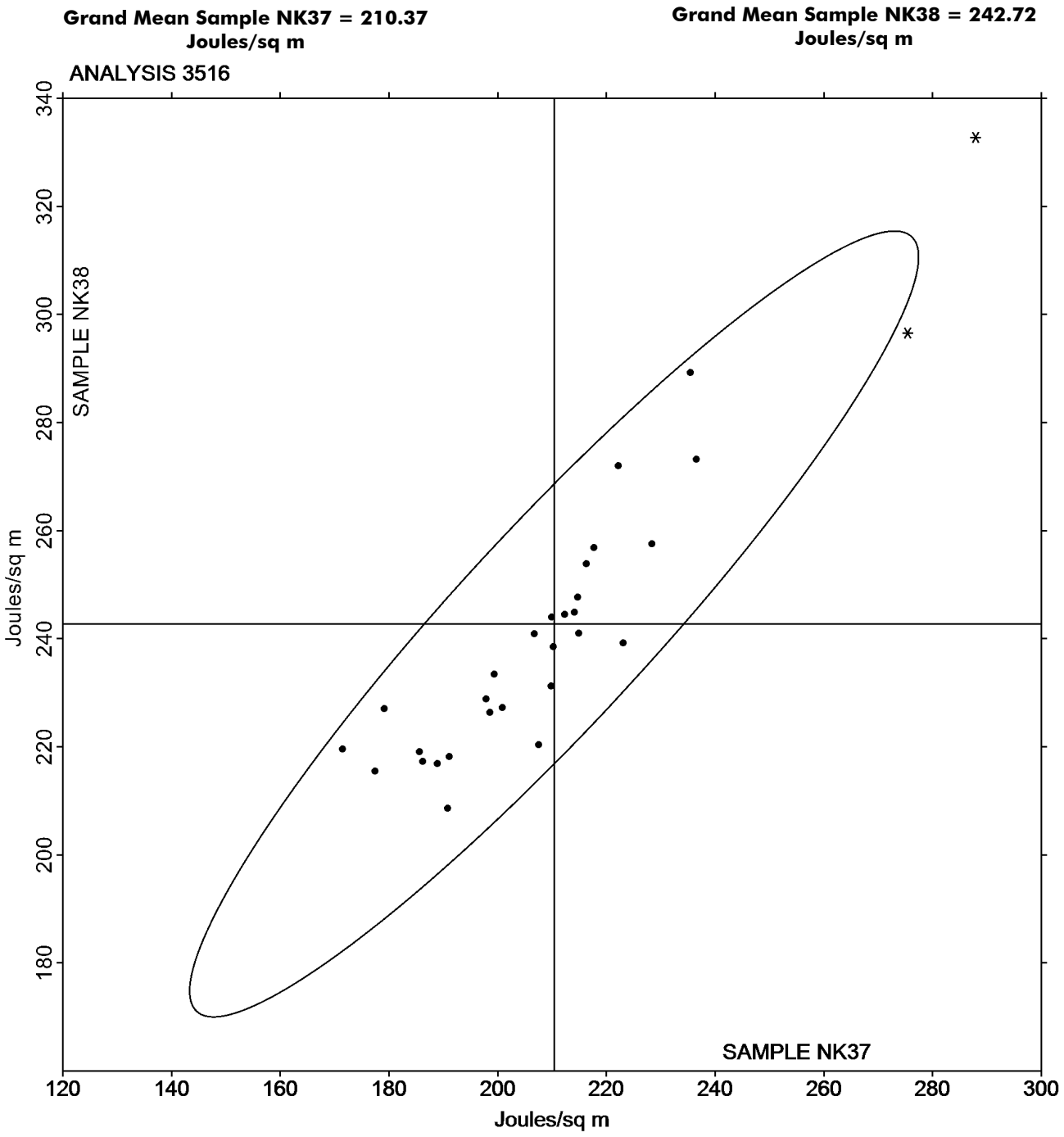
TKJCMP (X) - Data for sample NK38 are low.

Analysis Notes:

6Z24ED - 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	TT	Tinius Olsen Model MHT
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

Report #4342, February 2025

WebCode	Data Flag	Sample NK37 Lab Mean	Sample NK37 Diff from Grand Mean	Sample NK37 CPV	Sample NK38 Lab Mean	Sample NK38 Diff from Grand Mean	Sample NK38 CPV	Instr Code
3ERZ3E		2.170	-0.196	-0.88	2.150	-0.205	-0.86	XX
4PLRNA	*	2.377	0.011	0.05	2.099	-0.256	-1.07	XX
4WKDWW		2.415	0.049	0.22	2.543	0.188	0.79	IN
69C7ZD		2.471	0.105	0.47	2.534	0.179	0.75	XX
6Z24ED		2.607	0.241	1.09	2.597	0.242	1.01	TA
9Q3ETT		2.203	-0.163	-0.73	2.210	-0.145	-0.61	LE
AJXYE6		2.516	0.150	0.68	2.507	0.152	0.64	TX
AUENDB		2.639	0.273	1.23	2.562	0.207	0.87	LX
BMVUJQ		2.274	-0.092	-0.41	2.326	-0.029	-0.12	XX
CBH2M4		2.464	0.098	0.44	2.540	0.185	0.78	XX
CR3RL3		2.122	-0.244	-1.10	2.167	-0.188	-0.79	LX
CV6JWN		2.614	0.248	1.12	2.577	0.222	0.93	TS
G8LW2L		2.808	0.442	1.99	2.726	0.371	1.56	IM
GJEMFX	*	2.994	0.628	2.83	3.025	0.670	2.81	DM
GK6NJ2		2.314	-0.052	-0.23	2.371	0.016	0.07	TT
J33JD4		2.440	0.074	0.33	2.464	0.109	0.46	LE
J66M2K		2.340	-0.026	-0.12	2.260	-0.095	-0.40	TB
J89J4Z		2.198	-0.168	-0.76	2.154	-0.201	-0.84	LE
MBHUQE	X	4.127	1.761	7.93	4.047	1.692	7.09	LW
ND29UE		1.982	-0.384	-1.73	1.878	-0.477	-2.00	LC
Q89U2P		2.340	-0.026	-0.12	2.301	-0.054	-0.23	TH
QKWPKB		2.270	-0.096	-0.43	2.220	-0.135	-0.57	LE
TEKLM8		2.101	-0.265	-1.19	2.194	-0.161	-0.67	LW
TKJCMP	X	2.900	0.534	2.40	2.400	0.045	0.19	LX
UEXJBP		2.099	-0.267	-1.20	2.057	-0.298	-1.25	LC
VGM3X9		2.252	-0.114	-0.51	2.098	-0.257	-1.08	LW
VJP4X6		2.468	0.102	0.46	2.544	0.189	0.79	IM
WDBRCN		2.207	-0.159	-0.72	2.262	-0.093	-0.39	LW
WVVHBN		2.223	-0.143	-0.64	2.241	-0.114	-0.48	LE
XFCF6J		2.499	0.133	0.60	2.593	0.238	1.00	TV
XFYLPJ		2.162	-0.204	-0.92	2.148	-0.207	-0.87	XX
Z2U394		2.252	-0.114	-0.51	2.254	-0.101	-0.42	LE
ZA2YR2		2.641	0.275	1.24	2.577	0.222	0.93	XX
ZRJZM3		2.247	-0.119	-0.54	2.178	-0.177	-0.74	LH

Summary Statistics	Sample NK37	Sample NK38
Grand Means	2.37 Percent	2.35 Percent
Stnd Dev Btwn Labs	0.22 Percent	0.24 Percent

Statistics based on 32 of 34 reporting participants.

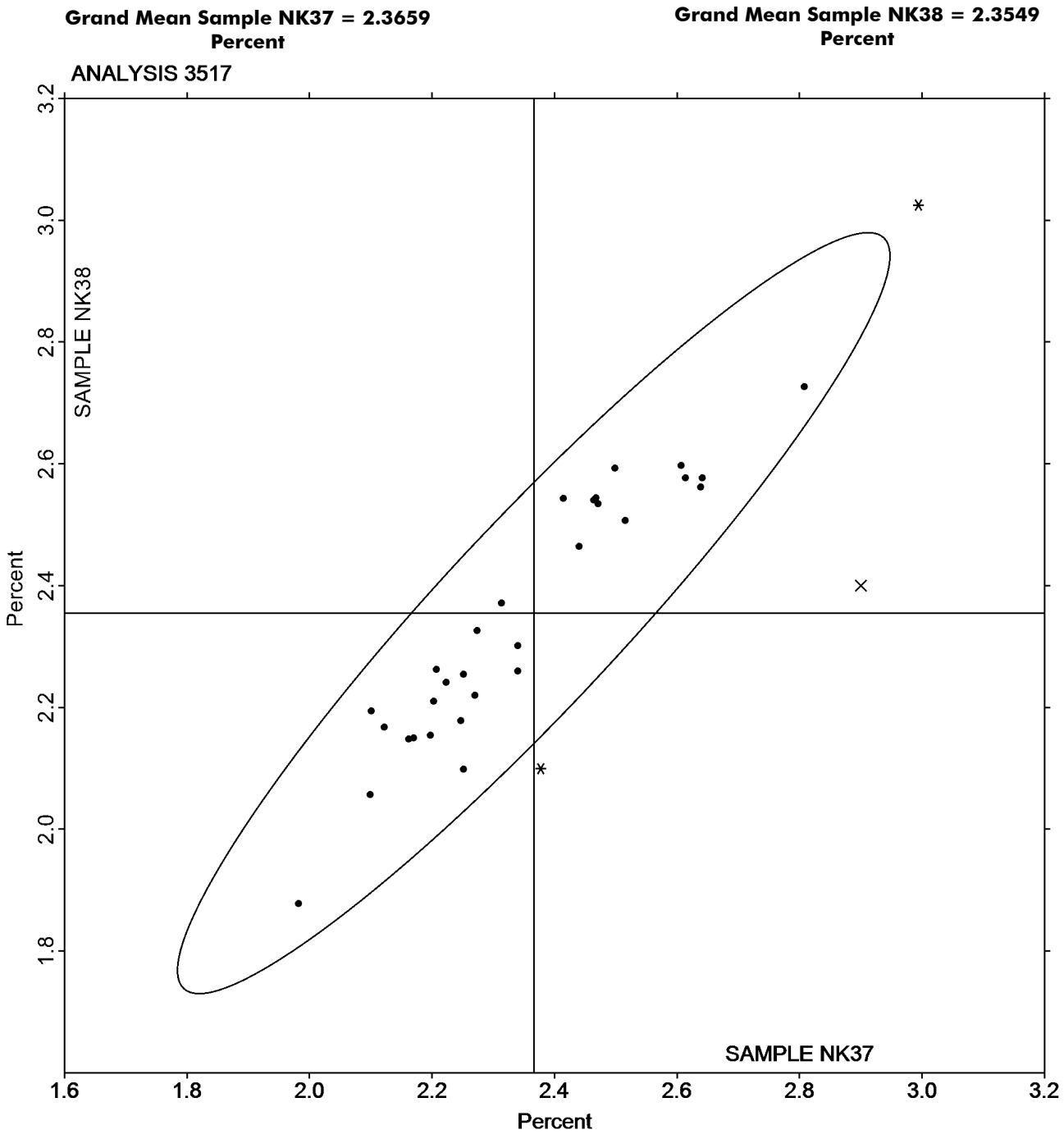
Comments on Assigned Data Flags for Test #3517

MBHUQE (X) - Extreme Data.

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

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
TT	Tinius Olsen Model MHT	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 PS37 Lab Mean	Sample PS37 Diff from Grand Mean	Sample PS37 CPV	Sample PS38 Lab Mean	Sample PS38 Diff from Grand Mean	Sample PS38 CPV	Instr Code
2VXYBG		0.6710	-0.0027	-0.02	0.6650	0.0008	0.01	ZZ
4FW8HC		0.7300	0.0563	0.47	0.6780	0.0138	0.10	ZZ
4VABBX		0.7950	0.1213	1.02	0.8650	0.2008	1.52	ZZ
69C7ZD		0.6230	-0.0507	-0.42	0.6240	-0.0402	-0.30	ZZ
AYV7ER		0.6370	-0.0367	-0.31	0.6510	-0.0132	-0.10	ZZ
BC93Q7	X	1.3920	0.7183	6.01	1.4000	0.7358	5.57	ZZ
BD4LR8		0.6070	-0.0667	-0.56	0.5600	-0.1042	-0.79	ZZ
CR3RL3		0.6820	0.0083	0.07	0.6480	-0.0162	-0.12	ZZ
CV6JWN		0.7970	0.1233	1.03	0.7230	0.0588	0.44	ZZ
DGX3G7	*	1.0160	0.3423	2.87	1.0910	0.4268	3.23	ZZ
DN24H2		0.5440	-0.1297	-1.09	0.5320	-0.1322	-1.00	ZZ
J33JD4		0.5370	-0.1367	-1.14	0.5310	-0.1332	-1.01	ZZ
JLAVYY		0.5590	-0.1147	-0.96	0.5450	-0.1192	-0.90	ZZ
K6MZXV		0.7650	0.0913	0.76	0.7260	0.0618	0.47	ZZ
MTX3RE		0.5710	-0.1027	-0.86	0.5520	-0.1122	-0.85	ZZ
ND29UE		0.5780	-0.0957	-0.80	0.5890	-0.0752	-0.57	ZZ
Q89U2P		0.5890	-0.0847	-0.71	0.5640	-0.1002	-0.76	ZZ
RXZKAQ		0.6430	-0.0307	-0.26	0.6320	-0.0322	-0.24	ZZ
VGM3X9		0.7070	0.0333	0.28	0.7420	0.0778	0.59	ZZ
VRZK8Q		0.5980	-0.0757	-0.63	0.6060	-0.0582	-0.44	ZZ
WNFVJ8		0.6410	-0.0327	-0.27	0.6300	-0.0342	-0.26	ZZ
XAB49M		0.8580	0.1843	1.54	0.7950	0.1308	0.99	ZZ

Summary Statistics	Sample PS37	Sample PS38
Grand Means	0.67 Microns	0.66 Microns
Stnd Dev Btwn Labs	0.12 Microns	0.13 Microns

Statistics based on 21 of 22 reporting participants.

Comments on Assigned Data Flags for Test #3531

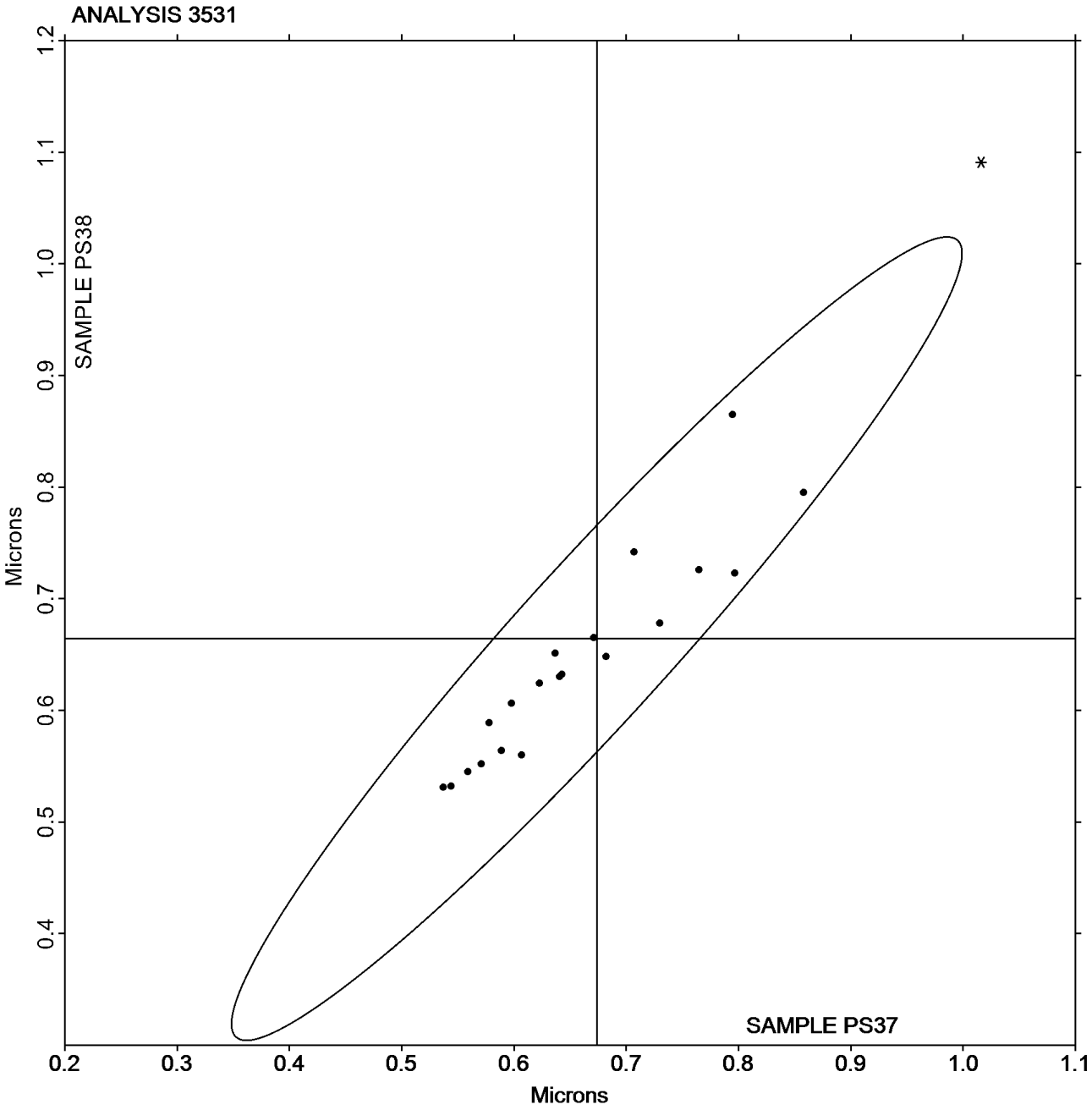
BC93Q7 (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample PS37 = 0.67371 Microns

Grand Mean Sample PS38 = 0.66424 Microns



Paper & Paperboard Interlaboratory Testing Program

Analysis 3545
Directional Brightness
TAPPI Official Test Method T452

WebCode	Data Flag	Sample BR37 Lab Mean	Sample BR37 Diff from Grand Mean	Sample BR37 CPV	Sample BR38 Lab Mean	Sample BR38 Diff from Grand Mean	Sample BR38 CPV	Instr Code
4JVHEC	X	72.46	-4.74	-2.49	71.31	-6.00	-3.26	TP
4PLRNA		77.86	0.66	0.35	78.21	0.90	0.49	XX
AYV7ER		76.67	-0.53	-0.28	76.90	-0.40	-0.22	PP
BD4LR8		78.72	1.52	0.80	78.70	1.39	0.76	TD
BVNCQ8		77.09	-0.11	-0.06	77.47	0.17	0.09	TP
J33JD4		80.31	3.11	1.63	80.08	2.78	1.51	HG
J66M2K		76.90	-0.30	-0.16	77.03	-0.28	-0.15	XD
JLAVYY		77.86	0.66	0.35	77.86	0.55	0.30	HG
KKU9KG		75.92	-1.27	-0.67	76.22	-1.08	-0.59	XX
NWDX8C	*	71.57	-5.62	-2.95	71.68	-5.62	-3.05	LA
PPXEND		77.60	0.40	0.21	77.45	0.14	0.08	HG
PZF3GQ		76.06	-1.13	-0.59	76.28	-1.03	-0.56	TS
Q89U2P		76.78	-0.42	-0.22	76.81	-0.49	-0.27	TP
RXZKAQ		75.72	-1.47	-0.77	75.79	-1.52	-0.82	TP
TEKLM8		76.14	-1.05	-0.55	76.06	-1.24	-0.67	TS
VGM3X9		77.01	-0.18	-0.10	77.14	-0.17	-0.09	TP
VRZK8Q		79.89	2.70	1.41	79.77	2.47	1.34	HG
WNFVJ8		79.13	1.93	1.01	79.36	2.05	1.12	TP
WWQ2DP		79.56	2.36	1.24	79.48	2.17	1.18	TP
XAB49M		76.92	-0.27	-0.14	77.00	-0.31	-0.17	HZ
ZN68QH		76.21	-0.98	-0.52	76.80	-0.51	-0.28	XX

Summary Statistics	Sample BR37	Sample BR38
Grand Means	77.20 Percent	77.30 Percent
Stnd Dev Btwn Labs	1.91 Percent	1.84 Percent

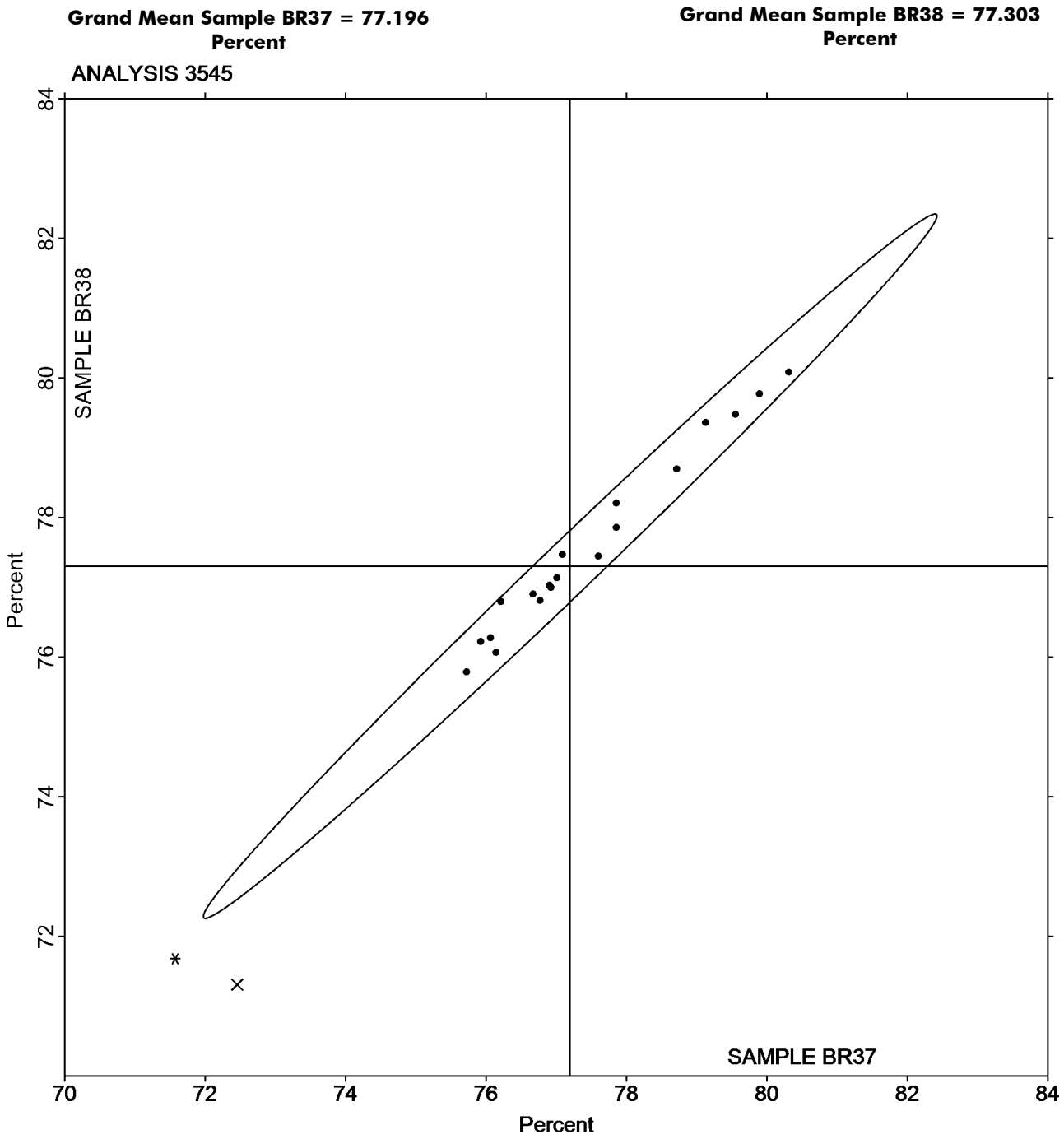
Statistics based on 20 of 21 reporting participants.

Comments on Assigned Data Flags for Test #3545

4JVHEC (X) - Data for sample BR38 are low. Inconsistent within the determinations of both samples.

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	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

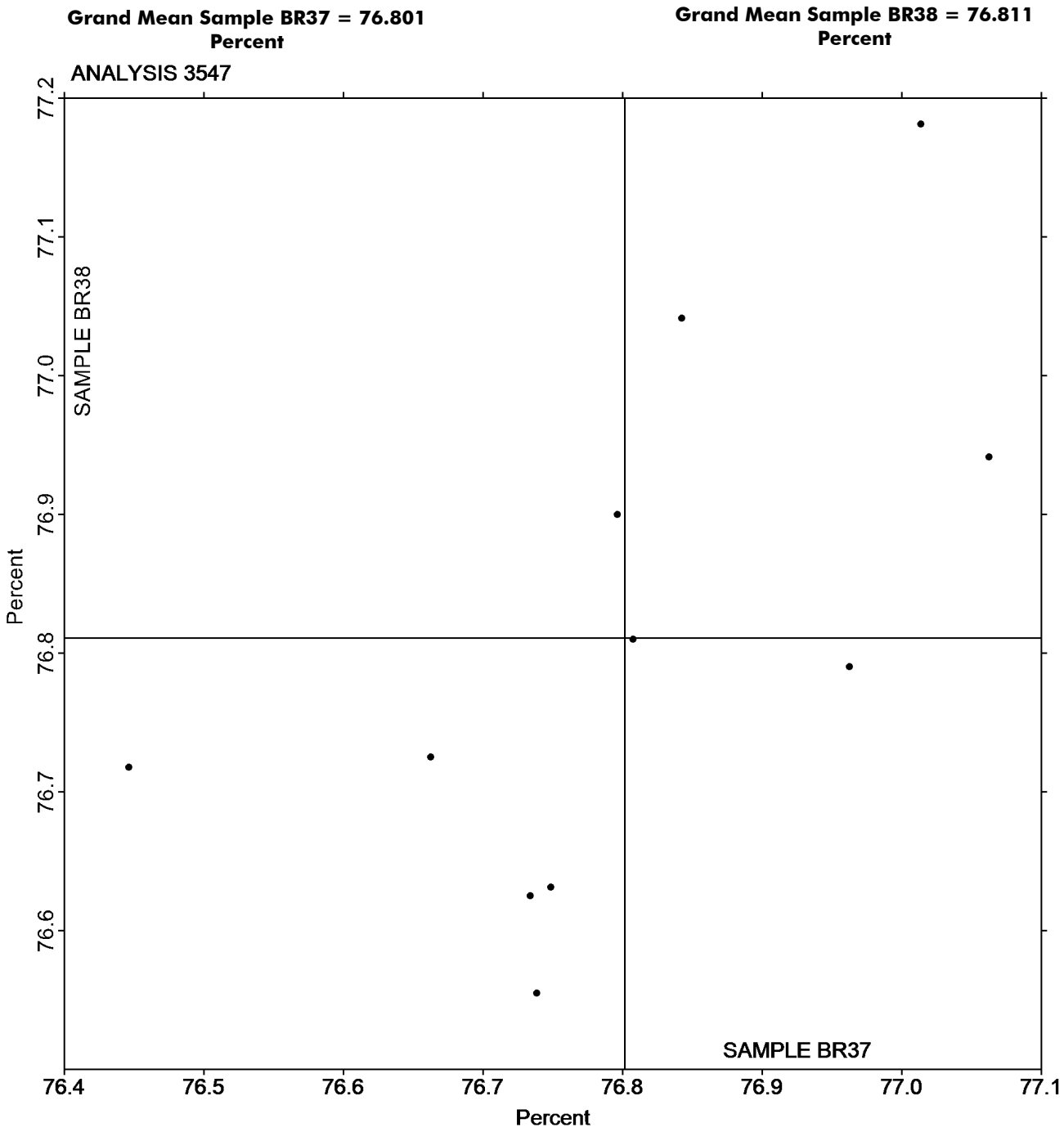
WebCode	Data Flag	Sample BR37 Lab Mean	Sample BR37 Diff from Grand Mean	Sample BR37 CPV	Sample BR38 Lab Mean	Sample BR38 Diff from Grand Mean	Sample BR38 CPV	Instr Code
4VABBX		77.06	0.26	1.51	76.94	0.13	0.68	TC
8C67T7		76.73	-0.07	-0.39	76.63	-0.19	-0.97	LA
BD4LR8		76.45	-0.36	-2.06	76.72	-0.09	-0.49	TD
CR3RL3		76.80	-0.01	-0.03	76.90	0.09	0.47	LT
CV6JWN		77.01	0.21	1.23	77.18	0.37	1.94	LT
JLAVYY		76.81	0.01	0.04	76.81	0.00	0.00	TC
MBHUQE		76.96	0.16	0.93	76.79	-0.02	-0.11	LT
Q89U2P		76.66	-0.14	-0.80	76.73	-0.09	-0.45	LT
VGM3X9		76.75	-0.05	-0.30	76.63	-0.18	-0.94	EA
WNFVJ8		76.74	-0.06	-0.36	76.56	-0.26	-1.34	TC
WYVRHJ		76.84	0.04	0.24	77.04	0.23	1.21	LE

Summary Statistics	Sample BR37	Sample BR38
Grand Means	76.80 Percent	76.81 Percent
Stnd Dev Btwn Labs	0.17 Percent	0.19 Percent

Statistics based on 11 of 11 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	TD	Technidyne Color Touch X



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 #4342, February 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
4FW8HC		CA37	89.71	0.33	-0.44	-0.03	0.07	-0.04	0.09	TC
		CA38	89.69	0.40	-0.48					
4PLRNA		CA37	90.33	0.29	-0.35	0.04	-0.06	0.09	0.12	XX
		CA38	90.37	0.23	-0.26					
77LGZX		CA37	89.62	-0.39	-0.01	0.19	-0.01	-0.05	0.20	NH
		CA38	89.81	-0.39	-0.06					
AYV7ER		CA37	86.83	0.31	-0.39	0.00	0.00	0.24	0.24	TC
		CA38	86.83	0.31	-0.15					
BD4LR8		CA37	86.86	0.30	-0.34	0.00	0.05	0.04	0.06	TC
		CA38	86.86	0.34	-0.30					
DGX3G7		CA37	88.45	0.80	-0.93	0.00	0.07	-0.15	0.16	TC
		CA38	88.45	0.87	-1.08					
J33JD4		CA37	87.49	0.78	-0.82	0.00	0.03	0.02	0.04	HK
		CA38	87.49	0.82	-0.80					
JLAVYY		CA37	87.58	0.79	-0.48	-0.20	0.00	-0.06	0.21	HK
		CA38	87.38	0.79	-0.55					
NWDX8C		CA37	86.95	-0.47	0.26	-0.07	0.02	-0.02	0.07	XX
		CA38	86.88	-0.45	0.24					
PECAGD		CA37	85.85	0.96	-0.58	0.00	0.05	-0.09	0.10	TS
		CA38	85.84	1.02	-0.67					
TE2PCT		CA37	89.68	0.41	-0.12	0.07	0.07	-0.12	0.15	TC
		CA38	89.75	0.47	-0.24					
VRZK8Q		CA37	87.13	0.62	-0.47	-0.25	0.08	-0.24	0.35	HK
		CA38	86.88	0.70	-0.71					
WNFVJ8		CA37	86.79	0.31	-0.36	0.16	-0.05	0.16	0.23	TC
		CA38	86.95	0.26	-0.20					

Summary Statistics

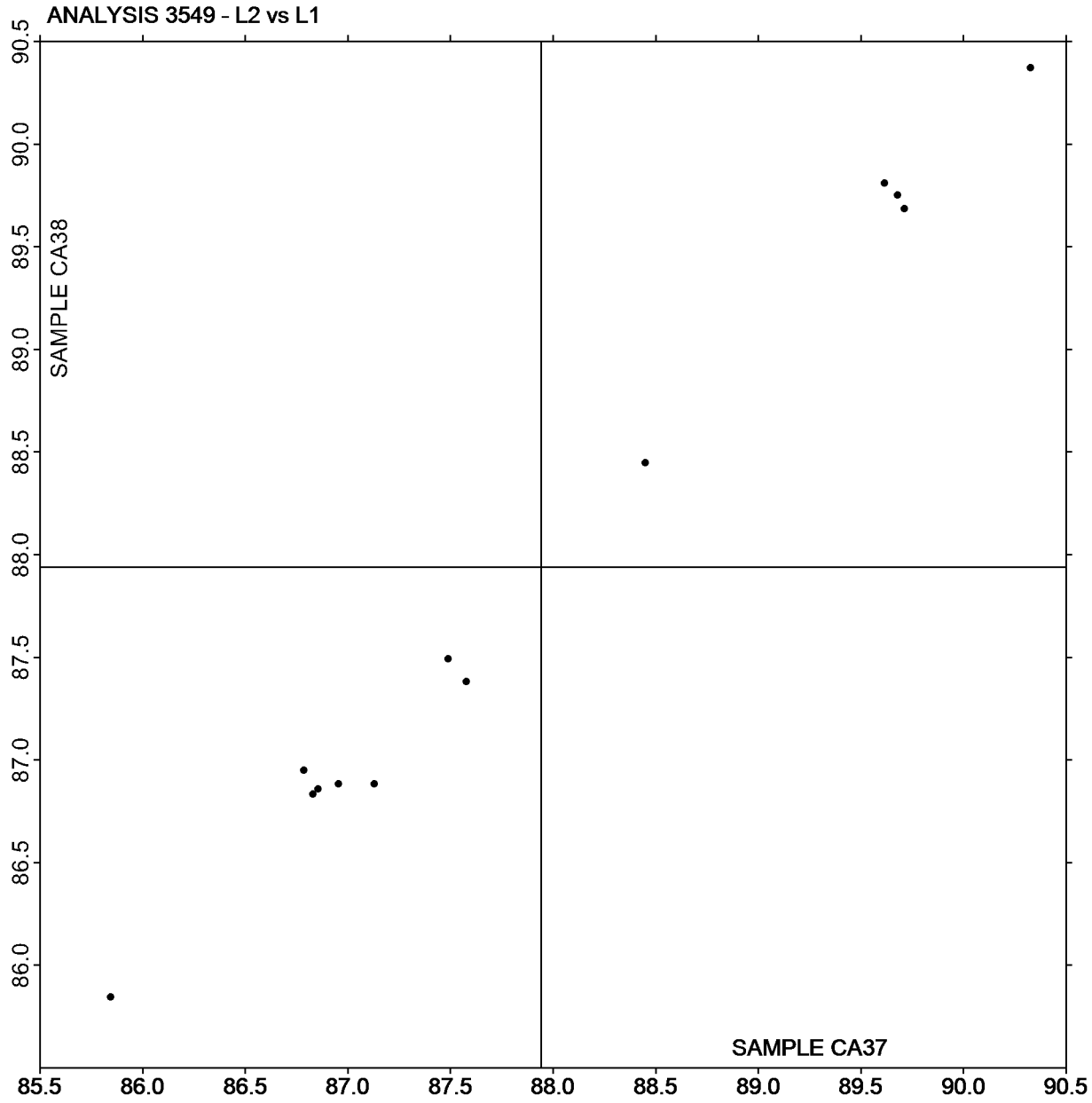
Grand Means							
CA37	87.942	0.388	-0.389	-0.004	0.025	-0.016	0.157
CA38	87.938	0.413	-0.405				
Stnd Dev Btwn Labs							
CA37	1.444	0.431	0.313	0.121	0.045	0.129	0.089
CA38	1.486	0.449	0.354				

Statistics based on 13 of 13 reporting participants

Key to Instrument Codes Reported by Participants

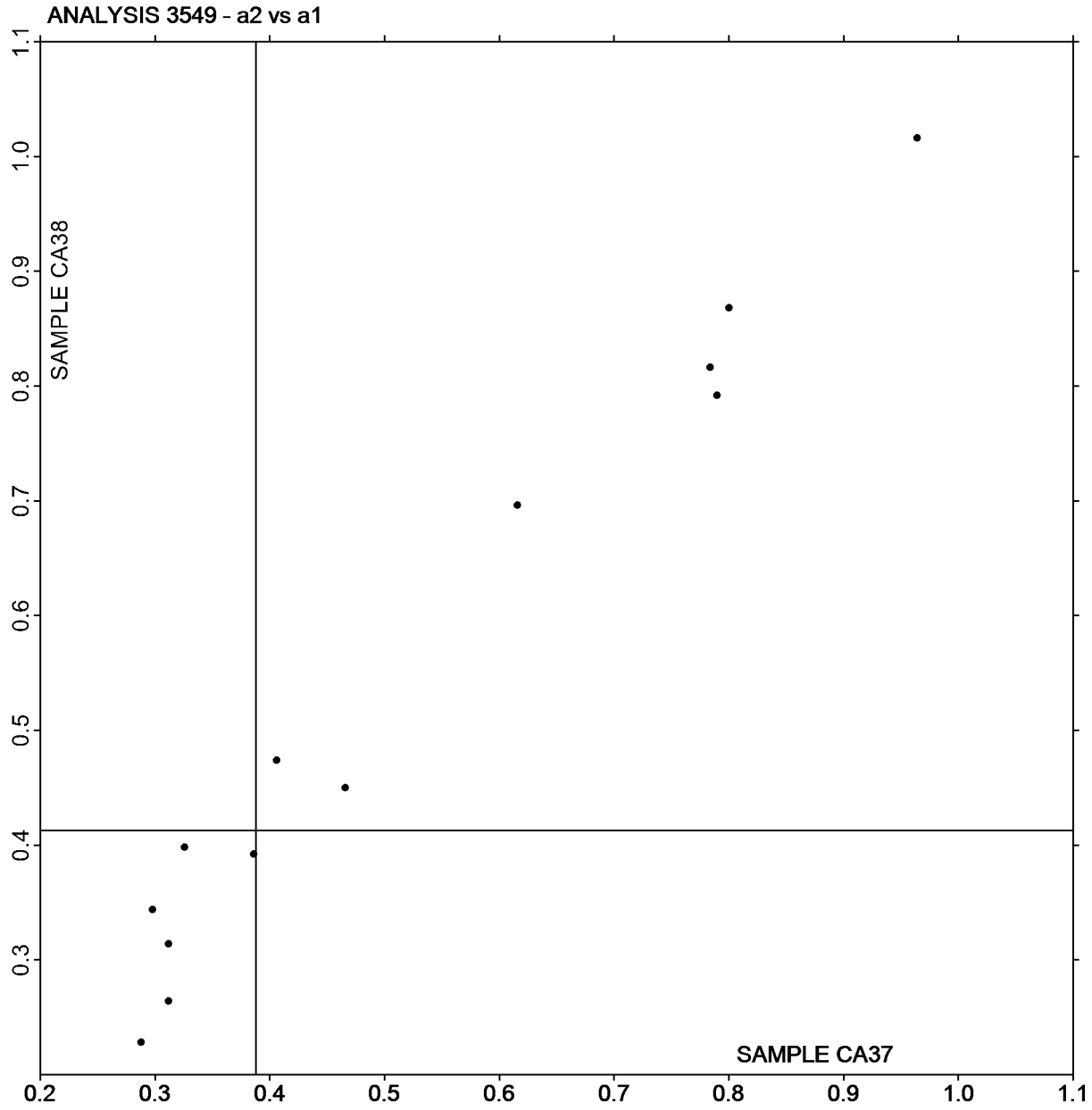
HK	Hunter LabScan XE	NH	Minolta CM-3700A Spectrophotometer
TC	Technidyne Color Touch Series	TS	Technidyne Brightimeter Micro S-5
XX	Instrument make/model not specified by lab		

Plot of L values CA38 vs L values CA37



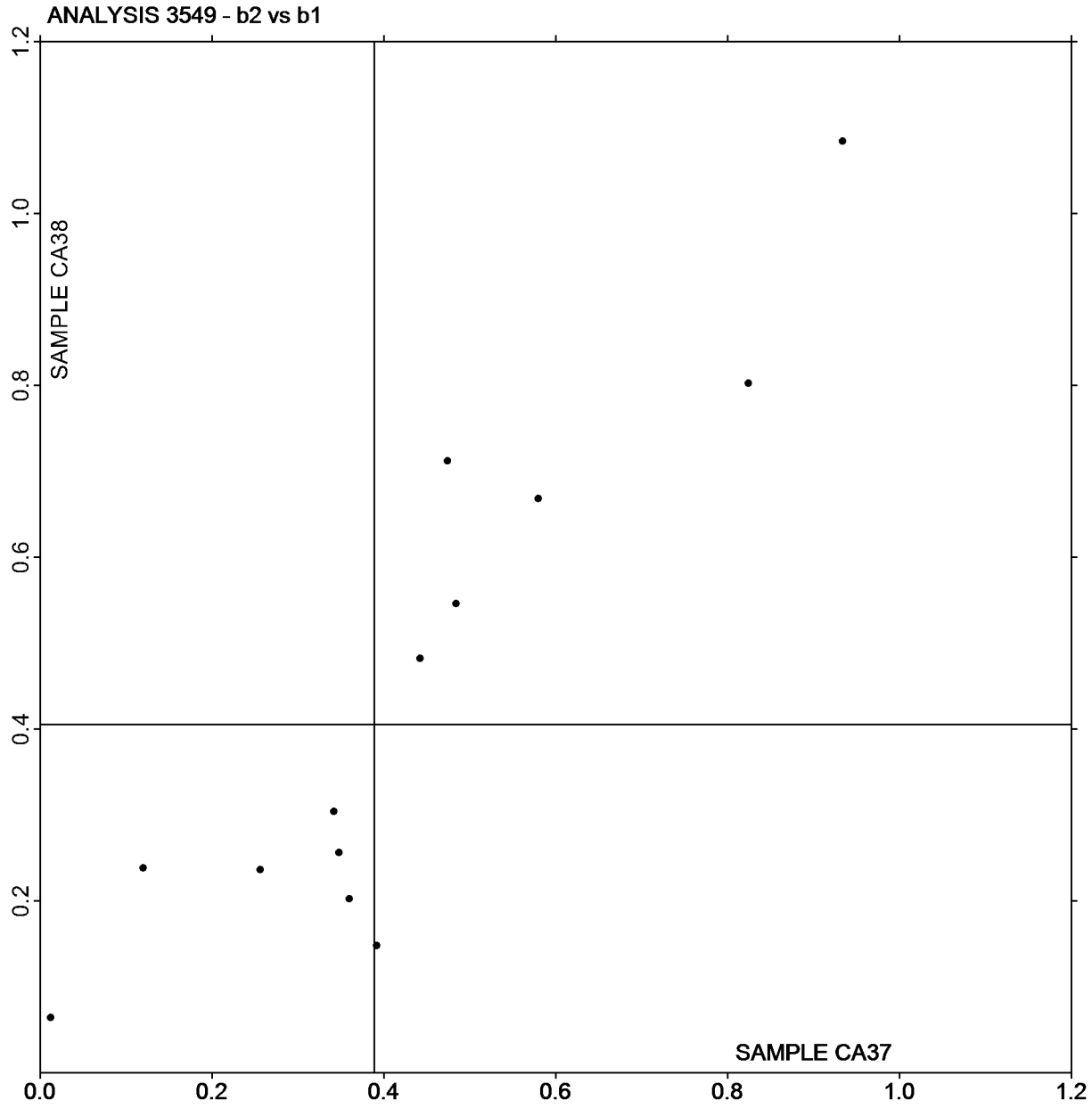
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA38 vs a values CA37



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 CA38 vs b values CA37



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 #4342, February 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
BVNCQ8		**CA37**	89.76	-0.43	0.49	-0.12	0.01	-0.35	0.37	NG
		CA38	89.64	-0.42	0.13					
CGMZV9		**CA37**	89.82	-0.64	0.02	-0.21	0.06	-0.37	0.43	TC
		CA38	89.61	-0.58	-0.35					
JJNCUU		**CA37**	89.92	-0.54	0.06	-0.24	0.01	-0.21	0.32	XX
		CA38	89.68	-0.53	-0.15					
JLAVYY		**CA37**	87.29	-0.60	0.08	-0.14	0.02	-0.08	0.17	TC
		CA38	87.15	-0.58	0.00					
K8N3NX		**CA37**	89.80	-0.56	0.09	-0.15	0.01	-0.20	0.25	XX
		CA38	89.64	-0.55	-0.11					
MBHUQE		**CA37**	89.68	0.36	-0.55	-0.13	0.02	-0.06	0.15	LS
		CA38	89.55	0.37	-0.61					
Q89U2P		**CA37**	89.63	-0.48	0.13	-0.08	0.00	-0.09	0.12	LT
		CA38	89.55	-0.49	0.05					
RV9J7N		**CA37**	89.99	-0.28	-0.27	-0.10	0.02	-0.18	0.21	NF
		CA38	89.89	-0.26	-0.45					
RXZKAQ		**CA37**	88.11	-0.54	0.05	-0.32	0.02	-0.28	0.43	HL
		CA38	87.79	-0.53	-0.23					
VGM3X9		**CA37**	89.56	-0.51	-0.26	0.23 X	-0.05 X	0.40 X	0.46	EG
		CA38	89.79	-0.55	0.15					
XYPY2M		**CA37**	89.83	-0.41	0.24	-0.13	0.02	-0.17	0.21	NH
		CA38	89.70	-0.39	0.07					
ZN68QH		**CA37**	89.73	-0.37	0.29	-0.05	0.01	-0.08	0.10	XX
		CA38	89.68	-0.36	0.21					

Summary Statistics

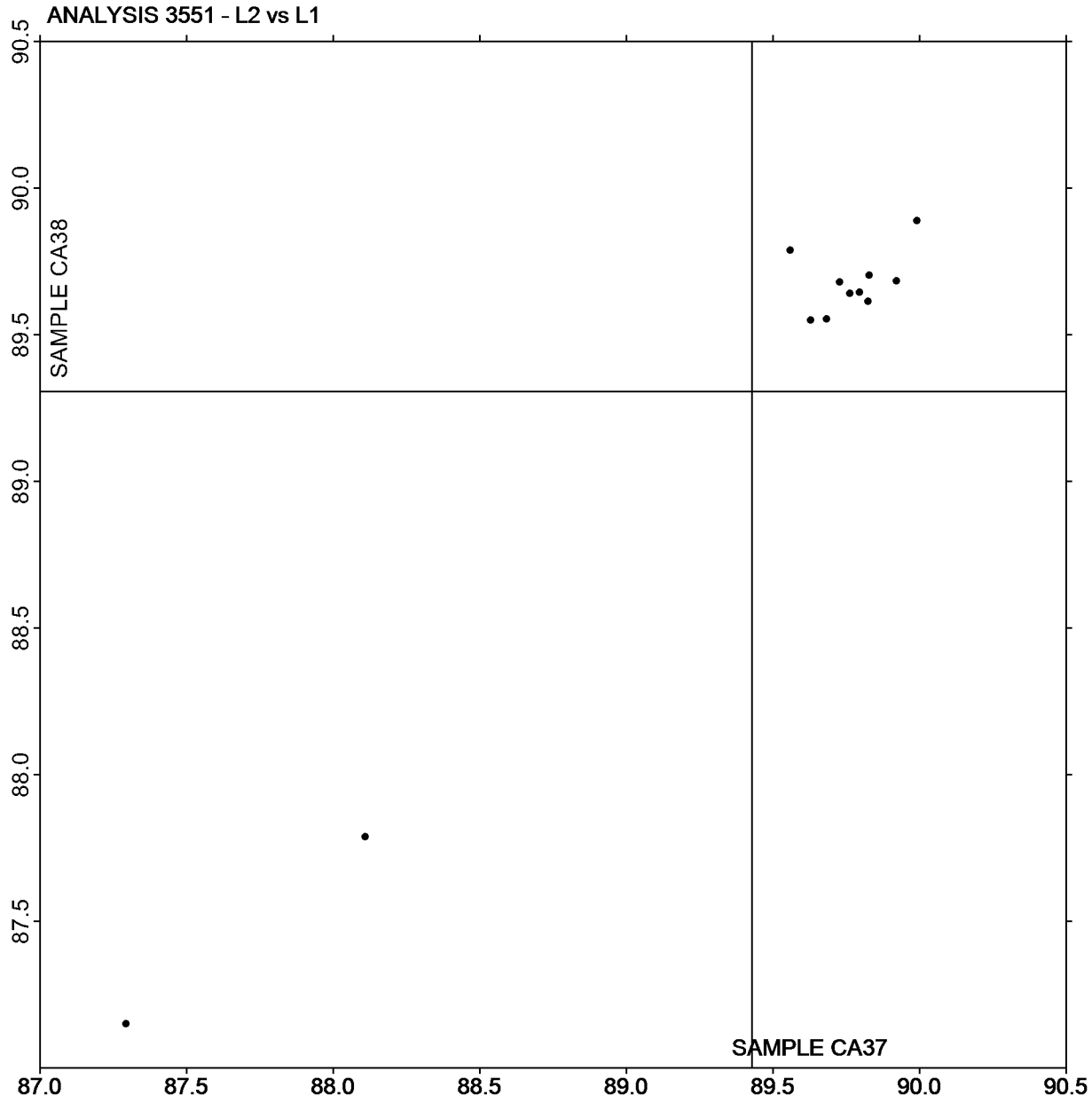
Grand Means							
CA37	89.427	-0.417	0.032	-0.120	0.011	-0.139	0.267
CA38	89.307	-0.406	-0.108				
Stnd Dev Btwn Labs							
CA37	0.833	0.264	0.277	0.132	0.024	0.199	0.131
CA38	0.874	0.264	0.258				

Statistics based on 12 of 12 reporting participants

Key to Instrument Codes Reported by Participants

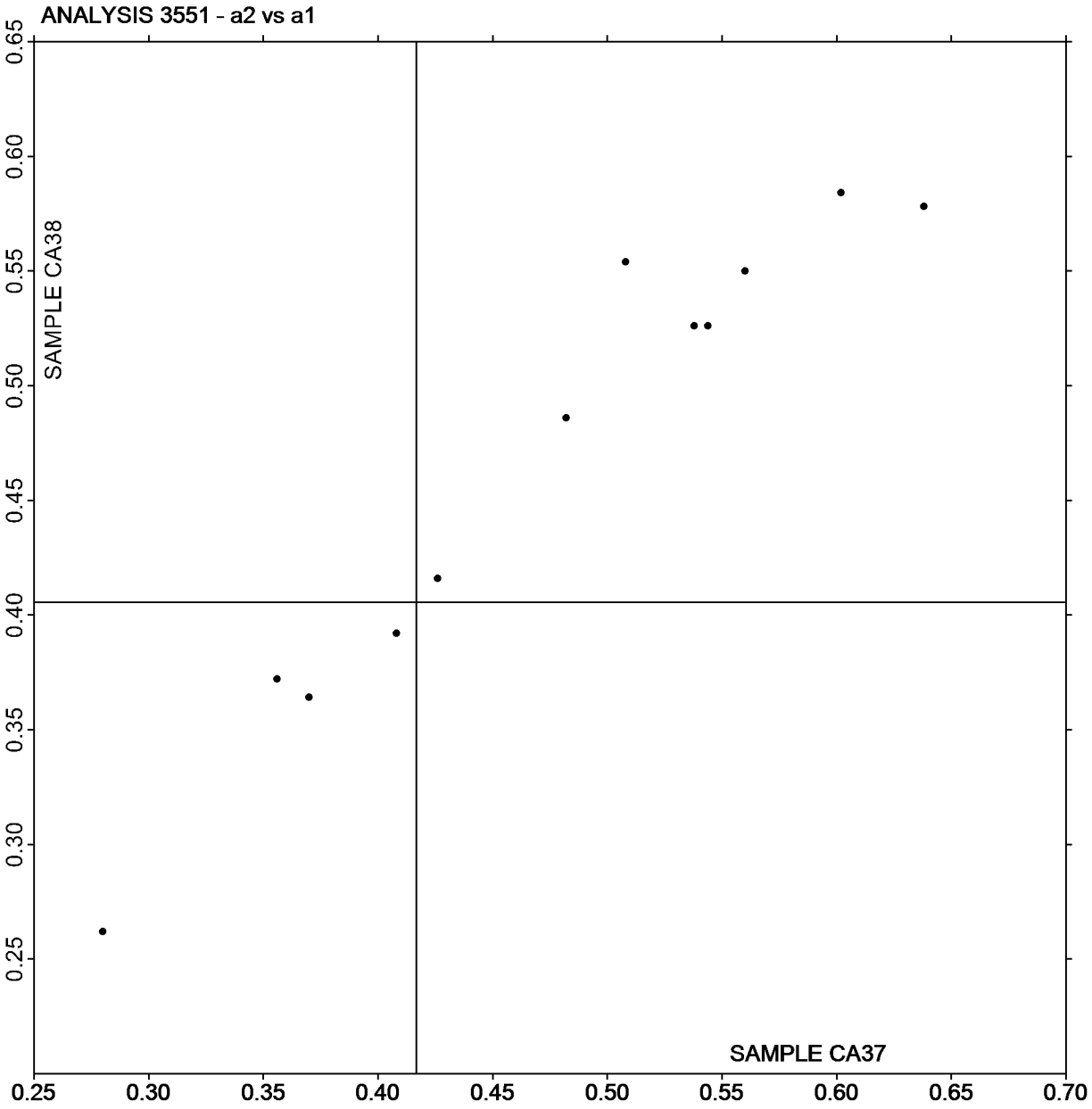
EG	Datacolor Elrepho	HL	Hunter Agera
LS	L & W Elrepho SE 070	LT	L & W Elrepho SE 071
NF	Minolta CM-3600d Spectrophotometer	NG	Minolta CM-3700d Spectrophotometer
NH	Minolta CM-3700A Spectrophotometer	TC	Technidyne Color Touch Series
XX	Instrument make/model not specified by lab		

Plot of L values CA38 vs L values CA37



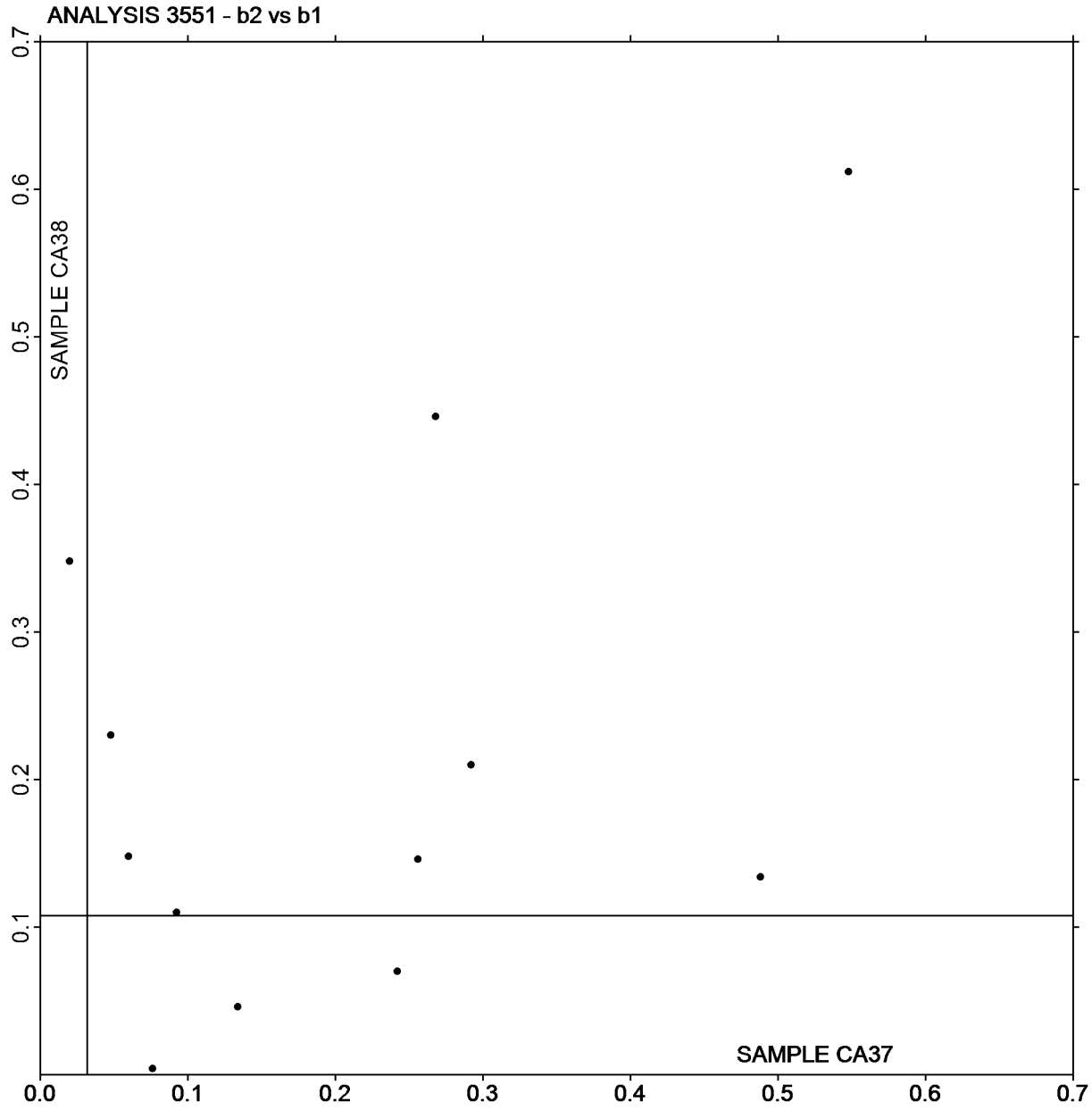
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA38 vs a values CA37



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 CA38 vs b values CA37



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

Report #4342, February 2025

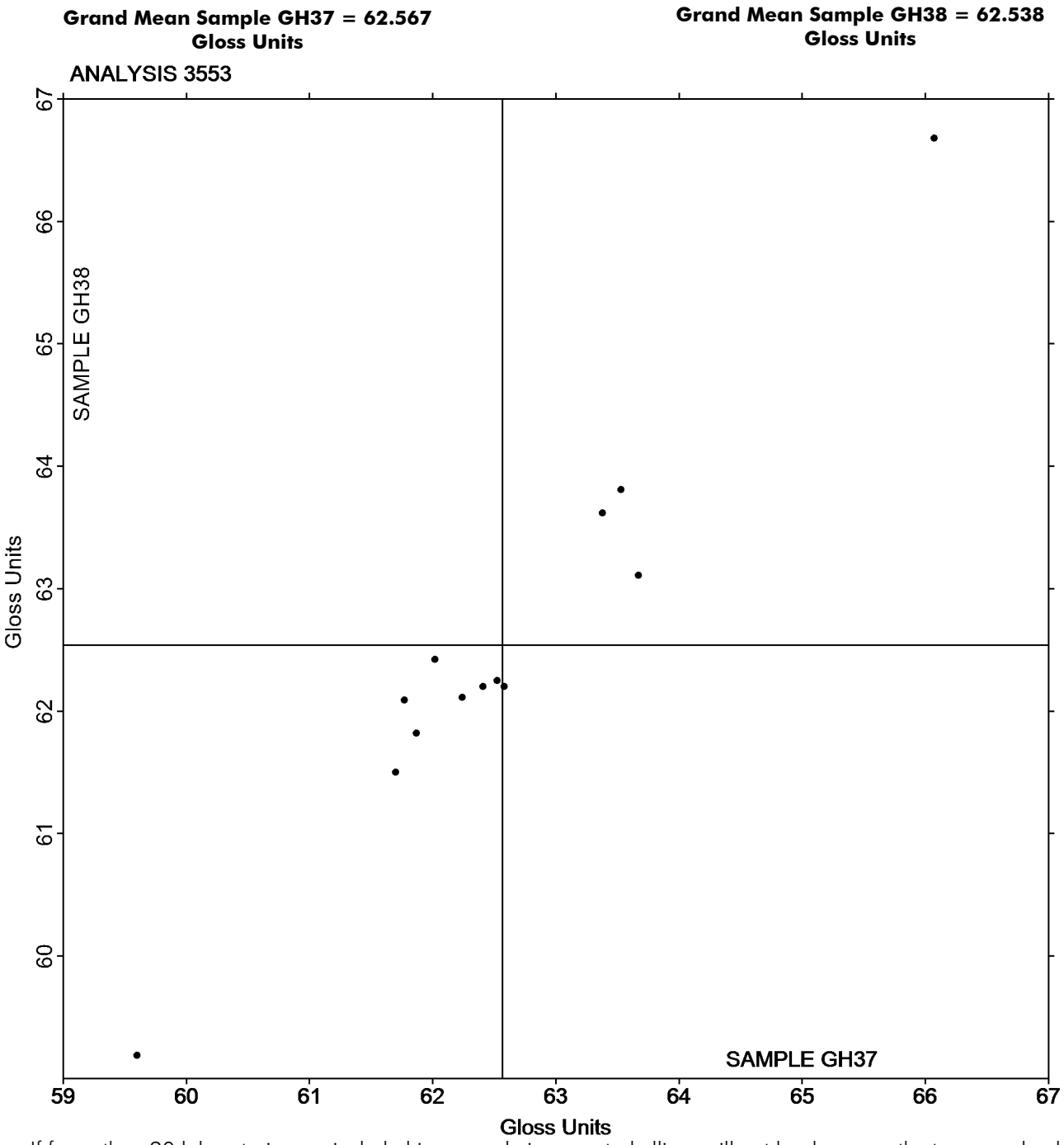
WebCode	Data Flag	Sample GH37 Lab Mean	Sample GH37 Diff from Grand Mean	Sample GH37 CPV	Sample GH38 Lab Mean	Sample GH38 Diff from Grand Mean	Sample GH38 CPV	Instr Code
443TJF		61.77	-0.80	-0.54	62.09	-0.45	-0.27	GM
4FW8HC		62.41	-0.16	-0.11	62.20	-0.34	-0.20	LF
AYV7ER		62.53	-0.04	-0.03	62.25	-0.29	-0.17	PP
BD4LR8		62.58	0.01	0.01	62.20	-0.34	-0.20	TA
CR3RL3		63.53	0.96	0.65	63.81	1.27	0.76	LW
J33JD4		61.70	-0.87	-0.59	61.50	-1.04	-0.62	PP
K6MZXV		66.07	3.50	2.37	66.68	4.14	2.47	LF
MTX3RE		63.67	1.10	0.75	63.11	0.57	0.34	VM
ND29UE		63.38	0.81	0.55	63.62	1.08	0.64	LG
Q89U2P		59.60	-2.97	-2.01	59.19	-3.35	-2.00	GA
VGM3X9		62.24	-0.33	-0.22	62.11	-0.43	-0.26	TH
VRZK8Q		61.87	-0.70	-0.47	61.82	-0.72	-0.43	TP
WNFVJ8		62.02	-0.55	-0.37	62.42	-0.12	-0.07	GM

Summary Statistics	Sample GH37	Sample GH38
Grand Means	62.57 Gloss Units	62.54 Gloss Units
Stnd Dev Btwn Labs	1.48 Gloss Units	1.68 Gloss Units

Statistics based on 13 of 13 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
LW	L & W Gloss Tester	PP	Technidyne Profile/Plus
TA	Technidyne Test Plus Gloss 75 degree	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

Report #4342, February 2025

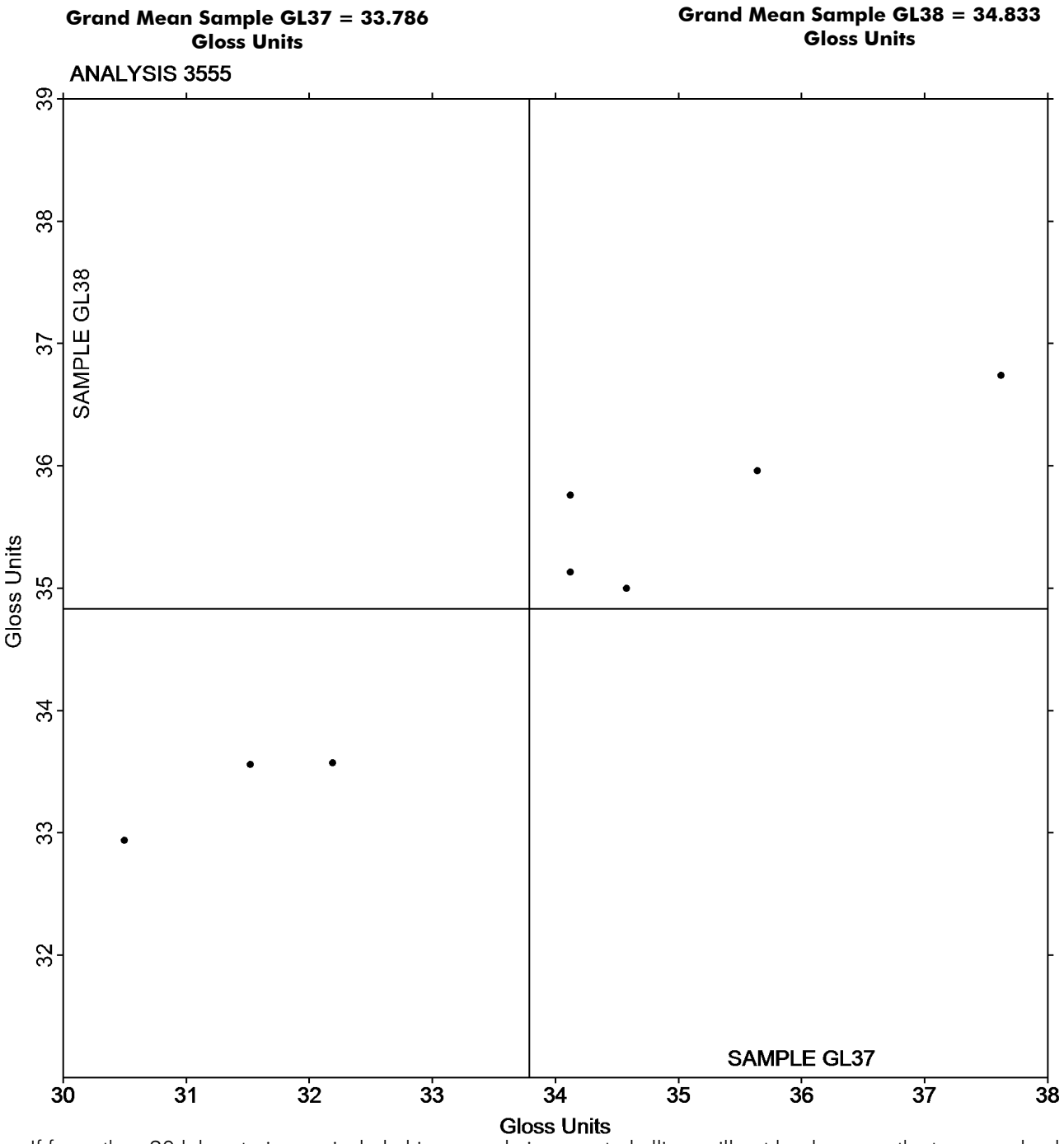
WebCode	Data Flag	Sample GL37 Lab Mean	Sample GL37 Diff from Grand Mean	Sample GL37 CPV	Sample GL38 Lab Mean	Sample GL38 Diff from Grand Mean	Sample GL38 CPV	Instr Code
BD4LR8		32.19	-1.60	-0.69	33.57	-1.26	-0.94	TA
CR3RL3		35.64	1.85	0.80	35.96	1.13	0.84	LW
J66M2K		30.50	-3.29	-1.42	32.94	-1.89	-1.41	TH
J89J4Z		31.52	-2.27	-0.98	33.56	-1.27	-0.95	GM
JLAVYY		37.62	3.83	1.66	36.74	1.91	1.42	PP
PECAGD		34.58	0.79	0.34	35.00	0.17	0.12	TP
T4H8KL		34.12	0.33	0.14	35.76	0.93	0.69	WJ
XAB49M		34.12	0.33	0.14	35.13	0.30	0.22	GS

Summary Statistics	Sample GL37	Sample GL38
Grand Means	33.79 Gloss Units	34.83 Gloss Units
Stnd Dev Btwn Labs	2.31 Gloss Units	1.35 Gloss Units

Statistics based on 8 of 8 reporting participants.

Key to Instrument Codes Reported by Participants

GM	BYK-Gardner micro-gloss	GS	BYK-Gardner Glossgard II
LW	L & W Gloss Tester	PP	Technidyne Profile/Plus
TA	Technidyne Test Plus Gloss 75 degree	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

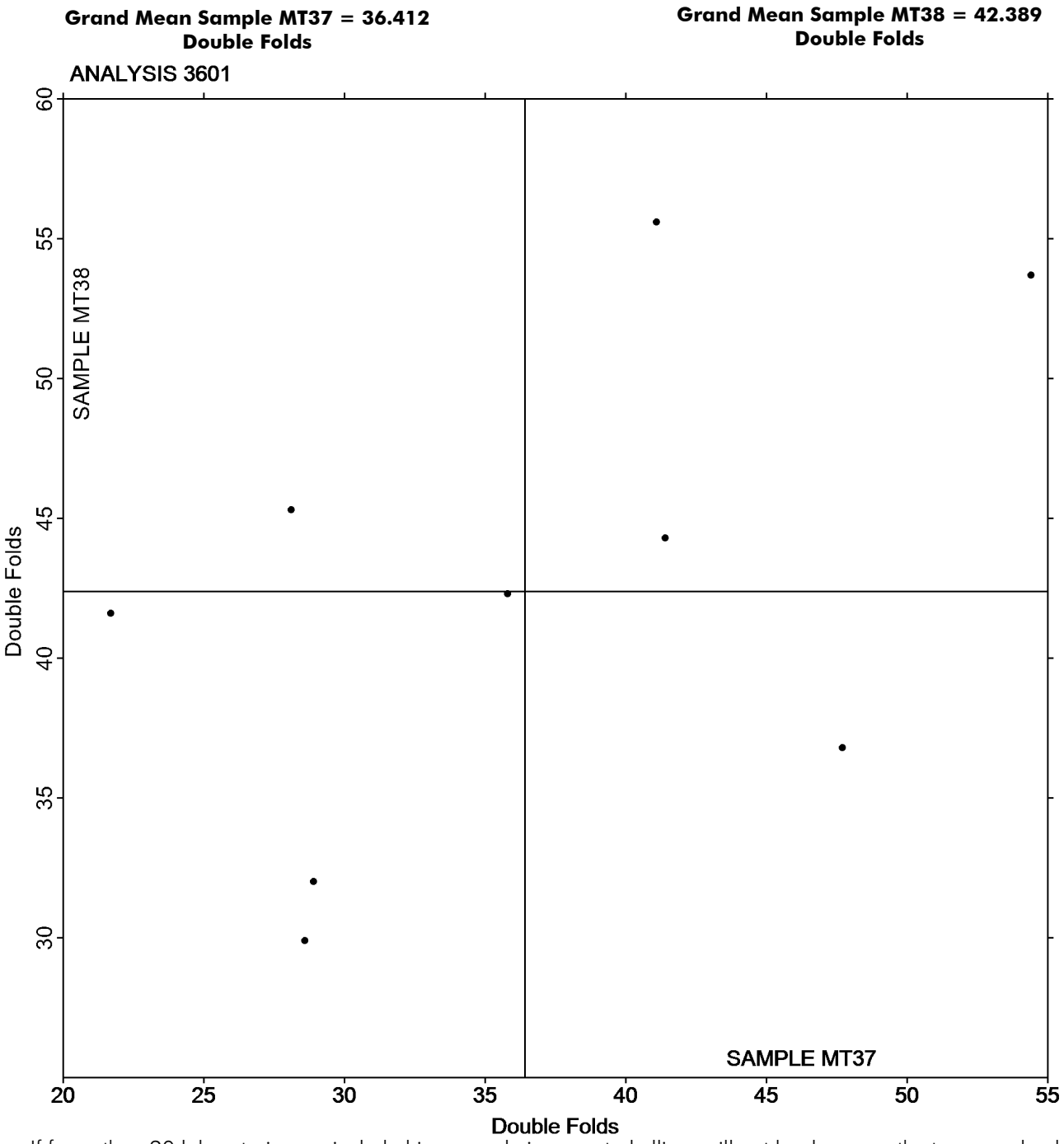
WebCode	Data Flag	Sample MT37 Lab Mean	Sample MT37 Diff from Grand Mean	Sample MT37 CPV	Sample MT38 Lab Mean	Sample MT38 Diff from Grand Mean	Sample MT38 CPV	Instr Code
46EHQX		35.80	-0.61	-0.06	42.30	-0.09	-0.01	XX
DX828P		41.40	4.99	0.47	44.30	1.91	0.22	MT
ELVVY9		54.40	17.99	1.69	53.70	11.31	1.29	MT
G8LW2L		28.11	-8.30	-0.78	45.30	2.91	0.33	MT
J66M2K		47.70	11.29	1.06	36.80	-5.59	-0.64	MT
JJNCUU		28.90	-7.51	-0.71	32.00	-10.39	-1.19	XX
MTX3RE		21.70	-14.71	-1.39	41.60	-0.79	-0.09	MT
Q89U2P		28.60	-7.81	-0.74	29.90	-12.49	-1.43	MT
VGM3X9		41.10	4.69	0.44	55.60	13.21	1.51	MT

Summary Statistics	Sample MT37	Sample MT38
Grand Means	36.41 Double Folds	42.39 Double Folds
Stnd Dev Btwn Labs	10.61 Double Folds	8.73 Double Folds

Statistics based on 9 of 9 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 BG37 Lab Mean	Sample BG37 Diff from Grand Mean	Sample BG37 CPV	Sample BG38 Lab Mean	Sample BG38 Diff from Grand Mean	Sample BG38 CPV	Instr Code
26NM7K		112.3	-6.4	-0.32	115.6	-2.9	-0.15	ZZ
4VABBX		127.4	8.7	0.44	122.1	3.5	0.18	ZZ
77LGZX	X	4.3	-114.4	-5.78	4.5	-114.1	-5.69	ZZ
DN24H2		124.1	5.4	0.27	129.2	10.6	0.53	ZZ
DX828P		120.2	1.5	0.08	114.1	-4.5	-0.22	ZZ
J66M2K		138.3	19.5	0.99	137.4	18.8	0.94	ZZ
KKU9KG	X	265.3	146.6	7.40	254.2	135.6	6.76	ZZ
MTX3RE		72.5	-46.2	-2.33	70.4	-48.2	-2.40	ZZ
RXZKAQ		115.0	-3.7	-0.19	121.2	2.6	0.13	ZZ
TBLAQ8		140.1	21.3	1.08	138.1	19.5	0.97	ZZ
XYPY2M		118.6	-0.1	-0.01	119.0	0.4	0.02	ZZ

Summary Statistics	Sample BG37	Sample BG38
Grand Means	118.72 Gurley Units	118.57 Gurley Units
Stnd Dev Btwn Labs	19.80 Gurley Units	20.05 Gurley Units

Statistics based on 9 of 11 reporting participants.

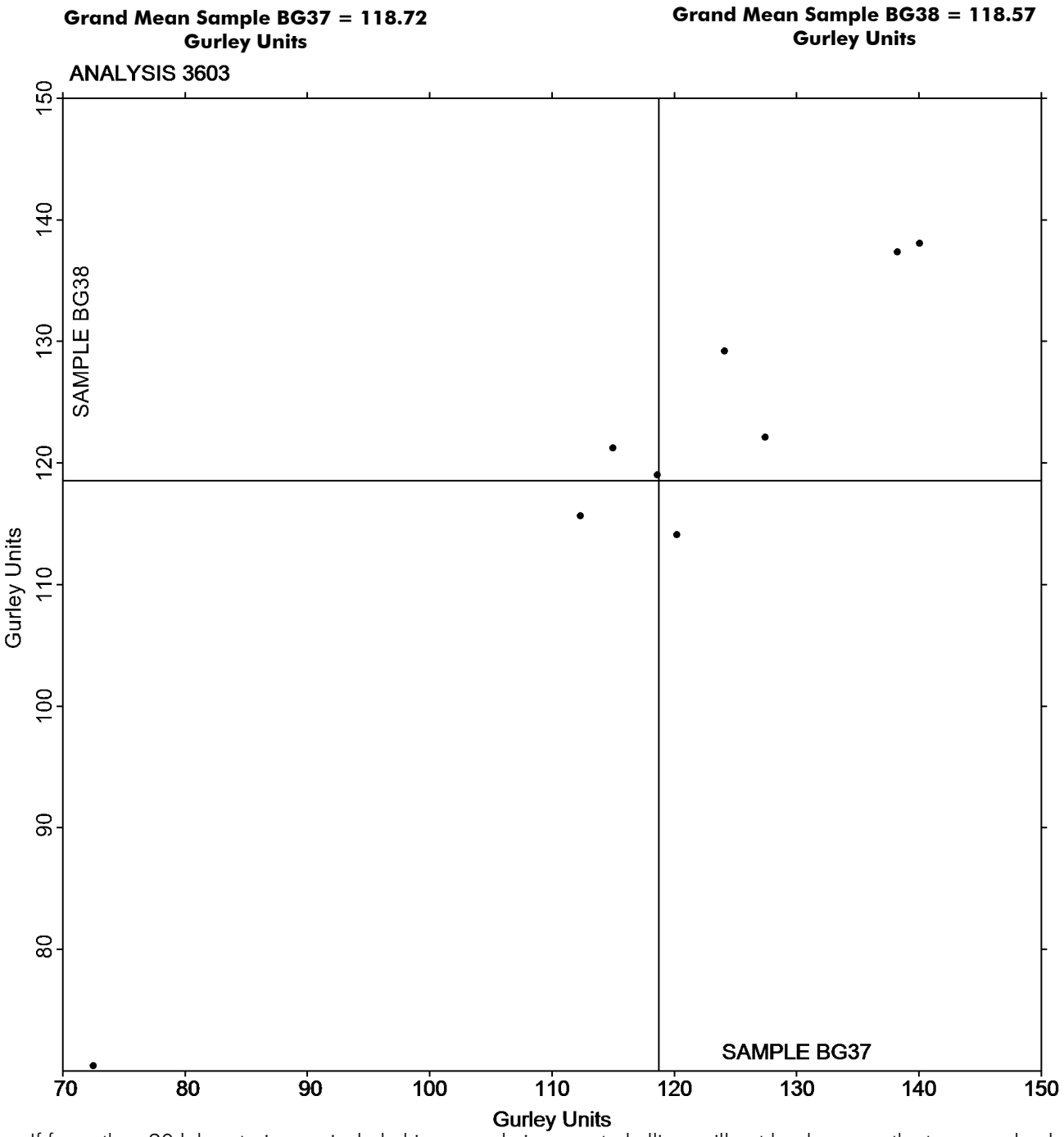
Comments on Assigned Data Flags for Test #3603

KKU9KG (X) - Extreme Data.

77LGZX (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

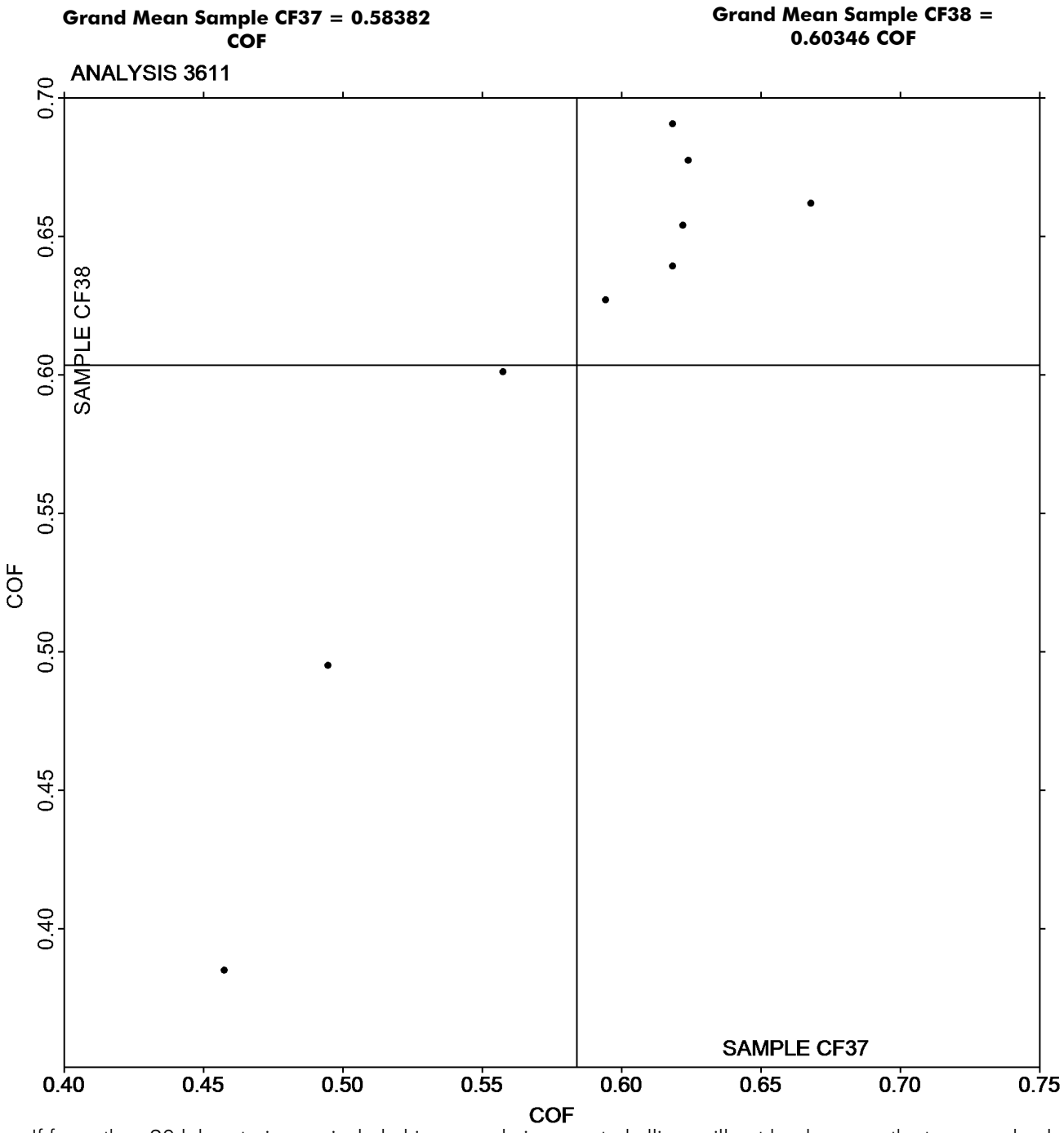
WebCode	Data Flag	Sample CF37 Lab Mean	Sample CF37 Diff from Grand Mean	Sample CF37 CPV	Sample CF38 Lab Mean	Sample CF38 Diff from Grand Mean	Sample CF38 CPV	Instr Code
4PLRNA		0.4946	-0.0892	-1.31	0.4950	-0.1085	-1.08	XX
77LGZX		0.4574	-0.1264	-1.85	0.3850	-0.2185	-2.18	TX
CV6JWN		0.5574	-0.0264	-0.39	0.6010	-0.0025	-0.02	TA
DN24H2		0.6240	0.0402	0.59	0.6774	0.0739	0.74	TA
G8LW2L		0.6184	0.0346	0.51	0.6906	0.0871	0.87	TM
KDR8DV		0.5942	0.0104	0.15	0.6270	0.0235	0.23	TN
PECAGD		0.6184	0.0346	0.51	0.6392	0.0357	0.36	TA
TBLAQ8		0.6220	0.0382	0.56	0.6540	0.0505	0.50	TA
XYPY2M		0.6680	0.0842	1.23	0.6620	0.0585	0.58	TP

Summary Statistics	Sample CF37	Sample CF38
Grand Means	0.58 COF	0.60 COF
Stnd Dev Btwn Labs	0.07 COF	0.10 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

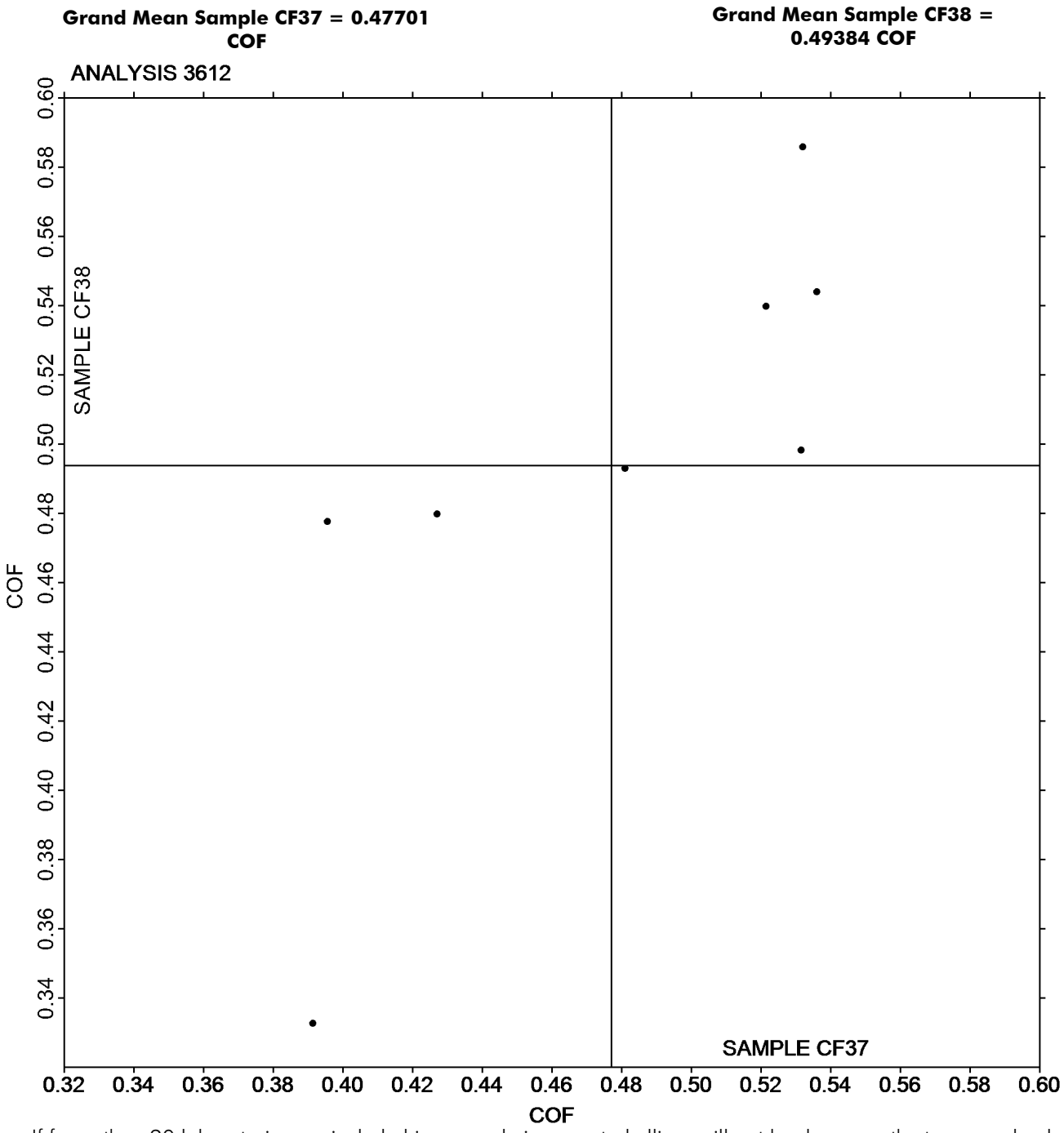
WebCode	Data Flag	Sample CF37 Lab Mean	Sample CF37 Diff from Grand Mean	Sample CF37 CPV	Sample CF38 Lab Mean	Sample CF38 Diff from Grand Mean	Sample CF38 CPV	Instr Code
4PLRNA		0.4810	0.0040	0.06	0.4930	-0.0008	-0.01	XX
77LGZX		0.3914	-0.0856	-1.36	0.3326	-0.1612	-2.14	TX
CV6JWN		0.3956	-0.0814	-1.29	0.4776	-0.0162	-0.22	TA
DN24H2		0.5214	0.0444	0.70	0.5398	0.0460	0.61	TA
G8LW2L		0.5320	0.0550	0.87	0.5858	0.0920	1.22	TM
KDR8DV		0.4270	-0.0500	-0.79	0.4797	-0.0141	-0.19	TN
PECAGD		0.5316	0.0546	0.86	0.4982	0.0044	0.06	TA
TBLAQ8		0.5360	0.0590	0.93	0.5440	0.0502	0.67	TA

Summary Statistics	Sample CF37	Sample CF38
Grand Means	0.48 COF	0.49 COF
Stnd Dev Btwn Labs	0.06 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

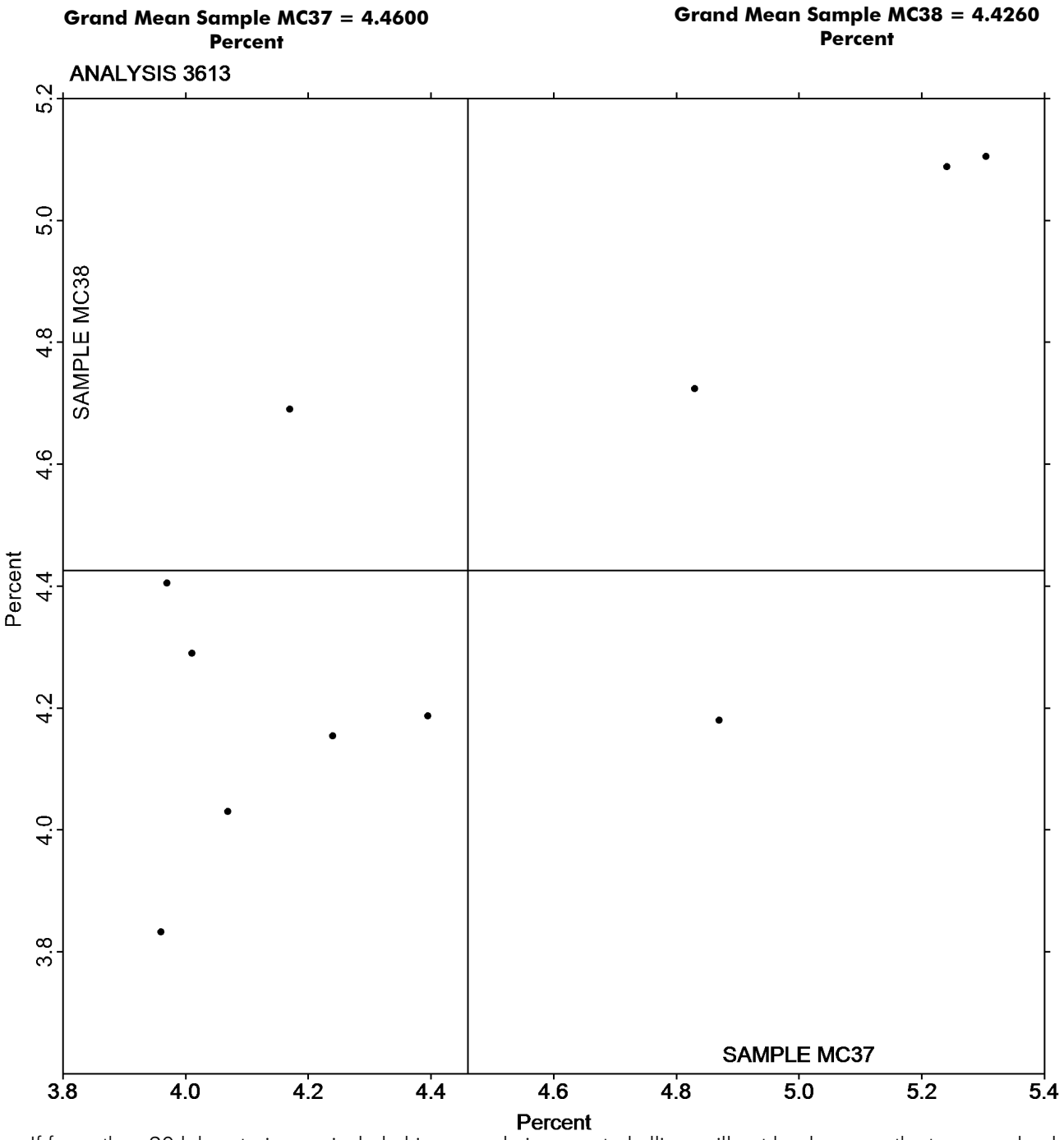
WebCode	Data Flag	Sample MC37 Lab Mean	Sample MC37 Diff from Grand Mean	Sample MC37 CPV	Sample MC38 Lab Mean	Sample MC38 Diff from Grand Mean	Sample MC38 CPV	Instr Code
33C8CJ		5.241	0.781	1.53	5.088	0.662	1.57	ZZ
4MH3JF		4.170	-0.290	-0.57	4.690	0.264	0.63	ZZ
CBH2M4		4.395	-0.065	-0.13	4.187	-0.239	-0.57	ZZ
DX828P		5.305	0.845	1.65	5.105	0.679	1.61	ZZ
GCF4D3		3.970	-0.490	-0.96	4.405	-0.021	-0.05	ZZ
GK6NJ2		4.240	-0.220	-0.43	4.155	-0.271	-0.64	ZZ
QKWPKB		4.870	0.410	0.80	4.180	-0.246	-0.58	ZZ
RV9J7N		4.010	-0.450	-0.88	4.290	-0.136	-0.32	ZZ
T4H8KL		3.960	-0.500	-0.98	3.833	-0.593	-1.41	ZZ
TBLAQ8		4.069	-0.391	-0.76	4.030	-0.396	-0.94	ZZ
WVVHBN		4.830	0.370	0.72	4.724	0.298	0.71	ZZ

Summary Statistics	Sample MC37	Sample MC38
Grand Means	4.46 Percent	4.43 Percent
Stnd Dev Btwn Labs	0.51 Percent	0.42 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

Report #4342, February 2025

Analysis 3615

Sizing Test (Hercules Type)

TAPPI Official Test Method T530

WebCode	Data Flag	Sample HS37 Lab Mean	Sample HS37 Diff from Grand Mean	Sample HS37 CPV	Sample HS38 Lab Mean	Sample HS38 Diff from Grand Mean	Sample HS38 CPV	Instr Code
4FW8HC	X	110.78	52.21	1.13	80.97	23.72	0.53	HE
4VABBX		95.69	37.12	0.80	87.61	30.36	0.68	HE
4WKDWW		77.91	19.34	0.42	78.02	20.77	0.46	HE
77LGZX		47.10	-11.47	-0.25	45.50	-11.75	-0.26	HE
AUENDB		49.30	-9.27	-0.20	56.30	-0.95	-0.02	HE
BVNCQ8		21.07	-37.50	-0.81	20.98	-36.27	-0.81	HE
CGMZV9	*	210.60	152.03	3.29	206.60	149.35	3.32	HE
CV6JWN		21.95	-36.62	-0.79	23.15	-34.10	-0.76	HE
J89J4Z		64.60	6.03	0.13	63.90	6.65	0.15	HE
KKU9KG		94.08	35.51	0.77	92.08	34.83	0.77	XX
L7EBFG		37.36	-21.21	-0.46	36.97	-20.28	-0.45	HE
MTX3RE		18.60	-39.97	-0.86	18.90	-38.35	-0.85	HE
PECAGD		81.78	23.21	0.50	72.90	15.65	0.35	HE
PZF3GQ		41.16	-17.41	-0.38	37.50	-19.75	-0.44	HE
QL632C		42.10	-16.47	-0.36	40.10	-17.15	-0.38	HE
RXZKAQ		93.54	34.97	0.76	92.30	35.05	0.78	HE
TBLAQ8		61.22	2.65	0.06	62.08	4.83	0.11	HE
TE2PCT		13.04	-45.53	-0.99	11.97	-45.28	-1.01	HE
XYPY2M		19.32	-39.25	-0.85	18.42	-38.83	-0.86	HE
ZN68QH		22.32	-36.25	-0.78	22.48	-34.77	-0.77	XX

Summary Statistics	Sample HS37	Sample HS38
Grand Means	58.57 Seconds	57.25 Seconds
Stnd Dev Btwn Labs	46.22 Seconds	44.95 Seconds

Statistics based on 19 of 20 reporting participants.

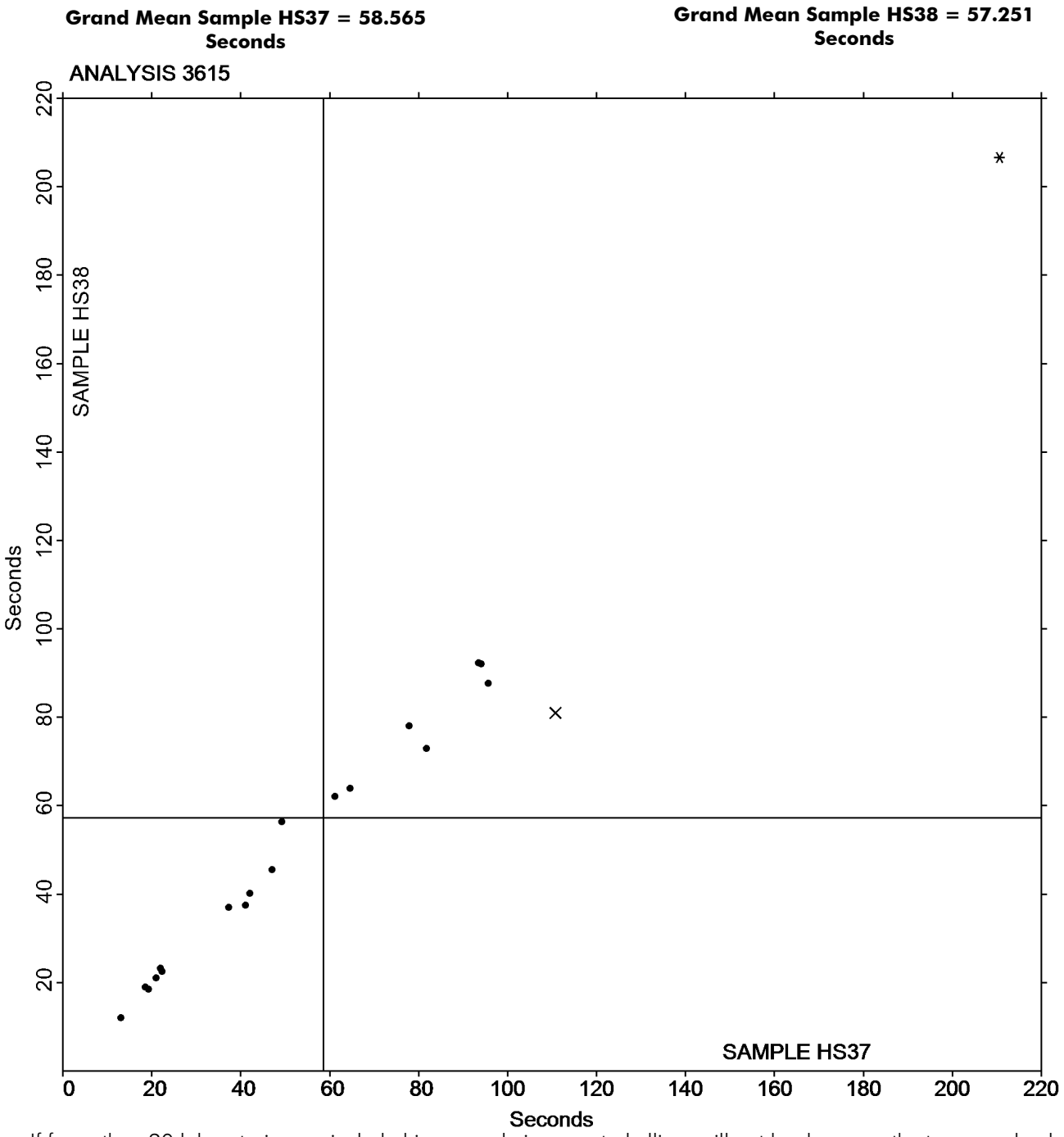
Comments on Assigned Data Flags for Test #3615

4FW8HC (X) - Inconsistent in testing between samples.

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-