Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #4312 - August 2024

Introduction to the Paper & Paperboard Interlaboratory Program

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The CTS Paper & Paperboard Interlaboratory Program

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

About CTS

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

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Key for Web Summary Reports (Page 1 of 2)

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

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

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

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

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

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

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

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

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

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

Common Problems Highlighted in Footnotes

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

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

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

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

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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3501

Thickness (Caliper), Packaging papers

TAPPI Official Test Method T411

WebCode	Data Flag	Sample CK31 Lab Mean	Sample CK31 Diff from Grand Mean	Sample CK31 CPV	Sample CK32 Lab Mean	Sample CK32 Diff from Grand Mean	Sample CK32 CPV	Instr Code
2ELXFR		10.000	0.040	0.32	10.004	0.039	0.31	LW
64W88W		9.972	0.012	0.10	9.956	-0.009	-0.08	LC
6U8GMQ		10.158	0.198	1.57	10.171	0.206	1.66	PP
82GP2W		10.123	0.163	1.29	10.125	0.159	1.29	LW
8QZ7GZ		9.860	-0.100	-0.80	9.860	-0.105	-0.85	XX
ADZ9AJ		9.948	-0.012	-0.10	9.959	-0.007	-0.06	LW
AZE2BW		10.034	0.074	0.59	10.026	0.061	0.49	EM
BF8TVX		9.709	-0.251	-1.99	9.715	-0.250	-2.02	XX
DD8RLC		9.885	-0.075	-0.60	9.880	-0.085	-0.69	OK
ECCAKB		9.970	0.010	0.08	10.020	0.055	0.44	LW
FBZWDT		9.949	-0.011	-0.09	10.024	0.058	0.47	LW
HQJL47	*	9.800	-0.160	-1.27	9.910	-0.055	-0.45	XX
HX2Z7B		9.968	0.008	0.06	9.976	0.011	0.09	LA
J6XE6H	*	9.618	-0.342	-2.72	9.614	-0.351	-2.84	XX
K4JA7J		9.989	0.029	0.23	9.989	0.024	0.19	TA
KDPUTL		9.819	-0.141	-1.12	9.848	-0.117	-0.95	EM
MBQM2K		10.000	0.040	0.32	9.984	0.019	0.15	MS
MC8JTJ		9.966	0.006	0.05	9.989	0.024	0.19	EM
PJEXQ7		9.942	-0.018	-0.14	9.950	-0.015	-0.12	EM
PKRPG2		9.864	-0.096	-0.76	9.846	-0.119	-0.96	XX
PNRZC2		9.952	-0.008	-0.06	10.035	0.070	0.56	TA
QFCGQG		9.760	-0.200	-1.59	9.722	-0.243	-1.97	OK
QT2GJ6		10.121	0.161	1.28	10.078	0.113	0.91	PP
RWXJNW		10.046	0.086	0.68	10.082	0.117	0.94	LC
TGX628		10.069	0.109	0.86	10.076	0.111	0.89	LW
TPCTZF		10.045	0.085	0.67	9.982	0.017	0.13	XX
UAUHMD		10.063	0.102	0.81	10.043	0.078	0.63	LW
UCJPAV	X	9.870	-0.090	-0.72	9.660	-0.305	-2.47	PP
UT9YUC		10.078	0.118	0.94	10.008	0.043	0.34	EM
XN7WH8		10.072	0.112	0.89	10.089	0.124	1.00	LW
XWB4X8		10.025	0.065	0.51	10.002	0.037	0.30	LB
YPR2Q6	X	2.034	-7.926	-62.91	2.023	-7.942	-64.18	LW

Summary Statistics	Sample CK31	Sample CK32
Grand Means	9.96 mils	9.97 mils
Stnd Dev Btwn Labs	0.13 mils	0.12 mils

Statistics based on 30 of 32 reporting participants.

Comments on Assigned Data Flags for Test #3501

YPR2Q6 (X) - Extreme Data.

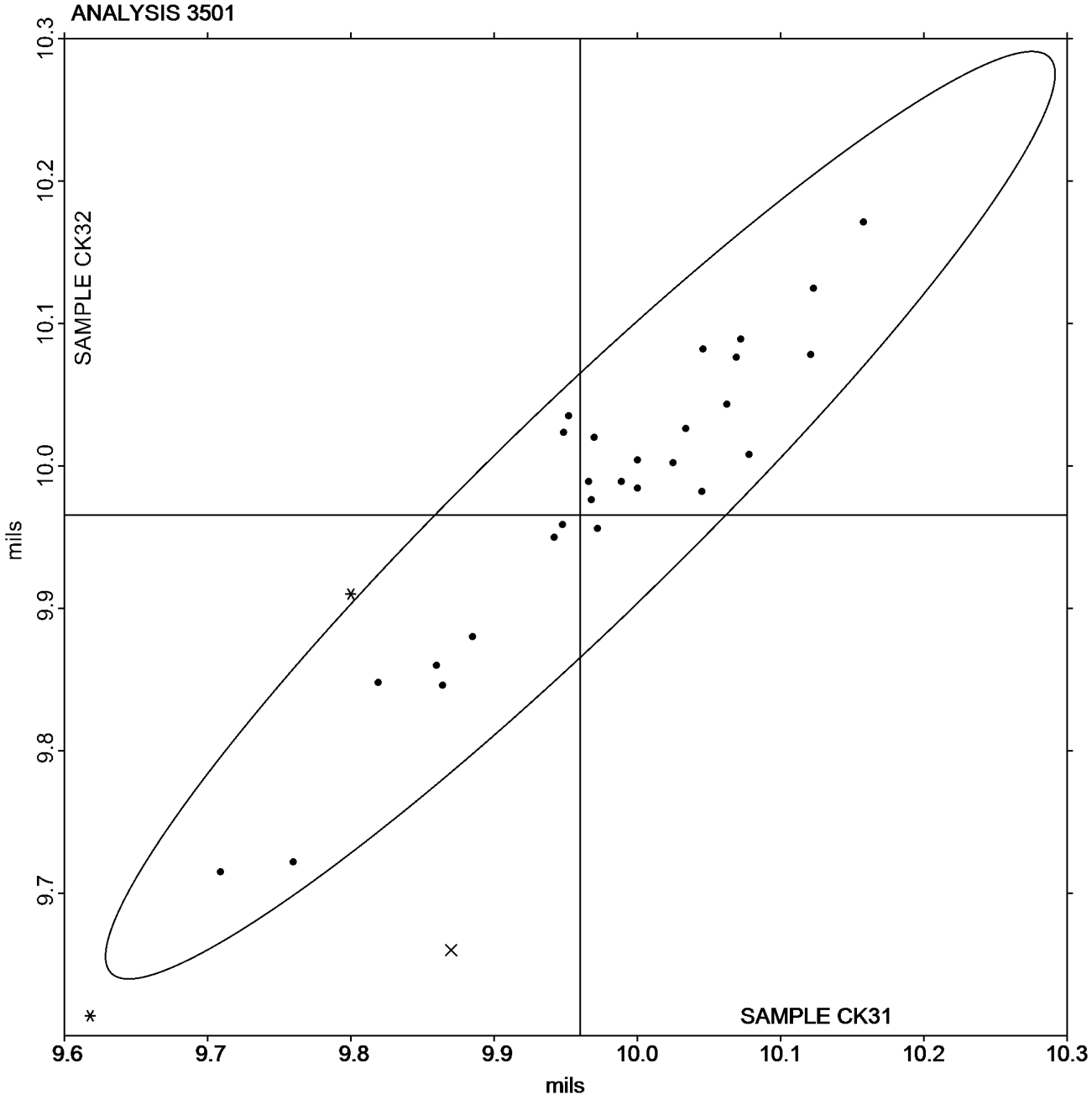
UCJPAV (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample CK32.

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 CK31 = 9.9602 mils

Grand Mean Sample CK32 = 9.9654 mils



Paper & Paperboard Interlaboratory Testing Program

Analysis 3511

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

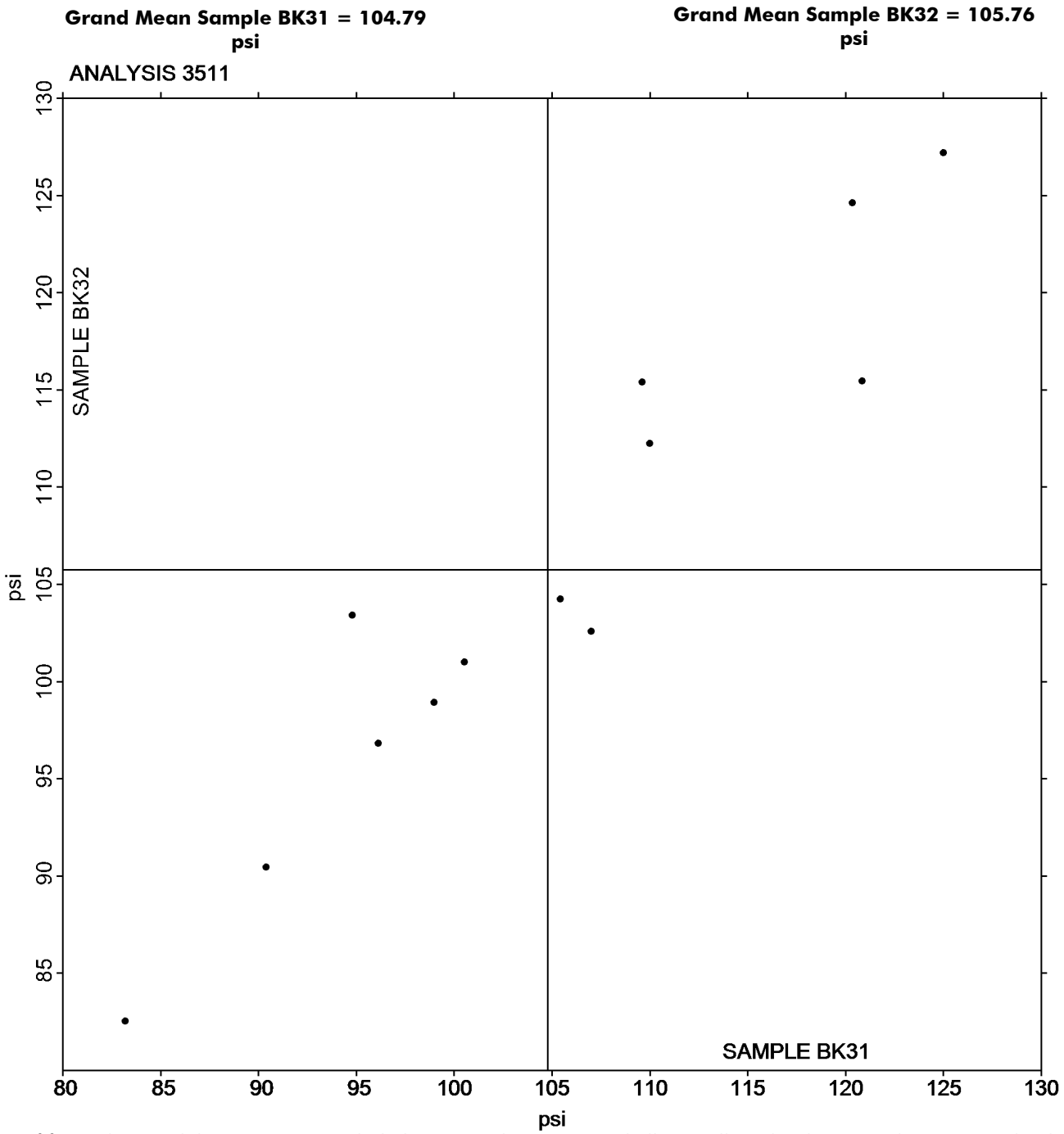
WebCode	Data Flag	Sample BK31 Lab Mean	Sample BK31 Diff from Grand Mean	Sample BK31 CPV	Sample BK32 Lab Mean	Sample BK32 Diff from Grand Mean	Sample BK32 CPV	Instr Code
2ELXFR		120.3	15.6	1.25	124.6	18.9	1.47	ZZ
4JT6WM		125.0	20.2	1.62	127.2	21.4	1.67	ZZ
82GP2W		83.2	-21.6	-1.73	82.5	-23.2	-1.81	ZZ
C3DW9Q		90.4	-14.4	-1.16	90.5	-15.3	-1.19	ZZ
DD8RLC		105.4	0.6	0.05	104.2	-1.5	-0.12	ZZ
J2UFVA		96.1	-8.7	-0.69	96.8	-8.9	-0.69	ZZ
JMDM6H		94.8	-10.0	-0.80	103.4	-2.4	-0.18	ZZ
L3668L		99.0	-5.8	-0.47	98.9	-6.8	-0.53	ZZ
PJEXQ7		100.5	-4.3	-0.34	101.0	-4.7	-0.37	ZZ
PNRZC2		110.0	5.2	0.42	112.3	6.5	0.50	ZZ
RTVJNY		109.6	4.8	0.39	115.4	9.6	0.75	ZZ
UAUHMD		107.0	2.2	0.18	102.6	-3.2	-0.25	ZZ
VKCGUU		120.8	16.1	1.29	115.4	9.7	0.75	ZZ

Summary Statistics	Sample BK31	Sample BK32
Grand Means	104.79 psi	105.76 psi
Stnd Dev Btwn Labs	12.46 psi	12.86 psi

Statistics based on 13 of 13 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 RK31 Lab Mean	Sample RK31 Diff from Grand Mean	Sample RK31 CPV	Sample RK32 Lab Mean	Sample RK32 Diff from Grand Mean	Sample RK32 CPV	Instr Code
64W88W		209.5	-11.3	-0.59	157.6	-23.6	-1.52	ZZ
6U8GMQ		225.8	4.9	0.26	195.8	14.6	0.94	ZZ
7BPZTW		233.6	12.8	0.66	190.7	9.5	0.61	ZZ
82GP2W		233.0	12.2	0.63	192.7	11.5	0.74	ZZ
8QZ7GZ		242.0	21.2	1.10	198.4	17.2	1.11	ZZ
ADZ9AJ		219.7	-1.1	-0.06	175.6	-5.6	-0.36	ZZ
AZE2BW		232.4	11.6	0.60	188.7	7.5	0.48	ZZ
B8EFXJ		189.4	-31.5	-1.64	160.3	-20.9	-1.34	ZZ
BPUPYK		231.5	10.6	0.55	195.8	14.6	0.94	ZZ
C3DW9Q	*	164.8	-56.0	-2.91	136.0	-45.2	-2.90	ZZ
DD8RLC		219.3	-1.5	-0.08	184.8	3.6	0.23	ZZ
HX2Z7B		201.4	-19.4	-1.01	166.5	-14.7	-0.94	ZZ
JMDM6H		224.6	3.8	0.20	188.1	6.9	0.44	ZZ
K4JA7J		216.7	-4.2	-0.22	167.8	-13.4	-0.86	ZZ
KDPUTL	X	275.0	54.2	2.82	262.6	81.5	5.23	ZZ
L3668L		210.4	-10.4	-0.54	173.6	-7.6	-0.49	ZZ
MC8JTJ		205.2	-15.7	-0.82	168.6	-12.6	-0.81	ZZ
MNGGDE		218.3	-2.6	-0.13	182.1	0.9	0.06	ZZ
QFCGQG	X	191.3	-29.6	-1.54	190.2	9.0	0.58	ZZ
QGLQJE		240.3	19.4	1.01	201.1	19.9	1.28	ZZ
QR7XH4	*	261.7	40.8	2.12	199.0	17.9	1.15	ZZ
RVJXCA		210.0	-10.8	-0.56	171.1	-10.1	-0.65	ZZ
TGX628		218.8	-2.1	-0.11	172.3	-8.9	-0.57	ZZ
TPCTZF		245.3	24.4	1.27	191.8	10.6	0.68	ZZ
UAUHMD		224.6	3.8	0.20	189.5	8.3	0.53	ZZ
XN7WH8		237.6	16.8	0.87	196.3	15.1	0.97	ZZ
YPR2Q6		211.2	-9.7	-0.50	184.4	3.2	0.20	ZZ
Z946P3		215.2	-5.7	-0.30	182.4	1.2	0.08	ZZ

Summary Statistics	Sample RK31	Sample RK32
Grand Means	220.85 Grams	181.19 Grams
Stnd Dev Btwn Labs	19.24 Grams	15.57 Grams

Statistics based on 26 of 28 reporting participants.

Comments on Assigned Data Flags for Test #3513

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

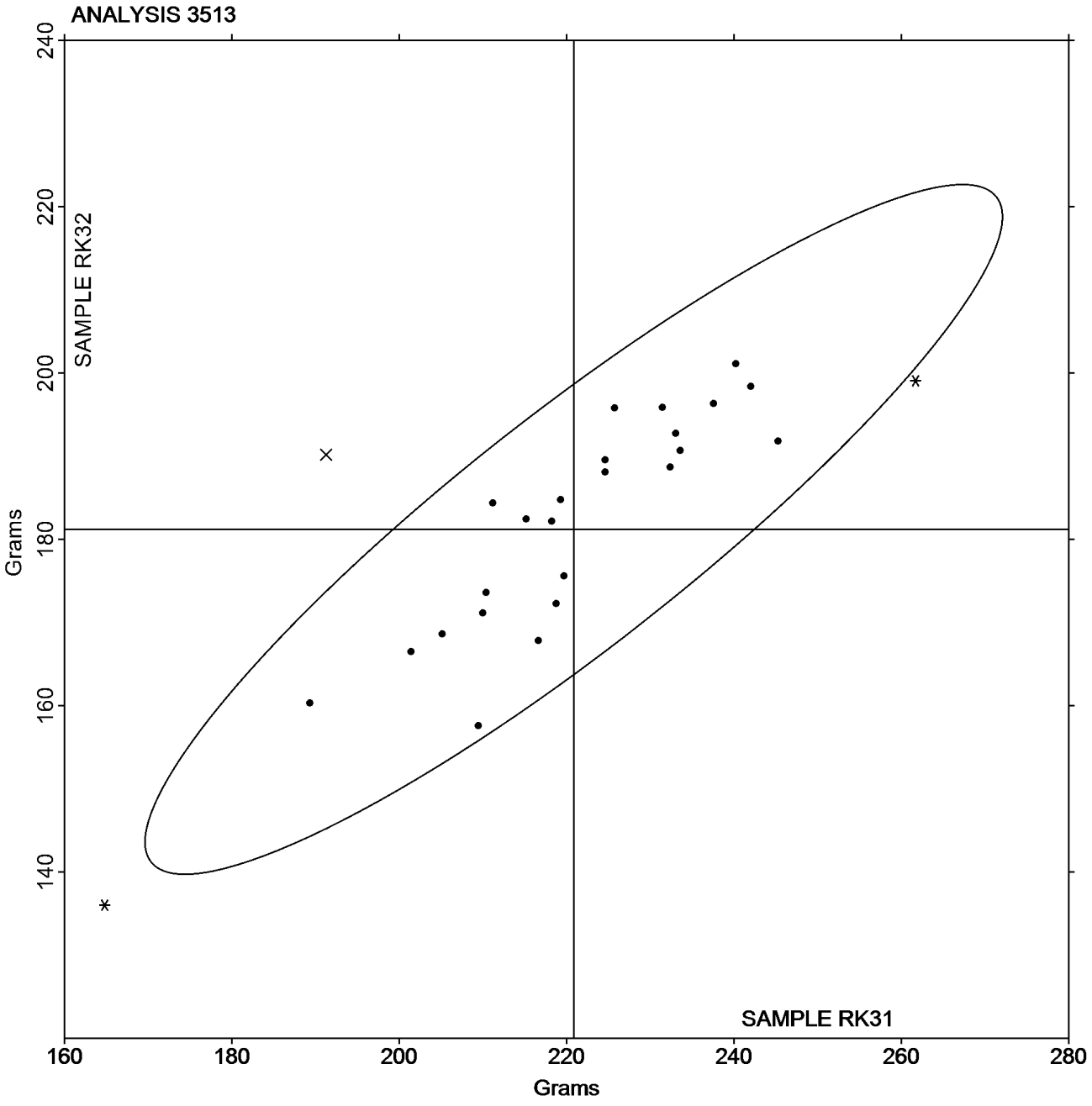
QFCGQG (X) - Inconsistent in testing between samples.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample RK31 = 220.85 Grams

Grand Mean Sample RK32 = 181.19 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK31 Lab Mean	Sample NK31 Diff from Grand Mean	Sample NK31 CPV	Sample NK32 Lab Mean	Sample NK32 Diff from Grand Mean	Sample NK32 CPV	Instr Code
2VDVHM		16.13	0.14	0.12	10.87	0.14	0.18	LI
64W88W		15.88	-0.11	-0.10	10.77	0.05	0.05	IN
6U8GMQ	X	10.09	-5.90	-5.19	10.05	-0.68	-0.83	TH
7BPZTW		15.06	-0.94	-0.82	9.94	-0.79	-0.96	LE
82GP2W		14.86	-1.13	-0.99	9.83	-0.90	-1.09	IM
8QZ7GZ		16.53	0.54	0.47	11.24	0.51	0.61	XX
9TZTBG	*	12.43	-3.56	-3.13	8.56	-2.17	-2.63	TT
ADZ9AJ		15.99	0.00	0.00	10.61	-0.11	-0.14	LE
BPUPYK	X	10.02	-5.97	-5.25	9.85	-0.88	-1.06	TH
ECCAKB		16.16	0.17	0.15	10.57	-0.16	-0.19	TH
HQJL47	X	13.63	-2.36	-2.08	10.06	-0.67	-0.81	XX
HX2Z7B		16.98	0.99	0.87	11.49	0.76	0.92	LA
JMDM6H		15.68	-0.31	-0.27	10.70	-0.03	-0.04	LE
K4JA7J		16.15	0.16	0.14	10.37	-0.36	-0.44	TB
KDPUTL		16.17	0.18	0.16	10.98	0.25	0.30	LW
L3668L		15.71	-0.28	-0.25	10.32	-0.41	-0.50	TX
MNGGDE		14.94	-1.05	-0.92	9.70	-1.02	-1.24	XX
MWRJYE		15.53	-0.46	-0.40	10.79	0.06	0.08	IR
PKRPG2		16.87	0.88	0.77	11.65	0.92	1.11	TB
PNRZC2		16.00	0.01	0.01	11.10	0.37	0.45	TV
QGLQJE		14.94	-1.05	-0.92	9.62	-1.11	-1.35	LH
QPZB6Y		17.87	1.88	1.65	12.06	1.34	1.62	LA
RCCTPZ		17.45	1.46	1.28	11.76	1.03	1.25	LA
REY8DA		15.03	-0.96	-0.85	9.95	-0.78	-0.95	IM
TGX628		16.07	0.08	0.07	10.74	0.01	0.01	LW
TPCTZF		15.41	-0.58	-0.51	10.08	-0.65	-0.78	ID
UAUHMD		15.69	-0.30	-0.27	10.70	-0.03	-0.03	LH
UT9YUC		17.60	1.61	1.41	11.57	0.84	1.01	LE
VNUJ2Y		17.41	1.42	1.25	11.55	0.82	0.99	LE
X4U86A		17.00	1.01	0.89	11.39	0.66	0.80	DM
XN7WH8		15.25	-0.74	-0.65	10.42	-0.31	-0.38	LE
XWB4X8	*	18.28	2.29	2.01	12.81	2.08	2.52	LC
Y9K2G2		14.54	-1.45	-1.27	10.24	-0.49	-0.59	TS
YPR2Q6		16.10	0.11	0.10	10.47	-0.26	-0.31	LW
Z946P3		16.00	0.00	0.00	10.50	-0.23	-0.28	LE

Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample NK31	Sample NK32
Grand Means	15.99 kN/m	10.73 kN/m
Stnd Dev Btwn Labs	1.14 kN/m	0.83 kN/m

Statistics based on 32 of 35 reporting participants.

Comments on Assigned Data Flags for Test #3515

HQJL47 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample NK31.

6U8GMQ (X) - Data for sample NK31 are low.

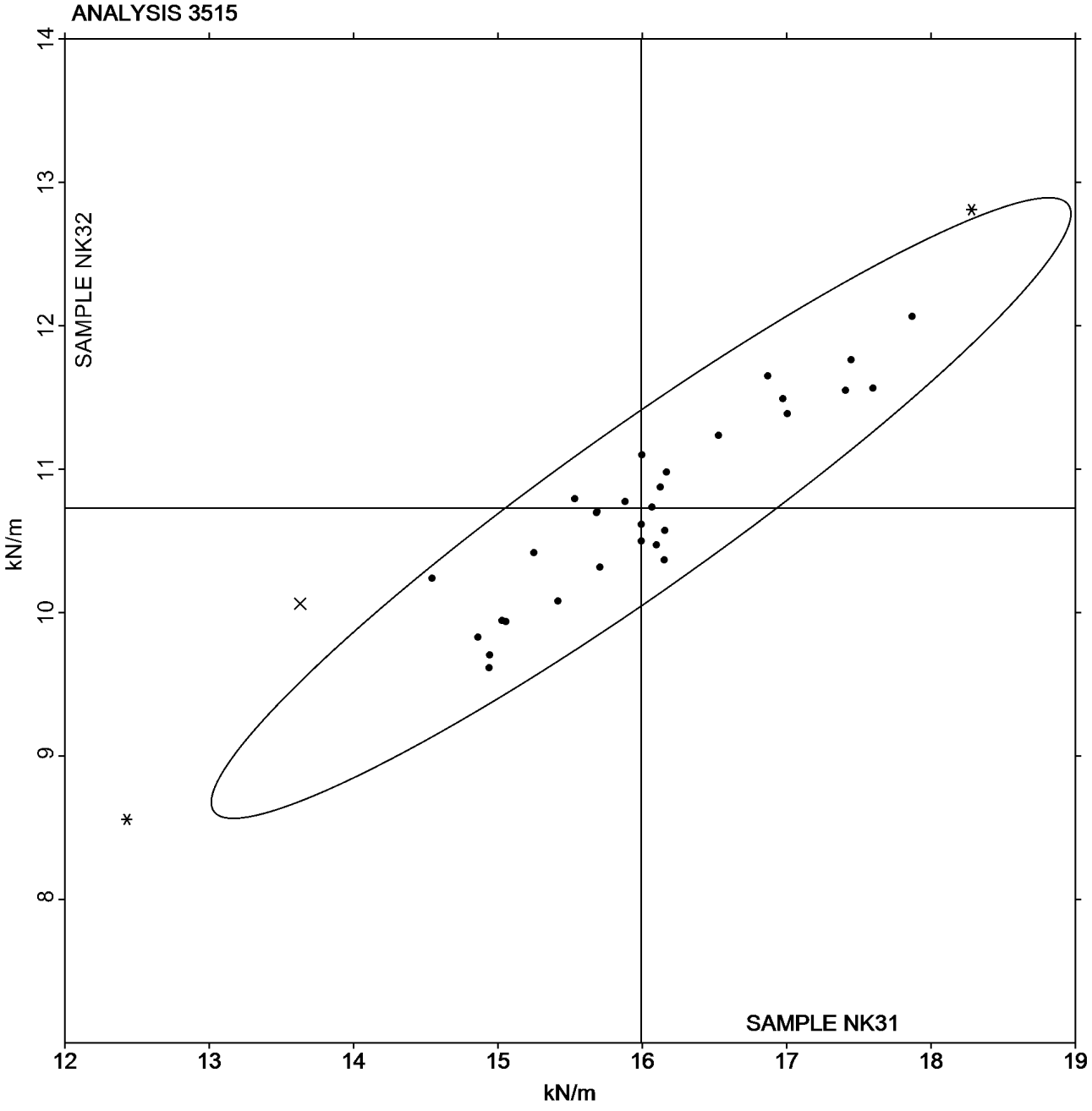
BPUPYK (X) - Data for sample NK31 are low.

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	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 NK31 = 15.991 kN/m

Grand Mean Sample NK32 = 10.729 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 3516

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK31 Lab Mean	Sample NK31 Diff from Grand Mean	Sample NK31 CPV	Sample NK32 Lab Mean	Sample NK32 Diff from Grand Mean	Sample NK32 CPV	Instr Code
64W88W		215.0	-0.5	-0.02	113.8	-4.6	-0.34	IN
82GP2W		221.9	6.5	0.26	108.9	-9.5	-0.71	IM
8QZ7GZ	X	19.0	-196.5	-7.89	15.4	-103.0	-7.69	XX
9TZTBG		182.7	-32.8	-1.32	99.7	-18.7	-1.40	TT
ADZ9AJ		190.7	-24.7	-0.99	106.4	-12.0	-0.90	LE
ECCAKB		242.2	26.7	1.07	132.7	14.4	1.07	TH
HQJL47		204.5	-11.0	-0.44	128.7	10.3	0.77	TH
HX2Z7B		233.5	18.0	0.72	142.7	24.4	1.82	LA
JMDM6H		187.4	-28.1	-1.13	109.4	-9.0	-0.67	LE
KDPUTL		191.3	-24.1	-0.97	107.6	-10.8	-0.80	LW
L3668L		240.1	24.6	0.99	125.5	7.1	0.53	TX
MNGGDE		222.0	6.5	0.26	113.4	-5.0	-0.37	XX
MWRJYE		190.2	-25.3	-1.02	117.7	-0.6	-0.05	IR
PKRPG2		246.7	31.2	1.25	128.0	9.7	0.72	TB
PNRZC2		278.9	63.4	2.55	146.8	28.5	2.12	TV
QGLQJE		185.5	-30.0	-1.20	96.9	-21.4	-1.60	LH
QPZB6Y		228.0	12.5	0.50	119.8	1.4	0.11	LA
RCCTPZ		232.3	16.8	0.68	133.9	15.6	1.16	LC
REY8DA		190.8	-24.7	-0.99	100.8	-17.6	-1.31	IM
TGX628		193.7	-21.7	-0.87	106.4	-12.0	-0.89	LW
UAUHMD		211.2	-4.2	-0.17	118.6	0.2	0.02	LH
UT9YUC		268.3	52.8	2.12	136.2	17.8	1.33	LE
VNUJ2Y		221.1	5.6	0.23	123.7	5.3	0.40	LE
X4U86A	X	339.3	123.8	4.97	168.1	49.8	3.71	DM
XN7WH8		202.2	-13.3	-0.53	113.6	-4.8	-0.36	LE
XWB4X8		208.2	-7.3	-0.29	130.0	11.6	0.87	LC
Y9K2G2		209.2	-6.3	-0.25	122.3	4.0	0.30	TS
YPR2Q6		210.8	-4.7	-0.19	103.9	-14.4	-1.08	LE
Z946P3		209.4	-6.1	-0.24	108.4	-9.9	-0.74	LE

Summary Statistics	Sample NK31	Sample NK32
Grand Means	215.48 Joules/sq m	118.37 Joules/sq m
Stnd Dev Btwn Labs	24.91 Joules/sq m	13.40 Joules/sq m

Statistics based on 27 of 29 reporting participants.

Comments on Assigned Data Flags for Test #3516

8QZ7GZ (X) - Extreme Data.

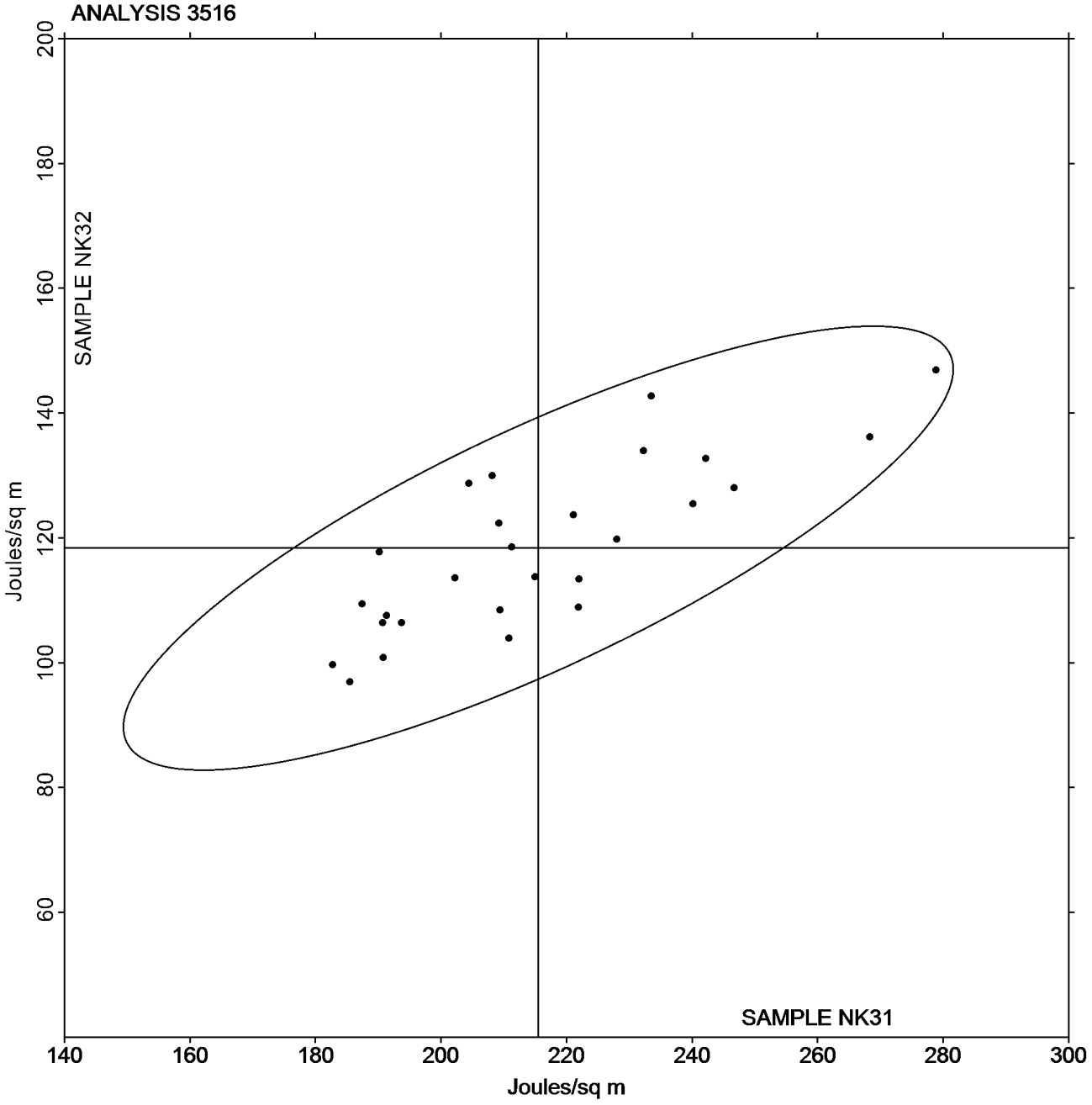
X4U86A (X) - Data for both samples are high. Inconsistent within the determinations of sample NK32.

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	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 NK31 = 215.48 Joules/sq m

Grand Mean Sample NK32 = 118.37 Joules/sq m



Paper & Paperboard Interlaboratory Testing Program

Analysis 3517

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK31 Lab Mean	Sample NK31 Diff from Grand Mean	Sample NK31 CPV	Sample NK32 Lab Mean	Sample NK32 Diff from Grand Mean	Sample NK32 CPV	Instr Code
64W88W		2.125	-0.057	-0.20	1.694	-0.087	-0.44	IN
82GP2W		2.357	0.175	0.60	1.810	0.028	0.14	IM
8QZ7GZ	X	22.150	19.968	68.57	11.918	10.137	51.02	XX
9TZTBG		2.412	0.230	0.79	1.938	0.157	0.79	TT
ADZ9AJ		1.857	-0.325	-1.12	1.586	-0.195	-0.98	LE
ECCAKB		2.405	0.223	0.77	1.955	0.174	0.87	TH
HQJL47	*	2.280	0.098	0.34	2.080	0.299	1.50	XX
HX2Z7B		2.262	0.080	0.28	1.861	0.080	0.40	LX
JMDM6H		1.867	-0.315	-1.08	1.624	-0.157	-0.79	LE
K4JA7J		2.171	-0.011	-0.04	1.684	-0.097	-0.49	TB
KDPUTL		1.876	-0.306	-1.05	1.569	-0.212	-1.07	LW
L3668L		2.398	0.216	0.74	1.910	0.129	0.65	TX
MNGGDE		2.333	0.151	0.52	1.862	0.081	0.41	XX
MWRJYE		1.928	-0.254	-0.87	1.699	-0.082	-0.41	XX
PKRPG2		2.292	0.110	0.38	1.834	0.053	0.26	XX
PNRZC2		2.777	0.595	2.04	2.192	0.411	2.07	TV
QGLQJE		1.899	-0.283	-0.97	1.565	-0.216	-1.09	LH
QPZB6Y		1.950	-0.232	-0.80	1.560	-0.221	-1.11	XX
RCCTPZ		1.997	-0.185	-0.63	1.710	-0.071	-0.36	LC
REY8DA		2.346	0.164	0.56	1.972	0.191	0.96	IM
TGX628		1.898	-0.284	-0.97	1.581	-0.200	-1.01	LW
TPCTZF		2.265	0.083	0.29	1.691	-0.090	-0.45	XX
UAUHMD		2.125	-0.057	-0.20	1.713	-0.068	-0.34	LX
UT9YUC		2.379	0.197	0.68	1.849	0.068	0.34	LE
VNUJ2Y		1.966	-0.216	-0.74	1.737	-0.044	-0.22	LE
X4U86A	*	3.118	0.936	3.21	2.358	0.577	2.90	DM
XN7WH8		2.047	-0.135	-0.46	1.699	-0.082	-0.41	LE
XWB4X8		1.754	-0.428	-1.47	1.586	-0.195	-0.98	LC
Y9K2G2		2.304	0.122	0.42	1.931	0.150	0.75	TS
YPR2Q6		2.036	-0.146	-0.50	1.567	-0.214	-1.08	LW
Z946P3		2.030	-0.152	-0.52	1.624	-0.157	-0.79	LE

Summary Statistics	Sample NK31	Sample NK32
Grand Means	2.18 Percent	1.78 Percent
Stnd Dev Btwn Labs	0.29 Percent	0.20 Percent

Statistics based on 30 of 31 reporting participants.

Comments on Assigned Data Flags for Test #3517

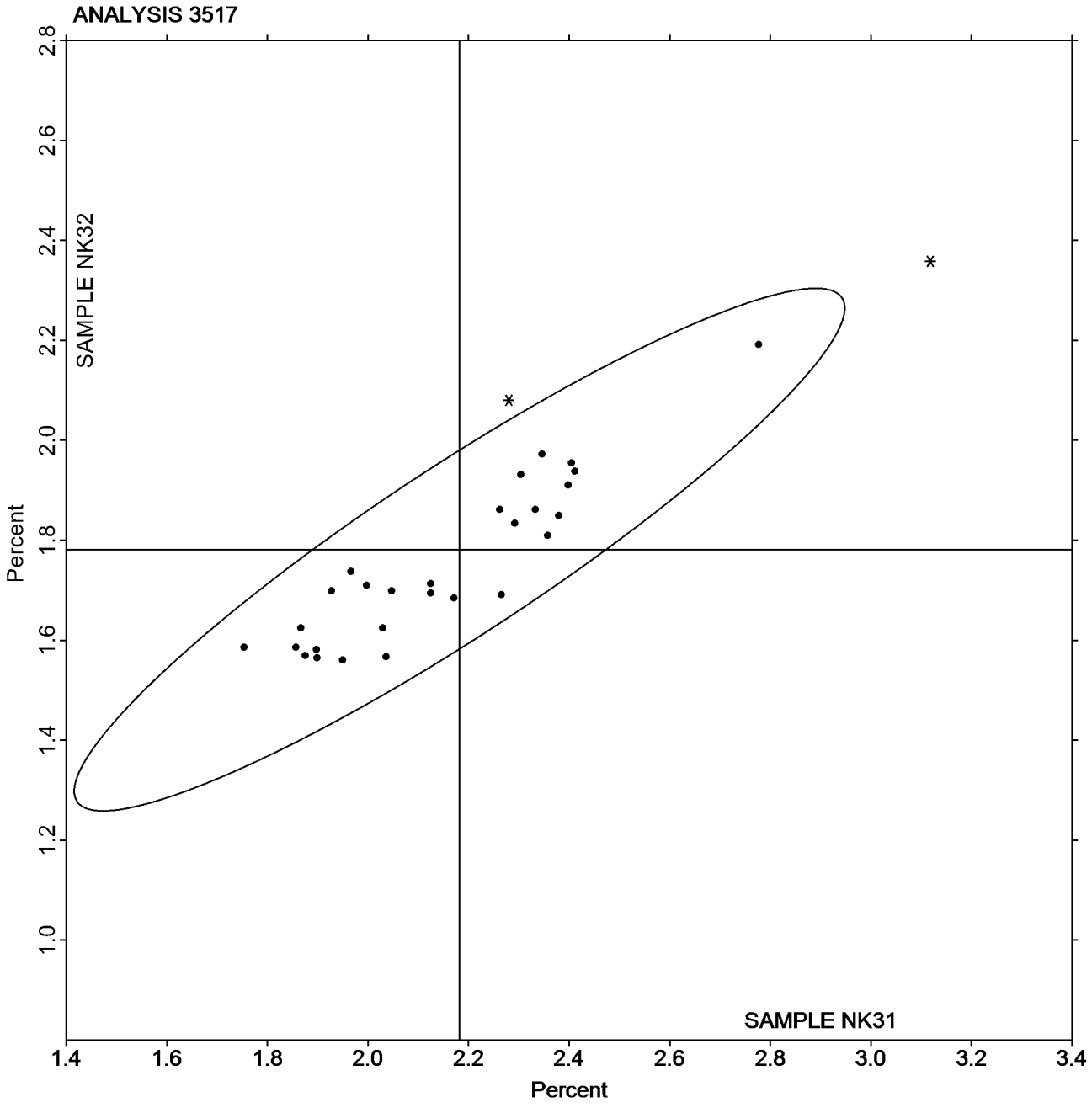
8QZ7GZ (X) - Extreme Data.

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)
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 NK31 = 2.1818
Percent

Grand Mean Sample NK32 = 1.7814
Percent



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 PS31 Lab Mean	Sample PS31 Diff from Grand Mean	Sample PS31 CPV	Sample PS32 Lab Mean	Sample PS32 Diff from Grand Mean	Sample PS32 CPV	Instr Code
6Z9TJM		2.433	0.153	0.55	2.397	0.064	0.21	ZZ
AZE2BW		2.317	0.037	0.13	2.453	0.120	0.39	ZZ
DD8RLC		2.512	0.232	0.84	2.545	0.212	0.68	ZZ
DJGQFP		2.233	-0.047	-0.17	2.282	-0.051	-0.16	ZZ
ECCAKB		2.267	-0.013	-0.05	2.384	0.051	0.16	ZZ
GLQ82Q		1.967	-0.313	-1.13	2.039	-0.294	-0.95	ZZ
GWP3YL		2.519	0.239	0.86	2.540	0.207	0.67	ZZ
HFKQ6B		2.070	-0.210	-0.76	2.120	-0.213	-0.69	ZZ
HGG98C		1.554	-0.726	-2.63	1.518	-0.815	-2.63	ZZ
K8FVY8		2.536	0.256	0.93	2.444	0.111	0.36	ZZ
KDPUTL		2.026	-0.254	-0.92	1.982	-0.351	-1.13	ZZ
KZJXC6		2.218	-0.062	-0.23	2.412	0.079	0.25	ZZ
MC8JTJ		2.495	0.215	0.78	2.323	-0.010	-0.03	ZZ
PKRPG2		2.319	0.039	0.14	2.506	0.173	0.56	ZZ
PU2Y7F		2.244	-0.036	-0.13	2.344	0.011	0.04	ZZ
QFCGQG		2.852	0.572	2.07	3.057	0.724	2.33	ZZ
QPJDCY		2.074	-0.206	-0.75	2.203	-0.130	-0.42	ZZ
RWXJNW		2.184	-0.096	-0.35	2.058	-0.275	-0.89	ZZ
UAUHMD		2.266	-0.014	-0.05	2.261	-0.072	-0.23	ZZ
UT9YUC		2.214	-0.066	-0.24	2.204	-0.129	-0.42	ZZ
XWB4X8		2.007	-0.273	-0.99	2.195	-0.138	-0.45	ZZ
Y9K2G2		2.313	0.033	0.12	2.358	0.025	0.08	ZZ
Z3U7VN		2.276	-0.004	-0.02	2.348	0.015	0.05	ZZ
Z6GQ2R		2.833	0.553	2.00	3.021	0.688	2.22	ZZ

Summary Statistics	Sample PS31	Sample PS32
Grand Means	2.28 Microns	2.33 Microns
Stnd Dev Btwn Labs	0.28 Microns	0.31 Microns

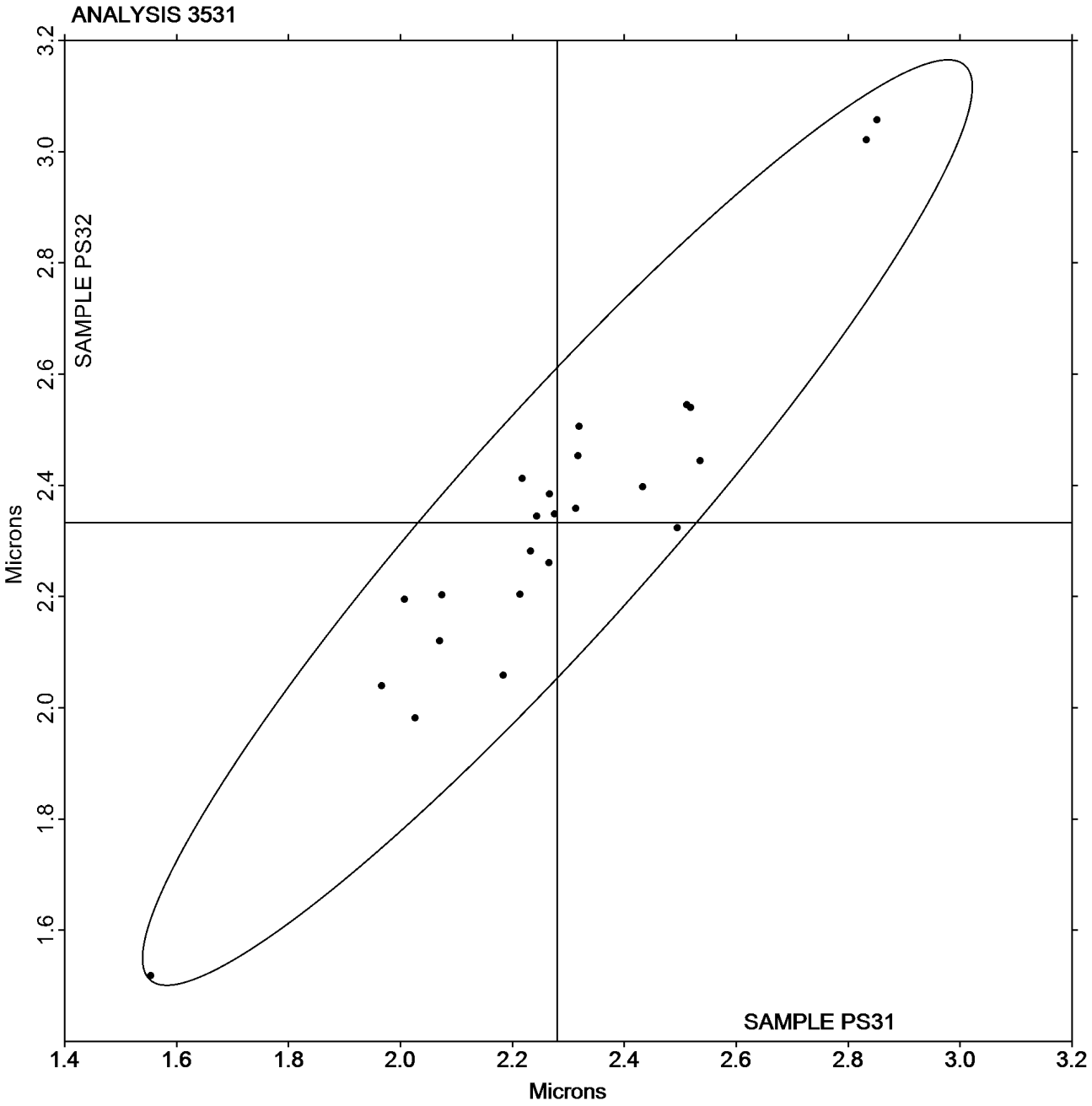
Statistics based on 24 of 24 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample PS31 = 2.2804 Microns

Grand Mean Sample PS32 = 2.3331 Microns



Paper & Paperboard Interlaboratory Testing Program

Analysis 3545
Directional Brightness
TAPPI Official Test Method T452

WebCode	Data Flag	Sample BR31 Lab Mean	Sample BR31 Diff from Grand Mean	Sample BR31 CPV	Sample BR32 Lab Mean	Sample BR32 Diff from Grand Mean	Sample BR32 CPV	Instr Code
6Z9TJM		78.54	2.18	0.67	78.62	2.21	0.67	TD
8QZ7GZ		77.65	1.28	0.39	77.71	1.29	0.39	XX
AZE2BW		79.97	3.60	1.10	79.74	3.32	1.01	HG
DD8RLC		77.74	1.38	0.42	77.87	1.46	0.44	HG
ECCAKB		76.96	0.60	0.18	76.53	0.11	0.03	TP
GHTNYR		76.13	-0.24	-0.07	75.98	-0.44	-0.13	TS
GWP3YL		75.49	-0.87	-0.27	75.67	-0.75	-0.23	PP
HFKQ6B		75.45	-0.92	-0.28	75.51	-0.90	-0.27	TD
HGG98C		75.33	-1.04	-0.32	75.31	-1.11	-0.34	HZ
JJGYNB		78.94	2.57	0.79	78.85	2.44	0.74	TP
K4JA7J	*	77.04	0.67	0.21	77.86	1.45	0.44	XD
KDPUTL		78.21	1.85	0.57	78.38	1.96	0.60	TP
KZJXC6		75.97	-0.40	-0.12	75.97	-0.44	-0.14	TP
MC8JTJ		78.34	1.98	0.61	78.53	2.12	0.65	TP
QFCGQG	*	65.65	-10.72	-3.28	65.33	-11.09	-3.38	TD
TGX628		76.74	0.37	0.11	76.67	0.26	0.08	TS
UCJPAV		70.37	-6.00	-1.84	70.95	-5.47	-1.67	TP
UT9YUC		79.96	3.59	1.10	79.94	3.52	1.07	HG
Y9K2G2		76.69	0.33	0.10	76.55	0.13	0.04	TS
ZB79E4		76.16	-0.21	-0.06	76.33	-0.08	-0.02	XX

Summary Statistics	Sample BR31	Sample BR32
Grand Means	76.37 Percent	76.41 Percent
Stnd Dev Btwn Labs	3.27 Percent	3.28 Percent

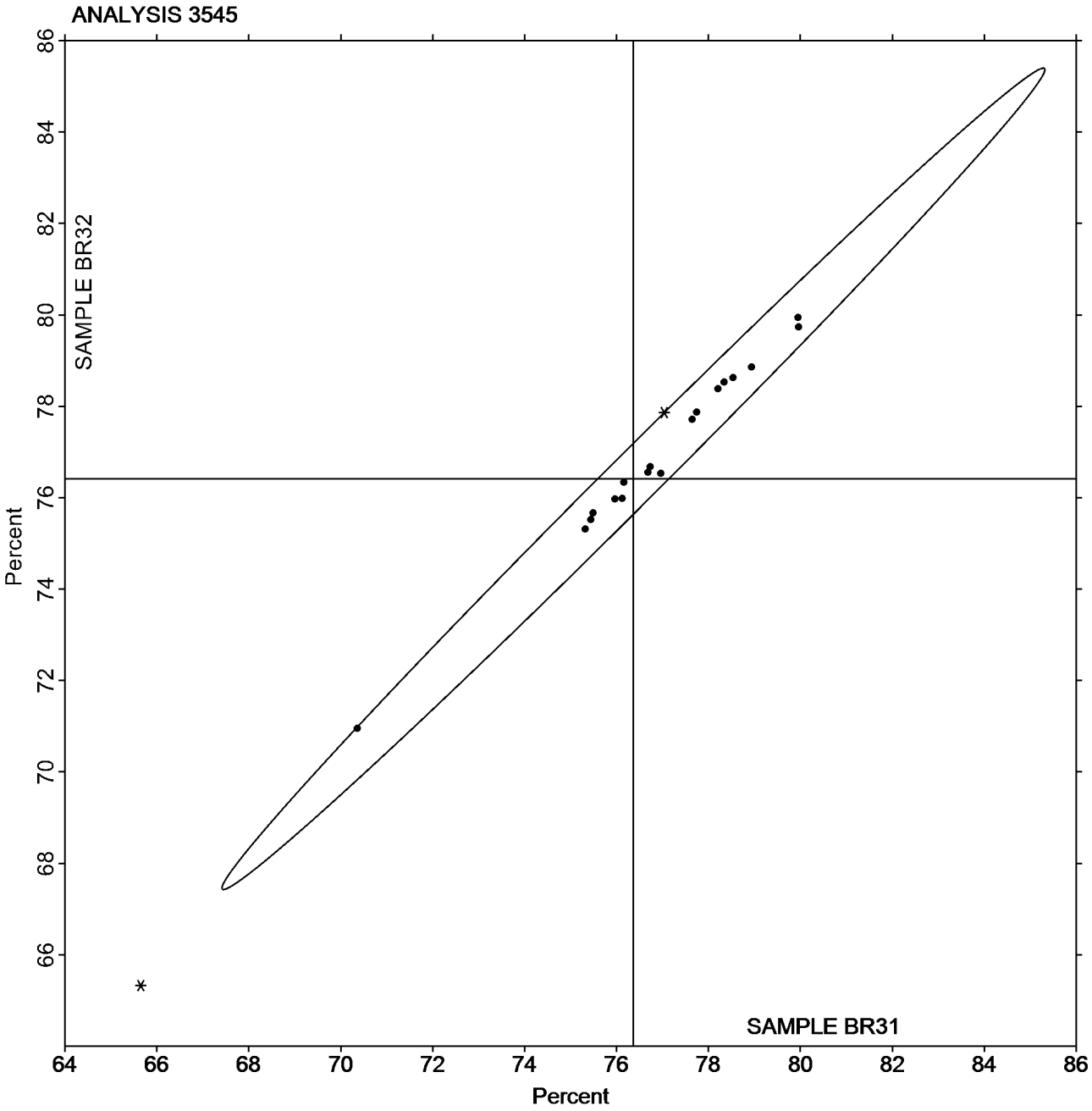
Statistics based on 20 of 20 reporting participants.

Key to Instrument Codes Reported by Participants

HG	Hunter Labscan / XE	HZ	Hunter Lab ColorFlex EZ Series
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

Grand Mean Sample BR31 = 76.366 Percent

Grand Mean Sample BR32 = 76.414 Percent



Paper & Paperboard Interlaboratory Testing Program

Analysis 3547
Diffuse Brightness
TAPPI Official Test Method T525

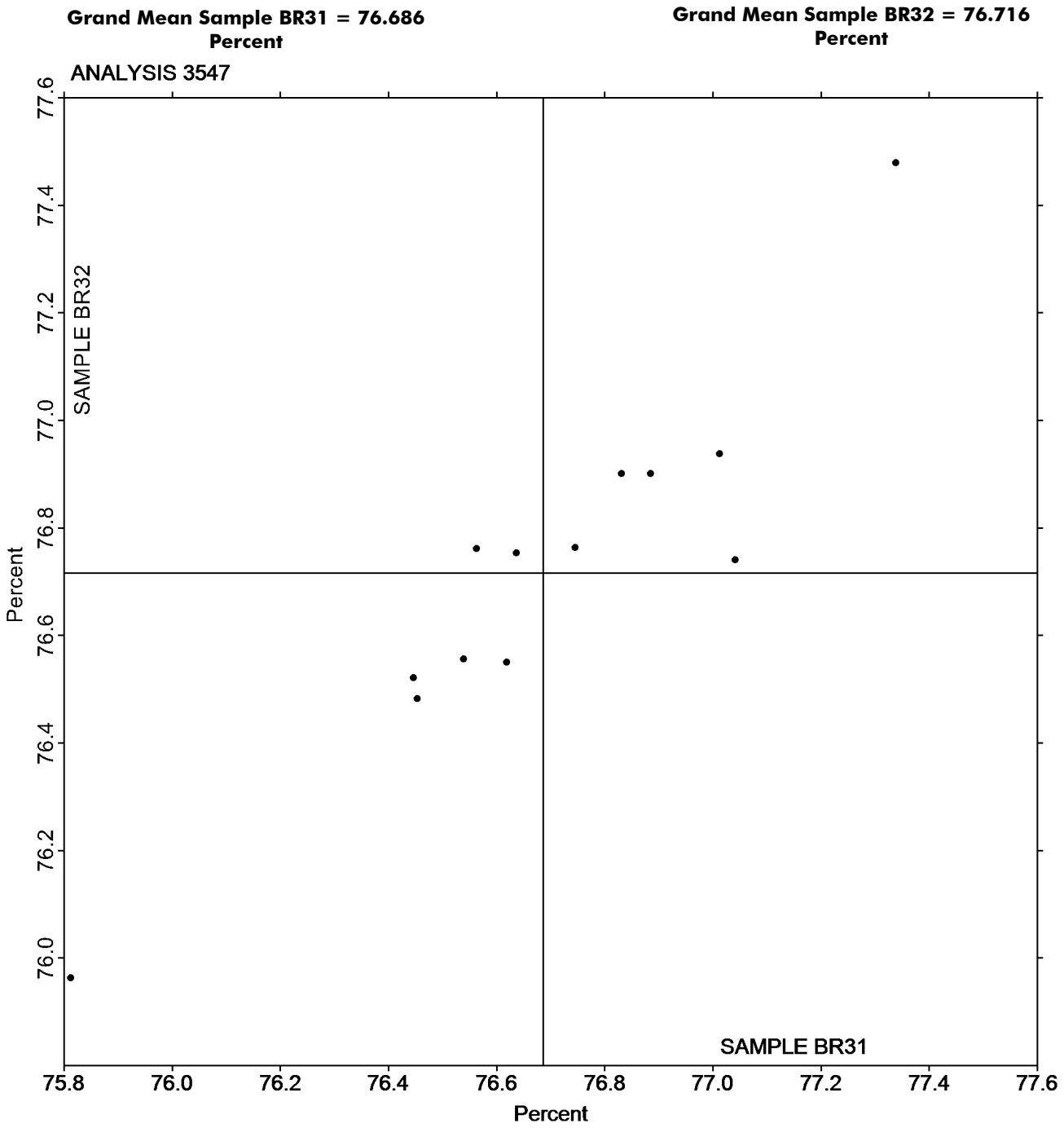
WebCode	Data Flag	Sample BR31 Lab Mean	Sample BR31 Diff from Grand Mean	Sample BR31 CPV	Sample BR32 Lab Mean	Sample BR32 Diff from Grand Mean	Sample BR32 CPV	Instr Code
3L3VJ7		76.45	-0.24	-0.65	76.52	-0.19	-0.57	LE
6Z9TJM		76.75	0.06	0.16	76.76	0.05	0.14	TD
DD8RLC		76.56	-0.12	-0.33	76.76	0.05	0.13	TC
DJGQFP		76.83	0.14	0.39	76.90	0.19	0.54	TC
ECCAKB		75.81	-0.87	-2.36	75.96	-0.75	-2.19	LT
G4BXZP		77.01	0.33	0.88	76.94	0.22	0.64	TP
KDPUTL		76.45	-0.23	-0.63	76.48	-0.23	-0.68	EA
MBQM2K		76.62	-0.07	-0.18	76.55	-0.17	-0.48	LA
MC8JTJ		76.64	-0.05	-0.14	76.75	0.04	0.11	TC
RQ6HKW		76.89	0.20	0.54	76.90	0.19	0.54	LE
UAUHMD		76.54	-0.15	-0.40	76.56	-0.16	-0.46	LT
Y9K2G2		77.34	0.65	1.76	77.48	0.76	2.22	LT
YPR2Q6		77.04	0.35	0.96	76.74	0.02	0.07	LT

Summary Statistics	Sample BR31	Sample BR32
Grand Means	76.69 Percent	76.72 Percent
Stnd Dev Btwn Labs	0.37 Percent	0.34 Percent

Statistics based on 13 of 13 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
TP	Technidyne Test/Plus		



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 #4312, August 2024

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
2JYZZ3		**CA31**	85.87	0.75	-0.58	-0.17	-0.04	0.06	0.18	TS
		CA32	85.70	0.70	-0.52					
3L3VJ7		**CA31**	89.46	0.34	-0.58	-0.01	0.03	-0.09	0.09	LS
		CA32	89.45	0.37	-0.66					
6Z9TJM		**CA31**	86.89	0.31	-0.51	-0.16	0.04	-0.12	0.21	TC
		CA32	86.73	0.35	-0.63					
8QZ7GZ		**CA31**	89.95	0.28	-0.61	-0.06	0.08	-0.12	0.16	XX
		CA32	89.90	0.37	-0.73					
AZE2BW		**CA31**	86.88	0.75	-0.85	0.06	-0.08	0.11	0.15	HK
		CA32	86.94	0.67	-0.75					
DD8RLC		**CA31**	87.25	0.82	-0.74	0.05	0.00	0.00	0.05	HK
		CA32	87.31	0.82	-0.74					
GWP3YL		**CA31**	86.73	0.29	-0.54	0.05	0.01	0.04	0.06	TC
		CA32	86.77	0.30	-0.51					
HFKQ6B		**CA31**	85.24	1.00	-1.68	-0.04	-0.10	0.20	0.23	TC
		CA32	85.20	0.90	-1.48					
MBQM2K		**CA31**	86.72	0.68	-0.95	0.03	-0.09	0.16	0.19	LA
		CA32	86.75	0.59	-0.79					
MC8JTJ		**CA31**	86.92	0.30	-0.45	-0.18	0.08	-0.30	0.36	TC
		CA32	86.74	0.38	-0.75					
PJEXQ7		**CA31**	89.64	0.50	-0.55	0.00	0.00	-0.05	0.05	TC
		CA32	89.65	0.50	-0.60					
QFCGQG		**CA31**	79.89 *	0.48	-1.09	-0.02	0.02	-0.03	0.04	TC
		CA32	79.88	0.50	-1.12					
UT9YUC		**CA31**	87.38	0.83	-1.05	0.09	-0.02	0.13	0.16	HK
		CA32	87.47	0.81	-0.93					
WN2FJA		**CA31**	89.86	-0.44	-0.12	-0.13	0.01	0.04	0.14	NH
		CA32	89.73	-0.42	-0.08					
Y9K2G2		**CA31**	86.02	1.36 *	-1.50 *	-0.04	0.09	1.19 X	1.20 X	TS
		CA32	85.97	1.45	-0.30					
Z3U7VN		**CA31**	89.59	0.32	-0.54	-0.03	0.03	-0.09	0.10	TC
		CA32	89.56	0.35	-0.63					

Z6GQ2R	CA31	88.43	0.92	-1.40	0.28	X	-0.04	0.21	0.35	TC
	CA32	88.71	0.88	-1.19						

Summary Statistics

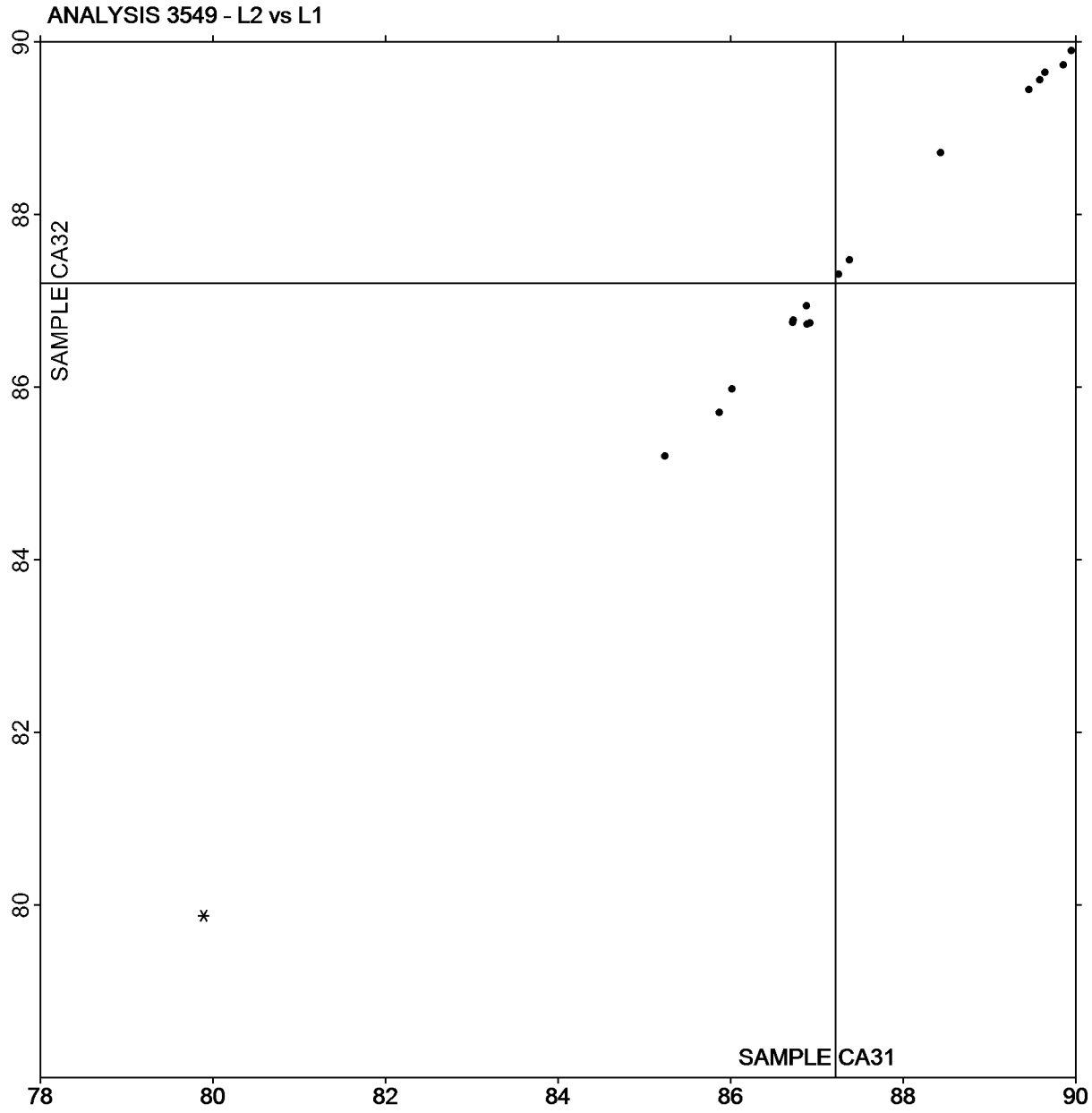
Grand Means							
CA31	87.219	0.559	-0.808	-0.016	0.001	0.079	0.218
CA32	87.203	0.560	-0.729				
Stnd Dev Btwn Labs							
CA31	2.426	0.402	0.418	0.112	0.059	0.316	0.270
CA32	2.435	0.388	0.326				

Statistics based on 17 of 17 reporting participants

Key to Instrument Codes Reported by Participants

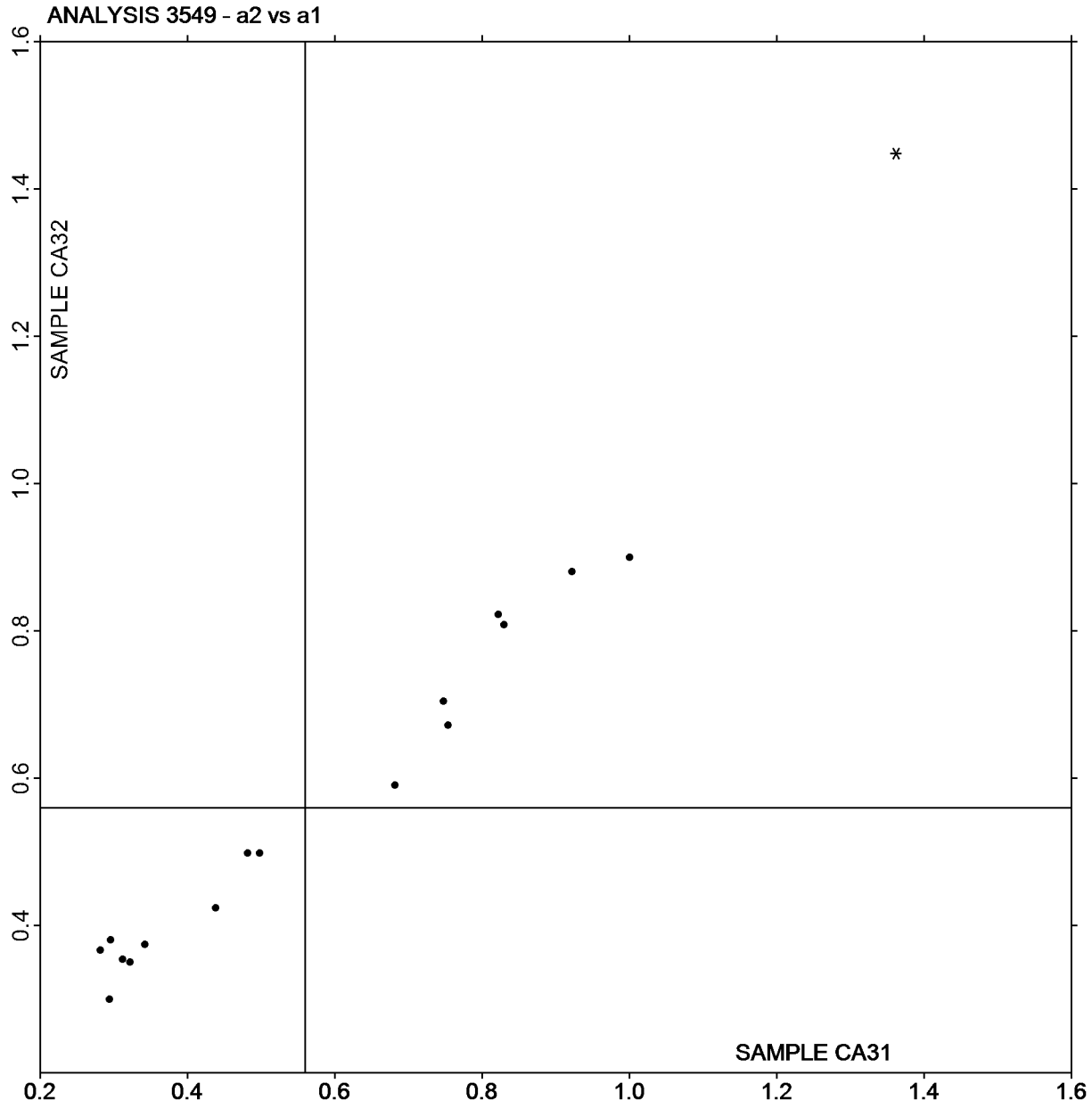
HK	Hunter LabScan XE	LA	L & W Elrepho AL300
LS	L & W Elrepho SE 070	NH	Minolta CM-3700A Spectrophotometer
TC	Technidyne Color Touch Series	TS	Technidyne Brightimeter Micro S-5
XX	Instrument make/model not specified by lab		

Plot of L values CA32 vs L values CA31



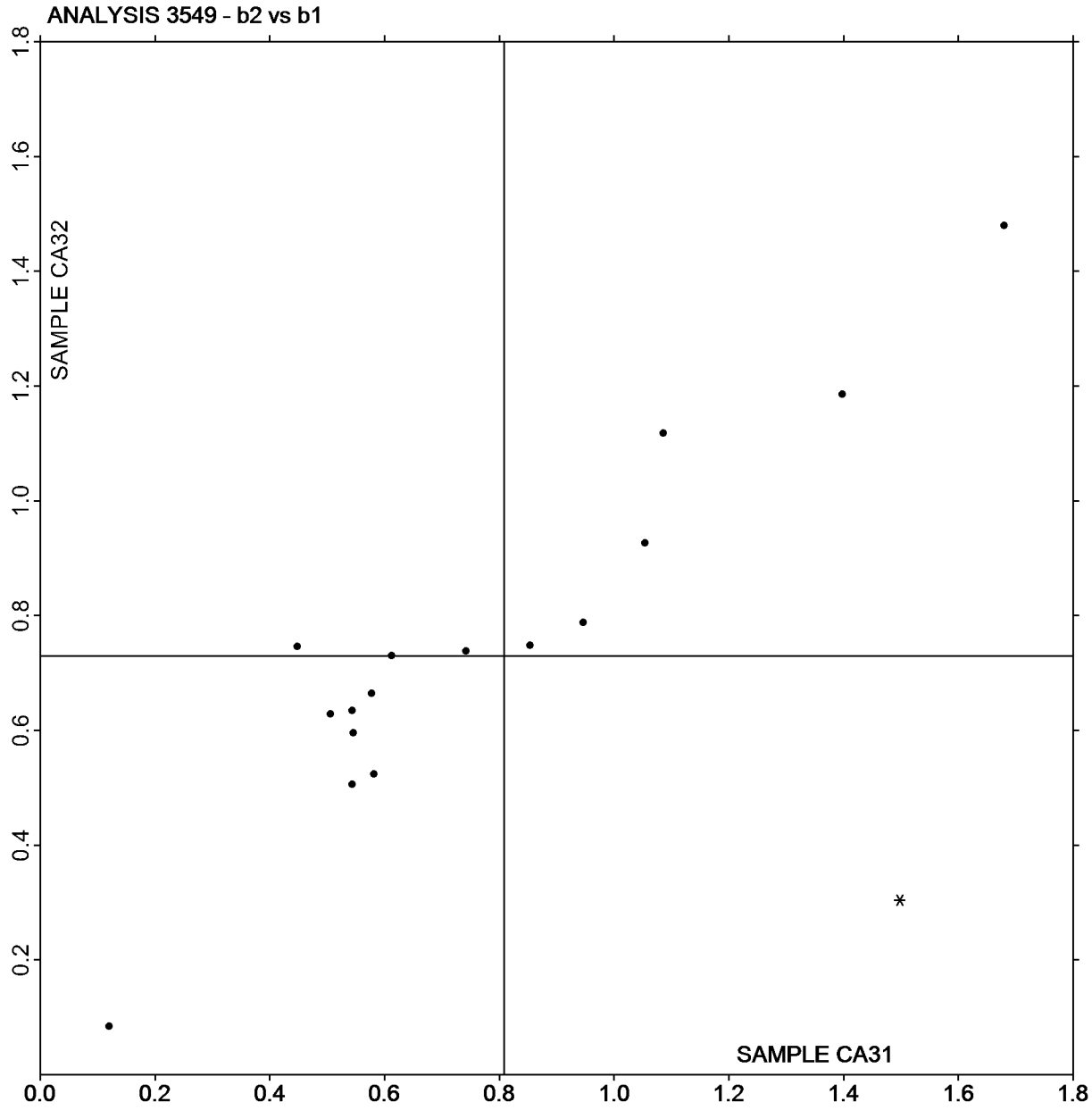
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA32 vs a values CA31



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 CA32 vs b values CA31



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 #4312, August 2024

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
7M264X		CA31	89.21	-0.58		-0.07		-0.22	-0.02	-0.10	0.24	XC
		CA32	88.99	-0.59		-0.17						
8UYGDZ		CA31	90.34	-0.41		-0.69		0.06	0.02	0.05	0.08	NF
		CA32	90.40	-0.39		-0.64						
96CYMH		CA31	90.12	-0.51		-0.18		-0.10	-0.02	-0.11	0.15	XC
		CA32	90.02	-0.53		-0.29						
DD8RLC	X	CA31	86.62	0.38	X	-0.68		0.17	-0.06	0.20	0.27	TC
		CA32	86.80	0.32		-0.49						
E6WQZB		CA31	89.96	-0.59		-0.14		-0.11	0.01	-0.14	0.18	XX
		CA32	89.85	-0.59		-0.28						
ECCAKB		CA31	89.55	-0.47		-0.19		0.14	-0.02	0.23	0.27	LT
		CA32	89.70	-0.49		0.03						
FEB2RE		CA31	89.67	-0.60		-0.17		-0.01	-0.01	-0.03	0.03	TC
		CA32	89.66	-0.61		-0.20						
KDPUTL		CA31	89.53	-0.51		-0.16		0.17	0.03	0.13	0.22	EG
		CA32	89.70	-0.48		-0.03						
KZJXC6		CA31	87.73	-0.50		-0.23		0.02	0.00	0.05	0.06	XX
		CA32	87.75	-0.50		-0.17						
QT2GJ6		CA31	89.77	-0.39		-0.01		0.03	-0.07	0.14	0.16	NH
		CA32	89.80	-0.46		0.13						
VZ2QFB		CA31	89.75	-0.52		-0.12		-0.10	0.01	-0.06	0.11	XX
		CA32	89.65	-0.51		-0.18						
YPR2Q6		CA31	89.67	-0.56		-0.49		0.01	-0.07	0.26	0.27	LS
		CA32	89.68	-0.62		-0.23						

Summary Statistics

Grand Means							
CA31	89.327	-0.512	-0.262	-0.010	-0.013	0.039	0.160
CA32	89.332	-0.525	-0.209				
Stnd Dev Btwn Labs							
CA31	1.071	0.070	0.229	0.115	0.033	0.137	0.083
CA32	1.033	0.072	0.209				

Statistics based on 11 of 12 reporting participants

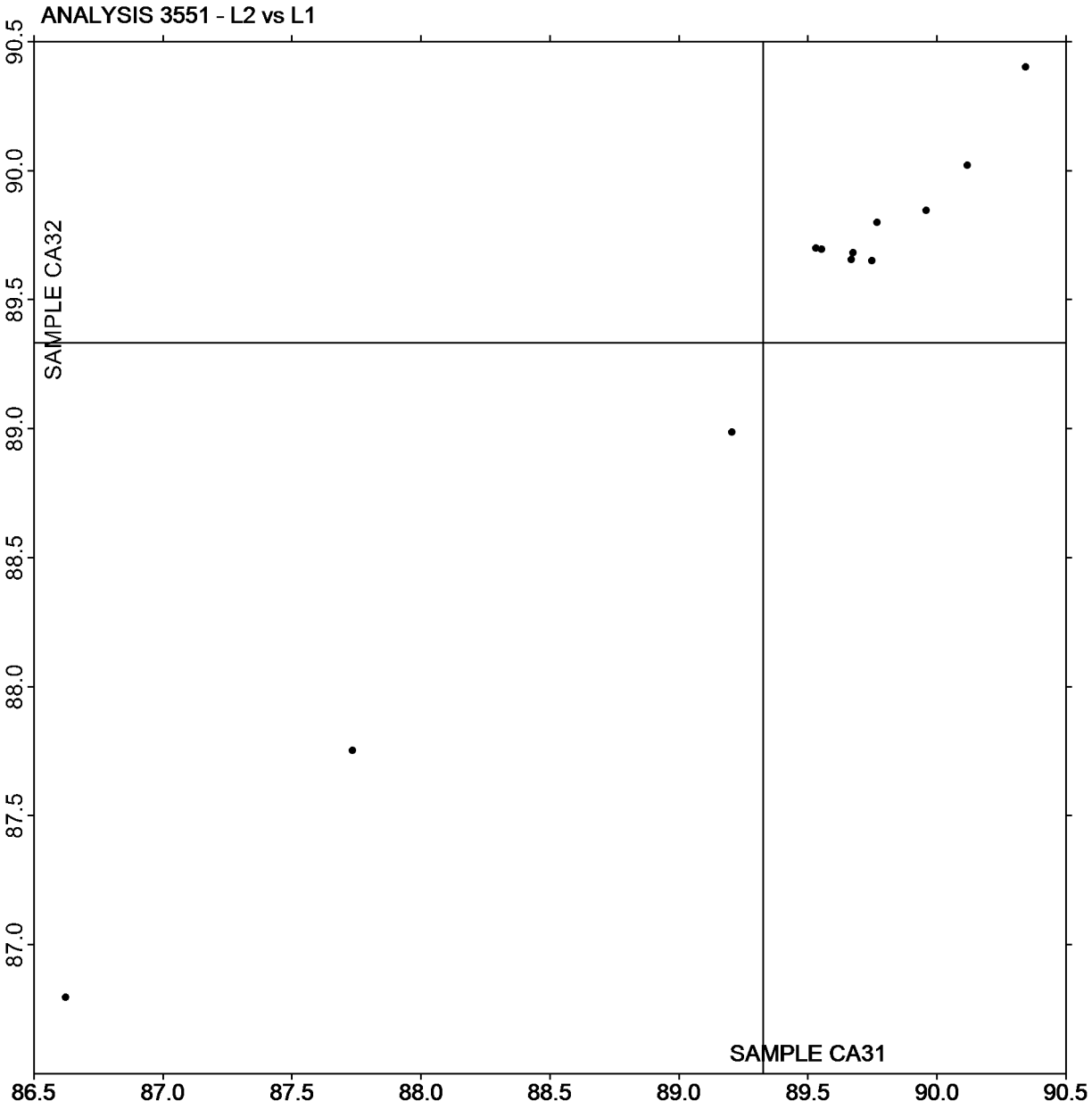
Comments on Assigned Data Flags for Test #3551

DD8RLC (X) - Extreme data for both "a" values.

Key to Instrument Codes Reported by Participants

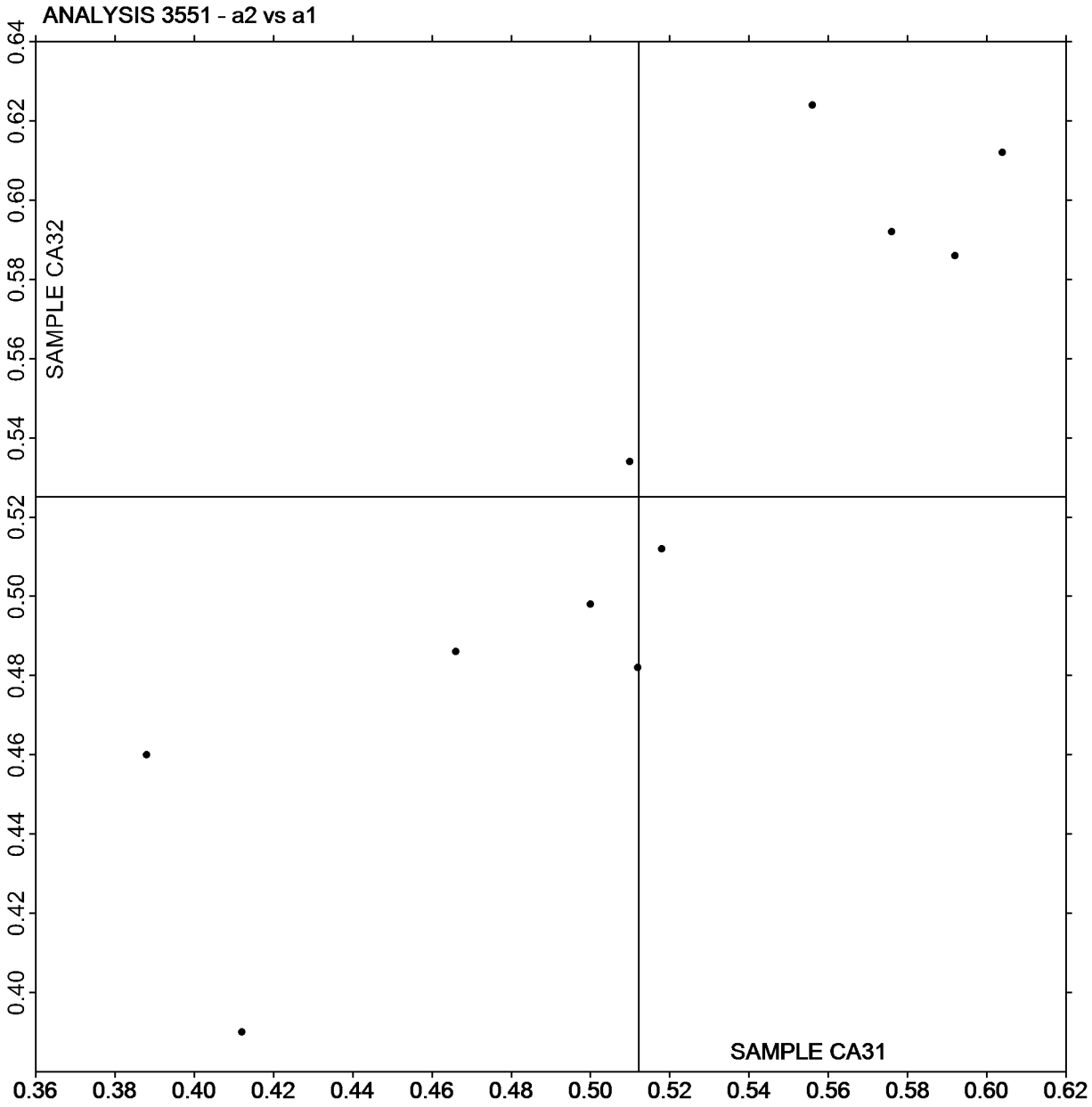
EG	Datacolor Elrepho	LS	L & W Elrepho SE 070
LT	L & W Elrepho SE 071	NF	Minolta CM-3600d Spectrophotometer
NH	Minolta CM-3700A Spectrophotometer	TC	Technidyne Color Touch Series
XC	X-Rite eXact Series	XX	Instrument make/model not specified by lab

Plot of L values CA32 vs L values CA31



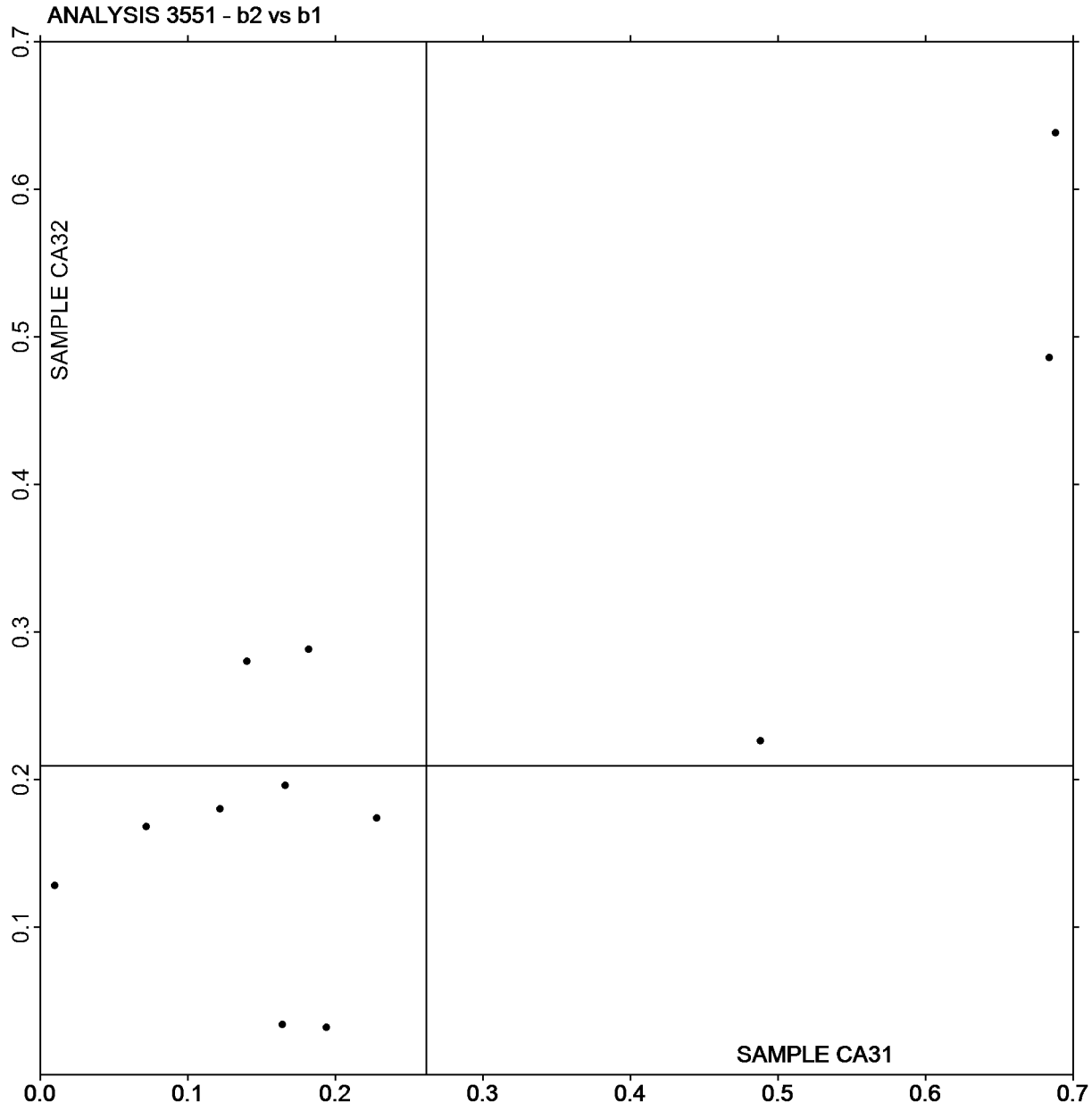
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA32 vs a values CA31



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 CA32 vs b values CA31



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

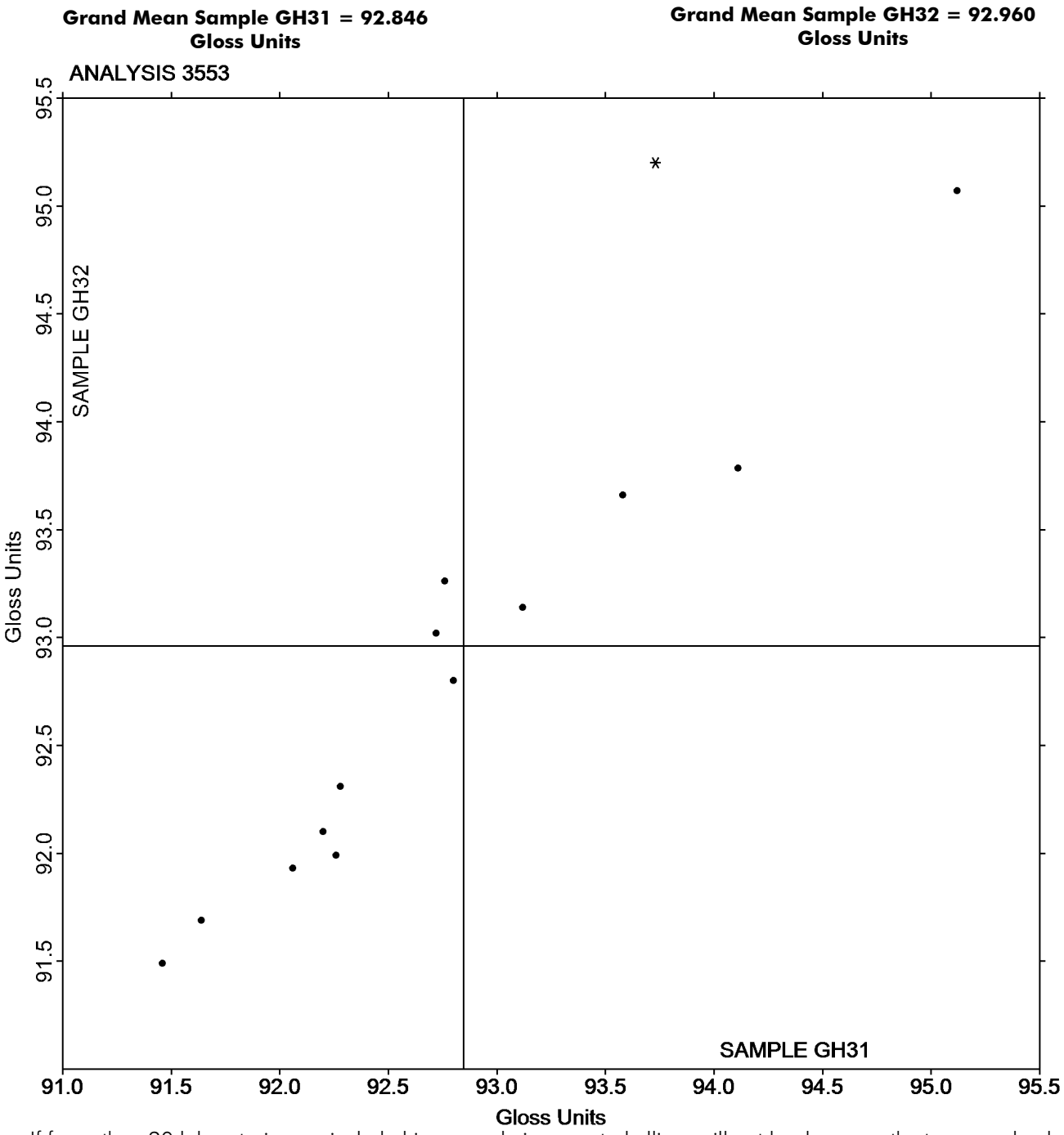
WebCode	Data Flag	Sample GH31 Lab Mean	Sample GH31 Diff from Grand Mean	Sample GH31 CPV	Sample GH32 Lab Mean	Sample GH32 Diff from Grand Mean	Sample GH32 CPV	Instr Code
6Z9TJM		92.28	-0.57	-0.56	92.31	-0.65	-0.56	TA
793L4L		91.46	-1.39	-1.37	91.49	-1.47	-1.26	GM
AZE2BW		93.12	0.27	0.27	93.14	0.18	0.15	TP
ECCAKB		91.64	-1.21	-1.19	91.69	-1.27	-1.09	GA
GWP3YL		94.11	1.26	1.25	93.79	0.82	0.71	PP
HFKQ6B		92.26	-0.59	-0.58	91.99	-0.97	-0.83	LA
KDPUTL		92.76	-0.09	-0.08	93.26	0.30	0.26	TH
MC8JTJ		92.80	-0.05	-0.05	92.80	-0.16	-0.14	GM
PU2Y7F		95.12	2.27	2.25	95.07	2.11	1.81	VM
RWXJNW	*	93.73	0.88	0.88	95.20	2.24	1.92	LF
UAUHMD		92.06	-0.79	-0.78	91.93	-1.03	-0.88	LW
UT9YUC		92.72	-0.13	-0.12	93.02	0.06	0.05	PP
XWB4X8		92.20	-0.65	-0.64	92.10	-0.86	-0.74	LG
Z3U7VN		93.58	0.73	0.73	93.66	0.70	0.60	LF

Summary Statistics	Sample GH31	Sample GH32
Grand Means	92.85 Gloss Units	92.96 Gloss Units
Stnd Dev Btwn Labs	1.01 Gloss Units	1.17 Gloss Units

Statistics based on 14 of 14 reporting participants.

Key to Instrument Codes Reported by Participants

GA	BYK-Gardner (model not specified)	GM	BYK-Gardner micro-gloss
LA	L & W Gloss - Autoline 300	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

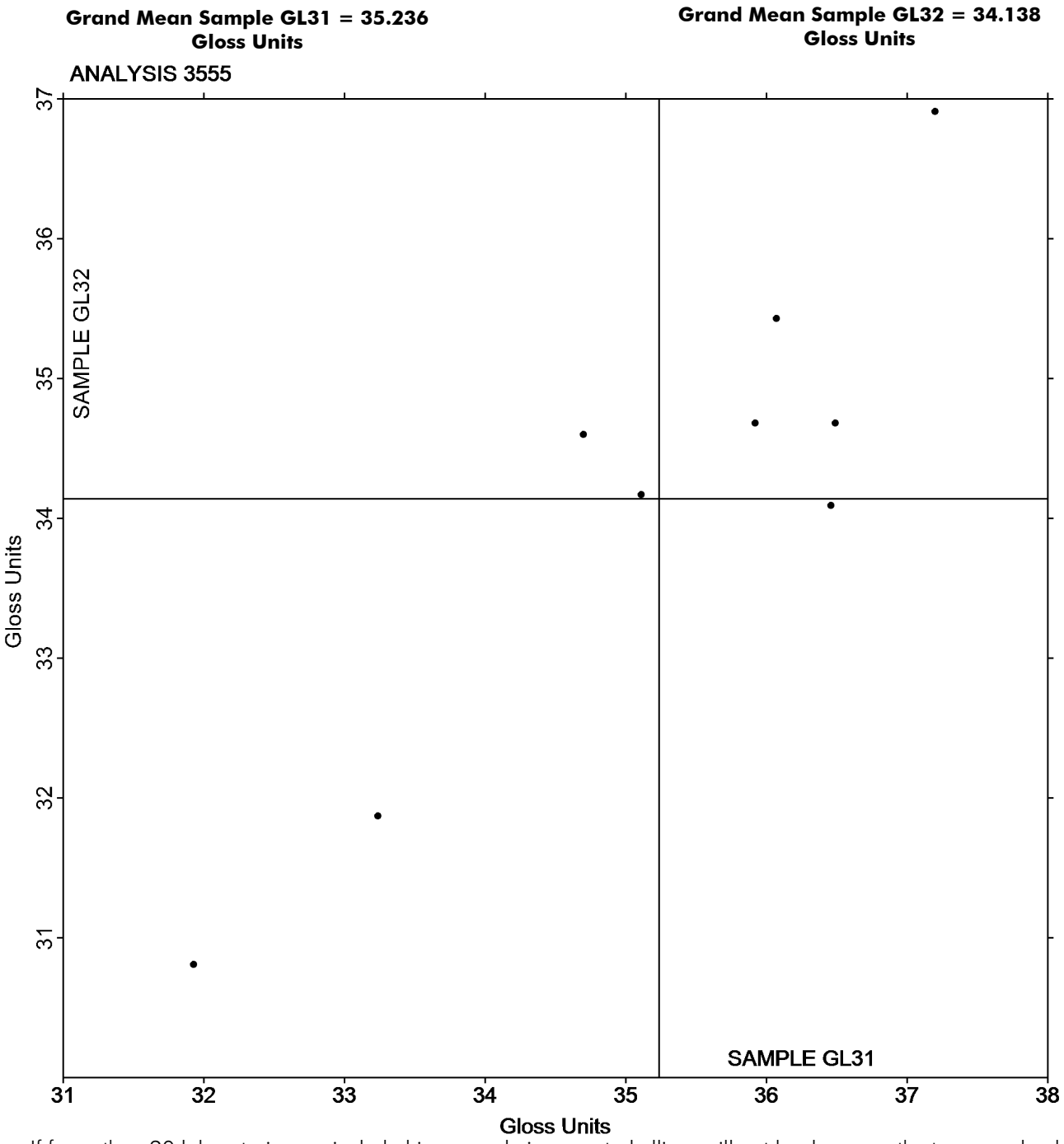
WebCode	Data Flag	Sample GL31 Lab Mean	Sample GL31 Diff from Grand Mean	Sample GL31 CPV	Sample GL32 Lab Mean	Sample GL32 Diff from Grand Mean	Sample GL32 CPV	Instr Code
2JYZZ3		36.07	0.83	0.49	35.43	1.29	0.71	TP
6Z9TJM		33.24	-2.00	-1.17	31.87	-2.27	-1.25	TA
ADZ9AJ		31.93	-3.31	-1.94	30.81	-3.33	-1.83	GM
DD8RLC		37.20	1.96	1.15	36.91	2.77	1.53	PP
HGG98C		35.11	-0.13	-0.07	34.17	0.03	0.02	GS
HUJWY7		35.92	0.68	0.40	34.68	0.54	0.30	GM
K4JA7J		36.49	1.25	0.73	34.68	0.54	0.30	TH
TNGBXE		36.46	1.22	0.72	34.09	-0.05	-0.03	WJ
UAUHMD		34.70	-0.54	-0.31	34.60	0.46	0.25	LW

Summary Statistics	Sample GL31	Sample GL32
Grand Means	35.24 Gloss Units	34.14 Gloss Units
Stnd Dev Btwn Labs	1.71 Gloss Units	1.82 Gloss Units

Statistics based on 9 of 9 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

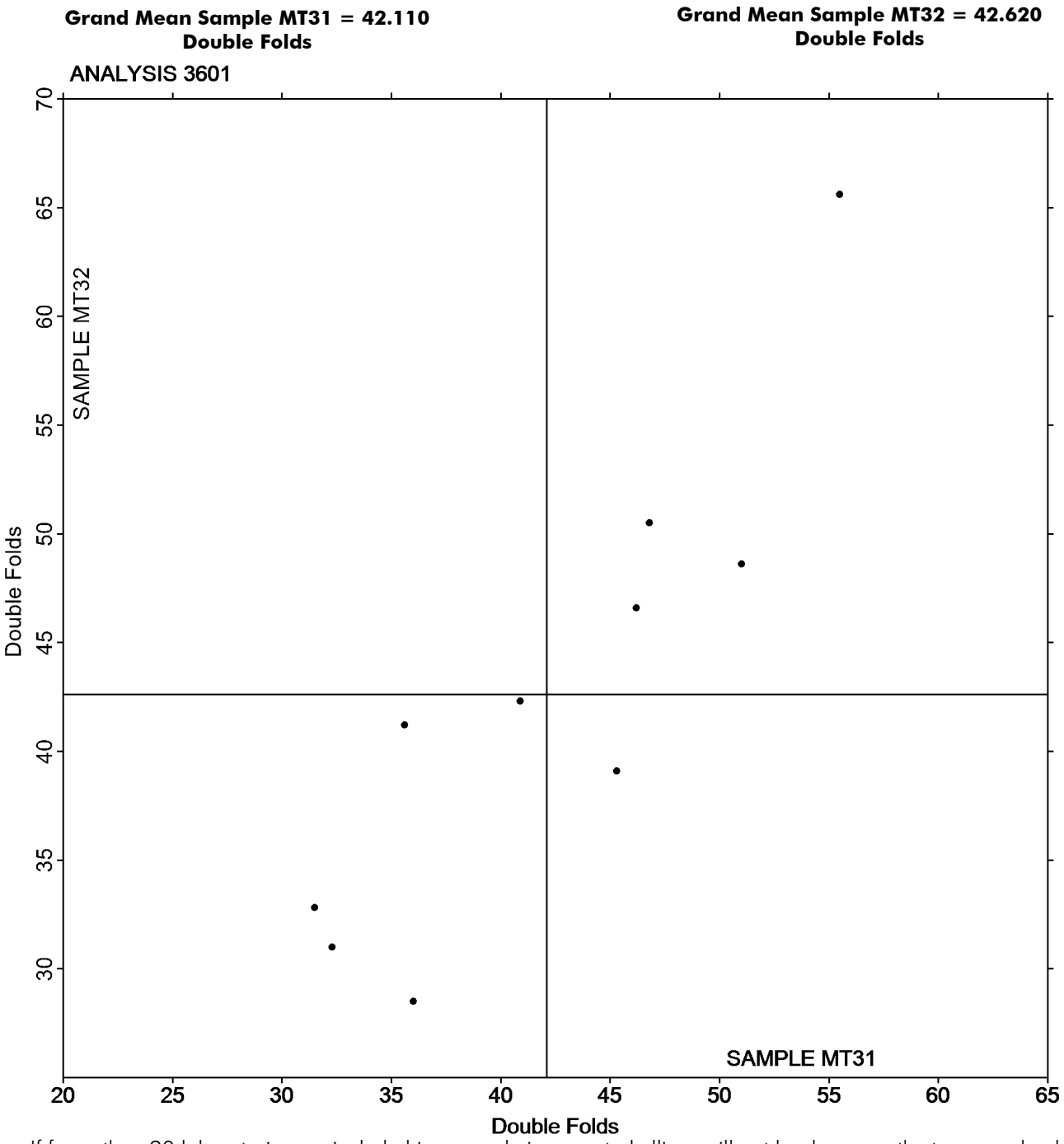
WebCode	Data Flag	Sample MT31 Lab Mean	Sample MT31 Diff from Grand Mean	Sample MT31 CPV	Sample MT32 Lab Mean	Sample MT32 Diff from Grand Mean	Sample MT32 CPV	Instr Code
82GP2W		40.90	-1.21	-0.15	42.30	-0.32	-0.03	MT
BQ4YPW		55.50	13.39	1.64	65.60	22.98	2.09	MT
ECCAKB		31.50	-10.61	-1.30	32.80	-9.82	-0.89	MT
GLQ82Q		45.30	3.19	0.39	39.10	-3.52	-0.32	MT
K4JA7J		36.00	-6.11	-0.75	28.50	-14.12	-1.28	MT
KDPUTL		46.80	4.69	0.58	50.50	7.88	0.72	MT
NCG98G		51.00	8.89	1.09	48.60	5.98	0.54	MT
PU2Y7F		35.60	-6.51	-0.80	41.20	-1.42	-0.13	MT
VZ2QFB		32.30	-9.81	-1.20	31.00	-11.62	-1.06	XX
WNMUA8		46.20	4.09	0.50	46.60	3.98	0.36	XX

Summary Statistics	Sample MT31	Sample MT32
Grand Means	42.11 Double Folds	42.62 Double Folds
Stnd Dev Btwn Labs	8.15 Double Folds	10.99 Double Folds

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

MT	MIT - Tinius Olsen	XX	Instrument make/model not specified by lab



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

Paper & Paperboard Interlaboratory Testing Program

Report #4312, August 2024

Analysis 3603
Bending Resistance, Gurley Type
TAPPI Official Test Method T543

WebCode	Data Flag	Sample BG31 Lab Mean	Sample BG31 Diff from Grand Mean	Sample BG31 CPV	Sample BG32 Lab Mean	Sample BG32 Diff from Grand Mean	Sample BG32 CPV	Instr Code
7M264X		118.0	-54.9	-1.03	118.4	-60.2	-1.13	ZZ
DJGQFP		216.7	43.8	0.82	225.1	46.5	0.87	ZZ
GLQ82Q		216.7	43.8	0.82	226.2	47.6	0.89	ZZ
K4JA7J	X	384.1	211.2	3.98	356.8	178.2	3.33	ZZ
KZJXC6		206.6	33.7	0.64	217.4	38.8	0.73	ZZ
NCG98G		224.0	51.1	0.96	225.8	47.2	0.88	ZZ
PU2Y7F		130.0	-42.9	-0.81	138.1	-40.5	-0.76	ZZ
QT2GJ6		92.9	-80.0	-1.51	94.7	-83.9	-1.57	ZZ
T2ML62		188.5	15.6	0.29	189.3	10.7	0.20	ZZ
WN2FJA	X	4.4	-168.5	-3.17	4.2	-174.4	-3.26	ZZ
Z89LM2		223.8	50.9	0.96	226.0	47.4	0.89	ZZ
ZB79E4		111.9	-61.0	-1.15	124.9	-53.7	-1.01	ZZ

Summary Statistics	Sample BG31	Sample BG32
Grand Means	172.90 Gurley Units	178.58 Gurley Units
Stnd Dev Btwn Labs	53.11 Gurley Units	53.46 Gurley Units

Statistics based on 10 of 12 reporting participants.

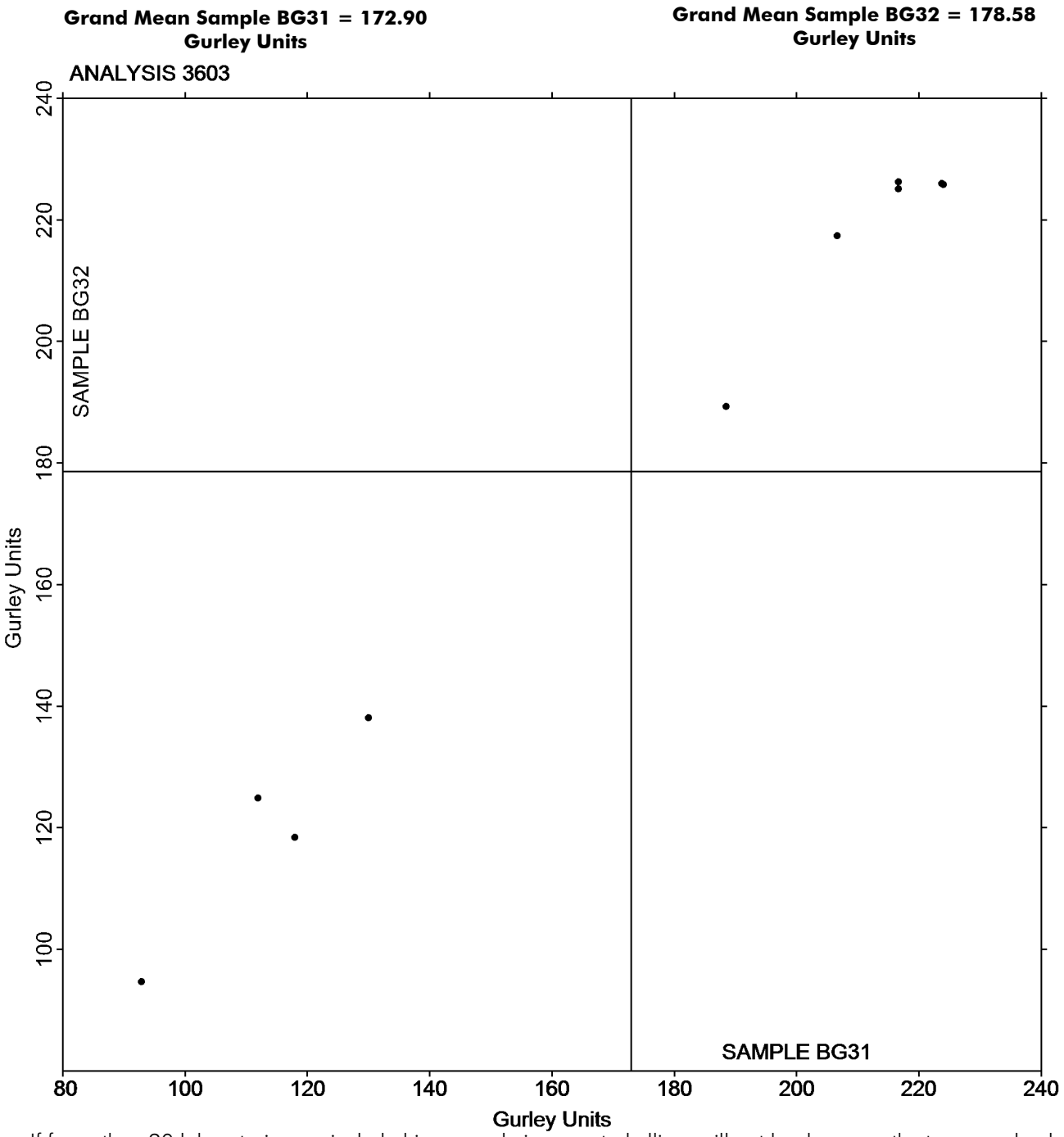
Comments on Assigned Data Flags for Test #3603

K4JA7J (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.

WN2FJA (X) - Data for both samples are low. Possible Systematic Error.

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

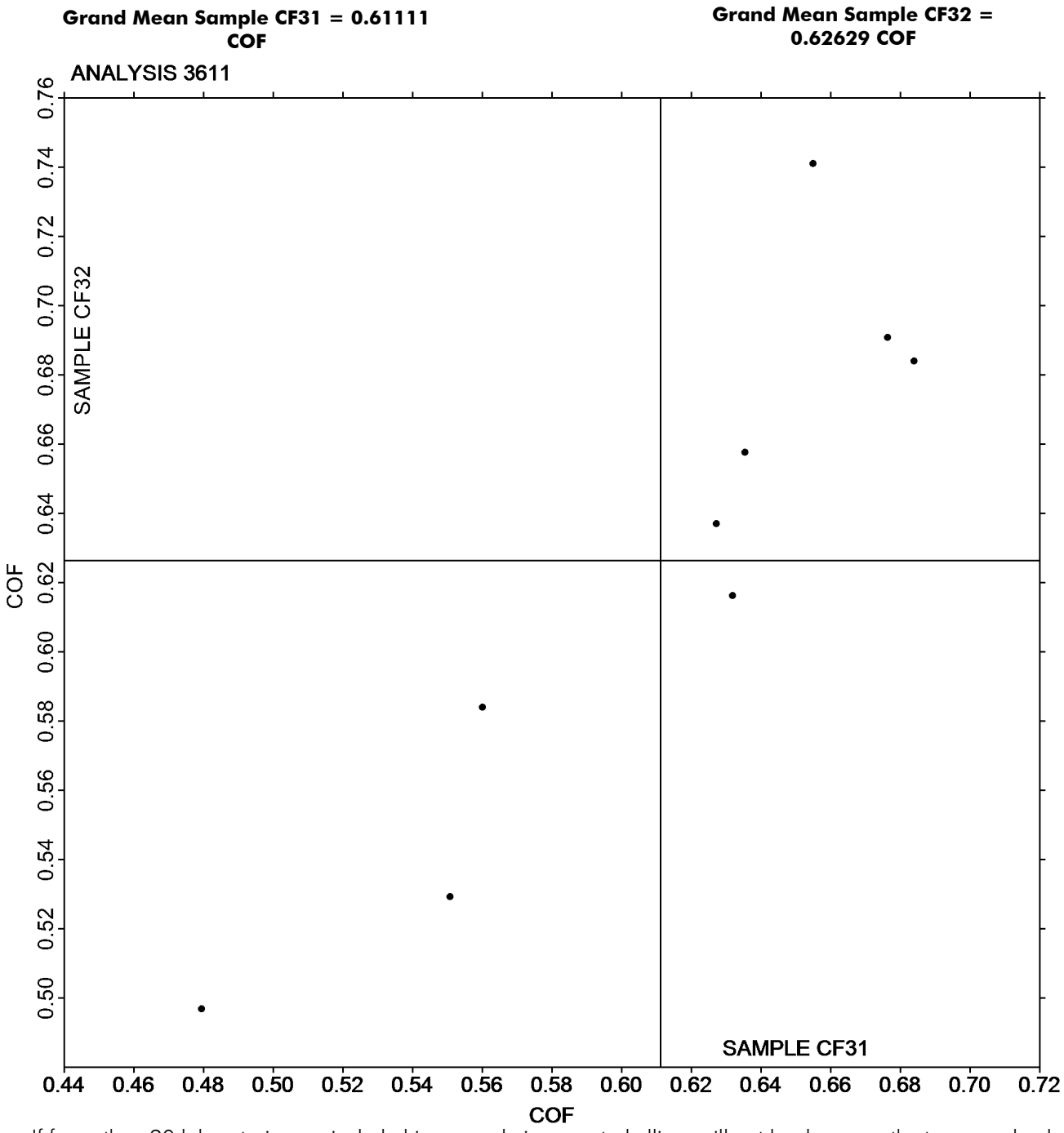
WebCode	Data Flag	Sample CF31 Lab Mean	Sample CF31 Diff from Grand Mean	Sample CF31 CPV	Sample CF32 Lab Mean	Sample CF32 Diff from Grand Mean	Sample CF32 CPV	Instr Code
2JYZZ3		0.6764	0.0653	0.97	0.6908	0.0645	0.82	TA
82GP2W		0.6318	0.0207	0.31	0.6162	-0.0101	-0.13	TM
8QZ7GZ		0.4794	-0.1317	-1.95	0.4968	-0.1295	-1.64	XX
GLQ82Q		0.6550	0.0439	0.65	0.7410	0.1147	1.45	TA
QT2GJ6		0.6840	0.0729	1.08	0.6840	0.0577	0.73	TP
RCCTPZ		0.6272	0.0161	0.24	0.6370	0.0107	0.14	TA
WN2FJA		0.5508	-0.0603	-0.89	0.5292	-0.0971	-1.23	TX
Y9K2G2		0.6354	0.0243	0.36	0.6576	0.0313	0.40	TA
Z89LM2		0.5600	-0.0511	-0.76	0.5840	-0.0423	-0.54	TA

Summary Statistics	Sample CF31	Sample CF32
Grand Means	0.61 COF	0.63 COF
Stnd Dev Btwn Labs	0.07 COF	0.08 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
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

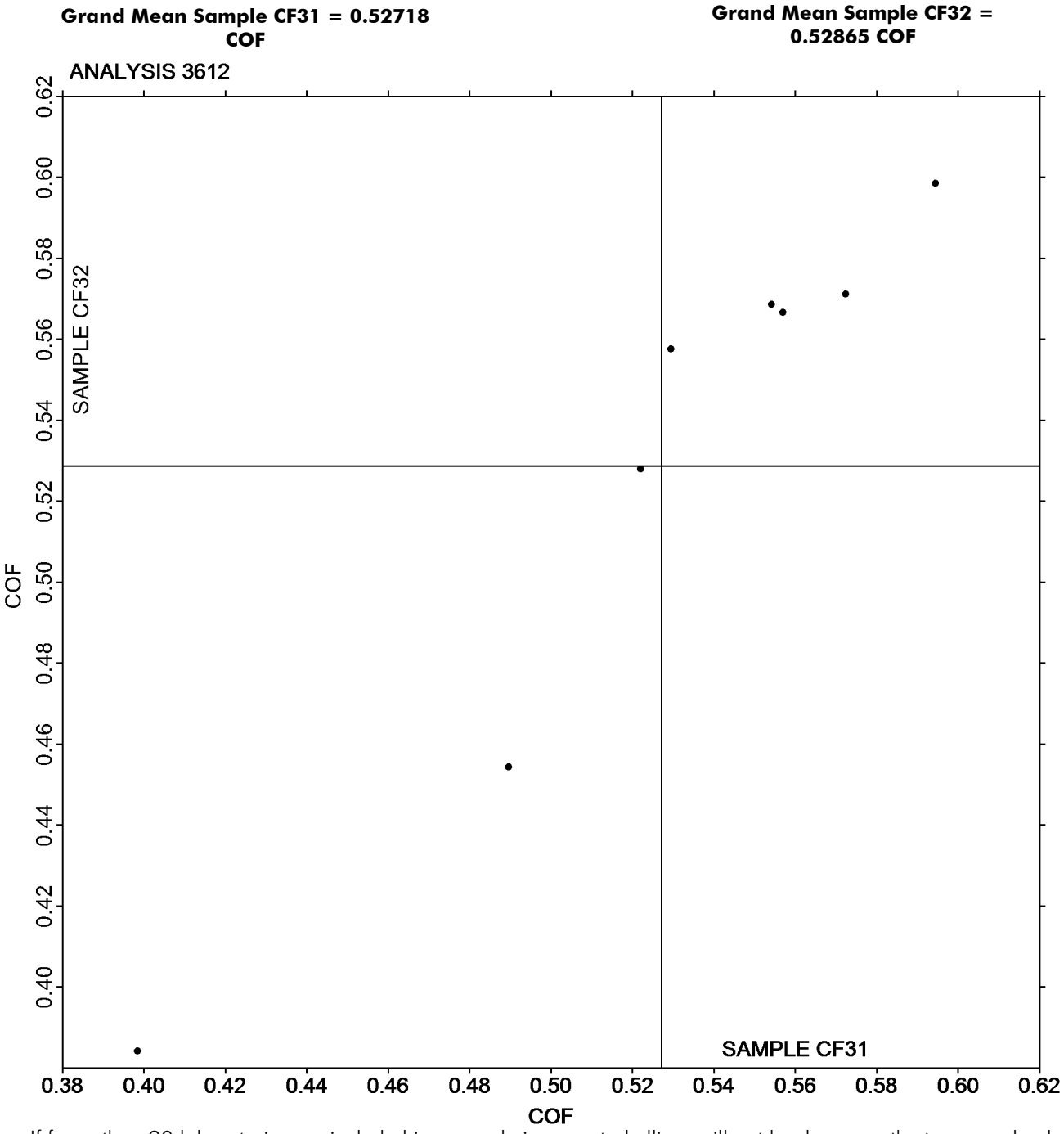
WebCode	Data Flag	Sample CF31 Lab Mean	Sample CF31 Diff from Grand Mean	Sample CF31 CPV	Sample CF32 Lab Mean	Sample CF32 Diff from Grand Mean	Sample CF32 CPV	Instr Code
2JYZZ3		0.5724	0.0452	0.74	0.5712	0.0425	0.59	TA
82GP2W		0.5944	0.0672	1.10	0.5986	0.0699	0.96	TM
8QZ7GZ		0.3984	-0.1288	-2.10	0.3842	-0.1445	-1.99	XX
GLQ82Q		0.5294	0.0022	0.04	0.5576	0.0290	0.40	TA
RCCTPZ		0.5570	0.0298	0.49	0.5666	0.0379	0.52	TA
WN2FJA		0.4896	-0.0376	-0.61	0.4544	-0.0743	-1.02	TX
Y9K2G2		0.5542	0.0270	0.44	0.5686	0.0399	0.55	TA
Z89LM2		0.5220	-0.0052	-0.08	0.5280	-0.0007	-0.01	TA

Summary Statistics	Sample CF31	Sample CF32
Grand Means	0.53 COF	0.53 COF
Stnd Dev Btwn Labs	0.06 COF	0.07 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
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 MC31 Lab Mean	Sample MC31 Diff from Grand Mean	Sample MC31 CPV	Sample MC32 Lab Mean	Sample MC32 Diff from Grand Mean	Sample MC32 CPV	Instr Code
3L3VJ7		4.015	-0.561	-1.43	4.007	-0.579	-1.44	ZZ
8UYGDZ		4.790	0.214	0.54	5.260	0.674	1.68	ZZ
9TZTBG		4.381	-0.195	-0.49	4.409	-0.177	-0.44	ZZ
DGTCRF		4.106	-0.470	-1.20	4.111	-0.475	-1.18	ZZ
HU2NAB		5.130	0.554	1.41	4.810	0.224	0.56	ZZ
NCG98G		5.235	0.659	1.68	5.063	0.476	1.18	ZZ
T2ML62		4.386	-0.190	-0.48	4.395	-0.191	-0.48	ZZ
TNGBXE		4.357	-0.219	-0.56	4.290	-0.296	-0.74	ZZ
TPCTZF		4.431	-0.145	-0.37	4.419	-0.167	-0.42	ZZ
VNUJ2Y		4.844	0.268	0.68	4.917	0.331	0.82	ZZ
Z89LM2		4.660	0.084	0.21	4.767	0.181	0.45	ZZ
Z946P3	X	2.950	-1.626	-4.14	4.740	0.154	0.38	ZZ

Summary Statistics	Sample MC31	Sample MC32
Grand Means	4.58 Percent	4.59 Percent
Stnd Dev Btwn Labs	0.39 Percent	0.40 Percent

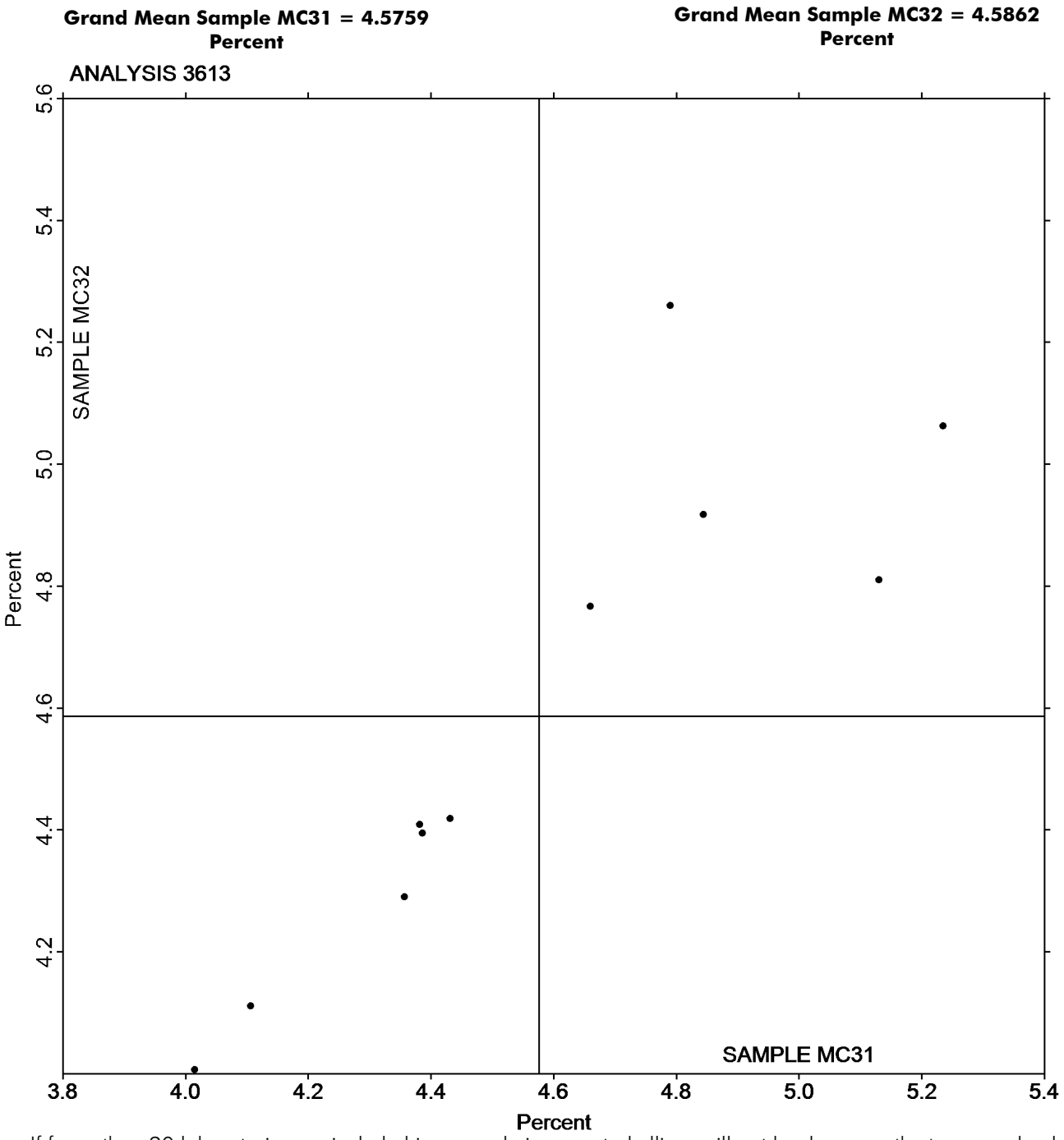
Statistics based on 11 of 12 reporting participants.

Comments on Assigned Data Flags for Test #3613

Z946P3 (X) - Data for sample MC31 are low. Inconsistent within the determinations of both samples.

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 HS31 Lab Mean	Sample HS31 Diff from Grand Mean	Sample HS31 CPV	Sample HS32 Lab Mean	Sample HS32 Diff from Grand Mean	Sample HS32 CPV	Instr Code
2JYZZ3		81.41	23.62	0.86	83.07	27.56	1.03	HE
64W88W		23.62	-34.17	-1.25	22.51	-33.00	-1.23	HE
7M264X		47.40	-10.39	-0.38	39.40	-16.11	-0.60	HE
96CYMH		61.20	3.41	0.12	75.70	20.19	0.76	HE
ADZ9AJ		80.50	22.71	0.83	80.36	24.85	0.93	HE
D6X47R		42.83	-14.96	-0.55	39.66	-15.85	-0.59	HE
DJGQFP		94.27	36.48	1.33	92.62	37.11	1.39	HE
FEB2RE		46.24	-11.55	-0.42	44.74	-10.77	-0.40	HE
GHTNYR		77.64	19.85	0.72	65.20	9.69	0.36	HE
HX2Z7B		84.20	26.41	0.96	79.30	23.79	0.89	HE
JMDM6H		35.26	-22.53	-0.82	33.15	-22.36	-0.84	HE
KZJXC6		77.38	19.59	0.72	80.88	25.37	0.95	HE
PJEXQ7		13.78	-44.01	-1.61	11.69	-43.82	-1.64	HE
PU2Y7F		65.86	8.07	0.29	66.33	10.82	0.40	HE
QT2GJ6		23.80	-33.99	-1.24	23.67	-31.84	-1.19	HE
WN2FJA		27.70	-30.09	-1.10	25.60	-29.91	-1.12	HE
Y9K2G2		16.39	-41.40	-1.51	15.79	-39.72	-1.49	HE
Z3U7VN		79.57	21.78	0.80	78.54	23.03	0.86	HE
Z89LM2		80.84	23.05	0.84	76.74	21.23	0.79	HE
ZB79E4	*	95.83	38.04	1.39	75.21	19.70	0.74	XX

Summary Statistics	Sample HS31	Sample HS32
Grand Means	57.79 Seconds	55.51 Seconds
Stnd Dev Btwn Labs	27.40 Seconds	26.73 Seconds

Statistics based on 20 of 20 reporting participants.

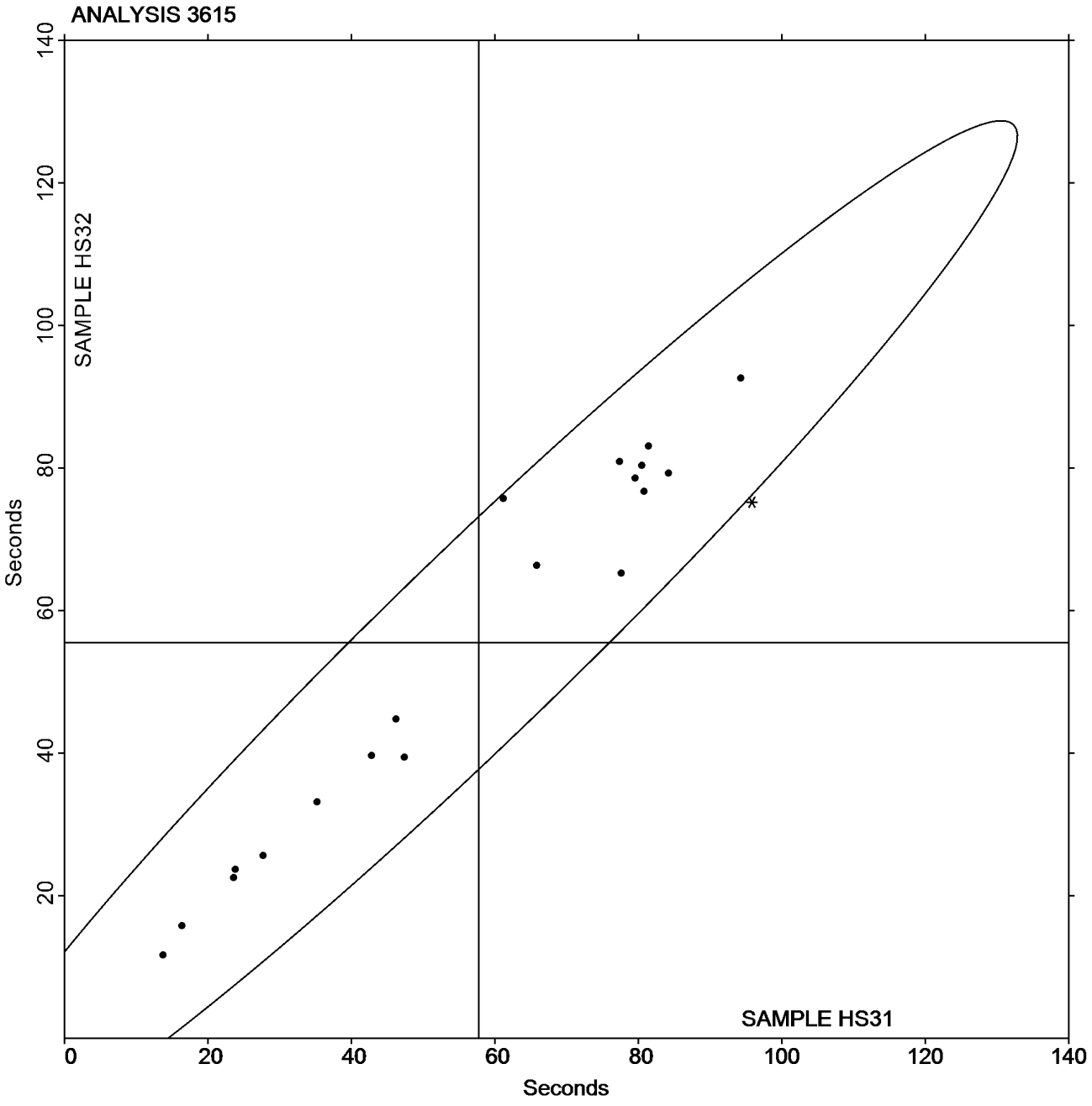
Key to Instrument Codes Reported by Participants

HE Hercules Sizing Tester

XX Instrument make/model not specified by lab

Grand Mean Sample HS31 = 57.786 Seconds

Grand Mean Sample HS32 = 55.508 Seconds



-End of Report-