Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #4292 - April 2024

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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

Report #4292, April 2024

Analysis 3501

Thickness (Caliper), Packaging papers

TAPPI Official Test Method T411

WebCode	Data Flag	Sample CK27 Lab Mean	Sample CK27 Diff from Grand Mean	Sample CK27 CPV	Sample CK28 Lab Mean	Sample CK28 Diff from Grand Mean	Sample CK28 CPV	Instr Code
26QKWD		13.48	-0.34	-1.66	13.36	-0.46	-2.22	XX
2PXTBC		13.86	0.03	0.15	13.94	0.12	0.60	EM
6LPUCF		13.95	0.12	0.60	13.97	0.15	0.74	LW
6YT39C	*	13.28	-0.54	-2.65	13.32	-0.50	-2.44	TM
7WYW37		13.57	-0.26	-1.25	13.55	-0.27	-1.30	XX
9CVN88		14.07	0.25	1.21	14.01	0.19	0.92	LW
A68KDA		13.91	0.08	0.41	13.99	0.17	0.81	TA
A9MR2A		14.06	0.23	1.13	13.96	0.14	0.70	LB
AHRYGA		13.92	0.10	0.48	13.93	0.11	0.51	EM
B3VARQ		14.19	0.36	1.77	14.24	0.42	2.04	PP
B9ZQM7		13.59	-0.24	-1.16	13.70	-0.12	-0.56	LW
CBHKM4		14.08	0.26	1.27	14.04	0.22	1.08	LW
D2AE2Z		13.66	-0.17	-0.81	13.74	-0.08	-0.37	LC
FDW4CQ		13.83	0.01	0.03	13.83	0.01	0.03	EM
FKWP26		13.70	-0.13	-0.61	13.74	-0.08	-0.41	LW
H6H24U		13.78	-0.04	-0.21	13.76	-0.06	-0.29	XX
HJXY9V	X	17.47	3.64	17.80	17.53	3.71	18.08	LW
L68L7W		13.97	0.14	0.71	13.92	0.10	0.50	XX
MADF2R		13.79	-0.03	-0.16	13.74	-0.08	-0.41	LC
MFK74X		13.76	-0.07	-0.33	13.77	-0.05	-0.24	LW
NVAH8R		13.92	0.10	0.47	13.91	0.09	0.44	LC
PQEYPT		13.75	-0.07	-0.34	13.70	-0.12	-0.60	EM
PXCZJR		13.82	0.00	-0.02	13.84	0.02	0.11	TA
TNWBGP		13.83	0.01	0.03	13.72	-0.10	-0.49	TM
U9DU4R		13.48	-0.34	-1.68	13.47	-0.35	-1.71	LW
UMEJ7K		14.02	0.19	0.94	14.02	0.20	0.98	XX
UZLCPJ		14.00	0.17	0.85	14.09	0.27	1.30	EM
VHZBA8		13.97	0.15	0.71	13.88	0.06	0.28	LW
VTY9UL		13.51	-0.31	-1.52	13.59	-0.23	-1.12	XX
WKJLLH		13.89	0.07	0.33	13.88	0.06	0.29	LW
XAW8VK		13.87	0.05	0.23	13.73	-0.09	-0.44	OK
YRWGEH		13.96	0.14	0.66	13.93	0.11	0.51	XX
ZKQZJ3		13.91	0.08	0.40	13.98	0.16	0.76	PP

Summary Statistics	Sample CK27	Sample CK28
Grand Means	13.82 mils	13.82 mils
Stnd Dev Btwn Labs	0.20 mils	0.21 mils

Statistics based on 32 of 33 reporting participants.

Comments on Assigned Data Flags for Test #3501

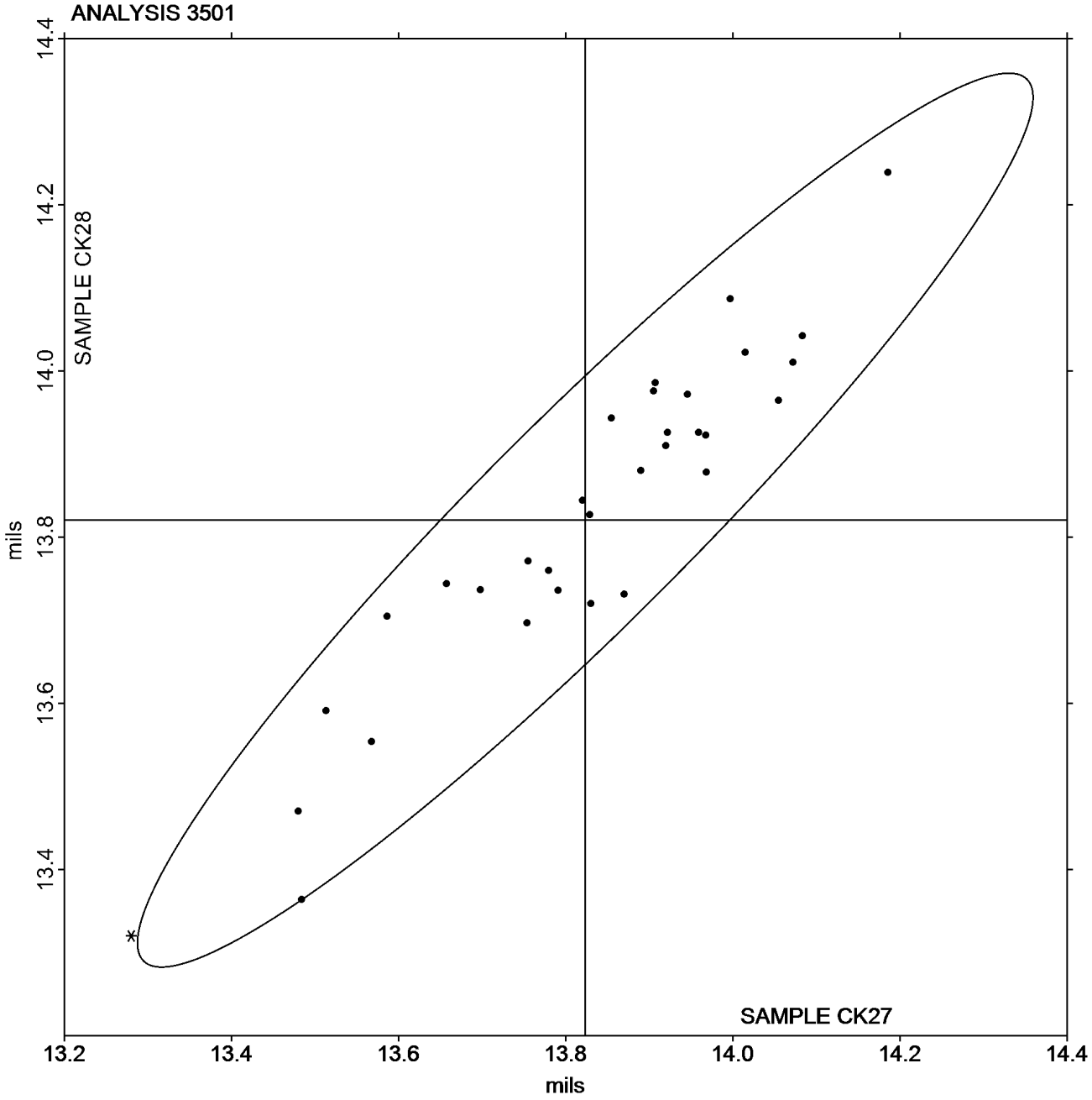
HJXY9V (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

EM	Emveco	LB	L & W Autoline 600
LC	L & W Autoline 400	LW	L & W
OK	Oakland	PP	Technidyne Profile/Plus
TA	Thwing-Albert	TM	TMI
XX	Instrument make/model not specified by lab		

Grand Mean Sample CK27 = 13.823 mils

Grand Mean Sample CK28 = 13.820 mils



Paper & Paperboard Interlaboratory Testing Program

Analysis 3511

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

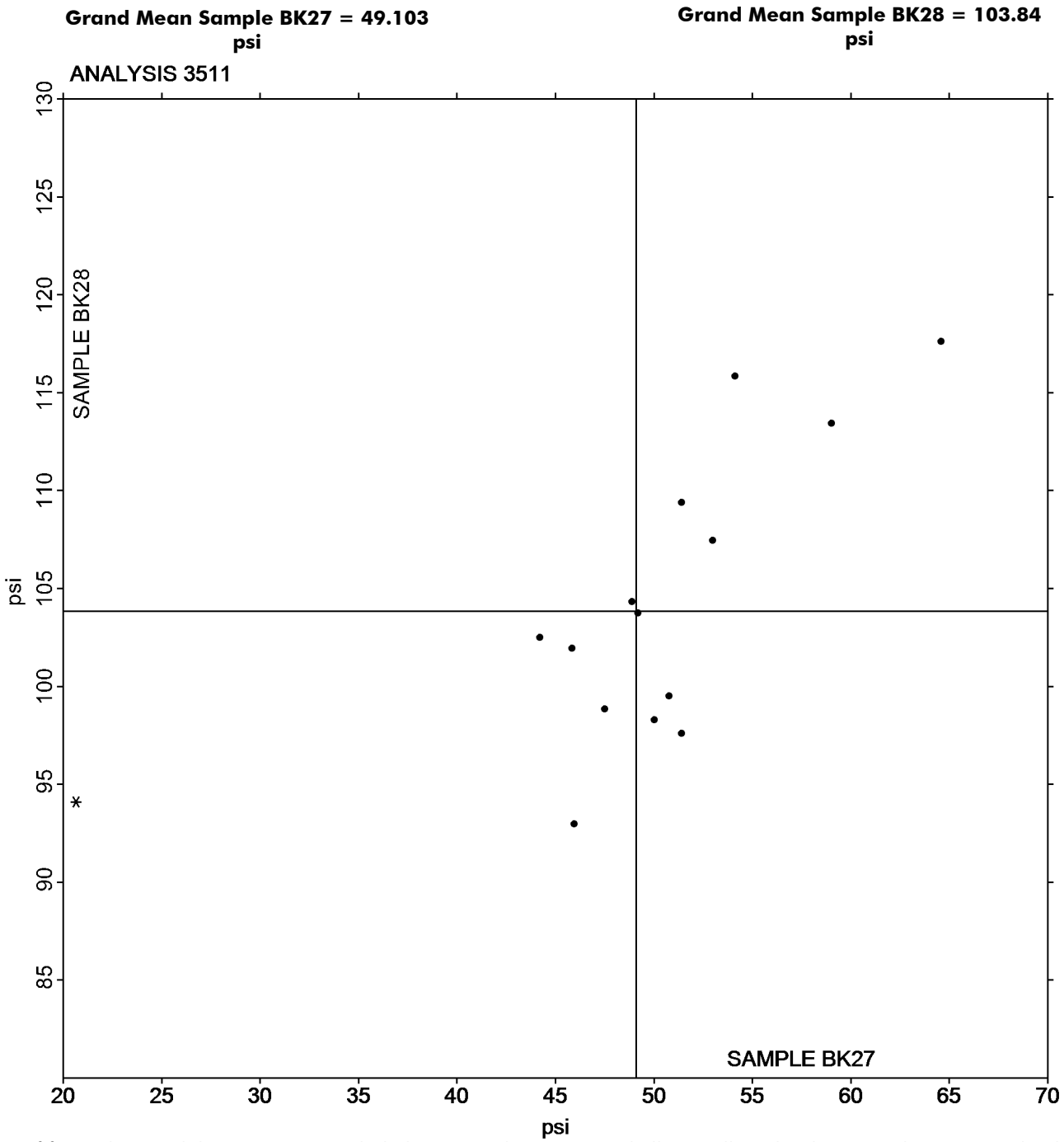
WebCode	Data Flag	Sample BK27 Lab Mean	Sample BK27 Diff from Grand Mean	Sample BK27 CPV	Sample BK28 Lab Mean	Sample BK28 Diff from Grand Mean	Sample BK28 CPV	Instr Code
78GDVC		59.02	9.92	1.05	113.4	9.6	1.27	ZZ
9TUZF9		51.40	2.30	0.24	109.4	5.6	0.74	ZZ
CBHKM4		45.95	-3.15	-0.33	93.0	-10.9	-1.44	ZZ
D7QMPZ	*	20.65	-28.45	-3.01	94.1	-9.7	-1.29	ZZ
DEG649		51.40	2.30	0.24	97.6	-6.2	-0.82	ZZ
HJXY9V		52.99	3.88	0.41	107.5	3.6	0.48	ZZ
MFK74X		50.04	0.93	0.10	98.3	-5.5	-0.73	ZZ
PW2XWT		54.12	5.02	0.53	115.8	12.0	1.59	ZZ
PXCZJR		45.85	-3.25	-0.34	102.0	-1.9	-0.25	ZZ
RNV3QQ		49.18	0.08	0.01	103.7	-0.1	-0.01	ZZ
RTBBEQ		64.60	15.50	1.64	117.6	13.8	1.82	ZZ
U9DU4R		44.20	-4.90	-0.52	102.5	-1.3	-0.18	ZZ
VHZBA8		48.89	-0.21	-0.02	104.3	0.5	0.06	ZZ
XAW8VK		50.76	1.66	0.18	99.5	-4.3	-0.57	ZZ
ZUD2YC		47.50	-1.61	-0.17	98.8	-5.0	-0.66	ZZ

Summary Statistics	Sample BK27	Sample BK28
Grand Means	49.10 psi	103.84 psi
Stnd Dev Btwn Labs	9.45 psi	7.57 psi

Statistics based on 15 of 15 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 RK27 Lab Mean	Sample RK27 Diff from Grand Mean	Sample RK27 CPV	Sample RK28 Lab Mean	Sample RK28 Diff from Grand Mean	Sample RK28 CPV	Instr Code
2PXTBC		178.0	-2.5	-0.24	216.8	-0.2	-0.01	ZZ
6LPUCF		191.5	11.0	1.03	227.9	10.9	0.77	ZZ
7WYW37		175.4	-5.1	-0.48	194.2	-22.8	-1.61	ZZ
9CVN88		187.7	7.2	0.68	216.9	-0.1	-0.01	ZZ
9TUZF9		160.7	-19.8	-1.86	194.1	-23.0	-1.62	ZZ
A68KDA		178.4	-2.1	-0.20	215.6	-1.4	-0.10	ZZ
AHPEKT		169.8	-10.7	-1.01	204.7	-12.3	-0.87	ZZ
AHRYGA		158.0	-22.5	-2.12	189.5	-27.5	-1.95	ZZ
B3VARQ		199.7	19.2	1.81	234.6	17.6	1.24	ZZ
C2DMT9		175.9	-4.6	-0.43	206.1	-10.9	-0.77	ZZ
CBHKM4		186.8	6.3	0.59	225.5	8.5	0.60	ZZ
D7QMPZ		173.2	-7.3	-0.69	208.0	-9.0	-0.64	ZZ
DB2NV4		196.3	15.8	1.48	232.6	15.5	1.10	ZZ
DWWE69	X	207.9	27.4	2.58	277.6	60.6	4.28	ZZ
FKWP26		180.6	0.1	0.01	216.1	-0.9	-0.07	ZZ
H6H24U		191.2	10.7	1.01	234.0	17.0	1.20	ZZ
HJXY9V		182.2	1.7	0.16	221.9	4.8	0.34	ZZ
HR8QDJ		192.1	11.6	1.09	238.8	21.8	1.54	ZZ
L68L7W		177.1	-3.4	-0.32	209.9	-7.1	-0.50	ZZ
LM24CQ		181.2	0.7	0.07	208.0	-9.0	-0.64	ZZ
MADF2R		167.6	-12.9	-1.22	217.7	0.7	0.05	ZZ
MFK74X		175.5	-5.0	-0.47	204.4	-12.6	-0.89	ZZ
N7A4HW		175.5	-5.0	-0.47	212.2	-4.9	-0.35	ZZ
PQEYPT	X	224.4	43.9	4.14	294.8	77.8	5.50	ZZ
QZYPPQ		183.8	3.2	0.31	214.4	-2.6	-0.19	ZZ
U9DU4R		170.4	-10.1	-0.95	202.8	-14.2	-1.01	ZZ
VGLWNJ		171.4	-9.2	-0.86	221.6	4.6	0.32	ZZ
VL34CJ		177.2	-3.3	-0.31	220.4	3.4	0.24	ZZ
XAW8VK		183.4	2.9	0.27	219.1	2.1	0.15	ZZ
YRWGEH		198.7	18.2	1.71	239.3	22.2	1.57	ZZ
ZCCGY3		197.3	16.8	1.58	249.6	32.5	2.30	ZZ
ZUD2YC		178.6	-1.9	-0.18	214.4	-2.6	-0.19	ZZ

Summary Statistics	Sample RK27	Sample RK28
Grand Means	180.51 Grams	217.04 Grams
Stnd Dev Btwn Labs	10.62 Grams	14.15 Grams

Statistics based on 30 of 32 reporting participants.

Comments on Assigned Data Flags for Test #3513

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

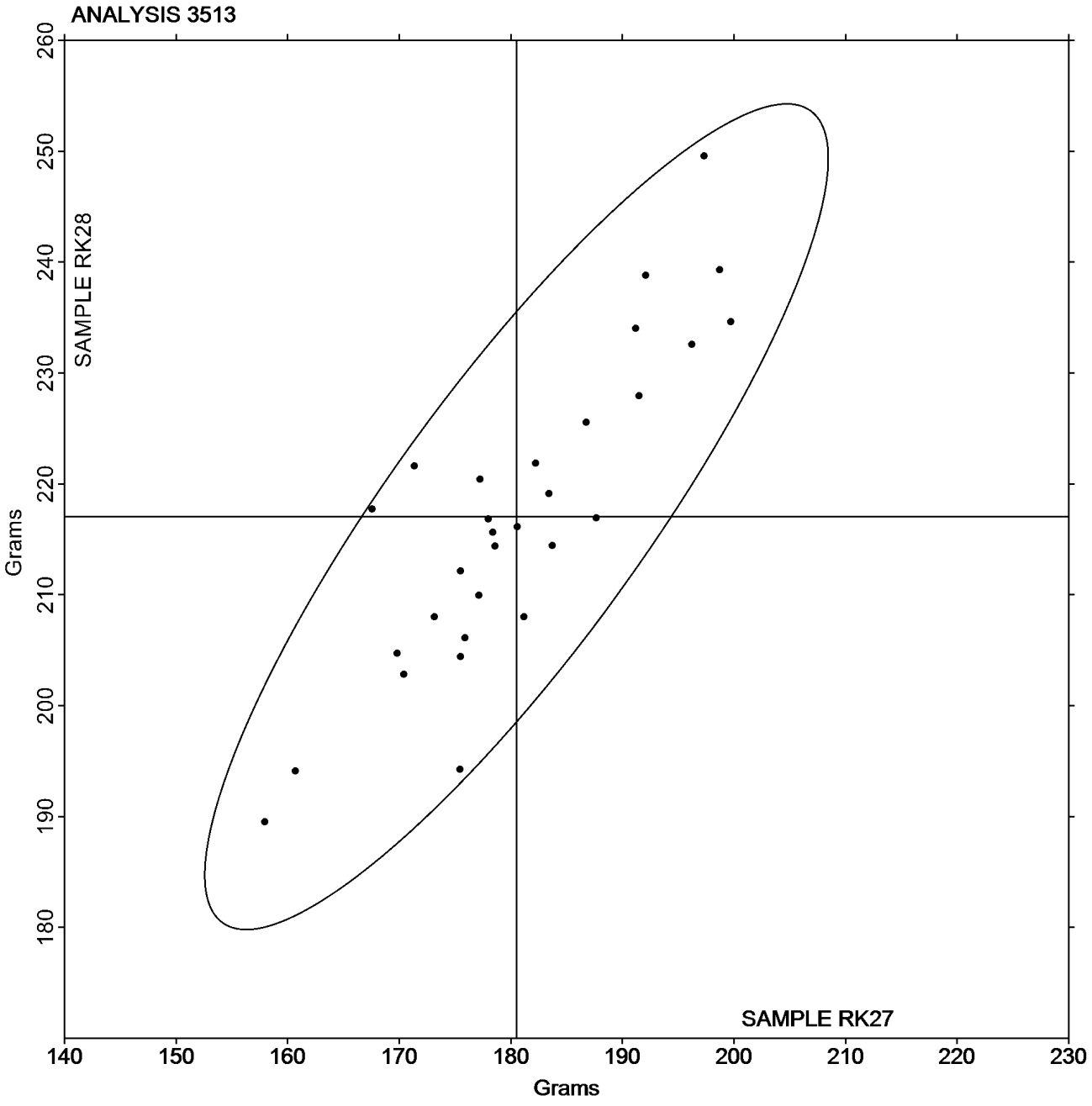
DWWE69 (X) - Data for sample RK28 are high. Inconsistent within the determinations of both samples.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample RK27 = 180.51 Grams

Grand Mean Sample RK28 = 217.04 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK27 Lab Mean	Sample NK27 Diff from Grand Mean	Sample NK27 CPV	Sample NK28 Lab Mean	Sample NK28 Diff from Grand Mean	Sample NK28 CPV	Instr Code
3WFJBD		10.214	0.959	1.41	11.95	1.23	1.56	LI
6LPUCF		9.049	-0.206	-0.30	10.54	-0.18	-0.23	LE
78GDVC		9.541	0.286	0.42	11.15	0.43	0.54	PT
79H4A8		8.588	-0.667	-0.98	10.05	-0.67	-0.84	IM
9CVN88		9.096	-0.159	-0.23	10.38	-0.34	-0.43	LW
9TUZF9		9.369	0.114	0.17	10.60	-0.12	-0.15	LE
A68KDA		9.135	-0.120	-0.18	10.55	-0.17	-0.21	TB
A9MR2A		10.006	0.751	1.10	11.71	0.99	1.25	LC
B3VARQ		8.289	-0.966	-1.42	9.64	-1.08	-1.37	TH
C2DMT9		9.171	-0.085	-0.12	11.31	0.59	0.74	LA
CBHKM4		8.918	-0.337	-0.49	10.39	-0.33	-0.42	IM
D7QMPZ	X	54.140	44.885	65.94	69.81	59.09	74.78	TO
DB2NV4		8.541	-0.714	-1.05	10.08	-0.64	-0.81	LE
DWWE69		9.355	0.100	0.15	11.21	0.49	0.62	LA
FKWP26		9.359	0.103	0.15	11.13	0.41	0.52	LE
H6H24U		10.061	0.806	1.18	11.90	1.18	1.50	XX
HBPHLV		8.450	-0.805	-1.18	9.90	-0.82	-1.03	TS
HJXY9V		9.161	-0.095	-0.14	10.70	-0.02	-0.02	LH
HR8QDJ		8.073	-1.183	-1.74	9.59	-1.13	-1.43	TH
L68L7W		9.415	0.160	0.23	10.96	0.24	0.30	LW
LM24CQ		9.500	0.245	0.36	10.78	0.06	0.08	XX
MADF2R		9.564	0.309	0.45	10.30	-0.42	-0.54	IR
MFK74X		10.949	1.694	2.49	12.32	1.60	2.03	LE
MMX4PV		9.894	0.639	0.94	12.20	1.48	1.87	LA
N7A4HW		9.227	-0.028	-0.04	10.78	0.06	0.08	LH
NVQMPP		9.564	0.309	0.45	10.30	-0.42	-0.54	IR
PQEYPT		9.315	0.060	0.09	10.81	0.09	0.11	LW
PXCZJR		10.778	1.522	2.24	11.97	1.25	1.58	TV
QZYPPQ		9.189	-0.066	-0.10	10.80	0.08	0.10	LE
U9DU4R		9.051	-0.205	-0.30	10.97	0.25	0.31	LX
UZLCPJ	X	11.044	1.789	2.63	11.46	0.74	0.94	LE
VAJYUL		7.881	-1.374	-2.02	9.10	-1.62	-2.06	TT
VL34CJ		9.133	-0.122	-0.18	9.74	-0.98	-1.24	XX
VTY9UL		9.793	0.538	0.79	11.14	0.42	0.54	TB
WKJLLH		9.140	-0.116	-0.17	10.33	-0.39	-0.50	TH
YRWGEH		8.991	-0.264	-0.39	10.31	-0.41	-0.52	ID
ZUD2YC		8.177	-1.079	-1.58	9.61	-1.11	-1.41	TX

Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample NK27	Sample NK28
Grand Means	9.26 kN/m	10.72 kN/m
Stnd Dev Btwn Labs	0.68 kN/m	0.79 kN/m

Statistics based on 35 of 37 reporting participants.

Comments on Assigned Data Flags for Test #3515

UZLCPJ (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample NK27.

D7QMPZ (X) - Extreme Data.

Analysis Notes:

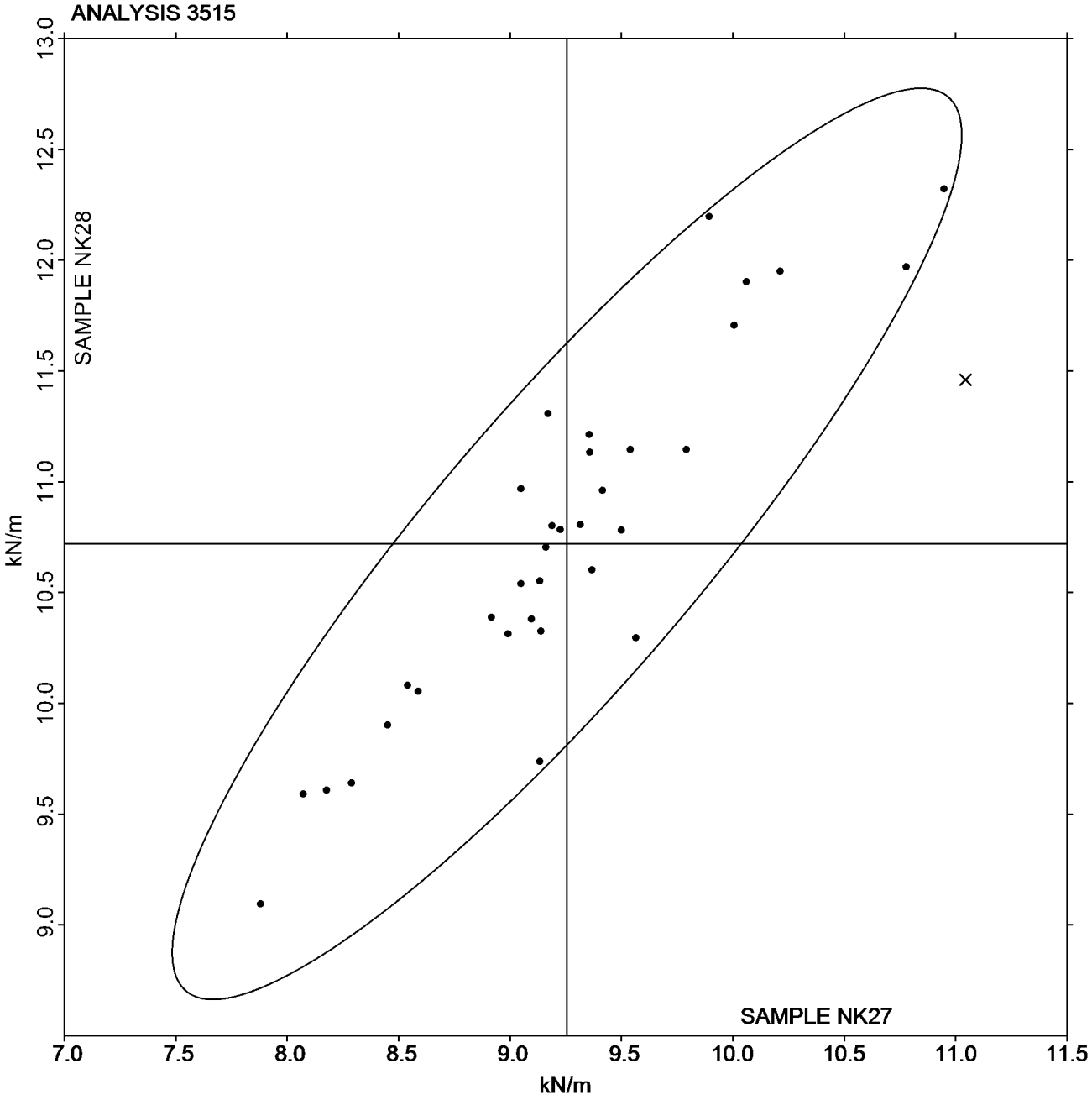
H6H24U - One determination removed from the Lab Mean of Sample NK27 per Grubb's Test at 1% risk (TAPPI 1205).

Key to Instrument Codes Reported by Participants

ID	Instron 4200 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)
PT	PTA Horizontal Tensile Tester	TB	Thwing-Albert EJA/1000
TH	Thwing-Albert QC-3A	TO	Thwing-Albert QC-1000
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 NK27 = 9.2554 kN/m

Grand Mean Sample NK28 = 10.720 kN/m



Paper & Paperboard Interlaboratory Testing Program

Report #4292, April 2024

Analysis 3516

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

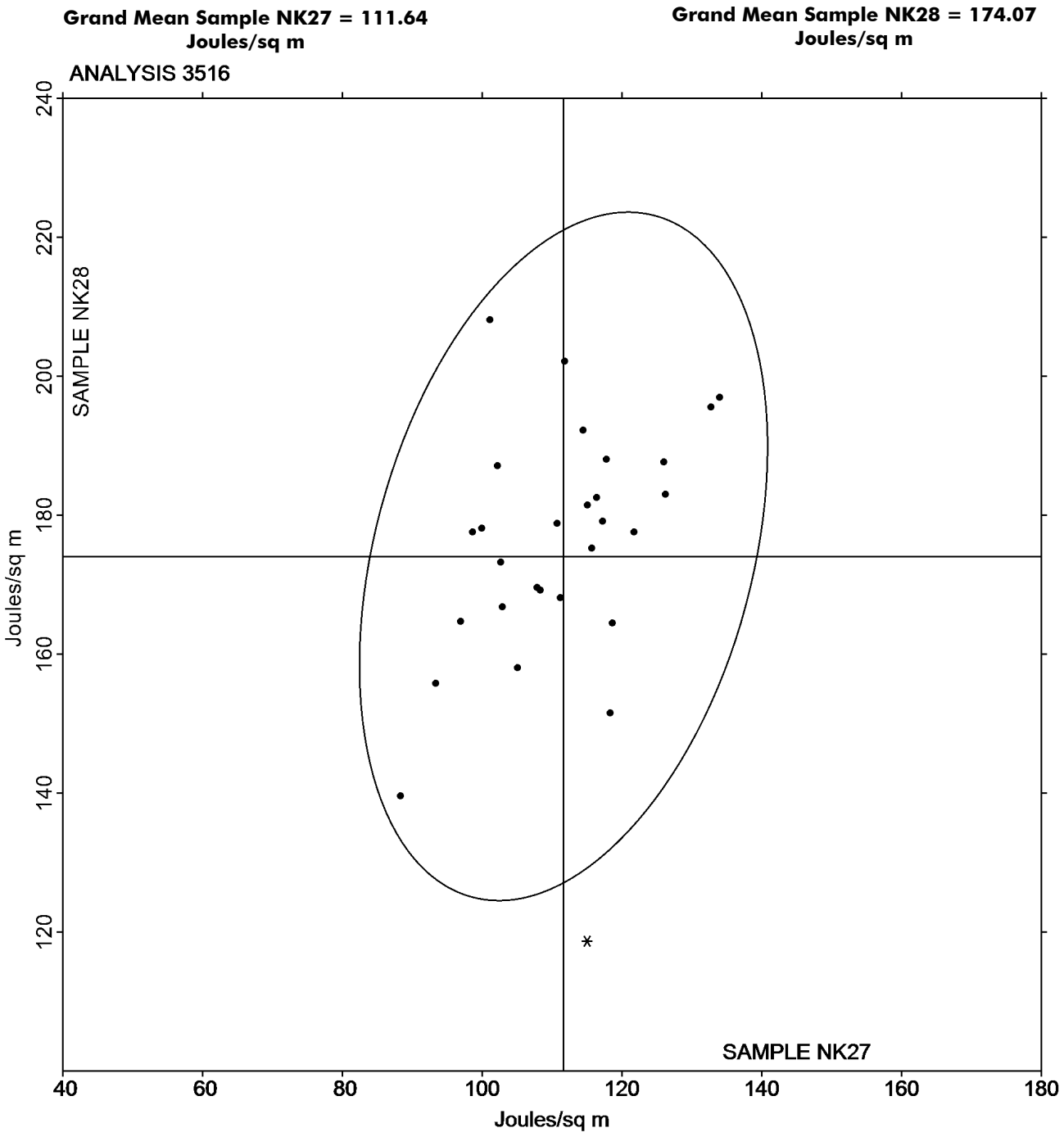
WebCode	Data Flag	Sample NK27 Lab Mean	Sample NK27 Diff from Grand Mean	Sample NK27 CPV	Sample NK28 Lab Mean	Sample NK28 Diff from Grand Mean	Sample NK28 CPV	Instr Code
6LPUCF		107.9	-3.7	-0.34	169.6	-4.5	-0.24	LE
78GDVC		115.1	3.5	0.31	181.4	7.4	0.39	PT
79H4A8		96.9	-14.7	-1.33	164.7	-9.4	-0.50	IM
9CVN88		105.1	-6.5	-0.59	158.0	-16.1	-0.85	LW
9TUZF9	*	115.0	3.4	0.30	118.7	-55.4	-2.94	LE
A9MR2A		102.2	-9.4	-0.85	187.1	13.0	0.69	LC
C2DMT9		101.1	-10.5	-0.95	208.1	34.0	1.81	LA
CBHKM4		114.4	2.8	0.25	192.2	18.1	0.96	IM
DB2NV4		118.7	7.0	0.63	164.5	-9.6	-0.51	LE
DWWE69		98.7	-13.0	-1.17	177.6	3.5	0.19	LC
FKWP26		102.7	-8.9	-0.80	173.2	-0.8	-0.04	LE
H6H24U		126.0	14.4	1.30	187.6	13.5	0.72	XX
HBPHLV		115.7	4.1	0.37	175.3	1.2	0.06	TS
HJXY9V		121.7	10.1	0.91	177.6	3.5	0.19	LH
L68L7W		111.2	-0.4	-0.04	168.1	-6.0	-0.32	LE
MADF2R		118.3	6.7	0.60	151.5	-22.5	-1.20	IR
MFK74X		132.8	21.1	1.90	195.6	21.5	1.14	LE
MMX4PV		100.0	-11.7	-1.05	178.1	4.0	0.21	LA
N7A4HW		102.9	-8.7	-0.79	166.8	-7.3	-0.39	LH
NVQMPP		118.3	6.7	0.60	151.5	-22.5	-1.20	IR
PQEYPT		108.4	-3.3	-0.30	169.2	-4.9	-0.26	LW
PXCZJR		126.3	14.6	1.32	183.0	8.9	0.47	TV
QZYPPQ		110.7	-0.9	-0.08	178.8	4.7	0.25	LE
U9DU4R		111.8	0.2	0.01	202.1	28.1	1.49	TH
UZLCPJ		134.0	22.4	2.02	196.9	22.8	1.21	LE
VAJYUL		88.3	-23.3	-2.10	139.6	-34.5	-1.83	TT
VL34CJ		117.3	5.6	0.51	179.1	5.0	0.27	XX
VTY9UL		117.8	6.2	0.56	188.1	14.0	0.74	TB
WKJLLH		116.4	4.8	0.43	182.5	8.5	0.45	TH
ZUD2YC		93.4	-18.3	-1.65	155.7	-18.3	-0.97	TX

Summary Statistics	Sample NK27	Sample NK28
Grand Means	111.64 Joules/sq m	174.07 Joules/sq m
Stnd Dev Btwn Labs	11.10 Joules/sq m	18.83 Joules/sq m

Statistics based on 30 of 30 reporting participants.

Key to Instrument Codes Reported by Participants

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	PT	PTA Horizontal Tensile Tester
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TS	TMI Horizontal Tensile Tester 84-58	TT	Tinius Olsen Model MHT
TV	Thwing-Albert Vantage NX	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		



Paper & Paperboard Interlaboratory Testing Program

Analysis 3517

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK27 Lab Mean	Sample NK27 Diff from Grand Mean	Sample NK27 CPV	Sample NK28 Lab Mean	Sample NK28 Diff from Grand Mean	Sample NK28 CPV	Instr Code
6LPUCF		1.703	-0.026	-0.13	2.367	-0.044	-0.16	LE
78GDVC		1.804	0.075	0.37	2.487	0.076	0.29	PT
79H4A8		1.960	0.231	1.14	2.726	0.315	1.19	IM
9CVN88		1.671	-0.058	-0.28	2.245	-0.166	-0.62	LW
9TUZF9	X	1.773	0.044	0.22	1.754	-0.657	-2.48	LE
A68KDA	*	1.110	-0.619	-3.04	1.542	-0.869	-3.28	TB
A9MR2A		1.420	-0.309	-1.52	2.285	-0.126	-0.47	LC
C2DMT9	X	1.448	-0.281	-1.38	2.874	0.463	1.75	LX
CBHKM4		1.933	0.204	1.00	2.757	0.346	1.31	IM
D7QMPZ	X	0.107	-1.622	-7.97	0.125	-2.286	-8.63	TO
DB2NV4		1.737	0.008	0.04	2.406	-0.005	-0.02	LE
DWWE69		1.460	-0.269	-1.32	2.267	-0.144	-0.54	LC
FKWP26		1.607	-0.122	-0.60	2.309	-0.102	-0.38	LE
H6H24U		1.444	-0.285	-1.40	2.211	-0.200	-0.75	XX
HBPHLV		2.006	0.277	1.36	2.650	0.239	0.90	TS
HJXY9V		1.887	0.158	0.78	2.451	0.040	0.15	LX
L68L7W		1.700	-0.029	-0.14	2.284	-0.127	-0.48	LW
MADF2R		1.800	0.071	0.35	2.188	-0.223	-0.84	IR
MFK74X	X	0.069	-1.660	-8.15	0.093	-2.318	-8.75	LE
MMX4PV		1.455	-0.274	-1.35	2.151	-0.260	-0.98	XX
N7A4HW		1.640	-0.089	-0.44	2.320	-0.091	-0.34	LH
NVQMPP		1.800	0.071	0.35	2.188	-0.223	-0.84	XX
PQEYPT		1.706	-0.023	-0.11	2.356	-0.055	-0.21	LW
PXCZJR		1.883	0.154	0.76	2.429	0.018	0.07	TV
QZYPPQ		1.734	0.005	0.02	2.434	0.023	0.09	LE
U9DU4R		2.060	0.331	1.63	3.040	0.629	2.38	LX
UZLCPJ		1.803	0.074	0.36	2.539	0.128	0.48	LE
VAJYUL		1.765	0.036	0.18	2.429	0.018	0.07	TT
VL34CJ		1.902	0.173	0.85	2.737	0.326	1.23	XX
VTY9UL		1.797	0.068	0.33	2.529	0.118	0.45	XX
WKJLLH		1.898	0.169	0.83	2.693	0.282	1.07	TH
YRWGEH		1.795	0.066	0.32	2.470	0.059	0.22	XX
ZUD2YC		1.659	-0.070	-0.34	2.416	0.005	0.02	TX

Summary Statistics	Sample NK27	Sample NK28
Grand Means	1.73 Percent	2.41 Percent
Stnd Dev Btwn Labs	0.20 Percent	0.26 Percent

Statistics based on 29 of 33 reporting participants.

Comments on Assigned Data Flags for Test #3517

9TUZF9 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample NK28.

MFK74X (X) - Extreme Data.

D7QMPZ (X) - Extreme Data.

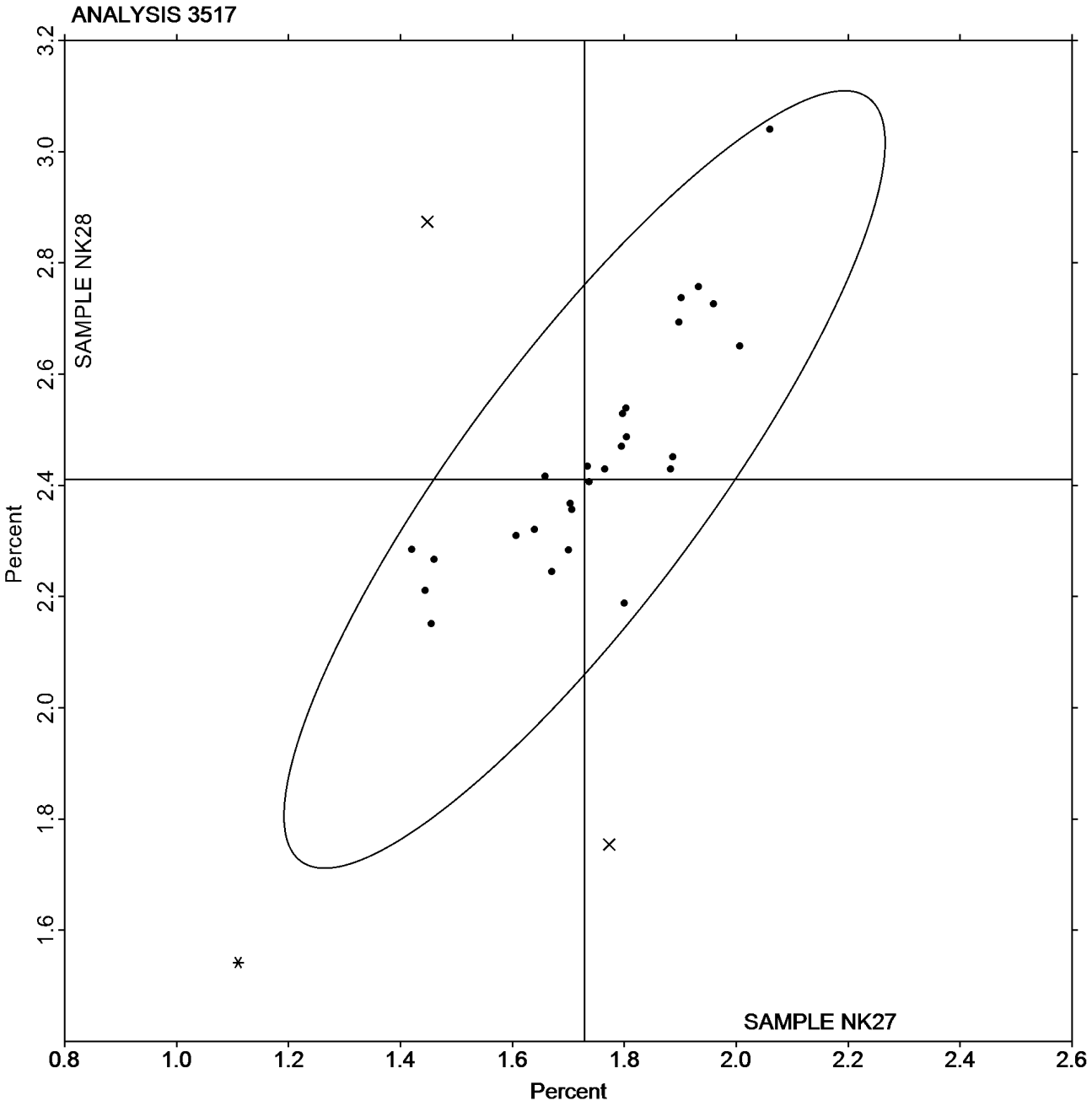
C2DMT9 (X) - Inconsistent in testing between samples.

Key to Instrument Codes Reported by Participants

IM	Instron 5500 Series	IR	Instron 5900 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)	PT	PTA Horizontal Tensile Tester
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TO	Thwing-Albert QC-1000	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 NK27 = 1.7289
Percent

Grand Mean Sample NK28 = 2.4105
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 PS27 Lab Mean	Sample PS27 Diff from Grand Mean	Sample PS27 CPV	Sample PS28 Lab Mean	Sample PS28 Diff from Grand Mean	Sample PS28 CPV	Instr Code
2PXTBC		1.078	-0.036	-0.64	1.117	0.000	0.00	ZZ
33Z27Z		1.231	0.117	2.09	1.214	0.097	1.46	ZZ
4EBLBE		1.203	0.089	1.59	1.189	0.072	1.08	ZZ
7WYW37		1.130	0.016	0.29	1.139	0.022	0.33	ZZ
8AHZM8		1.135	0.021	0.38	1.120	0.003	0.04	ZZ
8XVPJB		1.088	-0.026	-0.46	1.131	0.014	0.21	ZZ
9YFZN9		1.154	0.040	0.72	1.101	-0.016	-0.24	ZZ
A9MR2A		1.064	-0.050	-0.89	1.067	-0.050	-0.76	ZZ
AHRYGA		1.069	-0.045	-0.80	1.102	-0.015	-0.23	ZZ
EHBLU8		1.099	-0.015	-0.26	1.076	-0.041	-0.62	ZZ
FU8RM6		1.048	-0.066	-1.17	1.046	-0.071	-1.07	ZZ
HBPHLV		1.217	0.103	1.84	1.230	0.113	1.70	ZZ
HHH3GV		1.077	-0.037	-0.65	1.068	-0.049	-0.74	ZZ
HJXY9V		1.127	0.013	0.24	1.125	0.008	0.12	ZZ
JV8AXW		1.087	-0.027	-0.48	1.042	-0.075	-1.13	ZZ
LX4PCX		1.180	0.066	1.18	1.240	0.123	1.85	ZZ
PQEYPT		1.012	-0.102	-1.81	0.954	-0.163	-2.46	ZZ
T4NVCR		1.078	-0.036	-0.64	1.135	0.018	0.27	ZZ
UMDTQP		1.132	0.018	0.33	1.106	-0.011	-0.17	ZZ
UZLCPJ		1.064	-0.050	-0.89	1.099	-0.018	-0.27	ZZ
VTY9UL		1.121	0.007	0.13	1.125	0.008	0.12	ZZ
WKJLLH		1.076	-0.038	-0.67	1.071	-0.046	-0.70	ZZ
XAW8VK		1.145	0.031	0.56	1.196	0.079	1.19	ZZ

Summary Statistics	Sample PS27	Sample PS28
Grand Means	1.11 Microns	1.12 Microns
Stnd Dev Btwn Labs	0.06 Microns	0.07 Microns

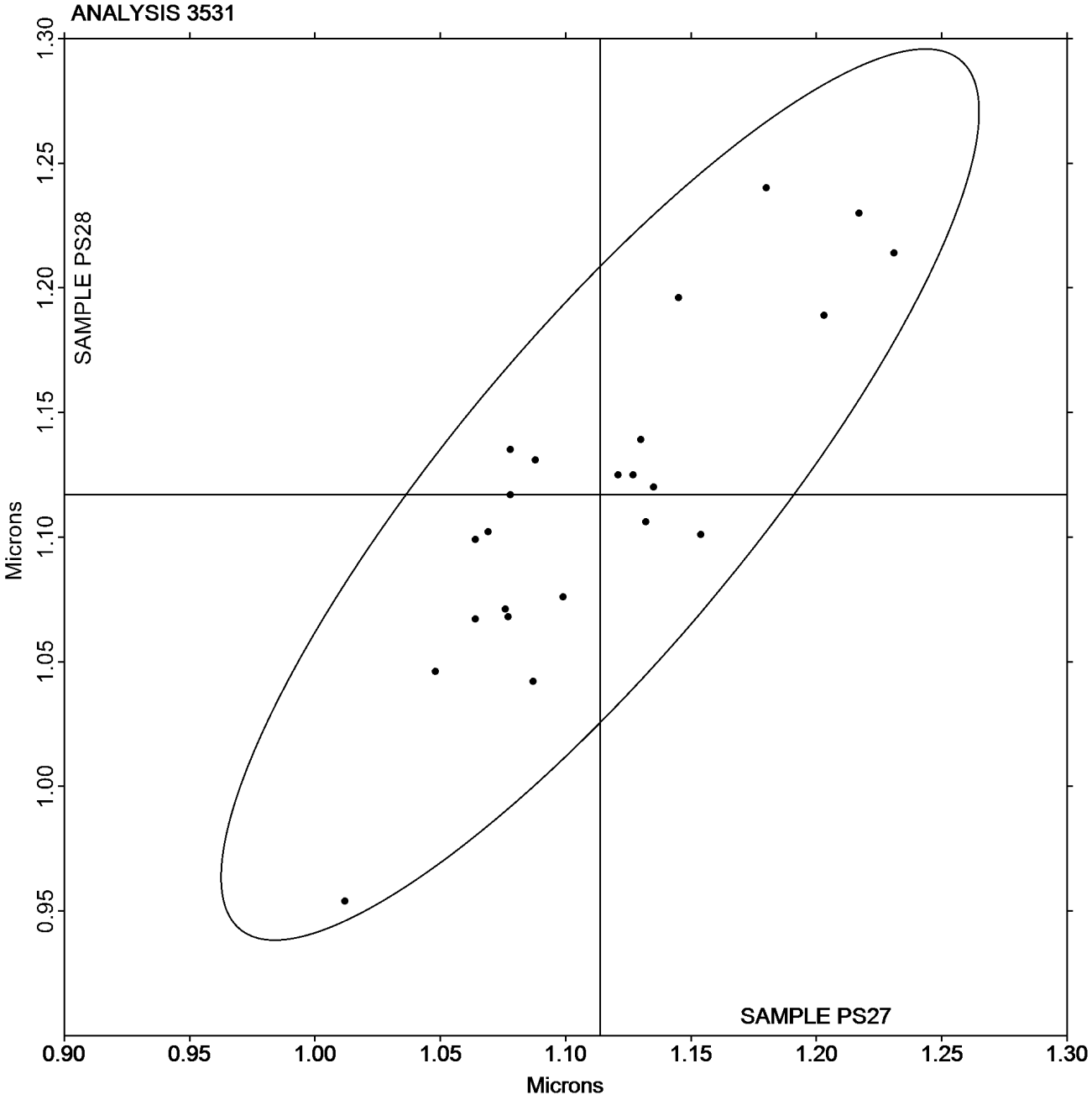
Statistics based on 23 of 23 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample PS27 = 1.1137 Microns

Grand Mean Sample PS28 = 1.1171 Microns



Paper & Paperboard Interlaboratory Testing Program

Analysis 3545
Directional Brightness
TAPPI Official Test Method T452

WebCode	Data Flag	Sample BR27 Lab Mean	Sample BR27 Diff from Grand Mean	Sample BR27 CPV	Sample BR28 Lab Mean	Sample BR28 Diff from Grand Mean	Sample BR28 CPV	Instr Code
2PXTBC	X	84.87	-0.38	-0.39	79.81	2.82	2.63	HG
33Z27Z		84.67	-0.58	-0.59	76.64	-0.34	-0.32	HZ
3J8QRD		84.50	-0.75	-0.76	76.23	-0.76	-0.71	TT
7BK9EF		85.48	0.22	0.23	77.11	0.13	0.12	XX
7WYW37	X	73.04	-12.21	-12.40	67.20	-9.78	-9.12	XX
8XVPJB		83.94	-1.31	-1.33	75.31	-1.68	-1.56	PP
9CVN88		84.68	-0.57	-0.58	76.04	-0.94	-0.88	TS
A68KDA		85.27	0.02	0.02	77.61	0.63	0.58	XD
AHRYGA		87.03	1.78	1.80	78.55	1.57	1.46	TP
CEHWJ4		84.76	-0.49	-0.50	76.62	-0.36	-0.34	XX
EHBLU8		86.92	1.67	1.69	78.92	1.93	1.80	TD
H6H24U		85.30	0.05	0.05	76.87	-0.11	-0.10	XX
HBPHLV		84.50	-0.75	-0.76	76.70	-0.28	-0.26	TS
LVZTTV		84.50	-0.75	-0.76	76.14	-0.85	-0.79	TS
LX4PCX		84.15	-1.10	-1.12	75.50	-1.48	-1.38	TD
PQEYPT		86.37	1.12	1.14	77.84	0.85	0.80	TP
QKF9DE		86.84	1.59	1.61	78.90	1.92	1.79	TP
UMDTQP		84.93	-0.32	-0.32	76.60	-0.38	-0.36	TP
UZLCPJ	X	79.12	-6.14	-6.23	72.89	-4.09	-3.81	HG
WKJLLH		84.60	-0.65	-0.66	76.41	-0.57	-0.53	TP
XAW8VK		86.08	0.83	0.84	77.71	0.73	0.68	HG

Summary Statistics	Sample BR27	Sample BR28
Grand Means	85.25 Percent	76.98 Percent
Stnd Dev Btwn Labs	0.98 Percent	1.07 Percent

Statistics based on 18 of 21 reporting participants.

Comments on Assigned Data Flags for Test #3545

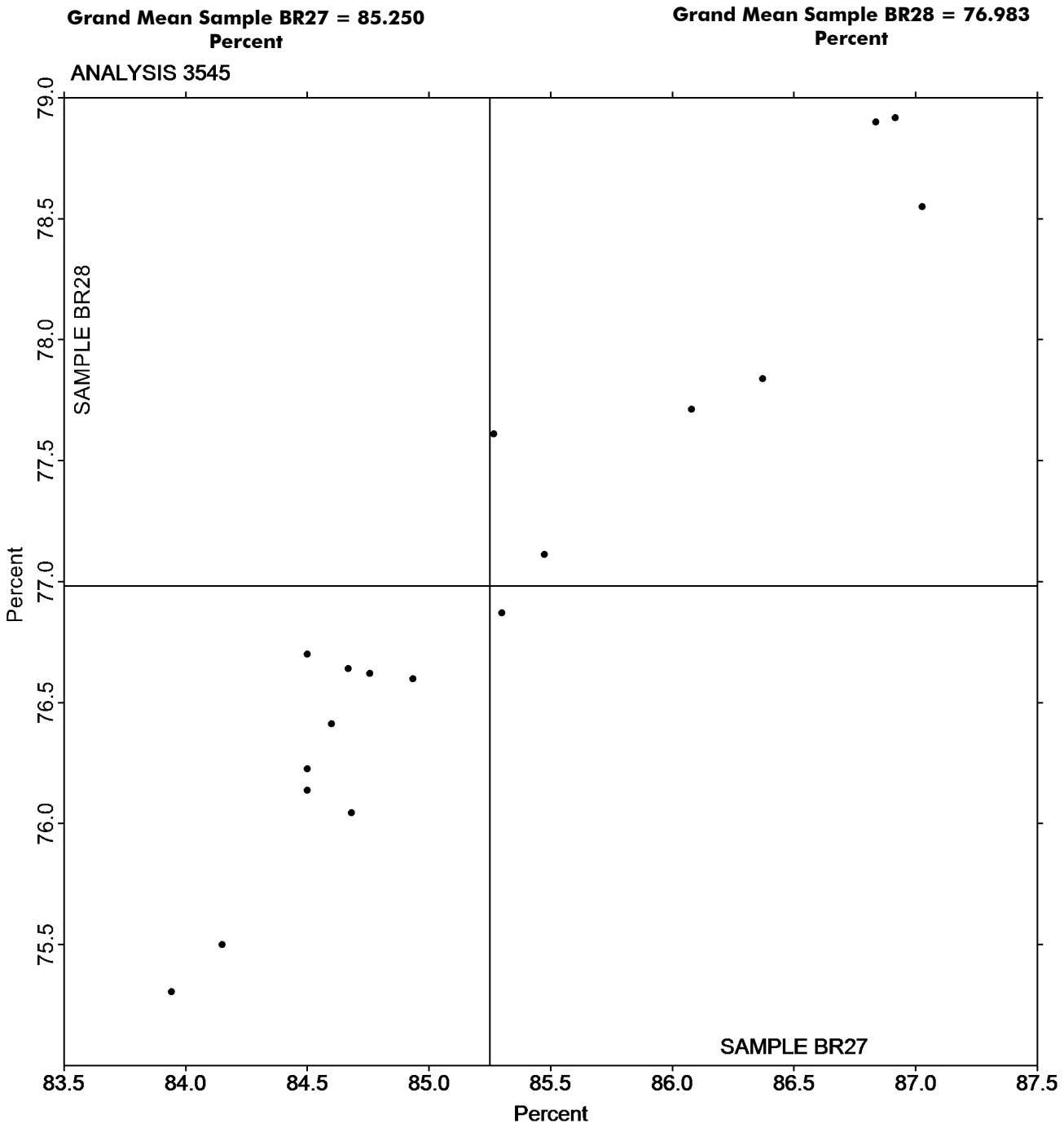
UZLCPJ (X) - Extreme Data.

2PXTBC (X) - Data for sample BR28 are high.

7WYW37 (X) - Extreme Data.

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
TT	Technidyne Brightimeter Micro S4-M	XD	X-Rite Color Ci7600
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 3547
Diffuse Brightness
TAPPI Official Test Method T525

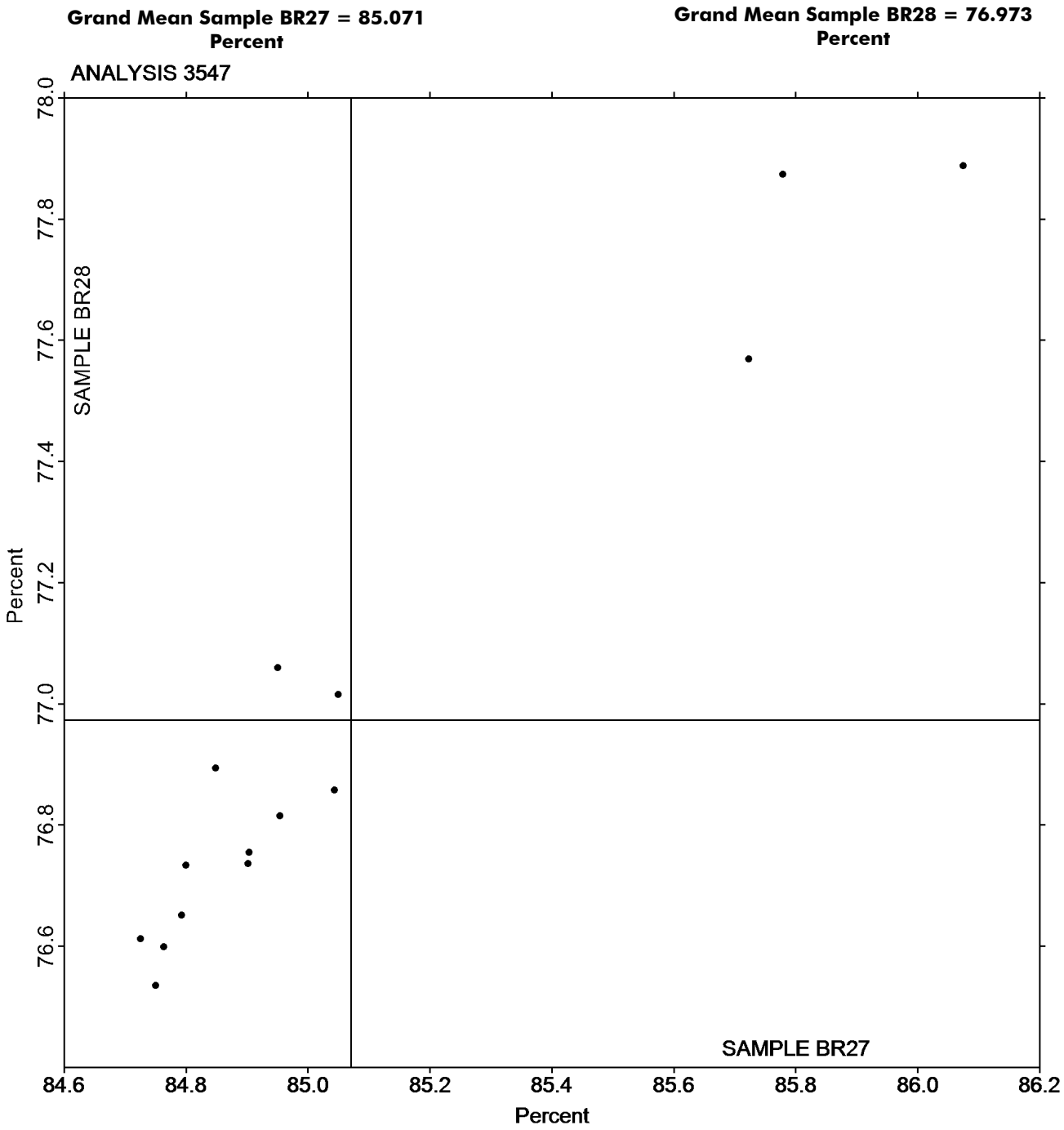
WebCode	Data Flag	Sample BR27 Lab Mean	Sample BR27 Diff from Grand Mean	Sample BR27 CPV	Sample BR28 Lab Mean	Sample BR28 Diff from Grand Mean	Sample BR28 CPV	Instr Code
4EBLBE		85.04	-0.03	-0.06	76.86	-0.12	-0.26	TC
9MMJY8		84.76	-0.31	-0.72	76.60	-0.37	-0.84	LE
AHRYGA		84.90	-0.17	-0.40	76.74	-0.24	-0.53	TC
D2AE2Z		84.79	-0.28	-0.65	76.65	-0.32	-0.72	LA
EHBLU8		84.80	-0.27	-0.64	76.73	-0.24	-0.54	TD
EJBC93		85.05	-0.02	-0.05	77.02	0.04	0.09	XX
HBPHLV		85.78	0.71	1.66	77.87	0.90	2.02	LT
HJXY9V		84.85	-0.22	-0.52	76.89	-0.08	-0.18	LT
HZ3TFV		84.73	-0.35	-0.81	76.61	-0.36	-0.81	TP
L68L7W		84.75	-0.32	-0.75	76.54	-0.44	-0.98	LT
PQEYPT		84.95	-0.12	-0.27	76.82	-0.16	-0.35	EA
QBCY7P		84.95	-0.12	-0.28	77.06	0.09	0.20	LE
TNWBGP		86.08	1.00	2.36	77.89	0.91	2.05	TM
WKJLLH		85.72	0.65	1.53	77.57	0.60	1.34	LT
XAW8VK		84.90	-0.17	-0.39	76.76	-0.22	-0.49	TC

Summary Statistics	Sample BR27	Sample BR28
Grand Means	85.07 Percent	76.97 Percent
Stnd Dev Btwn Labs	0.43 Percent	0.45 Percent

Statistics based on 15 of 15 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
TM	Technidyne Technibrite Micro TB-1C	TP	Technidyne Test/Plus
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 3549

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

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

Report #4292, April 2024

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L	a	b	Color Difference Values ΔL	Δa	Δb	ΔE	Instr Code
2PXTBC	X	CA27	88.34	-0.31 X	-0.94	0.04	0.15 X	0.08	0.17	HK
		CA28	88.38	-0.16	-0.86					
7WYW37		CA27	82.42 *	0.63	-0.88	-0.82 X	0.02	0.27	0.86 X	XX
		CA28	81.60	0.65	-0.60					
8AHZM8		CA27	89.69	0.39	-0.62	-0.05	-0.02	0.04	0.07	TC
		CA28	89.64	0.37	-0.58					
8XVPJB		CA27	86.78	0.34	-0.68	-0.01	0.00	0.05	0.05	TC
		CA28	86.77	0.34	-0.63					
9MMJY8		CA27	89.50	0.35	-0.68	-0.08	0.03	-0.13	0.15	LS
		CA28	89.43	0.38	-0.81					
AHRYGA		CA27	86.90	0.27	-0.51	-0.04	0.04	-0.14	0.15	TC
		CA28	86.86	0.31	-0.65					
CXX6J4		CA27	86.02	1.43 *	-0.65	-0.24	-0.12	0.05	0.28	TS
		CA28	85.78	1.31	-0.59					
D2AE2Z		CA27	86.79	0.64	-0.83	-0.13	0.02	-0.12	0.18	LA
		CA28	86.66	0.67	-0.95					
EHBLU8		CA27	86.66	0.35	-0.73	0.07	0.00	0.05	0.09	TC
		CA28	86.73	0.35	-0.68					
EJBC93	X	CA27	89.73	-0.55 X	-0.17	0.02	0.00	0.05	0.05	TC
		CA28	89.75	-0.55	-0.13					
FDW4CQ		CA27	89.54	0.56	-0.73	0.03	0.00	0.04	0.05	TC
		CA28	89.57	0.56	-0.69					
FU8RM6		CA27	88.54	0.90	-1.31	0.16	0.03	-0.02	0.16	TC
		CA28	88.70	0.93	-1.34					
H6H24U		CA27	89.23	0.39	-1.34	0.13	0.00	0.11	0.17	XX
		CA28	89.36	0.39	-1.22					
HBPHLV		CA27	85.90	1.53 *	-1.58	-0.01	0.16 X	-0.12	0.20	TS
		CA28	85.89	1.69	-1.70					
LX4PCX		CA27	85.16	0.97	-1.63	0.10	0.01	-0.01	0.10	TC
		CA28	85.26	0.98	-1.64					
MKZERW		CA27	85.77	1.02	-1.57	0.08	0.00	0.11	0.14	TS
		CA28	85.85	1.02	-1.46					

QX9QBT	X	CA27 CA28	89.54 89.48		-0.28 -0.35	X	-0.36 -0.27	-0.05	-0.07	0.09	0.12	NH
UZLCPJ	X	CA27 CA28	88.53 89.51	*	-0.58 -0.63	X	-0.42 -0.34	0.98 X	-0.04	0.08	0.98 X	HK
XAW8VK		CA27 CA28	87.29 87.38		0.82 0.80		-0.70 -0.63	0.09	-0.02	0.07	0.12	HF

Summary Statistics

Grand Means							
CA27	87.492	0.706	-0.860	-0.048	0.010	0.018	0.184
CA28	87.506	0.716	-0.830				
Stnd Dev Btwn Labs							
CA27	1.961	0.400	0.431	0.237	0.057	0.113	0.197
CA28	2.130	0.407	0.448				

Statistics based on 15 of 19 reporting participants

Comments on Assigned Data Flags for Test #3549

EJBC93 (X) - Low "a" values for both samples.

QX9QBT (X) - Low "a" value for sample CA28.

UZLCPJ (X) - Low "a" values for both samples. Large delta L & E.

2PXTBC (X) - Low "a" value for sample CA27. Inconsistent within replicate readings of "a" for sample CA27. Large delta a.

Analysis Notes:

EJBC93 - Due to CTS graphs using Absolute Values, data Flag is located within consensus data. However, "a" data is lower than the positive Grand Mean as shown above graphs.

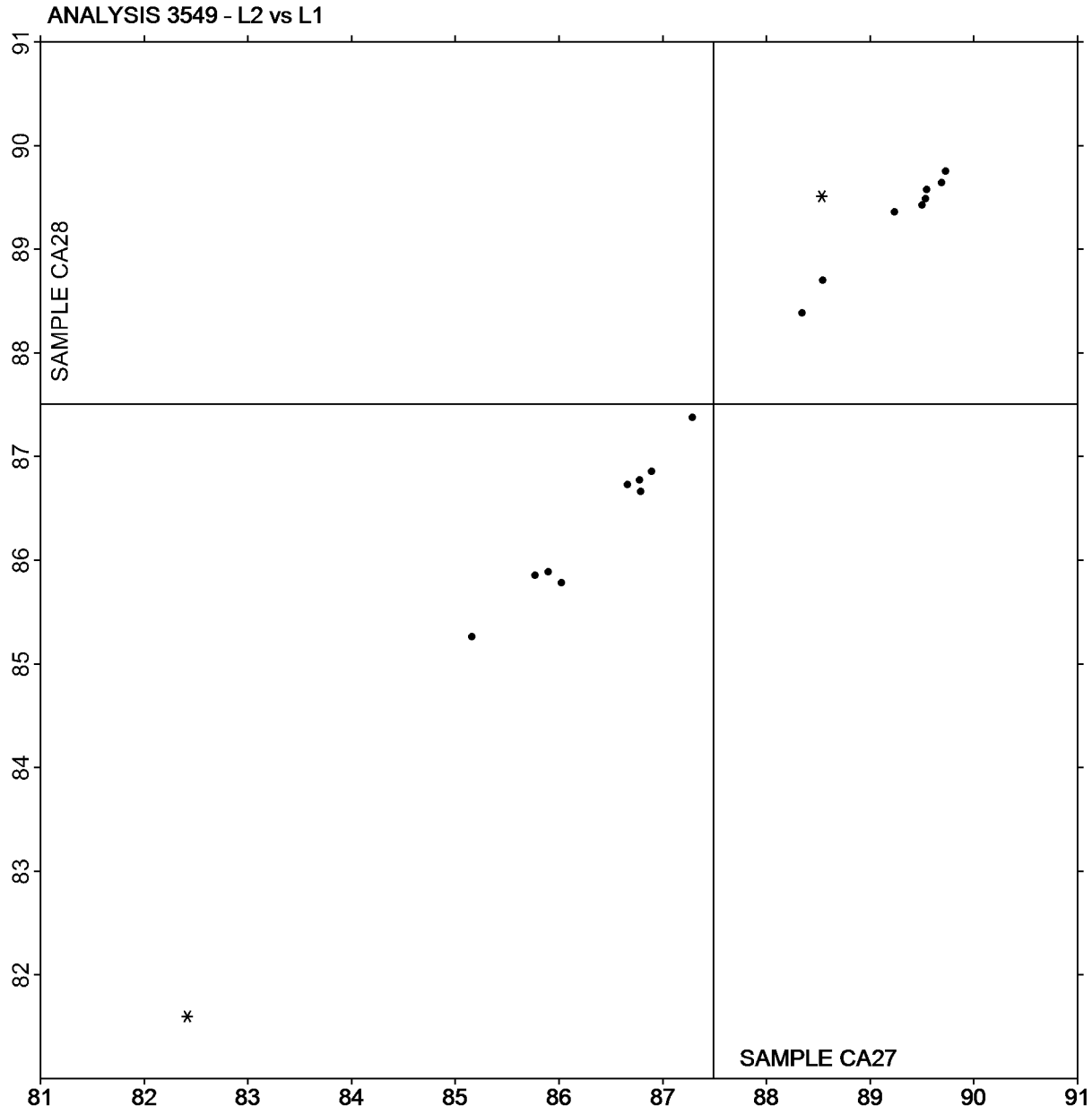
QX9QBT - Due to CTS graphs using Absolute Values, data Flag is located within consensus data. However, "a" data is lower than the positive Grand Mean as shown above graphs.

UZLCPJ - Due to CTS graphs using Absolute Values, data Flag is located within consensus data. However, "a" data is lower than the positive Grand Mean as shown above graphs.

Key to Instrument Codes Reported by Participants

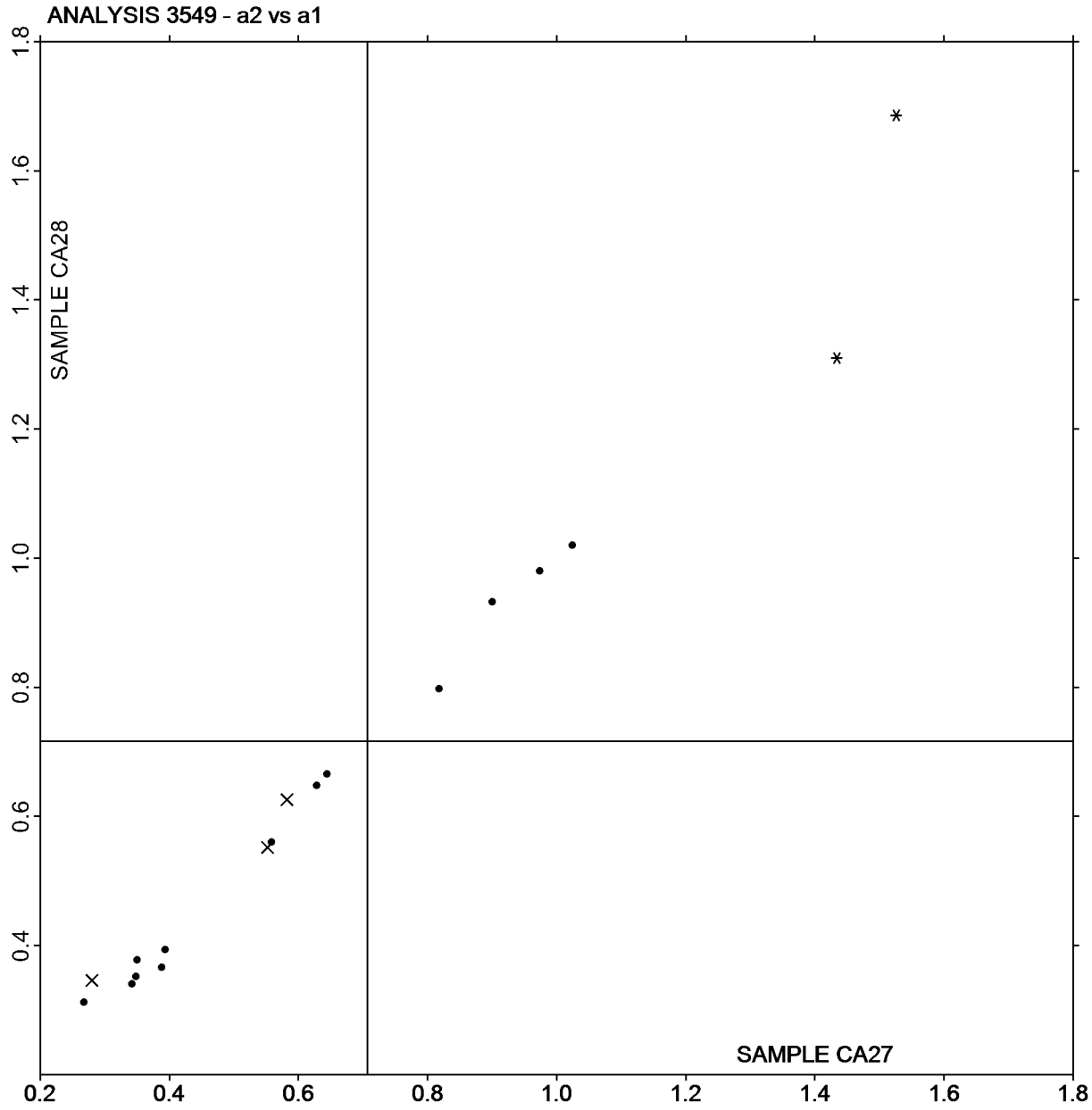
HF	Hunter LabScan II	HK	Hunter LabScan XE
LA	L & W Elrepho AL300	LS	L & W Elrepho SE 070
NH	Minolta CM-3700A Spectrophotometer	TC	Technidyne Color Touch Series
TS	Technidyne Brightimeter Micro S-5	XX	Instrument make/model not specified by lab

Plot of L values CA28 vs L values CA27



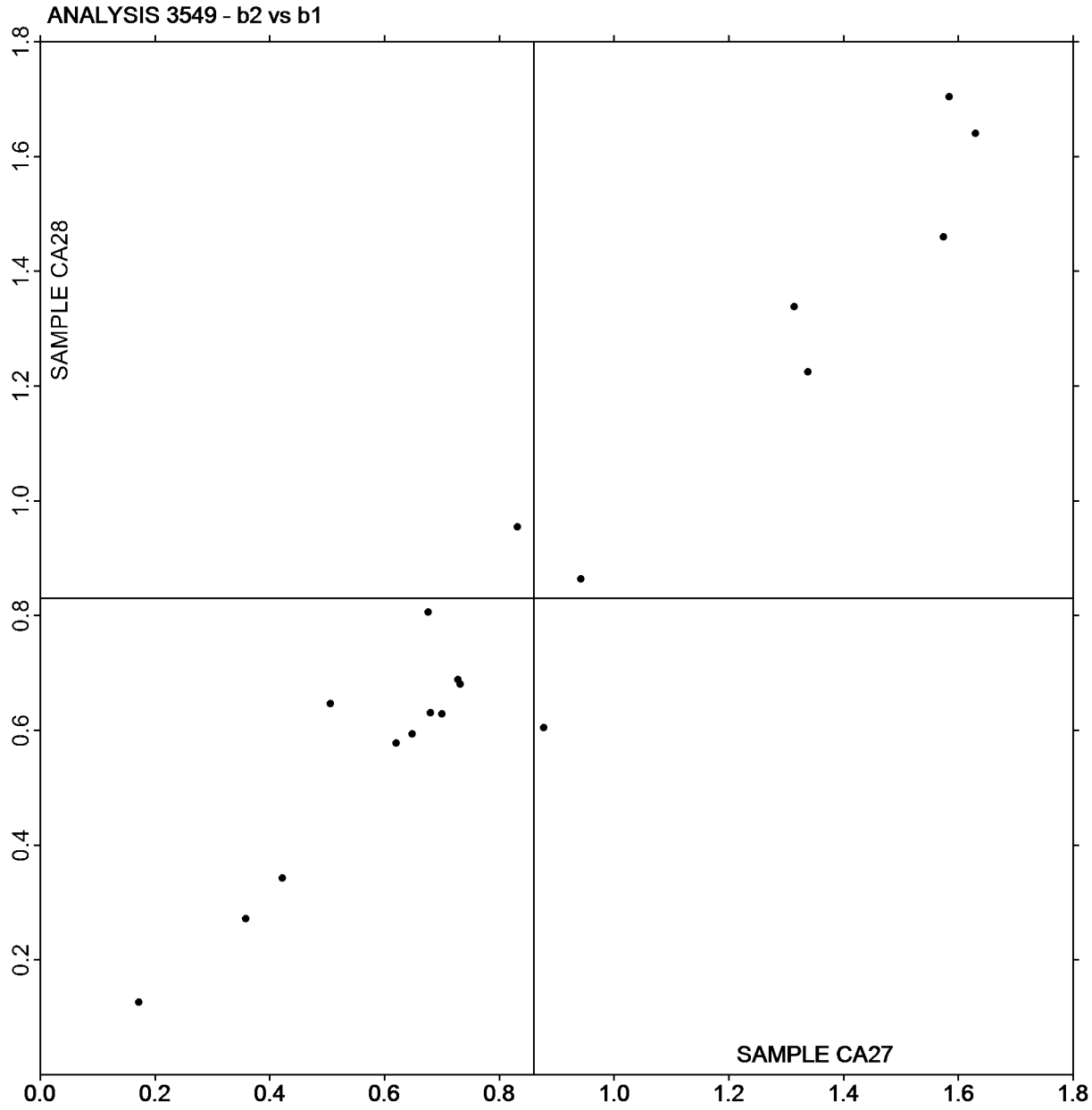
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA28 vs a values CA27



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 CA28 vs b values CA27



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 3551

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

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

Report #4292, April 2024

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L	a	b	Color Difference Values ΔL	Δa	Δb	ΔE	Instr Code
3J8QRD		**CA27**	87.49	-0.26	-0.33	-0.01	0.00	-0.04	0.04	XB
		CA28	87.48	-0.26	-0.37					
64NW7D		**CA27**	89.83	-0.60	-0.44	0.28 X	0.10	-0.01	0.30	XC
		CA28	90.11	-0.50	-0.45					
6Z8NHE		**CA27**	89.75	-0.55	-0.10	-0.10	0.02	-0.17	0.20	XX
		CA28	89.65	-0.53	-0.28					
7BK9EF	X	**CA27**	89.81	-0.59	0.18 X	0.03	-0.02	0.12	0.13	XX
		CA28	89.84	-0.60	0.31					
L68L7W		**CA27**	89.54	-0.54	-0.44	0.02	-0.02	0.04	0.05	LS
		CA28	89.56	-0.56	-0.39					
PQEYPT		**CA27**	89.57	-0.49	-0.41	0.06	0.04	0.07	0.10	EG
		CA28	89.63	-0.45	-0.34					
PY3YWQ		**CA27**	90.05	-0.46	-0.52	-0.08	-0.01	0.00	0.08	NF
		CA28	89.98	-0.47	-0.52					
R8TGAP		**CA27**	90.38	-0.57	-0.40	0.00	-0.03	0.00	0.03	XC
		CA28	90.37	-0.61	-0.40					
UMDTQP		**CA27**	87.14	-0.13	-0.53	-0.01	-0.01	0.02	0.03	HE
		CA28	87.13	-0.14	-0.51					
V8F4BH		**CA27**	89.70	-0.50	-0.25	-0.02	0.01	-0.02	0.03	XX
		CA28	89.68	-0.49	-0.27					
WKJLLH		**CA27**	89.53	-0.44	-0.28	0.01	0.01	0.08	0.08	LT
		CA28	89.53	-0.43	-0.20					
WY44G8		**CA27**	89.72	-0.49	-0.09	0.01	0.17 X	-0.34	0.38	TC
		CA28	89.73	-0.32	-0.43					
XAW8VK	X	**CA27**	86.69	0.38 X	-0.70	0.05	0.08	0.00	0.09	TC
		CA28	86.74	0.46	-0.70					
ZKQZJ3		**CA27**	89.75	-0.41	-0.11	-0.22	0.04	-0.24	0.32	NH
		CA28	89.53	-0.37	-0.34					

Summary Statistics

Grand Means							
CA27	89.210	-0.463	-0.353	-0.005	0.025	-0.050	0.137
CA28	89.212	-0.441	-0.400				
Stnd Dev Btwn Labs							
CA27	1.170	0.134	0.183	0.116	0.057	0.131	0.129
CA28	1.168	0.136	0.128				

Statistics based on 12 of 14 reporting participants

Comments on Assigned Data Flags for Test #3551

XAW8VK (X) - Very high "a" values for both samples.

7BK9EF (X) - Very high "b" values for both samples. Inconsistent within replicate readings of "b" for sample CA27.

Analysis Notes:

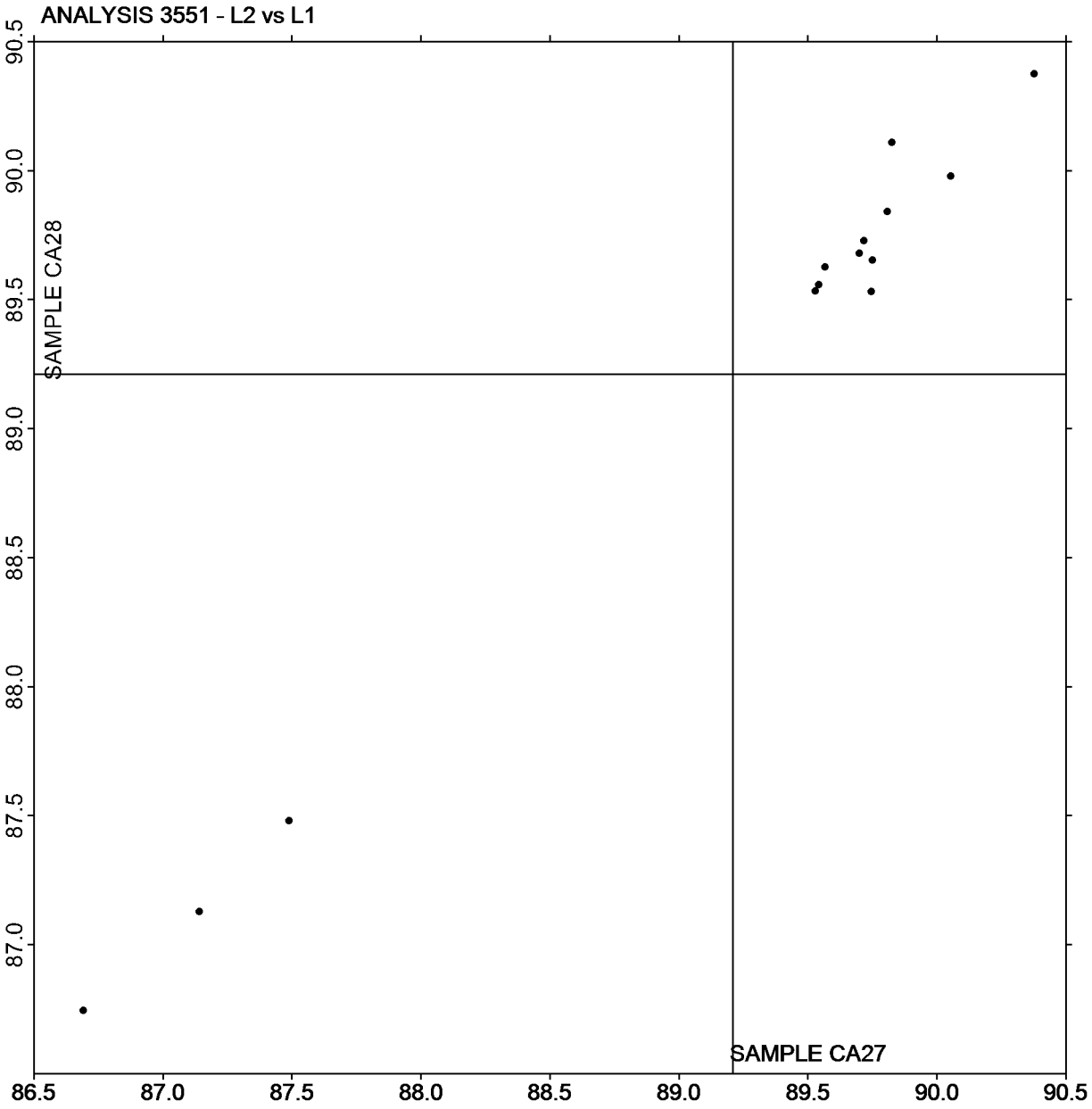
7BK9EF - Due to CTS graphs using Absolute Values, data Flag is located within consensus data. However, "b" data is higher than the negative Grand Mean as shown above graphs.

XAW8VK - Due to CTS graphs using Absolute Values, data Flag is located within consensus data. However, "a" data is higher than the negative Grand Mean as shown above graphs.

Key to Instrument Codes Reported by Participants

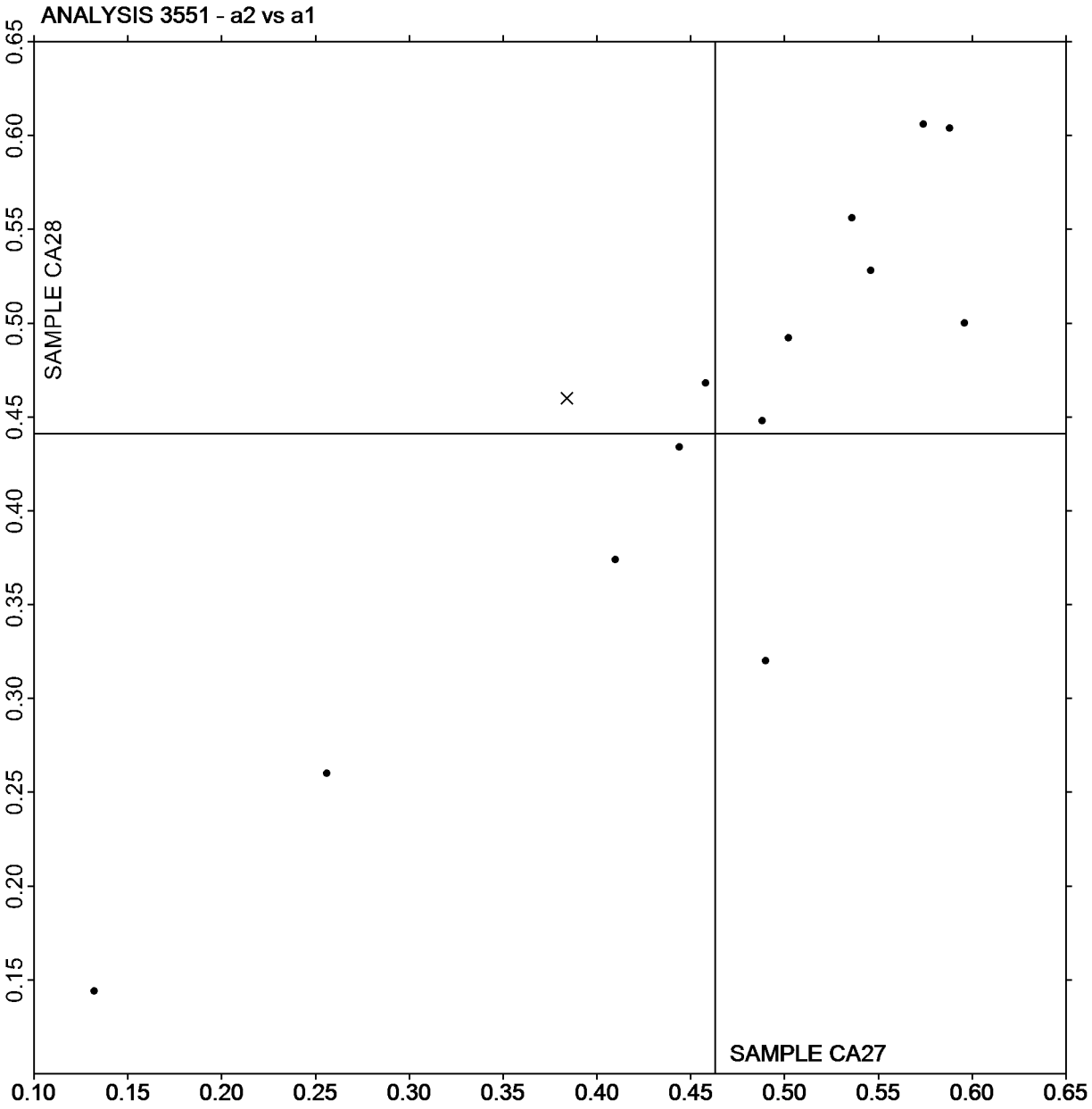
EG	Datacolor Elrepho	HE	Hunter LabScan
LS	L & W Elrepho SE 070	LT	L & W Elrepho SE 071
NF	Minolta CM-3600d Spectrophotometer	NH	Minolta CM-3700A Spectrophotometer
TC	Technidyne Color Touch Series	XB	X-Rite Ci7
XC	X-Rite eXact Series	XX	Instrument make/model not specified by lab

Plot of L values CA28 vs L values CA27



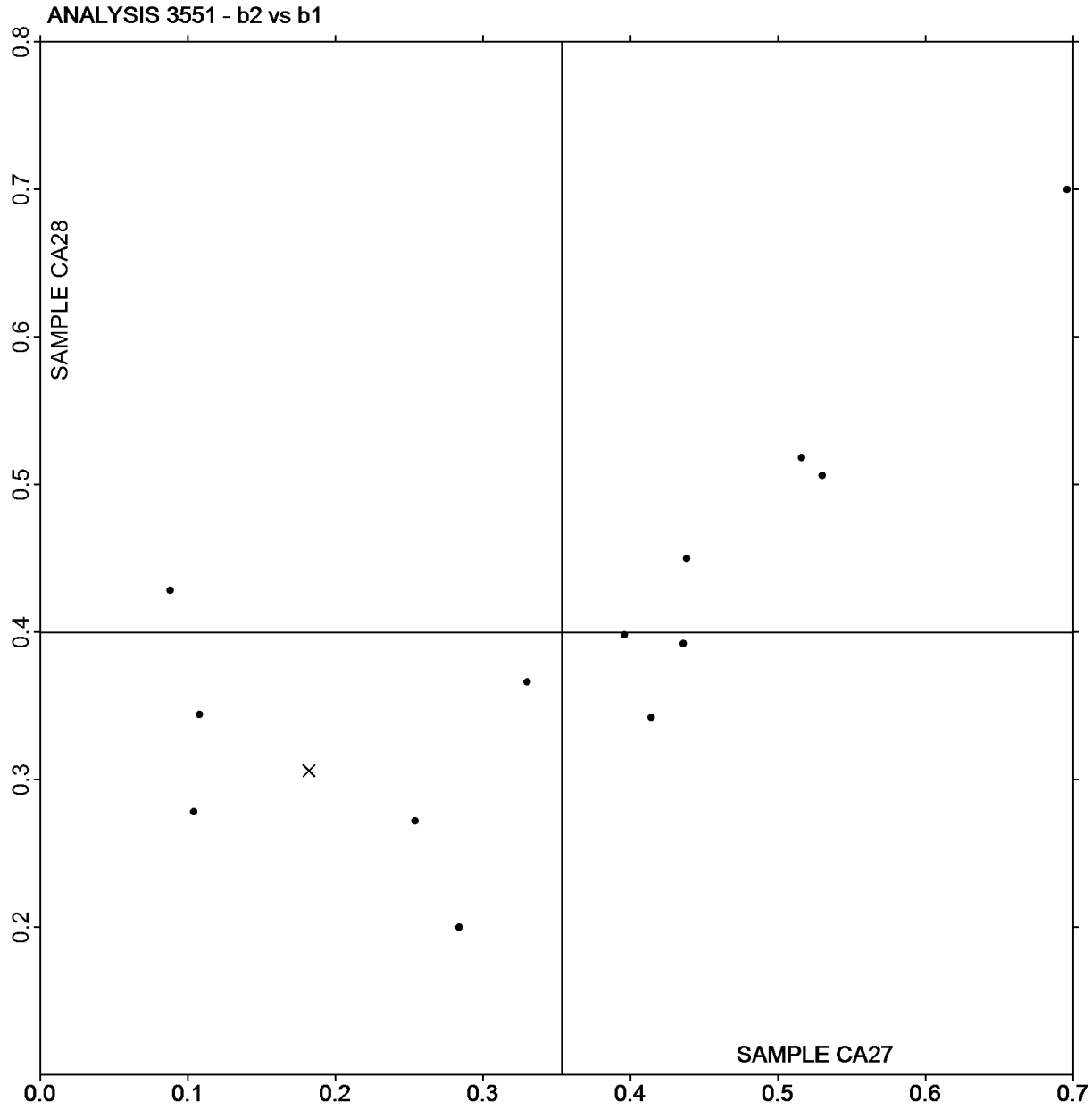
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA28 vs a values CA27



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 CA28 vs b values CA27



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 #4292, April 2024

Analysis 3553

Specular Gloss at 75 Degrees - High Range

TAPPI Official Test Method T480

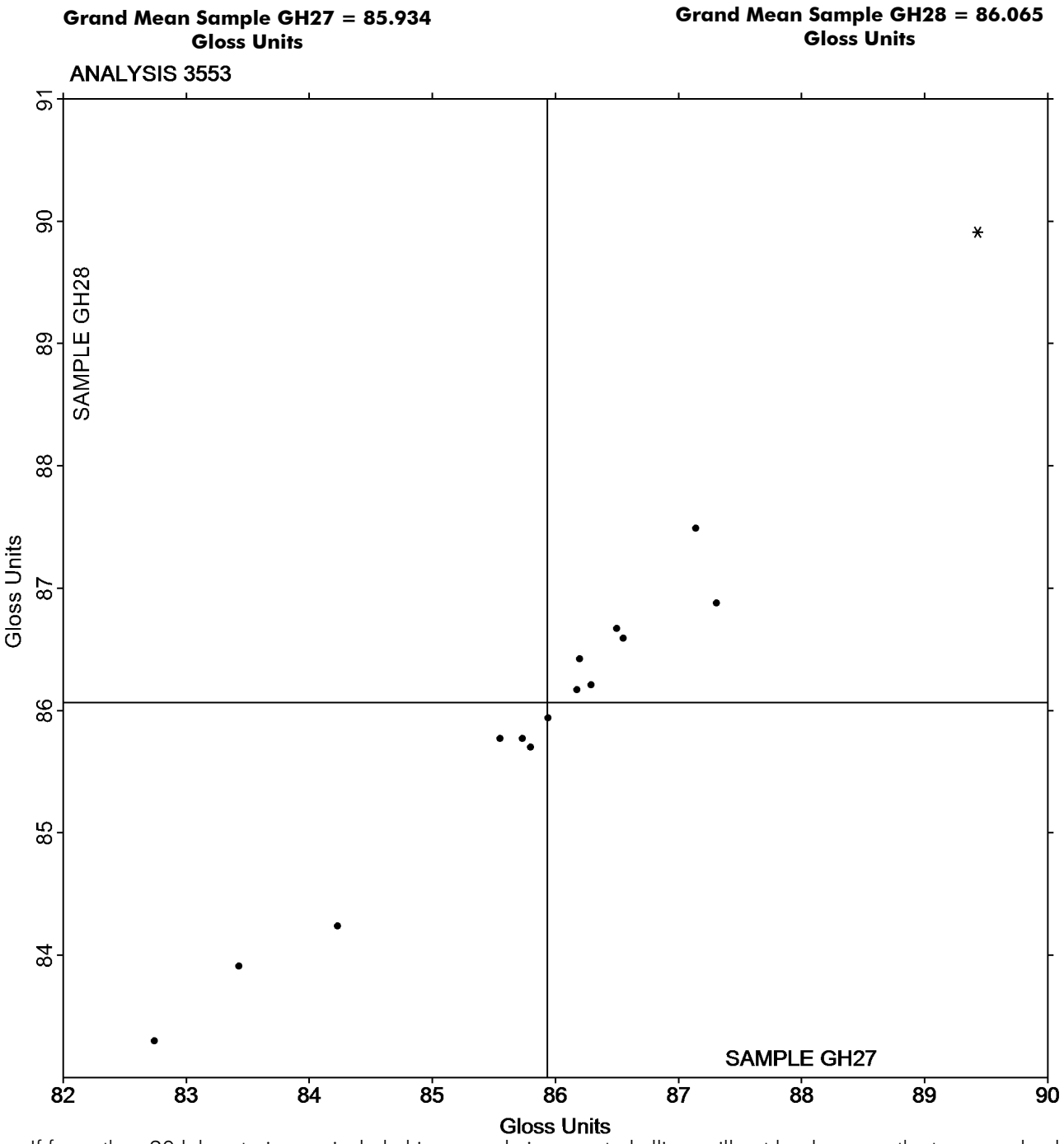
WebCode	Data Flag	Sample GH27 Lab Mean	Sample GH27 Diff from Grand Mean	Sample GH27 CPV	Sample GH28 Lab Mean	Sample GH28 Diff from Grand Mean	Sample GH28 CPV	Instr Code
2PXTBC		85.94	0.01	0.00	85.94	-0.12	-0.08	TP
8AHZM8		85.73	-0.20	-0.13	85.77	-0.29	-0.19	LF
8XVPJB		86.18	0.24	0.15	86.17	0.11	0.07	PP
A9MR2A		86.29	0.36	0.22	86.21	0.15	0.09	LG
AHRYGA		86.20	0.26	0.16	86.42	0.36	0.23	GM
EHBLU8		83.43	-2.50	-1.56	83.91	-2.15	-1.38	TA
HJXY9V		87.14	1.21	0.75	87.49	1.43	0.91	LW
JV8AXW		87.31	1.38	0.86	86.88	0.82	0.52	VM
LX4PCX		85.80	-0.13	-0.08	85.70	-0.36	-0.23	LA
MKZERW		86.55	0.62	0.38	86.59	0.53	0.34	PT
NVAH8R	*	89.43	3.50	2.18	89.91	3.85	2.46	LF
PQEYPT		86.50	0.57	0.35	86.67	0.61	0.39	TH
UZLCPJ		85.55	-0.38	-0.24	85.77	-0.29	-0.19	PP
WKJLLH		82.74	-3.19	-1.99	83.30	-2.76	-1.77	GA
WZCGVN		84.23	-1.70	-1.06	84.24	-1.82	-1.17	GM

Summary Statistics	Sample GH27	Sample GH28
Grand Means	85.93 Gloss Units	86.06 Gloss Units
Stnd Dev Btwn Labs	1.61 Gloss Units	1.56 Gloss Units

Statistics based on 15 of 15 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	PT	PTA Line Gloss Meter
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

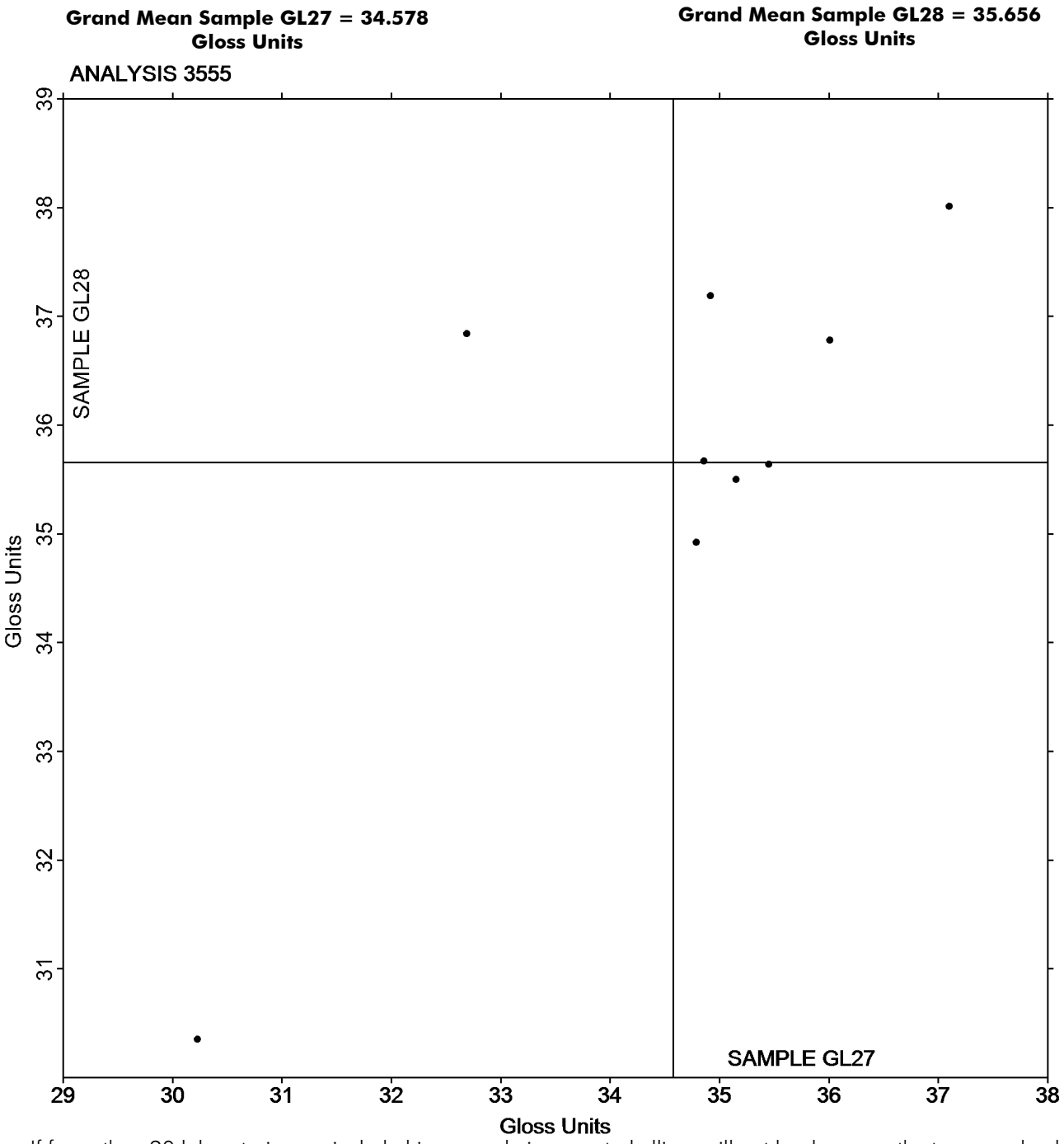
WebCode	Data Flag	Sample GL27 Lab Mean	Sample GL27 Diff from Grand Mean	Sample GL27 CPV	Sample GL28 Lab Mean	Sample GL28 Diff from Grand Mean	Sample GL28 CPV	Instr Code
33Z27Z		35.45	0.87	0.43	35.64	-0.02	-0.01	GS
3J8QRD		34.86	0.28	0.14	35.67	0.01	0.01	TH
A68KDA		34.79	0.21	0.11	34.92	-0.74	-0.33	TH
CXX6J4		36.01	1.43	0.71	36.78	1.12	0.51	TP
EHBLU8		30.23	-4.35	-2.17	30.35	-5.31	-2.39	TA
FKWP26		35.15	0.57	0.29	35.50	-0.16	-0.07	GM
HJXY9V		34.92	0.34	0.17	37.19	1.53	0.69	LW
HMXB6V		32.69	-1.89	-0.94	36.84	1.18	0.53	WJ
XAW8VK		37.10	2.52	1.26	38.01	2.35	1.06	PP

Summary Statistics	Sample GL27	Sample GL28
Grand Means	34.58 Gloss Units	35.66 Gloss Units
Stnd Dev Btwn Labs	2.01 Gloss Units	2.22 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

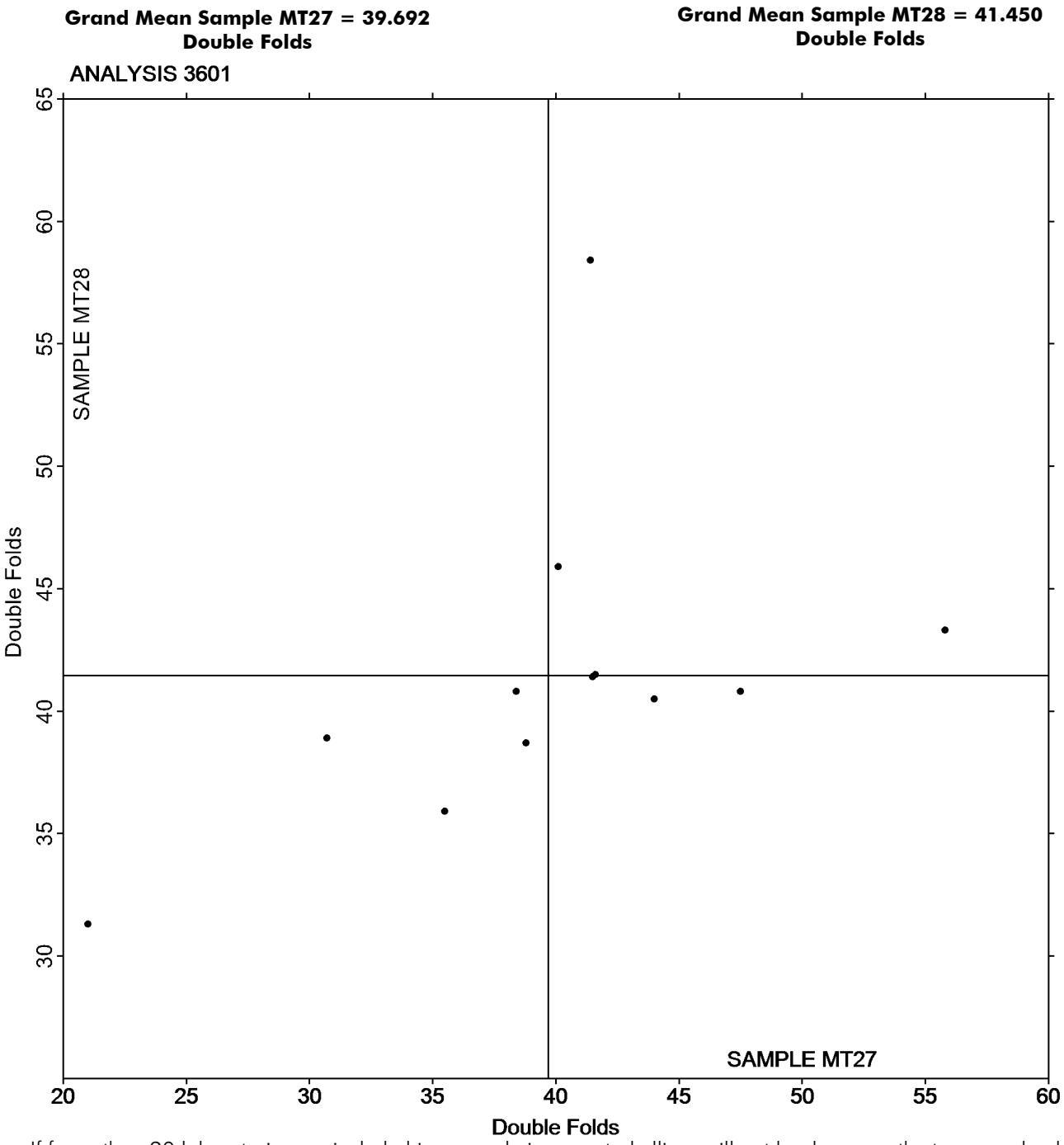
WebCode	Data Flag	Sample MT27 Lab Mean	Sample MT27 Diff from Grand Mean	Sample MT27 CPV	Sample MT28 Lab Mean	Sample MT28 Diff from Grand Mean	Sample MT28 CPV	Instr Code
3J8QRD		38.40	-1.29	-0.15	40.80	-0.65	-0.10	MT
6YT39C		44.00	4.31	0.51	40.50	-0.95	-0.15	MT
7BLYTB		41.40	1.71	0.20	58.40	16.95	2.62	XX
A68KDA		21.00	-18.69	-2.19	31.30	-10.15	-1.57	MT
CBHKM4		41.60	1.91	0.22	41.50	0.05	0.01	MT
HHH3GV		41.50	1.81	0.21	41.40	-0.05	-0.01	MT
JV8AXW		40.10	0.41	0.05	45.90	4.45	0.69	MT
PQEYPT		47.50	7.81	0.92	40.80	-0.65	-0.10	MT
QD4XKM		55.80	16.11	1.89	43.30	1.85	0.29	MT
V8F4BH		35.50	-4.19	-0.49	35.90	-5.55	-0.86	XX
WKJLLH		30.70	-8.99	-1.05	38.90	-2.55	-0.39	MT
YRDNMK		38.80	-0.89	-0.10	38.70	-2.75	-0.43	MT

Summary Statistics	Sample MT27	Sample MT28
Grand Means	39.69 Double Folds	41.45 Double Folds
Stnd Dev Btwn Labs	8.52 Double Folds	6.47 Double Folds

Statistics based on 12 of 12 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

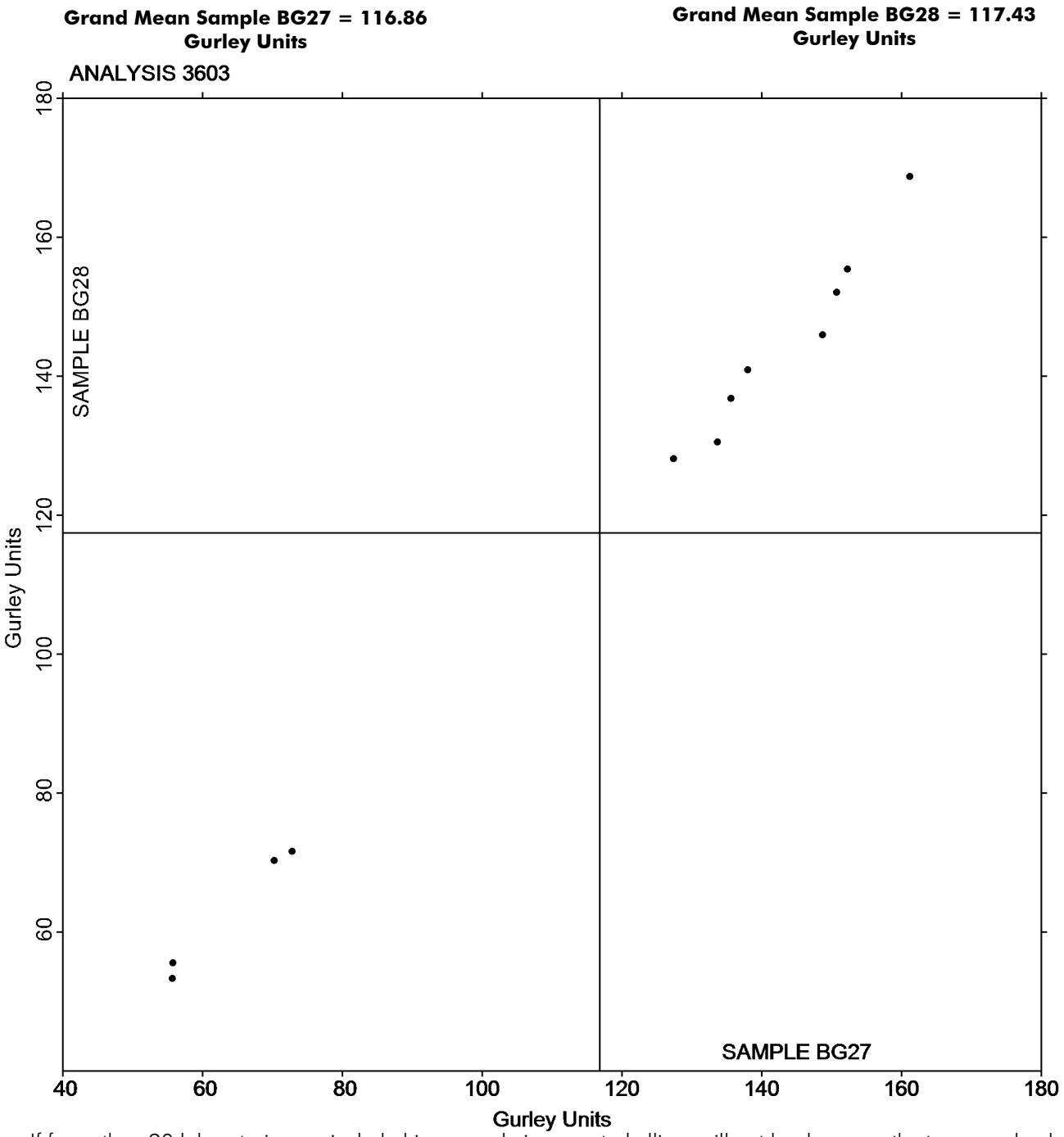
WebCode	Data Flag	Sample BG27 Lab Mean	Sample BG27 Diff from Grand Mean	Sample BG27 CPV	Sample BG28 Lab Mean	Sample BG28 Diff from Grand Mean	Sample BG28 CPV	Instr Code
3J8QRD		161.2	44.3	1.09	168.7	51.3	1.22	ZZ
4EBLBE		152.3	35.4	0.87	155.4	38.0	0.90	ZZ
A68KDA		55.7	-61.1	-1.50	53.3	-64.1	-1.52	ZZ
CEHWJ4		148.7	31.9	0.78	145.9	28.5	0.68	ZZ
FWVE4Z		150.7	33.9	0.83	152.1	34.6	0.82	ZZ
HHH3GV		127.4	10.6	0.26	128.1	10.7	0.25	ZZ
JV8AXW		70.3	-46.6	-1.15	70.3	-47.2	-1.12	ZZ
QX9QBT		55.8	-61.0	-1.50	55.5	-61.9	-1.47	ZZ
R8TGAP		72.8	-44.1	-1.08	71.6	-45.8	-1.09	ZZ
UMDTQP		133.6	16.8	0.41	130.5	13.1	0.31	ZZ
YRDNMK		135.6	18.8	0.46	136.8	19.3	0.46	ZZ
ZKQZJ3		138.1	21.2	0.52	140.9	23.5	0.56	ZZ

Summary Statistics	Sample BG27	Sample BG28
Grand Means	116.86 Gurley Units	117.43 Gurley Units
Stnd Dev Btwn Labs	40.62 Gurley Units	42.17 Gurley Units

Statistics based on 12 of 12 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 CF27 Lab Mean	Sample CF27 Diff from Grand Mean	Sample CF27 CPV	Sample CF28 Lab Mean	Sample CF28 Diff from Grand Mean	Sample CF28 CPV	Instr Code
CBHKM4		0.6604	0.0305	0.47	0.6390	0.0106	0.13	TM
CXX6J4		0.6716	0.0417	0.64	0.6772	0.0488	0.59	TA
DWWE69		0.6026	-0.0273	-0.42	0.6012	-0.0272	-0.33	TA
FWVE4Z		0.5700	-0.0599	-0.92	0.6100	-0.0184	-0.22	TA
H6H24U		0.5654	-0.0645	-0.99	0.4628	-0.1656	-2.00	XX
HBPHLV		0.6072	-0.0227	-0.35	0.6824	0.0540	0.65	TA
HHH3GV		0.7424	0.1125	1.73	0.7686	0.1402	1.69	TA
QX9QBT		0.5552	-0.0747	-1.14	0.5906	-0.0378	-0.46	TX
V3JC48	X	50.2000	49.5701	760.11	48.4000	47.7716	576.06	TA
ZKQZJ3		0.6940	0.0641	0.98	0.6240	-0.0044	-0.05	TP

Summary Statistics	Sample CF27	Sample CF28
Grand Means	0.63 COF	0.63 COF
Stnd Dev Btwn Labs	0.07 COF	0.08 COF

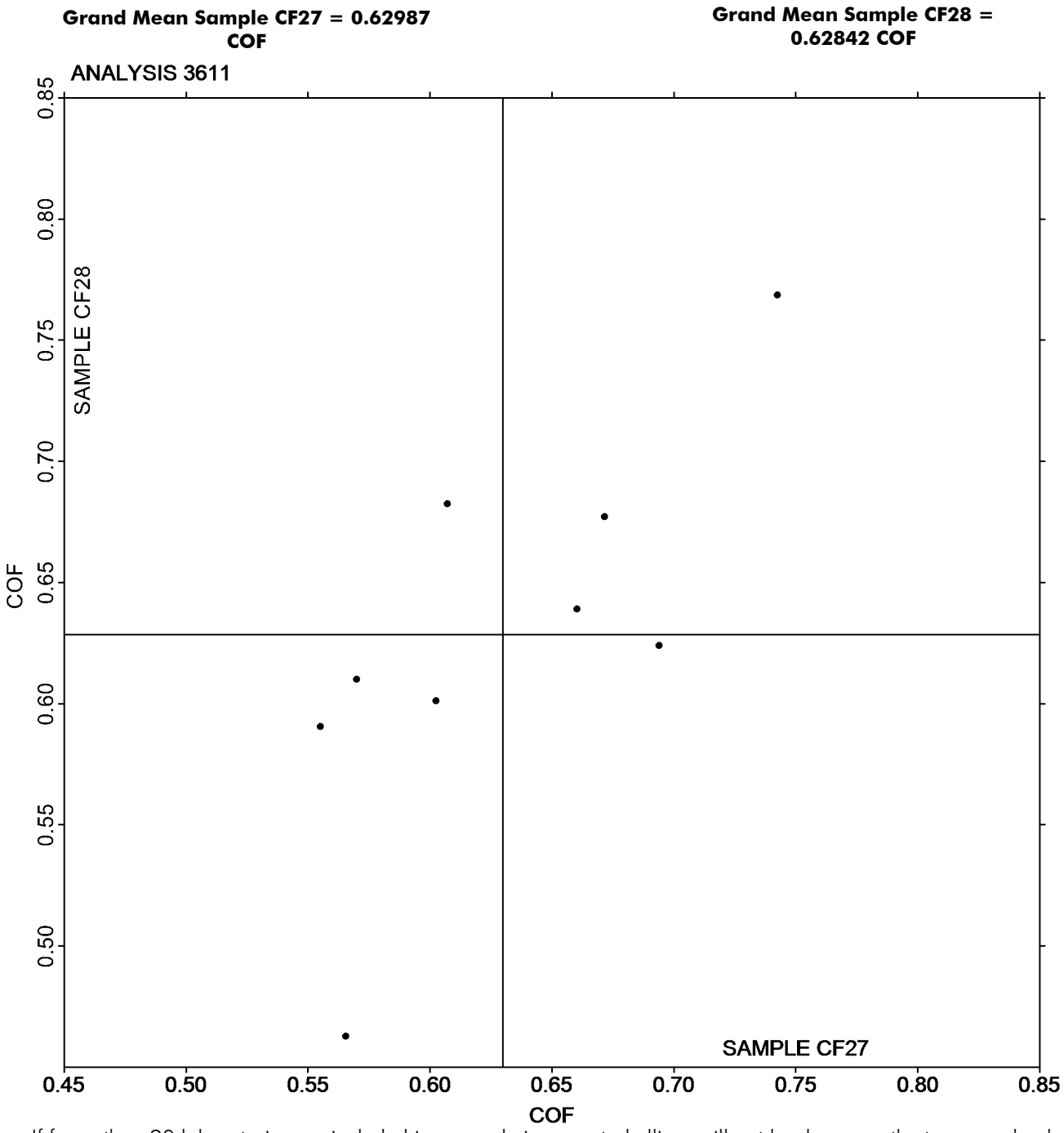
Statistics based on 9 of 10 reporting participants.

Comments on Assigned Data Flags for Test #3611

V3JC48 (X) - Extreme Data.

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 CF27 Lab Mean	Sample CF27 Diff from Grand Mean	Sample CF27 CPV	Sample CF28 Lab Mean	Sample CF28 Diff from Grand Mean	Sample CF28 CPV	Instr Code
CBHKM4		0.5608	0.0189	0.52	0.5126	-0.0187	-0.29	TM
CXX6J4		0.5730	0.0311	0.85	0.5196	-0.0117	-0.18	TA
DWWE69		0.5312	-0.0107	-0.29	0.5378	0.0065	0.10	TA
FWVE4Z		0.5200	-0.0219	-0.60	0.5460	0.0147	0.23	TA
H6H24U		0.4984	-0.0435	-1.19	0.4102	-0.1211	-1.87	XX
HBPHLV		0.5222	-0.0197	-0.54	0.5956	0.0643	1.00	TA
HHH3GV		0.6100	0.0681	1.87	0.6256	0.0943	1.46	TA
QX9QBT		0.5198	-0.0221	-0.61	0.5028	-0.0285	-0.44	TX
V3JC48	X	44.6000	44.0581	1,207.13	42.4000	41.8687	647.71	TA

Summary Statistics	Sample CF27	Sample CF28
Grand Means	0.54 COF	0.53 COF
Stnd Dev Btwn Labs	0.04 COF	0.06 COF

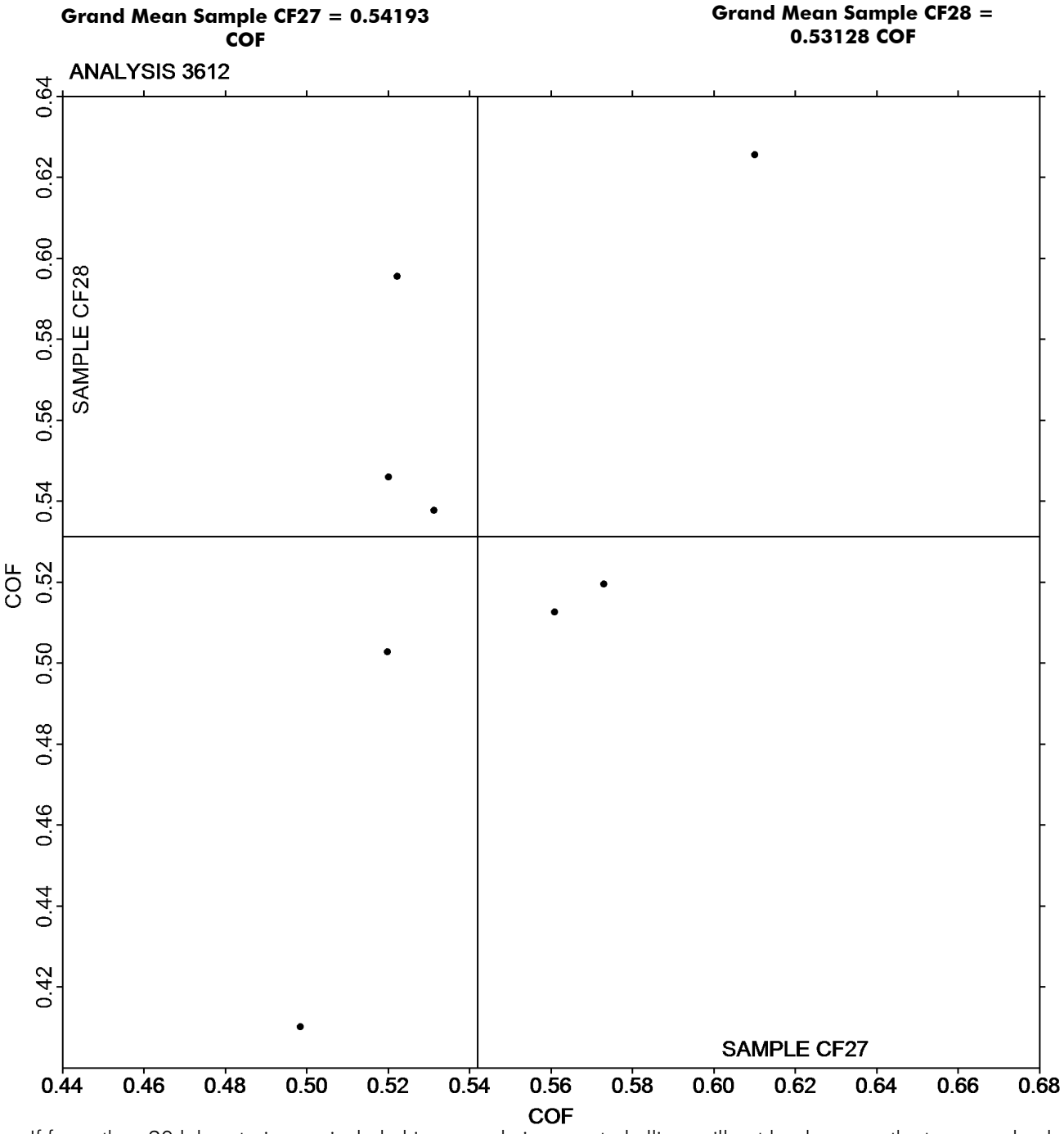
Statistics based on 8 of 9 reporting participants.

Comments on Assigned Data Flags for Test #3612

V3JC48 (X) - Extreme Data.

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

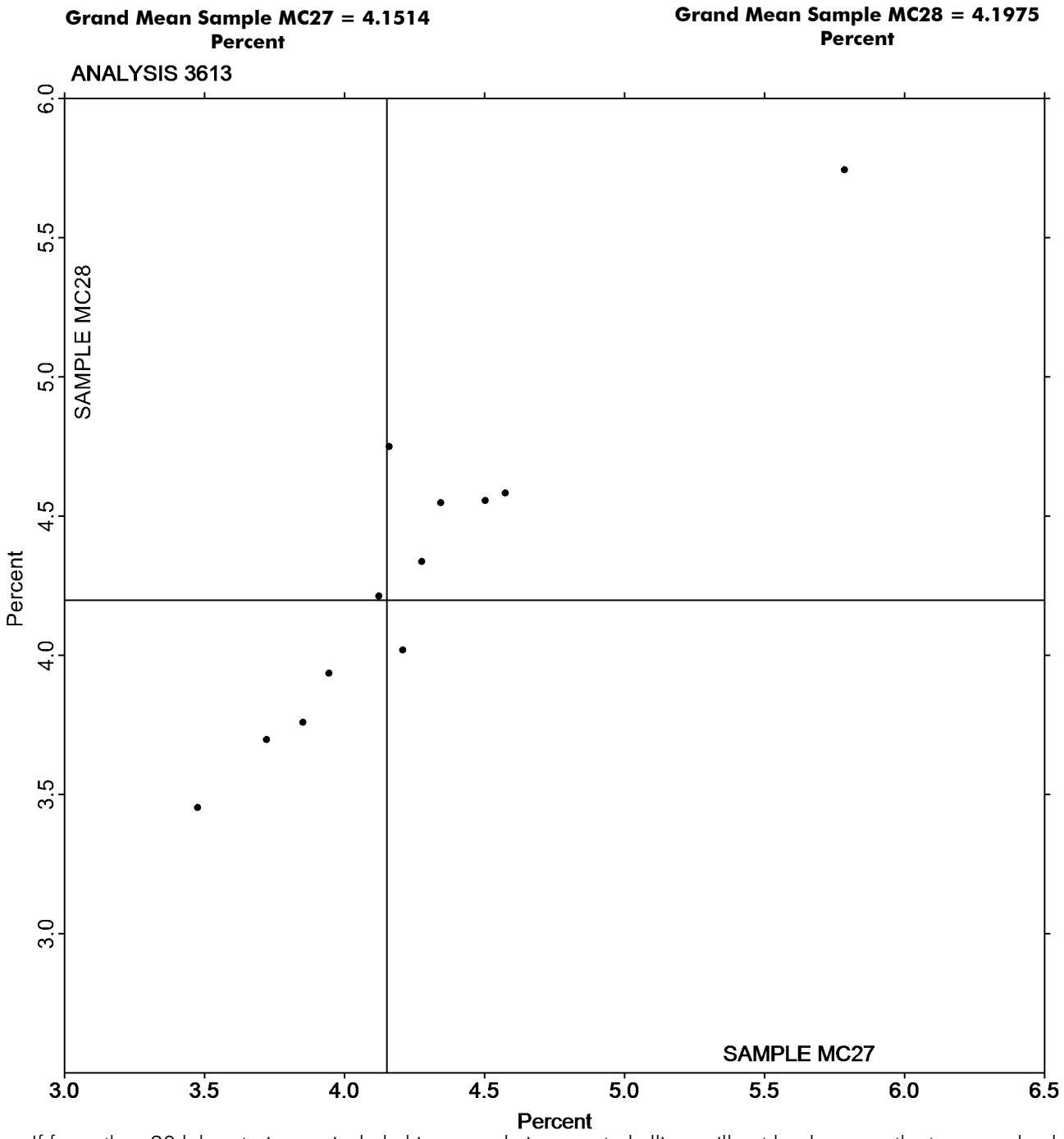
WebCode	Data Flag	Sample MC27 Lab Mean	Sample MC27 Diff from Grand Mean	Sample MC27 CPV	Sample MC28 Lab Mean	Sample MC28 Diff from Grand Mean	Sample MC28 CPV	Instr Code
9MMJY8		3.852	-0.299	-0.46	3.758	-0.439	-0.64	ZZ
DAN2DP		3.945	-0.206	-0.32	3.935	-0.262	-0.38	ZZ
FWVE4Z		4.344	0.192	0.29	4.548	0.350	0.51	ZZ
HMXB6V		3.723	-0.429	-0.66	3.698	-0.500	-0.73	ZZ
JMQHPJ		3.476	-0.675	-1.03	3.452	-0.745	-1.08	ZZ
KPTZ2K		4.123	-0.028	-0.04	4.213	0.016	0.02	ZZ
PQCDTD		4.160	0.009	0.01	4.750	0.553	0.80	ZZ
PY3YWQ		3.000	-1.151	-1.76	2.980	-1.217	-1.77	ZZ
R7ZB7T		4.575	0.424	0.65	4.582	0.385	0.56	ZZ
VAJYUL		4.207	0.056	0.09	4.018	-0.180	-0.26	ZZ
VFCU2K		4.502	0.351	0.54	4.556	0.359	0.52	ZZ
YRDNMK		5.785	1.634	2.50	5.743	1.545	2.24	ZZ
YRWGEH		4.276	0.125	0.19	4.336	0.139	0.20	ZZ

Summary Statistics	Sample MC27	Sample MC28
Grand Means	4.15 Percent	4.20 Percent
Stnd Dev Btwn Labs	0.65 Percent	0.69 Percent

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

WebCode	Data Flag	Sample HS27 Lab Mean	Sample HS27 Diff from Grand Mean	Sample HS27 CPV	Sample HS28 Lab Mean	Sample HS28 Diff from Grand Mean	Sample HS28 CPV	Instr Code
4EBLBE		97.51	26.89	0.93	96.08	28.09	0.97	HE
64NW7D		101.18	30.56	1.06	113.49	45.50	1.57	HE
6YT39C		105.70	35.08	1.22	102.10	34.11	1.17	HE
7BK9EF		87.65	17.03	0.59	86.23	18.24	0.63	XX
8AHZM8		84.51	13.89	0.48	83.54	15.55	0.54	HE
9TUZF9		47.73	-22.89	-0.79	50.29	-17.70	-0.61	HE
C2DMT9		79.00	8.38	0.29	81.50	13.51	0.46	HE
CEHWJ4	*	111.06	40.44	1.40	90.83	22.84	0.79	XX
CXX6J4		90.42	19.80	0.69	96.98	28.99	1.00	HE
FDW4CQ		51.08	-19.54	-0.68	43.53	-24.46	-0.84	HE
FKWP26		111.20	40.58	1.41	113.30	45.31	1.56	HE
FWVE4Z		72.94	2.32	0.08	65.60	-2.39	-0.08	HE
HBPHLV		15.67	-54.95	-1.91	16.53	-51.46	-1.77	HE
JV8AXW		20.97	-49.65	-1.72	20.48	-47.51	-1.63	HE
LVZTTV		87.60	16.98	0.59	74.90	6.91	0.24	HE
MADF2R		63.56	-7.06	-0.24	61.21	-6.78	-0.23	XX
MKZERW		22.80	-47.82	-1.66	22.90	-45.09	-1.55	HE
QX9QBT		32.49	-38.13	-1.32	29.40	-38.59	-1.33	HE
R8TGAP		55.10	-15.52	-0.54	46.10	-21.89	-0.75	HE
UJF3TQ		47.30	-23.32	-0.81	44.00	-23.99	-0.83	HE
UMDTQP		90.39	19.77	0.69	89.92	21.93	0.75	HE
V3JC48		86.21	15.59	0.54	80.19	12.20	0.42	HE
WY44G8		70.60	-0.02	0.00	64.33	-3.65	-0.13	HE
ZKQZJ3		62.10	-8.52	-0.30	58.28	-9.71	-0.33	HE

Summary Statistics	Sample HS27	Sample HS28
Grand Means	70.62 Seconds	67.99 Seconds
Stnd Dev Btwn Labs	28.80 Seconds	29.06 Seconds

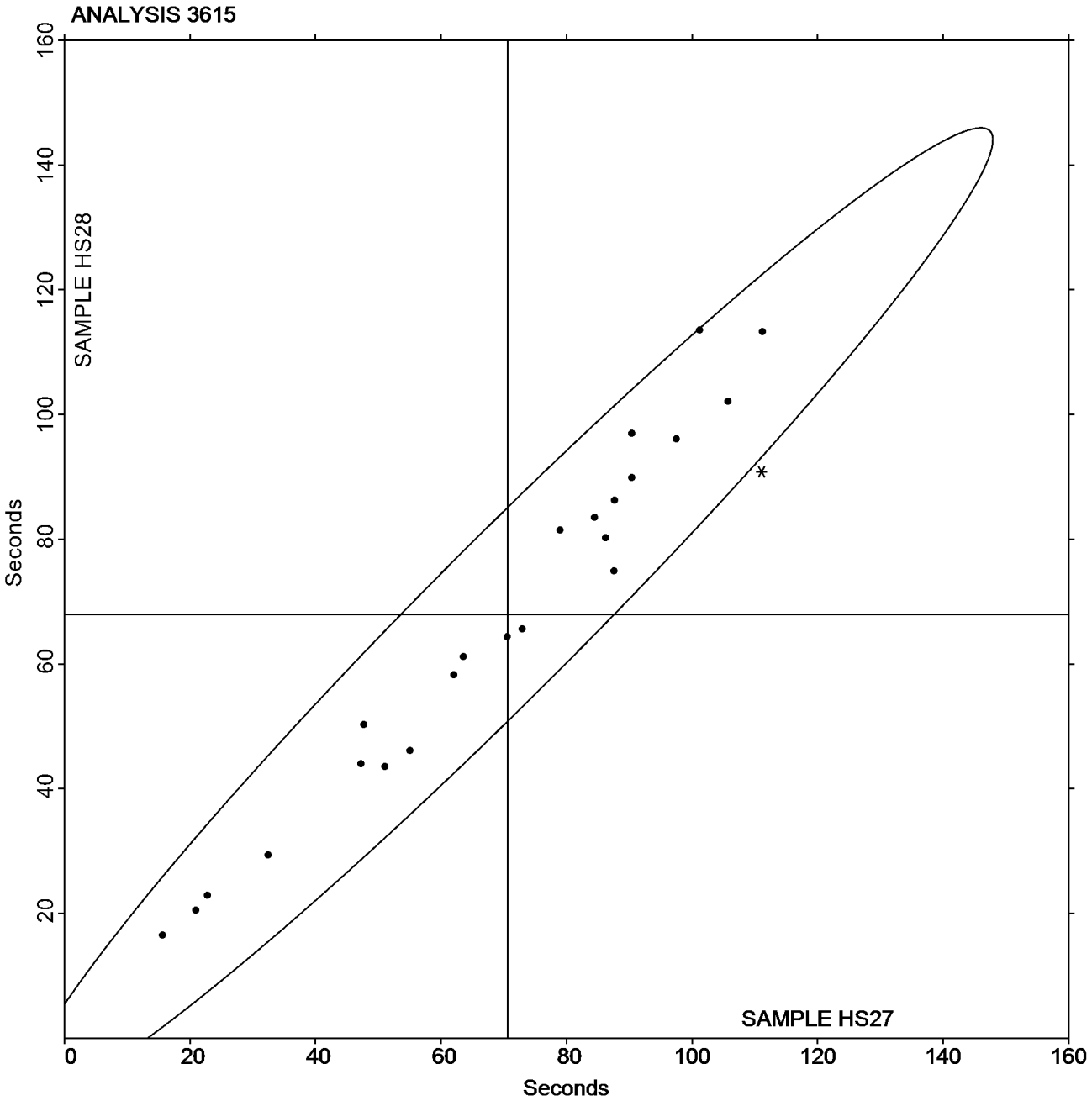
Statistics based on 24 of 24 reporting participants.

Key to Instrument Codes Reported by Participants

HE	Hercules Sizing Tester	XX	Instrument make/model not specified by lab

Grand Mean Sample HS27 = 70.615 Seconds

Grand Mean Sample HS28 = 67.988 Seconds



-End of Report-