Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #4242 - June 2023

Introduction to the Paper & Paperboard Interlaboratory Program

Explanation of Tables and Definitions of Terms

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

The CTS Paper & Paperboard Interlaboratory Program

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

About CTS

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

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

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

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

Key for Web Summary Reports (Page 1 of 2)

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

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

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

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

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

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

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

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

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

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

Common Problems Highlighted in Footnotes

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

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

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

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

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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3501

Thickness (Caliper), Packaging papers

TAPPI Official Test Method T411

WebCode	Data Flag	Sample CK17 Lab Mean	Sample CK17 Diff from Grand Mean	Sample CK17 CPV	Sample CK18 Lab Mean	Sample CK18 Diff from Grand Mean	Sample CK18 CPV	Instr Code
3MN773		7.674	-0.016	-0.20	9.394	-0.124	-1.16	EM
3VXVLM		7.718	0.028	0.33	9.459	-0.059	-0.56	LB
489LKF		7.665	-0.025	-0.31	9.488	-0.030	-0.28	TA
6JK66W		7.764	0.074	0.89	9.632	0.114	1.07	LW
8LXTDX		7.727	0.037	0.44	9.491	-0.027	-0.26	LW
8MC68W		7.721	0.031	0.37	9.513	-0.005	-0.05	LW
8R4M8U		7.667	-0.023	-0.28	9.479	-0.039	-0.37	LW
AT84BH		7.496	-0.194	-2.35	9.294	-0.224	-2.10	XX
B3TFCM		7.702	0.012	0.14	9.691	0.173	1.62	EM
BQKKAK		7.831	0.141	1.70	9.765	0.247	2.31	EM
CN8AUR		7.693	0.002	0.03	9.488	-0.030	-0.28	LW
DG96FG	X	7.332	-0.358	-4.33	9.201	-0.317	-2.97	EM
DJBZ4Q		7.729	0.039	0.47	9.510	-0.008	-0.08	LC
E4VEYQ		7.575	-0.116	-1.40	9.520	0.001	0.01	LC
FYDNXN		7.652	-0.038	-0.47	9.402	-0.116	-1.09	LA
G3U9NB		7.762	0.072	0.87	9.558	0.040	0.37	LW
GX3WTE		7.579	-0.111	-1.35	9.353	-0.165	-1.55	XX
HRR62R		7.578	-0.112	-1.36	9.517	-0.001	-0.01	OK
JEZ6JN		7.776	0.086	1.03	9.624	0.106	0.99	PP
MPQT62		7.597	-0.093	-1.13	9.470	-0.048	-0.45	EM
MW6LEC		7.750	0.060	0.72	9.540	0.022	0.20	LW
MXV39K		7.814	0.124	1.49	9.700	0.182	1.70	PP
QJ76W2		7.772	0.082	0.99	9.602	0.083	0.78	LW
RLPJZ2		7.697	0.007	0.08	9.533	0.015	0.14	TA
TWL2VZ		7.630	-0.060	-0.73	9.360	-0.158	-1.48	XX
U8MNKC		7.613	-0.077	-0.94	9.422	-0.096	-0.90	XX
VM9U6B		7.580	-0.110	-1.33	9.520	0.002	0.02	XX
XZ7MMX		7.745	0.055	0.66	9.566	0.048	0.45	EM
YL9UJ9		7.743	0.053	0.63	9.553	0.035	0.33	XX
YRVFQU		7.809	0.118	1.43	9.643	0.125	1.17	XX
Z86LJ6		7.655	-0.035	-0.43	9.461	-0.057	-0.54	XX

Summary Statistics	Sample CK17	Sample CK18
Grand Means	7.69 mils	9.52 mils
Stnd Dev Btwn Labs	0.08 mils	0.11 mils

Statistics based on 30 of 31 reporting participants.

Comments on Assigned Data Flags for Test #3501

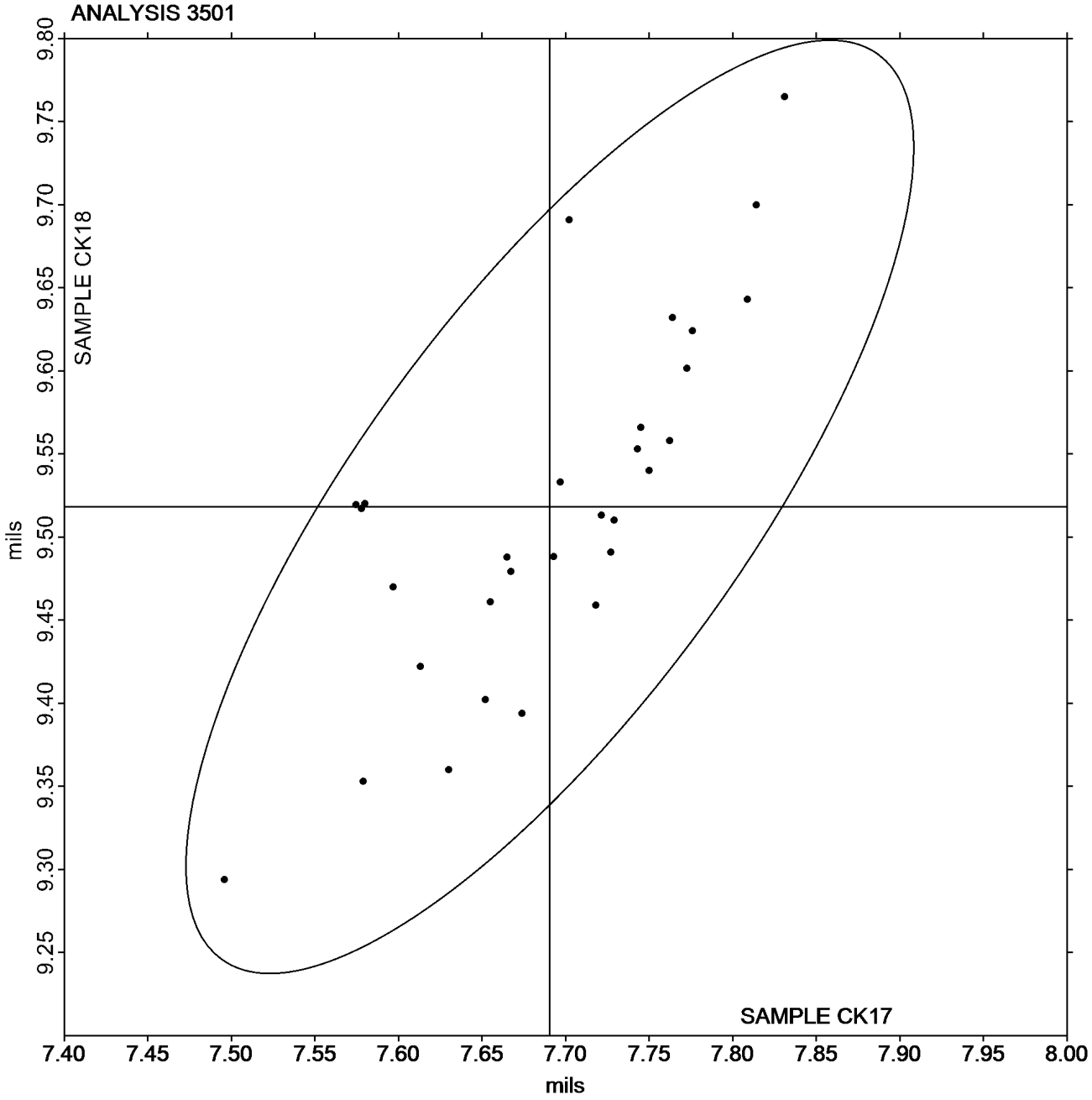
DG96FG (X) - Data for both samples are low.

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	OK	Oakland
PP	Technidyne Profile/Plus	TA	Thwing-Albert
XX	Instrument make/model not specified by lab		

Grand Mean Sample CK17 = 7.6905 mils

Grand Mean Sample CK18 = 9.5182 mils



Paper & Paperboard Interlaboratory Testing Program

Analysis 3511

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

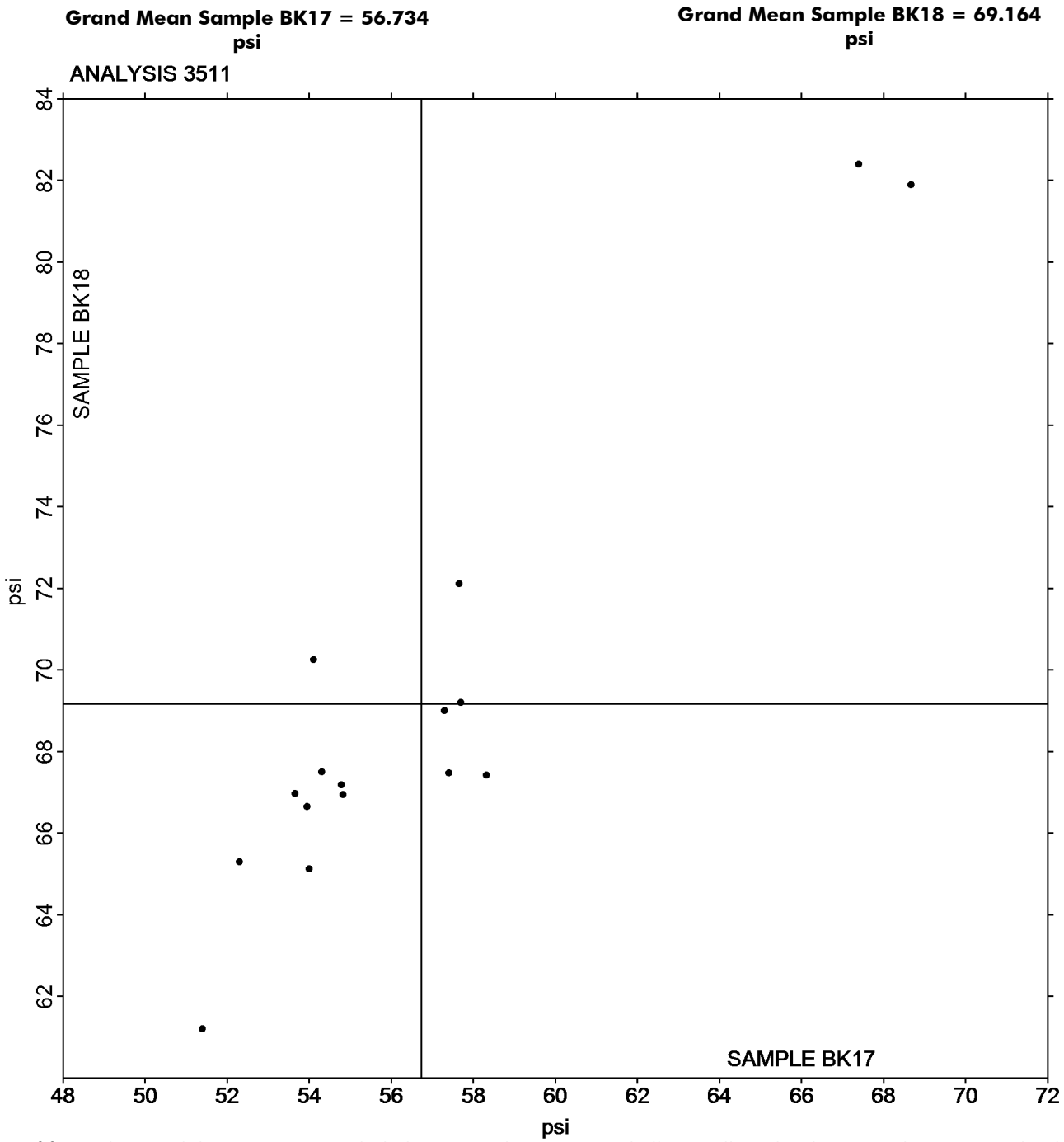
WebCode	Data Flag	Sample BK17 Lab Mean	Sample BK17 Diff from Grand Mean	Sample BK17 CPV	Sample BK18 Lab Mean	Sample BK18 Diff from Grand Mean	Sample BK18 CPV	Instr Code
489LKF		54.10	-2.63	-0.54	70.25	1.09	0.19	ZZ
8R4M8U		54.78	-1.95	-0.40	67.18	-1.98	-0.35	ZZ
AGWC8H		57.70	0.97	0.20	69.20	0.04	0.01	ZZ
CN8AUR		57.65	0.92	0.19	72.11	2.95	0.53	ZZ
G3U9NB		54.30	-2.43	-0.50	67.50	-1.66	-0.30	ZZ
HRR62R		57.30	0.57	0.12	69.00	-0.16	-0.03	ZZ
KDJ9RP		54.00	-2.74	-0.56	65.12	-4.04	-0.72	ZZ
M3BDPV		57.40	0.67	0.14	67.47	-1.69	-0.30	ZZ
MW6LEC		52.30	-4.43	-0.91	65.30	-3.86	-0.69	ZZ
QEZB6Q		51.40	-5.33	-1.10	61.20	-7.96	-1.42	ZZ
QJ76W2		58.32	1.58	0.33	67.42	-1.74	-0.31	ZZ
R8QGJU		53.95	-2.78	-0.57	66.65	-2.51	-0.45	ZZ
UABZJH		54.82	-1.91	-0.39	66.95	-2.21	-0.40	ZZ
UY6FWF		68.68	11.94	2.46	81.90	12.73	2.27	ZZ
YRVFQU		53.65	-3.08	-0.63	66.96	-2.20	-0.39	ZZ
ZZ2NML		67.40	10.67	2.19	82.40	13.24	2.36	ZZ

Summary Statistics	Sample BK17	Sample BK18
Grand Means	56.73 psi	69.16 psi
Stnd Dev Btwn Labs	4.86 psi	5.60 psi

Statistics based on 16 of 16 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 RK17 Lab Mean	Sample RK17 Diff from Grand Mean	Sample RK17 CPV	Sample RK18 Lab Mean	Sample RK18 Diff from Grand Mean	Sample RK18 CPV	Instr Code
44B4MN		101.21	1.56	0.18	132.3	-4.6	-0.32	ZZ
6JK66W		95.60	-4.05	-0.46	132.6	-4.4	-0.31	ZZ
8MC68W		94.51	-5.14	-0.59	129.5	-7.5	-0.52	ZZ
8R4M8U		99.67	0.02	0.00	132.8	-4.1	-0.29	ZZ
9JRHZV		97.54	-2.11	-0.24	133.2	-3.8	-0.26	ZZ
B3TFCM		93.95	-5.70	-0.65	124.6	-12.3	-0.86	ZZ
BQKKAK		103.70	4.05	0.46	141.3	4.4	0.31	ZZ
E4VEYQ		95.20	-4.45	-0.51	141.5	4.5	0.32	ZZ
FEAUGJ		113.23	13.58	1.55	155.8	18.9	1.32	ZZ
FJ6PXX		91.84	-7.81	-0.89	118.2	-18.7	-1.31	ZZ
FYDNXN		93.10	-6.55	-0.75	131.9	-5.0	-0.35	ZZ
G3U9NB		107.71	8.06	0.92	139.1	2.2	0.15	ZZ
GP8WEL		85.60	-14.05	-1.61	127.6	-9.3	-0.65	ZZ
GX3WTE		90.20	-9.45	-1.08	115.4	-21.5	-1.50	ZZ
HCFWWH		107.48	7.83	0.90	153.8	16.9	1.18	ZZ
HRR62R		102.00	2.35	0.27	137.1	0.2	0.01	ZZ
JTYANF		79.80	-19.85	-2.27	110.3	-26.7	-1.86	ZZ
M3BDPV		116.00	16.35	1.87	156.0	19.1	1.33	ZZ
MPQT62	*	101.10	1.45	0.17	117.4	-19.6	-1.37	ZZ
MW6LEC	X	26.90	-72.75	-8.32	30.3	-106.6	-7.45	ZZ
PQQXGD		103.30	3.65	0.42	139.1	2.2	0.15	ZZ
QEZB6Q		107.70	8.05	0.92	143.0	6.1	0.43	ZZ
QJ76W2		102.96	3.31	0.38	134.6	-2.3	-0.16	ZZ
RLPJZ2		98.60	-1.05	-0.12	135.2	-1.7	-0.12	ZZ
TN83E4		103.47	3.82	0.44	148.5	11.6	0.81	ZZ
TWL2VZ		101.20	1.55	0.18	156.4	19.5	1.36	ZZ
XQKE93		94.90	-4.75	-0.54	139.0	2.0	0.14	ZZ
XZ7MMX		84.86	-14.79	-1.69	119.9	-17.0	-1.19	ZZ
YL9UJ9		114.51	14.86	1.70	173.0	36.0	2.52	ZZ
YRVFQU		108.88	9.23	1.05	152.0	15.1	1.05	ZZ

Summary Statistics	Sample RK17	Sample RK18
Grand Means	99.65 Grams	136.93 Grams
Stnd Dev Btwn Labs	8.75 Grams	14.30 Grams

Statistics based on 29 of 30 reporting participants.

Comments on Assigned Data Flags for Test #3513

MW6LEC (X) - Extreme Data.

Analysis Notes:

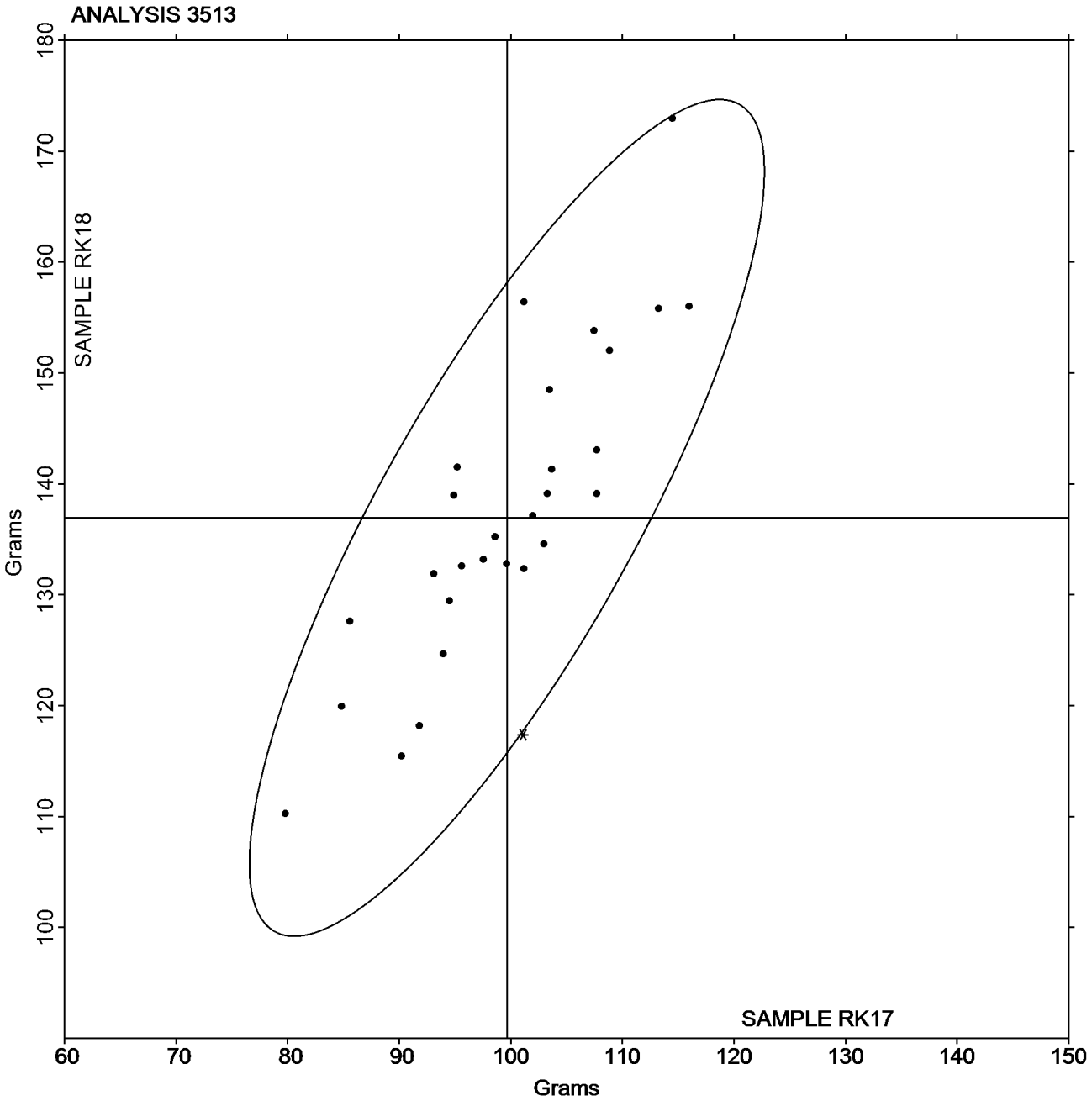
FJ6PXX - Data appear to be reported as mN, not gf as indicated on data entry form. CTS will not correct the Units going forward.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample RK17 = 99.649 Grams

Grand Mean Sample RK18 = 136.93 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK17 Lab Mean	Sample NK17 Diff from Grand Mean	Sample NK17 CPV	Sample NK18 Lab Mean	Sample NK18 Diff from Grand Mean	Sample NK18 CPV	Instr Code
3DHCXV		8.656	-0.658	-1.36	10.46	-0.65	-1.13	TS
44B4MN		8.853	-0.461	-0.95	10.81	-0.30	-0.52	LH
489LKF		9.133	-0.181	-0.37	10.50	-0.61	-1.06	TO
6JK66W		9.253	-0.060	-0.12	11.31	0.20	0.34	LW
8LXTDX		9.366	0.052	0.11	11.02	-0.09	-0.15	TH
8MC68W		9.620	0.306	0.63	11.53	0.42	0.73	LE
8R4M8U		9.607	0.293	0.60	11.38	0.27	0.47	LH
9JRHZV		9.220	-0.093	-0.19	11.40	0.28	0.49	LE
AT84BH	X	0.320	-8.994	-18.53	0.34	-10.77	-18.70	TB
B3TFCM		9.805	0.492	1.01	11.58	0.47	0.82	TO
CD8URU		8.750	-0.564	-1.16	10.37	-0.74	-1.29	IR
DG96FG		9.881	0.568	1.17	11.56	0.45	0.78	LE
DJBZ4Q	X	12.353	3.039	6.26	14.62	3.51	6.09	LB
E4VEYQ		8.783	-0.530	-1.09	10.37	-0.74	-1.28	IF
EV2A6P		8.765	-0.549	-1.13	10.55	-0.56	-0.98	XX
FEAUGJ		9.003	-0.310	-0.64	11.16	0.05	0.08	TR
FJ6PXX		10.058	0.745	1.53	12.02	0.91	1.58	LW
FYDNXN		9.274	-0.039	-0.08	11.26	0.15	0.26	LA
FZQ9TJ		8.877	-0.436	-0.90	10.61	-0.50	-0.87	DM
G3U9NB		10.028	0.714	1.47	12.03	0.92	1.60	TX
G6X2KU		9.299	-0.014	-0.03	11.27	0.16	0.27	TH
GP8WEL		9.044	-0.269	-0.56	10.77	-0.34	-0.59	TX
KDJ9RP		9.788	0.475	0.98	11.76	0.65	1.13	LW
LMKB9R		9.818	0.505	1.04	11.64	0.52	0.91	LA
M3BDPV		8.923	-0.391	-0.81	10.91	-0.20	-0.35	XX
MW6LEC		9.812	0.499	1.03	11.85	0.74	1.28	LX
PQQXGD		8.879	-0.435	-0.90	10.53	-0.58	-1.01	LE
QEZB6Q		8.685	-0.629	-1.30	10.47	-0.64	-1.11	LE
QJ76W2		9.031	-0.282	-0.58	10.91	-0.20	-0.35	LE
RLPJZ2		9.268	-0.046	-0.09	10.94	-0.17	-0.30	TB
TN83E4		10.322	1.009	2.08	12.05	0.94	1.63	LA
TWL2VZ	X	10.144	0.831	1.71	12.85	1.73	3.01	XX
UY6FWF		9.881	0.568	1.17	11.98	0.87	1.50	PT
VM9U6B	X	6.918	-2.396	-4.94	9.09	-2.02	-3.51	XX
WNJVRA		10.157	0.844	1.74	11.62	0.51	0.89	LI
YKTDHM	*	8.619	-0.694	-1.43	9.75	-1.36	-2.36	TT
YL9UJ9		9.195	-0.119	-0.25	10.85	-0.26	-0.46	ID
YRVFQU		9.387	0.074	0.15	10.96	-0.15	-0.26	XX
ZNTW78		8.931	-0.382	-0.79	10.71	-0.40	-0.69	IM

Paper & Paperboard Interlaboratory Testing Program

Analysis 3515
Tensile Breaking Strength - Packaging Papers
TAPPI Official Test Method T494

Summary Statistics	Sample NK17	Sample NK18
Grand Means	9.31 kN/m	11.11 kN/m
Stnd Dev Btwn Labs	0.49 kN/m	0.58 kN/m

Statistics based on 35 of 39 reporting participants.

Comments on Assigned Data Flags for Test #3515

TWL2VZ (X) - Data for sample NK18 are high. Inconsistent within the determinations of sample NK18.

VM9U6B (X) - Data for both samples are low.

DJBZ4Q (X) - Extreme Data.

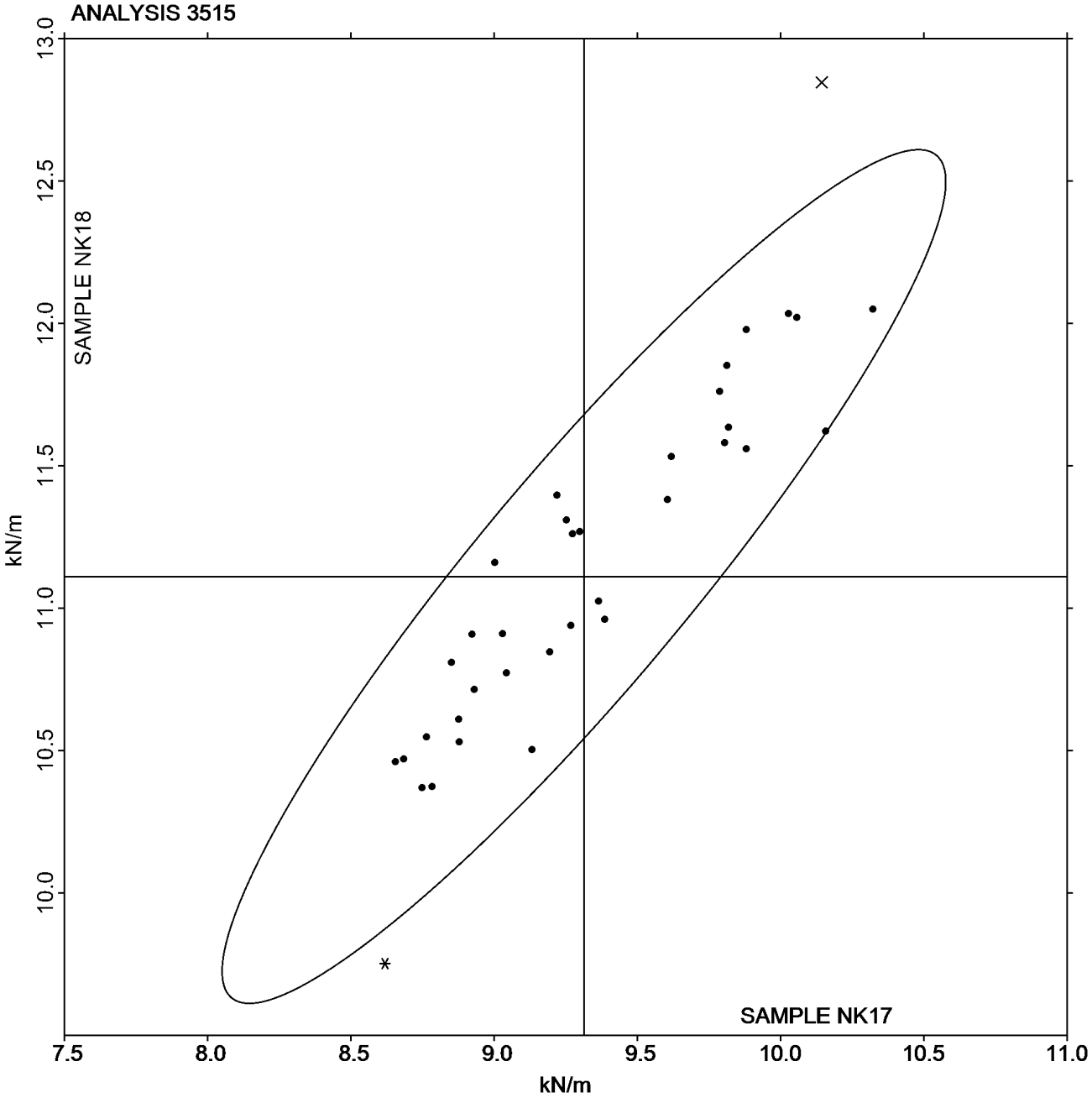
AT84BH (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	ID	Instron 4200 Series
IF	Instron 3340 Series	IM	Instron 5500 Series
IR	Instron 5900 Series	LA	L & W Autoline
LB	L & W Tensile - Autoline 400	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
TR	TMI Horizontal Tensile Tester	TS	TMI Horizontal Tensile Tester 84-58
TT	Tinius Olsen Model MHT	TX	Thwing-Albert (model not specified)
XX	Instrument make/model not specified by lab		

Grand Mean Sample NK17 = 9.3135 kN/m

Grand Mean Sample NK18 = 11.111 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 3516

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK17 Lab Mean	Sample NK17 Diff from Grand Mean	Sample NK17 CPV	Sample NK18 Lab Mean	Sample NK18 Diff from Grand Mean	Sample NK18 CPV	Instr Code
3DHCXV		138.9	-2.6	-0.21	192.5	4.9	0.31	TS
489LKF		151.6	10.1	0.81	186.2	-1.4	-0.09	TO
6JK66W		129.2	-12.4	-0.99	188.9	1.3	0.08	LW
8LXTDX		160.1	18.6	1.48	192.4	4.7	0.30	TH
8MC68W		132.6	-8.9	-0.71	173.2	-14.4	-0.92	LE
8R4M8U		136.6	-4.9	-0.39	175.7	-12.0	-0.77	LH
9JRHZV		128.9	-12.7	-1.01	188.3	0.6	0.04	LE
AT84BH	X	791.2	649.7	51.81	970.8	783.1	50.27	TB
B3TFCM		151.7	10.1	0.81	189.7	2.0	0.13	TO
CD8URU		149.1	7.6	0.61	193.3	5.7	0.37	IR
DG96FG		156.9	15.4	1.23	198.5	10.9	0.70	LE
DJBZ4Q		124.6	-16.9	-1.35	171.0	-16.7	-1.07	LB
E4VEYQ		120.8	-20.8	-1.66	181.4	-6.2	-0.40	IF
EV2A6P		145.5	4.0	0.32	195.7	8.1	0.52	XX
FEAUGJ		125.0	-16.5	-1.32	188.4	0.8	0.05	TR
FJ6PXX		138.7	-2.8	-0.23	177.9	-9.7	-0.62	LE
FYDNXN		157.5	15.9	1.27	211.3	23.7	1.52	LA
FZQ9TJ	*	168.8	27.3	2.17	231.7	44.1	2.83	DM
G3U9NB		153.6	12.1	0.96	203.0	15.4	0.99	LE
GP8WEL		154.7	13.2	1.05	200.7	13.1	0.84	TX
KDJ9RP		139.3	-2.2	-0.17	175.1	-12.6	-0.81	LW
LMKB9R		141.7	0.2	0.02	188.9	1.3	0.08	LA
M3BDPV		154.8	13.3	1.06	205.0	17.4	1.11	XX
MW6LEC		156.4	14.9	1.19	211.6	24.0	1.54	TH
PQQXGD		124.5	-17.1	-1.36	167.2	-20.4	-1.31	LE
QEZB6Q		132.4	-9.1	-0.73	182.9	-4.8	-0.31	LE
QJ76W2		130.3	-11.2	-0.89	179.5	-8.1	-0.52	LE
TN83E4		148.9	7.4	0.59	191.8	4.1	0.27	LC
TWL2VZ		139.9	-1.6	-0.13	181.1	-6.5	-0.42	XX
UY6FWF		132.5	-9.0	-0.72	183.3	-4.4	-0.28	PT
VM9U6B	X	58.5	-83.0	-6.62	107.7	-79.9	-5.13	TH
YKTDHM	*	129.8	-11.7	-0.94	146.9	-40.7	-2.61	TT
YRVFQU		141.6	0.1	0.01	177.8	-9.8	-0.63	XX
ZNTW78		131.6	-9.9	-0.79	173.3	-14.3	-0.92	IM

Summary Statistics	Sample NK17	Sample NK18
Grand Means	141.52 Joules/sq m	187.63 Joules/sq m
Stnd Dev Btwn Labs	12.54 Joules/sq m	15.58 Joules/sq m

Statistics based on 32 of 34 reporting participants.

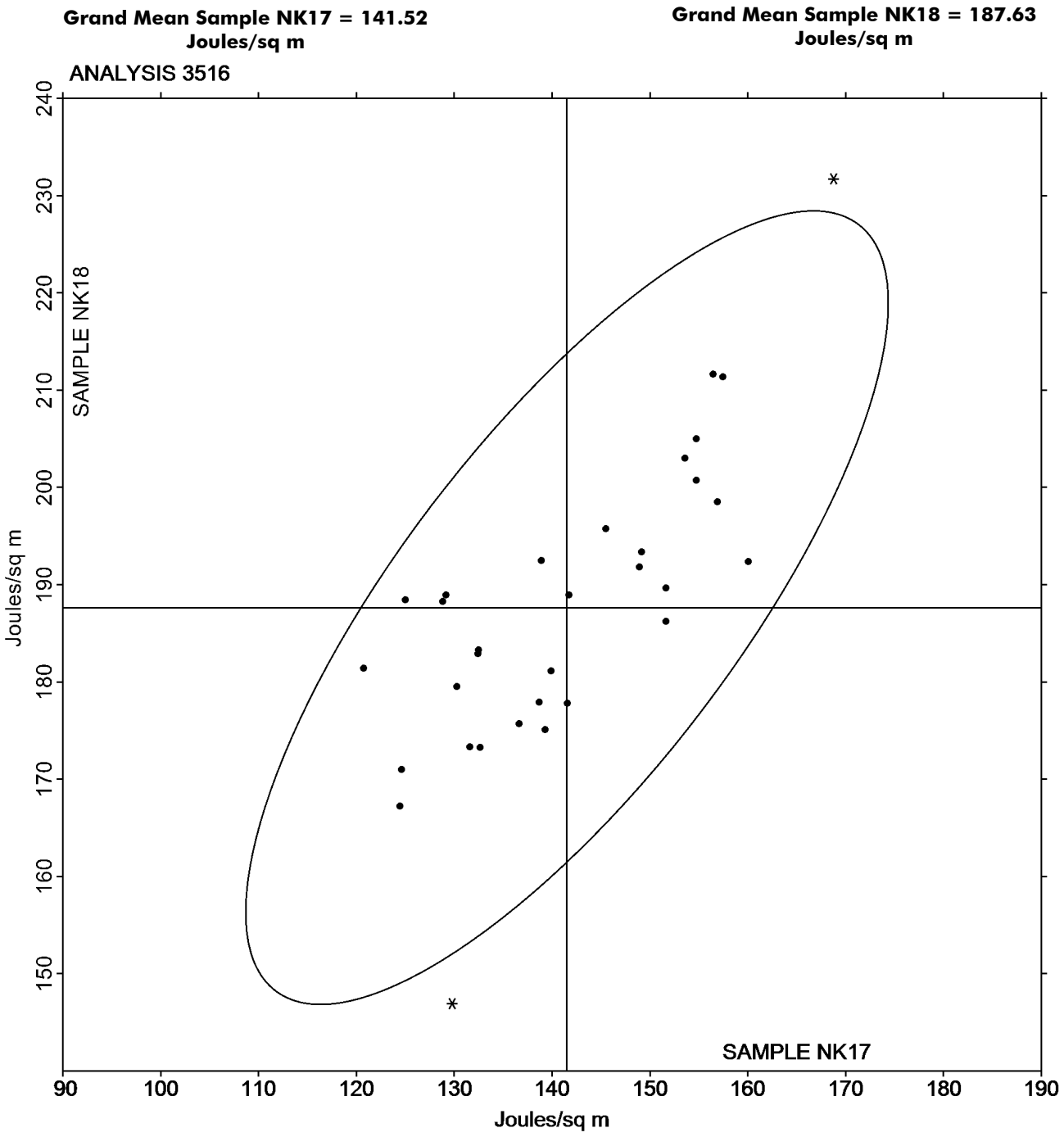
Comments on Assigned Data Flags for Test #3516

VM9U6B (X) - Extreme Data.

AT84BH (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	IF	Instron 3340 Series
IM	Instron 5500 Series	IR	Instron 5900 Series
LA	L & W Autoline	LB	L & W Tensile - Autoline 400
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	TO	Thwing-Albert QC-1000
TR	TMI Horizontal Tensile Tester	TS	TMI Horizontal Tensile Tester 84-58
TT	Tinius Olsen Model MHT	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 NK17 Lab Mean	Sample NK17 Diff from Grand Mean	Sample NK17 CPV	Sample NK18 Lab Mean	Sample NK18 Diff from Grand Mean	Sample NK18 CPV	Instr Code
3DHCXV		2.426	0.106	0.46	2.743	0.196	0.80	TS
489LKF		2.583	0.263	1.14	2.743	0.196	0.80	TO
6JK66W		2.071	-0.249	-1.08	2.428	-0.119	-0.49	LW
8LXTDX		2.847	0.527	2.28	2.922	0.375	1.54	TH
8MC68W		2.068	-0.252	-1.09	2.222	-0.325	-1.34	LE
8R4M8U		2.295	-0.025	-0.11	2.371	-0.176	-0.73	LX
9JRHZV		2.074	-0.246	-1.06	2.411	-0.136	-0.56	LE
AT84BH		2.442	0.122	0.53	2.667	0.120	0.49	XX
B3TFCM		2.366	0.046	0.20	2.482	-0.065	-0.27	TO
CD8URU		2.559	0.239	1.04	2.765	0.218	0.89	XX
DG96FG		2.343	0.023	0.10	2.514	-0.033	-0.14	LE
DJBZ4Q		2.260	-0.060	-0.26	2.399	-0.148	-0.61	LB
E4VEYQ	*	2.061	-0.259	-1.12	2.605	0.058	0.24	XX
EV2A6P		2.463	0.143	0.62	2.732	0.185	0.76	XX
FEAUGJ		2.252	-0.068	-0.29	2.628	0.081	0.33	TR
FJ6PXX		2.056	-0.264	-1.14	2.188	-0.359	-1.48	LW
FYDNXN		2.520	0.200	0.87	2.897	0.350	1.44	LX
FZQ9TJ	*	2.865	0.545	2.36	3.237	0.690	2.83	DM
G3U9NB	X	0.087	-2.232	-9.66	0.087	-2.461	-10.11	LE
GP8WEL		2.534	0.214	0.93	2.739	0.192	0.79	TX
KDJ9RP		2.122	-0.198	-0.86	2.242	-0.305	-1.26	LW
LMKB9R		2.009	-0.311	-1.34	2.328	-0.219	-0.90	XX
M3BDPV		2.520	0.200	0.87	2.790	0.243	1.00	XX
MW6LEC		2.630	0.310	1.34	2.900	0.353	1.45	LX
PQQXGD		2.077	-0.243	-1.05	2.311	-0.236	-0.97	LE
QJ76W2		2.118	-0.202	-0.87	2.381	-0.166	-0.68	LE
RLPJZ2		2.301	-0.019	-0.08	2.484	-0.063	-0.26	TB
TN83E4		2.107	-0.213	-0.92	2.298	-0.249	-1.03	LC
TWL2VZ		2.139	-0.181	-0.78	2.455	-0.092	-0.38	XX
UY6FWF		2.085	-0.235	-1.02	2.375	-0.173	-0.71	PT
VM9U6B	X	1.370	-0.950	-4.11	3.240	0.693	2.85	XX
YKTDHM		2.365	0.045	0.20	2.338	-0.209	-0.86	TT
YL9UJ9		2.316	-0.003	-0.01	2.478	-0.069	-0.29	XX
YRVFQU		2.210	-0.110	-0.47	2.346	-0.201	-0.83	XX
ZNTW78		2.463	0.143	0.62	2.648	0.101	0.41	IM

Paper & Paperboard Interlaboratory Testing Program

Analysis 3517

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample NK17	Sample NK18
Grand Means	2.32 Percent	2.55 Percent
Stnd Dev Btwn Labs	0.23 Percent	0.24 Percent

Statistics based on 33 of 35 reporting participants.

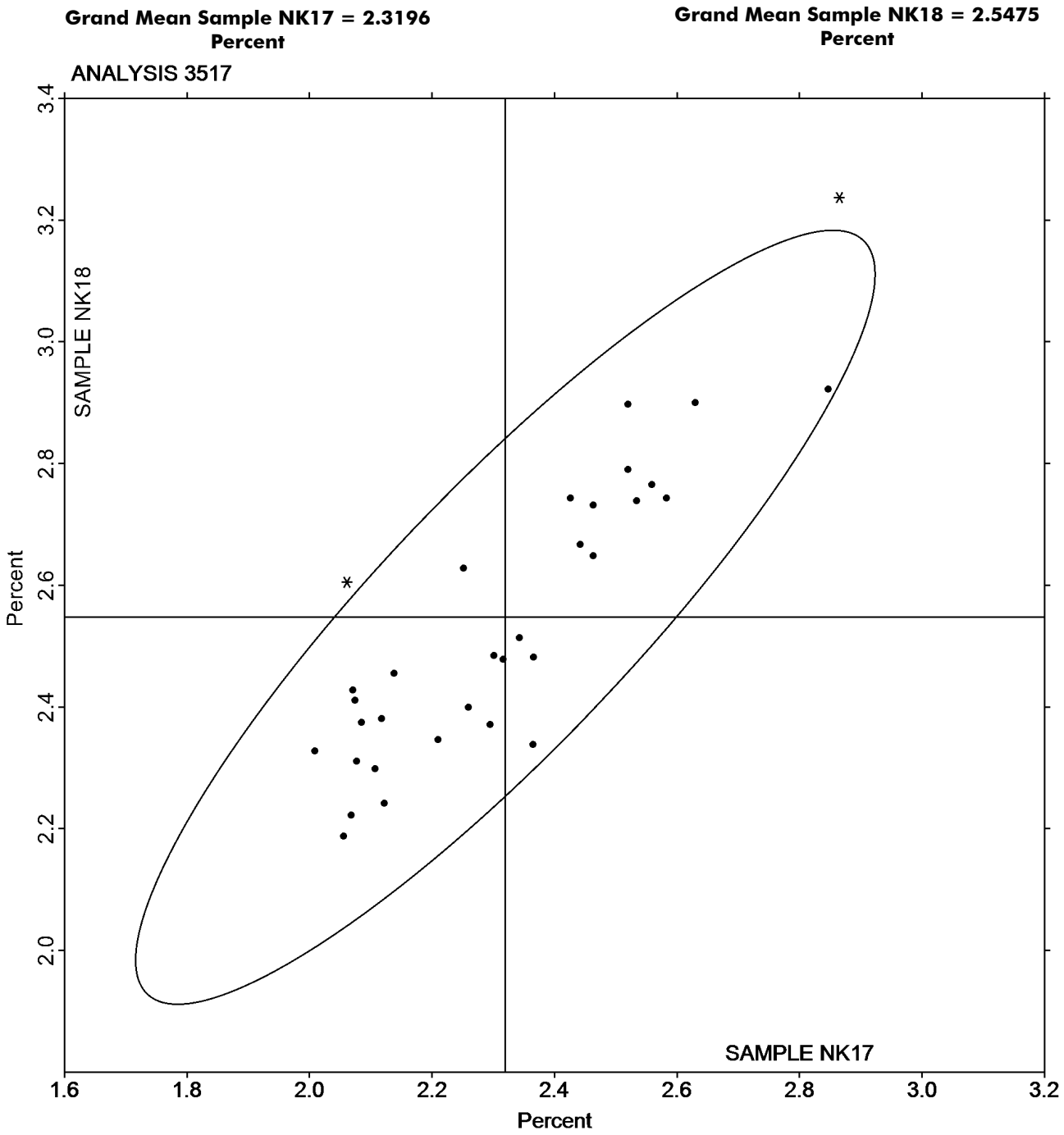
Comments on Assigned Data Flags for Test #3517

G3U9NB (X) - Extreme Data.

VM9U6B (X) - Data for sample NK17 are low and data for sample NK18 are high. Inconsistent in testing between samples. Inconsistent within the determinations of sample NK18.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	IM	Instron 5500 Series
LB	L & W Tensile - Autoline 400	LC	L & W Tensile - Autoline 600
LE	L & W Tensile Tester 066	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	TR	TMI Horizontal Tensile Tester
TS	TMI Horizontal Tensile Tester 84-58	TT	Tinius Olsen Model MHT
TX	Thwing-Albert (model not specified)	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program

Analysis 3531

Roughness - Print Surf Method - 0.5 to 4.0 Microns

TAPPI Official Test Method T555

WebCode	Data Flag	Sample PS17 Lab Mean	Sample PS17 Diff from Grand Mean	Sample PS17 CPV	Sample PS18 Lab Mean	Sample PS18 Diff from Grand Mean	Sample PS18 CPV	Instr Code
3DHCXV		2.034	-0.212	-0.60	2.307	0.107	0.55	ZZ
3VXVLM		2.665	0.419	1.20	2.319	0.119	0.61	ZZ
3VYUFV		2.542	0.296	0.84	2.222	0.022	0.11	ZZ
4J6N7W		2.850	0.604	1.72	2.571	0.371	1.90	ZZ
72F4HN		2.540	0.294	0.84	2.070	-0.130	-0.66	ZZ
8LXTDX		2.000	-0.246	-0.70	2.089	-0.111	-0.57	ZZ
8R4M8U		2.047	-0.199	-0.57	2.196	-0.004	-0.02	ZZ
A3JYVC		1.999	-0.247	-0.70	2.238	0.038	0.20	ZZ
AFJ2UB		2.128	-0.118	-0.34	2.426	0.226	1.16	ZZ
AT84BH	X	35.397	33.151	94.56	40.001	37.801	193.18	ZZ
BQKKAK		2.132	-0.114	-0.32	2.312	0.112	0.57	ZZ
DG96FG		2.451	0.205	0.59	2.271	0.071	0.36	ZZ
DJBZ4Q		1.795	-0.451	-1.29	1.888	-0.312	-1.59	ZZ
GER8FG		1.833	-0.413	-1.18	1.956	-0.244	-1.25	ZZ
GX3WTE		2.120	-0.126	-0.36	2.307	0.107	0.55	ZZ
GXEXDR		2.295	0.049	0.14	2.359	0.159	0.81	ZZ
HGAQUJ	*	1.545	-0.701	-2.00	1.648	-0.552	-2.82	ZZ
HRR62R		2.215	-0.031	-0.09	2.268	0.068	0.35	ZZ
MPQT62		2.046	-0.200	-0.57	1.897	-0.303	-1.55	ZZ
NY78LA		2.877	0.631	1.80	2.170	-0.030	-0.15	ZZ
P9QVXM		2.226	-0.020	-0.06	2.378	0.178	0.91	ZZ
PBHVVY		2.092	-0.154	-0.44	2.250	0.050	0.26	ZZ
PEF9XQ		2.040	-0.206	-0.59	2.400	0.200	1.02	ZZ
XZ7MMX		2.758	0.512	1.46	2.113	-0.087	-0.44	ZZ
Z9WQPX		2.884	0.638	1.82	2.273	0.073	0.37	ZZ
ZGPZFF		2.163	-0.083	-0.24	2.099	-0.101	-0.51	ZZ
ZZ2NML		2.113	-0.133	-0.38	2.165	-0.035	-0.18	ZZ

Summary Statistics	Sample PS17	Sample PS18
Grand Means	2.25 Microns	2.20 Microns
Stnd Dev Btwn Labs	0.35 Microns	0.20 Microns

Statistics based on 26 of 27 reporting participants.

Comments on Assigned Data Flags for Test #3531

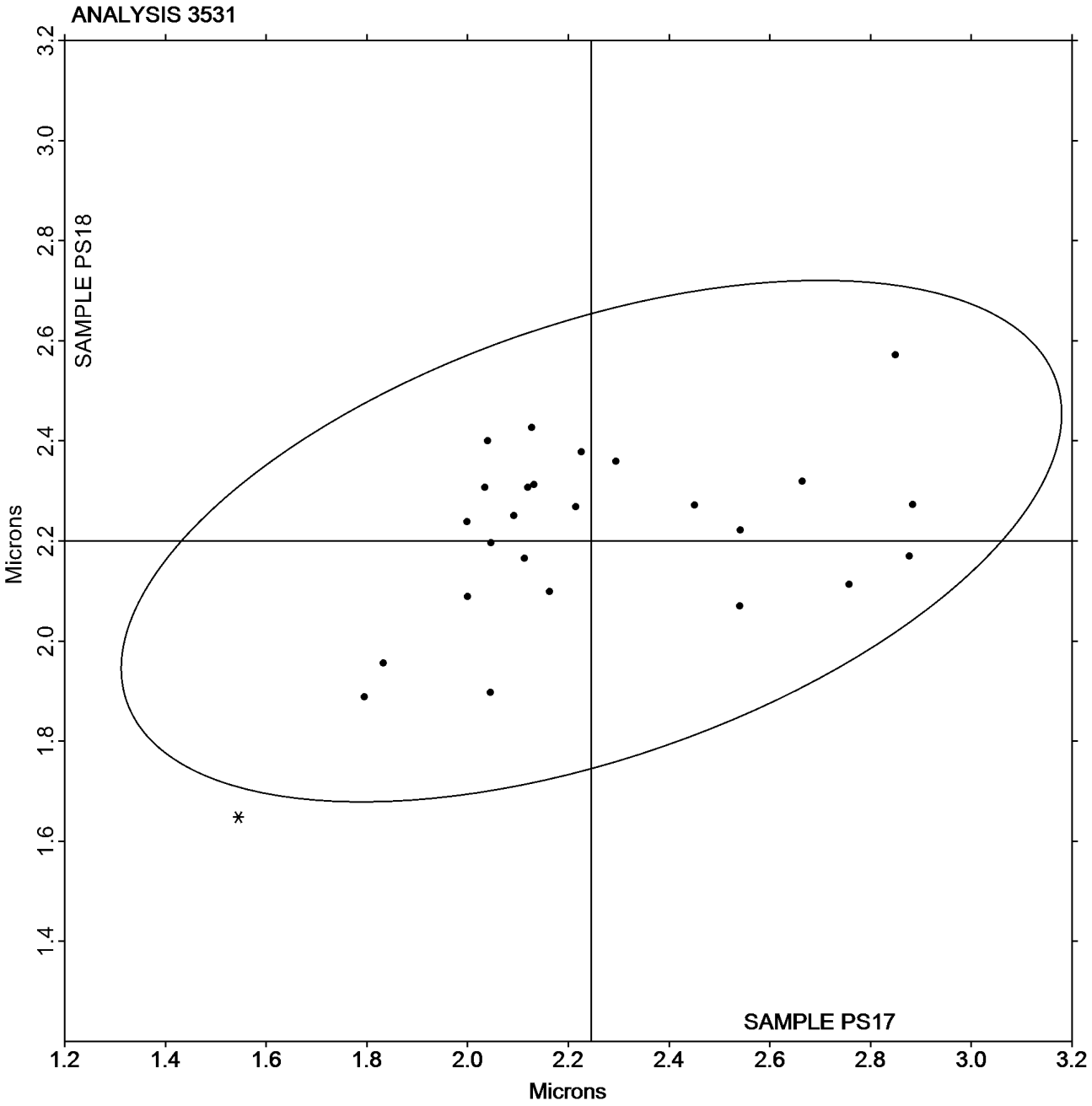
AT84BH (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample PS17 = 2.2458 Microns

Grand Mean Sample PS18 = 2.1997 Microns



Paper & Paperboard Interlaboratory Testing Program

Analysis 3545
Directional Brightness
TAPPI Official Test Method T452

WebCode	Data Flag	Sample BR17 Lab Mean	Sample BR17 Diff from Grand Mean	Sample BR17 CPV	Sample BR18 Lab Mean	Sample BR18 Diff from Grand Mean	Sample BR18 CPV	Instr Code
3DHCXV		84.63	-0.91	-0.69	84.96	-0.54	-0.47	TS
3Q8KA3		86.94	1.39	1.04	86.21	0.71	0.62	TP
3VYUFV		87.07	1.52	1.14	86.96	1.47	1.27	TD
4ERM8K	X	72.50	-13.05	-9.80	85.07	-0.42	-0.37	XX
6JK66W		84.78	-0.77	-0.58	84.73	-0.77	-0.67	TS
72F4HN		84.08	-1.47	-1.11	84.25	-1.25	-1.08	TD
8LXTDX		84.45	-1.10	-0.82	84.33	-1.17	-1.02	TP
BQKKAK		85.40	-0.15	-0.11	85.33	-0.17	-0.15	HG
DG96FG		85.07	-0.48	-0.36	85.07	-0.43	-0.37	HG
GX3WTE	X	72.01	-13.53	-10.16	72.65	-12.85	-11.13	XX
HGAQUJ		84.62	-0.93	-0.70	84.73	-0.77	-0.67	HZ
HRR62R		85.96	0.42	0.31	86.02	0.52	0.45	HG
M3BDPV		85.85	0.30	0.23	85.84	0.34	0.29	XX
MPQT62		85.58	0.03	0.02	85.86	0.36	0.31	TP
PBHVVY		84.61	-0.94	-0.70	84.44	-1.06	-0.92	TP
PEF9XQ		84.34	-1.21	-0.91	84.27	-1.23	-1.06	PP
Q98BK4	*	89.56	4.02	3.02	88.80	3.30	2.86	PE
RLPJZ2		85.36	-0.18	-0.14	85.50	0.00	0.00	XD
TWL2VZ		86.15	0.60	0.45	86.23	0.73	0.63	XX
XZ7MMX		86.63	1.08	0.81	86.51	1.01	0.88	TP
ZDTBZ9		84.34	-1.21	-0.91	84.45	-1.05	-0.91	TS

Summary Statistics	Sample BR17	Sample BR18
Grand Means	85.55 Percent	85.50 Percent
Stnd Dev Btwn Labs	1.33 Percent	1.15 Percent

Statistics based on 19 of 21 reporting participants.

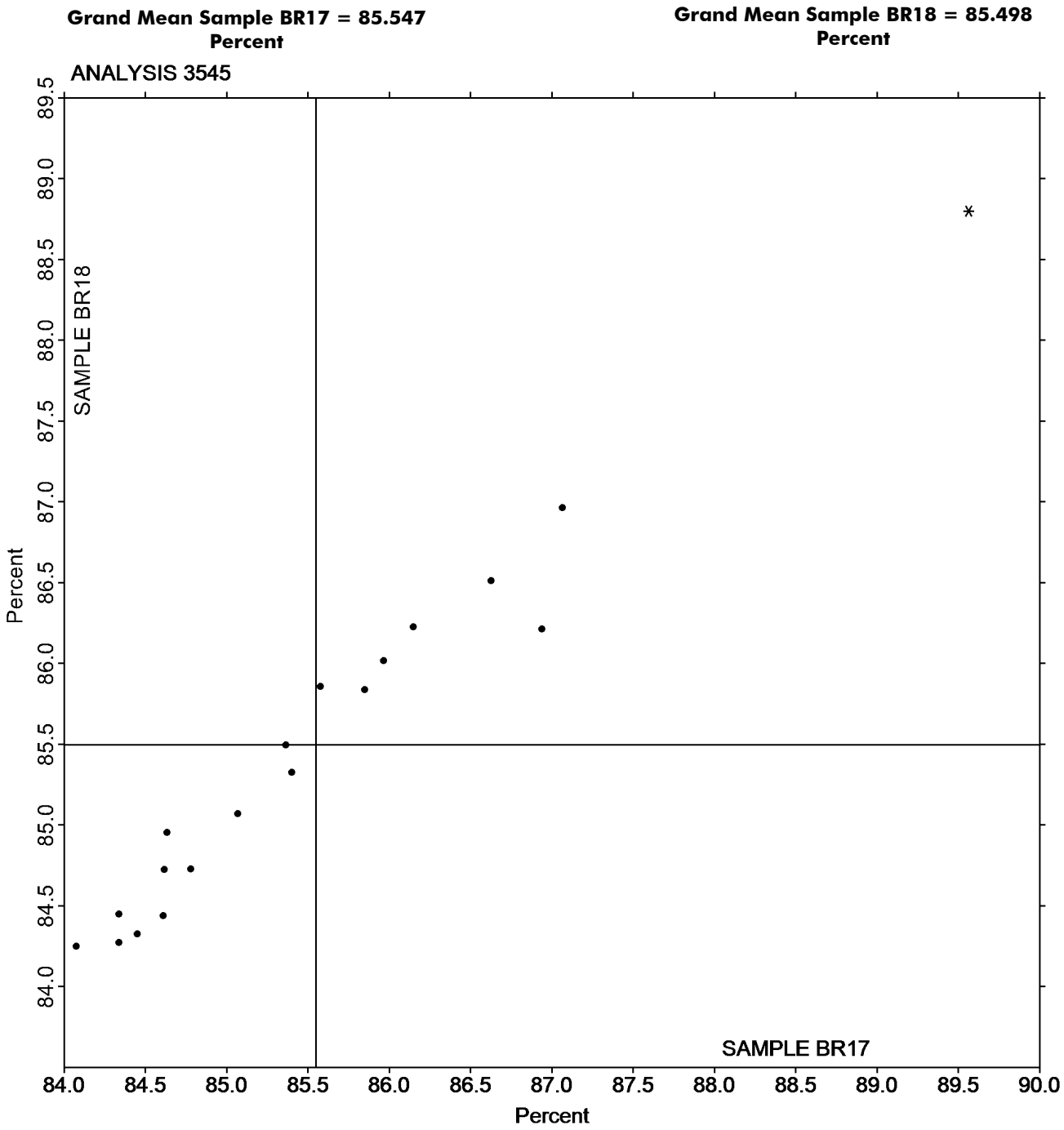
Comments on Assigned Data Flags for Test #3545

4ERM8K (X) - Extreme Data for Sample BR17.

GX3WTE (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

HG	Hunter Labscan / XE	HZ	Hunter Lab ColorFlex EZ Series
PE	Photovolt 577	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		



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 BR17 Lab Mean	Sample BR17 Diff from Grand Mean	Sample BR17 CPV	Sample BR18 Lab Mean	Sample BR18 Diff from Grand Mean	Sample BR18 CPV	Instr Code
3DHCXV		85.75	0.94	2.13	86.08	1.20	2.62	LT
3VYUFV		84.78	-0.02	-0.05	84.83	-0.04	-0.09	TC
6PP7YY		84.89	0.09	0.20	84.95	0.07	0.16	LE
8LXTDX		83.87	-0.93	-2.11	84.21	-0.67	-1.47	LT
8R4M8U		84.49	-0.31	-0.70	84.50	-0.37	-0.82	LT
DKNRUL		84.52	-0.29	-0.65	84.54	-0.34	-0.75	LE
FEAUGJ		84.94	0.14	0.32	84.95	0.07	0.16	TC
FJ6PXX		84.69	-0.11	-0.26	84.69	-0.18	-0.40	LT
HRR62R		85.21	0.41	0.93	85.22	0.34	0.74	TC
MPQT62		84.82	0.02	0.04	84.88	0.00	0.00	EA
NRL4E8	X	68.84	-15.96	-36.07	68.99	-15.88	-34.71	TC
NY78LA	X	68.76	-16.04	-36.25	69.15	-15.73	-34.36	TC
XZ7MMX		84.78	-0.02	-0.05	84.85	-0.03	-0.06	TC
ZGPZFF		84.89	0.09	0.20	84.84	-0.04	-0.08	TC

Summary Statistics	Sample BR17	Sample BR18
Grand Means	84.80 Percent	84.88 Percent
Stnd Dev Btwn Labs	0.44 Percent	0.46 Percent

Statistics based on 12 of 14 reporting participants.

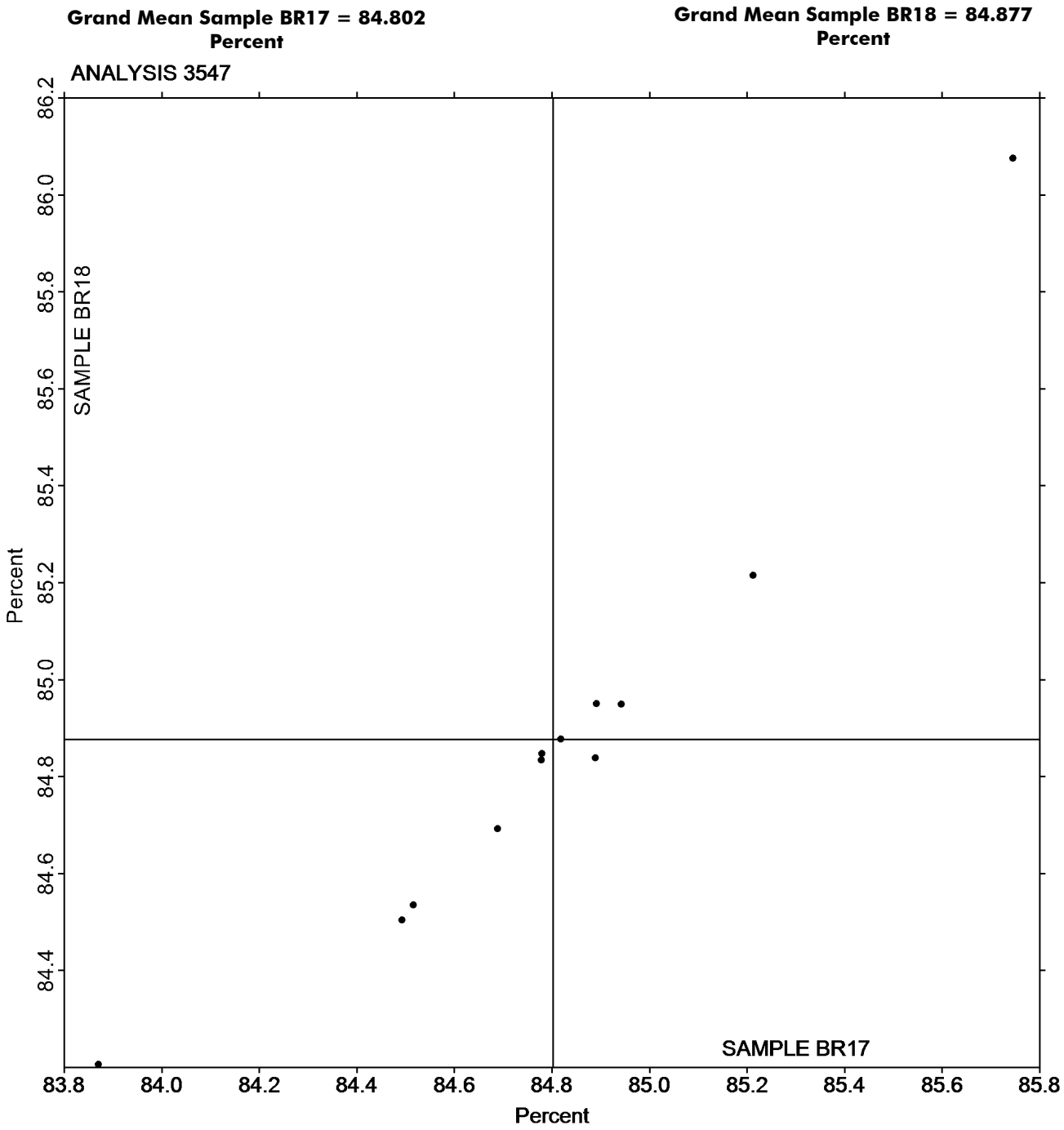
Comments on Assigned Data Flags for Test #3547

NY78LA (X) - Extreme Data.

NRL4E8 (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

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



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

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L	a	b	Color Difference Values ΔL	Δa	Δb	ΔE	Instr Code
3DHCXV	X	CA17	92.64 *	0.02 X	1.24	-0.11 X	-0.04	-0.08	0.15 X	TS
		CA18	92.52	-0.02	1.16					
3MN773		CA17	94.77	-0.49	1.86	0.01	-0.03	0.00	0.03	TC
		CA18	94.78	-0.52	1.86					
3VYUFV		CA17	93.25	-0.61	1.94	0.02	0.00	0.00	0.02	TC
		CA18	93.27	-0.61	1.95					
6CG6LU		CA17	94.92	-0.44	2.21	-0.02	-0.03	-0.01	0.04	XX
		CA18	94.89	-0.47	2.20					
72F4HN		CA17	92.32	-0.22	1.24	0.04	0.02	0.00	0.04	TC
		CA18	92.36	-0.20	1.24					
8CUDPE	X	CA17	92.38	0.07 X	1.36	0.10 X	0.01	0.02	0.10	TS
		CA18	92.48	0.08	1.38					
BQKKAK		CA17	93.50	-0.44	1.72	0.00	-0.06	0.08	0.10	HK
		CA18	93.50	-0.50	1.80					
DAGWPH	X	CA17	94.09	0.42 X	0.68	-0.09 X	-0.01	-0.06	0.11	TS
		CA18	94.00	0.40	0.63					
DG96FG		CA17	93.67	-0.59	1.65	-0.02	0.00	-0.01	0.02	HK
		CA18	93.65	-0.59	1.64					
DKNRUL		CA17	94.65	-0.55	1.92	0.00	0.01	-0.01	0.01	LS
		CA18	94.65	-0.54	1.91					
GX3WTE	X	CA17	86.07 X	-0.28	-0.58 X	0.18 X	-0.01	-0.03	0.18 X	XX
		CA18	86.25	-0.29	-0.61					
HRR62R		CA17	93.82	-0.40	1.86	0.02	0.02	-0.01	0.03	HF
		CA18	93.85	-0.38	1.85					
PEF9XQ		CA17	93.32	-0.56	1.95	0.04	-0.06	0.04	0.08	TC
		CA18	93.35	-0.62	1.99					
Q98BK4		CA17	92.58	-0.56	1.53	0.04	-0.03	0.05	0.07	XX
		CA18	92.62	-0.59	1.58					
TWL2VZ		CA17	93.80	-0.68	3.52 *	-0.01	0.06	-0.02	0.07	XX
		CA18	93.80	-0.61	3.50					
XZ7MMX		CA17	93.31	-0.61	1.90	0.03	0.05	-0.07	0.09	TC
		CA18	93.34	-0.56	1.83					

Summary Statistics

Grand Means							
CA17	93.534	-0.494	1.773	0.013	-0.004	0.004	0.051
CA18	93.538	-0.498	1.768				
Stnd Dev Btwn Labs							
CA17	0.839	0.135	0.619	0.022	0.039	0.037	0.029
CA18	0.825	0.133	0.625				

Statistics based on 12 of 16 reporting participants

Comments on Assigned Data Flags for Test #3549

3DHCXV (X) - High "a" values for both samples. Inconsistent within replicate readings of "a" for both samples. Small delta L. Large delta E.

8CUDPE (X) - High "a" values for both samples. Inconsistent within replicate readings of "a" for both samples. Large delta L.

DAGWPH (X) - Extreme data for both "a" values. Inconsistent within replicate readings of "a" for Sample CA18. Small delta L.

GX3WTE (X) - Extreme data for both "L" values. Low "b" values for both samples. Inconsistent within replicate readings of "b" for Sample CA18. Large delta L & E.

Analysis Notes:

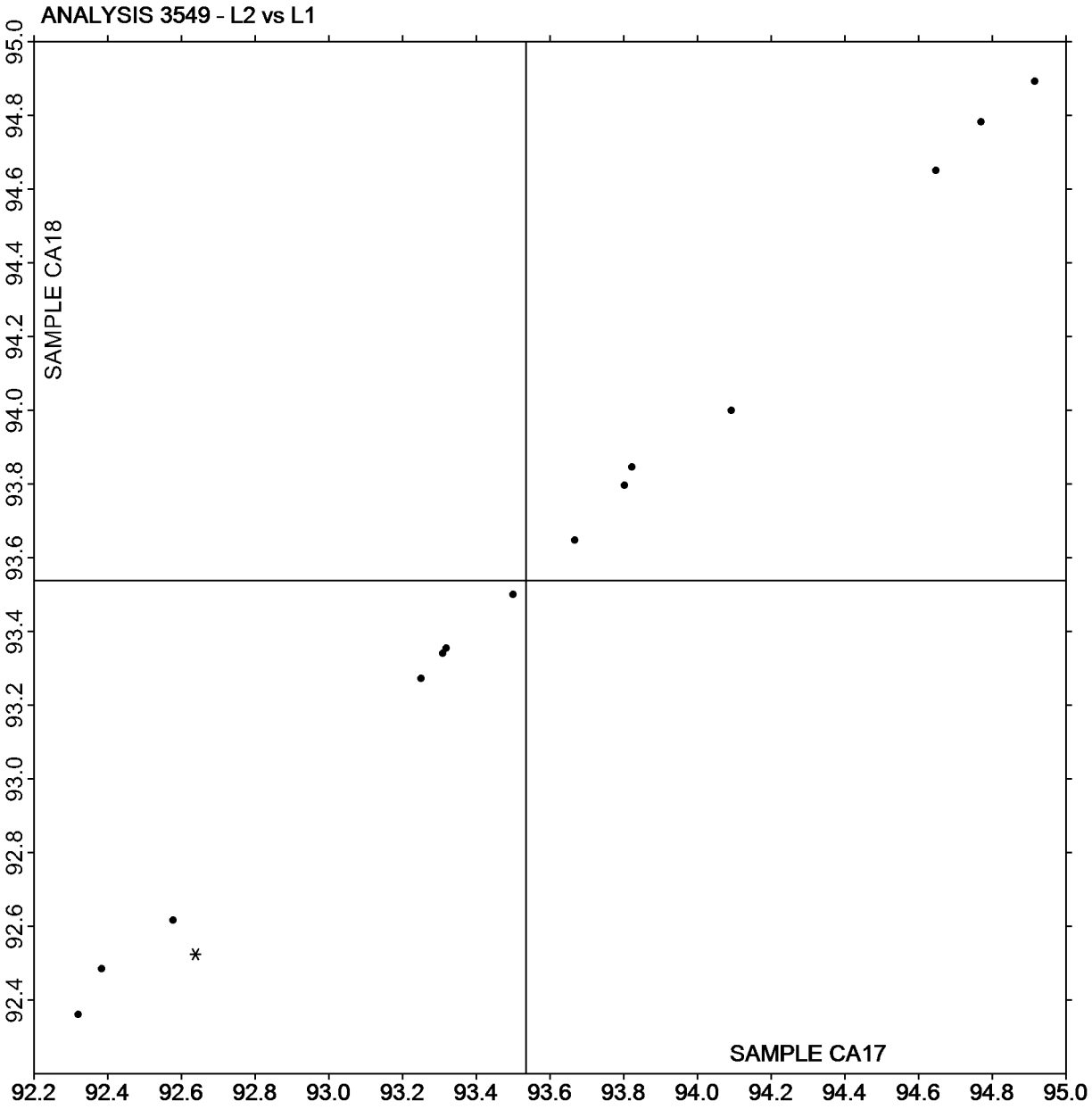
DAGWPH - Due to CTS graphs using Absolute Values, data Flag is located within consensus data. However, "a" data is higher than the negative Grand Mean as shown above graphs.

GX3WTE - Due to CTS graphs using Absolute Values, data Flag is located within consensus data. However, "b" data is lower than the positive Grand Mean as shown above graphs.

Key to Instrument Codes Reported by Participants

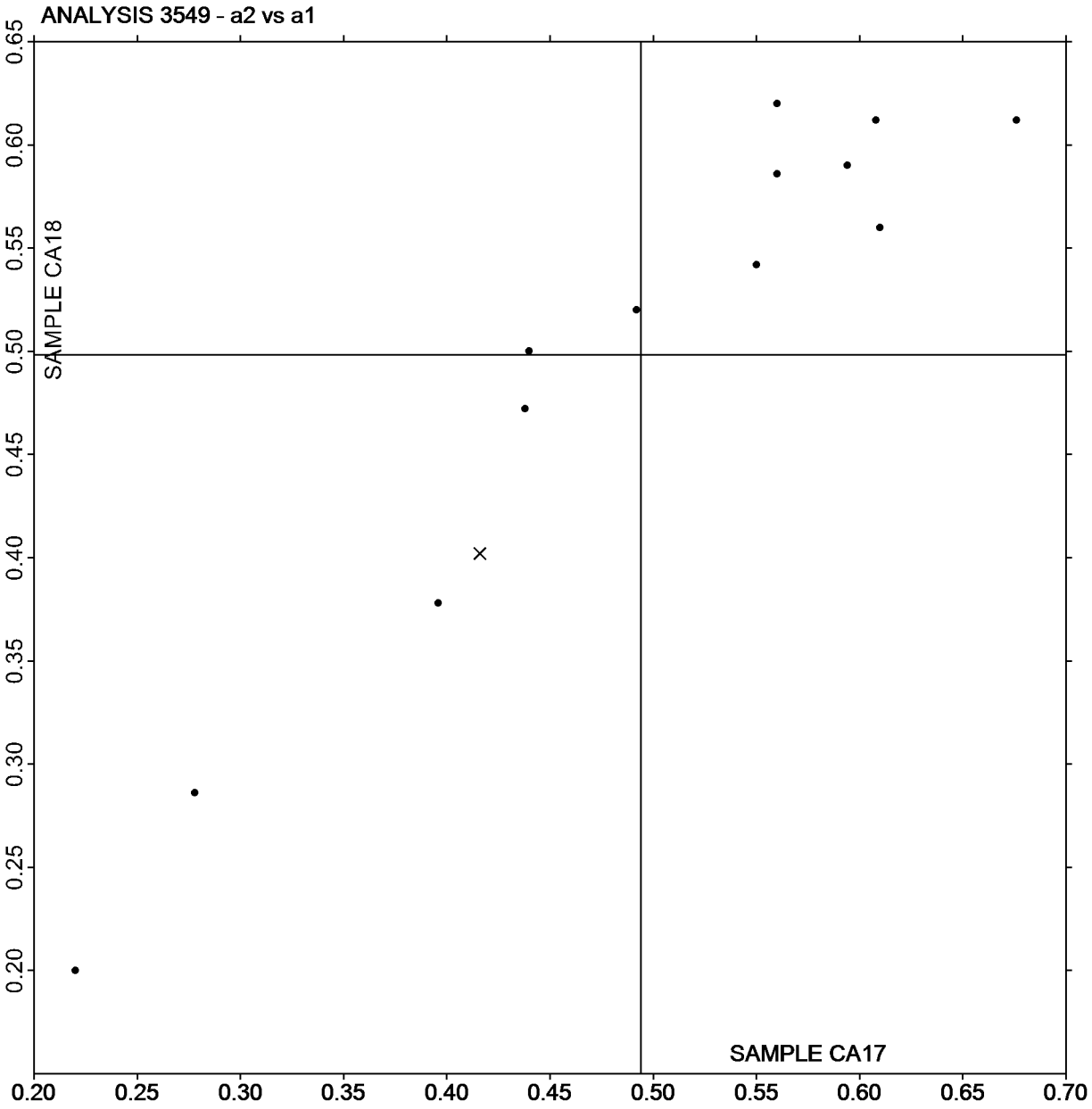
HF	Hunter LabScan II	HK	Hunter LabScan XE
LS	L & W Elrepho SE 070	TC	Technidyne Color Touch Series
TS	Technidyne Brightimeter Micro S-5	XX	Instrument make/model not specified by lab

Plot of L values CA18 vs L values CA17



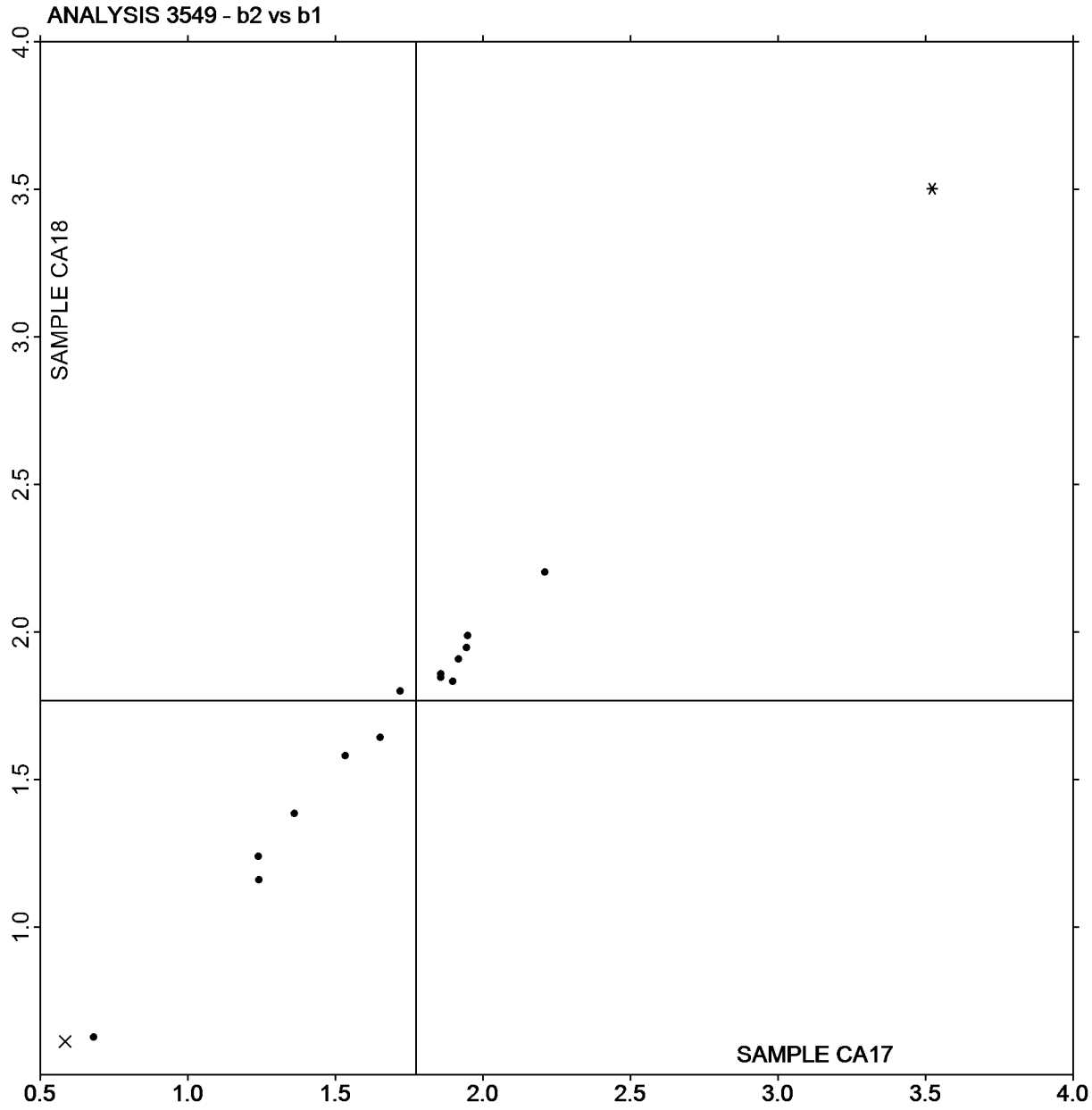
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA18 vs a values CA17



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 CA18 vs b values CA17



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 #4242, June 2023

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L	a	b	Color Difference Values ΔL	Δa	Δb	ΔE	Instr Code
4MJ9BX		**CA17**	94.77	-0.71	1.86	-0.02	0.03	-0.05	0.06	TC
		CA18	94.75	-0.68	1.81					
7DAFY9		**CA17**	94.45	-0.57	1.79	-0.05	-0.01	0.00	0.05	XC
		CA18	94.40	-0.58	1.79					
8LXTDX		**CA17**	94.77	-0.53	2.05	0.02	-0.01	0.00	0.02	LT
		CA18	94.78	-0.54	2.05					
8XDJDN		**CA17**	94.93	-0.55	1.96	0.00	0.01	-0.05	0.05	XX
		CA18	94.94	-0.54	1.91					
B43CTK	X	**CA17**	94.07	-5.80 X	8.33 X	0.03	1.21 X	5.71 X	5.83 X	XC
		CA18	94.10	-4.58 X	14.03 X					
BHPG6M		**CA17**	95.14	-0.51	1.65	-0.03	-0.02	0.11	0.12	NF
		CA18	95.11	-0.53	1.77					
FJ6PXX		**CA17**	94.75	-0.54	2.01	-0.01	-0.01	0.01	0.02	LS
		CA18	94.74	-0.54	2.02					
HRR62R		**CA17**	93.30	-0.55	1.56	-0.03	0.02	0.00	0.03	TC
		CA18	93.27	-0.53	1.56					
JEZ6JN		**CA17**	94.71	-0.53	2.03 *	0.11	0.08 X	-0.50 X	0.52 X	MN
		CA18	94.82	-0.45	1.53					
MPQT62		**CA17**	94.73	-0.61	1.95	-0.01	-0.01	-0.03	0.03	EH
		CA18	94.72	-0.62	1.92					
P9QVXM		**CA17**	94.76	-0.55	1.91	0.00	-0.01	0.03	0.04	TC
		CA18	94.75	-0.56	1.94					
PBHVVY		**CA17**	93.82	-0.44	1.73	-0.01	0.02	-0.08	0.08	HE
		CA18	93.81	-0.42	1.65					
RYG69G		**CA17**	94.82	-0.51	2.10	-0.01	0.00	0.00	0.01	XX
		CA18	94.81	-0.51	2.10					
T2FXH7		**CA17**	95.07	-0.46	1.80	0.02	0.02	0.02	0.03	XX
		CA18	95.09	-0.44	1.82					
XM6V2T		**CA17**	95.21	-0.42	1.55	0.15 X	-0.04	0.03	0.16	XX
		CA18	95.37	-0.46	1.58					

Summary Statistics

Grand Means							
CA17	94.621	-0.534	1.853	0.009	0.005	-0.035	0.087
CA18	94.631	-0.529	1.818				
Stnd Dev Btwn Labs							
CA17	0.520	0.072	0.179	0.056	0.028	0.141	0.131
CA18	0.539	0.071	0.185				

Statistics based on 14 of 15 reporting participants

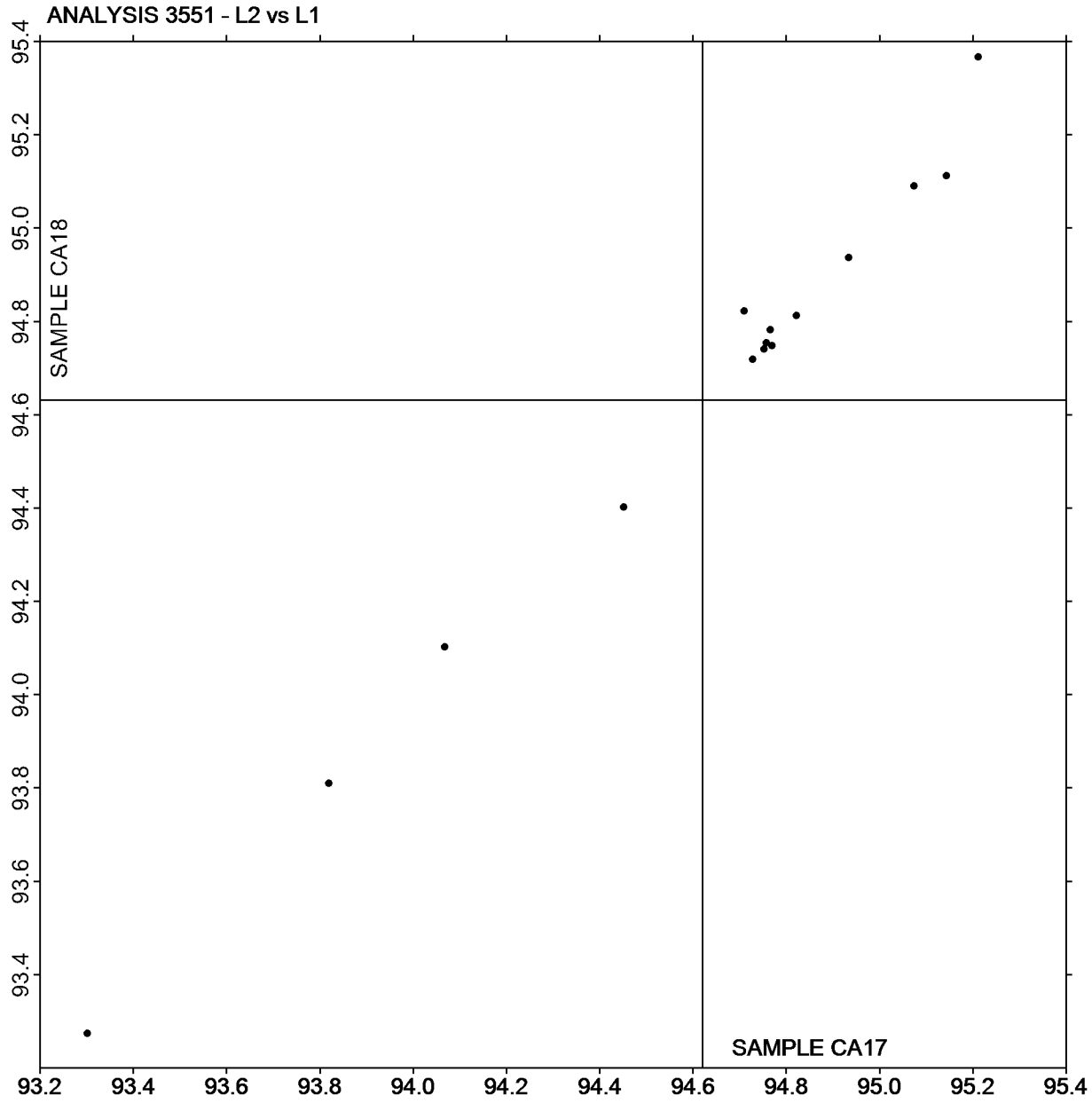
Comments on Assigned Data Flags for Test #3551

B43CTK (X) - Extreme data for both "a" & "b" values. Large delta a, b and E.

Key to Instrument Codes Reported by Participants

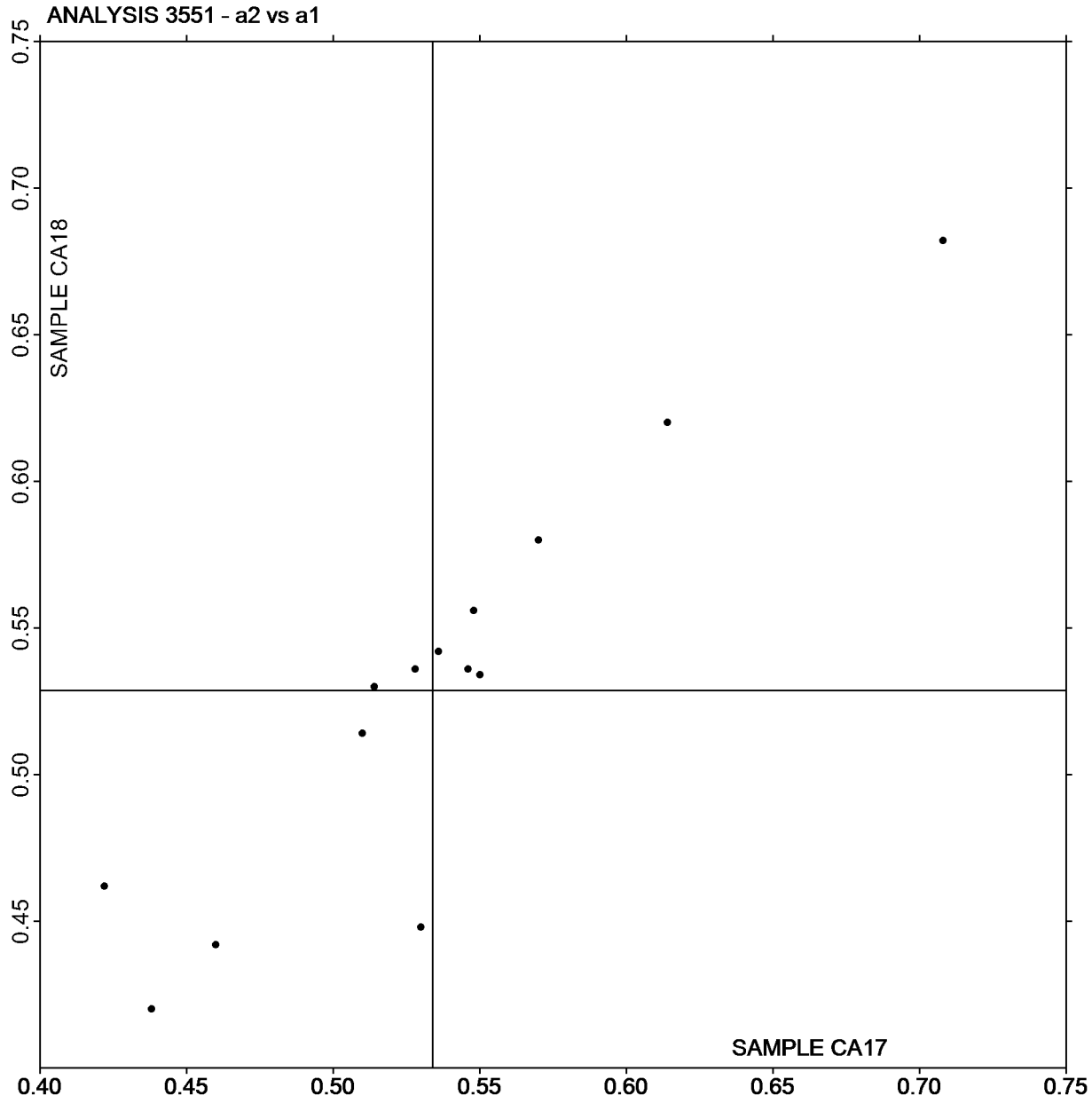
EH	Datacolor Elrepho SF450	HE	Hunter LabScan
LS	L & W Elrepho SE 070	LT	L & W Elrepho SE 071
MN	Minolta (model not specified)	NF	Minolta CM-3600d Spectrophotometer
TC	Technidyne Color Touch Series	XC	X-Rite eXact Series
XX	Instrument make/model not specified by lab		

Plot of L values CA18 vs L values CA17



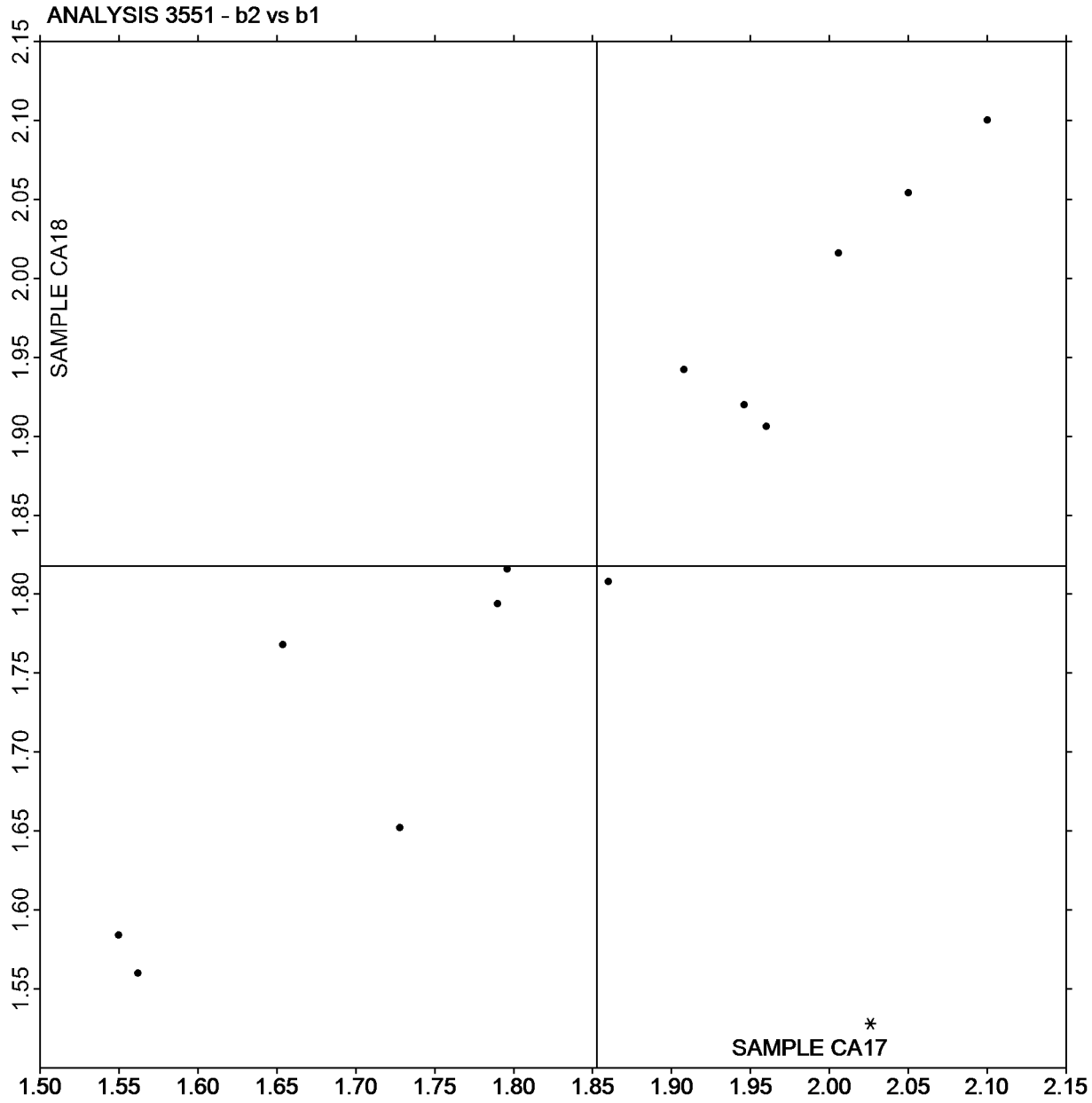
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA18 vs a values CA17



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 CA18 vs b values CA17



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

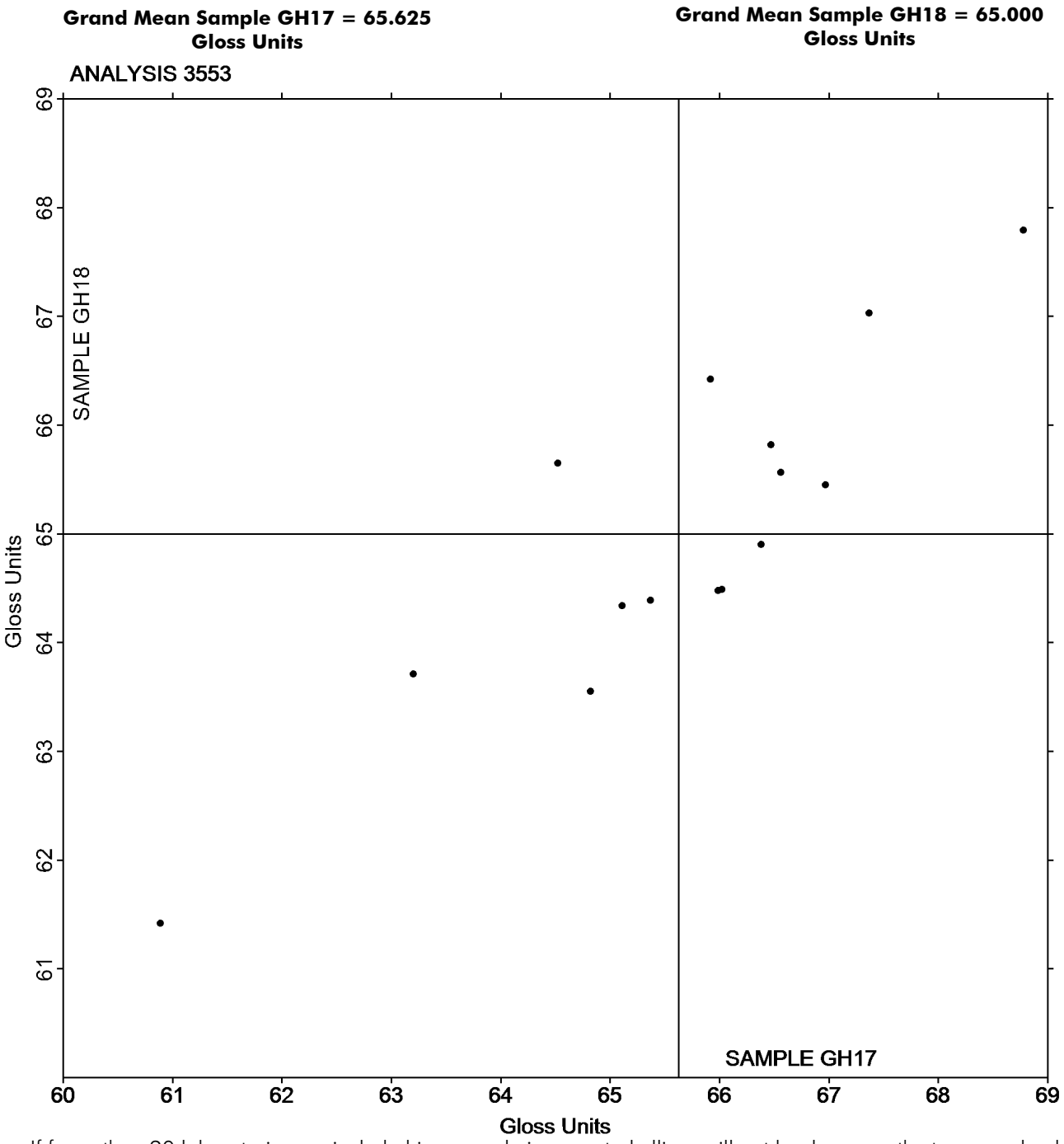
WebCode	Data Flag	Sample GH17 Lab Mean	Sample GH17 Diff from Grand Mean	Sample GH17 CPV	Sample GH18 Lab Mean	Sample GH18 Diff from Grand Mean	Sample GH18 CPV	Instr Code
3VXVLM		65.11	-0.51	-0.28	64.34	-0.66	-0.43	LG
3VYUFV		68.78	3.16	1.71	67.79	2.79	1.80	XX
72F4HN		60.89	-4.73	-2.56	61.42	-3.58	-2.32	LA
8LXTDX		63.20	-2.42	-1.31	63.71	-1.29	-0.83	GA
8R4M8U		64.52	-1.10	-0.60	65.65	0.65	0.42	LW
A3JYVC		66.97	1.35	0.73	65.45	0.45	0.29	VM
B43CTK		65.37	-0.25	-0.14	64.39	-0.61	-0.39	GM
BQKKAK		64.82	-0.80	-0.44	63.55	-1.45	-0.94	TP
DAGWPH		65.99	0.37	0.20	64.48	-0.52	-0.34	PT
DG96FG		66.38	0.76	0.41	64.90	-0.10	-0.06	PP
DJBZ4Q		67.37	1.75	0.94	67.03	2.03	1.31	LF
MPQT62		65.92	0.30	0.16	66.42	1.42	0.92	TH
P9QVXM		66.02	0.40	0.21	64.49	-0.51	-0.33	LF
PEF9XQ		66.56	0.94	0.51	65.57	0.56	0.37	PP
XZ7MMX		66.47	0.85	0.46	65.82	0.82	0.53	GM

Summary Statistics	Sample GH17	Sample GH18
Grand Means	65.62 Gloss Units	65.00 Gloss Units
Stnd Dev Btwn Labs	1.85 Gloss Units	1.55 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
TH	Technidyne T480A	TP	Technidyne Profile Plus
VM	Valmet PaperLab (was Kajaani/Robotest)	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 3555

Specular Gloss at 75 Degrees - Low Range

TAPPI Official Test Method T480

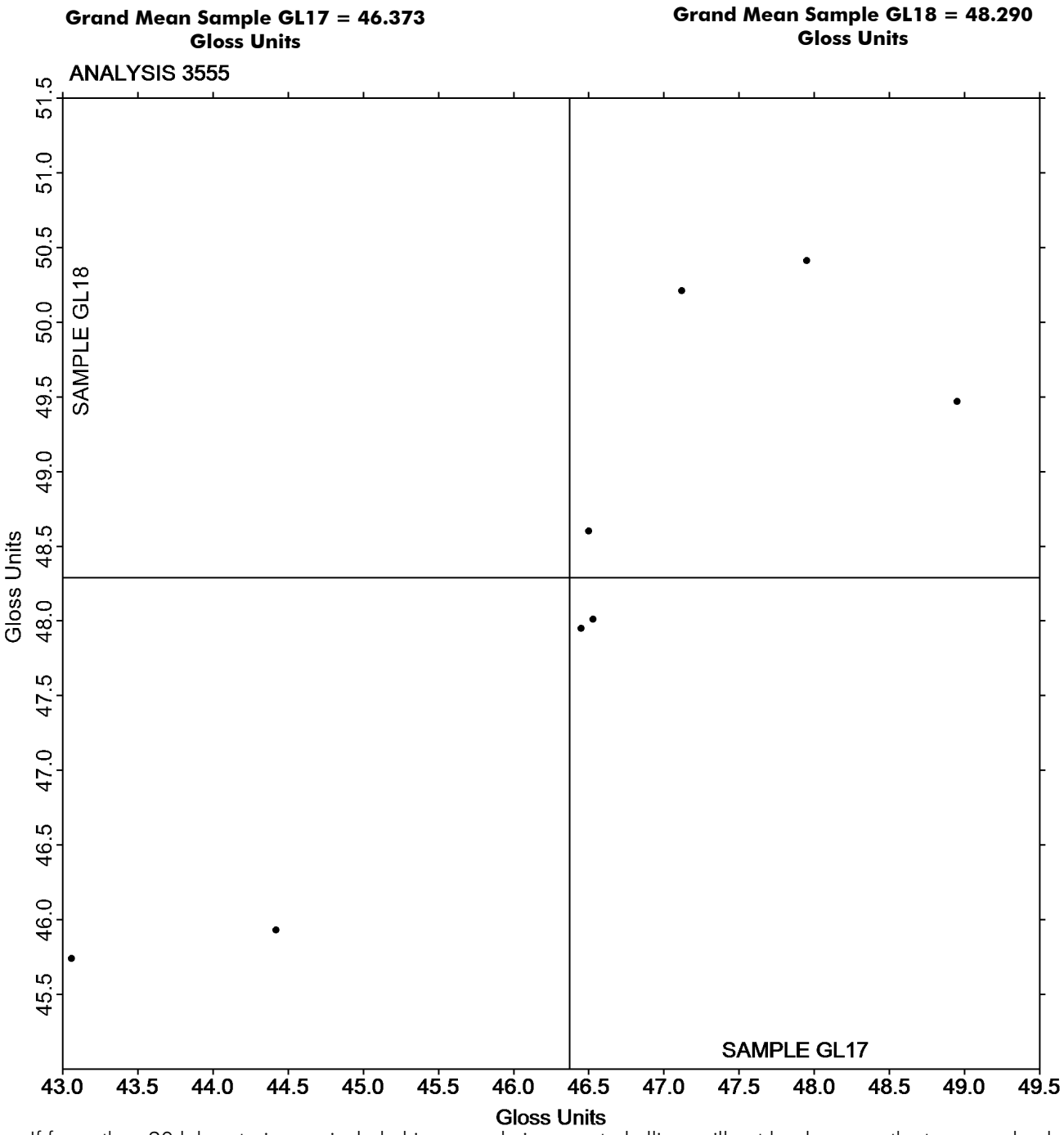
WebCode	Data Flag	Sample GL17 Lab Mean	Sample GL17 Diff from Grand Mean	Sample GL17 CPV	Sample GL18 Lab Mean	Sample GL18 Diff from Grand Mean	Sample GL18 CPV	Instr Code
3VYUFV		48.95	2.58	1.38	49.47	1.18	0.67	XX
4J6N7W		43.06	-3.31	-1.77	45.74	-2.55	-1.44	WJ
8CUDPE		46.53	0.16	0.08	48.01	-0.28	-0.16	TP
8MC68W		44.42	-1.95	-1.04	45.93	-2.36	-1.33	GM
8R4M8U		47.12	0.75	0.40	50.21	1.92	1.08	LW
HGAQUJ		46.45	0.08	0.04	47.95	-0.34	-0.19	GS
HRR62R		47.95	1.58	0.84	50.41	2.12	1.20	PP
RLPJZ2		46.50	0.13	0.07	48.60	0.31	0.18	TH

Summary Statistics	Sample GL17	Sample GL18
Grand Means	46.37 Gloss Units	48.29 Gloss Units
Stnd Dev Btwn Labs	1.87 Gloss Units	1.77 Gloss Units

Statistics based on 8 of 8 reporting participants.

Key to Instrument Codes Reported by Participants

GM	BYK-Gardner micro-gloss	GS	BYK-Gardner Glossgard II
LW	L & W Gloss Tester	PP	Technidyne Profile/Plus
TH	Technidyne T480A	TP	Technidyne Profile Plus
WJ	Zehntner ZLR 1020	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 3601

Folding Endurance (MIT) - Double Folds

TAPPI Official Test Method T511

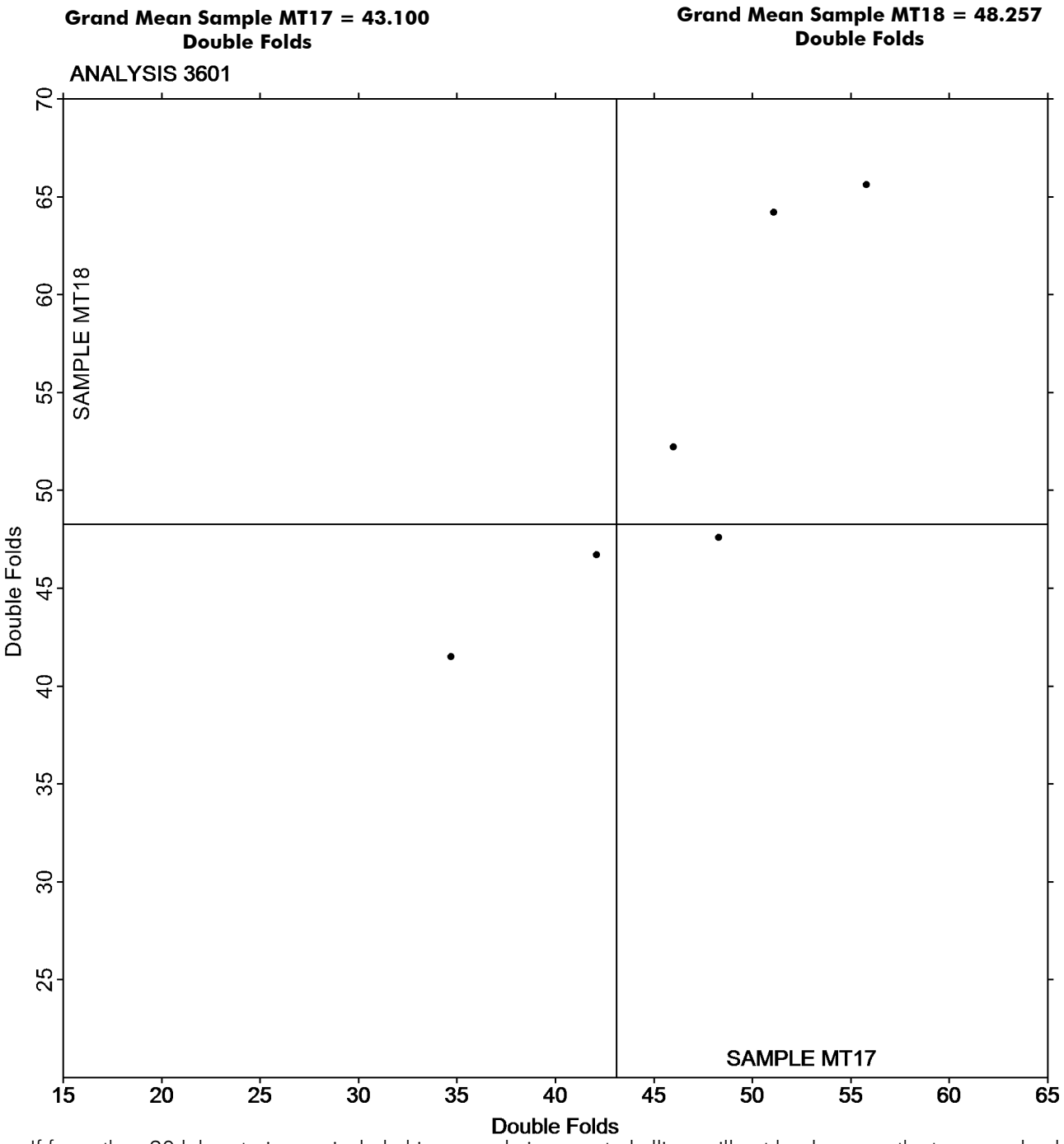
WebCode	Data Flag	Sample MT17 Lab Mean	Sample MT17 Diff from Grand Mean	Sample MT17 CPV	Sample MT18 Lab Mean	Sample MT18 Diff from Grand Mean	Sample MT18 CPV	Instr Code
8LXTDX		42.10	-1.00	-0.09	46.70	-1.56	-0.10	MT
8XDJDN		34.70	-8.40	-0.77	41.50	-6.76	-0.44	XX
A3JYVC		46.00	2.90	0.27	52.20	3.94	0.26	MT
BWPJKA		51.10	8.00	0.74	64.20	15.94	1.04	XX
GER8FG		48.30	5.20	0.48	47.60	-0.66	-0.04	MT
RLPJZ2		23.70	-19.40	-1.79	20.00	-28.26	-1.84	MT
YKU7FV		55.80	12.70	1.17	65.60	17.34	1.13	MT

Summary Statistics	Sample MT17	Sample MT18
Grand Means	43.10 Double Folds	48.26 Double Folds
Stnd Dev Btwn Labs	10.87 Double Folds	15.37 Double Folds

Statistics based on 7 of 7 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 BG17 Lab Mean	Sample BG17 Diff from Grand Mean	Sample BG17 CPV	Sample BG18 Lab Mean	Sample BG18 Diff from Grand Mean	Sample BG18 CPV	Instr Code
4ERM8K		157.0	12.3	1.53	151.5	9.1	1.47	ZZ
6L7V72		148.7	4.0	0.50	139.9	-2.5	-0.40	ZZ
7DAFY9		152.5	7.8	0.97	148.1	5.7	0.92	ZZ
A3JYVC	X	229.8	85.1	10.55	220.2	77.8	12.51	ZZ
GER8FG		132.1	-12.6	-1.57	135.8	-6.6	-1.06	ZZ
JEZ6JN		136.5	-8.2	-1.01	132.8	-9.6	-1.54	ZZ
LKH7ZD		150.5	5.8	0.72	148.7	6.4	1.03	ZZ
PBHVVY		138.3	-6.4	-0.79	138.9	-3.4	-0.55	ZZ
QZD7Q3		138.2	-6.5	-0.80	137.8	-4.6	-0.73	ZZ
RLPJZ2		148.4	3.7	0.46	144.1	1.7	0.28	ZZ
ZGPZFF		144.7	0.0	0.00	146.1	3.7	0.59	ZZ

Summary Statistics	Sample BG17	Sample BG18
Grand Means	144.71 Gurley Units	142.36 Gurley Units
Stnd Dev Btwn Labs	8.07 Gurley Units	6.22 Gurley Units

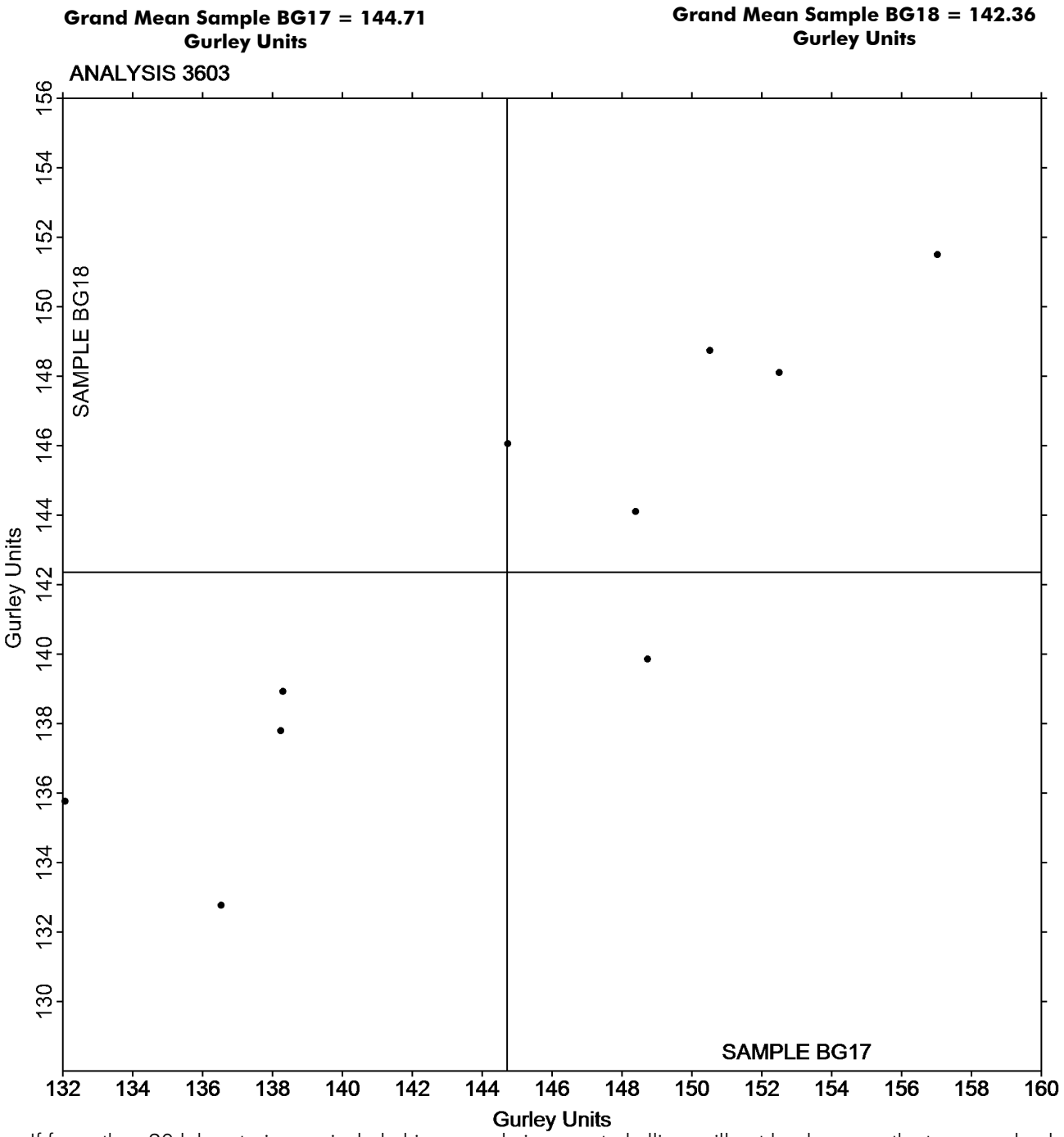
Statistics based on 10 of 11 reporting participants.

Comments on Assigned Data Flags for Test #3603

A3JYVC (X) - Extreme Data.

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 CF17 Lab Mean	Sample CF17 Diff from Grand Mean	Sample CF17 CPV	Sample CF18 Lab Mean	Sample CF18 Diff from Grand Mean	Sample CF18 CPV	Instr Code
3DHCXV		0.5980	0.0254	0.25	0.5378	-0.0589	-0.88	TA
6CG6LU	X	527.2000	526.6274	5,211.08	484.2000	483.6033	7,244.77	XX
8CUDPE		0.6552	0.0826	0.82	0.6108	0.0141	0.21	TA
CD6AUT		0.3260	-0.2466	-2.44	0.5380	-0.0587	-0.88	XX
GER8FG		0.6320	0.0594	0.59	0.6696	0.0729	1.09	XX
GXEXDR		0.6563	0.0837	0.83	0.6363	0.0396	0.59	TN
JEZ6JN		0.6020	0.0294	0.29	0.6700	0.0733	1.10	TP
LKH7ZD		0.6520	0.0794	0.79	0.6740	0.0773	1.16	TA
PBHVVY		0.5322	-0.0404	-0.40	0.5166	-0.0801	-1.20	TA
TN83E4		0.5650	-0.0076	-0.08	0.6076	0.0109	0.16	TA
TWL2VZ		0.5074	-0.0652	-0.65	0.5060	-0.0907	-1.36	XX

Summary Statistics	Sample CF17	Sample CF18
Grand Means	0.57 COF	0.60 COF
Stnd Dev Btwn Labs	0.10 COF	0.07 COF

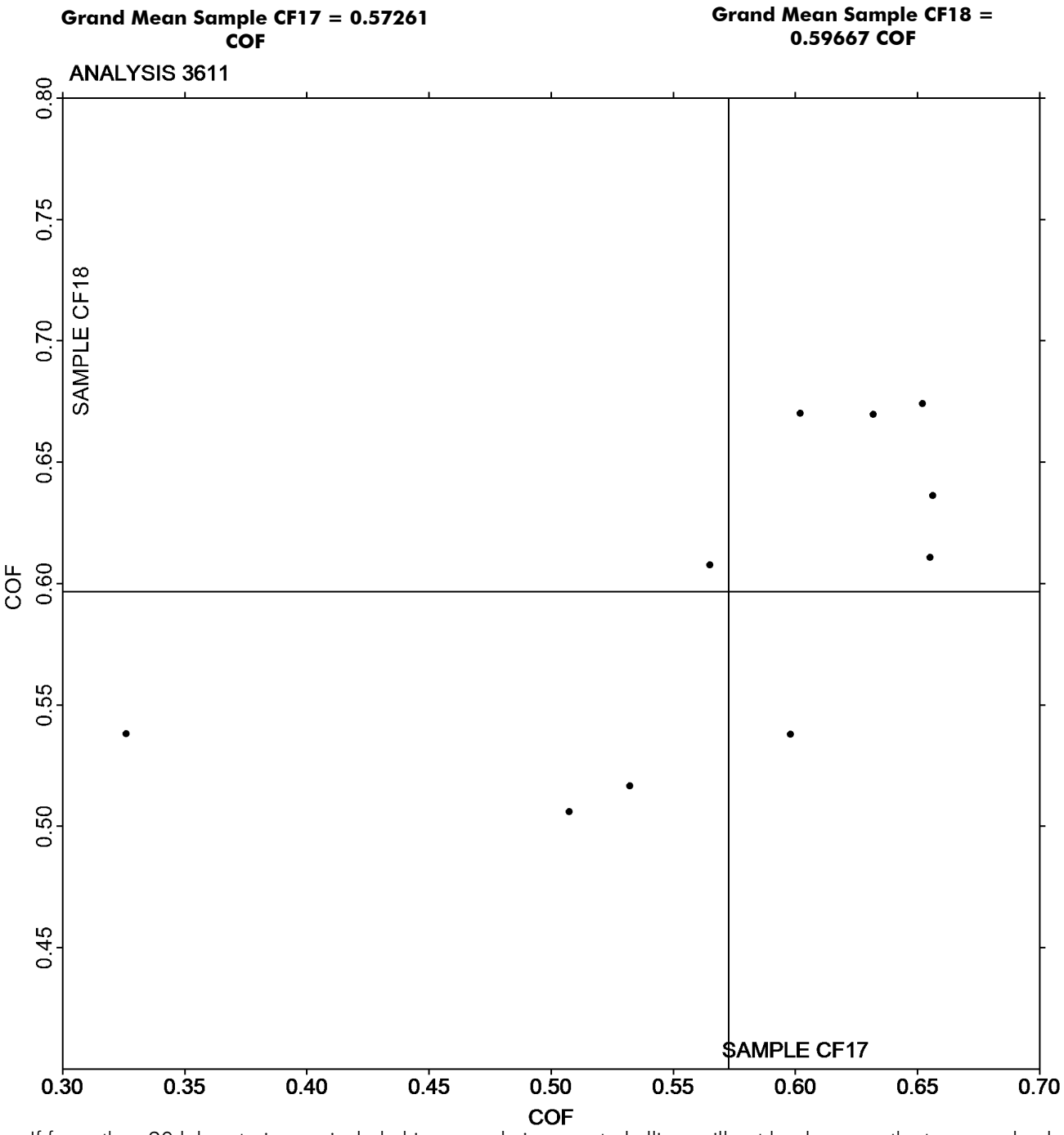
Statistics based on 10 of 11 reporting participants.

Comments on Assigned Data Flags for Test #3611

6CG6LU (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

TA	Thwing-Albert Friction Tester	TN	TMI 32-07 Monitor/Slip and Friction
TP	TMI 32-25 COF Tester (Inclined Plane)	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 CF17 Lab Mean	Sample CF17 Diff from Grand Mean	Sample CF17 CPV	Sample CF18 Lab Mean	Sample CF18 Diff from Grand Mean	Sample CF18 CPV	Instr Code
3DHCXV		0.4328	-0.0530	-0.61	0.3966	-0.0947	-1.52	TA
6CG6LU	X	475.0000	474.5142	5,429.64	472.8000	472.3087	7,586.57	XX
8CUDPE		0.5502	0.0644	0.74	0.4696	-0.0217	-0.35	TA
CD6AUT		0.2800	-0.2058	-2.35	0.4740	-0.0173	-0.28	XX
GER8FG		0.5196	0.0338	0.39	0.5678	0.0765	1.23	XX
GXEXDR		0.5648	0.0790	0.90	0.5495	0.0582	0.94	TN
LKH7ZD		0.5420	0.0562	0.64	0.5440	0.0527	0.85	TA
PBHVVY		0.4722	-0.0136	-0.16	0.4500	-0.0413	-0.66	TA
TN83E4		0.5178	0.0320	0.37	0.5462	0.0549	0.88	TA
TWL2VZ		0.4926	0.0068	0.08	0.4240	-0.0673	-1.08	XX

Summary Statistics	Sample CF17	Sample CF18
Grand Means	0.49 COF	0.49 COF
Stnd Dev Btwn Labs	0.09 COF	0.06 COF

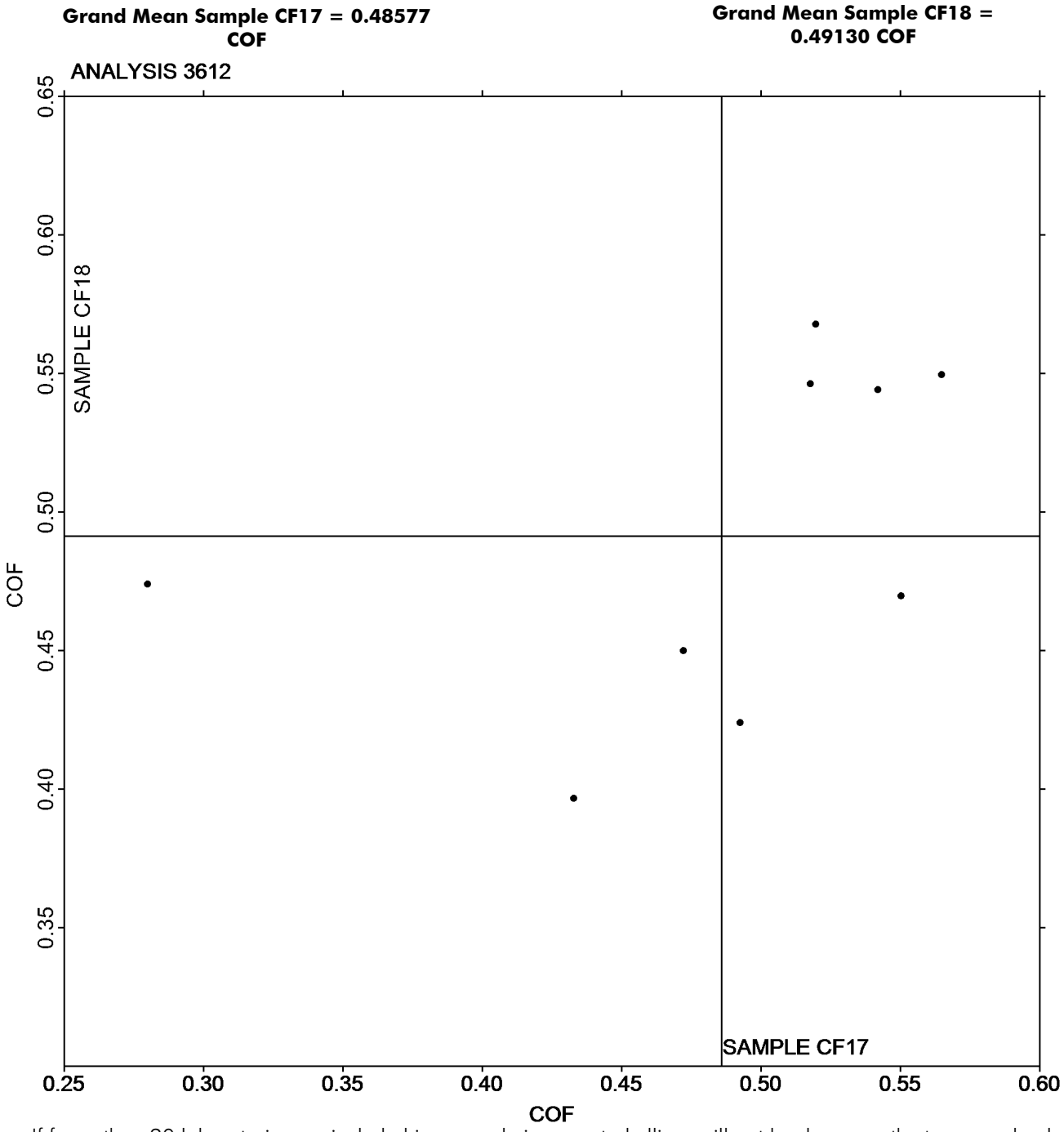
Statistics based on 9 of 10 reporting participants.

Comments on Assigned Data Flags for Test #3612

6CG6LU (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

TA	Thwing-Albert Friction Tester	TN	TMI 32-07 Monitor/Slip and Friction
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

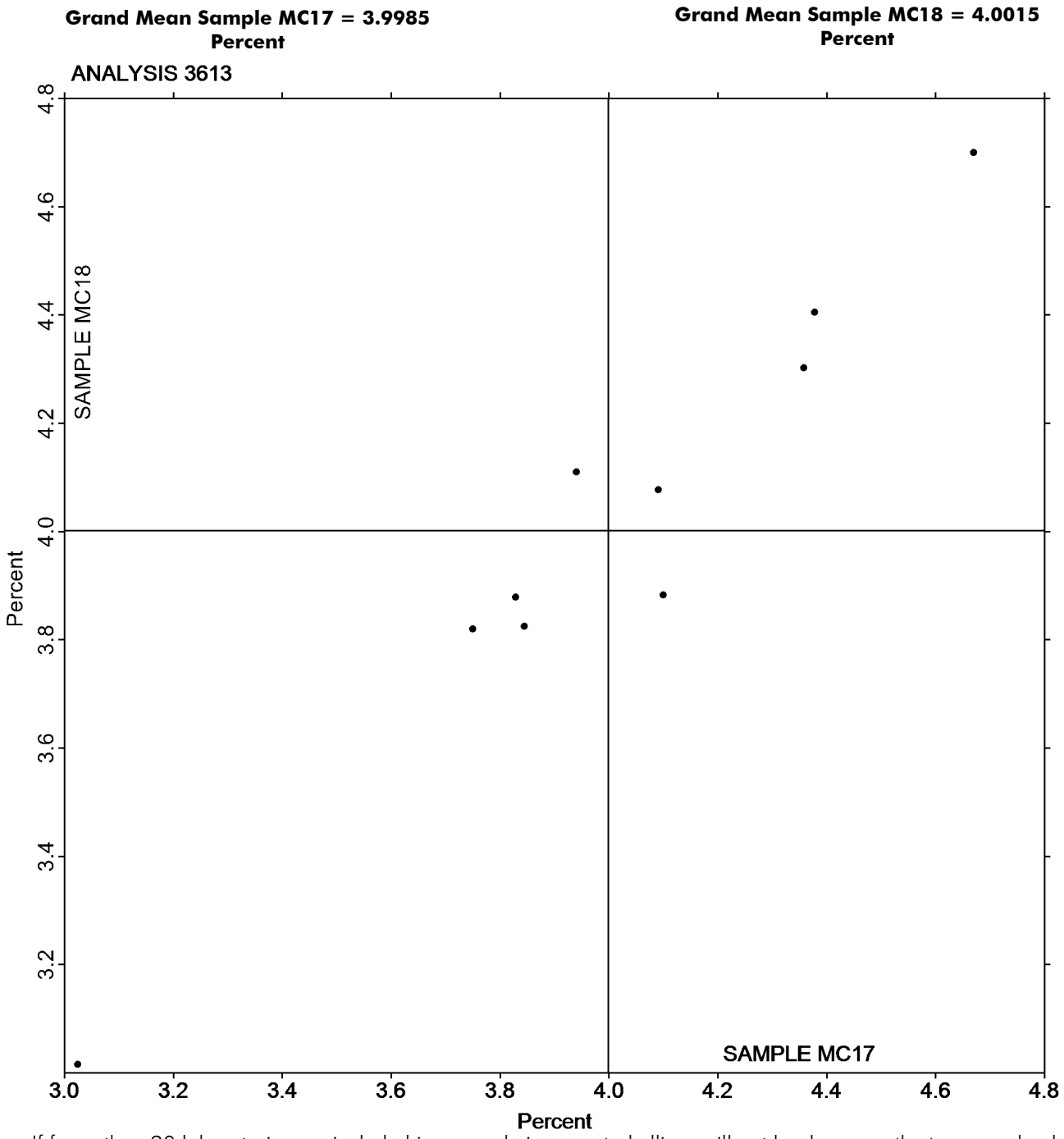
WebCode	Data Flag	Sample MC17 Lab Mean	Sample MC17 Diff from Grand Mean	Sample MC17 CPV	Sample MC18 Lab Mean	Sample MC18 Diff from Grand Mean	Sample MC18 CPV	Instr Code
4J6N7W		3.845	-0.154	-0.34	3.825	-0.177	-0.39	ZZ
6L7V72		4.091	0.092	0.21	4.077	0.076	0.17	ZZ
9JRHZV		3.750	-0.249	-0.55	3.820	-0.182	-0.40	ZZ
DKNRUL		3.024	-0.975	-2.17	3.015	-0.987	-2.19	ZZ
LKH7ZD		4.358	0.359	0.80	4.302	0.300	0.67	ZZ
QRH3M6		3.829	-0.170	-0.38	3.879	-0.123	-0.27	ZZ
T2FXH7		3.940	-0.059	-0.13	4.110	0.108	0.24	ZZ
YKTDHM		4.378	0.380	0.85	4.404	0.403	0.89	ZZ
YL9UJ9		4.100	0.101	0.23	3.883	-0.119	-0.26	ZZ
ZJDFN3		4.670	0.671	1.50	4.700	0.698	1.55	ZZ

Summary Statistics	Sample MC17	Sample MC18
Grand Means	4.00 Percent	4.00 Percent
Stnd Dev Btwn Labs	0.45 Percent	0.45 Percent

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



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

Paper & Paperboard Interlaboratory Testing Program

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

WebCode	Data Flag	Sample HS17 Lab Mean	Sample HS17 Diff from Grand Mean	Sample HS17 CPV	Sample HS18 Lab Mean	Sample HS18 Diff from Grand Mean	Sample HS18 CPV	Instr Code
3DHCXV		61.94	-13.08	-0.59	68.06	-2.29	-0.10	HE
3MN773		65.55	-9.47	-0.43	58.53	-11.82	-0.54	HE
489LKF		70.35	-4.67	-0.21	67.12	-3.23	-0.15	HE
4ERM8K		102.27	27.25	1.24	90.88	20.53	0.93	XX
4MJ9BX		60.00	-15.02	-0.68	50.10	-20.25	-0.92	HE
6CG6LU		46.03	-28.99	-1.31	43.43	-26.92	-1.22	HE
7DAFY9		78.00	2.98	0.13	77.20	6.85	0.31	HE
8CUDPE		82.49	7.47	0.34	78.29	7.94	0.36	HE
8MC68W		92.70	17.68	0.80	95.50	25.15	1.14	HE
A3JYVC		71.03	-3.99	-0.18	62.39	-7.96	-0.36	HE
B3TFCM		83.99	8.97	0.41	72.85	2.50	0.11	HE
CD6AUT		64.98	-10.04	-0.46	61.32	-9.03	-0.41	XX
DAGWPH	*	95.37	20.35	0.92	70.74	0.39	0.02	HE
E4VEYQ		28.13	-46.89	-2.13	28.38	-41.97	-1.91	XX
FYDNXN		88.40	13.38	0.61	91.20	20.85	0.95	HE
GXEXDR		89.20	14.18	0.64	76.80	6.45	0.29	HE
H3Q7CB		58.30	-16.72	-0.76	51.90	-18.45	-0.84	HE
JEZ6JN		26.79	-48.23	-2.19	25.41	-44.94	-2.04	HE
LKH7ZD		91.48	16.46	0.75	85.08	14.73	0.67	HE
P9QVXM		95.93	20.91	0.95	97.01	26.66	1.21	HE
PBHVVY		98.04	23.02	1.04	100.27	29.92	1.36	HE
Q98BK4		62.73	-12.29	-0.56	49.68	-20.67	-0.94	HE
QEZB6Q		50.12	-24.90	-1.13	47.05	-23.30	-1.06	HE
TWL2VZ		83.71	8.69	0.39	84.36	14.01	0.64	XX
XM6V2T		119.60	44.58	2.02	114.70	44.35	2.01	XX
ZDTBZ9		67.60	-7.42	-0.34	61.68	-8.67	-0.39	HE
ZGPZFF		90.90	15.88	0.72	89.50	19.15	0.87	HE

Summary Statistics	Sample HS17	Sample HS18
Grand Means	75.02 Seconds	70.35 Seconds
Stnd Dev Btwn Labs	22.05 Seconds	22.02 Seconds

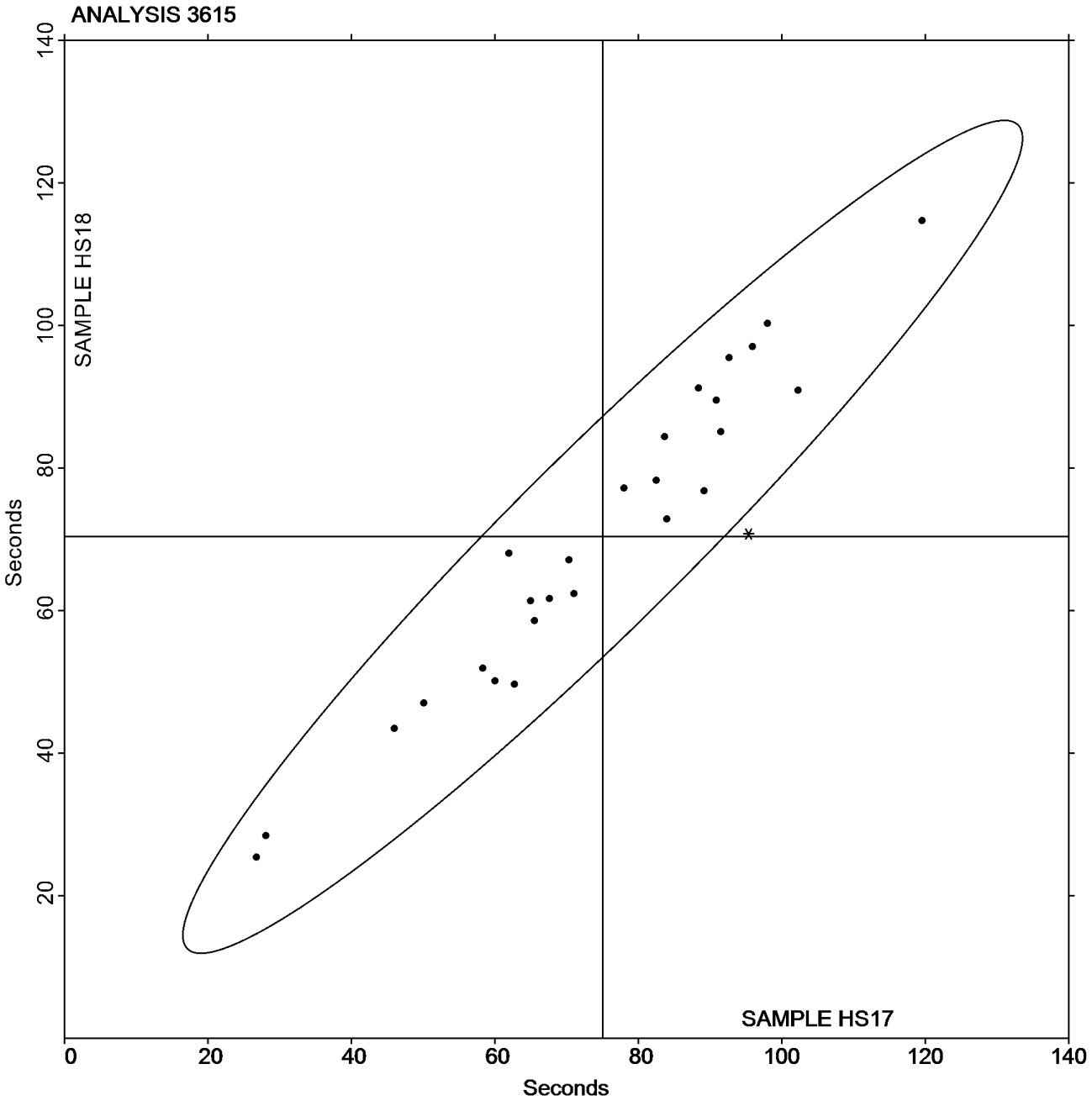
Statistics based on 27 of 27 reporting participants.

Key to Instrument Codes Reported by Participants

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

Grand Mean Sample HS17 = 75.023 Seconds

Grand Mean Sample HS18 = 70.349 Seconds



-End of Report-