Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #4262 - October 2023

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 industries including color, rubber, plastics, fasteners and metals, containerboard, paper, agriculture, hemp, and wine, as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality assurance objectives. Labs from the U.S., as well as more than 100 countries, currently participate in the CTS programs.

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

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Key for Web Summary Reports (Page 1 of 2)

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

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

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

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

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

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

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

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

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

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

Common Problems Highlighted in Footnotes

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

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

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

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

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

Paper & Paperboard Interlaboratory Testing Program

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

WebCode	Data Flag	Sample CK21 Lab Mean	Sample CK21 Diff from Grand Mean	Sample CK21 CPV	Sample CK22 Lab Mean	Sample CK22 Diff from Grand Mean	Sample CK22 CPV	Instr Code
2UC9H8		7.825	0.164	1.55	9.774	0.166	1.23	LW
2WNNET		7.669	0.008	0.08	9.540	-0.068	-0.50	XX
3BHRWP		7.650	-0.011	-0.10	9.550	-0.058	-0.43	XX
428PBN		7.670	0.009	0.09	9.690	0.082	0.61	LW
473J9P		7.602	-0.059	-0.55	9.594	-0.014	-0.10	LW
4BAABV		7.770	0.109	1.03	9.804	0.196	1.45	PP
7LQEVZ		7.731	0.070	0.66	9.701	0.093	0.69	TA
AWUXMH		7.568	-0.093	-0.88	9.505	-0.103	-0.76	LC
BREQYJ	X	7.220	-0.441	-4.18	9.030	-0.578	-4.28	TM
C7QKPY		7.770	0.109	1.03	9.735	0.127	0.94	LW
C874AW		7.755	0.094	0.89	9.642	0.034	0.25	LW
CC2Y9J		7.448	-0.213	-2.02	9.328	-0.280	-2.07	XX
CKRJCV		7.693	0.032	0.30	9.742	0.134	0.99	EM
E74UTJ		7.556	-0.105	-0.99	9.530	-0.078	-0.58	LA
F64FHW		7.421	-0.240	-2.27	9.326	-0.282	-2.09	XX
GGE6YD		7.764	0.103	0.98	9.737	0.129	0.95	XX
GHNAC2		7.641	-0.020	-0.19	9.567	-0.041	-0.30	EM
HPNW2F		7.768	0.107	1.02	9.726	0.118	0.87	LW
LYXR8H		7.531	-0.130	-1.23	9.452	-0.156	-1.16	LW
N8MZ7D		7.732	0.071	0.68	9.728	0.120	0.89	LW
NE4VL9		7.614	-0.047	-0.44	9.551	-0.057	-0.42	OK
PCCYWE		7.555	-0.106	-1.00	9.537	-0.071	-0.53	XX
PHJPZK		7.605	-0.056	-0.53	9.599	-0.009	-0.07	EM
PMYXNJ		7.774	0.113	1.07	9.661	0.053	0.39	EM
PQWEZD		7.559	-0.102	-0.97	9.496	-0.112	-0.83	LC
PV9PQM		7.815	0.154	1.46	9.757	0.149	1.10	LA
Q99NEJ	*	7.776	0.115	1.10	9.884	0.276	2.04	LB
TZ8A8E		7.766	0.105	1.00	9.678	0.070	0.52	EM
UNRFT2		7.595	-0.066	-0.62	9.460	-0.148	-1.10	TA
XC96RE		7.610	-0.051	-0.48	9.470	-0.138	-1.02	XX
XEA7UW		7.642	-0.019	-0.18	9.520	-0.089	-0.65	TM
XHBEX8		7.613	-0.048	-0.46	9.569	-0.039	-0.29	LW

Summary Statistics	Sample CK21	Sample CK22
Grand Means	7.66 mils	9.61 mils
Stnd Dev Btwn Labs	0.11 mils	0.14 mils

Statistics based on 31 of 32 reporting participants.

Comments on Assigned Data Flags for Test #3501

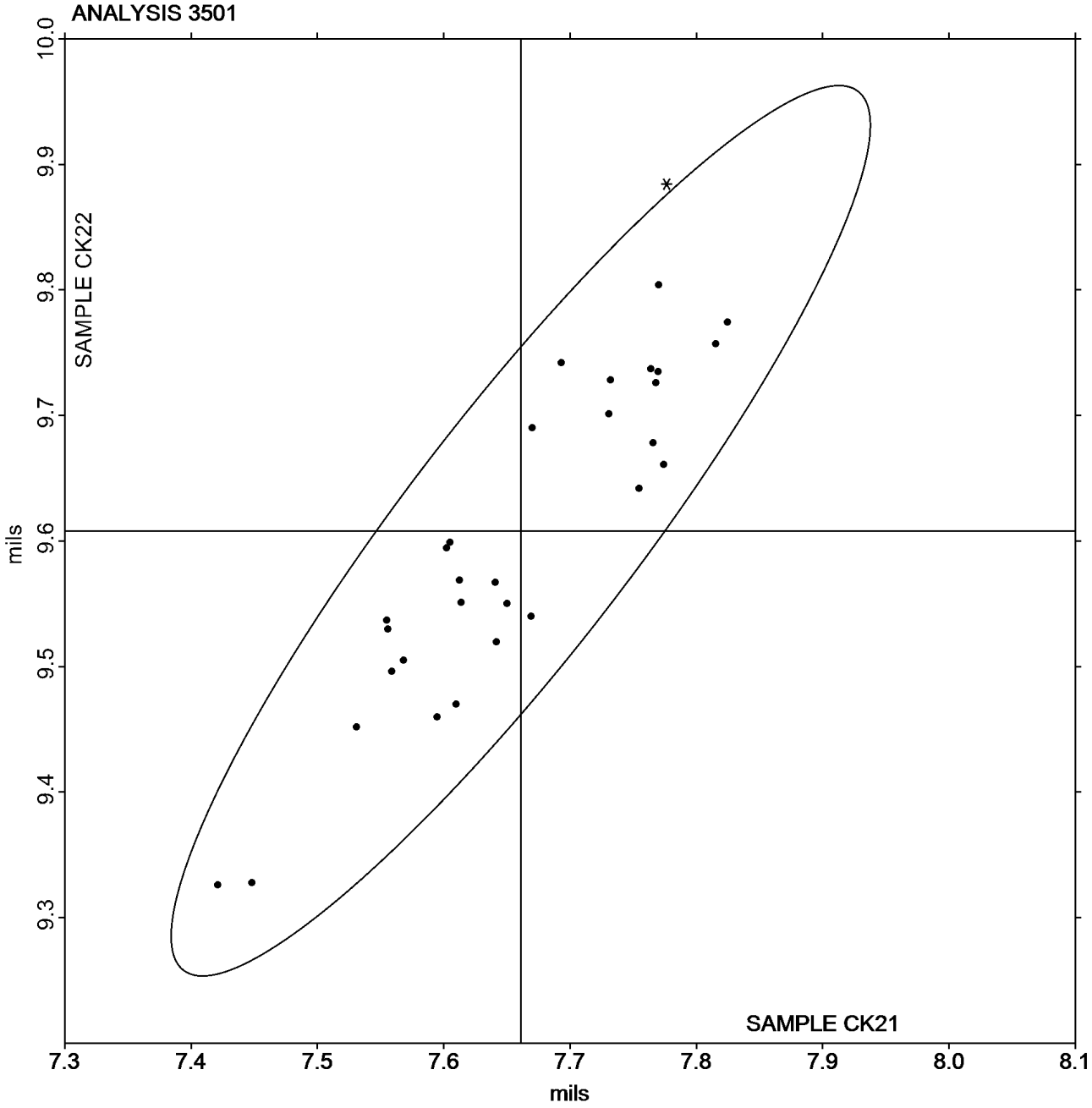
BREQYJ (X) - Data for both samples are low.

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
TM	TMI	XX	Instrument make/model not specified by lab

Grand Mean Sample CK21 = 7.6609 mils

Grand Mean Sample CK22 = 9.6082 mils



Paper & Paperboard Interlaboratory Testing Program

Analysis 3511

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

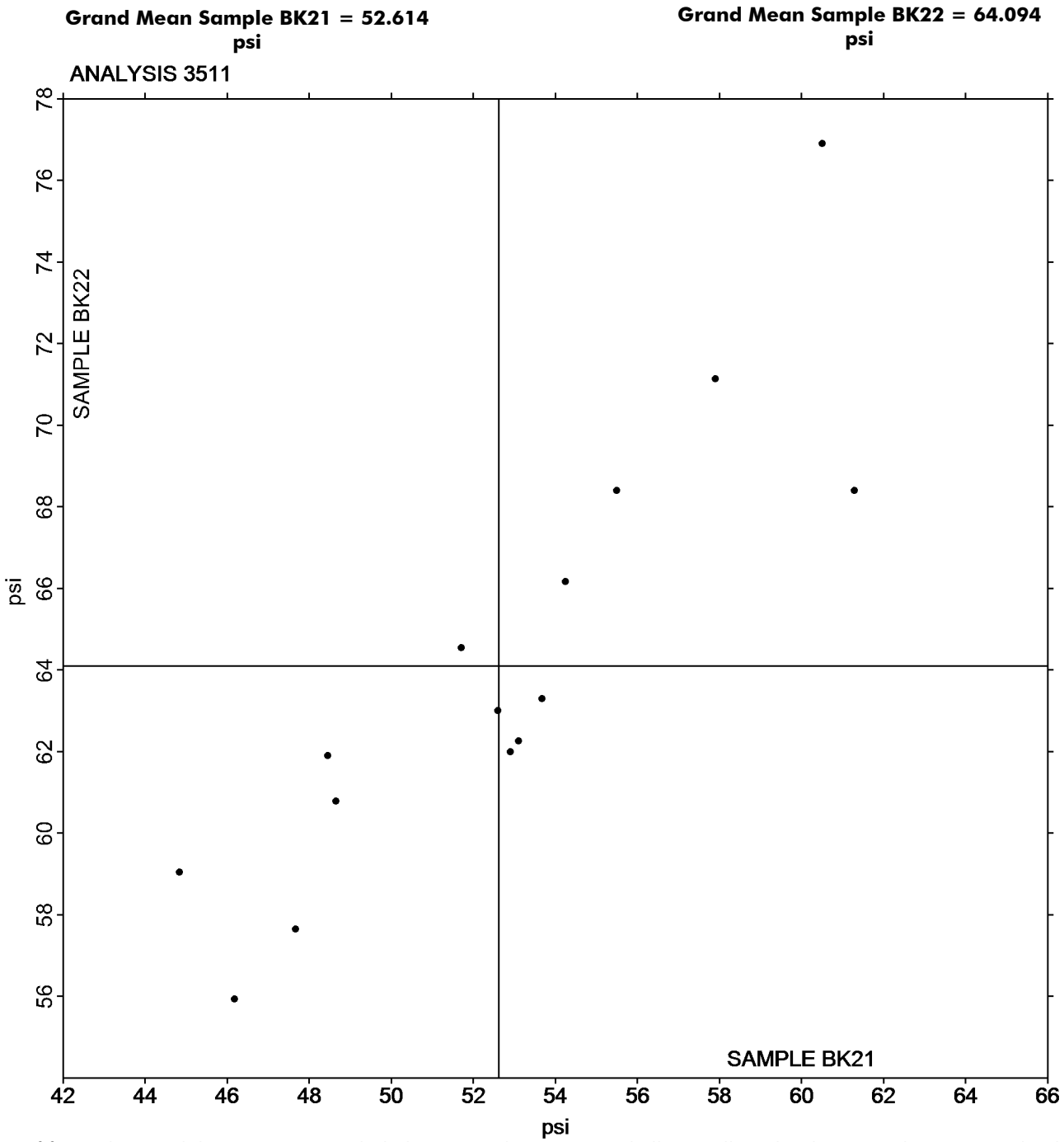
WebCode	Data Flag	Sample BK21 Lab Mean	Sample BK21 Diff from Grand Mean	Sample BK21 CPV	Sample BK22 Lab Mean	Sample BK22 Diff from Grand Mean	Sample BK22 CPV	Instr Code
2UC9H8		53.11	0.49	0.10	62.26	-1.84	-0.34	ZZ
7YUW7Z		55.50	2.89	0.59	68.40	4.31	0.79	ZZ
AJ7V4Q		46.18	-6.43	-1.31	55.93	-8.17	-1.50	ZZ
C7QKPY		48.65	-3.96	-0.81	60.78	-3.31	-0.61	ZZ
C874AW		51.71	-0.91	-0.18	64.54	0.45	0.08	ZZ
EFA29J		52.90	0.29	0.06	62.00	-2.09	-0.38	ZZ
J9B3KQ		47.67	-4.95	-1.01	57.64	-6.45	-1.19	ZZ
MB8RGF		53.68	1.07	0.22	63.30	-0.79	-0.15	ZZ
N8MZ7D		54.24	1.63	0.33	66.17	2.07	0.38	ZZ
NE4VL9		52.60	-0.01	0.00	63.00	-1.09	-0.20	ZZ
NRNBP8		61.29	8.67	1.76	68.40	4.31	0.79	ZZ
TX3HE2		60.50	7.89	1.60	76.90	12.81	2.35	ZZ
UNRFT2		48.45	-4.16	-0.85	61.90	-2.19	-0.40	ZZ
XEA7UW		57.90	5.29	1.08	71.14	7.05	1.30	ZZ
XHBEX8		44.83	-7.78	-1.58	59.05	-5.05	-0.93	ZZ

Summary Statistics	Sample BK21	Sample BK22
Grand Means	52.61 psi	64.09 psi
Stnd Dev Btwn Labs	4.91 psi	5.44 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 RK21 Lab Mean	Sample RK21 Diff from Grand Mean	Sample RK21 CPV	Sample RK22 Lab Mean	Sample RK22 Diff from Grand Mean	Sample RK22 CPV	Instr Code
2UC9H8		104.59	6.37	0.46	144.2	9.4	0.48	ZZ
6L8BMZ		115.17	16.95	1.21	160.6	25.8	1.31	ZZ
7LQEVZ		95.00	-3.22	-0.23	126.9	-7.9	-0.40	ZZ
7YUW7Z		92.00	-6.22	-0.45	133.3	-1.5	-0.08	ZZ
C7QKPY		106.48	8.26	0.59	141.8	7.0	0.36	ZZ
C874AW		96.50	-1.72	-0.12	128.3	-6.5	-0.33	ZZ
CKRJCV		98.23	0.01	0.00	127.4	-7.4	-0.38	ZZ
CMJF2P		75.84	-22.38	-1.60	106.4	-28.4	-1.44	ZZ
E74UTJ		92.51	-5.71	-0.41	121.3	-13.5	-0.69	ZZ
F64FHW		97.68	-0.54	-0.04	145.4	10.6	0.54	ZZ
GGE6YD		115.50	17.28	1.24	152.8	18.0	0.92	ZZ
GM3TTJ		105.40	7.18	0.51	144.8	10.0	0.51	ZZ
HPNW2F		106.40	8.18	0.59	149.5	14.7	0.75	ZZ
J9B3KQ		88.60	-9.62	-0.69	124.4	-10.4	-0.53	ZZ
KMB4XR		99.60	1.38	0.10	130.4	-4.4	-0.22	ZZ
L99UTH	*	95.28	-2.94	-0.21	151.2	16.4	0.84	ZZ
LYXR8H		92.90	-5.32	-0.38	133.2	-1.6	-0.08	ZZ
MB8RGF		65.80	-32.42	-2.32	90.7	-44.1	-2.24	ZZ
NE4VL9		99.40	1.18	0.08	138.0	3.2	0.16	ZZ
PHJPZK	*	139.19	40.97	2.93	188.6	53.9	2.74	ZZ
PQWEZD		98.32	0.10	0.01	131.6	-3.2	-0.16	ZZ
QXP7LC		102.62	4.40	0.32	141.6	6.8	0.35	ZZ
TZ8A8E		90.66	-7.56	-0.54	120.7	-14.1	-0.72	ZZ
XC96RE		105.20	6.98	0.50	147.6	12.8	0.65	ZZ
XEA7UW		72.30	-25.92	-1.86	94.3	-40.5	-2.06	ZZ
XHBEX8		101.28	3.06	0.22	132.8	-2.0	-0.10	ZZ
XN2N87		99.48	1.26	0.09	131.7	-3.1	-0.16	ZZ

Summary Statistics	Sample RK21	Sample RK22
Grand Means	98.22 Grams	134.79 Grams
Stnd Dev Btwn Labs	13.96 Grams	19.64 Grams

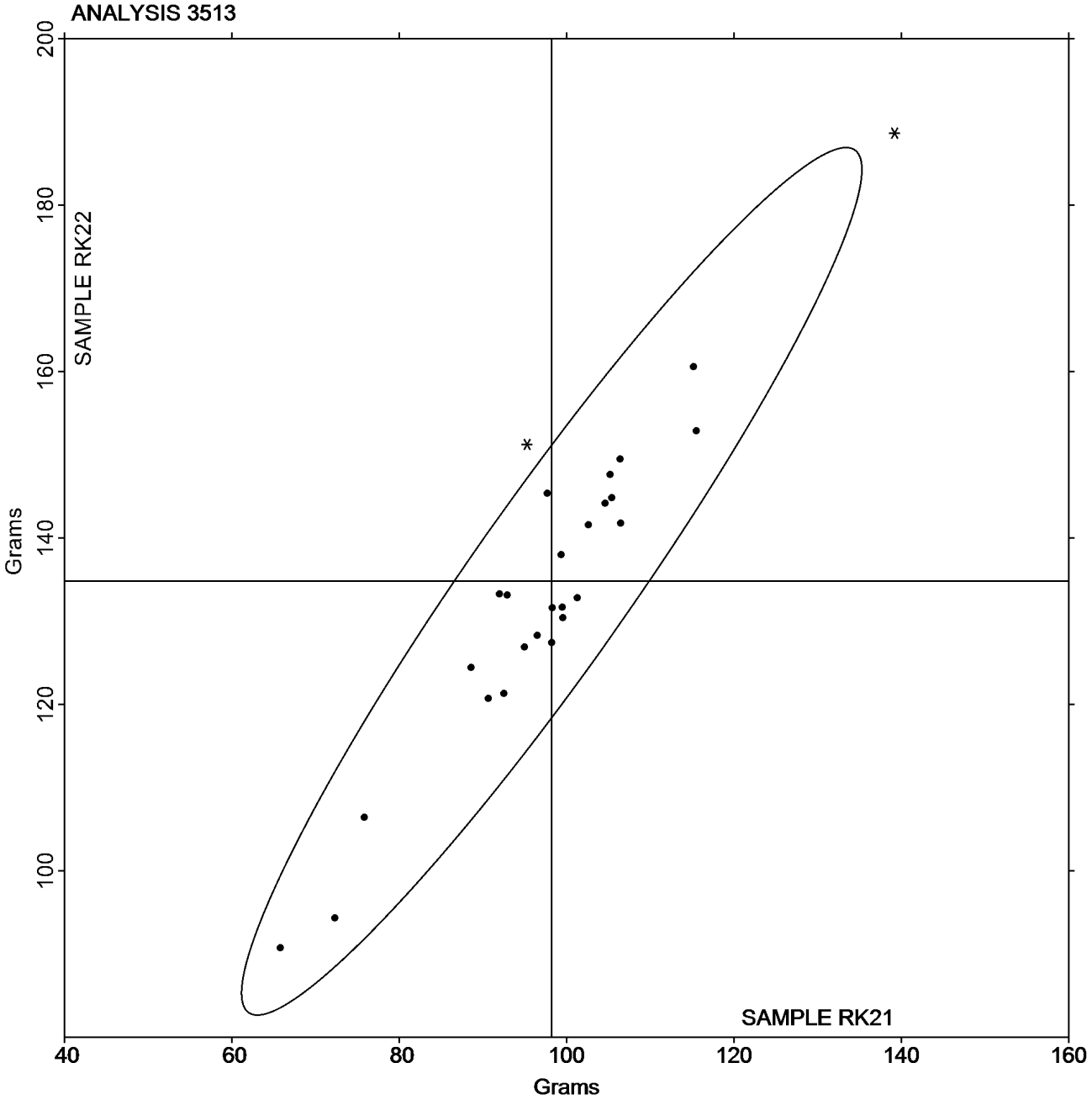
Statistics based on 27 of 27 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample RK21 = 98.219 Grams

Grand Mean Sample RK22 = 134.79 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK21 Lab Mean	Sample NK21 Diff from Grand Mean	Sample NK21 CPV	Sample NK22 Lab Mean	Sample NK22 Diff from Grand Mean	Sample NK22 CPV	Instr Code
2UC9H8		11.00	0.34	0.53	11.09	0.45	0.72	TX
3BHRWP		9.56	-1.10	-1.73	9.64	-0.99	-1.57	XX
428PBN	X	10.20	-0.46	-0.72	10.84	0.21	0.33	TH
6L8BMZ		10.37	-0.30	-0.46	10.45	-0.18	-0.29	TR
7LQEVZ		10.35	-0.31	-0.49	10.30	-0.33	-0.53	TB
7YUW7Z		10.80	0.13	0.21	10.94	0.31	0.49	LE
AJ7V4Q		11.14	0.47	0.74	11.14	0.50	0.80	LW
BEU84U		9.99	-0.67	-1.05	9.81	-0.82	-1.30	TS
C7QKPY		10.55	-0.12	-0.18	10.54	-0.10	-0.15	LH
C874AW		10.47	-0.19	-0.30	10.58	-0.05	-0.08	LE
CC2Y9J		10.33	-0.33	-0.52	10.31	-0.32	-0.51	TB
DLKP9F		11.42	0.75	1.18	11.41	0.78	1.23	LI
E74UTJ		11.14	0.48	0.75	10.88	0.25	0.39	LA
GGE6YD		10.55	-0.12	-0.18	10.61	-0.02	-0.04	ID
GM3TTJ		11.39	0.73	1.14	11.18	0.55	0.87	LA
HPNUCC		11.49	0.82	1.29	11.52	0.89	1.41	DM
HPNW2F		10.88	0.22	0.34	10.88	0.24	0.39	LE
HYUYZL		10.49	-0.18	-0.28	10.53	-0.11	-0.17	IM
J9B3KQ		10.33	-0.33	-0.52	10.25	-0.38	-0.60	TX
KDN3GH		9.79	-0.88	-1.38	9.78	-0.85	-1.36	IR
KMB4XR		11.08	0.42	0.65	10.70	0.07	0.11	XX
LYXR8H		10.58	-0.09	-0.14	10.63	0.00	0.00	LW
MB8RGF		10.42	-0.24	-0.38	10.55	-0.08	-0.13	IM
NRNBP8		10.89	0.23	0.36	10.58	-0.05	-0.07	PT
PHJPZK		9.09	-1.57	-2.46	9.26	-1.37	-2.17	LW
PMYXNJ		11.56	0.90	1.40	11.65	1.02	1.62	LE
PQWEZD	*	10.43	-0.24	-0.37	9.92	-0.71	-1.13	IF
Q99NEJ		11.42	0.75	1.18	11.36	0.73	1.16	LC
QXP7LC		10.18	-0.49	-0.76	10.24	-0.39	-0.63	LE
RF467Z		11.81	1.15	1.80	11.89	1.26	2.00	LA
UNRFT2	X	6.37	-4.30	-6.73	6.41	-4.22	-6.71	TO
UTMAQ3	X	11.31	0.65	1.01	10.12	-0.51	-0.82	TH
WLFMPC	X	10.34	-0.32	-0.50	11.13	0.50	0.79	LH
WR6ZQZ		9.76	-0.90	-1.41	9.71	-0.92	-1.46	TT
XC96RE		11.66	1.00	1.56	11.54	0.91	1.44	XX
XHBEX8		10.27	-0.39	-0.62	10.25	-0.38	-0.60	IM
XN2N87		10.73	0.07	0.11	10.74	0.11	0.17	LE

Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample NK21	Sample NK22
Grand Means	10.66 kN/m	10.63 kN/m
Stnd Dev Btwn Labs	0.64 kN/m	0.63 kN/m

Statistics based on 33 of 37 reporting participants.

Comments on Assigned Data Flags for Test #3515

WLFMPC (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample NK21.

428PBN (X) - Inconsistent in testing between samples.

UTMAQ3 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample NK22.

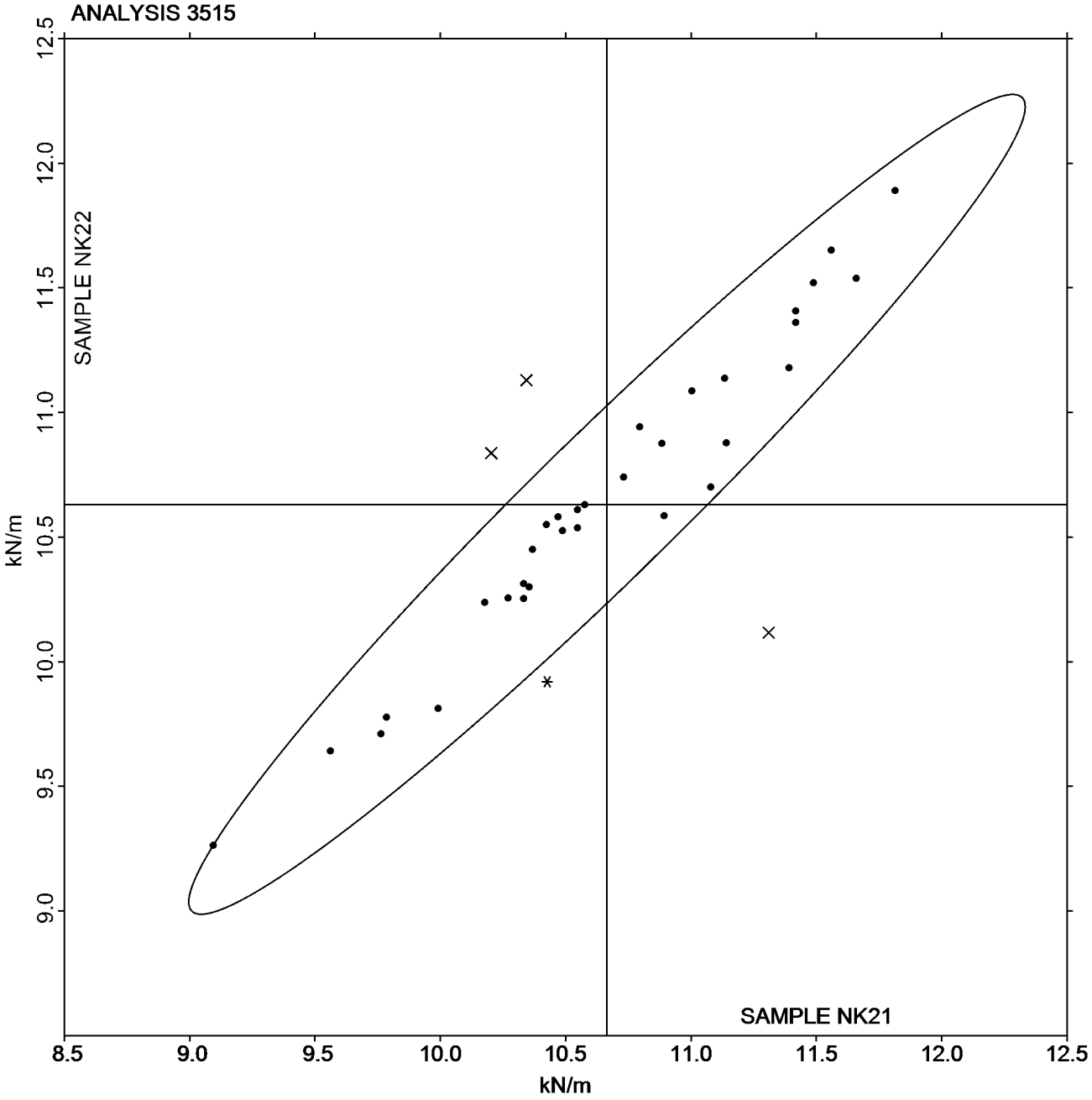
UNRFT2 (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	ID	Instron 4200 Series
IF	Instron 3340 Series	IM	Instron 5500 Series
IR	Instron 5900 Series	LA	L & W Autoline
LC	L & W Tensile - Autoline 600	LE	L & W Tensile Tester 066
LH	L & W Alwetron TH1 (Horizontal) SE 060	LI	LLoyds Instruments
LW	L & W Tensile Tester SE062	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 NK21 = 10.664 kN/m

Grand Mean Sample NK22 = 10.632 kN/m



Paper & Paperboard Interlaboratory Testing Program

Analysis 3516

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK21 Lab Mean	Sample NK21 Diff from Grand Mean	Sample NK21 CPV	Sample NK22 Lab Mean	Sample NK22 Diff from Grand Mean	Sample NK22 CPV	Instr Code
2UC9H8		190.3	10.4	0.47	186.9	8.0	0.36	LE
3BHRWP		185.8	5.9	0.27	198.2	19.3	0.87	TH
428PBN		189.4	9.5	0.43	193.4	14.4	0.65	TH
6L8BMZ		164.5	-15.3	-0.70	176.5	-2.5	-0.11	TR
AJ7V4Q		187.6	7.7	0.35	183.0	4.0	0.18	LW
BEU84U		181.8	2.0	0.09	174.5	-4.5	-0.20	TS
C7QKPY		176.4	-3.5	-0.16	172.8	-6.1	-0.28	LH
C874AW		170.0	-9.9	-0.45	169.1	-9.8	-0.44	LE
CC2Y9J		187.0	7.1	0.32	183.3	4.4	0.20	TB
E74UTJ		204.0	24.1	1.10	197.5	18.5	0.83	LA
HPNUCC		225.0	45.1	2.05	227.1	48.2	2.17	DM
HPNW2F		170.2	-9.7	-0.44	176.4	-2.5	-0.11	LE
HYUYZL		156.2	-23.7	-1.08	155.7	-23.3	-1.05	IM
J9B3KQ		189.6	9.7	0.44	185.4	6.4	0.29	TX
KDN3GH		192.2	12.3	0.56	190.2	11.3	0.51	IR
KMB4XR		183.5	3.6	0.16	163.8	-15.1	-0.68	XX
LYXR8H		168.0	-11.9	-0.54	169.1	-9.8	-0.44	LW
MB8RGF	X	0.9	-179.0	-8.13	0.9	-178.0	-8.02	XX
NRNBP8		174.2	-5.6	-0.26	168.6	-10.3	-0.46	PT
PHJPZK		153.0	-26.9	-1.22	152.1	-26.8	-1.21	LW
PMYXNJ		197.6	17.7	0.81	199.1	20.2	0.91	LE
PQWEZD		195.8	15.9	0.72	200.2	21.3	0.96	IF
Q99NEJ		172.9	-6.9	-0.32	167.7	-11.2	-0.51	LC
QXP7LC		165.8	-14.1	-0.64	168.6	-10.4	-0.47	LE
RF467Z		188.6	8.7	0.40	194.8	15.8	0.71	LA
UNRFT2	*	115.3	-64.6	-2.93	114.3	-64.7	-2.91	TO
WLFMPC	*	153.2	-26.6	-1.21	177.3	-1.6	-0.07	LH
WR6ZQZ		161.4	-18.5	-0.84	142.2	-36.7	-1.65	TT
XC96RE		232.1	52.2	2.37	223.2	44.3	2.00	XX
XHBEX8		188.6	8.7	0.40	185.3	6.4	0.29	IM
XN2N87		176.4	-3.4	-0.16	171.6	-7.3	-0.33	LE

Summary Statistics	Sample NK21	Sample NK22
Grand Means	179.88 Joules/sq m	178.92 Joules/sq m
Stnd Dev Btwn Labs	22.01 Joules/sq m	22.21 Joules/sq m

Statistics based on 30 of 31 reporting participants.

Comments on Assigned Data Flags for Test #3516

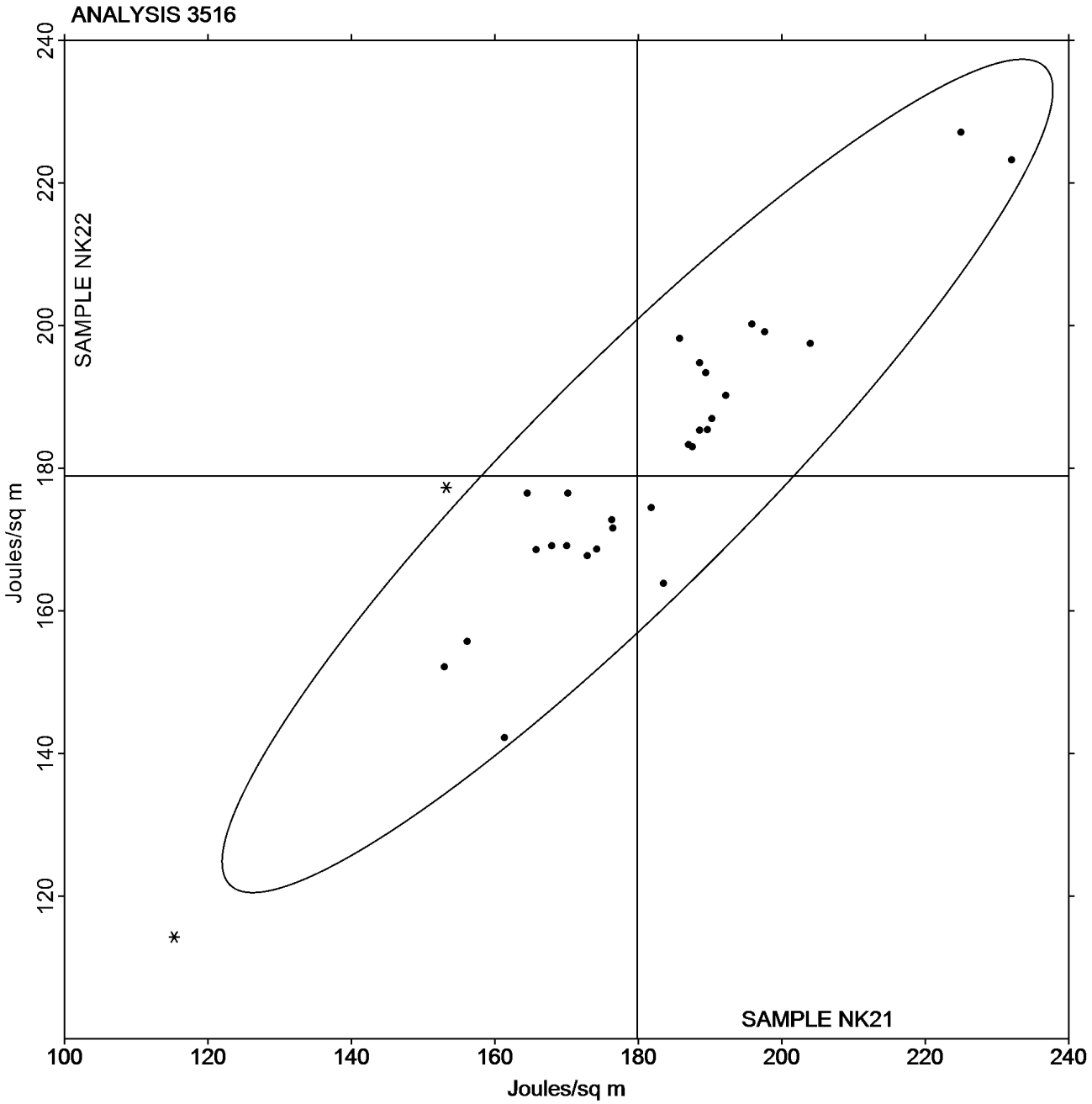
MB8RGF (X) - Extreme Data.

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	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

Grand Mean Sample NK21 = 179.88 Joules/sq m

Grand Mean Sample NK22 = 178.92 Joules/sq m



Paper & Paperboard Interlaboratory Testing Program

Analysis 3517

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK21 Lab Mean	Sample NK21 Diff from Grand Mean	Sample NK21 CPV	Sample NK22 Lab Mean	Sample NK22 Diff from Grand Mean	Sample NK22 CPV	Instr Code
2UC9H8	X	0.099	-2.467	-10.97	0.097	-2.467	-10.13	LE
3BHRWP		2.930	0.364	1.62	3.110	0.546	2.24	XX
428PBN		2.858	0.292	1.30	2.741	0.177	0.73	TH
6L8BMZ		2.508	-0.058	-0.26	2.587	0.023	0.09	TR
7LQEVZ		2.538	-0.028	-0.12	2.565	0.001	0.00	TB
AJ7V4Q		2.464	-0.102	-0.45	2.413	-0.151	-0.62	LW
BEU84U		2.748	0.182	0.81	2.690	0.126	0.52	TS
C7QKPY		2.490	-0.076	-0.34	2.474	-0.090	-0.37	LX
C874AW		2.373	-0.193	-0.86	2.350	-0.214	-0.88	LE
CC2Y9J		2.722	0.156	0.70	2.672	0.108	0.44	XX
E74UTJ		2.841	0.275	1.22	2.815	0.251	1.03	LX
GGE6YD		2.565	-0.001	0.00	2.592	0.028	0.12	XX
HPNUCC		2.954	0.388	1.73	2.992	0.428	1.76	DM
HPNW2F		2.312	-0.254	-1.13	2.384	-0.180	-0.74	LE
HYUYZL		2.525	-0.041	-0.18	2.488	-0.076	-0.31	IM
J9B3KQ		2.739	0.173	0.77	2.702	0.138	0.57	TX
KDN3GH		2.916	0.350	1.56	2.902	0.338	1.39	XX
KMB4XR		2.409	-0.157	-0.70	2.200	-0.364	-1.49	XX
LYXR8H		2.341	-0.225	-1.00	2.343	-0.221	-0.91	LW
MB8RGF		2.770	0.204	0.91	2.840	0.276	1.13	XX
PHJPZK		2.551	-0.015	-0.07	2.504	-0.060	-0.25	LW
PMYXNJ		2.533	-0.033	-0.15	2.536	-0.028	-0.11	LE
PQWEZD		2.796	0.230	1.02	2.993	0.429	1.76	XX
Q99NEJ		2.145	-0.421	-1.87	2.104	-0.460	-1.89	LC
QXP7LC		2.402	-0.164	-0.73	2.430	-0.134	-0.55	LE
RF467Z		2.319	-0.247	-1.10	2.362	-0.202	-0.83	XX
UNRFT2		2.648	0.082	0.37	2.609	0.045	0.19	TO
WLFMPC	*	2.200	-0.366	-1.63	2.380	-0.184	-0.75	LH
WR6ZQZ		2.579	0.013	0.06	2.438	-0.126	-0.52	TT
XC96RE		2.227	-0.338	-1.51	2.243	-0.321	-1.32	XX
XHBEX8		2.719	0.154	0.68	2.671	0.107	0.44	IM
XN2N87		2.413	-0.153	-0.68	2.350	-0.214	-0.88	LE

Summary Statistics	Sample NK21	Sample NK22
Grand Means	2.57 Percent	2.56 Percent
Stnd Dev Btwn Labs	0.22 Percent	0.24 Percent

Statistics based on 31 of 32 reporting participants.

Comments on Assigned Data Flags for Test #3517

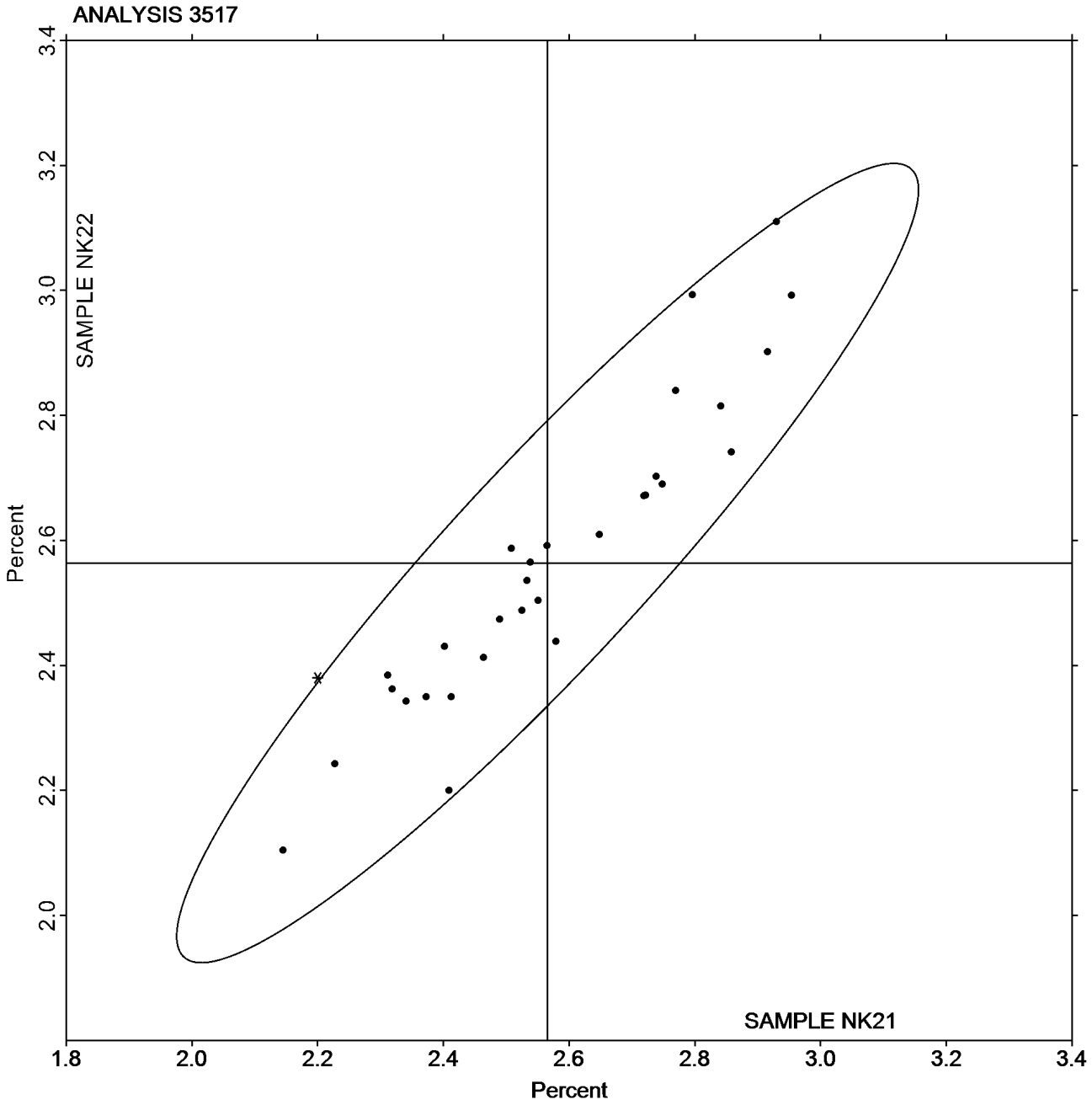
2UC9H8 (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	IM	Instron 5500 Series
LC	L & W Tensile - Autoline 600	LE	L & W Tensile Tester 066
LH	L & W Alwetron TH1 (Horizontal) SE 060	LW	L & W Tensile Tester SE062
LX	L & W (model not specified)	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 NK21 = 2.5657 Percent

Grand Mean Sample NK22 = 2.5639 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 PS21 Lab Mean	Sample PS21 Diff from Grand Mean	Sample PS21 CPV	Sample PS22 Lab Mean	Sample PS22 Diff from Grand Mean	Sample PS22 CPV	Instr Code
2GM9R6		0.7580	-0.0189	-0.27	0.7710	-0.0050	-0.07	ZZ
2RRW7W		0.6810	-0.0959	-1.37	0.6820	-0.0940	-1.30	ZZ
2Y83F9		0.8890	0.1121	1.60	0.8970	0.1210	1.67	ZZ
428PBN		0.7550	-0.0219	-0.31	0.7320	-0.0440	-0.61	ZZ
68T3MW		0.7670	-0.0099	-0.14	0.7760	0.0000	0.00	ZZ
6YBTYZ		0.9370	0.1601	2.29	0.9230	0.1470	2.03	ZZ
86YVGP		0.7480	-0.0289	-0.41	0.7500	-0.0260	-0.36	ZZ
8D9KVN	X	1.5570	0.7801	11.13	1.5000	0.7240	10.02	ZZ
AWUXMH		0.8300	0.0531	0.76	0.8470	0.0710	0.98	ZZ
B487MK		0.8450	0.0681	0.97	0.8210	0.0450	0.62	ZZ
BEU84U		0.8040	0.0271	0.39	0.8270	0.0510	0.71	ZZ
C7QKPY	X	0.9430	0.1661	2.37	0.8380	0.0620	0.86	ZZ
CC2Y9J		0.7540	-0.0229	-0.33	0.7520	-0.0240	-0.33	ZZ
CKRJCV		0.7470	-0.0299	-0.43	0.7350	-0.0410	-0.57	ZZ
F64FHW		0.8080	0.0311	0.44	0.8180	0.0420	0.58	ZZ
FLUDMD		0.8400	0.0631	0.90	0.8680	0.0920	1.27	ZZ
LPA2LP		0.8380	0.0611	0.87	0.8350	0.0590	0.82	ZZ
MDDAFC		0.7410	-0.0359	-0.51	0.7360	-0.0400	-0.55	ZZ
N7V4GJ		0.6920	-0.0849	-1.21	0.6880	-0.0880	-1.22	ZZ
NE4VL9		0.7580	-0.0189	-0.27	0.7300	-0.0460	-0.64	ZZ
PHJPZK		0.6360	-0.1409	-2.01	0.6300	-0.1460	-2.02	ZZ
PMYXNJ		0.7150	-0.0619	-0.88	0.7270	-0.0490	-0.68	ZZ
Q99NEJ		0.7140	-0.0629	-0.90	0.7060	-0.0700	-0.97	ZZ
T3Y9KD		0.8150	0.0381	0.54	0.8080	0.0320	0.44	ZZ
TBRG74		0.8470	0.0701	1.00	0.8350	0.0590	0.82	ZZ
TX3HE2		0.7260	-0.0509	-0.73	0.7310	-0.0450	-0.62	ZZ
TZ8A8E	X	2.0770	1.3001	18.56	2.2330	1.4570	20.17	ZZ
XEA7UW	X	73.7000	72.9231	1,040.80	73.4000	72.6240	1,005.59	ZZ

Summary Statistics	Sample PS21	Sample PS22
Grand Means	0.78 Microns	0.78 Microns
Stnd Dev Btwn Labs	0.07 Microns	0.07 Microns

Statistics based on 24 of 28 reporting participants.

Comments on Assigned Data Flags for Test #3531

TZ8A8E (X) - Extreme Data.

C7QKPY (X) - Inconsistent in testing between samples.

8D9KVN (X) - Extreme Data.

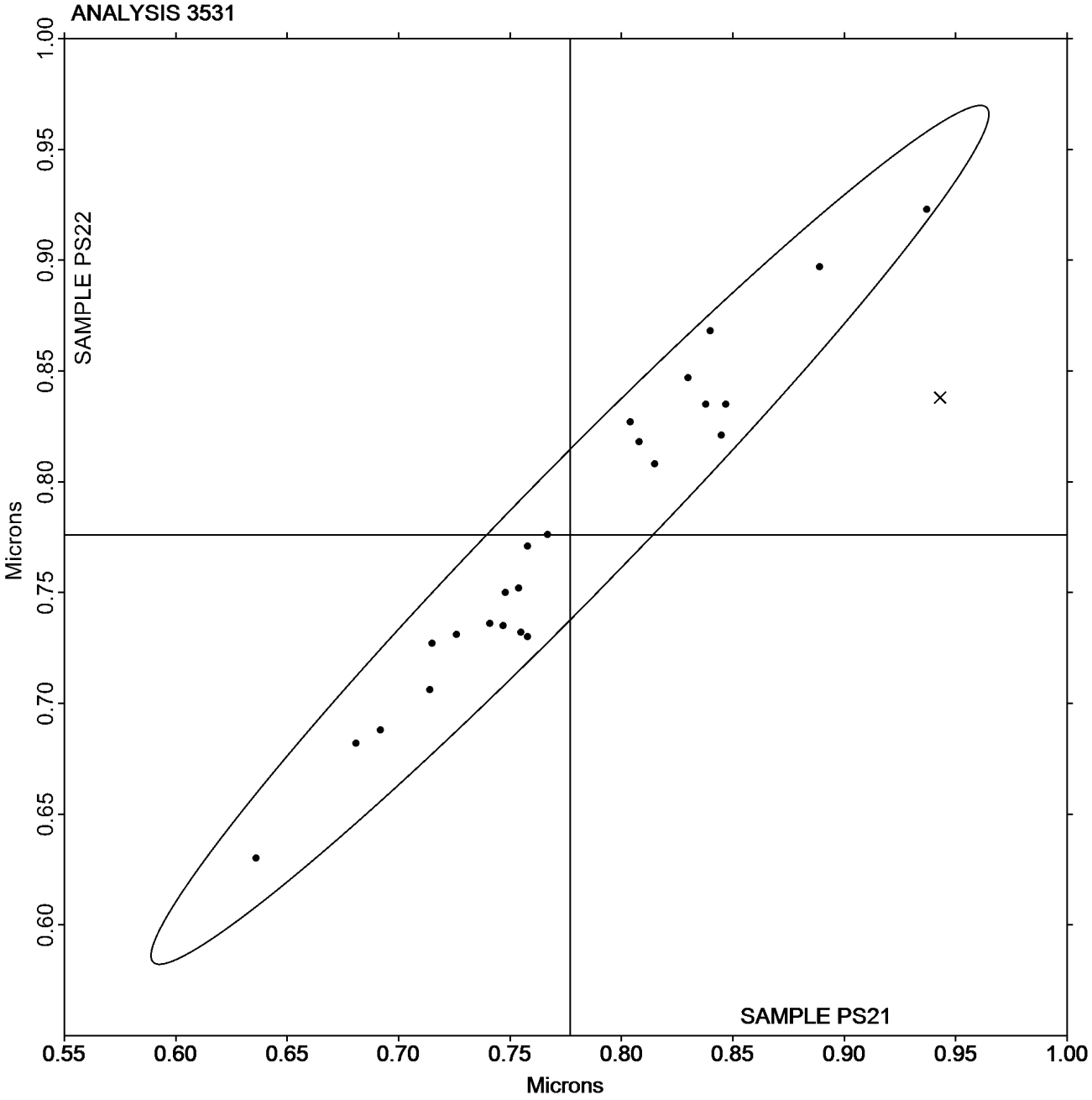
XEA7UW (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample PS21 = 0.77688 Microns

Grand Mean Sample PS22 = 0.77604 Microns



Paper & Paperboard Interlaboratory Testing Program

Analysis 3545
Directional Brightness
TAPPI Official Test Method T452

WebCode	Data Flag	Sample BR21 Lab Mean	Sample BR21 Diff from Grand Mean	Sample BR21 CPV	Sample BR22 Lab Mean	Sample BR22 Diff from Grand Mean	Sample BR22 CPV	Instr Code
2RRW7W		84.38	-0.82	-0.91	84.05	-1.13	-1.15	TD
3EDJ32		84.53	-0.67	-0.74	84.19	-0.99	-1.01	TT
428PBN		85.21	0.02	0.02	84.99	-0.19	-0.19	TP
68T3MW		84.78	-0.41	-0.46	84.71	-0.47	-0.48	HZ
74KA8N		84.38	-0.82	-0.91	84.41	-0.76	-0.78	TS
7LQEVZ		84.84	-0.35	-0.39	85.00	-0.18	-0.18	XD
86YVGP		84.78	-0.41	-0.46	84.81	-0.36	-0.37	TP
BEU84U		84.91	-0.28	-0.31	85.15	-0.03	-0.03	TS
CKRJCV		84.69	-0.50	-0.56	84.72	-0.46	-0.47	HG
F64FHW	X	73.65	-11.54	-12.83	73.38	-11.79	-12.02	XX
LYXR8H		84.43	-0.76	-0.85	84.51	-0.67	-0.68	TS
MDDAFC		87.11	1.92	2.13	86.96	1.79	1.82	TD
N8773H		84.79	-0.40	-0.44	84.86	-0.32	-0.33	XX
NE4VL9		86.14	0.94	1.05	86.12	0.94	0.96	HG
PHJPZK		85.12	-0.07	-0.08	84.78	-0.40	-0.40	TP
PMYXNJ		85.24	0.04	0.05	85.23	0.05	0.05	HG
T3Y9KD		84.06	-1.14	-1.26	83.88	-1.30	-1.32	PP
TZ8A8E		87.10	1.91	2.12	87.23	2.05	2.09	TP
VD6244		84.93	-0.26	-0.29	84.93	-0.25	-0.25	XX
XC96RE		85.78	0.59	0.65	86.00	0.82	0.84	XX
XX3BZ3		86.66	1.47	1.63	87.03	1.85	1.89	TP

Summary Statistics	Sample BR21	Sample BR22
Grand Means	85.19 Percent	85.18 Percent
Stnd Dev Btwn Labs	0.90 Percent	0.98 Percent

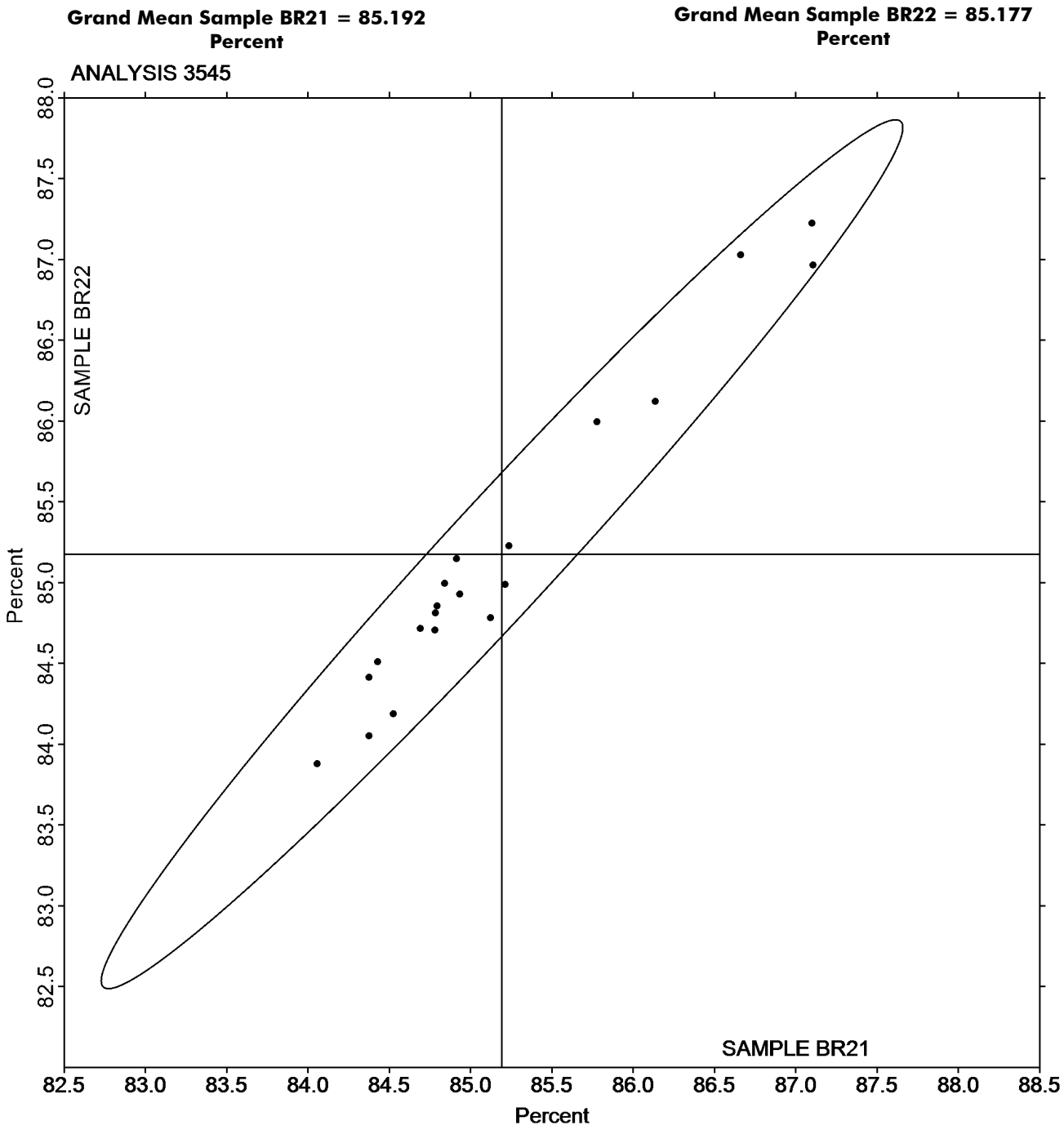
Statistics based on 20 of 21 reporting participants.

Comments on Assigned Data Flags for Test #3545

F64FHW (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		



Paper & Paperboard Interlaboratory Testing Program

Analysis 3547
Diffuse Brightness
TAPPI Official Test Method T525

WebCode	Data Flag	Sample BR21 Lab Mean	Sample BR21 Diff from Grand Mean	Sample BR21 CPV	Sample BR22 Lab Mean	Sample BR22 Diff from Grand Mean	Sample BR22 CPV	Instr Code
2GM9R6		85.06	0.16	0.47	85.15	0.21	0.56	TC
428PBN		84.71	-0.20	-0.60	84.73	-0.21	-0.56	LT
6L8BMZ		85.12	0.21	0.65	85.17	0.23	0.61	TC
BEU84U	*	85.81	0.90	2.76	86.02	1.08	2.88	LT
C7QKPY		84.59	-0.32	-0.97	84.58	-0.35	-0.94	LT
JMRZPR		84.63	-0.27	-0.84	84.65	-0.29	-0.77	LE
MDDAFC		84.79	-0.12	-0.35	84.80	-0.13	-0.36	TC
MX8UUJ		85.01	0.10	0.30	84.98	0.05	0.13	XX
N7V4GJ	X	69.04	-15.87	-48.54	68.93	-16.01	-42.57	TC
NE4VL9		84.71	-0.20	-0.61	84.78	-0.16	-0.42	TC
PHJPZK		84.62	-0.29	-0.87	84.50	-0.44	-1.16	EA
PV9PQM		85.19	0.28	0.86	85.15	0.21	0.57	LA
TZ8A8E		84.84	-0.07	-0.22	84.93	-0.01	-0.02	TC
V3MJBW		84.96	0.06	0.17	84.94	0.00	0.00	LE
VQVVDC	X	69.08	-15.83	-48.41	69.11	-15.83	-42.08	TC
XEA7UW		84.67	-0.24	-0.74	84.74	-0.19	-0.52	LA

Summary Statistics	Sample BR21	Sample BR22
Grand Means	84.91 Percent	84.94 Percent
Stnd Dev Btwn Labs	0.33 Percent	0.38 Percent

Statistics based on 14 of 16 reporting participants.

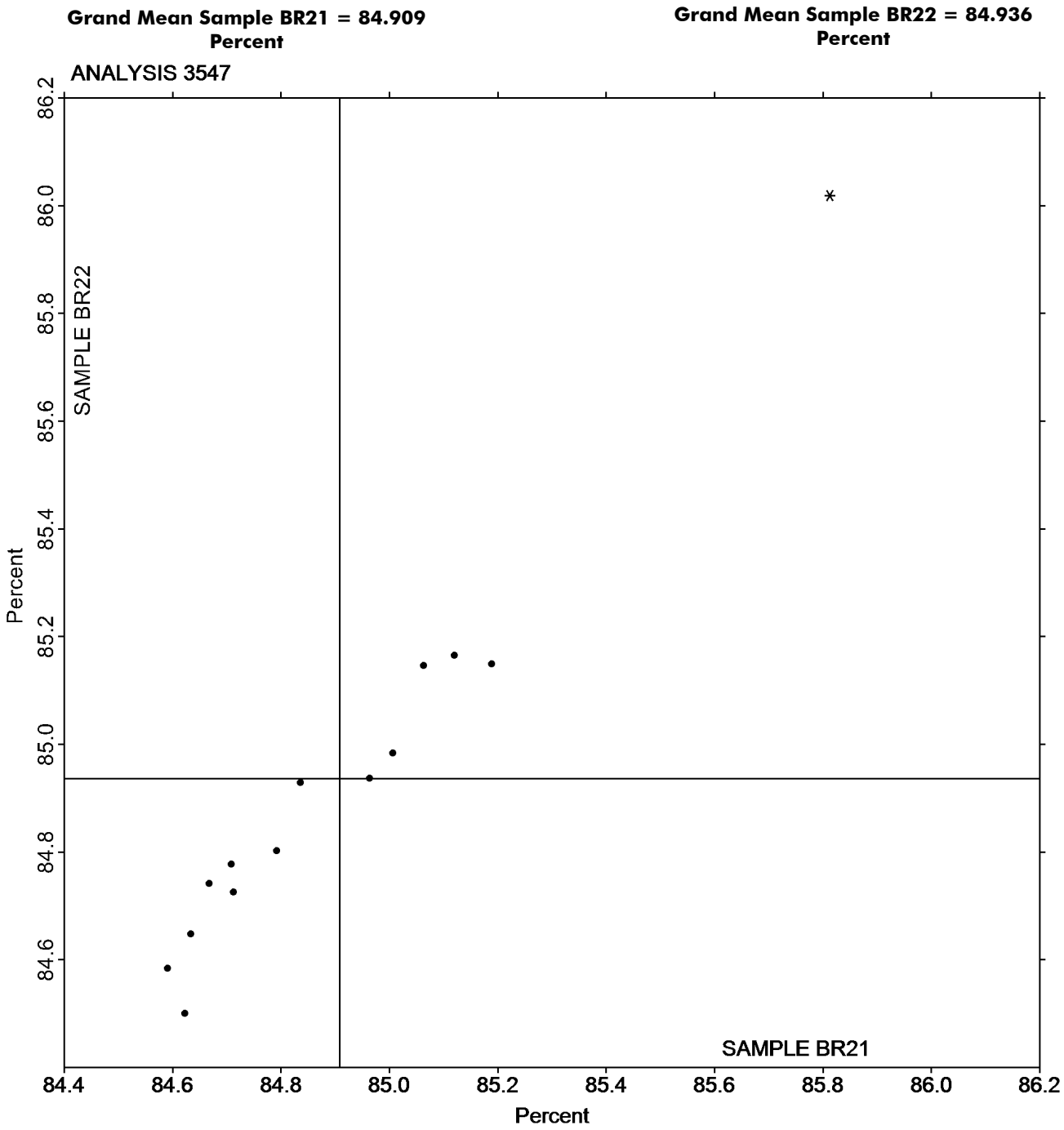
Comments on Assigned Data Flags for Test #3547

N7V4GJ (X) - Extreme Data.

VQVVDC (X) - Extreme Data.

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	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 #4262, October 2023

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L		a		b		Color Difference Values ΔL		Δa		Δb		ΔE		Instr Code
9DKJPX	X	CA21	92.68		0.30	X	1.46		-0.08		0.04	X	0.05		0.10		TS
		CA22	92.61		0.34		1.51										
BEU84U	X	CA21	92.62		0.06	X	1.42		0.02		0.16	X	-0.20		0.25		TS
		CA22	92.64		0.21		1.22										
CBMCXW	X	CA21	91.66		0.07	X	0.72		-0.13		-0.01		-0.02		0.13		TS
		CA22	91.53		0.05		0.70										
CKRJCV		CA21	93.33		-0.60		1.68		0.03		0.00		0.00		0.03		HK
		CA22	93.36		-0.60		1.68										
F64FHW	X	CA21	87.94	X	0.14	X	0.14	*	-1.95	X	0.10	X	-0.06		1.95	X	XX
		CA22	85.99		0.24		0.08										
FLUDMD		CA21	94.83		-0.58		1.90		-0.02		-0.01		0.00		0.02		TC
		CA22	94.81		-0.59		1.90										
GHNAC2		CA21	94.79		-0.53		1.89		0.00		0.01		-0.06		0.06		TC
		CA22	94.79		-0.52		1.83										
JMRZPR		CA21	94.72		-0.57		1.77		-0.03		-0.01		0.08		0.09		LS
		CA22	94.68		-0.58		1.85										
MDDAFC		CA21	93.24		-0.59		1.83		0.02		-0.01		0.04		0.05		TC
		CA22	93.26		-0.61		1.87										
MX8UUJ		CA21	94.83		-0.55		2.06		0.02		0.00		0.00		0.02		TC
		CA22	94.85		-0.55		2.06										
NE4VL9		CA21	94.00		-0.40		1.82		0.00		0.00		0.06		0.06		HF
		CA22	93.99		-0.40		1.88										
PMYXNJ		CA21	93.91		-0.45		1.47		0.01		-0.01		0.03		0.04		HK
		CA22	93.92		-0.46		1.50										
PV9PQM		CA21	93.48		-0.31		1.61		0.00		-0.03		0.06		0.07		LA
		CA22	93.48		-0.34		1.67										
T3Y9KD		CA21	93.25		-0.55		1.89		0.00		0.00		0.00		0.00		TC
		CA22	93.26		-0.55		1.88										
TZ8A8E		CA21	93.29		-0.61		1.79		0.04		-0.01		0.13		0.13		TC
		CA22	93.33		-0.62		1.92										
XC96RE		CA21	95.17	*	-0.59		1.78	*	-0.28	X	0.03	X	-0.28	X	0.39	X	XX
		CA22	94.89		-0.55		1.50										

XEA7UW	CA21	94.73	-0.12	1.80	0.02	0.00	0.00	0.02	XX
	CA22	94.75	-0.12	1.80					

Summary Statistics

Grand Means							
CA21	93.783	-0.496	1.589	-0.015	-0.002	0.005	0.075
CA22	93.759	-0.499	1.580				
Stnd Dev Btwn Labs							
CA21	1.005	0.144	0.481	0.082	0.014	0.097	0.102
CA22	1.001	0.141	0.505				

Statistics based on 13 of 17 reporting participants

Comments on Assigned Data Flags for Test #3549

BEU84U (X) - High "a" values for both samples. Inconsistent within replicate readings of "a" for both samples. Large delta a.

9DKJPX (X) - Very high "a" values for both samples. Inconsistent within replicate readings of "a" for both samples. Large delta a.

CBMCXW (X) - High "a" values for both samples. Inconsistent within replicate readings of "a" for both samples.

F64FHW (X) - Extreme data for both "L" values. Very high "a" values for both samples. Inconsistent within replicate readings of "a" for both samples. Small delta L. Large delta a & E.

Analysis Notes:

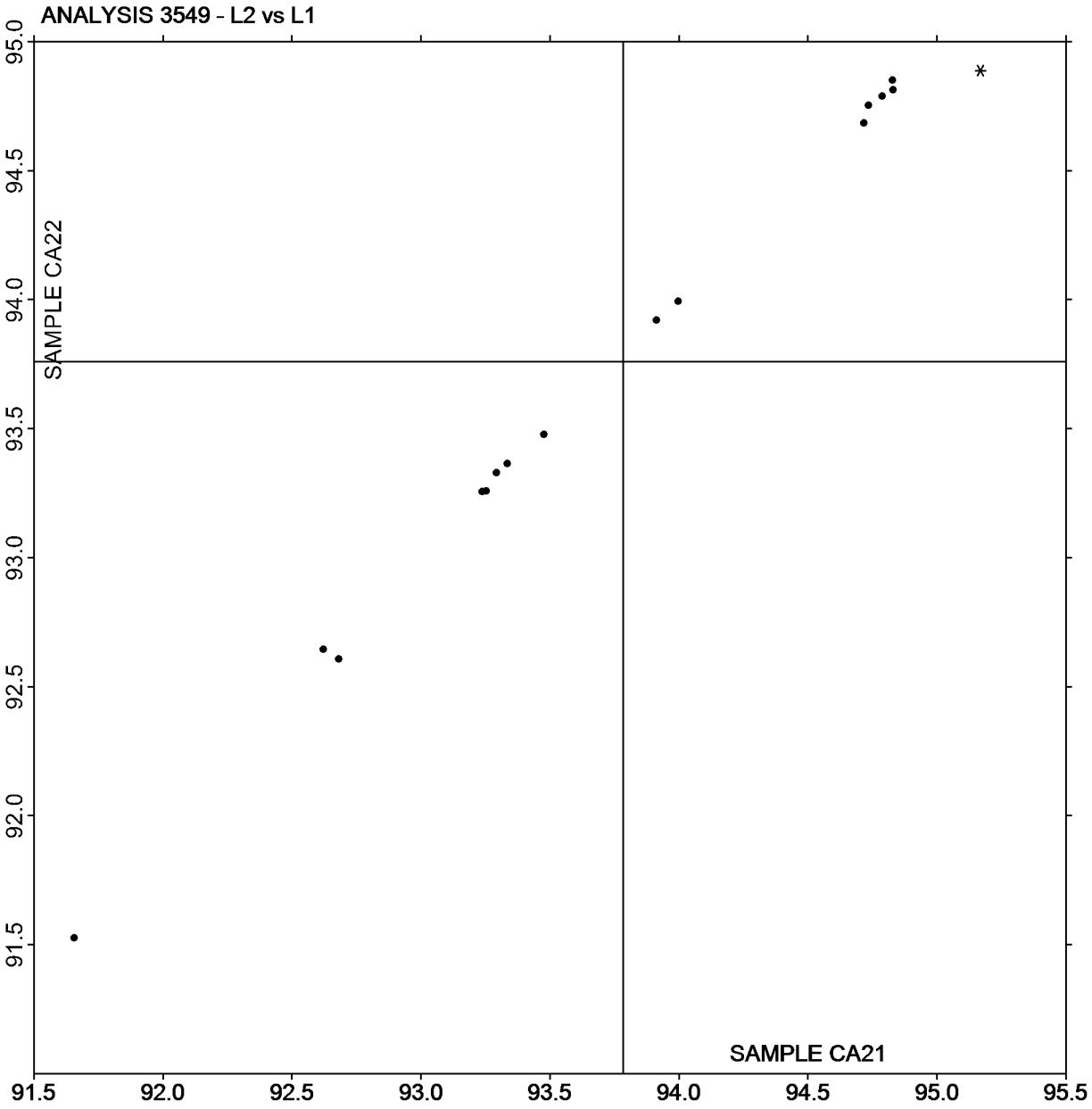
9DKJPX - Due to CTS graphs using Absolute Values, data Flag is located within consensus data. However, "a" data is higher than the negative Grand Mean as shown above graphs.

F64FHW - 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

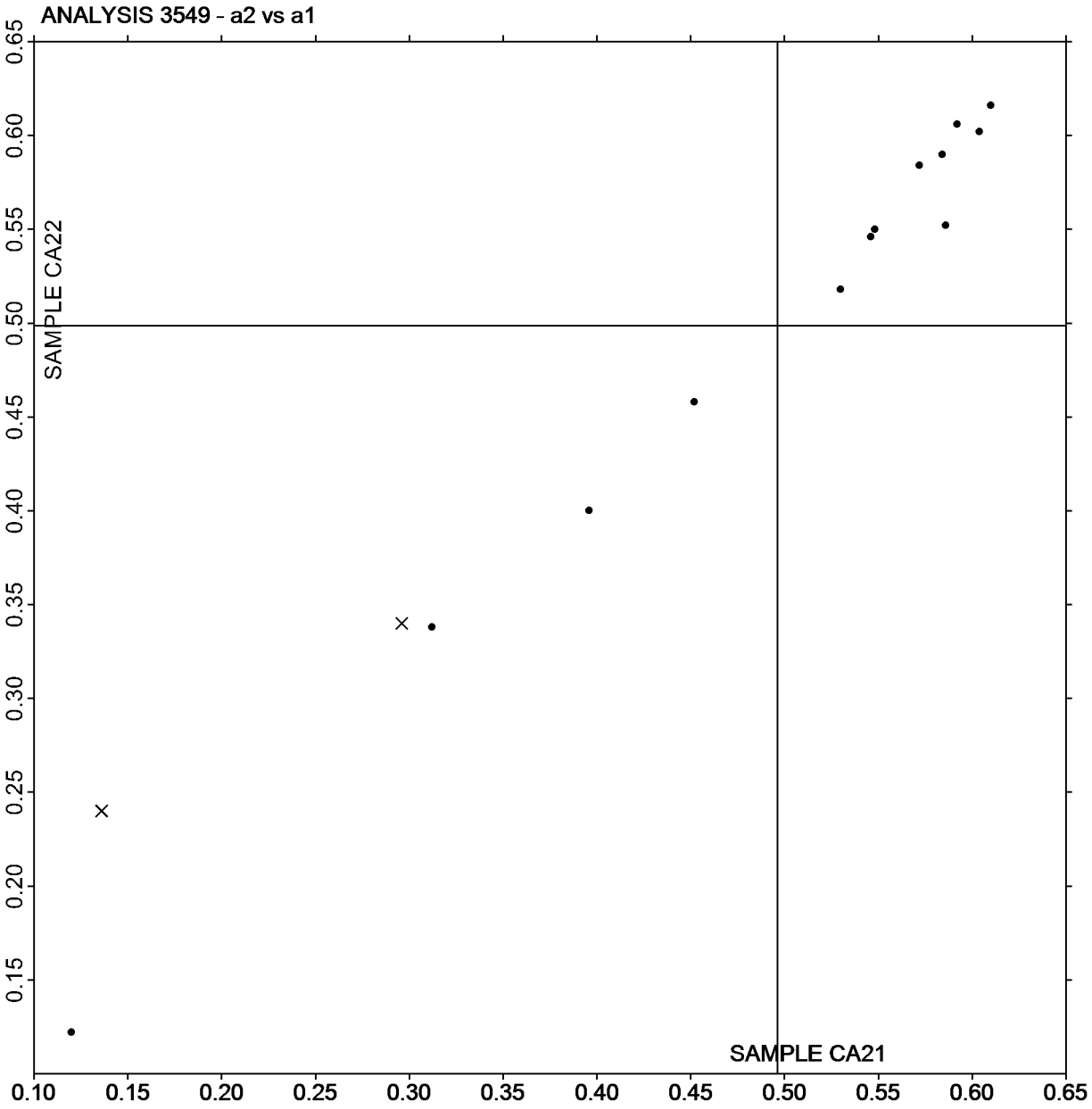
HF	Hunter LabScan II	HK	Hunter LabScan XE
LA	L & W Elrepho AL300	LS	L & W Elrepho SE 070
TC	Technidyne Color Touch Series	TS	Technidyne Brightimeter Micro S-5
XX	Instrument make/model not specified by lab		

Plot of L values CA22 vs L values CA21



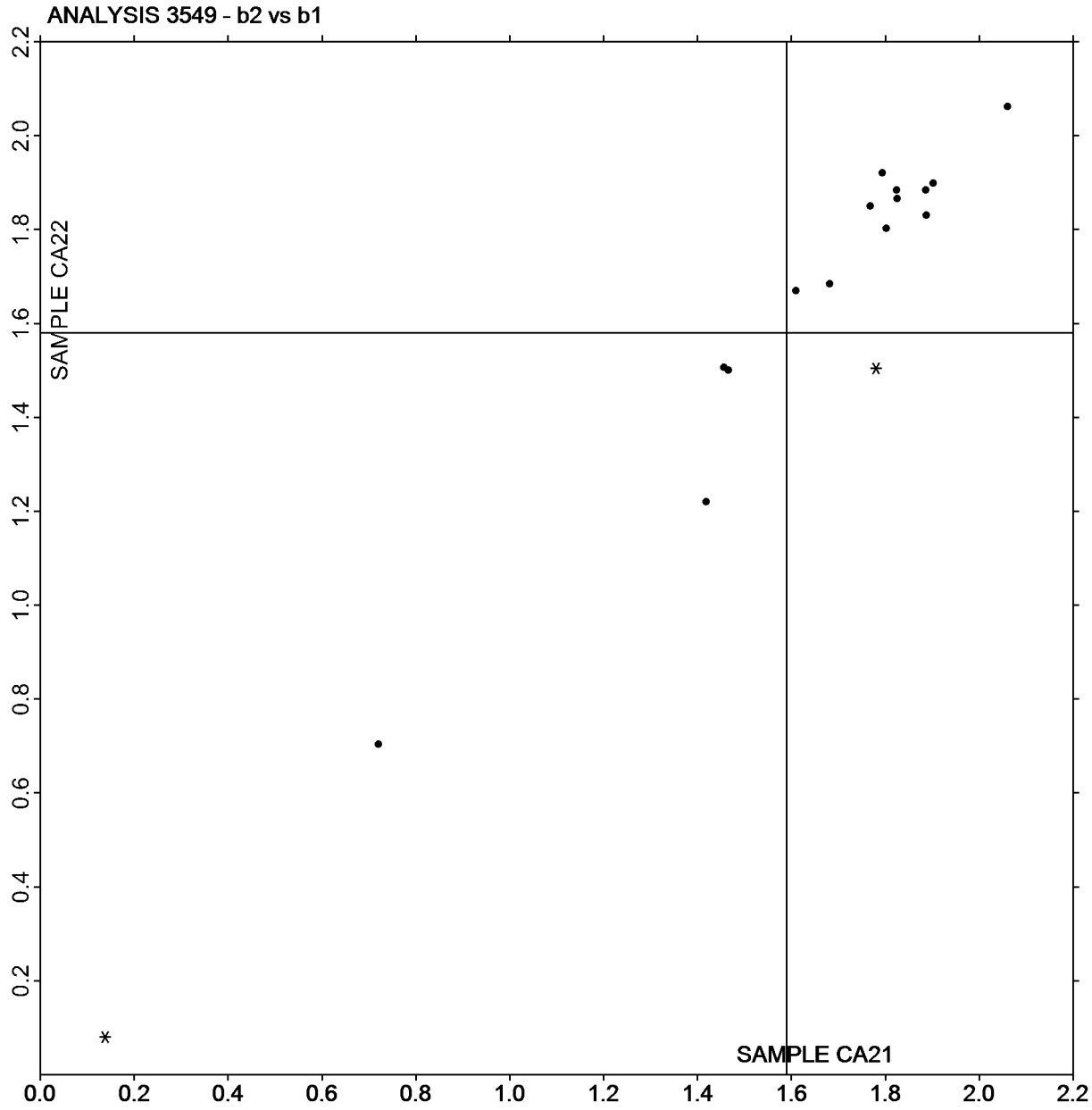
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA22 vs a values CA21



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 CA22 vs b values CA21



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 #4262, October 2023

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L		a		b		Color Difference Values ΔL		Δa		Δb		ΔE		Instr Code
3EDJ32		CA21	93.79		-0.44		1.64		-0.01		0.00		0.04		0.04		XB
		CA22	93.78		-0.45		1.68										
428PBN		CA21	94.98		-0.61		2.05		0.01		-0.01		0.01		0.01		LT
		CA22	94.99		-0.62		2.06										
86YVGP		CA21	93.56		-0.41		1.76		0.00		0.01		0.00		0.01		HE
		CA22	93.56		-0.39		1.76										
JRQCLR		CA21	95.05	*	-0.53		1.88		-0.26	X	-0.01		-0.25		0.36	X	NF
		CA22	94.79		-0.54		1.64										
NE4VL9		CA21	93.25		-0.67		1.89		0.00		-0.01		0.02		0.02		TC
		CA22	93.24		-0.67		1.91										
PHJPZK	X	CA21	86.58	X	-0.57		1.95		7.97	X	0.00		0.01		7.97	X	EG
		CA22	94.55		-0.57		1.96										
TFKJ8H		CA21	94.97		-0.53		1.96		0.00		-0.01		0.01		0.02		XX
		CA22	94.97		-0.54		1.98										
VD6244		CA21	94.78		-0.67		2.32		-0.04		-0.01		0.11		0.12		XX
		CA22	94.74		-0.68		2.43										
W4VWQD		CA21	95.10		-0.51		1.78		0.00		0.01		0.04		0.04		NF
		CA22	95.10		-0.50		1.82										
X3W6X4		CA21	94.76		-0.58		1.90		0.01		0.02		-0.18		0.19		TC
		CA22	94.77		-0.55		1.72										
XEA7UW		CA21	94.74		-0.11		1.80		0.01		-0.01		0.03		0.03		LS
		CA22	94.76		-0.12		1.83										
ZENEVW		CA21	94.89		-0.51		2.07		-0.01		0.01		0.01		0.02		XX
		CA22	94.87		-0.50		2.08										
ZLNXV8		CA21	94.55		-0.60		1.82		-0.08		-0.01		0.01		0.08		XC
		CA22	94.48		-0.61		1.83										

Summary Statistics

Grand Means							
CA21	94.535	-0.518	1.910	-0.031	0.000	-0.012	0.078
CA22	94.504	-0.518	1.900				
Stnd Dev Btwn Labs							
CA21	0.633	0.144	0.171	0.076	0.011	0.100	0.102
CA22	0.619	0.146	0.211				

Statistics based on 12 of 13 reporting participants

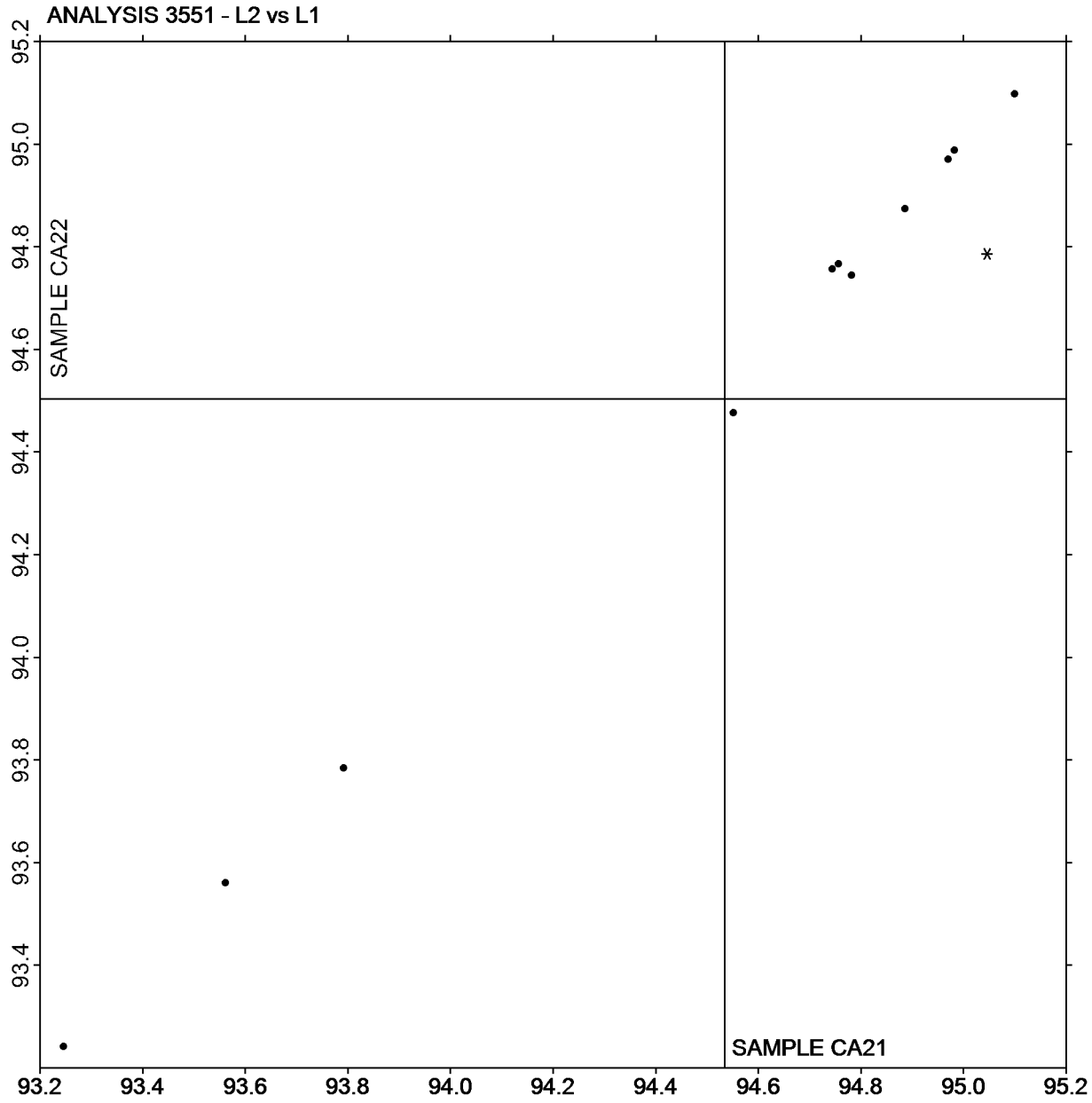
Comments on Assigned Data Flags for Test #3551

PHJPZK (X) - Extreme data for "L" value for sample CA21. Large delta L & E.

Key to Instrument Codes Reported by Participants

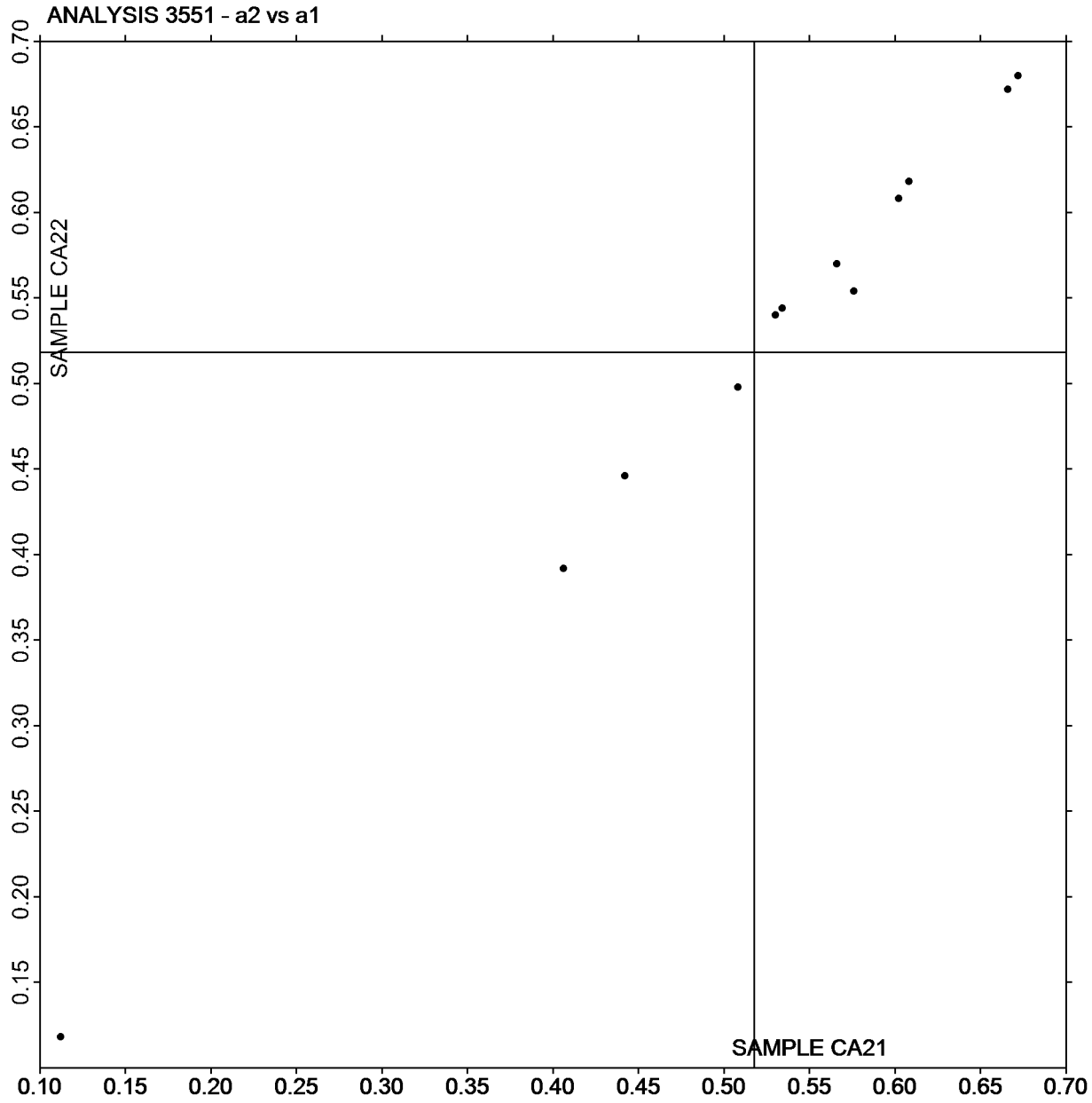
EG	Datacolor Elrepho	HE	Hunter LabScan
LS	L & W Elrepho SE 070	LT	L & W Elrepho SE 071
NF	Minolta CM-3600d Spectrophotometer	TC	Technidyne Color Touch Series
XB	X-Rite Ci7	XC	X-Rite eXact Series
XX	Instrument make/model not specified by lab		

Plot of L values CA22 vs L values CA21



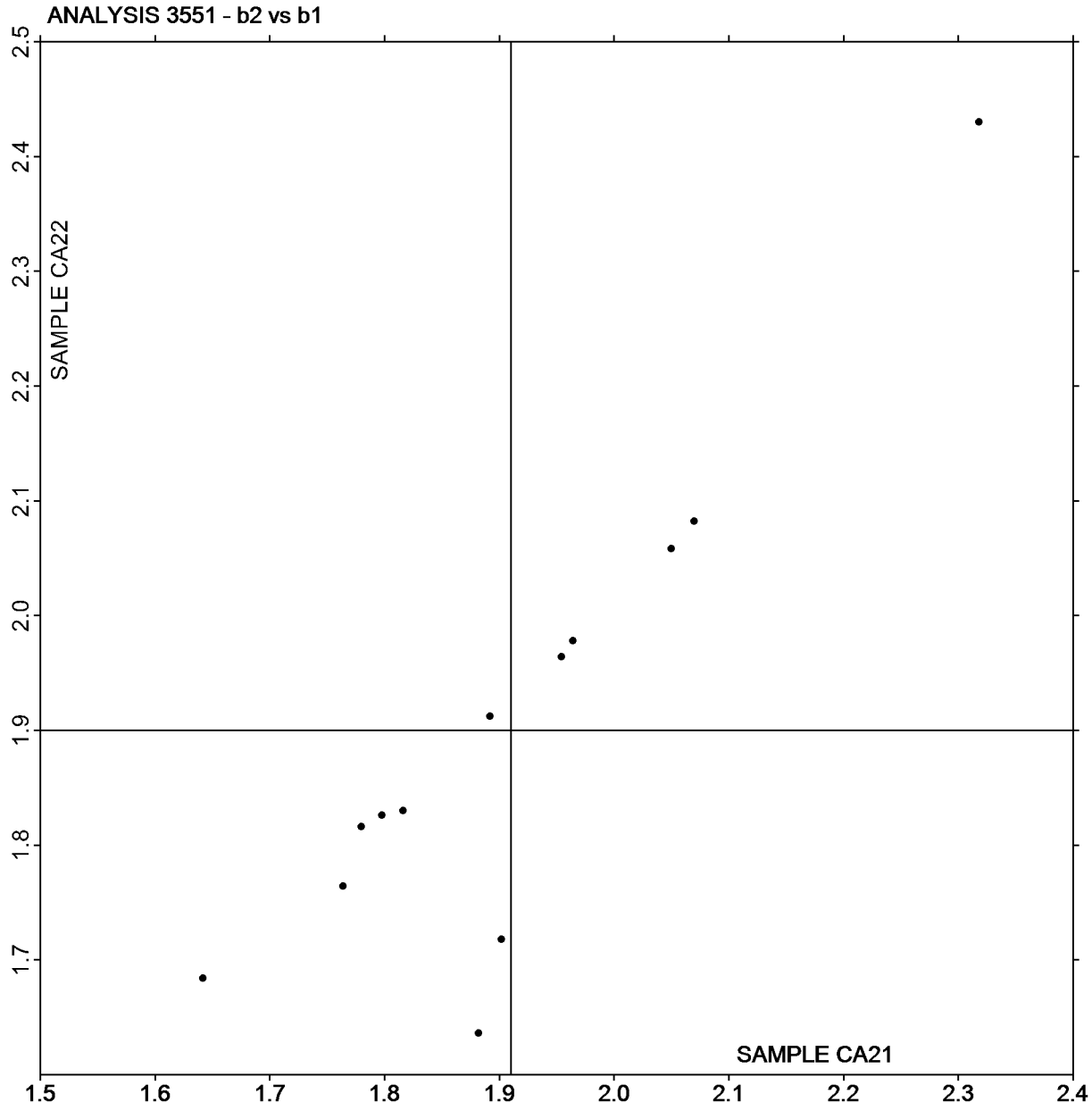
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA22 vs a values CA21



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 CA22 vs b values CA21



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 #4262, October 2023

Analysis 3553

Specular Gloss at 75 Degrees - High Range

TAPPI Official Test Method T480

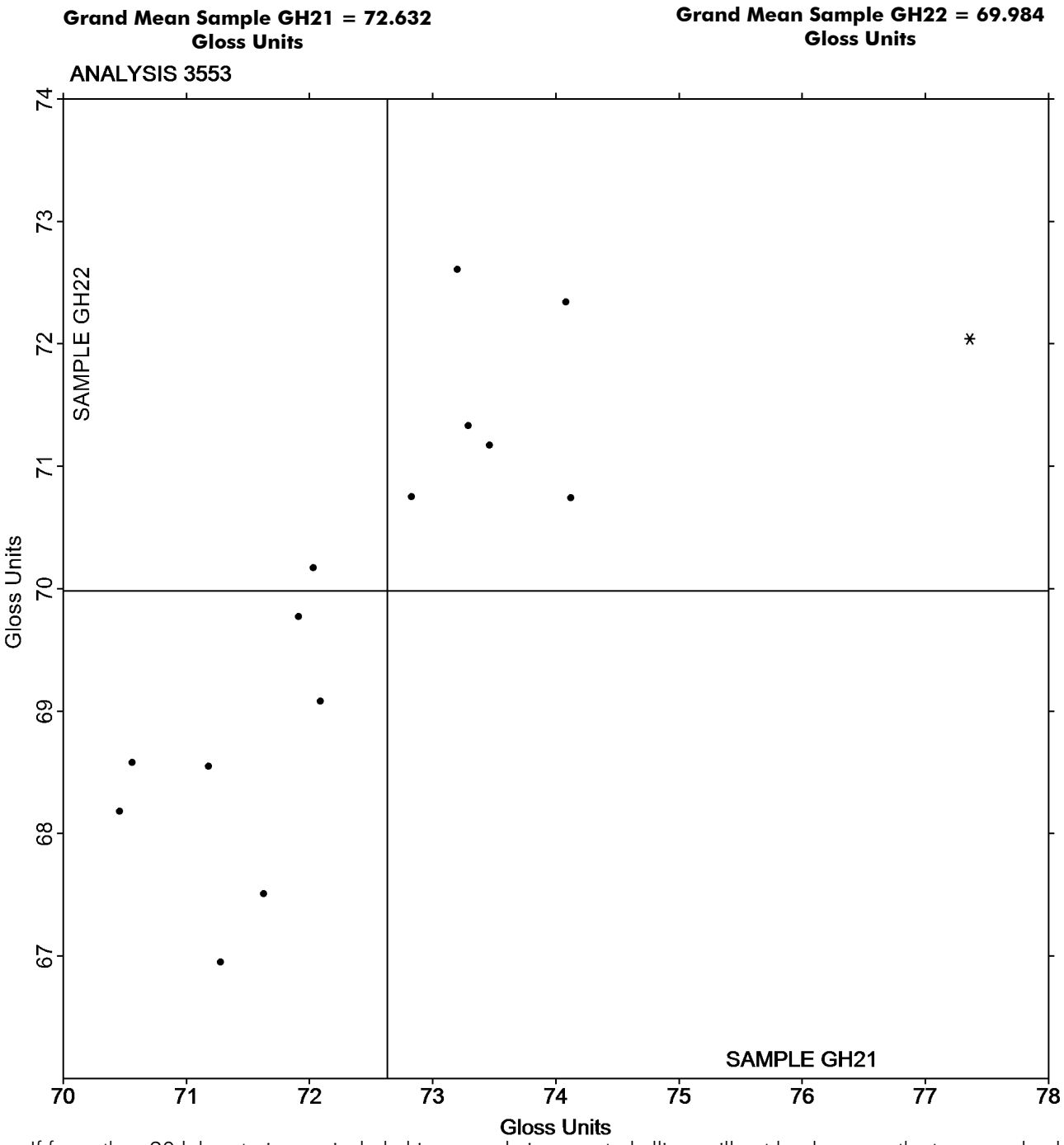
WebCode	Data Flag	Sample GH21 Lab Mean	Sample GH21 Diff from Grand Mean	Sample GH21 CPV	Sample GH22 Lab Mean	Sample GH22 Diff from Grand Mean	Sample GH22 CPV	Instr Code
2RRW7W		70.56	-2.07	-1.18	68.58	-1.40	-0.79	LA
428PBN		71.63	-1.00	-0.57	67.51	-2.47	-1.39	GA
6YBTYZ		74.08	1.45	0.82	72.34	2.36	1.32	VM
AWUXMH	*	77.36	4.73	2.69	72.04	2.06	1.15	LF
C7QKPY		72.83	0.20	0.11	70.75	0.77	0.43	LW
CBMCXW		74.12	1.49	0.85	70.74	0.76	0.42	PT
CKRJCV		70.46	-2.17	-1.24	68.18	-1.80	-1.01	TP
FLUDMD		73.29	0.66	0.37	71.33	1.35	0.75	LF
GYYYMG		71.91	-0.72	-0.41	69.77	-0.21	-0.12	GM
MDDAFC		71.28	-1.35	-0.77	66.95	-3.03	-1.70	XX
PHJPZK		72.09	-0.54	-0.31	69.08	-0.90	-0.51	TH
PMYXNJ		72.03	-0.60	-0.34	70.17	0.19	0.10	PP
Q99NEJ		71.18	-1.45	-0.83	68.55	-1.43	-0.80	LG
T3Y9KD		73.20	0.57	0.32	72.61	2.62	1.47	PP
TZ8A8E		73.46	0.83	0.47	71.17	1.19	0.66	GM

Summary Statistics	Sample GH21	Sample GH22
Grand Means	72.63 Gloss Units	69.98 Gloss Units
Stnd Dev Btwn Labs	1.76 Gloss Units	1.78 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 GL21 Lab Mean	Sample GL21 Diff from Grand Mean	Sample GL21 CPV	Sample GL22 Lab Mean	Sample GL22 Diff from Grand Mean	Sample GL22 CPV	Instr Code
2Y83F9		46.57	-2.28	-1.00	28.18	-1.02	-0.87	WJ
3EDJ32	X	73.57	24.72	10.83	28.95	-0.25	-0.22	TH
68T3MW		49.12	0.27	0.12	28.44	-0.76	-0.65	GS
7LQEVZ		49.78	0.93	0.41	30.78	1.58	1.33	TH
9DKJPX		48.55	-0.30	-0.13	29.98	0.78	0.66	TP
C7QKPY		49.96	1.11	0.49	28.52	-0.68	-0.58	LW
HPNW2F		43.90	-4.95	-2.17	27.60	-1.60	-1.36	GM
MDDAFC		50.13	1.28	0.56	28.67	-0.53	-0.45	XX
NE4VL9		50.45	1.60	0.70	30.87	1.67	1.41	PP
XEA7UW		51.20	2.35	1.03	29.80	0.60	0.50	TG

Summary Statistics	Sample GL21	Sample GL22
Grand Means	48.85 Gloss Units	29.20 Gloss Units
Stnd Dev Btwn Labs	2.28 Gloss Units	1.18 Gloss Units

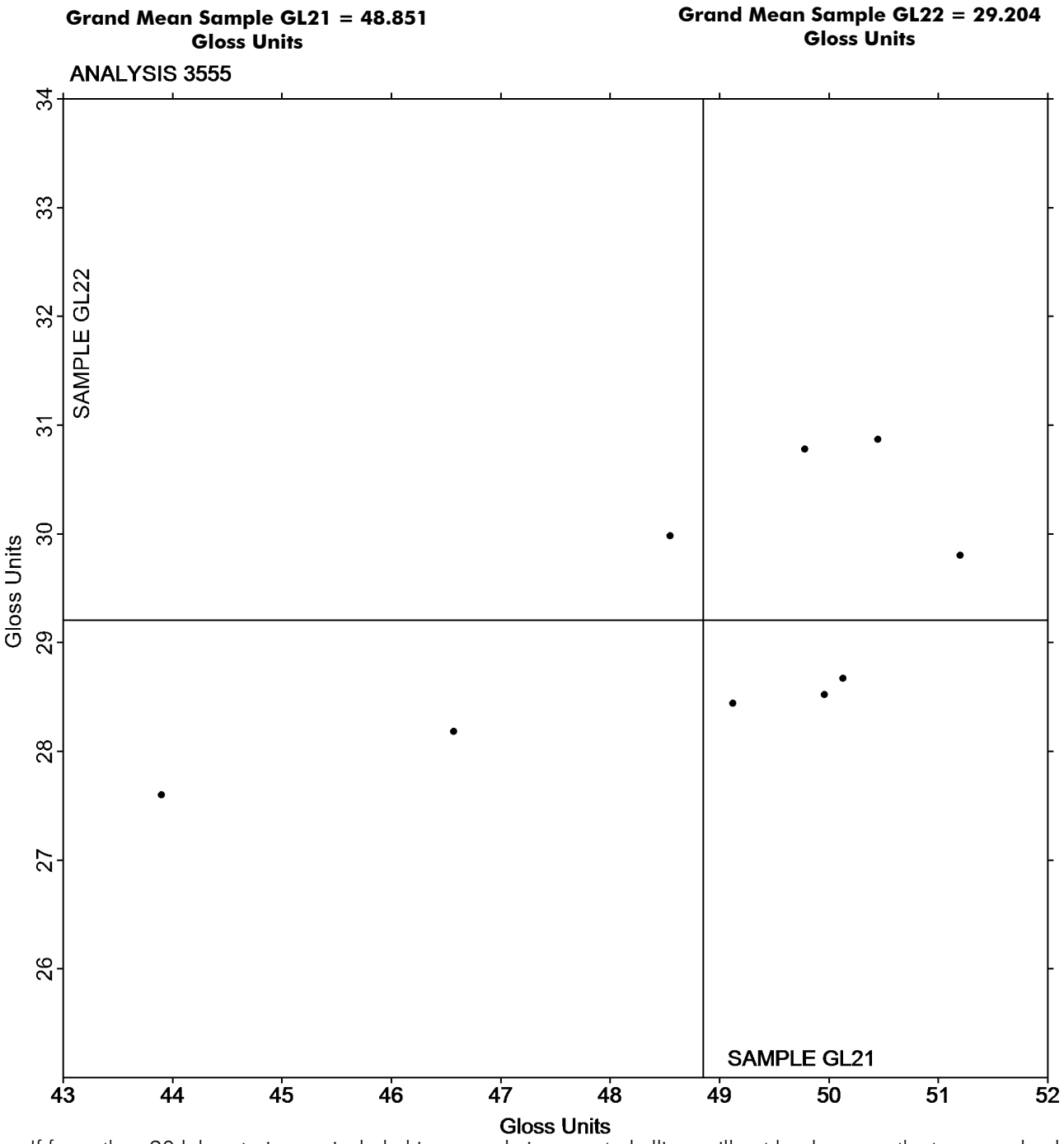
Statistics based on 9 of 10 reporting participants.

Comments on Assigned Data Flags for Test #3555

3EDJ32 (X) - Extreme Data for Sample GL21.

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
TG	Technidyne T480	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

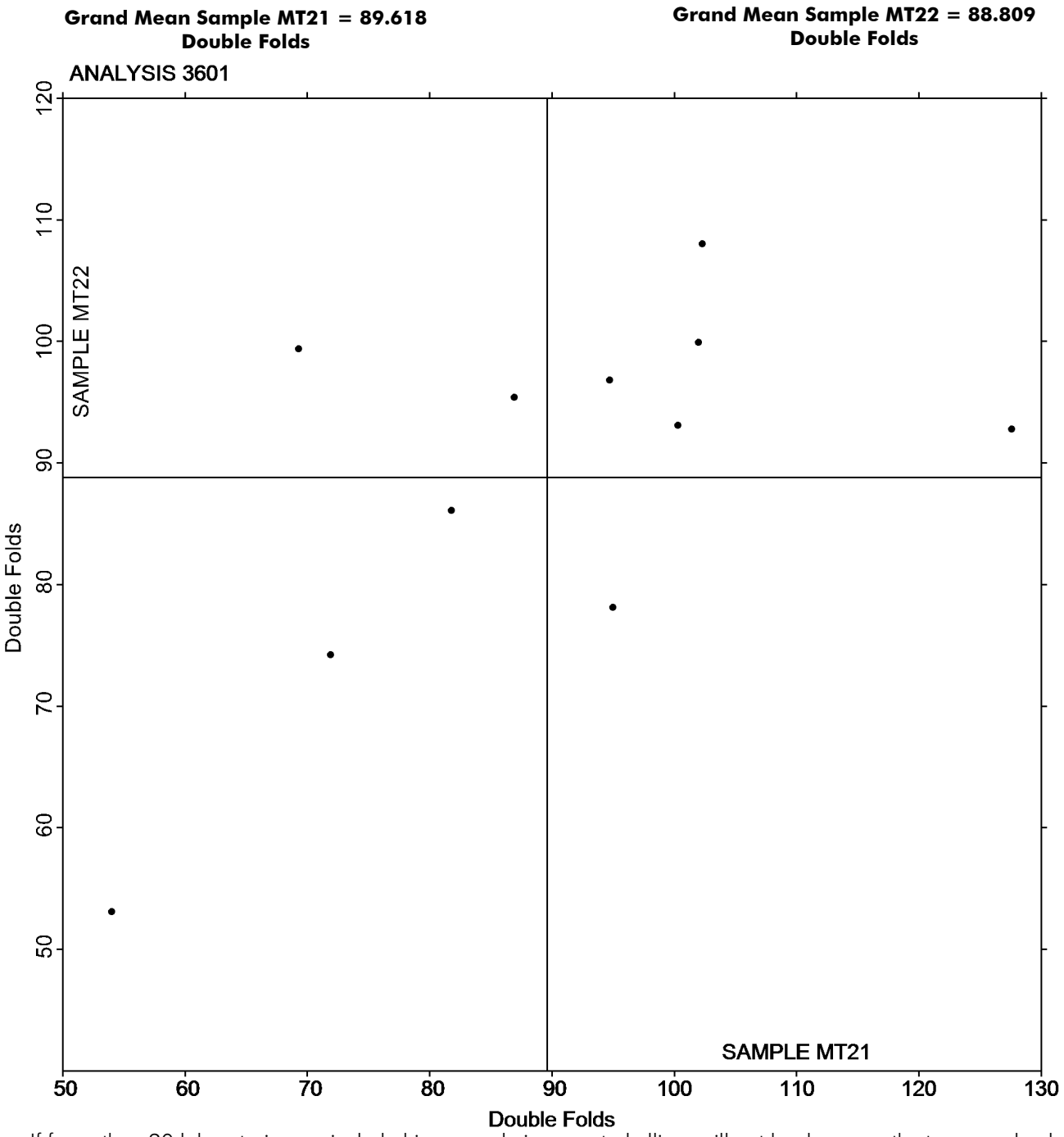
WebCode	Data Flag	Sample MT21 Lab Mean	Sample MT21 Diff from Grand Mean	Sample MT21 CPV	Sample MT22 Lab Mean	Sample MT22 Diff from Grand Mean	Sample MT22 CPV	Instr Code
3EDJ32		95.00	5.38	0.27	78.10	-10.71	-0.70	MT
428PBN		54.00	-35.62	-1.78	53.10	-35.71	-2.33	MT
6YBTYZ		69.30	-20.32	-1.02	99.40	10.59	0.69	MT
7LQEVZ		127.60	37.98	1.90	92.80	3.99	0.26	MT
BREQYJ		102.30	12.68	0.63	108.00	19.19	1.25	MT
FGGFEP		81.80	-7.82	-0.39	86.10	-2.71	-0.18	XX
K4VUWR		86.90	-2.72	-0.14	95.40	6.59	0.43	MT
LPA2LP		100.30	10.68	0.53	93.10	4.29	0.28	MT
PHJPZK		102.00	12.38	0.62	99.90	11.09	0.72	MT
TFKJ8H		71.90	-17.72	-0.89	74.20	-14.61	-0.95	XX
XHBEX8		94.70	5.08	0.25	96.80	7.99	0.52	MT

Summary Statistics	Sample MT21	Sample MT22
Grand Means	89.62 Double Folds	88.81 Double Folds
Stnd Dev Btwn Labs	19.97 Double Folds	15.35 Double Folds

Statistics based on 11 of 11 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

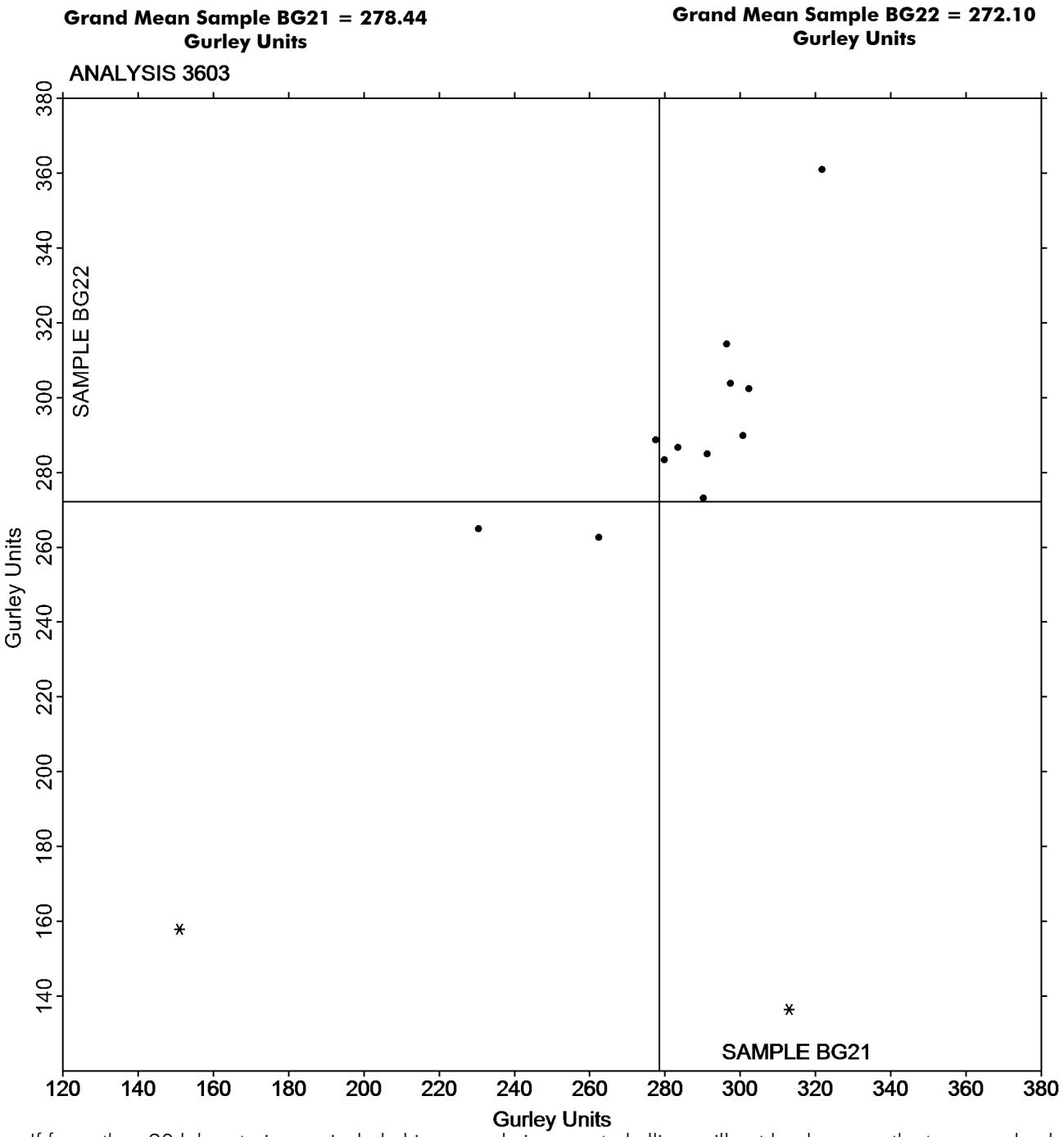
WebCode	Data Flag	Sample BG21 Lab Mean	Sample BG21 Diff from Grand Mean	Sample BG21 CPV	Sample BG22 Lab Mean	Sample BG22 Diff from Grand Mean	Sample BG22 CPV	Instr Code
2GM9R6		302.3	23.8	0.55	302.3	30.2	0.52	ZZ
3EDJ32		297.5	19.0	0.44	303.7	31.6	0.54	ZZ
4BAABV		296.5	18.0	0.42	314.2	42.1	0.72	ZZ
6YBTYZ	*	151.0	-127.4	-2.97	157.9	-114.2	-1.96	ZZ
79F46P		262.4	-16.0	-0.37	262.6	-9.5	-0.16	ZZ
7LQEVZ		290.3	11.9	0.28	273.1	1.0	0.02	ZZ
86YVGP		291.2	12.7	0.30	284.9	12.8	0.22	ZZ
8NNE93		321.8	43.4	1.01	360.9	88.8	1.52	ZZ
HFEPYL		230.5	-47.9	-1.12	264.9	-7.2	-0.12	ZZ
LPA2LP		283.5	5.1	0.12	286.7	14.6	0.25	ZZ
N8773H	*	313.0	34.6	0.80	136.5	-135.6	-2.33	ZZ
X8DDL4		277.5	-0.9	-0.02	288.6	16.5	0.28	ZZ
XHBEX8		279.9	1.5	0.03	283.4	11.3	0.19	ZZ
ZLNXV8		300.8	22.4	0.52	289.8	17.7	0.30	ZZ

Summary Statistics	Sample BG21	Sample BG22
Grand Means	278.44 Gurley Units	272.10 Gurley Units
Stnd Dev Btwn Labs	42.93 Gurley Units	58.34 Gurley Units

Statistics based on 14 of 14 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3611

Coefficient of Static Friction - Horizontal Plane Method - Printing Papers

TAPPI Official Test Method T549

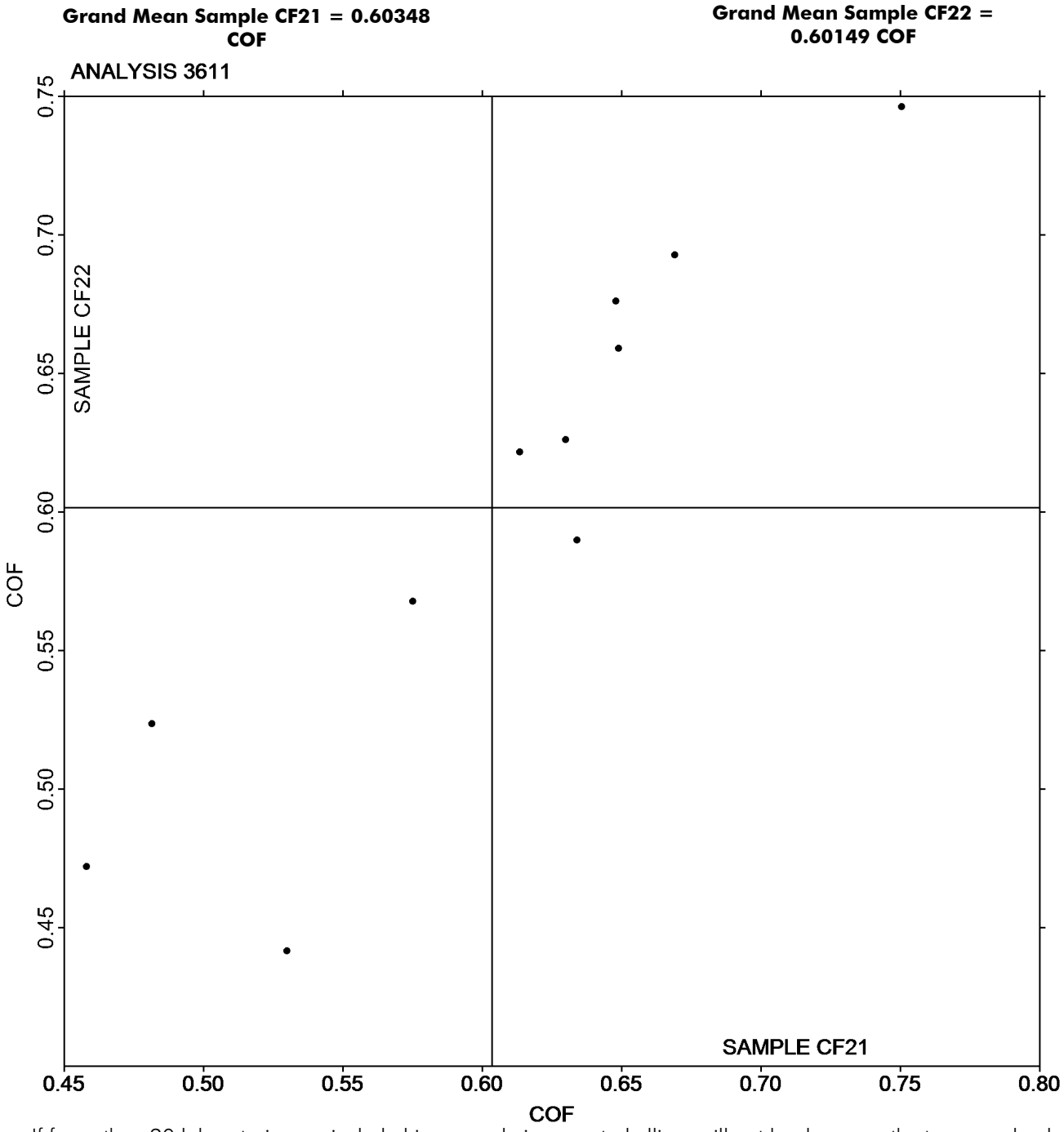
WebCode	Data Flag	Sample CF21 Lab Mean	Sample CF21 Diff from Grand Mean	Sample CF21 CPV	Sample CF22 Lab Mean	Sample CF22 Diff from Grand Mean	Sample CF22 CPV	Instr Code
4BAABV		0.6480	0.0445	0.52	0.6760	0.0745	0.79	TP
86YVGP		0.4814	-0.1221	-1.42	0.5236	-0.0779	-0.83	TA
8D9KVN		0.7504	0.1470	1.71	0.7462	0.1447	1.54	TN
9DKJPX		0.6134	0.0099	0.12	0.6216	0.0201	0.21	TA
BEU84U		0.6690	0.0655	0.76	0.6928	0.0913	0.97	TA
EDH3UL		0.4580	-0.1455	-1.69	0.4720	-0.1295	-1.37	TA
GM3TTJ		0.5750	-0.0285	-0.33	0.5678	-0.0337	-0.36	TA
HFEPYL		0.6300	0.0265	0.31	0.6260	0.0245	0.26	TA
LPA2LP		0.6490	0.0455	0.53	0.6590	0.0575	0.61	XX
XC96RE		0.5300	-0.0735	-0.85	0.4416	-0.1599	-1.70	XX
XHBEX8		0.6340	0.0305	0.35	0.5898	-0.0117	-0.12	TM

Summary Statistics	Sample CF21	Sample CF22
Grand Means	0.60 COF	0.60 COF
Stnd Dev Btwn Labs	0.09 COF	0.09 COF

Statistics based on 11 of 11 reporting participants.

Key to Instrument Codes Reported by Participants

TA	Thwing-Albert Friction Tester	TM	TMI 32-06 Monitor/Slip and Friction
TN	TMI 32-07 Monitor/Slip and Friction	TP	TMI 32-25 COF Tester (Inclined Plane)
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

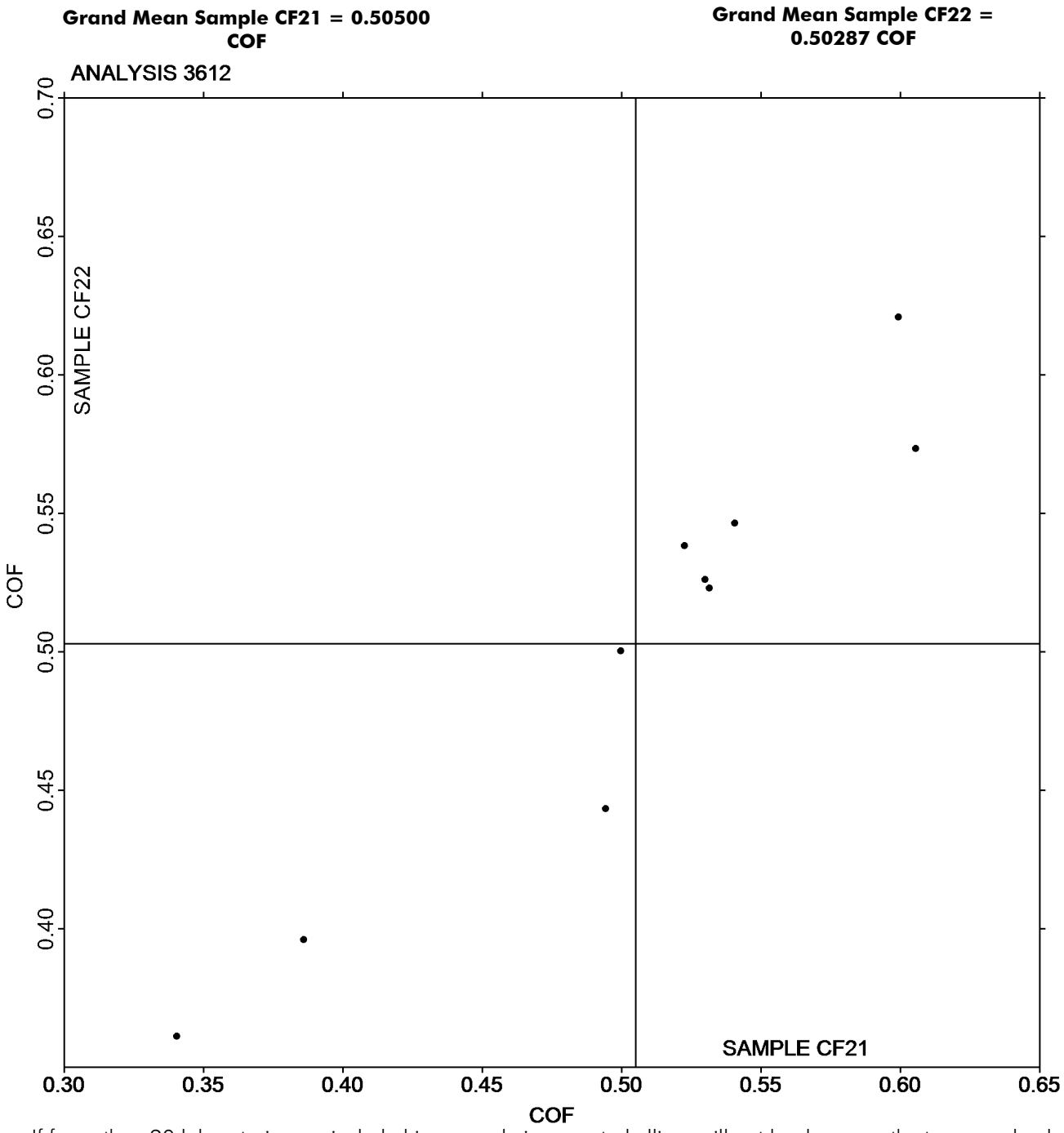
WebCode	Data Flag	Sample CF21 Lab Mean	Sample CF21 Diff from Grand Mean	Sample CF21 CPV	Sample CF22 Lab Mean	Sample CF22 Diff from Grand Mean	Sample CF22 CPV	Instr Code
86YVGP		0.3404	-0.1646	-1.96	0.3612	-0.1417	-1.76	TA
8D9KVN		0.5406	0.0356	0.42	0.5465	0.0436	0.54	TN
9DKJPX		0.4998	-0.0052	-0.06	0.5002	-0.0027	-0.03	TA
BEU84U		0.5994	0.0944	1.13	0.6208	0.1179	1.47	TA
EDH3UL		0.3860	-0.1190	-1.42	0.3960	-0.1069	-1.33	TA
GM3TTJ		0.5314	0.0264	0.31	0.5230	0.0201	0.25	TA
HFEPYL		0.5300	0.0250	0.30	0.5260	0.0231	0.29	TA
LPA2LP		0.5226	0.0176	0.21	0.5382	0.0353	0.44	XX
XC96RE		0.4942	-0.0108	-0.13	0.4434	-0.0595	-0.74	XX
XHBEX8		0.6056	0.1006	1.20	0.5734	0.0705	0.88	TM

Summary Statistics	Sample CF21	Sample CF22
Grand Means	0.51 COF	0.50 COF
Stnd Dev Btwn Labs	0.08 COF	0.08 COF

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

TA	Thwing-Albert Friction Tester	TM	TMI 32-06 Monitor/Slip and Friction
TN	TMI 32-07 Monitor/Slip and Friction	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

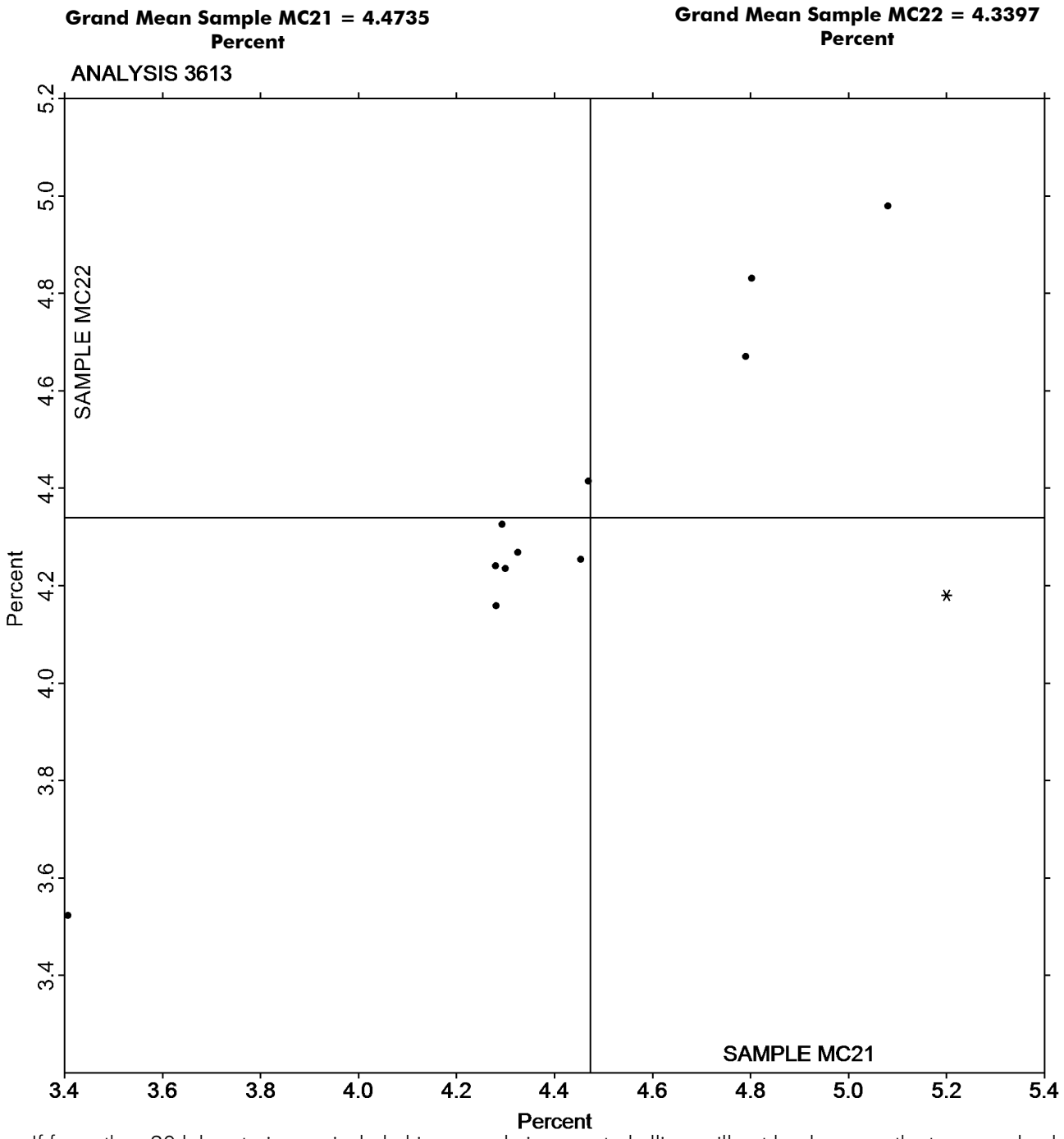
WebCode	Data Flag	Sample MC21 Lab Mean	Sample MC21 Diff from Grand Mean	Sample MC21 CPV	Sample MC22 Lab Mean	Sample MC22 Diff from Grand Mean	Sample MC22 CPV	Instr Code
2Y83F9		4.300	-0.174	-0.37	4.235	-0.105	-0.28	ZZ
3YLNRV		4.790	0.316	0.68	4.670	0.330	0.89	ZZ
GGE6YD		4.469	-0.005	-0.01	4.414	0.074	0.20	ZZ
HFEPYL		4.325	-0.148	-0.32	4.268	-0.072	-0.19	ZZ
JMRZPR		3.407	-1.067	-2.28	3.523	-0.817	-2.19	ZZ
JRQCLR		4.280	-0.194	-0.41	4.240	-0.100	-0.27	ZZ
KRKJ7F		4.281	-0.192	-0.41	4.158	-0.182	-0.49	ZZ
VAR27C		4.454	-0.020	-0.04	4.254	-0.086	-0.23	ZZ
WR6ZQZ		4.802	0.329	0.70	4.830	0.491	1.32	ZZ
X8DDL4		4.293	-0.180	-0.39	4.325	-0.014	-0.04	ZZ
XEA7UW		5.080	0.606	1.30	4.979	0.639	1.72	ZZ
XN2N87	*	5.200	0.726	1.56	4.180	-0.160	-0.43	ZZ

Summary Statistics	Sample MC21	Sample MC22
Grand Means	4.47 Percent	4.34 Percent
Stnd Dev Btwn Labs	0.47 Percent	0.37 Percent

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

WebCode	Data Flag	Sample HS21 Lab Mean	Sample HS21 Diff from Grand Mean	Sample HS21 CPV	Sample HS22 Lab Mean	Sample HS22 Diff from Grand Mean	Sample HS22 CPV	Instr Code
2GM9R6		105.66	30.74	1.26	103.50	31.33	1.29	HE
4BAABV		80.00	5.08	0.21	80.00	7.83	0.32	HE
6YBTYZ		22.70	-52.22	-2.14	22.14	-50.03	-2.06	HE
74KA8N	*	57.55	-17.37	-0.71	42.21	-29.96	-1.23	HE
7YUW7Z		47.30	-27.62	-1.13	53.50	-18.67	-0.77	HE
86YVGP		116.22	41.30	1.69	110.73	38.56	1.59	HE
8D9KVN		34.12	-40.80	-1.67	33.78	-38.39	-1.58	HE
9DKJPX		91.89	16.97	0.69	92.25	20.08	0.83	HE
BREQYJ	X	432.40	357.48	14.62	435.40	363.23	14.94	HE
CBMCXW		82.56	7.64	0.31	74.86	2.69	0.11	HE
E74UTJ		87.00	12.08	0.49	82.20	10.03	0.41	HE
EDH3UL		62.22	-12.70	-0.52	60.61	-11.56	-0.48	HE
FLUDMD		88.57	13.65	0.56	87.85	15.68	0.64	HE
GHNAC2		57.51	-17.41	-0.71	54.76	-17.41	-0.72	HE
GLBW6P		70.00	-4.92	-0.20	68.20	-3.97	-0.16	HE
HFEPYL		82.80	7.88	0.32	77.75	5.58	0.23	HE
HPNW2F		102.30	27.38	1.12	100.50	28.33	1.16	HE
N8773H		104.22	29.30	1.20	101.40	29.23	1.20	XX
PQWEZD		70.85	-4.07	-0.17	70.99	-1.18	-0.05	XX
VD6244		90.60	15.68	0.64	86.64	14.47	0.60	XX
X3W6X4		41.12	-33.80	-1.38	37.73	-34.44	-1.42	HE
XC96RE		85.89	10.97	0.45	86.66	14.49	0.60	XX
ZLNXV8		67.20	-7.72	-0.32	59.50	-12.67	-0.52	HE

Summary Statistics	Sample HS21	Sample HS22
Grand Means	74.92 Seconds	72.17 Seconds
Stnd Dev Btwn Labs	24.45 Seconds	24.32 Seconds

Statistics based on 22 of 23 reporting participants.

Comments on Assigned Data Flags for Test #3615

BREQYJ (X) - Extreme Data.

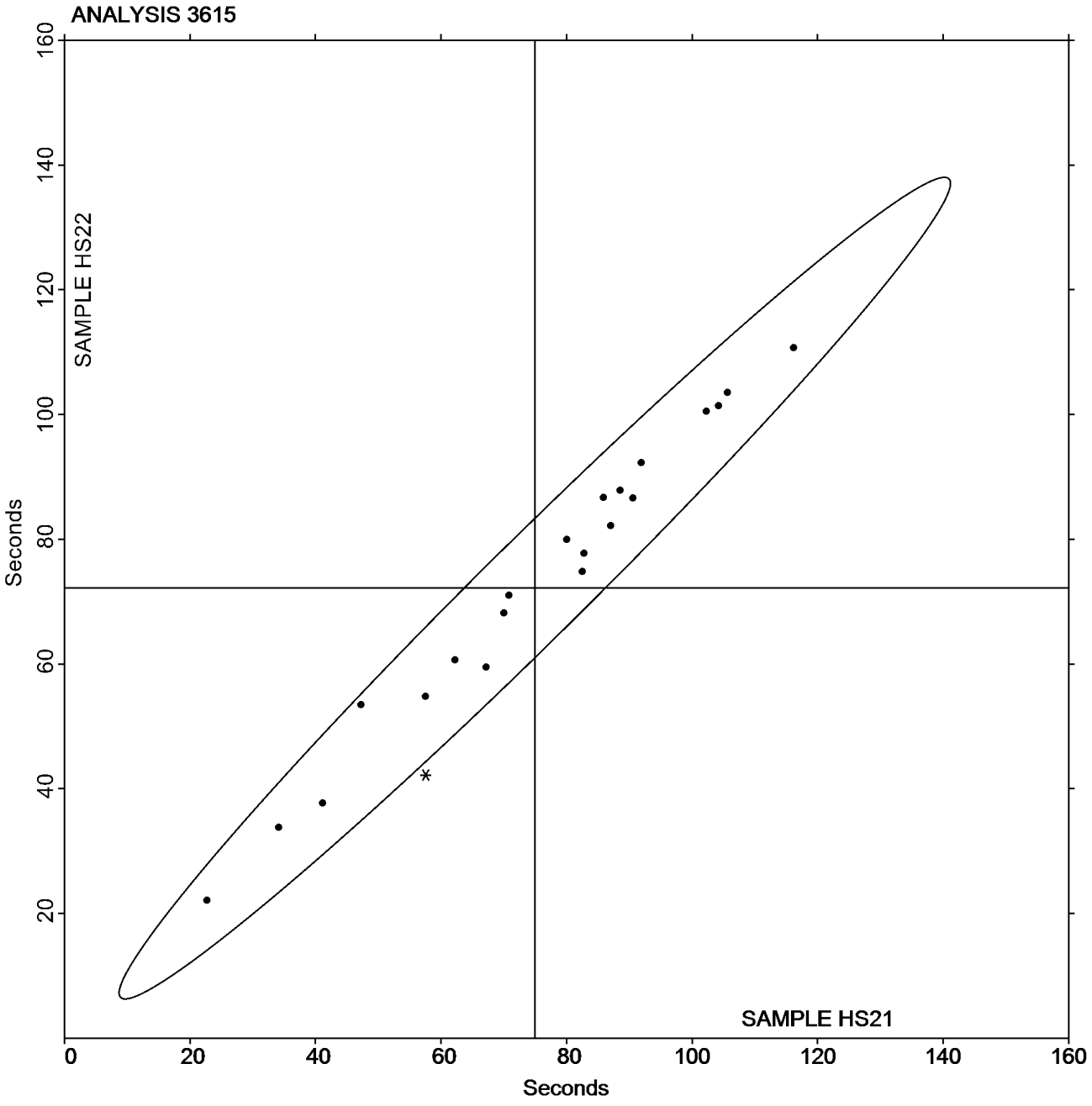
Key to Instrument Codes Reported by Participants

HE Hercules Sizing Tester

XX Instrument make/model not specified by lab

Grand Mean Sample HS21 = 74.922 Seconds

Grand Mean Sample HS22 = 72.171 Seconds



-End of Report-