Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #4392 - December 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
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3601	Folding Endurance (MIT) - Double Folds
3603	Bending Resistance, Gurley Type
3611	Coefficient of Static Friction - Horizontal Plane Method - Printing Papers
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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:

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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 #4392, December 2025

WebCode	Data Flag	Sample CK47 Lab Mean	Sample CK47 Diff from Grand Mean	Sample CK47 CPV	Sample CK48 Lab Mean	Sample CK48 Diff from Grand Mean	Sample CK48 CPV	Instr Code
33FNMR		10.72	-0.18	-1.33	10.69	-0.22	-1.58	OK
3KBG8Q		10.90	0.01	0.05	10.93	0.02	0.15	OK
3Z99FL		10.96	0.06	0.45	10.96	0.05	0.32	LW
8XKPYW		10.92	0.02	0.14	10.95	0.04	0.27	LC
AC3ULJ		10.86	-0.04	-0.28	10.86	-0.05	-0.36	LW
DQ4Z3H		11.16	0.26	1.95	11.16	0.25	1.77	LW
EQ3MUG		10.70	-0.20	-1.48	10.78	-0.13	-0.96	XX
F9XH6J		11.03	0.13	0.98	10.99	0.07	0.53	LB
GG87HG		10.95	0.05	0.38	10.94	0.03	0.18	EM
GZYCNM		10.76	-0.13	-1.00	10.72	-0.19	-1.36	LC
K237WH		10.86	-0.04	-0.28	10.92	0.01	0.04	XX
KZ8NVG		10.85	-0.05	-0.36	10.89	-0.03	-0.18	LW
L4N8FC		11.00	0.10	0.78	11.02	0.11	0.76	TA
LDACMB		10.96	0.06	0.44	10.94	0.03	0.18	LW
LDB9X7		10.76	-0.14	-1.03	10.73	-0.18	-1.29	TA
MQDWPZ		10.87	-0.03	-0.22	10.93	0.02	0.12	LA
QXKXCY		10.86	-0.04	-0.27	10.87	-0.04	-0.28	TA
TGPCK4		11.14	0.24	1.81	11.10	0.19	1.32	LW
TUYRTU		10.91	0.01	0.06	10.94	0.02	0.17	LW
TZMFNZ		10.93	0.03	0.25	10.96	0.05	0.35	LC
UEFNLP		10.84	-0.06	-0.46	10.90	-0.02	-0.11	EM
UFAER6		10.91	0.01	0.06	10.95	0.04	0.28	EM
UXT9HT		10.87	-0.03	-0.20	10.89	-0.02	-0.13	PP
VBU4EZ		11.03	0.13	0.97	11.04	0.13	0.94	XX
VC67ZY		10.79	-0.11	-0.81	10.80	-0.11	-0.79	XX
WEPFM6		10.76	-0.14	-1.06	10.78	-0.13	-0.91	MS
XEKDDR		11.00	0.10	0.78	10.96	0.05	0.33	PP
XHKN9R		10.78	-0.12	-0.90	10.80	-0.12	-0.83	XX
YA63ZM		10.93	0.04	0.27	10.97	0.06	0.41	LW
YEZWXN		10.89	-0.01	-0.08	10.91	0.00	0.02	PP
YHZ62Y		10.98	0.08	0.60	10.97	0.06	0.41	EM
YMFFE3		11.11	0.21	1.60	11.17	0.26	1.87	LW
YQVAVZ		11.05	0.15	1.12	11.13	0.22	1.55	LW
ZGYUJ2	*	10.51	-0.39	-2.93	10.46	-0.45	-3.19	LW

Summary Statistics	Sample CK47	Sample CK48
Grand Means	10.90 mils	10.91 mils
Stnd Dev Btwn Labs	0.13 mils	0.14 mils

Statistics based on 34 of 34 reporting participants.

Analysis Notes:

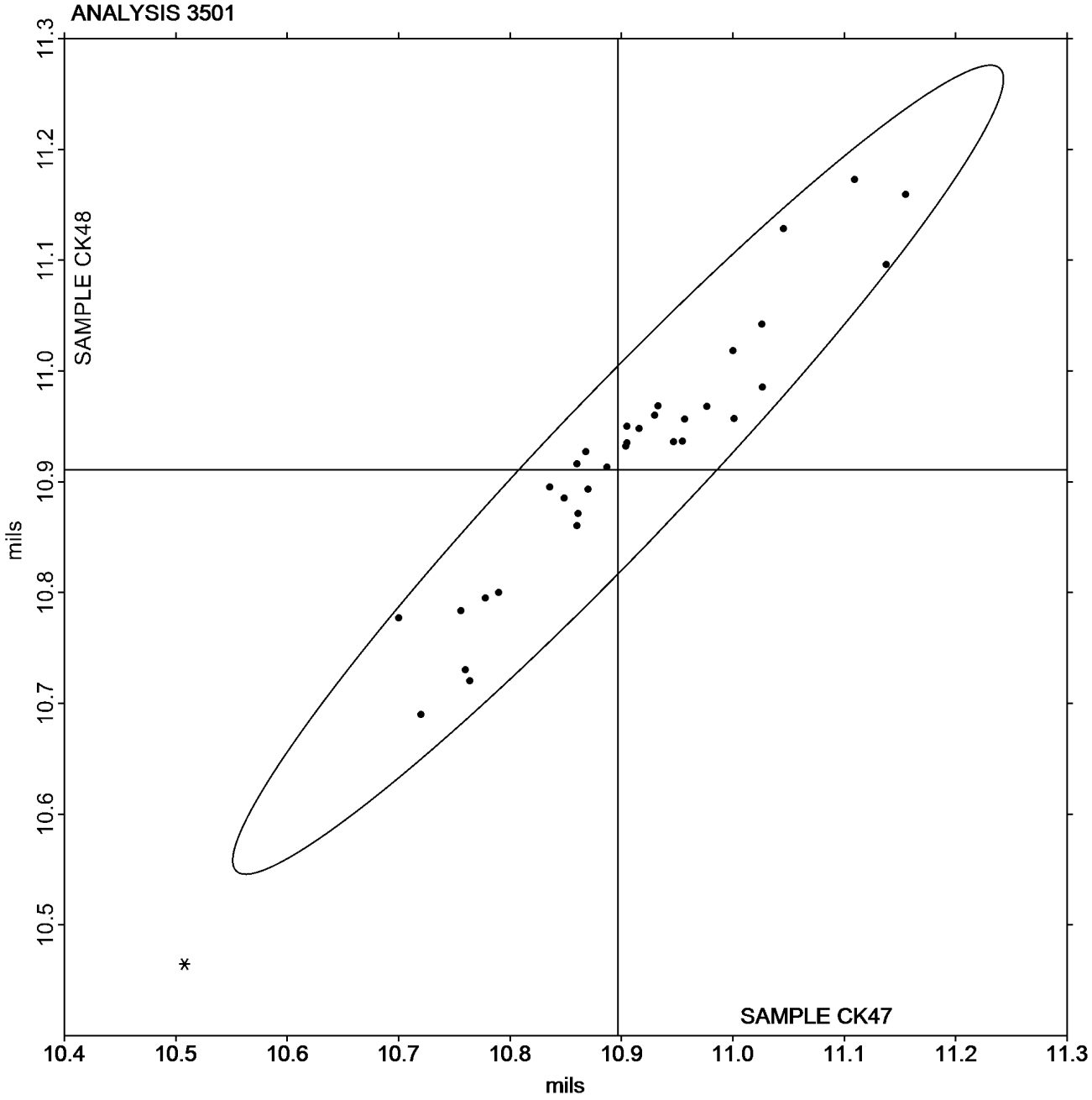
UEFNLP - One determination removed from the Lab Mean of Sample CK47 per Grubb's Test at 1% risk (TAPPI 1205).

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	XX	Instrument make/model not specified by lab

Grand Mean Sample CK47 = 10.897 mils

Grand Mean Sample CK48 = 10.911 mils



Paper & Paperboard Interlaboratory Testing Program

Analysis 3511

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

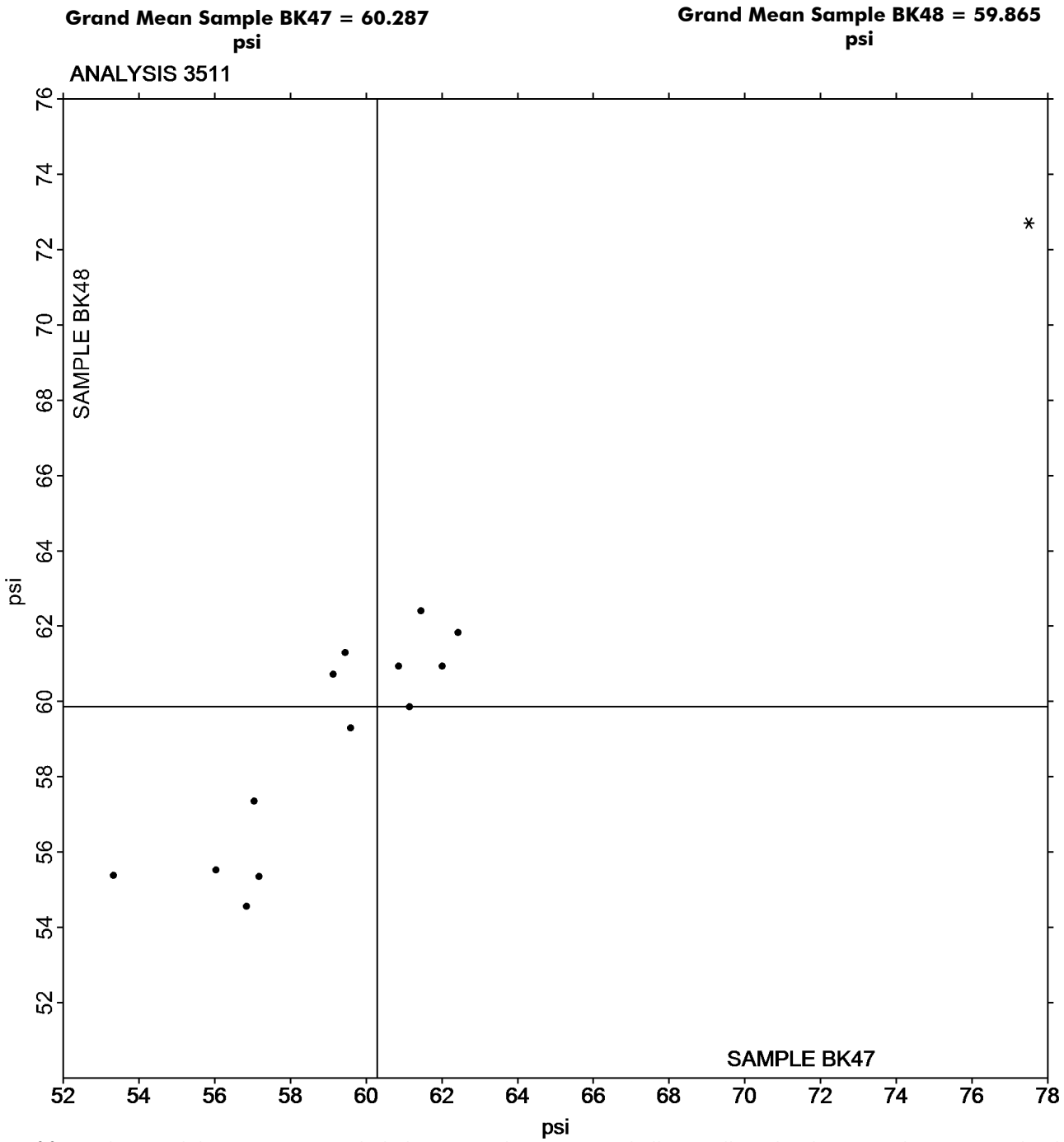
WebCode	Data Flag	Sample BK47 Lab Mean	Sample BK47 Diff from Grand Mean	Sample BK47 CPV	Sample BK48 Lab Mean	Sample BK48 Diff from Grand Mean	Sample BK48 CPV	Instr Code
2TBG8T		59.13	-1.15	-0.21	60.71	0.85	0.18	ZZ
3YVVBP		56.84	-3.45	-0.62	54.56	-5.30	-1.15	ZZ
3Z99FL		62.02	1.73	0.31	60.93	1.07	0.23	ZZ
C4XXQC		57.04	-3.24	-0.58	57.35	-2.52	-0.55	ZZ
DQ4Z3H		53.33	-6.95	-1.24	55.38	-4.49	-0.98	ZZ
NWYA29		59.60	-0.69	-0.12	59.30	-0.56	-0.12	ZZ
QXKXCY		61.15	0.86	0.15	59.85	-0.01	0.00	ZZ
TGPCK4		60.86	0.58	0.10	60.93	1.07	0.23	ZZ
UCA28Z		57.17	-3.12	-0.56	55.35	-4.52	-0.98	ZZ
UEFNLP		61.45	1.17	0.21	62.40	2.53	0.55	ZZ
XEKDDR	*	77.50	17.21	3.08	72.70	12.84	2.79	ZZ
YA63ZM		59.45	-0.84	-0.15	61.29	1.43	0.31	ZZ
YMFFE3		56.03	-4.25	-0.76	55.52	-4.34	-0.95	ZZ
YQVAVZ		62.42	2.14	0.38	61.83	1.97	0.43	ZZ

Summary Statistics	Sample BK47	Sample BK48
Grand Means	60.29 psi	59.86 psi
Stnd Dev Btwn Labs	5.60 psi	4.59 psi

Statistics based on 14 of 14 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 3513

Tearing Strength - Packaging Papers

TAPPI Official Test Method T414

WebCode	Data Flag	Sample RK47 Lab Mean	Sample RK47 Diff from Grand Mean	Sample RK47 CPV	Sample RK48 Lab Mean	Sample RK48 Diff from Grand Mean	Sample RK48 CPV	Instr Code
33FNMR		129.8	-35.9	-2.09	167.4	-53.1	-1.58	ZZ
CD367C		133.4	-32.3	-1.88	155.2	-65.2	-1.94	ZZ
DBQPBP		165.2	-0.5	-0.03	236.3	15.8	0.47	ZZ
DQ4Z3H		179.4	13.7	0.79	242.5	22.0	0.65	ZZ
FKQYUK		153.1	-12.6	-0.74	212.0	-8.5	-0.25	ZZ
GG87HG		162.0	-3.8	-0.22	165.6	-54.9	-1.63	ZZ
GZYCNM		163.6	-2.2	-0.13	220.6	0.1	0.00	ZZ
KZ8NVG		166.5	0.7	0.04	229.5	9.0	0.27	ZZ
L4N8FC		153.9	-11.8	-0.69	253.3	32.9	0.98	ZZ
LDACMB		193.5	27.8	1.62	278.0	57.5	1.71	ZZ
LTNKME		174.1	8.4	0.49	246.1	25.6	0.76	ZZ
MQDWPZ		153.8	-11.9	-0.69	214.5	-6.0	-0.18	ZZ
QVHY27		172.0	6.3	0.37	241.8	21.3	0.63	ZZ
TGPCK4		180.5	14.8	0.86	230.8	10.3	0.31	ZZ
TUYRTU		152.6	-13.1	-0.76	182.1	-38.3	-1.14	ZZ
UFAER6		163.2	-2.5	-0.14	230.6	10.1	0.30	ZZ
VBU4EZ		204.0	38.2	2.23	271.6	51.2	1.52	ZZ
VC67ZY		171.4	5.7	0.33	234.4	13.9	0.41	ZZ
XEKDDR		172.4	6.7	0.39	230.1	9.7	0.29	ZZ
YEZWXN		151.3	-14.4	-0.84	180.0	-40.5	-1.20	ZZ
YMFFE3		177.9	12.2	0.71	192.0	-28.5	-0.85	ZZ
YQVAVZ		172.1	6.4	0.37	235.9	15.5	0.46	ZZ

Summary Statistics	Sample RK47	Sample RK48
Grand Means	165.70 Grams	220.46 Grams
Stnd Dev Btwn Labs	17.18 Grams	33.66 Grams

Statistics based on 22 of 22 reporting participants.

Analysis Notes:

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

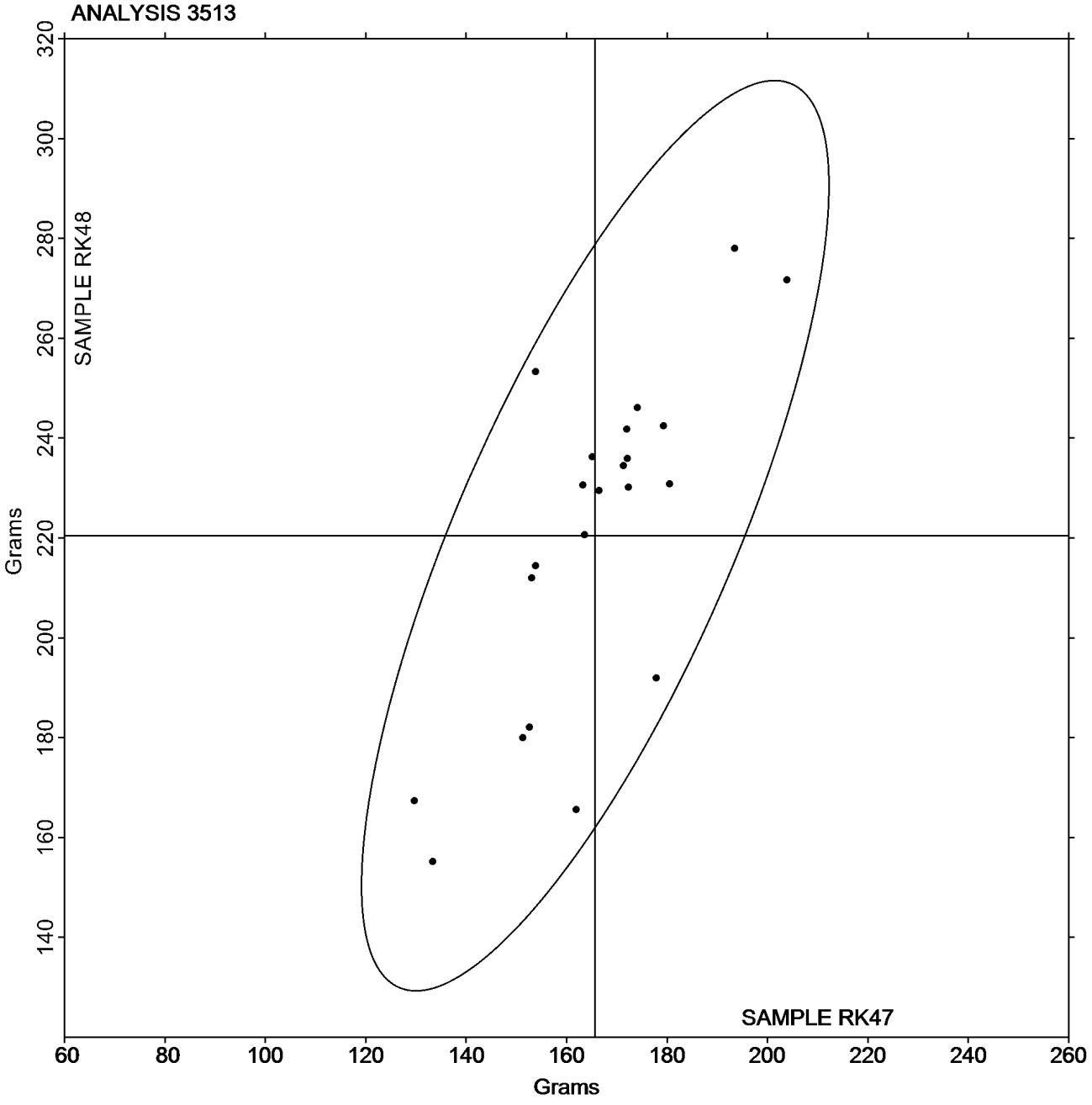
UFAER6 - Data appear to be off by a factor; data converted by CTS (x4). CTS will not correct the data going forward.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample RK47 = 165.70 Grams

Grand Mean Sample RK48 = 220.46 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK47 Lab Mean	Sample NK47 Diff from Grand Mean	Sample NK47 CPV	Sample NK48 Lab Mean	Sample NK48 Diff from Grand Mean	Sample NK48 CPV	Instr Code
3B8722		13.42	-0.03	-0.02	15.42	0.09	0.07	IR
3ZCT4P		14.12	0.68	0.60	15.39	0.05	0.04	LA
6PZDAL	X	27.74	14.29	12.70	32.36	17.03	13.41	LX
AC3ULJ		13.39	-0.05	-0.05	15.53	0.19	0.15	TH
C4XXQC		13.85	0.40	0.36	16.03	0.69	0.55	LW
DBQPBP		13.27	-0.18	-0.16	15.06	-0.27	-0.22	TV
DQ4Z3H		13.50	0.05	0.04	15.23	-0.10	-0.08	LH
EM4BYG		15.13	1.68	1.50	17.15	1.81	1.43	LI
F9XH6J		15.26	1.81	1.61	17.23	1.90	1.49	LC
FKQYUK		13.38	-0.07	-0.06	15.27	-0.06	-0.05	LE
GZYCNM	X	13.48	0.04	0.03	12.96	-2.37	-1.87	IF
HK3CCD		14.96	1.51	1.34	17.03	1.70	1.34	DM
K9ZVF9		11.23	-2.22	-1.97	13.04	-2.30	-1.81	TT
KZ8NVG		12.04	-1.40	-1.25	13.60	-1.73	-1.36	LW
L4N8FC		13.05	-0.40	-0.35	15.00	-0.33	-0.26	TB
LDACMB		11.72	-1.73	-1.53	13.97	-1.37	-1.08	LW
LDB9X7		12.89	-0.56	-0.49	14.85	-0.48	-0.38	TX
LTNKME		12.55	-0.89	-0.79	14.10	-1.23	-0.97	LE
MQDWPZ		14.48	1.03	0.92	15.82	0.48	0.38	LA
N6AVP3	*	16.59	3.15	2.80	19.01	3.68	2.90	XX
QVHY27		12.53	-0.91	-0.81	14.14	-1.19	-0.94	LH
TGPCK4		12.57	-0.88	-0.78	14.22	-1.12	-0.88	LE
TUYRTU		13.75	0.31	0.27	16.34	1.01	0.79	LE
UCA28Z		12.40	-1.05	-0.93	13.95	-1.38	-1.09	TX
VBU4EZ		12.93	-0.52	-0.46	14.94	-0.40	-0.31	ID
VC67ZY		14.33	0.88	0.78	16.70	1.36	1.07	XX
XEKDDR		13.36	-0.09	-0.08	14.88	-0.45	-0.36	TA
XFE4J7		12.83	-0.61	-0.54	14.20	-1.13	-0.89	TS
XHKN9R		13.65	0.21	0.18	15.76	0.42	0.33	TB
YHZ62Y		14.32	0.87	0.78	16.22	0.88	0.70	LE
YMFFE3		12.78	-0.67	-0.59	14.60	-0.73	-0.58	IM
YQVAVZ		13.10	-0.35	-0.31	15.36	0.02	0.02	LW

Summary Statistics	Sample NK47	Sample NK48
Grand Means	13.45 kN/m	15.34 kN/m
Stnd Dev Btwn Labs	1.13 kN/m	1.27 kN/m

Statistics based on 30 of 32 reporting participants.

Comments on Assigned Data Flags for Test #3515

GZYCNM (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample NK48.

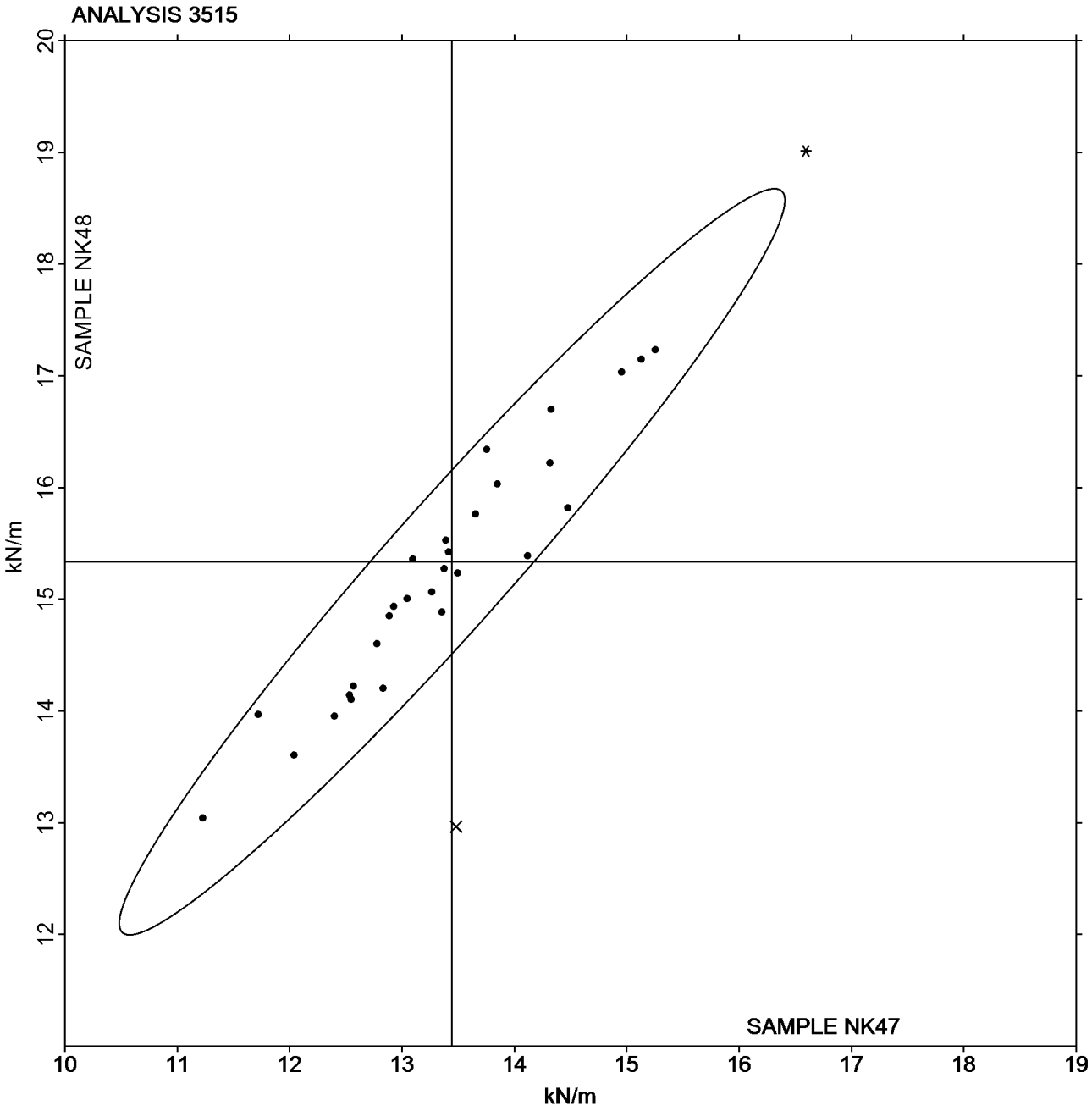
6PZDAL (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	ID	Instron 4200 Series
IF	Instron 3340 Series	IM	Instron 5500 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

Grand Mean Sample NK47 = 13.445 kN/m

Grand Mean Sample NK48 = 15.335 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 3516

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK47 Lab Mean	Sample NK47 Diff from Grand Mean	Sample NK47 CPV	Sample NK48 Lab Mean	Sample NK48 Diff from Grand Mean	Sample NK48 CPV	Instr Code
3B8722		200.0	-8.6	-0.41	233.9	-7.2	-0.34	IR
3ZCT4P		217.6	9.0	0.43	234.9	-6.2	-0.29	LA
6PZDAL		198.6	-10.1	-0.48	244.8	3.6	0.17	LX
AC3ULJ		182.7	-26.0	-1.23	205.1	-36.0	-1.71	TH
C4XXQC		218.0	9.3	0.44	254.8	13.7	0.65	LW
DBQPBP		240.9	32.2	1.53	265.5	24.3	1.15	TV
DQ4Z3H		198.8	-9.9	-0.47	241.1	0.0	0.00	LH
F9XH6J		217.1	8.4	0.40	246.4	5.3	0.25	LC
FKQYUK		200.2	-8.5	-0.40	234.5	-6.6	-0.31	LE
GZYCNM	X	196.8	-11.8	-0.56	143.2	-97.9	-4.63	IF
HK3CCD		257.5	48.8	2.32	287.3	46.1	2.18	DM
K9ZVF9		184.4	-24.3	-1.15	220.6	-20.6	-0.97	TT
KZ8NVG		169.2	-39.5	-1.88	195.6	-45.5	-2.15	LW
LDACMB		191.2	-17.5	-0.83	226.8	-14.3	-0.68	LW
LDB9X7		226.4	17.7	0.84	266.9	25.8	1.22	TX
LTNKME		194.4	-14.3	-0.68	217.2	-24.0	-1.13	LE
MQDWPZ		222.6	13.9	0.66	247.1	5.9	0.28	LA
N6AVP3		217.6	9.0	0.43	259.6	18.5	0.88	XX
QVHY27		184.1	-24.6	-1.17	222.3	-18.9	-0.89	LH
TGPCK4		184.9	-23.8	-1.13	214.2	-26.9	-1.27	LE
TUYRTU		202.9	-5.8	-0.28	237.0	-4.1	-0.20	LE
UCA28Z	X	358.5	149.8	7.12	405.4	164.3	7.77	TX
VC67ZY		225.0	16.3	0.78	270.3	29.2	1.38	XX
XEKDDR		219.5	10.8	0.51	248.4	7.2	0.34	TA
XFE4J7		213.4	4.7	0.22	234.1	-7.1	-0.33	TS
XHKN9R		225.6	16.9	0.81	261.9	20.7	0.98	TB
YHZ62Y		235.6	26.9	1.28	258.2	17.1	0.81	LE
YMFFE3		224.4	15.7	0.75	249.6	8.5	0.40	IM
YQVAVZ		181.9	-26.8	-1.28	232.7	-8.5	-0.40	LE

Summary Statistics	Sample NK47	Sample NK48
Grand Means	208.68 Joules/sq m	241.14 Joules/sq m
Stnd Dev Btwn Labs	21.04 Joules/sq m	21.13 Joules/sq m

Statistics based on 27 of 29 reporting participants.

Comments on Assigned Data Flags for Test #3516

GZYCNM (X) - Data for sample NK48 are low.

UCA28Z (X) - Extreme Data.

Analysis Notes:

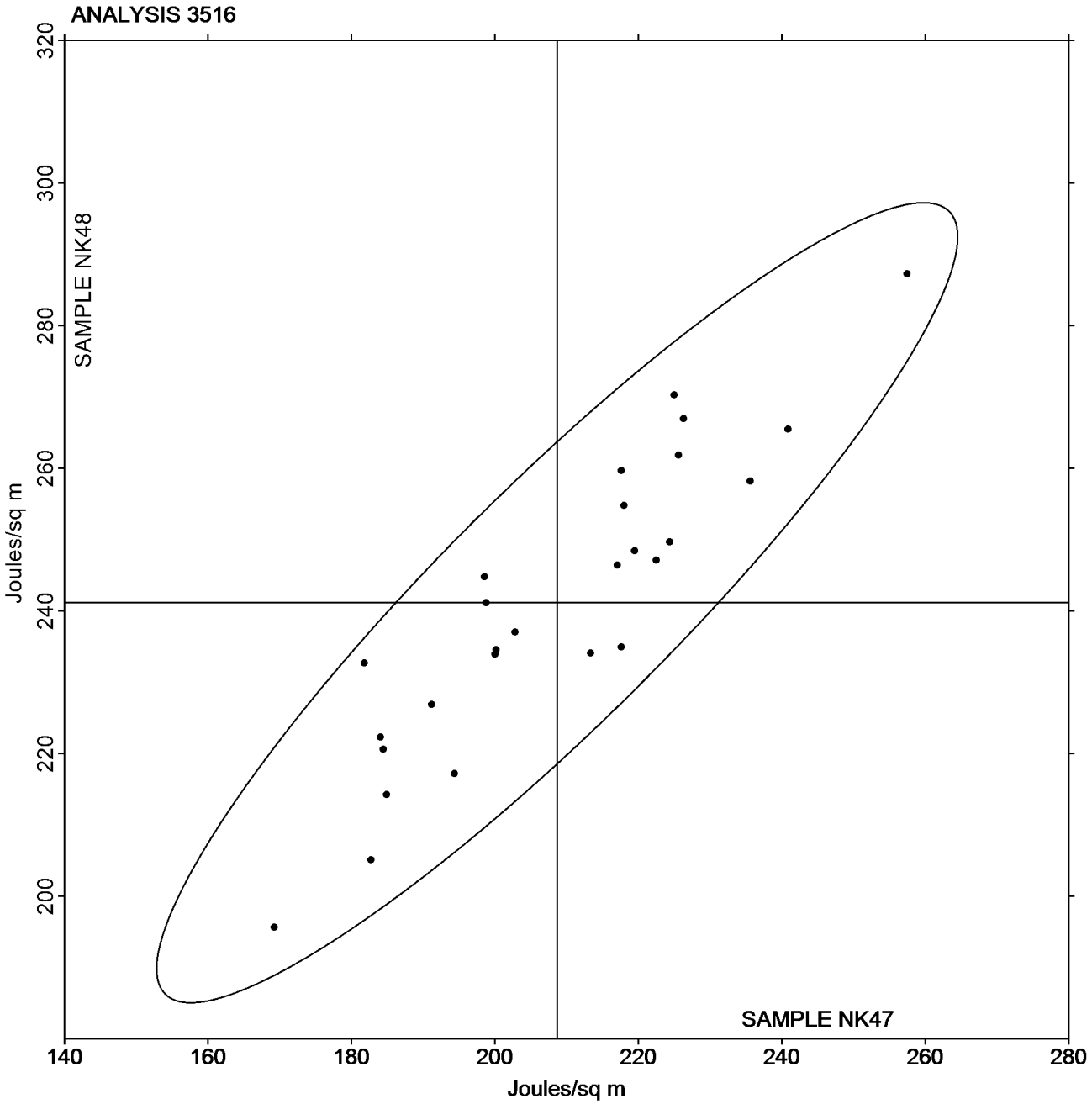
6PZDAL - Data appear to be reported as kg-m/sq m, not inch-lb/sq inch as indicated on data entry form. CTS will not correc the Units going forward.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	IF	Instron 3340 Series
IM	Instron 5500 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	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

Grand Mean Sample NK47 = 208.68 Joules/sq m

Grand Mean Sample NK48 = 241.14 Joules/sq m



Paper & Paperboard Interlaboratory Testing Program

Analysis 3517

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK47 Lab Mean	Sample NK47 Diff from Grand Mean	Sample NK47 CPV	Sample NK48 Lab Mean	Sample NK48 Diff from Grand Mean	Sample NK48 CPV	Instr Code
3B8722		2.236	-0.120	-0.51	2.255	-0.088	-0.40	XX
3ZCT4P		2.236	-0.120	-0.51	2.164	-0.179	-0.81	XX
6PZDAL	X	0.064	-2.293	-9.78	0.066	-2.278	-10.25	LX
AC3ULJ		2.130	-0.226	-0.96	2.055	-0.288	-1.30	TH
C4XXQC		2.335	-0.021	-0.09	2.332	-0.011	-0.05	LW
DBQPBP		2.745	0.389	1.66	2.654	0.311	1.40	TV
DQ4Z3H		2.272	-0.084	-0.36	2.367	0.024	0.11	LX
F9XH6J		2.014	-0.342	-1.46	1.979	-0.364	-1.64	LC
FKQYUK		2.230	-0.126	-0.54	2.240	-0.103	-0.46	LE
GZYCNM	X	2.227	-0.129	-0.55	1.721	-0.622	-2.80	IF
HK3CCD		2.634	0.278	1.19	2.551	0.208	0.93	DM
K9ZVF9		2.620	0.264	1.13	2.659	0.316	1.42	TT
KZ8NVG		2.139	-0.217	-0.93	2.073	-0.270	-1.22	LW
L4N8FC		2.387	0.031	0.13	2.457	0.114	0.51	TB
LDACMB		2.465	0.109	0.46	2.407	0.064	0.29	LW
LDB9X7		2.827	0.471	2.01	2.855	0.512	2.30	TX
LTNKME		2.278	-0.078	-0.33	2.211	-0.132	-0.60	LE
MQDWPZ		2.448	0.092	0.39	2.500	0.157	0.71	LX
N6AVP3		1.841	-0.515	-2.20	1.889	-0.454	-2.04	XX
QVHY27		2.180	-0.176	-0.75	2.290	-0.053	-0.24	LH
TGPCK4		2.174	-0.182	-0.78	2.187	-0.156	-0.70	LE
TUYRTU		2.225	-0.131	-0.56	2.138	-0.205	-0.92	LE
UCA28Z	X	4.401	2.045	8.72	4.357	2.014	9.06	TX
VBU4EZ		2.464	0.108	0.46	2.398	0.055	0.25	XX
VC67ZY		2.227	-0.129	-0.55	2.266	-0.077	-0.35	XX
XEKDDR		2.603	0.247	1.05	2.571	0.228	1.02	TA
XFE4J7		2.573	0.217	0.92	2.521	0.178	0.80	TS
XHKN9R		2.500	0.144	0.61	2.458	0.115	0.52	XX
YHZ62Y		2.460	0.104	0.44	2.361	0.018	0.08	LE
YMFFE3		2.643	0.287	1.22	2.541	0.197	0.89	IM
YQVAVZ		2.087	-0.269	-1.15	2.234	-0.109	-0.49	LW

Summary Statistics	Sample NK47	Sample NK48
Grand Means	2.36 Percent	2.34 Percent
Stnd Dev Btwn Labs	0.23 Percent	0.22 Percent

Statistics based on 28 of 31 reporting participants.

Comments on Assigned Data Flags for Test #3517

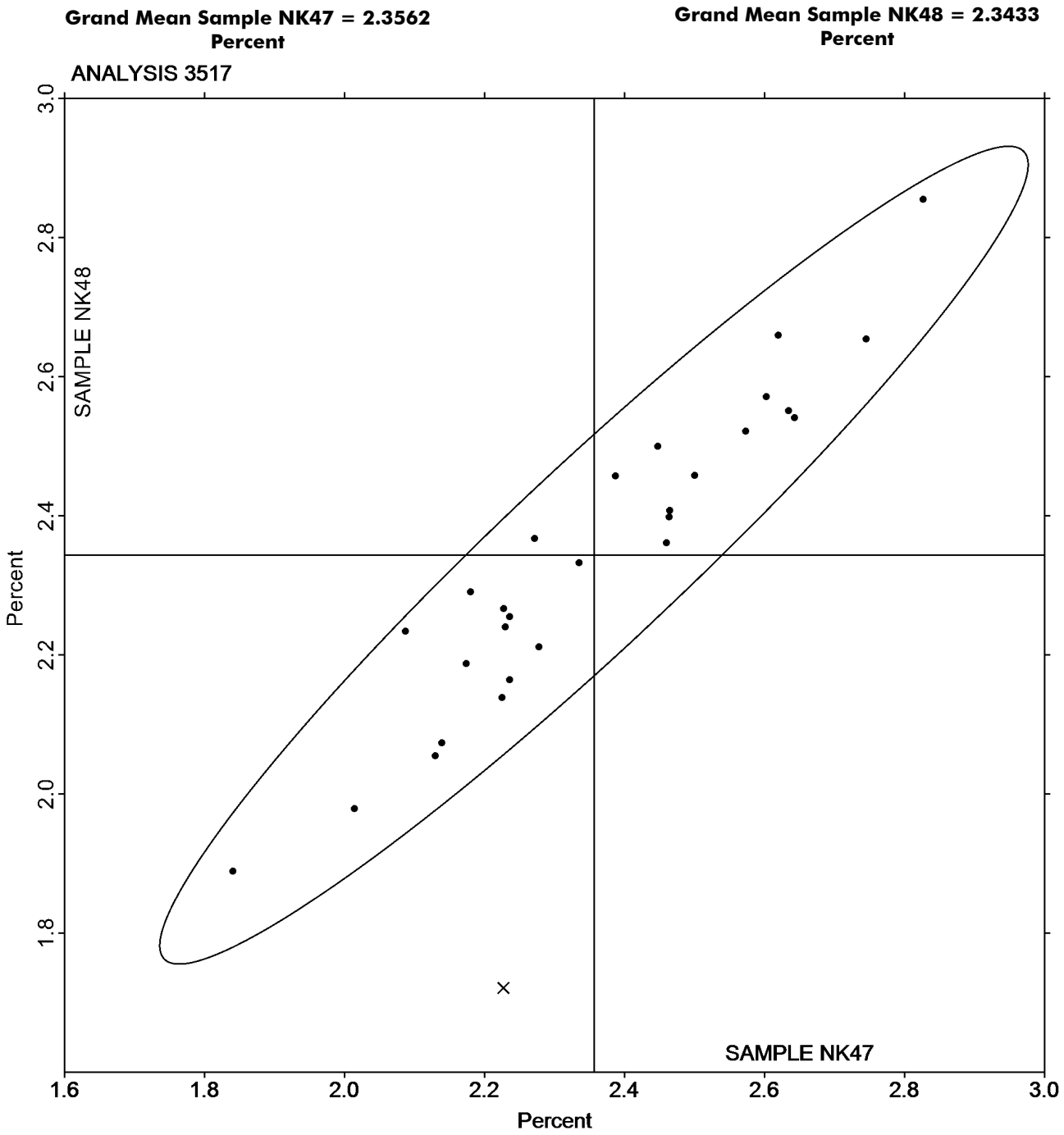
GZYCNM (X) - Data for sample NK48 are low.

UCA28Z (X) - Extreme Data.

6PZDAL (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	IF	Instron 3340 Series
IM	Instron 5500 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 PS47 Lab Mean	Sample PS47 Diff from Grand Mean	Sample PS47 CPV	Sample PS48 Lab Mean	Sample PS48 Diff from Grand Mean	Sample PS48 CPV	Instr Code
33FNMR	X	1.603	0.332	6.26	1.638	0.359	6.10	ZZ
3KBG8Q		1.258	-0.013	-0.26	1.265	-0.014	-0.25	ZZ
4B422H		1.205	-0.067	-1.26	1.208	-0.071	-1.22	ZZ
9Q64QT		1.253	-0.018	-0.35	1.281	0.002	0.03	ZZ
A2GQEJ		1.280	0.008	0.16	1.290	0.011	0.18	ZZ
AC3ULJ		1.259	-0.013	-0.24	1.319	0.040	0.67	ZZ
B9D86F		1.283	0.012	0.22	1.319	0.040	0.67	ZZ
CZYJ4L		1.154	-0.118	-2.22	1.145	-0.134	-2.29	ZZ
DC7NUE		1.314	0.042	0.80	1.334	0.055	0.93	ZZ
EGXH6K		1.327	0.056	1.05	1.340	0.061	1.03	ZZ
F9XH6J		1.230	-0.042	-0.78	1.188	-0.091	-1.56	ZZ
GG87HG		1.318	0.046	0.88	1.327	0.048	0.81	ZZ
KCJQGE		1.284	0.013	0.24	1.289	0.010	0.16	ZZ
LDACMB	X	1.356	0.084	1.60	1.153	-0.126	-2.15	ZZ
TW3MCX		1.291	0.019	0.37	1.319	0.040	0.67	ZZ
TZMFNZ		1.197	-0.075	-1.41	1.201	-0.078	-1.33	ZZ
UD7GJW		1.291	0.019	0.37	1.297	0.018	0.30	ZZ
UFAER6	*	1.353	0.082	1.54	1.296	0.017	0.28	ZZ
VK22XX		1.367	0.095	1.80	1.388	0.109	1.85	ZZ
XFE4J7		1.246	-0.026	-0.48	1.263	-0.016	-0.28	ZZ
XHKN9R		1.227	-0.045	-0.84	1.245	-0.034	-0.59	ZZ
YHZ62Y		1.293	0.021	0.41	1.274	-0.005	-0.09	ZZ

Summary Statistics	Sample PS47	Sample PS48
Grand Means	1.27 Microns	1.28 Microns
Stnd Dev Btwn Labs	0.05 Microns	0.06 Microns

Statistics based on 20 of 22 reporting participants.

Comments on Assigned Data Flags for Test #3531

LDACMB (X) - Inconsistent in testing between samples.

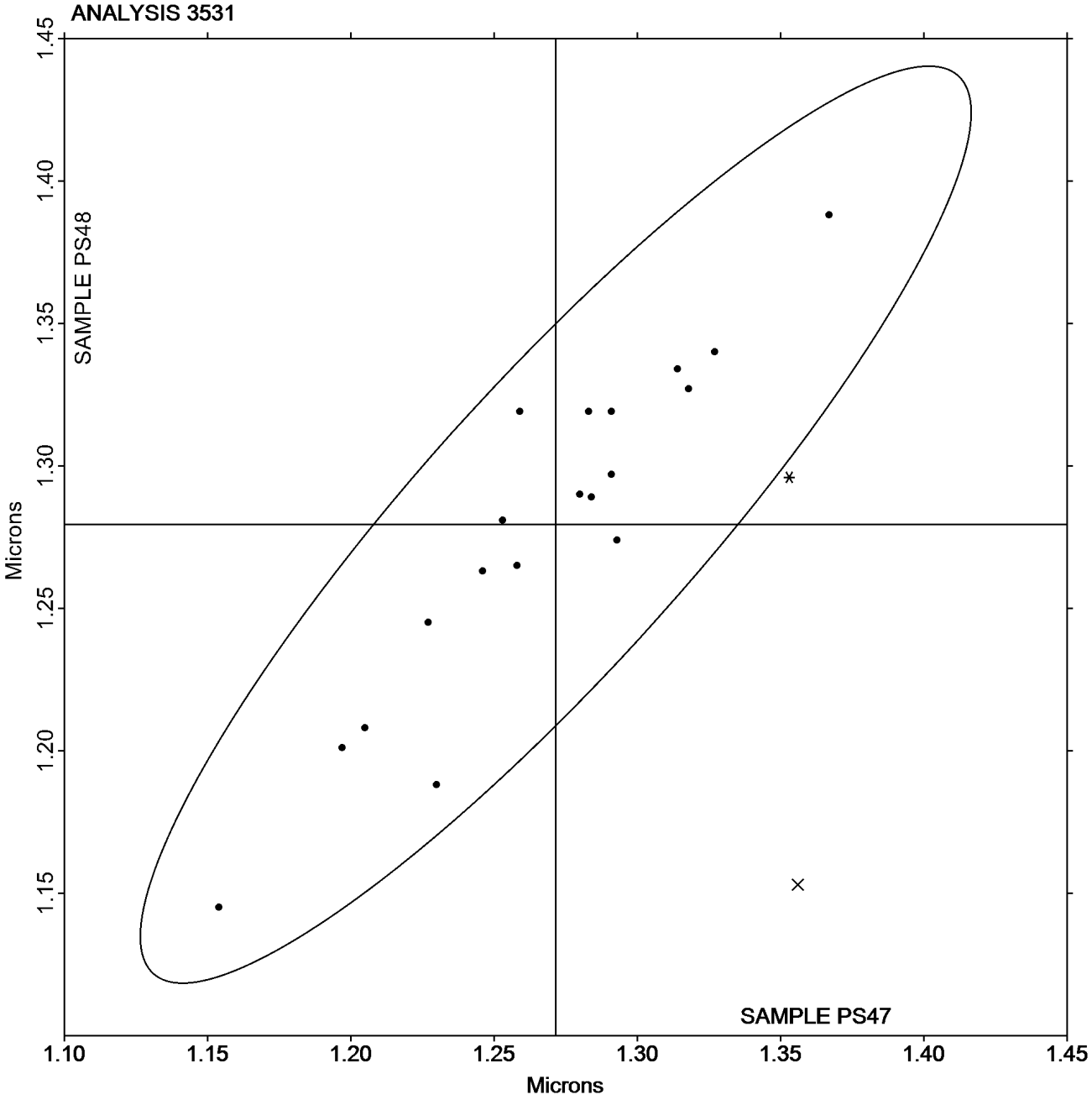
33FNMR (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample PS47 = 1.2715 Microns

Grand Mean Sample PS48 = 1.2794 Microns



Paper & Paperboard Interlaboratory Testing Program

Analysis 3545
Directional Brightness
TAPPI Official Test Method T452

WebCode	Data Flag	Sample BR47 Lab Mean	Sample BR47 Diff from Grand Mean	Sample BR47 CPV	Sample BR48 Lab Mean	Sample BR48 Diff from Grand Mean	Sample BR48 CPV	Instr Code
33FNMR	*	66.25	-10.29	-3.25	66.13	-10.42	-3.27	TD
3KBG8Q		77.48	0.95	0.30	77.58	1.03	0.32	HG
4B422H		76.25	-0.28	-0.09	76.32	-0.24	-0.07	HZ
873WXN		75.75	-0.79	-0.25	75.75	-0.81	-0.25	TS
8XKPYW		71.62	-4.91	-1.55	71.73	-4.83	-1.52	LA
AC3ULJ		76.03	-0.51	-0.16	76.30	-0.26	-0.08	TP
AV8UAA		79.60	3.06	0.97	79.96	3.40	1.07	TP
CPHYJP		79.14	2.60	0.82	78.63	2.07	0.65	TP
EGXH6K		75.07	-1.46	-0.46	74.84	-1.72	-0.54	PP
GG87HG		79.64	3.11	0.98	79.73	3.17	0.99	HG
KZ8NVG		76.26	-0.27	-0.09	76.54	-0.02	-0.01	TS
L4N8FC	X	76.46	-0.08	-0.02	79.35	2.79	0.88	XD
LDACMB		75.72	-0.81	-0.26	75.87	-0.69	-0.22	TP
TNAER7		75.68	-0.86	-0.27	75.94	-0.62	-0.19	XX
UD7GJW		78.66	2.12	0.67	78.73	2.18	0.68	TD
UFAER6		78.47	1.93	0.61	78.25	1.69	0.53	TP
VBU4EZ		79.35	2.81	0.89	79.42	2.86	0.90	TD
VC67ZY		77.49	0.96	0.30	77.47	0.91	0.29	XX
VK22XX		76.14	-0.40	-0.12	76.04	-0.52	-0.16	PP
XFE4J7		76.07	-0.46	-0.15	75.89	-0.67	-0.21	TS
YHZ62Y		80.04	3.50	1.10	80.04	3.48	1.09	HG

Summary Statistics	Sample BR47	Sample BR48
Grand Means	76.54 Percent	76.56 Percent
Stnd Dev Btwn Labs	3.17 Percent	3.19 Percent

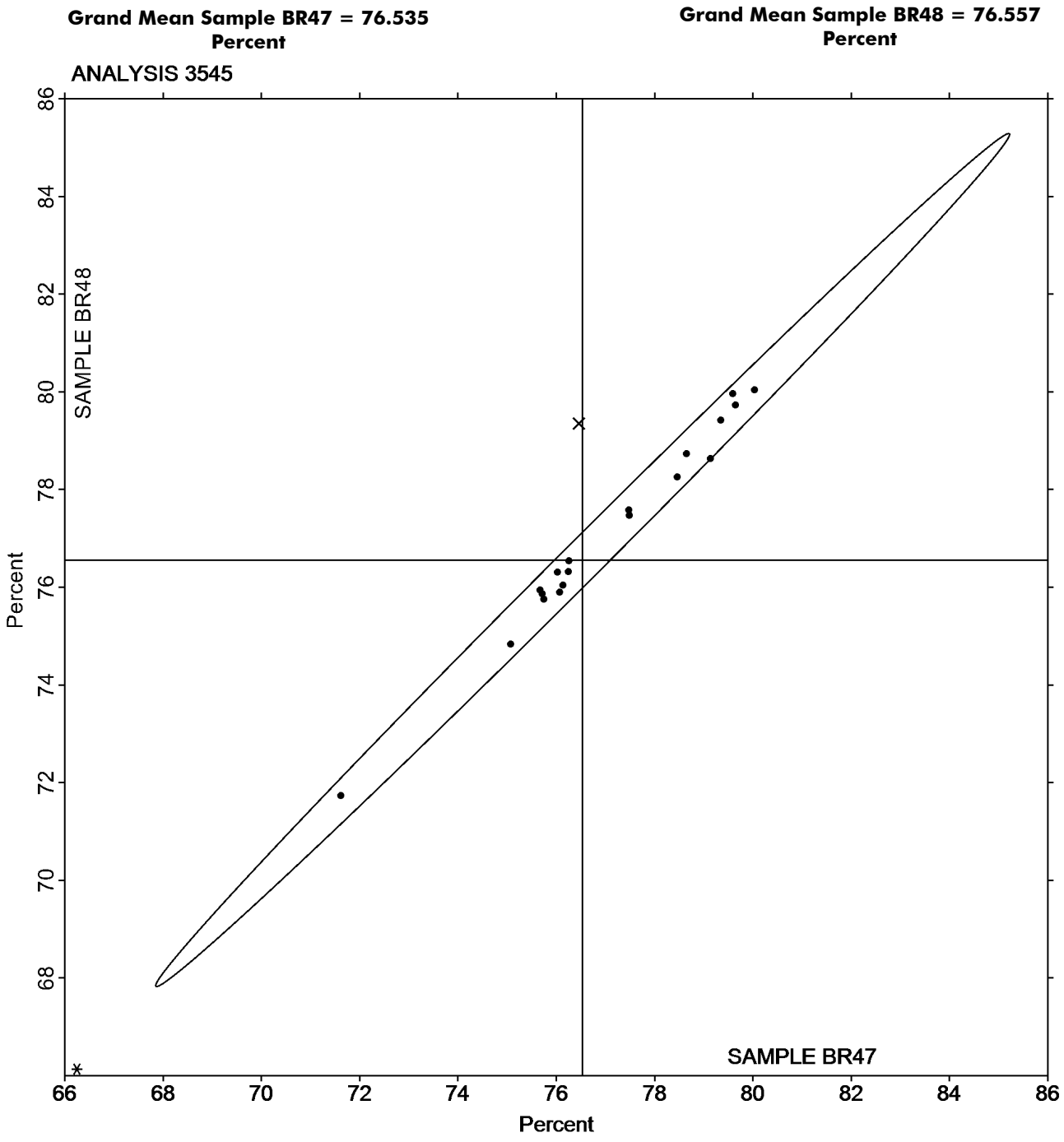
Statistics based on 20 of 21 reporting participants.

Comments on Assigned Data Flags for Test #3545

L4N8FC (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample BR48.

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

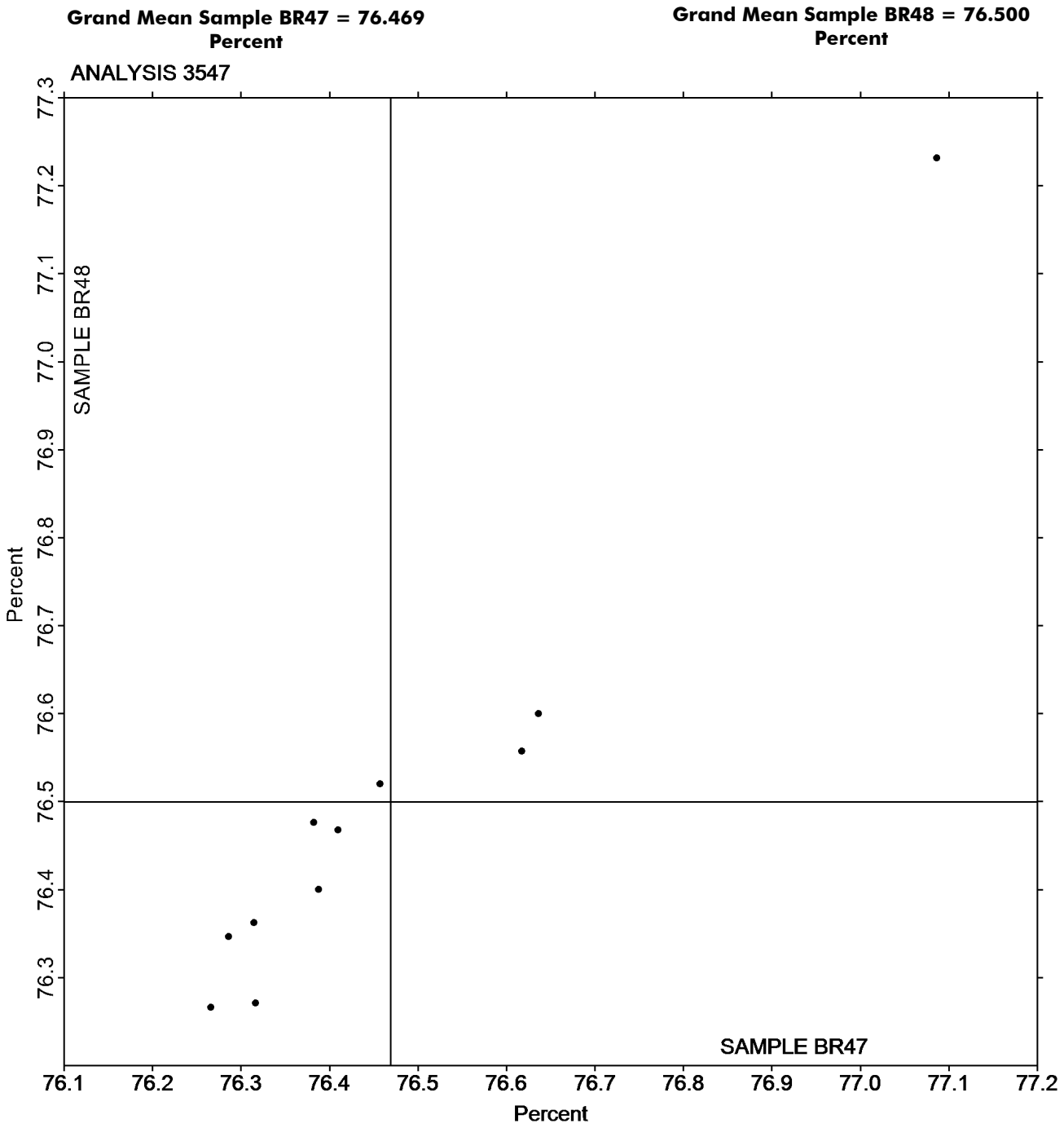
WebCode	Data Flag	Sample BR47 Lab Mean	Sample BR47 Diff from Grand Mean	Sample BR47 CPV	Sample BR48 Lab Mean	Sample BR48 Diff from Grand Mean	Sample BR48 CPV	Instr Code
3KBG8Q		76.29	-0.18	-0.77	76.35	-0.15	-0.58	TC
7MV88L		76.41	-0.06	-0.25	76.47	-0.03	-0.12	LE
AC3ULJ		76.39	-0.08	-0.34	76.40	-0.10	-0.37	LT
DQ4Z3H		76.32	-0.15	-0.65	76.36	-0.14	-0.52	LT
KCJQGE		76.62	0.15	0.62	76.56	0.06	0.22	LE
LDACMB		76.32	-0.15	-0.64	76.27	-0.23	-0.86	EA
UD7GJW		76.38	-0.09	-0.36	76.48	-0.02	-0.09	TD
UFAER6		76.46	-0.01	-0.05	76.52	0.02	0.08	TC
UQQYC2		76.64	0.17	0.70	76.60	0.10	0.38	LA
XFE4J7		77.09	0.62	2.58	77.23	0.73	2.75	LT
YQVAVZ		76.27	-0.20	-0.85	76.27	-0.23	-0.88	LT

Summary Statistics	Sample BR47	Sample BR48
Grand Means	76.47 Percent	76.50 Percent
Stnd Dev Btwn Labs	0.24 Percent	0.27 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 #4392, December 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
33FNMR		**CA47**	79.84 *	0.65	-1.44	0.06	0.03	-0.01	0.06	TC
		CA48	79.89	0.68	-1.45					
3KBG8Q		**CA47**	87.26	0.83	-0.61	-0.04	0.03	-0.11	0.12	HK
		CA48	87.22	0.86	-0.72					
4CWR8W		**CA47**	85.51	0.81	-1.30	-0.07	0.01	-0.05	0.09	TD
		CA48	85.44	0.83	-1.35					
8XKPYW		**CA47**	86.82	-0.02	-0.06	0.06	-0.03	0.05	0.09	XX
		CA48	86.88	-0.06	-0.01					
DC7NUE		**CA47**	89.49	0.35	-0.61	0.09	-0.05	0.18	0.20	TC
		CA48	89.57	0.31	-0.43					
EGXH6K		**CA47**	86.71	0.24	-0.22	-0.12	0.06	-0.39 X	0.41 X	TC
		CA48	86.59	0.30	-0.61					
GG87HG		**CA47**	86.88	0.70	-0.81	0.00	-0.03	0.10	0.11	HK
		CA48	86.88	0.67	-0.71					
TW3MCX		**CA47**	88.31	0.91	-1.44	-0.01	-0.04	0.11	0.12	TC
		CA48	88.30	0.87	-1.33					
UD7GJW		**CA47**	86.67	0.30	-0.48	-0.09	0.03	-0.10	0.14	TC
		CA48	86.58	0.33	-0.58					
UEFNLP		**CA47**	89.42	0.48	-0.61	0.11	-0.03	0.11	0.16	TC
		CA48	89.53	0.45	-0.50					
UFAER6		**CA47**	86.59	0.34	-0.62	0.04	-0.01	-0.02	0.04	TC
		CA48	86.63	0.33	-0.64					
VC67ZY		**CA47**	89.90	0.35	-0.55	0.05	-0.04	0.19	0.20	XX
		CA48	89.96	0.32	-0.36					
XFE4J7		**CA47**	85.33	2.24 *	-1.63	0.19	-0.08	0.15	0.25	TS
		CA48	85.52	2.16	-1.48					
YHZ62Y		**CA47**	87.38	0.79	-0.92	-0.05	0.04	-0.08	0.10	HK
		CA48	87.33	0.82	-1.01					

Summary Statistics

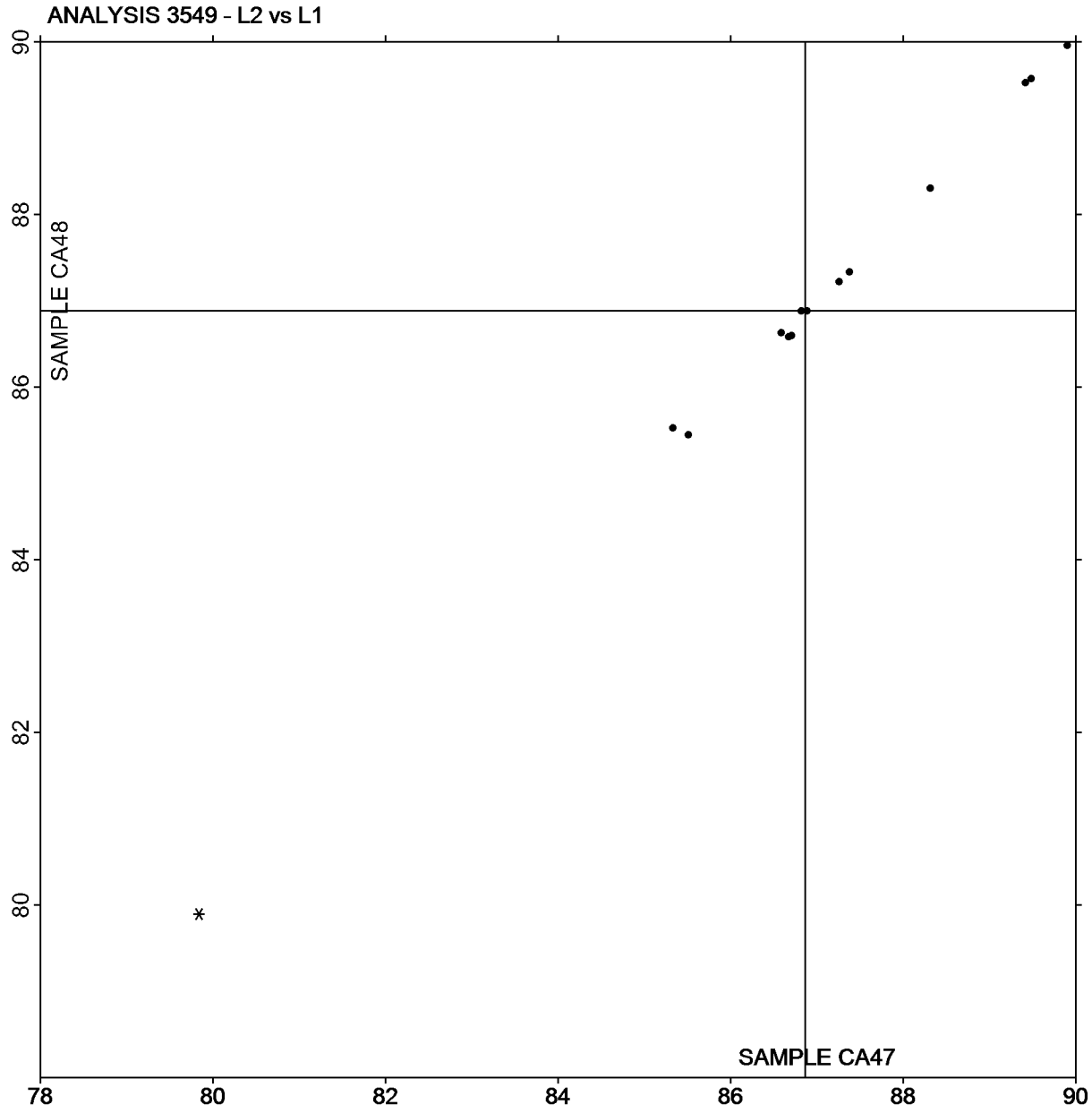
Grand Means							
CA47	86.866	0.641	-0.809	0.015	-0.007	0.011	0.149
CA48	86.881	0.634	-0.798				
Stnd Dev Btwn Labs							
CA47	2.463	0.534	0.478	0.085	0.040	0.154	0.095
CA48	2.465	0.520	0.455				

Statistics based on 14 of 14 reporting participants

Key to Instrument Codes Reported by Participants

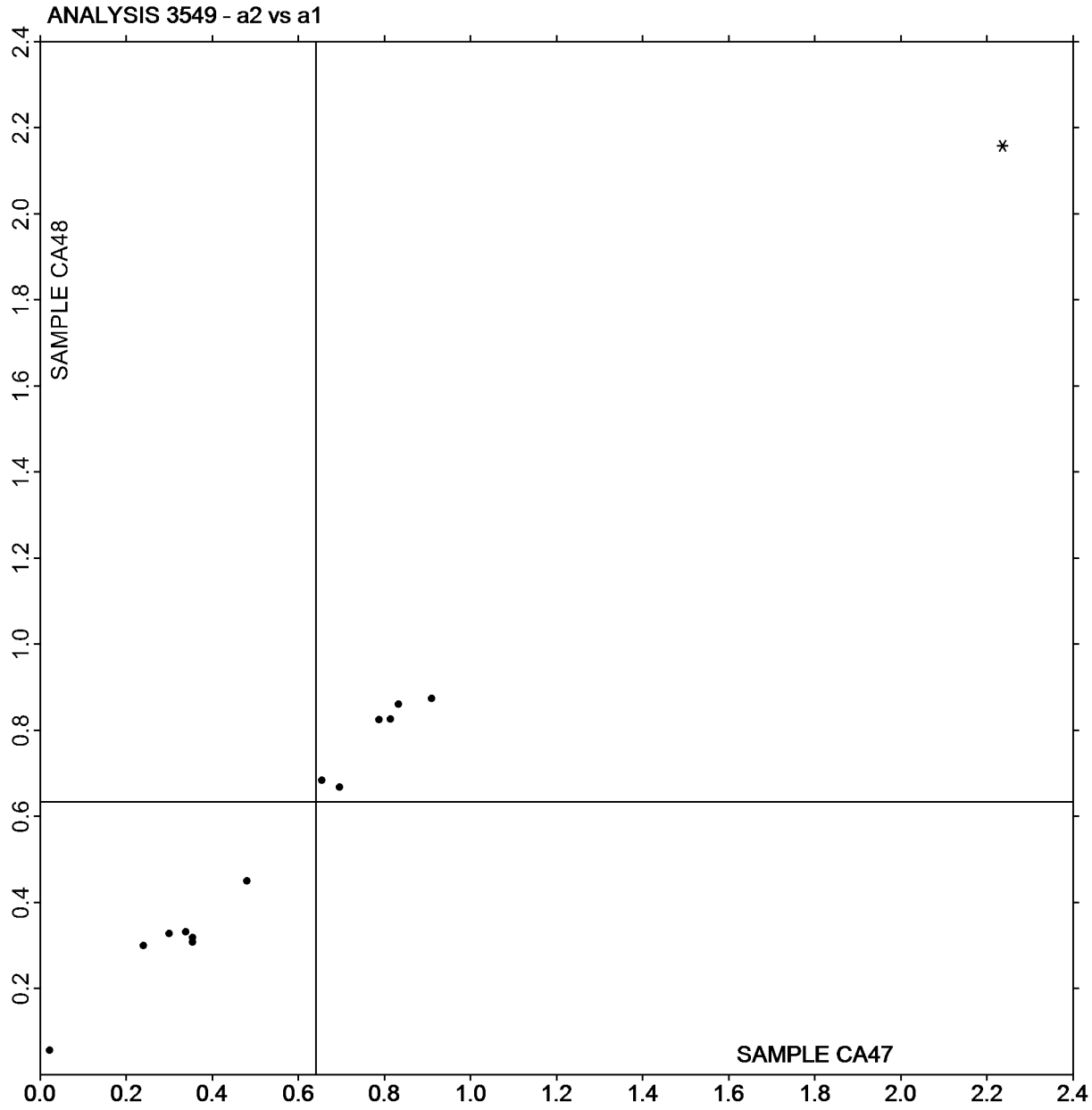
HK	Hunter LabScan XE	TC	Technidyne Color Touch Series
TD	Technidyne Color Touch X45	TS	Technidyne Brightimeter Micro S-5
XX	Instrument make/model not specified by lab		

Plot of L values CA48 vs L values CA47



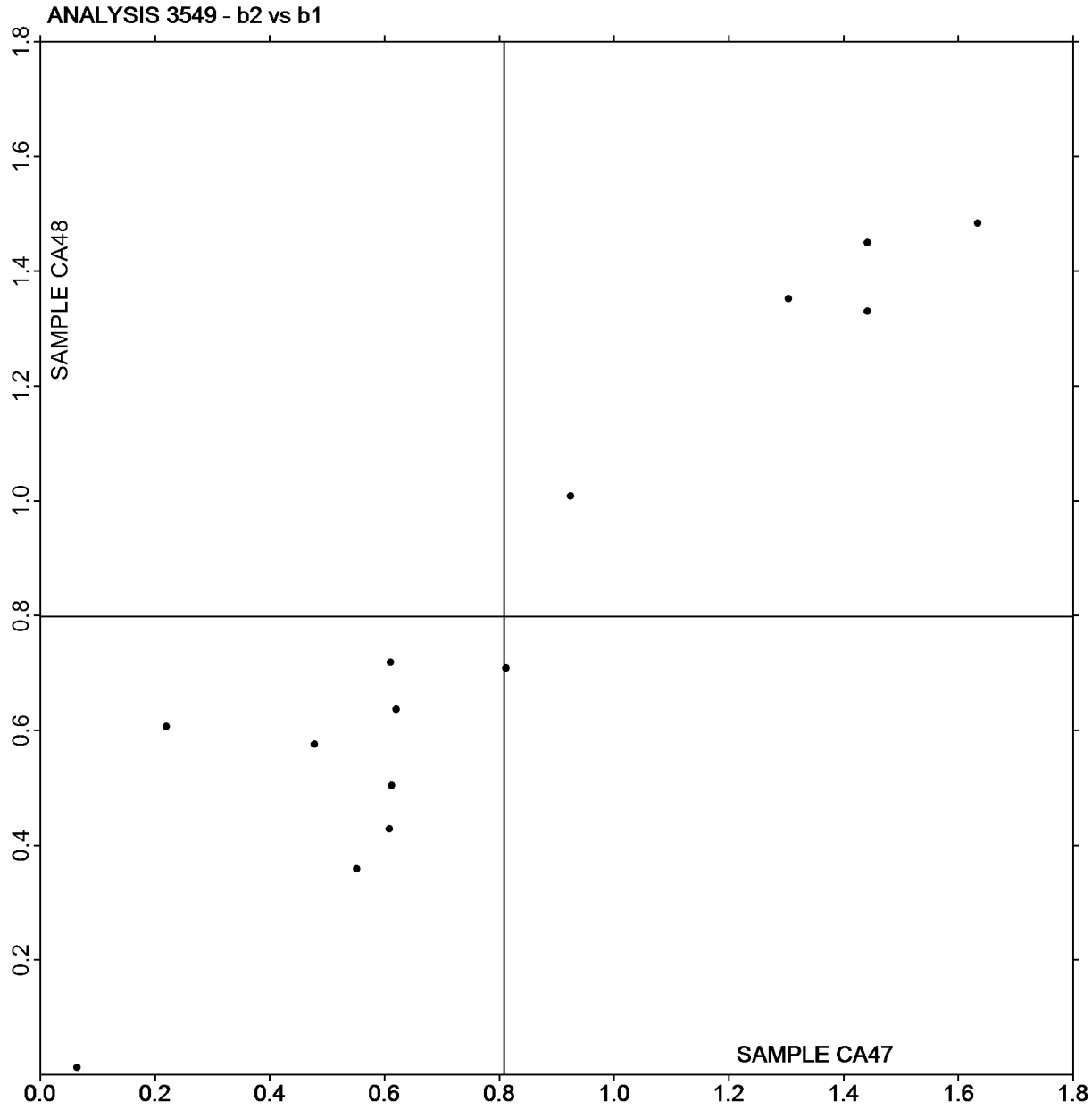
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA48 vs a values CA47



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 CA48 vs b values CA47



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 #4392, December 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
2N24PU		CA47	89.61	-0.57	-0.16	0.05	-0.01	0.10	0.12	XX
		CA48	89.66	-0.58	-0.06					
3KBG8Q		CA47	86.53	0.38	-0.73	0.16	-0.05	0.20	0.26 X	TC
		CA48	86.69	0.33	-0.52					
7MRMKH		CA47	89.55	-0.56	-0.35	0.04	0.06	0.00	0.07	TC
		CA48	89.60	-0.50	-0.35					
AC3ULJ		CA47	89.51	-0.48	-0.18	0.00	0.00	0.07	0.07	LT
		CA48	89.52	-0.48	-0.11					
LDACMB		CA47	89.43	-0.52	-0.21	0.03	-0.02	0.09	0.10	EG
		CA48	89.45	-0.54	-0.12					
NWYA29		CA47	92.20	-0.59	-0.03	-0.02	0.06	0.00	0.06	NF
		CA48	92.18	-0.53	-0.02					
VK22XX		CA47	87.77	-0.53	-0.25	0.11	-0.01	0.06	0.13	HL
		CA48	87.87	-0.53	-0.18					
VTC3JX		CA47	89.59	-0.54	-0.27	0.09	0.00	0.14	0.17	XX
		CA48	89.69	-0.55	-0.14					
YQVAVZ		CA47	89.32	0.40	-0.69	0.07	-0.03	0.05	0.09	LS
		CA48	89.39	0.37	-0.64					

Summary Statistics

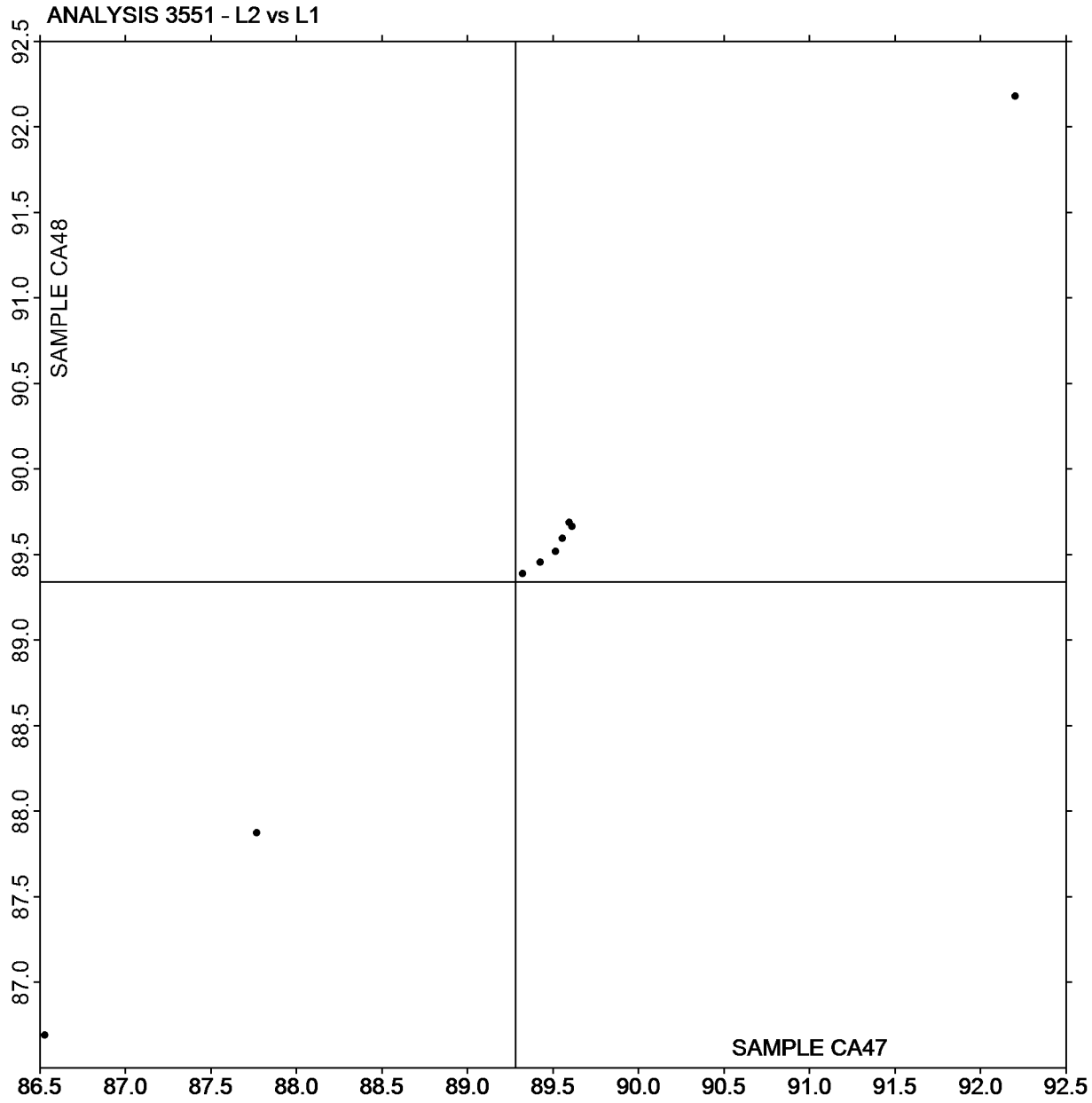
Grand Means							
CA47	89.280	-0.336	-0.318	0.060	0.001	0.080	0.118
CA48	89.339	-0.335	-0.238				
Stnd Dev Btwn Labs							
CA47	1.532	0.411	0.238	0.056	0.036	0.064	0.064
CA48	1.482	0.390	0.216				

Statistics based on 9 of 9 reporting participants

Key to Instrument Codes Reported by Participants

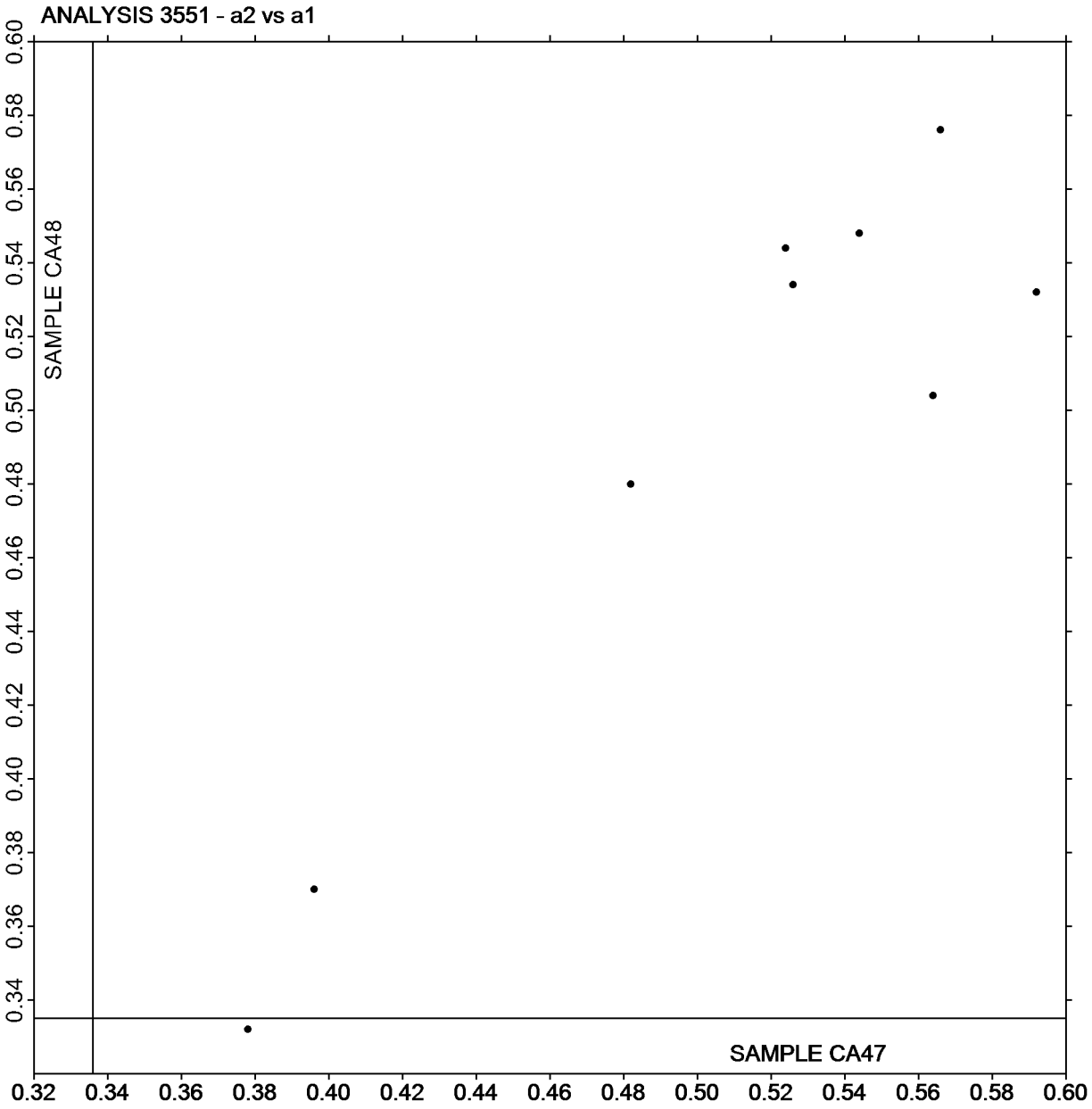
EG	Datacolor Elrepho	HL	Hunter Agera
LS	L & W Elrepho SE 070	LT	L & W Elrepho SE 071
NF	Minolta CM-3600d Spectrophotometer	TC	Technidyne Color Touch Series
XX	Instrument make/model not specified by lab		

Plot of L values CA48 vs L values CA47



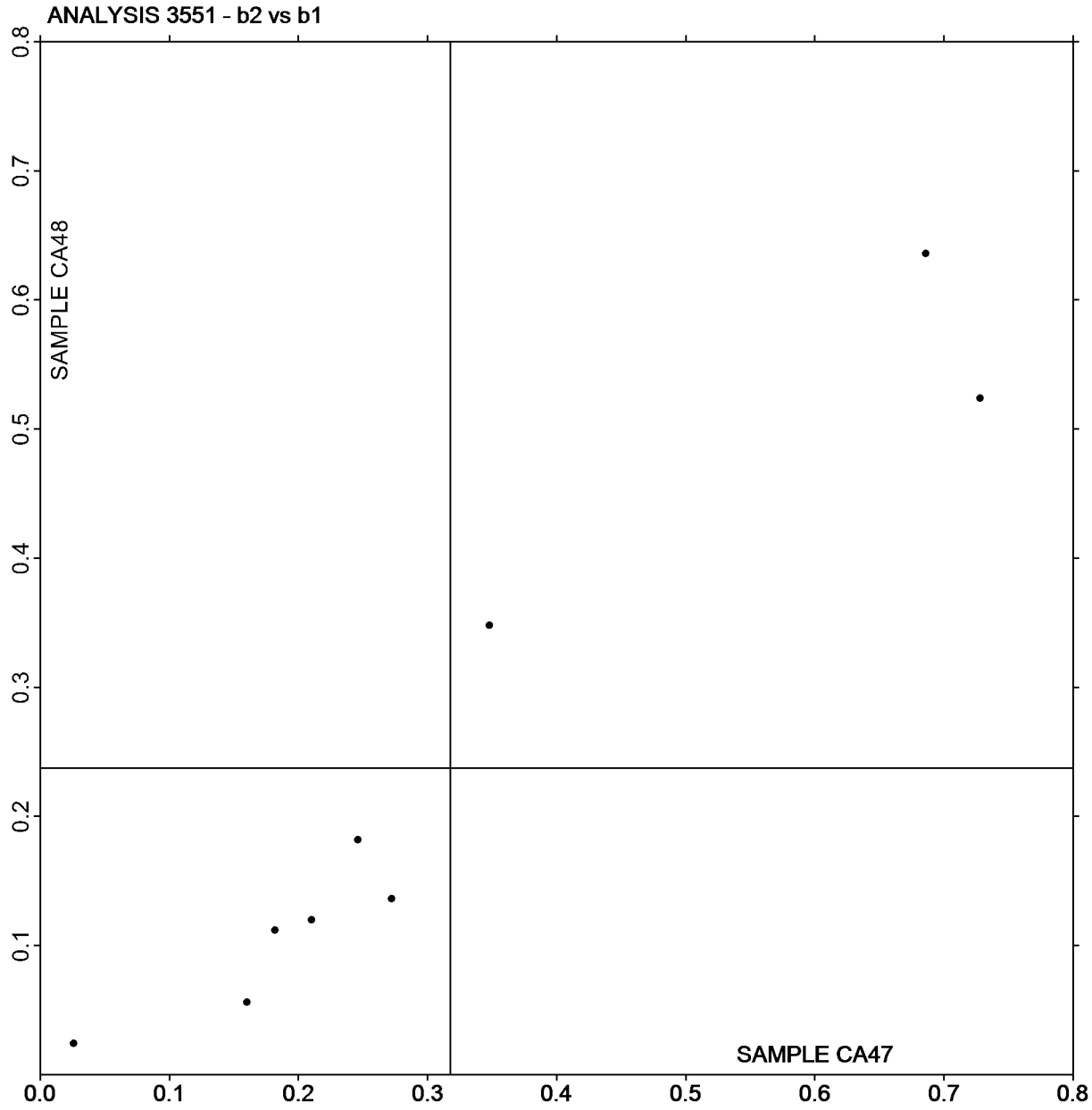
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA48 vs a values CA47



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 CA48 vs b values CA47



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

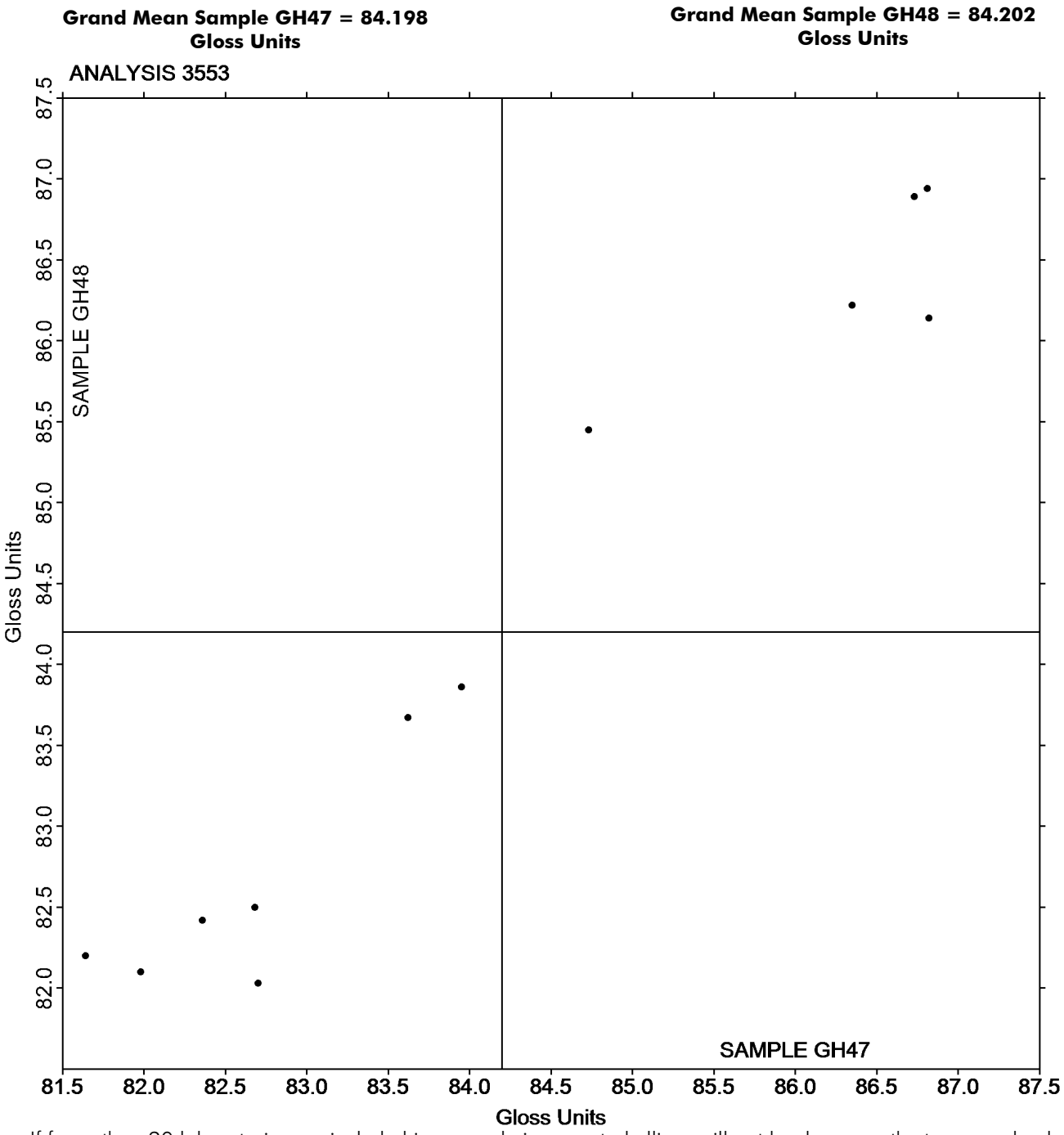
WebCode	Data Flag	Sample GH47 Lab Mean	Sample GH47 Diff from Grand Mean	Sample GH47 CPV	Sample GH48 Lab Mean	Sample GH48 Diff from Grand Mean	Sample GH48 CPV	Instr Code
9Q64QT		86.81	2.61	1.29	86.94	2.74	1.37	VM
AC3ULJ		82.36	-1.84	-0.91	82.42	-1.78	-0.89	GA
DC7NUE		86.82	2.62	1.30	86.14	1.94	0.97	LF
EGXH6K		86.35	2.15	1.07	86.22	2.02	1.01	PP
F9XH6J		83.62	-0.58	-0.29	83.67	-0.53	-0.27	LG
GG87HG		81.98	-2.22	-1.10	82.10	-2.10	-1.05	TP
LDACMB		86.73	2.53	1.25	86.89	2.69	1.35	TH
M2FEZ4		83.95	-0.25	-0.12	83.86	-0.34	-0.17	GM
TZMFNZ		82.70	-1.50	-0.74	82.03	-2.17	-1.09	LF
UD7GJW		81.64	-2.56	-1.27	82.20	-2.00	-1.00	TA
UFAER6		84.73	0.53	0.26	85.45	1.25	0.63	GM
YHZ62Y		82.68	-1.52	-0.75	82.50	-1.70	-0.85	PP

Summary Statistics	Sample GH47	Sample GH48
Grand Means	84.20 Gloss Units	84.20 Gloss Units
Stnd Dev Btwn Labs	2.02 Gloss Units	1.99 Gloss Units

Statistics based on 12 of 12 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	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

Report #4392, December 2025

Analysis 3555

Specular Gloss at 75 Degrees - Low Range

TAPPI Official Test Method T480

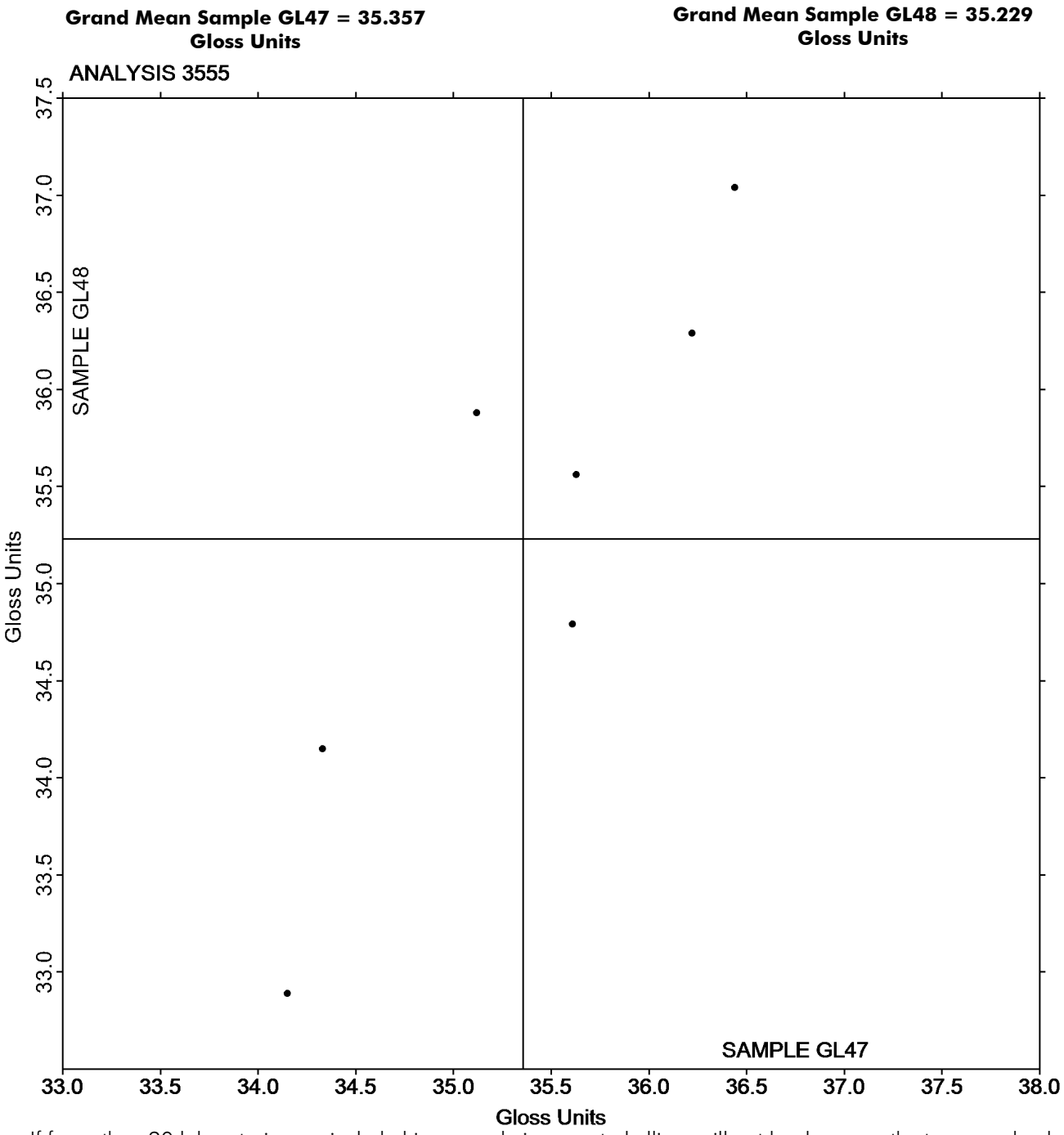
WebCode	Data Flag	Sample GL47 Lab Mean	Sample GL47 Diff from Grand Mean	Sample GL47 CPV	Sample GL48 Lab Mean	Sample GL48 Diff from Grand Mean	Sample GL48 CPV	Instr Code
2TBG8T		35.63	0.27	0.31	35.56	0.33	0.24	WJ
3KBG8Q		36.22	0.86	0.98	36.29	1.06	0.76	PP
4B422H		35.12	-0.24	-0.27	35.88	0.65	0.47	GS
4CWR8W		35.61	0.25	0.29	34.79	-0.44	-0.31	TP
L4N8FC		34.33	-1.03	-1.17	34.15	-1.08	-0.77	TH
TUYRTU		36.44	1.08	1.23	37.04	1.81	1.29	GM
UD7GJW		34.15	-1.21	-1.38	32.89	-2.34	-1.67	TA

Summary Statistics	Sample GL47	Sample GL48
Grand Means	35.36 Gloss Units	35.23 Gloss Units
Stnd Dev Btwn Labs	0.88 Gloss Units	1.40 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	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

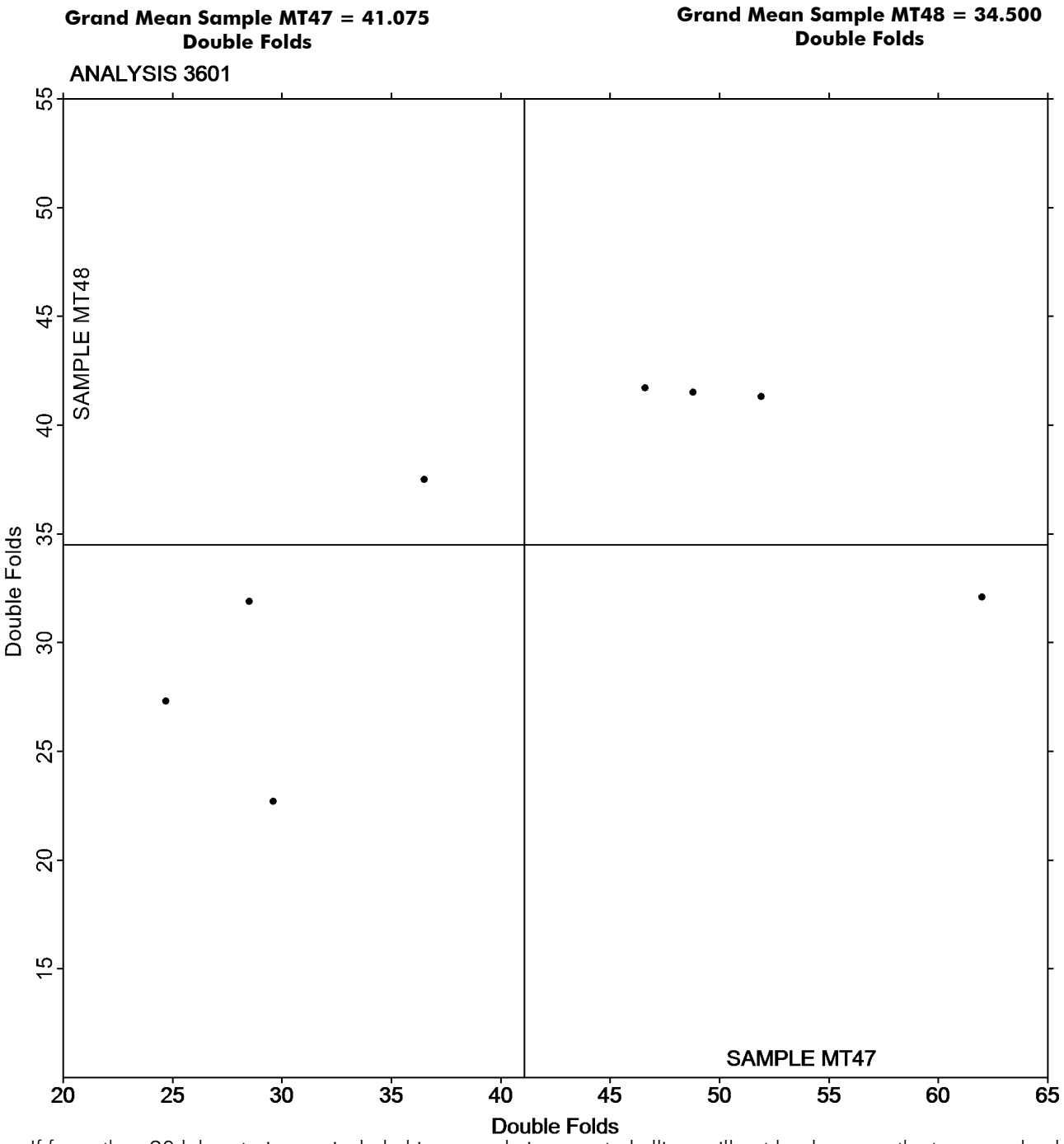
WebCode	Data Flag	Sample MT47 Lab Mean	Sample MT47 Diff from Grand Mean	Sample MT47 CPV	Sample MT48 Lab Mean	Sample MT48 Diff from Grand Mean	Sample MT48 CPV	Instr Code
2N24PU		62.00	20.93	1.58	32.10	-2.40	-0.33	XX
78F7BV		24.70	-16.38	-1.24	27.30	-7.20	-1.00	MT
9Q64QT		29.60	-11.48	-0.87	22.70	-11.80	-1.65	MT
GD8VMH		48.80	7.72	0.58	41.50	7.00	0.98	MT
L4N8FC		28.50	-12.58	-0.95	31.90	-2.60	-0.36	MT
LDACMB		51.90	10.82	0.82	41.30	6.80	0.95	MT
MN3E4A		36.50	-4.58	-0.35	37.50	3.00	0.42	MT
YMFFE3		46.60	5.53	0.42	41.70	7.20	1.00	MT

Summary Statistics	Sample MT47	Sample MT48
Grand Means	41.08 Double Folds	34.50 Double Folds
Stnd Dev Btwn Labs	13.22 Double Folds	7.17 Double Folds

Statistics based on 8 of 8 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

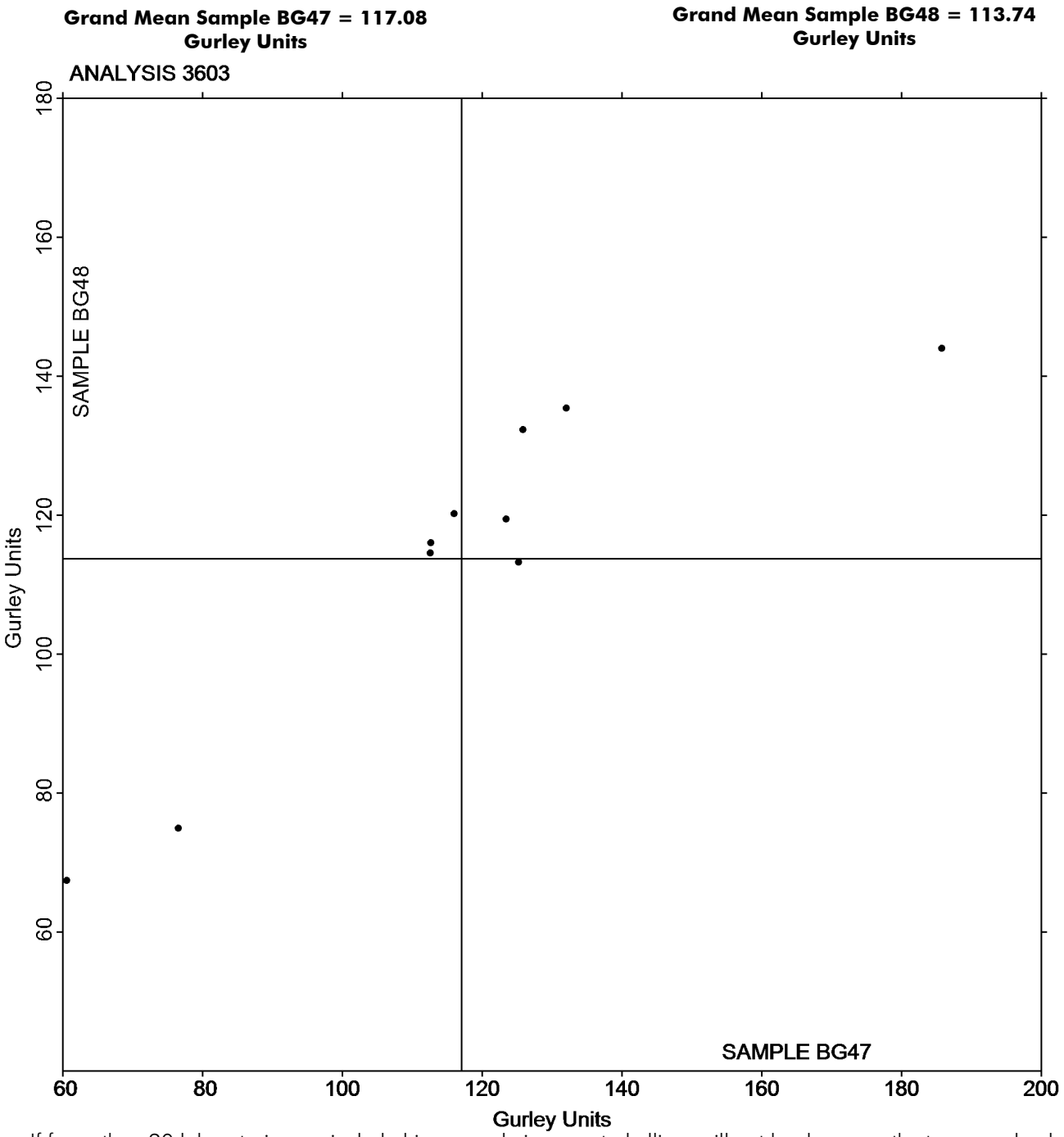
WebCode	Data Flag	Sample BG47 Lab Mean	Sample BG47 Diff from Grand Mean	Sample BG47 CPV	Sample BG48 Lab Mean	Sample BG48 Diff from Grand Mean	Sample BG48 CPV	Instr Code
9Q64QT		76.6	-40.5	-1.21	74.9	-38.8	-1.58	ZZ
CZYJ4L		116.0	-1.1	-0.03	120.2	6.5	0.26	ZZ
KCJQGE		123.4	6.4	0.19	119.4	5.7	0.23	ZZ
L3QZBX		112.6	-4.5	-0.13	114.5	0.8	0.03	ZZ
L4N8FC		185.8	68.7	2.06	144.0	30.3	1.23	ZZ
MN3E4A		112.7	-4.4	-0.13	116.0	2.3	0.09	ZZ
TNAER7		132.1	15.0	0.45	135.4	21.7	0.88	ZZ
UXT9HT		60.6	-56.5	-1.69	67.4	-46.4	-1.88	ZZ
VK22XX		125.2	8.1	0.24	113.2	-0.5	-0.02	ZZ
WUFFE6		125.9	8.8	0.26	132.3	18.6	0.75	ZZ

Summary Statistics	Sample BG47	Sample BG48
Grand Means	117.08 Gurley Units	113.74 Gurley Units
Stnd Dev Btwn Labs	33.34 Gurley Units	24.65 Gurley Units

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3611

Coefficient of Static Friction - Horizontal Plane Method - Printing Papers

TAPPI Official Test Method T549

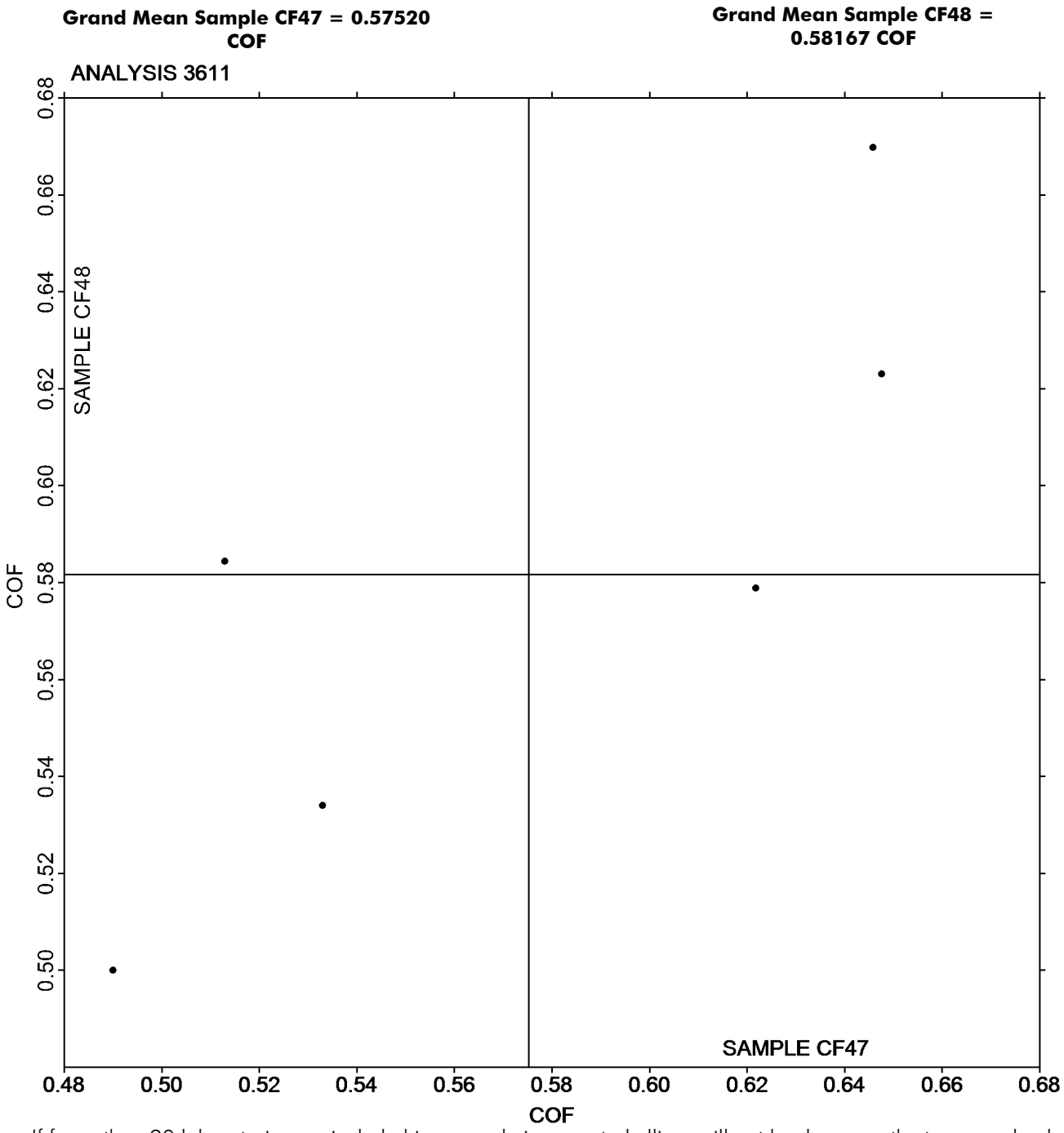
WebCode	Data Flag	Sample CF47 Lab Mean	Sample CF47 Diff from Grand Mean	Sample CF47 CPV	Sample CF48 Lab Mean	Sample CF48 Diff from Grand Mean	Sample CF48 CPV	Instr Code
4CWR8W		0.6218	0.0466	0.66	0.5788	-0.0029	-0.05	TA
6PZDAL		0.6458	0.0706	0.99	0.6698	0.0881	1.45	TA
CZYJ4L		0.6476	0.0724	1.02	0.6230	0.0413	0.68	TA
VC67ZY		0.5330	-0.0422	-0.59	0.5340	-0.0477	-0.79	XX
WUFFE6		0.4900	-0.0852	-1.20	0.5000	-0.0817	-1.35	TA
XFE4J7		0.5130	-0.0622	-0.87	0.5844	0.0027	0.05	TA

Summary Statistics	Sample CF47	Sample CF48
Grand Means	0.58 COF	0.58 COF
Stnd Dev Btwn Labs	0.07 COF	0.06 COF

Statistics based on 6 of 6 reporting participants.

Key to Instrument Codes Reported by Participants

TA	Thwing-Albert Friction Tester	XX	Instrument make/model not specified by lab



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3612

Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers

TAPPI Official Test Method T549

WebCode	Data Flag	Sample CF47 Lab Mean	Sample CF47 Diff from Grand Mean	Sample CF47 CPV	Sample CF48 Lab Mean	Sample CF48 Diff from Grand Mean	Sample CF48 CPV	Instr Code
4CWR8W		0.5374	0.0355	0.45	0.5238	0.0040	0.08	TA
6PZDAL		0.6052	0.1033	1.31	0.6084	0.0886	1.83	TA
CZYJ4L		0.5058	0.0039	0.05	0.5026	-0.0172	-0.35	TA
VC67ZY		0.5242	0.0223	0.28	0.5280	0.0082	0.17	XX
WUFFE6		0.4700	-0.0319	-0.40	0.4820	-0.0378	-0.78	TA
XFE4J7		0.3686	-0.1333	-1.69	0.4740	-0.0458	-0.94	TA

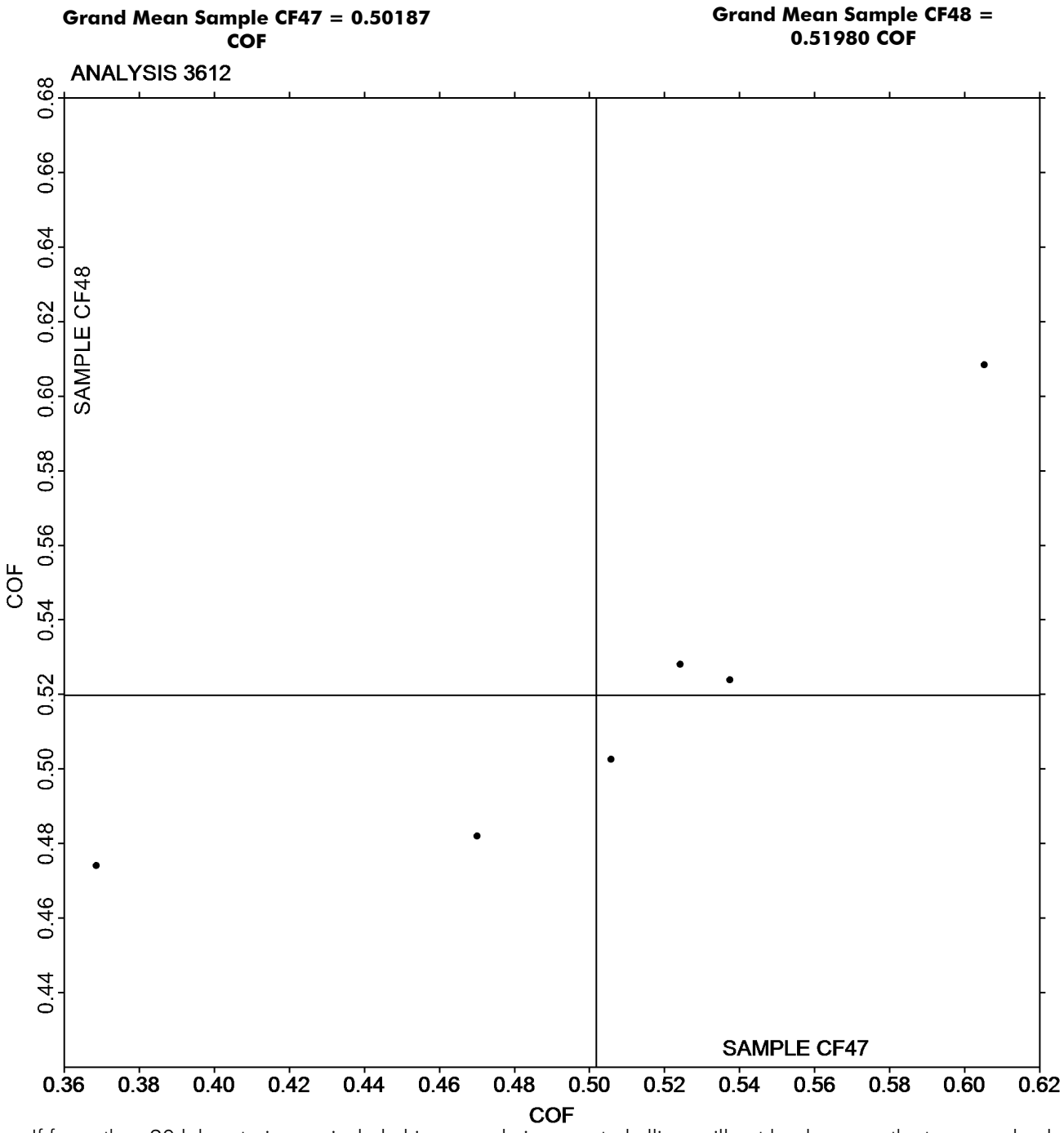
Summary Statistics	Sample CF47	Sample CF48
Grand Means	0.50 COF	0.52 COF
Stnd Dev Btwn Labs	0.08 COF	0.05 COF

Statistics based on 6 of 6 reporting participants.

Key to Instrument Codes Reported by Participants

TA Thwing-Albert Friction Tester

XX Instrument make/model not specified by lab



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3613
Moisture in Paper
TAPPI Official Test Method T412

WebCode	Data Flag	Sample MC47 Lab Mean	Sample MC47 Diff from Grand Mean	Sample MC47 CPV	Sample MC48 Lab Mean	Sample MC48 Diff from Grand Mean	Sample MC48 CPV	Instr Code
2TBG8T	M	4.175	-0.470	-1.51	No data reported for this sample			ZZ
77LF6G		4.912	0.267	0.86	4.503	-0.112	-0.29	ZZ
FKQYUK		5.000	0.355	1.14	4.590	-0.025	-0.06	ZZ
K9ZVF9		4.739	0.094	0.30	4.649	0.034	0.09	ZZ
L3QZBX		4.232	-0.413	-1.33	4.355	-0.260	-0.67	ZZ
MN3E4A		5.025	0.380	1.22	4.923	0.307	0.79	ZZ
NWYA29		4.610	-0.035	-0.11	5.470	0.855	2.19	ZZ
P8FDNX		4.650	0.005	0.02	4.580	-0.035	-0.09	ZZ
VBU4EZ		4.187	-0.458	-1.47	4.129	-0.486	-1.24	ZZ
WUFFE6		4.447	-0.197	-0.64	4.338	-0.277	-0.71	ZZ

Summary Statistics	Sample MC47	Sample MC48
Grand Means	4.64 Percent	4.62 Percent
Stnd Dev Btwn Labs	0.31 Percent	0.39 Percent

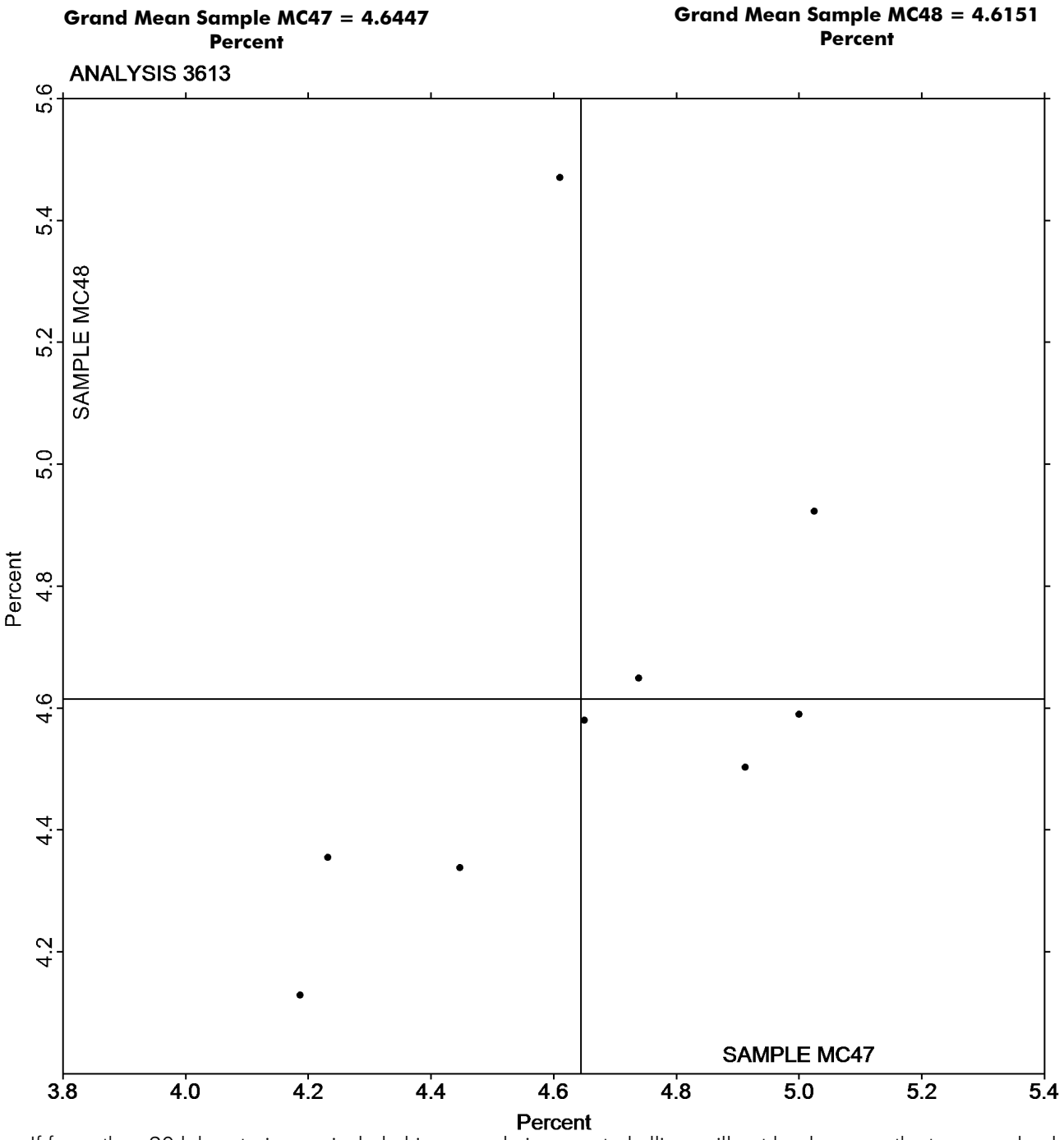
Statistics based on 9 of 10 reporting participants.

Comments on Assigned Data Flags for Test #3613

2TBG8T (M) - Participant did not submit data for sample MC48.

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 HS47 Lab Mean	Sample HS47 Diff from Grand Mean	Sample HS47 CPV	Sample HS48 Lab Mean	Sample HS48 Diff from Grand Mean	Sample HS48 CPV	Instr Code
4CWR8W	X	128.93	100.05	5.61	111.33	82.58	4.08	HE
7MRMKH		27.58	-1.30	-0.07	26.95	-1.80	-0.09	HE
873WXN		34.34	5.46	0.31	32.10	3.35	0.17	HE
9Q64QT		18.33	-10.55	-0.59	18.34	-10.41	-0.51	HE
DC7NUE		20.22	-8.66	-0.49	18.90	-9.85	-0.49	HE
GZYCNM		18.63	-10.25	-0.57	19.15	-9.60	-0.47	HE
KCJQGE		37.23	8.35	0.47	35.83	7.08	0.35	HE
MQDWPZ		18.91	-9.97	-0.56	18.58	-10.17	-0.50	HE
TUYRTU		21.22	-7.66	-0.43	19.48	-9.27	-0.46	HE
UEDWQ3		32.60	3.72	0.21	29.80	1.05	0.05	HE
UEFNLP		10.22	-18.66	-1.05	9.37	-19.38	-0.96	HE
UXT9HT		18.77	-10.11	-0.57	19.12	-9.63	-0.48	HE
VC67ZY	*	73.58	44.70	2.51	88.64	59.89	2.96	XX
VK22XX	X	133.44	104.56	5.86	127.00	98.25	4.85	HE
VNH7WT		18.53	-10.35	-0.58	18.08	-10.67	-0.53	XX
WUFFE6	*	64.00	35.12	1.97	58.82	30.07	1.49	HE
XFE4J7		19.01	-9.87	-0.55	18.10	-10.65	-0.53	HE

Summary Statistics	Sample HS47	Sample HS48
Grand Means	28.88 Seconds	28.75 Seconds
Stnd Dev Btwn Labs	17.83 Seconds	20.25 Seconds

Statistics based on 15 of 17 reporting participants.

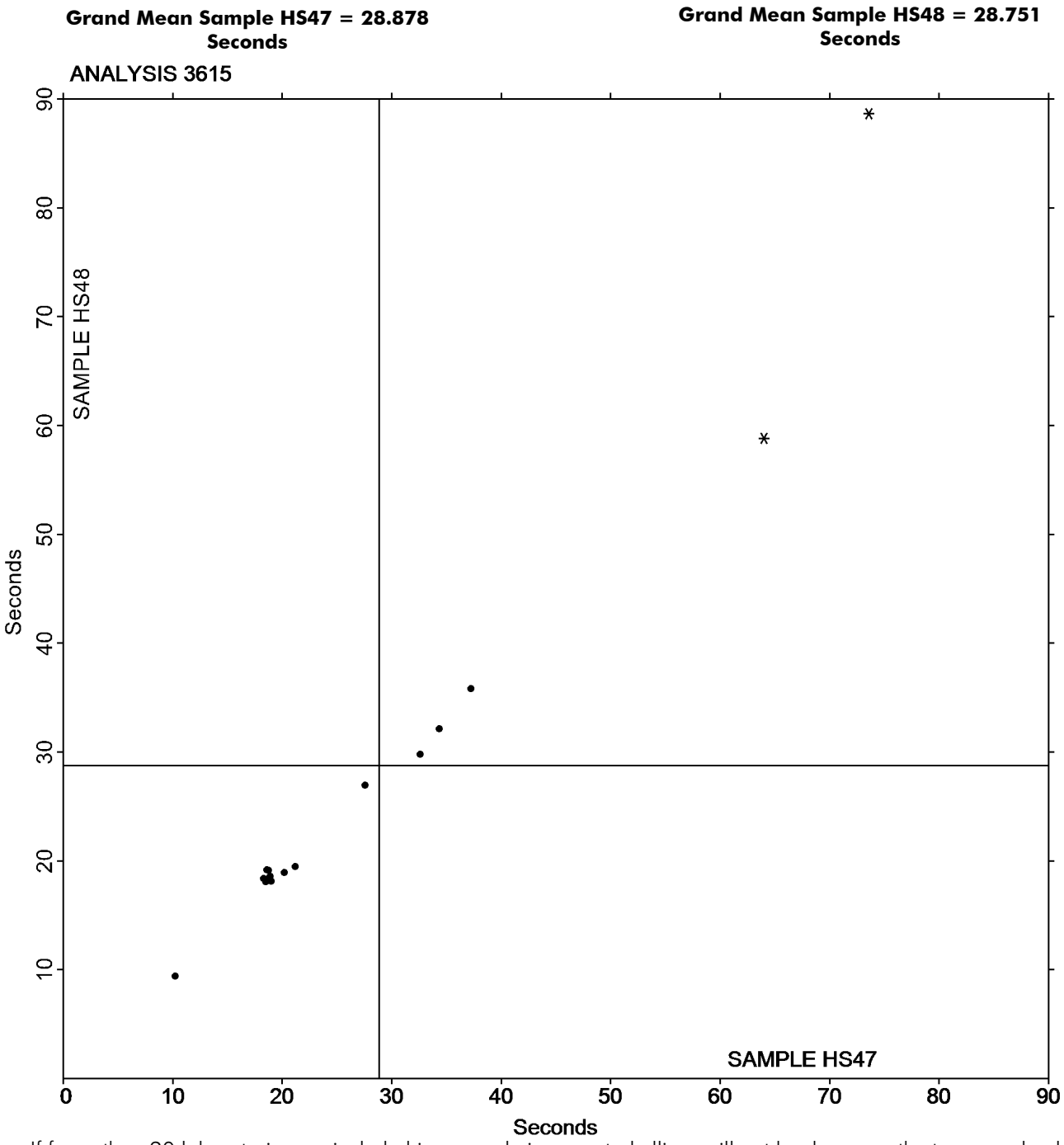
Comments on Assigned Data Flags for Test #3615

4CWR8W (X) - Data for both samples are high. Inconsistent within the determinations of both samples.

VK22XX (X) - Data for both samples are high. Inconsistent within the determinations of both 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-