Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #4302 - June 2024

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The CTS Paper & Paperboard Interlaboratory Program

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

About CTS

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

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Key for Web Summary Reports (Page 1 of 2)

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

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

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

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

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

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

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

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

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

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

Common Problems Highlighted in Footnotes

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

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

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

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

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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3501

Thickness (Caliper), Packaging papers

TAPPI Official Test Method T411

WebCode	Data Flag	Sample CK29 Lab Mean	Sample CK29 Diff from Grand Mean	Sample CK29 CPV	Sample CK30 Lab Mean	Sample CK30 Diff from Grand Mean	Sample CK30 CPV	Instr Code
223YD7	*	7.905	0.238	1.48	9.862	0.375	2.14	PP
2FKFR4		7.714	0.047	0.29	9.563	0.076	0.43	EM
2JN9RU		7.881	0.214	1.33	9.633	0.145	0.83	LW
2MGJA8		7.923	0.256	1.60	9.768	0.281	1.60	PP
37MBRZ	X	13.650	5.983	37.33	13.480	3.993	22.80	LW
6BDHAY		7.533	-0.134	-0.84	9.336	-0.151	-0.86	EM
7WWMT3		7.433	-0.234	-1.46	9.260	-0.227	-1.30	PP
949F4P		7.891	0.224	1.40	9.698	0.211	1.20	LW
9DA6EY		7.690	0.022	0.14	9.494	0.007	0.04	LW
9DULU2		7.339	-0.328	-2.05	9.079	-0.408	-2.33	XX
AKNEFZ		7.640	-0.027	-0.17	9.490	0.003	0.02	LW
BAKHWV		7.390	-0.277	-1.73	9.210	-0.277	-1.58	TM
BV6DP3		7.701	0.034	0.21	9.435	-0.052	-0.30	LW
DZCL8H		7.638	-0.029	-0.18	9.535	0.048	0.28	LC
EXEJQT		7.600	-0.067	-0.42	9.392	-0.095	-0.54	EM
FJVFKN		7.701	0.033	0.21	9.547	0.060	0.34	LW
G399DH		7.618	-0.049	-0.31	9.462	-0.025	-0.14	TA
HAZ8XN		7.463	-0.204	-1.28	9.256	-0.231	-1.32	OK
HDGFLN	X	7.598	-0.069	-0.43	9.642	0.155	0.88	LW
JBM9GG		7.680	0.013	0.08	9.574	0.087	0.50	LW
JCXXWM		7.588	-0.079	-0.50	9.422	-0.065	-0.37	LA
KBLH3L		7.607	-0.060	-0.38	9.458	-0.029	-0.17	LW
LRPK6C		7.837	0.169	1.06	9.776	0.289	1.65	LW
MGGLJF		7.446	-0.221	-1.38	9.233	-0.254	-1.45	XX
N69UZG		7.813	0.145	0.91	9.594	0.107	0.61	LB
NHXTRJ		7.590	-0.077	-0.48	9.370	-0.117	-0.67	XX
PU7T2G		7.791	0.124	0.77	9.582	0.095	0.54	XX
QENHU7		7.546	-0.121	-0.76	9.416	-0.071	-0.41	XX
REHP8H		7.756	0.089	0.55	9.490	0.003	0.02	LC
RMWE8B		7.760	0.093	0.58	9.555	0.068	0.39	EM
RQVP4B		7.885	0.218	1.36	9.711	0.224	1.28	EM
TPD8DB		7.612	-0.055	-0.35	9.401	-0.086	-0.49	TA
VW7AED		7.721	0.054	0.33	9.518	0.031	0.18	OK
WVQDLD		7.470	-0.197	-1.23	9.340	-0.147	-0.84	XX
Z7DMD3		7.862	0.195	1.21	9.613	0.126	0.72	PP

Summary Statistics	Sample CK29	Sample CK30
Grand Means	7.67 mils	9.49 mils
Stnd Dev Btwn Labs	0.16 mils	0.18 mils

Statistics based on 33 of 35 reporting participants.

Comments on Assigned Data Flags for Test #3501

HDGFLN (X) - Inconsistent in testing between samples.

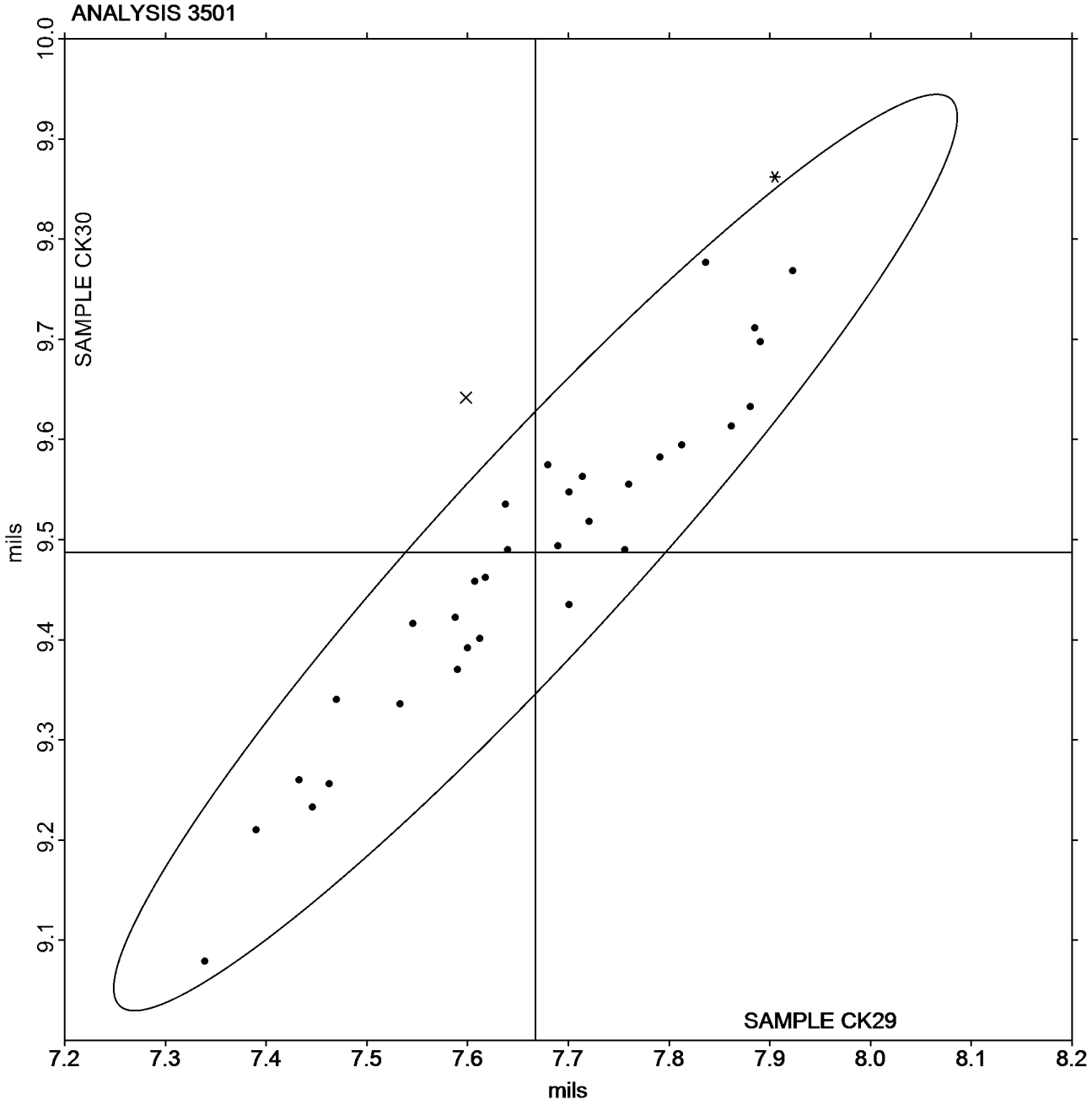
37MBRZ (X) - Extreme Data.

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 CK29 = 7.6673 mils

Grand Mean Sample CK30 = 9.4871 mils



Paper & Paperboard Interlaboratory Testing Program

Analysis 3511

Bursting Strength - Packaging Papers

TAPPI Official Test Method T403

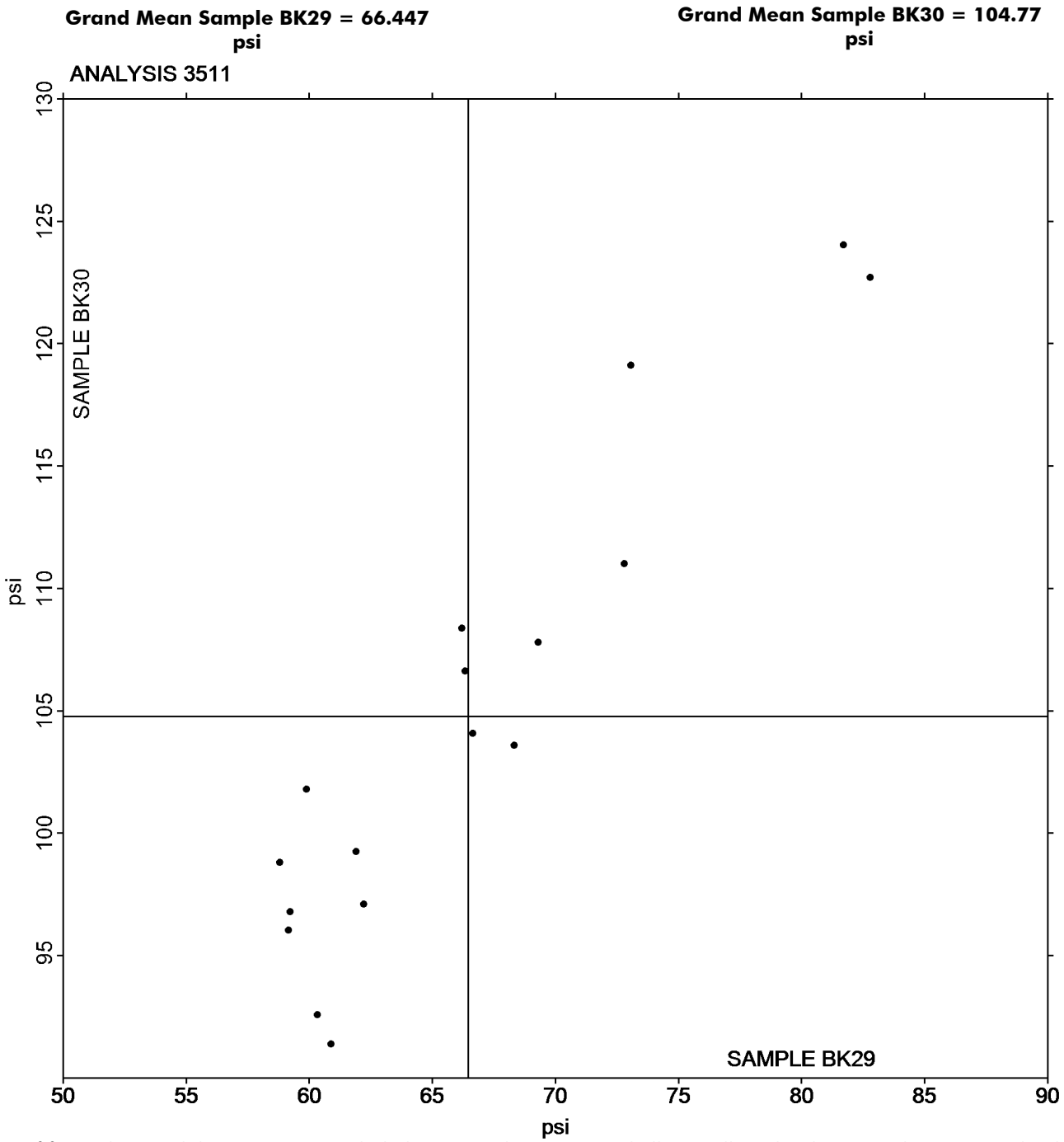
WebCode	Data Flag	Sample BK29 Lab Mean	Sample BK29 Diff from Grand Mean	Sample BK29 CPV	Sample BK30 Lab Mean	Sample BK30 Diff from Grand Mean	Sample BK30 CPV	Instr Code
43844Z		82.80	16.35	2.17	122.7	17.9	1.81	ZZ
7ECWU4		81.70	15.25	2.02	124.0	19.3	1.95	ZZ
9DA6EY		66.34	-0.11	-0.01	106.6	1.9	0.19	ZZ
9KRNNZ		62.21	-4.24	-0.56	97.1	-7.7	-0.77	ZZ
B4C2FU		60.33	-6.12	-0.81	92.6	-12.2	-1.23	ZZ
EXEJQT		59.15	-7.30	-0.97	96.0	-8.7	-0.88	ZZ
FJVFKN		73.07	6.62	0.88	119.1	14.4	1.45	ZZ
JBM9GG		68.33	1.88	0.25	103.6	-1.2	-0.12	ZZ
KYRAAC		59.23	-7.22	-0.96	96.8	-8.0	-0.81	ZZ
LRPK6C		60.88	-5.57	-0.74	91.4	-13.4	-1.35	ZZ
NF7UDK		66.21	-0.24	-0.03	108.4	3.6	0.36	ZZ
QLZNFB		72.80	6.35	0.84	111.0	6.2	0.63	ZZ
TPD8DB		69.30	2.85	0.38	107.8	3.0	0.31	ZZ
VW7AED		66.65	0.20	0.03	104.1	-0.7	-0.07	ZZ
VYX9RB		61.91	-4.54	-0.60	99.2	-5.5	-0.56	ZZ
X7QZDA		59.90	-6.55	-0.87	101.8	-3.0	-0.30	ZZ
YCVG7V		58.80	-7.65	-1.01	98.8	-6.0	-0.60	ZZ

Summary Statistics	Sample BK29	Sample BK30
Grand Means	66.45 psi	104.77 psi
Stnd Dev Btwn Labs	7.54 psi	9.90 psi

Statistics based on 17 of 17 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 RK29 Lab Mean	Sample RK29 Diff from Grand Mean	Sample RK29 CPV	Sample RK30 Lab Mean	Sample RK30 Diff from Grand Mean	Sample RK30 CPV	Instr Code
223YD7		206.6	24.3	1.32	241.7	23.3	1.00	ZZ
2FKFR4		163.8	-18.6	-1.00	206.4	-12.0	-0.51	ZZ
2JN9RU		184.4	2.1	0.11	210.5	-7.9	-0.34	ZZ
37MBRZ		170.2	-12.1	-0.66	200.8	-17.6	-0.75	ZZ
6BDHAY	*	230.8	48.5	2.62	255.1	36.7	1.57	ZZ
949F4P		198.5	16.2	0.87	236.9	18.6	0.79	ZZ
96JHPN		181.5	-0.8	-0.05	215.4	-3.0	-0.13	ZZ
9DA6EY		182.7	0.4	0.02	216.8	-1.6	-0.07	ZZ
9YRDQR		183.6	1.3	0.07	210.4	-8.0	-0.34	ZZ
BV6DP3		168.1	-14.2	-0.77	193.6	-24.8	-1.06	ZZ
BWFFC2		175.0	-7.4	-0.40	205.5	-12.9	-0.55	ZZ
DZCL8H		167.3	-15.0	-0.81	217.0	-1.4	-0.06	ZZ
E2W4BM	*	204.4	22.1	1.19	274.2	55.8	2.39	ZZ
E86DTH		188.8	6.5	0.35	231.2	12.8	0.55	ZZ
G399DH		179.3	-3.0	-0.16	212.1	-6.3	-0.27	ZZ
HAZ8XN		182.2	-0.1	-0.01	191.3	-27.1	-1.16	ZZ
JBM9GG		175.8	-6.5	-0.35	213.6	-4.8	-0.21	ZZ
JCXXWM		181.7	-0.6	-0.03	219.8	1.4	0.06	ZZ
K6V9RN		163.0	-19.4	-1.05	195.7	-22.7	-0.97	ZZ
KBLH3L		173.9	-8.4	-0.46	206.1	-12.3	-0.53	ZZ
KYRAAC	*	130.2	-52.1	-2.82	164.2	-54.2	-2.32	ZZ
LRPK6C		192.1	9.7	0.53	227.7	9.4	0.40	ZZ
NHXTRJ		202.8	20.5	1.11	257.2	38.8	1.66	ZZ
PU7T2G		192.7	10.4	0.56	241.9	23.5	1.01	ZZ
RMWE8B		191.8	9.5	0.51	228.6	10.2	0.44	ZZ
VW7AED	X	732.2	549.8	29.75	878.5	660.2	28.28	ZZ
VYX9RB		179.8	-2.5	-0.14	210.8	-7.6	-0.32	ZZ
VZ6DJE		209.2	26.9	1.45	251.8	33.4	1.43	ZZ
WKVUDZ		183.0	0.7	0.04	224.6	6.2	0.27	ZZ
X7QZDA		154.9	-27.5	-1.49	181.0	-37.4	-1.60	ZZ
YCVG7V		183.0	0.6	0.03	223.0	4.6	0.20	ZZ
ZK2NE4		171.2	-11.1	-0.60	205.2	-13.2	-0.56	ZZ

Summary Statistics	Sample RK29	Sample RK30
Grand Means	182.33 Grams	218.38 Grams
Stnd Dev Btwn Labs	18.48 Grams	23.34 Grams

Statistics based on 31 of 32 reporting participants.

Comments on Assigned Data Flags for Test #3513

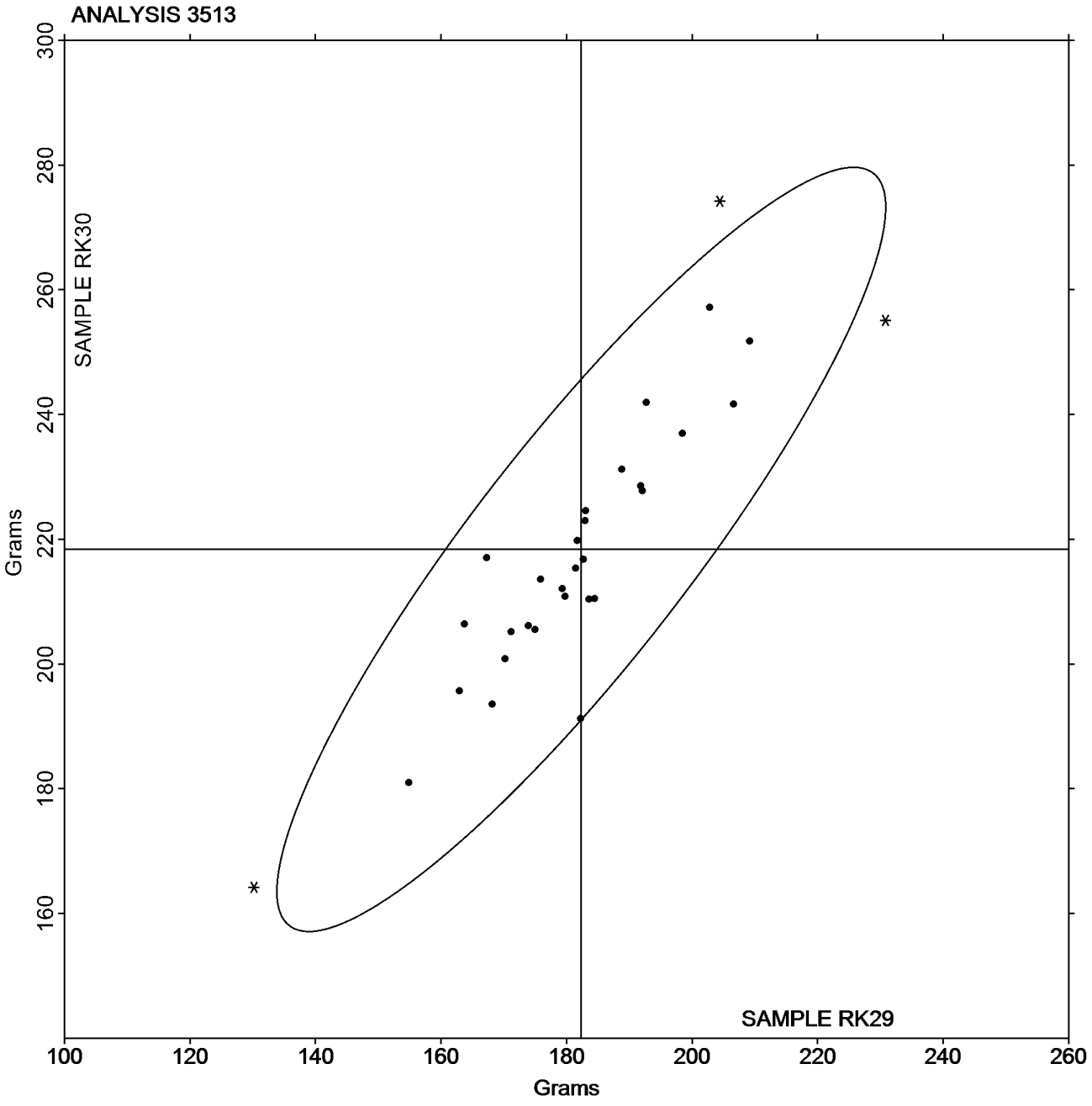
VW7AED (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample RK29 = 182.33 Grams

Grand Mean Sample RK30 = 218.38 Grams



Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK29 Lab Mean	Sample NK29 Diff from Grand Mean	Sample NK29 CPV	Sample NK30 Lab Mean	Sample NK30 Diff from Grand Mean	Sample NK30 CPV	Instr Code
223YD7	X	6.25	-4.59	-6.84	6.34	-9.82	-10.52	TH
262AA7		11.19	0.35	0.52	17.12	0.96	1.03	LE
2JN9RU		11.06	0.22	0.32	16.21	0.05	0.06	LW
37MBRZ	X	1.55	-9.29	-13.84	2.54	-13.61	-14.58	LX
6BDHAY		10.28	-0.56	-0.83	15.24	-0.91	-0.98	LW
949F4P		10.55	-0.29	-0.43	15.35	-0.81	-0.86	LE
96JHPN		10.77	-0.07	-0.10	15.90	-0.26	-0.28	LE
9DA6EY		10.68	-0.16	-0.24	16.28	0.12	0.13	LH
9KRNNZ		12.36	1.52	2.26	17.66	1.50	1.61	LW
9YRDQR		10.24	-0.59	-0.89	16.29	0.14	0.15	LH
AKNEFZ		10.24	-0.60	-0.90	14.67	-1.48	-1.59	TH
BV6DP3		10.75	-0.09	-0.13	16.27	0.11	0.12	LW
DZCL8H		10.58	-0.26	-0.39	15.74	-0.42	-0.45	IN
E2W4BM		11.48	0.64	0.96	17.58	1.43	1.53	LA
E374GU		11.75	0.91	1.36	16.59	0.44	0.47	LI
E86DTH		10.29	-0.55	-0.81	14.96	-1.20	-1.29	LE
E8LC6U		11.68	0.84	1.26	17.44	1.29	1.38	LA
FNRVFQ	*	10.46	-0.38	-0.57	16.95	0.79	0.85	DM
G399DH		9.81	-1.03	-1.53	15.55	-0.61	-0.65	TB
GMTA7W		9.94	-0.90	-1.34	14.80	-1.36	-1.46	TS
JBM9GG		12.25	1.41	2.11	18.11	1.96	2.09	LE
JCXXWM		11.07	0.23	0.34	16.90	0.74	0.79	LA
KBLH3L		11.09	0.25	0.37	16.37	0.21	0.22	LE
LRPK6C		10.30	-0.54	-0.81	15.30	-0.86	-0.92	IM
MGGLJF		11.33	0.49	0.73	16.66	0.50	0.54	TB
N69UZG		12.01	1.17	1.75	17.53	1.38	1.47	LC
NHXTRJ		10.95	0.11	0.17	15.97	-0.19	-0.20	XX
NYZCJF		9.94	-0.90	-1.35	14.83	-1.33	-1.42	TT
PU7T2G		10.63	-0.21	-0.32	15.44	-0.72	-0.77	ID
RQVP4B		11.49	0.65	0.97	17.07	0.91	0.98	LE
TPD8DB		10.94	0.10	0.15	16.33	0.17	0.19	TV
VT7WYZ		10.68	-0.16	-0.23	15.62	-0.54	-0.58	IR
VYX9RB		9.95	-0.89	-1.32	15.43	-0.73	-0.78	TX
VZ6DJE	X	6.54	-4.30	-6.41	6.73	-9.43	-10.09	TH
WKVUDZ		10.35	-0.49	-0.73	15.39	-0.77	-0.83	XX
WVQDLD		10.04	-0.80	-1.20	14.82	-1.33	-1.43	XX
X7QZDA	X	67.35	56.51	84.17	99.44	83.28	89.18	TO
YCVG7V	M	10.30	-0.54	-0.80	No data reported for this sample			LE
ZBEKDV		11.42	0.58	0.87	16.97	0.81	0.87	IM
ZK2NE4		10.83	-0.01	-0.02	16.15	-0.01	-0.01	XX

Paper & Paperboard Interlaboratory Testing Program

Analysis 3515

Tensile Breaking Strength - Packaging Papers

TAPPI Official Test Method T494

Summary Statistics	Sample NK29	Sample NK30
Grand Means	10.84 kN/m	16.16 kN/m
Stnd Dev Btwn Labs	0.67 kN/m	0.93 kN/m

Statistics based on 35 of 40 reporting participants.

Comments on Assigned Data Flags for Test #3515

YCVG7V (M) - Participant did not submit data for sample NK30.

X7QZDA (X) - Extreme Data.

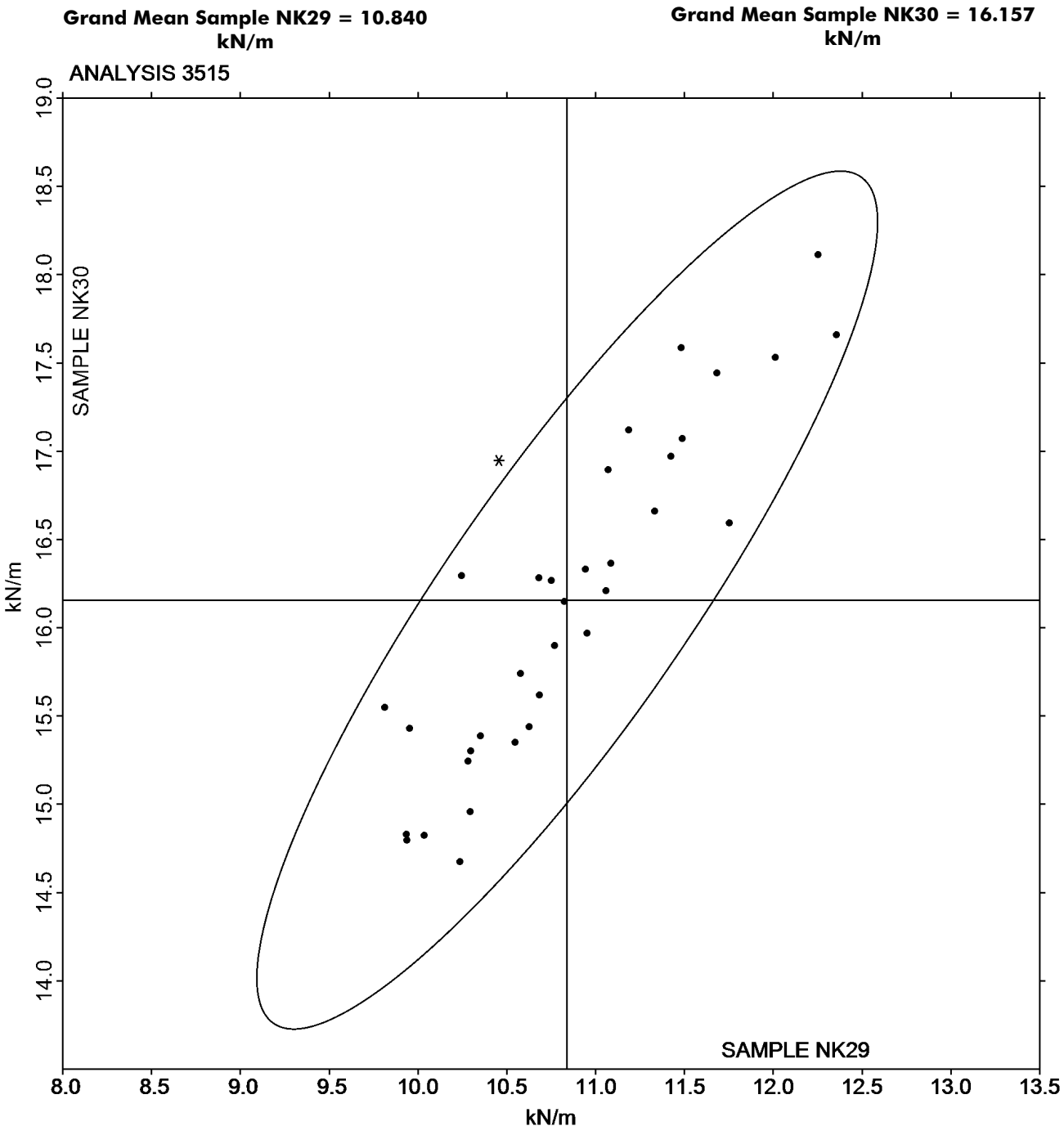
37MBRZ (X) - Extreme Data.

223YD7 (X) - Extreme Data.

VZ6DJE (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	ID	Instron 4200 Series
IM	Instron 5500 Series	IN	Instron 3360 Series
IR	Instron 5900 Series	LA	L & W Autoline
LC	L & W Tensile - Autoline 600	LE	L & W Tensile Tester 066
LH	L & W Alwetron TH1 (Horizontal) SE 060	LI	LLoyds Instruments
LW	L & W Tensile Tester SE062	LX	L & W (model not specified)
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TO	Thwing-Albert QC-1000	TS	TMI Horizontal Tensile Tester 84-58
TT	Tinius Olsen Model MHT	TV	Thwing-Albert Vantage NX
TX	Thwing-Albert (model not specified)	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program

Analysis 3516

Tensile Energy Absorption - Packaging Papers

TAPPI Official Test Method T494

WebCode	Data Flag	Sample NK29 Lab Mean	Sample NK29 Diff from Grand Mean	Sample NK29 CPV	Sample NK30 Lab Mean	Sample NK30 Diff from Grand Mean	Sample NK30 CPV	Instr Code
262AA7		115.9	-5.2	-0.40	213.4	-8.8	-0.47	LE
2JN9RU		109.7	-11.3	-0.87	205.6	-16.6	-0.89	LE
37MBRZ		129.2	8.1	0.62	212.0	-10.1	-0.54	TH
6BDHAY		106.5	-14.6	-1.12	191.7	-30.4	-1.63	LW
949F4P		111.7	-9.4	-0.72	205.3	-16.9	-0.90	LE
96JHPN		108.5	-12.6	-0.96	205.6	-16.5	-0.89	LE
9DA6EY		117.1	-3.9	-0.30	216.6	-5.6	-0.30	LH
9KRNNZ		138.6	17.5	1.34	232.8	10.6	0.57	LW
9YRDQR		96.8	-24.3	-1.86	200.1	-22.0	-1.18	LH
AKNEFZ		121.2	0.1	0.01	208.7	-13.5	-0.72	TH
BV6DP3		107.4	-13.7	-1.04	201.1	-21.0	-1.13	LW
DZCL8H		103.5	-17.6	-1.34	210.0	-12.1	-0.65	IN
E2W4BM		120.6	-0.5	-0.04	228.1	5.9	0.32	LC
E8LC6U		127.2	6.2	0.47	231.5	9.3	0.50	LA
FNRVFQ	X	150.3	29.2	2.23	330.6	108.4	5.81	DM
GMTA7W		117.3	-3.8	-0.29	224.8	2.6	0.14	TS
JBM9GG		116.6	-4.4	-0.34	217.7	-4.4	-0.24	LE
JCXXWM		133.1	12.0	0.92	232.6	10.5	0.56	LA
KBLH3L		106.7	-14.4	-1.10	197.6	-24.6	-1.31	LE
LRPK6C		131.8	10.7	0.82	243.6	21.4	1.15	IM
MGGLJF		130.1	9.0	0.69	242.5	20.4	1.09	TB
N69UZG		124.4	3.3	0.25	224.2	2.0	0.11	LC
NHXTRJ	*	162.4	41.3	3.16	268.3	46.1	2.47	XX
NYZCJF		120.5	-0.6	-0.04	228.7	6.6	0.35	TT
RQVP4B		137.5	16.4	1.26	240.2	18.0	0.97	LE
TPD8DB		130.4	9.3	0.71	256.8	34.7	1.86	TV
VT7WYZ		113.9	-7.2	-0.55	196.2	-26.0	-1.39	IR
VYX9RB		114.5	-6.6	-0.50	239.7	17.5	0.94	TX
WKVUDZ		122.6	1.5	0.11	233.4	11.2	0.60	XX
WVQDLD		131.1	10.0	0.76	233.8	11.6	0.62	TH
ZBEKDV		131.8	10.7	0.82	236.9	14.7	0.79	IM
ZK2NE4		115.0	-6.1	-0.47	207.2	-14.9	-0.80	XX

Summary Statistics	Sample NK29	Sample NK30
Grand Means	121.08 Joules/sq m	222.15 Joules/sq m
Stnd Dev Btwn Labs	13.08 Joules/sq m	18.67 Joules/sq m

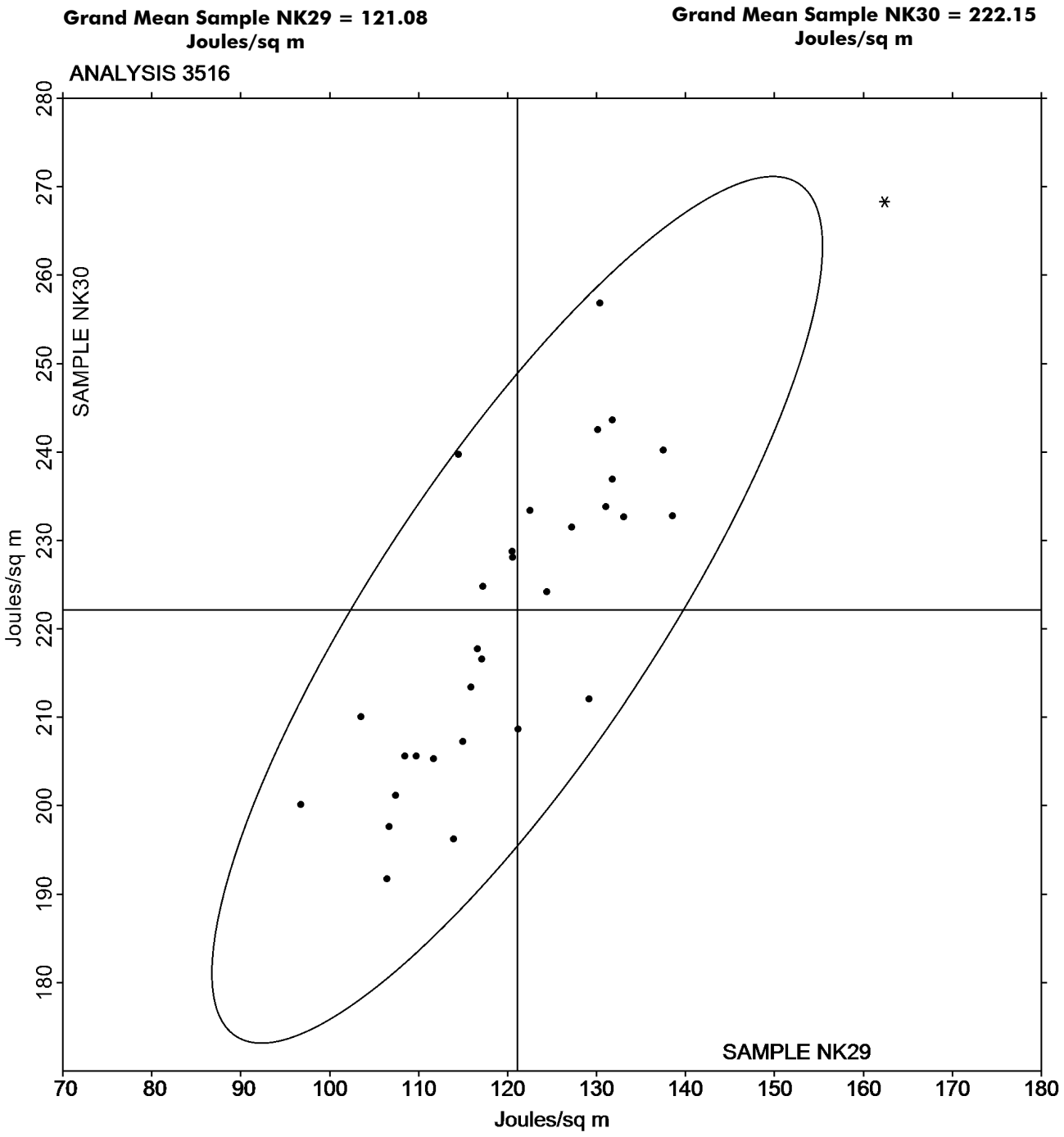
Statistics based on 31 of 32 reporting participants.

Comments on Assigned Data Flags for Test #3516

FNRVFQ (X) - Data for sample NK30 are high.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	IM	Instron 5500 Series
IN	Instron 3360 Series	IR	Instron 5900 Series
LA	L & W Autoline	LC	L & W Tensile - Autoline 600
LE	L & W Tensile Tester 066	LH	L & W Alwetron TH1 (Horizontal) SE 060
LW	L & W Tensile Tester SE062	TB	Thwing-Albert EJA/1000
TH	Thwing-Albert QC-3A	TS	TMI Horizontal Tensile Tester 84-58
TT	Tinius Olsen Model MHT	TV	Thwing-Albert Vantage NX
TX	Thwing-Albert (model not specified)	XX	Instrument make/model not specified by lab



Paper & Paperboard Interlaboratory Testing Program

Analysis 3517

Elongation to Break - Packaging Papers

TAPPI Official Test Method T494

		Sample NK29			Sample NK30			
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	Instr Code
262AA7		1.658	-0.093	-0.55	1.959	-0.198	-0.93	LE
2JN9RU		1.567	-0.184	-1.08	1.968	-0.189	-0.88	LW
37MBRZ	X	2.240	0.489	2.87	3.200	1.043	4.87	LX
6BDHAY		1.636	-0.115	-0.68	1.978	-0.179	-0.84	LW
949F4P		1.652	-0.099	-0.58	2.055	-0.102	-0.48	LE
96JHPN		1.595	-0.156	-0.92	2.009	-0.148	-0.69	LE
9DA6EY		1.704	-0.047	-0.28	2.088	-0.069	-0.32	LX
9KRNNZ		1.776	0.025	0.15	2.070	-0.087	-0.41	LW
9YRDQR		1.509	-0.242	-1.42	1.925	-0.232	-1.08	LH
AKNEFZ		1.982	0.231	1.35	2.369	0.212	0.99	TH
BV6DP3		1.591	-0.160	-0.94	1.948	-0.209	-0.98	LW
DZCL8H		1.582	-0.169	-0.99	2.094	-0.063	-0.30	IN
E2W4BM		1.614	-0.137	-0.80	1.966	-0.191	-0.89	LC
E8LC6U		1.682	-0.069	-0.41	2.007	-0.150	-0.70	XX
FNRVFQ	X	2.206	0.455	2.67	2.985	0.828	3.87	DM
G399DH		1.580	-0.171	-1.00	1.980	-0.177	-0.83	TB
GMTA7W		1.899	0.148	0.87	2.408	0.251	1.17	TS
JBM9GG	X	0.060	-1.691	-9.92	0.074	-2.083	-9.73	LE
JCXXWM		1.794	0.043	0.25	2.276	0.119	0.55	LX
KBLH3L		1.538	-0.213	-1.25	1.900	-0.257	-1.20	LE
LRPK6C		2.038	0.287	1.68	2.492	0.335	1.56	IM
MGGLJF		1.829	0.078	0.46	2.301	0.144	0.67	XX
N69UZG		1.564	-0.187	-1.10	1.912	-0.245	-1.15	LC
NHXTRJ		1.672	-0.080	-0.47	2.055	-0.102	-0.48	XX
NYZCJF		1.999	0.248	1.45	2.472	0.315	1.47	TT
PU7T2G		1.868	0.117	0.69	2.242	0.085	0.40	XX
RQVP4B		1.883	0.132	0.77	2.203	0.046	0.21	LE
TPD8DB		1.979	0.228	1.34	2.556	0.399	1.86	TV
VT7WYZ		1.667	-0.084	-0.49	1.974	-0.183	-0.86	XX
VYX9RB		1.824	0.073	0.43	2.398	0.241	1.12	TX
WKVUDZ		1.895	0.144	0.84	2.398	0.241	1.12	XX
WVQDLD		2.110	0.359	2.10	2.530	0.373	1.74	XX
X7QZDA	X	0.108	-1.643	-9.64	0.122	-2.035	-9.51	TO
ZBEKDV		1.958	0.207	1.21	2.374	0.217	1.01	IM
ZK2NE4		1.642	-0.109	-0.64	1.966	-0.191	-0.89	XX

Summary Statistics	Sample NK29	Sample NK30
Grand Means	1.75 Percent	2.16 Percent
Stnd Dev Btwn Labs	0.17 Percent	0.21 Percent

Statistics based on 31 of 35 reporting participants.

Comments on Assigned Data Flags for Test #3517

JBM9GG (X) - Extreme Data.

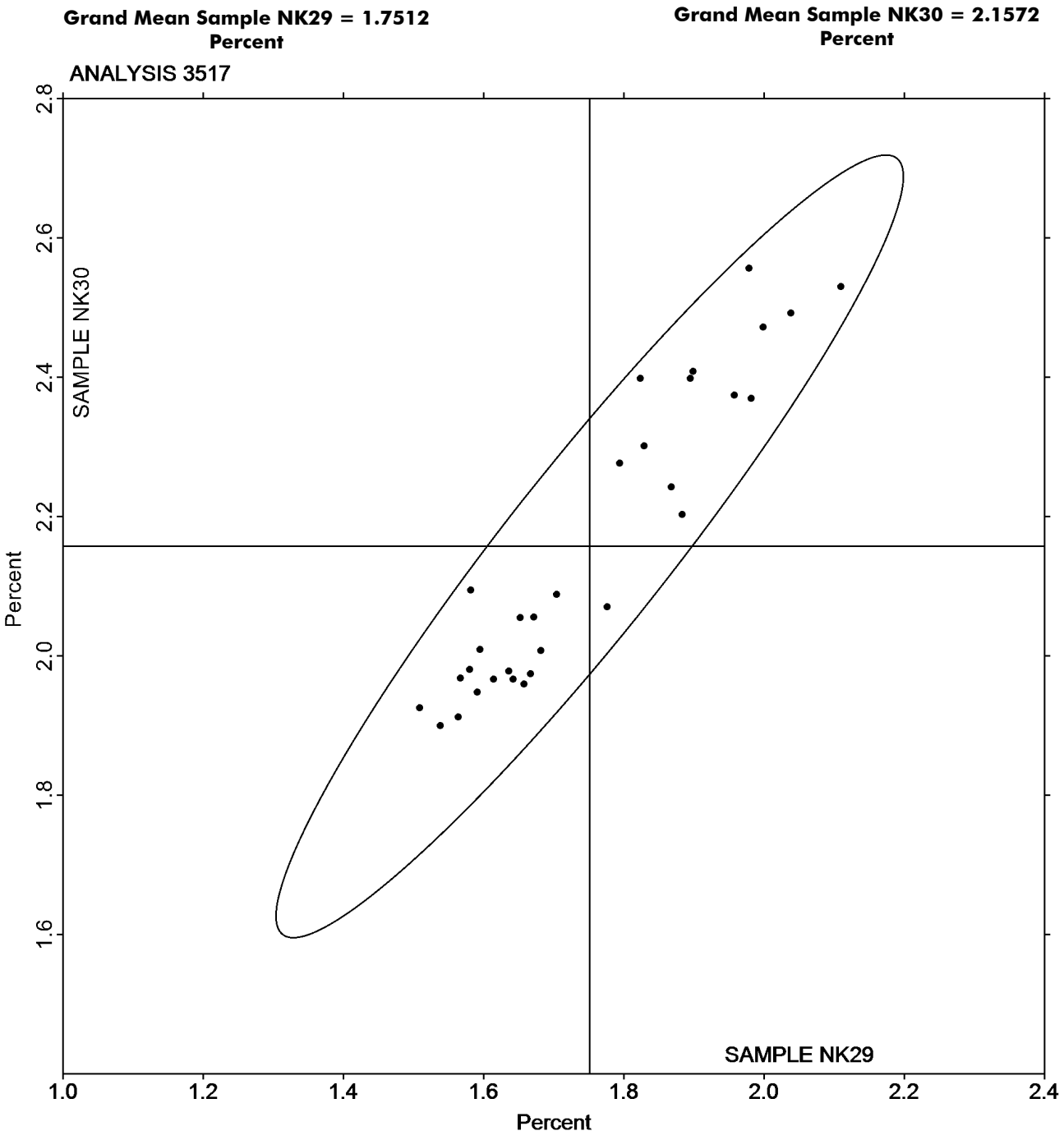
X7QZDA (X) - Extreme Data.

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

37MBRZ (X) - Data for both samples are high.

Key to Instrument Codes Reported by Participants

DM	IDM MTC-100 Tensile Tester	IM	Instron 5500 Series
IN	Instron 3360 Series	LC	L & W Tensile - Autoline 600
LE	L & W Tensile Tester 066	LH	L & W Alwetron TH1 (Horizontal) SE 060
LW	L & W Tensile Tester SE062	LX	L & W (model not specified)
TB	Thwing-Albert EJA/1000	TH	Thwing-Albert QC-3A
TO	Thwing-Albert QC-1000	TS	TMI Horizontal Tensile Tester 84-58
TT	Tinius Olsen Model MHT	TV	Thwing-Albert Vantage NX
TX	Thwing-Albert (model not specified)	XX	Instrument make/model not specified by lab



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 PS29 Lab Mean	Sample PS29 Diff from Grand Mean	Sample PS29 CPV	Sample PS30 Lab Mean	Sample PS30 Diff from Grand Mean	Sample PS30 CPV	Instr Code
2FKFR4		0.7130	-0.0151	-0.31	0.7020	-0.0284	-0.58	ZZ
6BDHAY		0.6330	-0.0951	-1.97	0.6240	-0.1064	-2.18	ZZ
6BGRGY		0.7310	0.0029	0.06	0.7340	0.0036	0.07	ZZ
7VK7GP		0.7760	0.0479	0.99	0.7770	0.0466	0.95	ZZ
9DA6EY		0.6960	-0.0321	-0.66	0.7190	-0.0114	-0.23	ZZ
9KRE3V		0.7800	0.0519	1.07	0.7640	0.0336	0.69	ZZ
AKNEFZ		0.7050	-0.0231	-0.48	0.6950	-0.0354	-0.73	ZZ
BDG9UU		0.7120	-0.0161	-0.33	0.7180	-0.0124	-0.25	ZZ
DKBZFT		0.7470	0.0189	0.39	0.7650	0.0346	0.71	ZZ
EMW6NQ		0.7080	-0.0201	-0.42	0.7080	-0.0224	-0.46	ZZ
GMTA7W		0.7800	0.0519	1.07	0.7930	0.0626	1.28	ZZ
HAZ8XN		0.8210	0.0929	1.92	0.8260	0.0956	1.96	ZZ
MGGLJF		0.7390	0.0109	0.22	0.7130	-0.0174	-0.36	ZZ
MLWU8F		0.7360	0.0079	0.16	0.7440	0.0136	0.28	ZZ
N69UZG		0.7390	0.0109	0.22	0.7350	0.0046	0.09	ZZ
REHP8H	*	0.5860	-0.1421	-2.94	0.6050	-0.1254	-2.57	ZZ
RMWE8B		0.7510	0.0229	0.47	0.7680	0.0376	0.77	ZZ
RQVP4B		0.7450	0.0169	0.35	0.7330	0.0026	0.05	ZZ
U9QZ76		0.7460	0.0179	0.37	0.7710	0.0406	0.83	ZZ
UPDHTE		0.7810	0.0529	1.09	0.7730	0.0426	0.87	ZZ
UX2HZB		0.7000	-0.0281	-0.58	0.7000	-0.0304	-0.62	ZZ
UXM6MZ		0.7160	-0.0121	-0.25	0.7380	0.0076	0.16	ZZ
VW7AED		0.7140	-0.0141	-0.29	0.7000	-0.0304	-0.62	ZZ
YYKVT4		0.7200	-0.0081	-0.17	0.7250	-0.0054	-0.11	ZZ

Summary Statistics	Sample PS29	Sample PS30
Grand Means	0.73 Microns	0.73 Microns
Stnd Dev Btwn Labs	0.05 Microns	0.05 Microns

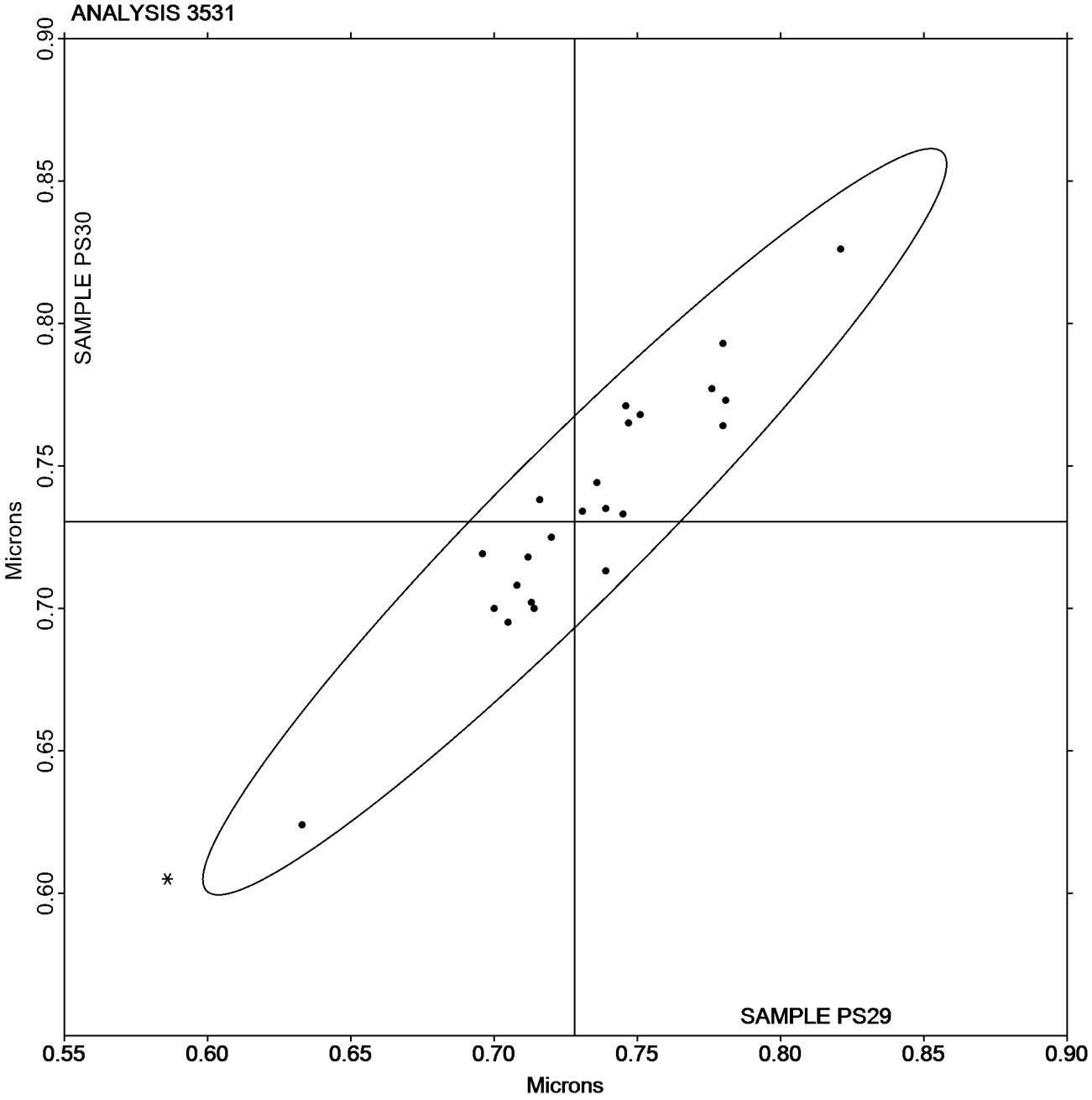
Statistics based on 24 of 24 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

Grand Mean Sample PS29 = 0.72813 Microns

Grand Mean Sample PS30 = 0.73042 Microns



Paper & Paperboard Interlaboratory Testing Program

Analysis 3545
Directional Brightness
TAPPI Official Test Method T452

WebCode	Data Flag	Sample BR29 Lab Mean	Sample BR29 Diff from Grand Mean	Sample BR29 CPV	Sample BR30 Lab Mean	Sample BR30 Diff from Grand Mean	Sample BR30 CPV	Instr Code
29GHX7		79.20	2.79	0.97	79.44	2.94	0.99	TP
2FKFR4		78.64	2.24	0.78	78.69	2.19	0.74	TP
6BDHAY		76.78	0.37	0.13	76.67	0.17	0.06	TP
6BGRGY		76.25	-0.15	-0.05	76.24	-0.26	-0.09	TP
7WWMT3		69.61	-6.79	-2.36	69.61	-6.89	-2.33	TP
89YQDM		76.57	0.16	0.06	76.49	-0.01	0.00	XX
AKNEFZ		76.94	0.53	0.18	76.88	0.38	0.13	TP
BV6DP3		76.30	-0.11	-0.04	76.62	0.12	0.04	TS
EMW6NQ		76.51	0.11	0.04	76.62	0.12	0.04	HZ
G399DH		76.92	0.51	0.18	77.44	0.95	0.32	XD
GMTA7W		76.38	-0.03	-0.01	76.51	0.02	0.01	TS
HAZ8XN	*	67.68	-8.73	-3.03	67.28	-9.22	-3.11	TS
HWWPMN		75.86	-0.54	-0.19	75.58	-0.92	-0.31	TS
KYRAAC	*	76.34	-0.07	-0.02	77.40	0.91	0.31	XX
MLWU8F		78.80	2.40	0.83	78.88	2.38	0.80	TD
NHXTRJ		77.66	1.26	0.44	77.96	1.46	0.49	XX
R9WUAK		75.65	-0.76	-0.26	75.71	-0.78	-0.26	TT
RMWE8B		80.01	3.61	1.25	79.90	3.41	1.15	HG
RQVP4B		80.10	3.69	1.28	80.04	3.54	1.20	HG
UX2HZB		75.34	-1.07	-0.37	75.49	-1.01	-0.34	TD
UXM6MZ		75.70	-0.70	-0.24	75.82	-0.68	-0.23	PP
VW7AED		77.68	1.27	0.44	77.68	1.18	0.40	HG

Summary Statistics	Sample BR29	Sample BR30
Grand Means	76.41 Percent	76.50 Percent
Stnd Dev Btwn Labs	2.88 Percent	2.96 Percent

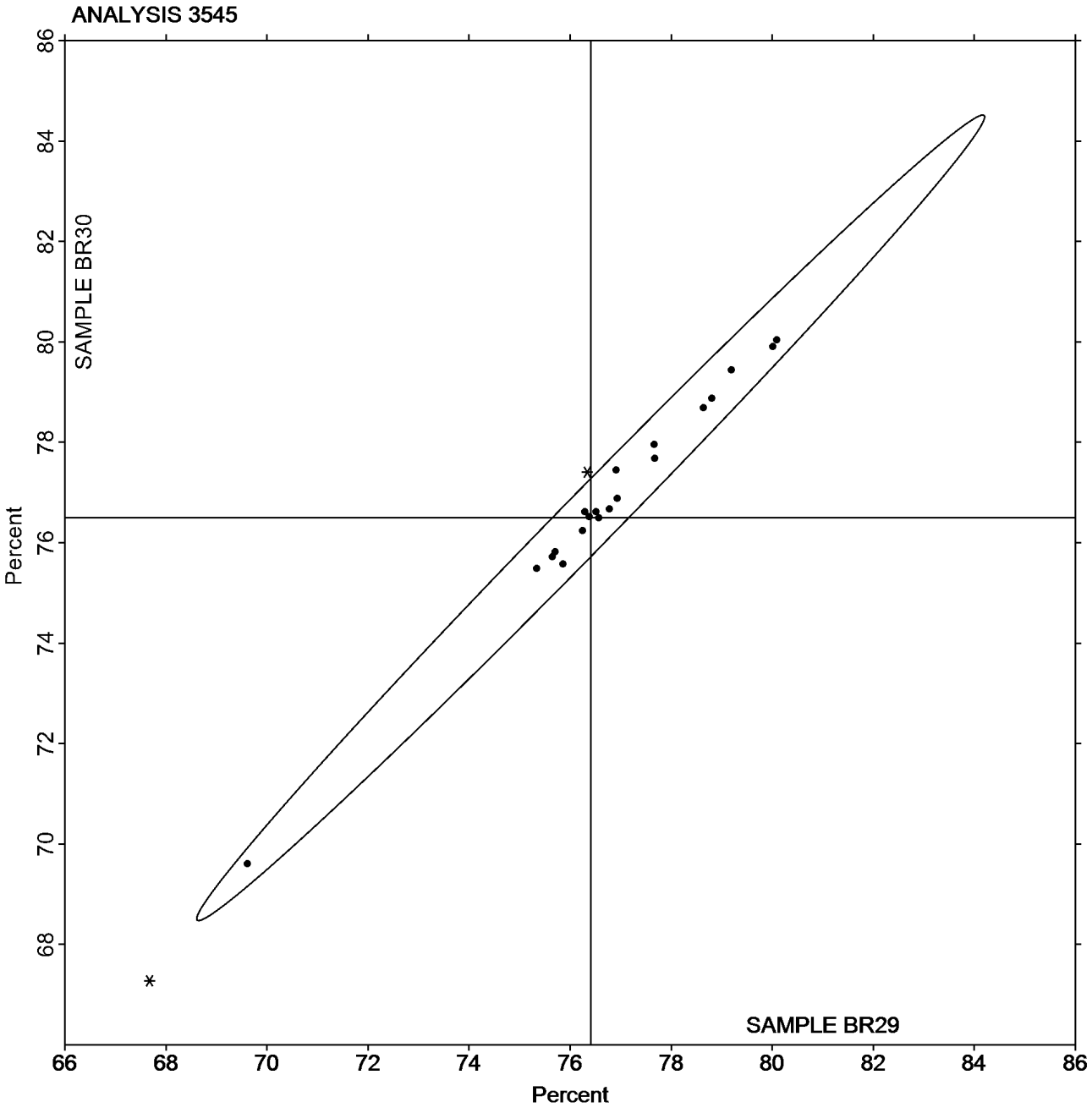
Statistics based on 22 of 22 reporting participants.

Key to Instrument Codes Reported by Participants

HG	Hunter Labscan / XE	HZ	Hunter Lab ColorFlex EZ Series
PP	Technidyne Profile/Plus	TD	Technidyne Color Touch 45X
TP	Technidyne Test/Plus	TS	Technidyne Brightimeter Micro S-5
TT	Technidyne Brightimeter Micro S4-M	XD	X-Rite Color Ci7600
XX	Instrument make/model not specified by lab		

Grand Mean Sample BR29 = 76.405 Percent

Grand Mean Sample BR30 = 76.496 Percent



Paper & Paperboard Interlaboratory Testing Program

Analysis 3547
Diffuse Brightness
TAPPI Official Test Method T525

WebCode	Data Flag	Sample BR29 Lab Mean	Sample BR29 Diff from Grand Mean	Sample BR29 CPV	Sample BR30 Lab Mean	Sample BR30 Diff from Grand Mean	Sample BR30 CPV	Instr Code
2FKFR4		76.66	-0.15	-0.63	76.68	-0.12	-0.41	TC
2JN9RU		76.70	-0.11	-0.48	76.70	-0.10	-0.35	LT
6BDHAY	X	79.93	3.12	13.41	78.25	1.45	4.96	EA
7VK7GP		76.88	0.07	0.30	76.80	0.00	0.00	TC
9DA6EY		76.62	-0.18	-0.79	76.62	-0.18	-0.63	LT
AKNEFZ		76.79	-0.02	-0.08	76.75	-0.05	-0.17	LT
ATGPPV		76.53	-0.28	-1.21	76.58	-0.22	-0.76	LE
B7LZ2N		76.90	0.09	0.41	76.57	-0.23	-0.80	XX
GMTA7W		77.41	0.60	2.58	77.64	0.84	2.89	LT
J7VY8J		76.78	-0.03	-0.14	76.81	0.01	0.04	TP
MLWU8F		76.81	0.01	0.03	76.76	-0.04	-0.15	TD
T68MLG		77.00	0.19	0.82	77.02	0.22	0.74	LE
VW7AED		76.62	-0.19	-0.81	76.68	-0.12	-0.40	TC

Summary Statistics	Sample BR29	Sample BR30
Grand Means	76.81 Percent	76.80 Percent
Stnd Dev Btwn Labs	0.23 Percent	0.29 Percent

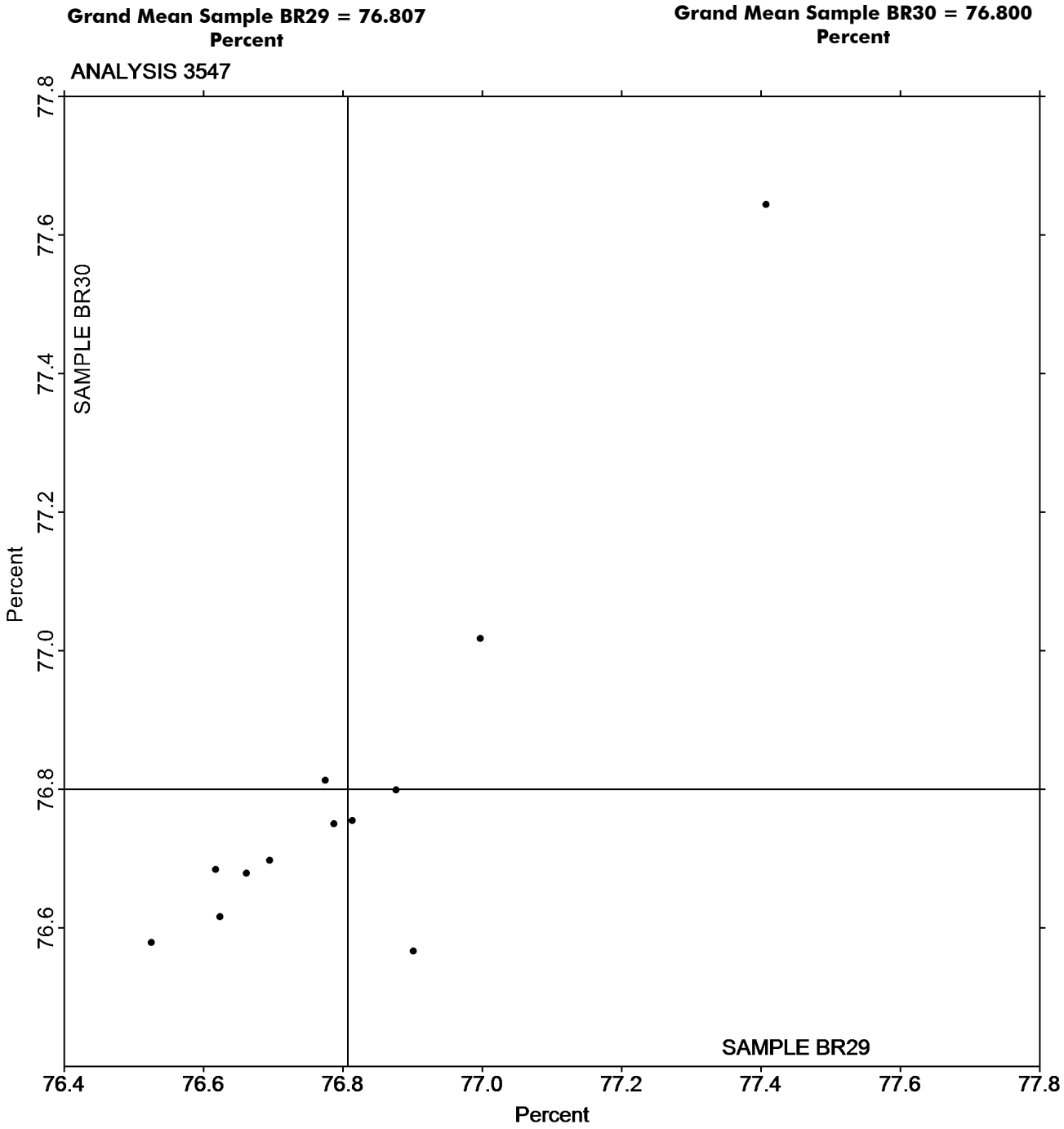
Statistics based on 12 of 13 reporting participants.

Comments on Assigned Data Flags for Test #3547

6BDHAY (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
TD	Technidyne Color Touch X	TP	Technidyne Test/Plus
XX	Instrument make/model not specified by lab		



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3549

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

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

Report #4302, June 2024

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L	a	b	Color Difference Values ΔL	Δa	Δb	ΔE	Instr Code
2FKFR4		**CA29**	86.80	0.39	-0.68	-0.04	-0.08	0.11	0.14	TC
		CA30	86.76	0.32	-0.57					
AFW3MP		**CA29**	86.06	1.21	-0.67	0.03	-0.16	0.26	0.31	TS
		CA30	86.08	1.05	-0.40					
ATGPPV		**CA29**	89.42	0.39	-0.69	0.07	-0.03	0.07	0.11	LS
		CA30	89.50	0.36	-0.61					
B7LZ2N		**CA29**	89.65	-0.44	-0.37	0.10	-0.07	0.17	0.20	TC
		CA30	89.75	-0.51	-0.21					
DKBZFT		**CA29**	88.56	0.91	-1.45	-0.01	0.01	-0.01	0.02	TC
		CA30	88.55	0.92	-1.46					
EXEJQT		**CA29**	89.62	0.60	-0.71	0.05	-0.10	0.15	0.19	TC
		CA30	89.67	0.50	-0.56					
GMTA7W		**CA29**	85.76	1.44	-1.44	-0.06	0.07	-0.06	0.11	TS
		CA30	85.70	1.51	-1.50					
GXCLFN		**CA29**	83.40	-0.41	-0.64	-0.29	-0.01	0.08	0.30	NH
		CA30	83.10	-0.41	-0.55					
HAZ8XN	X	**CA29**	80.49	1.04	-1.06	0.83 X	0.08	0.28	0.88 X	TS
		CA30	81.32 X	1.12	-0.78					
MLWU8F		**CA29**	86.78	0.36	-0.63	0.05	-0.03	0.10	0.11	TC
		CA30	86.83	0.33	-0.54					
NHXTRJ		**CA29**	89.73	0.28	-0.80	0.21	0.07	-0.01	0.23	XX
		CA30	89.94	0.36	-0.80					
RMWE8B		**CA29**	86.90	0.71	-0.90	0.09	-0.04	0.14	0.17	HK
		CA30	86.98	0.67	-0.76					
RQVP4B		**CA29**	87.54	0.79	-0.92	-0.16	0.05	-0.12	0.20	HK
		CA30	87.38	0.84	-1.04					
UPDHTE		**CA29**	89.56	0.38	-0.72	0.08	-0.12	0.21	0.26	TC
		CA30	89.63	0.26	-0.51					
UX2HZB		**CA29**	85.26	0.96	-1.54	-0.16	0.04	-0.14	0.22	TC
		CA30	85.10	1.00	-1.68					
UXM6MZ		**CA29**	86.81	0.29	-0.52	-0.10	0.03	-0.07	0.12	TC
		CA30	86.72	0.32	-0.59					

VW7AED	**CA29**	87.29	0.80	-0.68	-0.05	0.03	-0.08	0.10	HF
	CA30	87.24	0.83	-0.76					

Summary Statistics

Grand Means							
CA29	87.446	0.571	-0.849	-0.013	-0.020	0.051	0.174
CA30	87.433	0.557	-0.784				
Stnd Dev Btwn Labs							
CA29	1.861	0.504	0.338	0.124	0.070	0.123	0.080
CA30	1.959	0.523	0.409				

Statistics based on 16 of 17 reporting participants

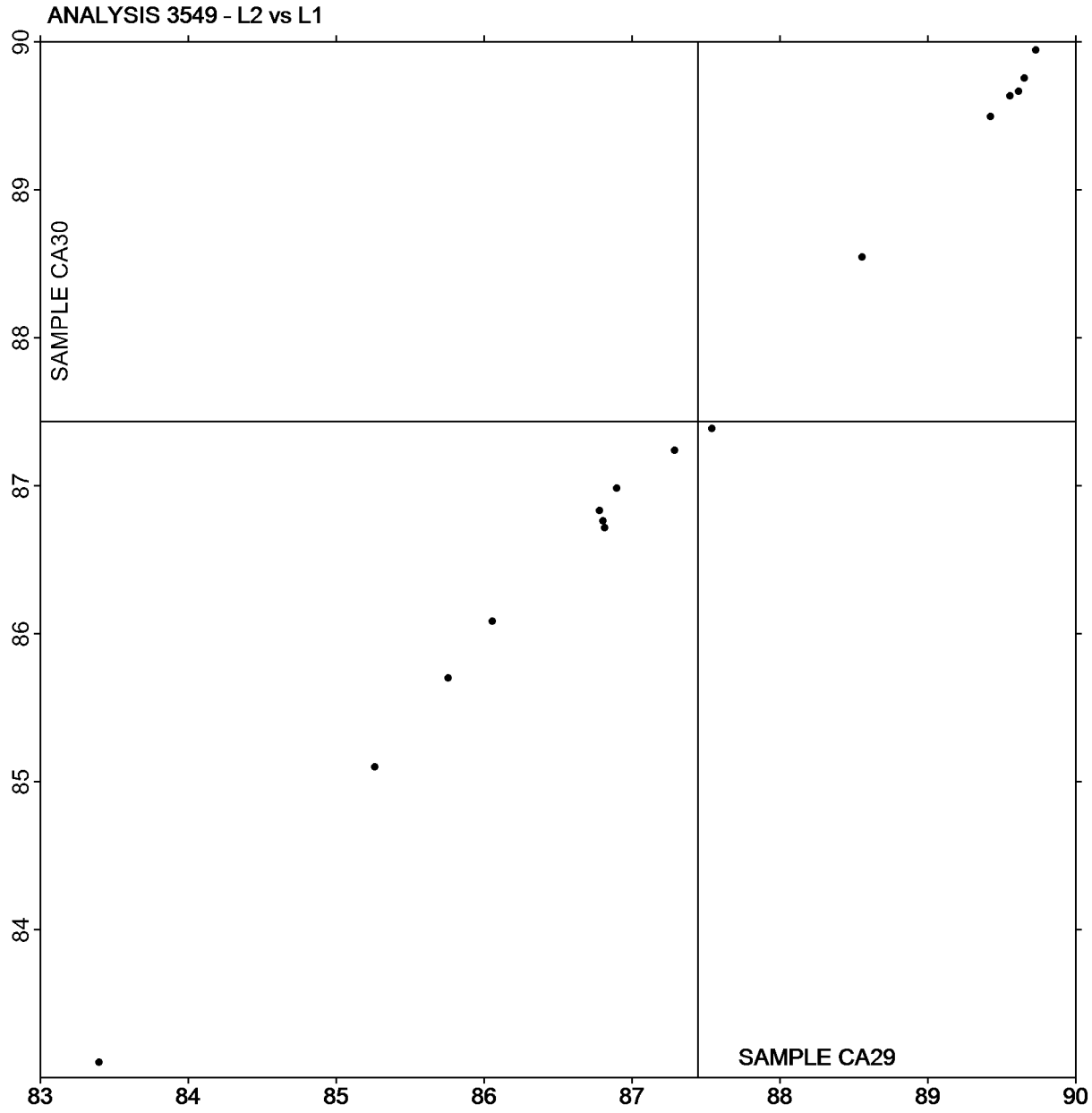
Comments on Assigned Data Flags for Test #3549

HAZ8XN (X) - Low "L" values for both samples. Inconsistent within replicate readings of "L" for both samples. Large delta L & E.

Key to Instrument Codes Reported by Participants

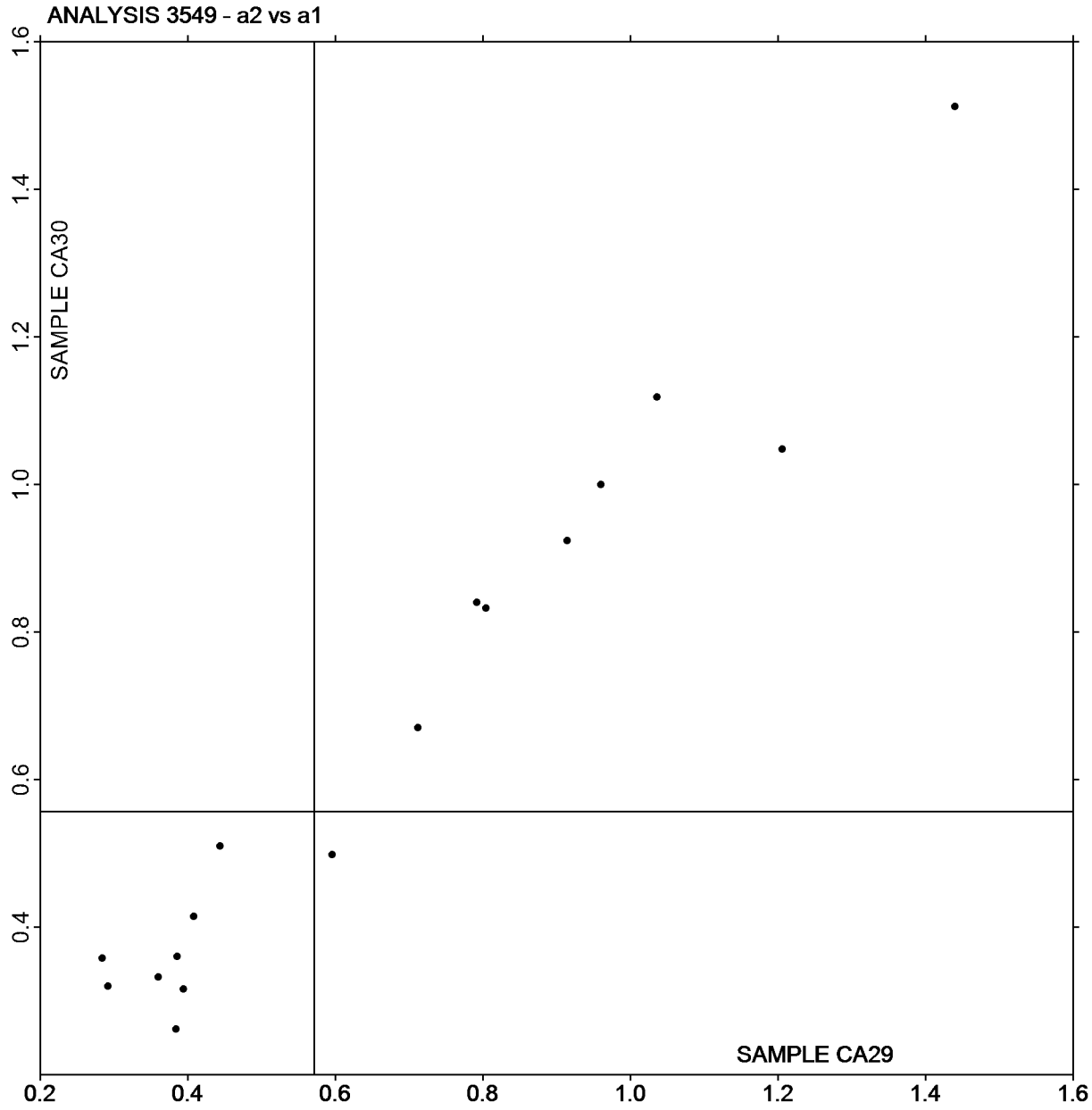
HF	Hunter LabScan II	HK	Hunter LabScan XE
LS	L & W Elrepho SE 070	NH	Minolta CM-3700A Spectrophotometer
TC	Technidyne Color Touch Series	TS	Technidyne Brightimeter Micro S-5
XX	Instrument make/model not specified by lab		

Plot of L values CA30 vs L values CA29



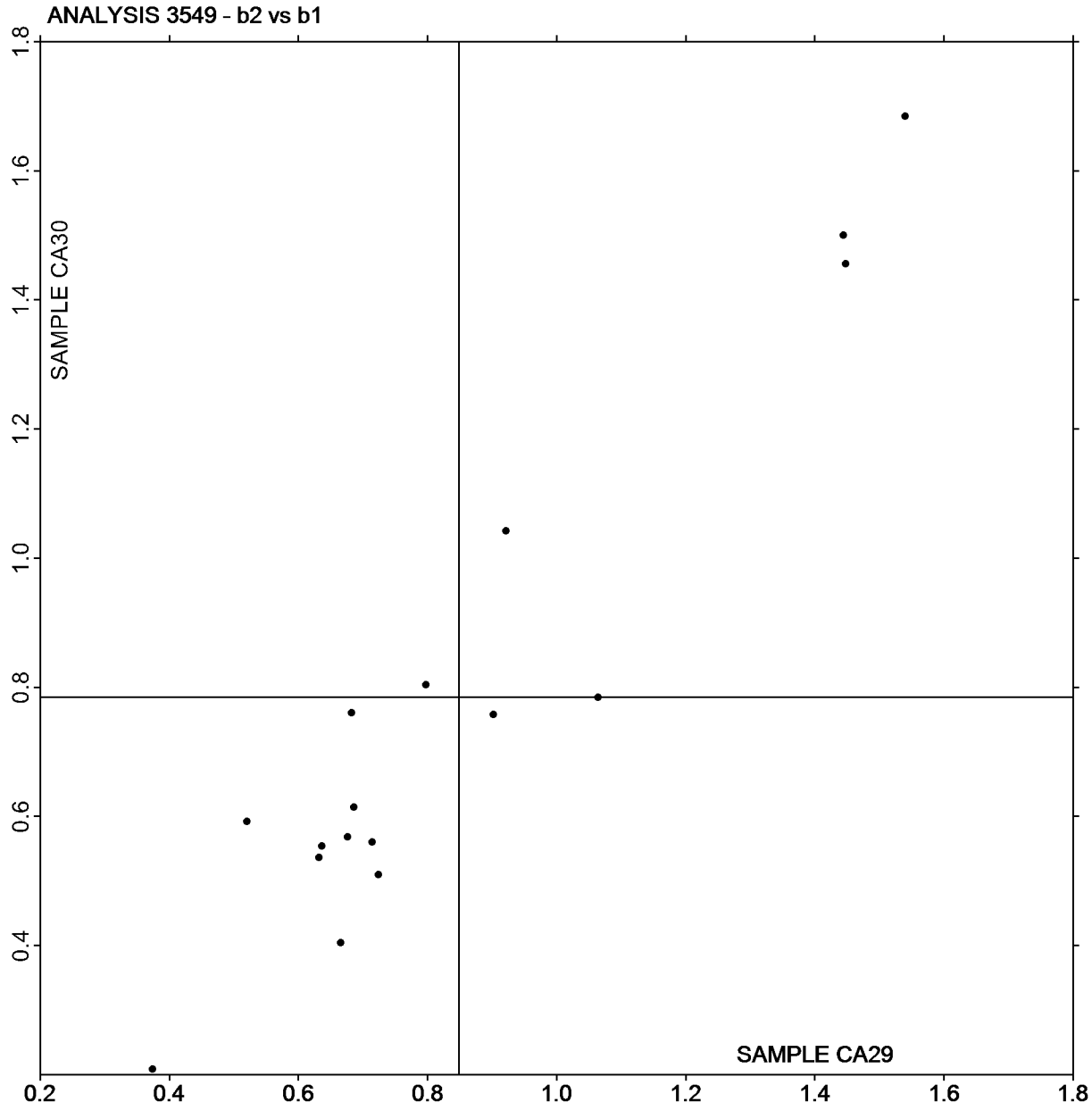
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA30 vs a values CA29



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 CA30 vs b values CA29



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 #4302, June 2024

Analysis 3551

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

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

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L	a	b	Color Difference Values ΔL	Δa	Δb	ΔE	Instr Code
2JN9RU		**CA29**	89.66	-0.52	-0.27	-0.12	-0.01	-0.12	0.17	LS
		CA30	89.53	-0.54	-0.40					
2MGJA8		**CA29**	89.72	-0.46	0.01	0.11	-0.01	0.20	0.23	NH
		CA30	89.83	-0.47	0.20					
2X69F8		**CA29**	89.87	-0.54	-0.28	-0.03	-0.06	0.00	0.07	XX
		CA30	89.85	-0.61	-0.27					
6BDHAY		**CA29**	89.55	-0.52	-0.31	-0.05	0.02	-0.19	0.19	EG
		CA30	89.49	-0.50	-0.50					
6BGRGY		**CA29**	87.81	-0.53	-0.21	-0.13	0.00	-0.15	0.20	HL
		CA30	87.68	-0.53	-0.36					
AKNEFZ		**CA29**	89.64	-0.52	-0.23	-0.01	0.00	0.04	0.04	LT
		CA30	89.63	-0.51	-0.18					
R9CY4C		**CA29**	89.58	-0.48	-0.46	-0.03	0.01	-0.04	0.05	XX
		CA30	89.55	-0.47	-0.50					
R9WUAK		**CA29**	87.45	-0.28	-0.27	0.00	0.01	-0.02	0.03	XB
		CA30	87.45	-0.27	-0.29					
TU92BC		**CA29**	89.75	-0.50	-0.43	-0.01	0.14 X	-0.30	0.33	TC
		CA30	89.74	-0.36	-0.73					
VW7AED		**CA29**	86.70	0.38	-0.78	0.06	-0.12	0.37	0.39	TC
		CA30	86.76	0.26	-0.42					
XY8W78		**CA29**	89.97	-0.32	-0.51	0.00	0.01	-0.03	0.03	NF
		CA30	89.97	-0.31	-0.54					
YXA23V		**CA29**	89.43	-0.58	-0.59	-0.08	-0.01	0.09	0.12	XC
		CA30	89.36	-0.58	-0.50					

Summary Statistics

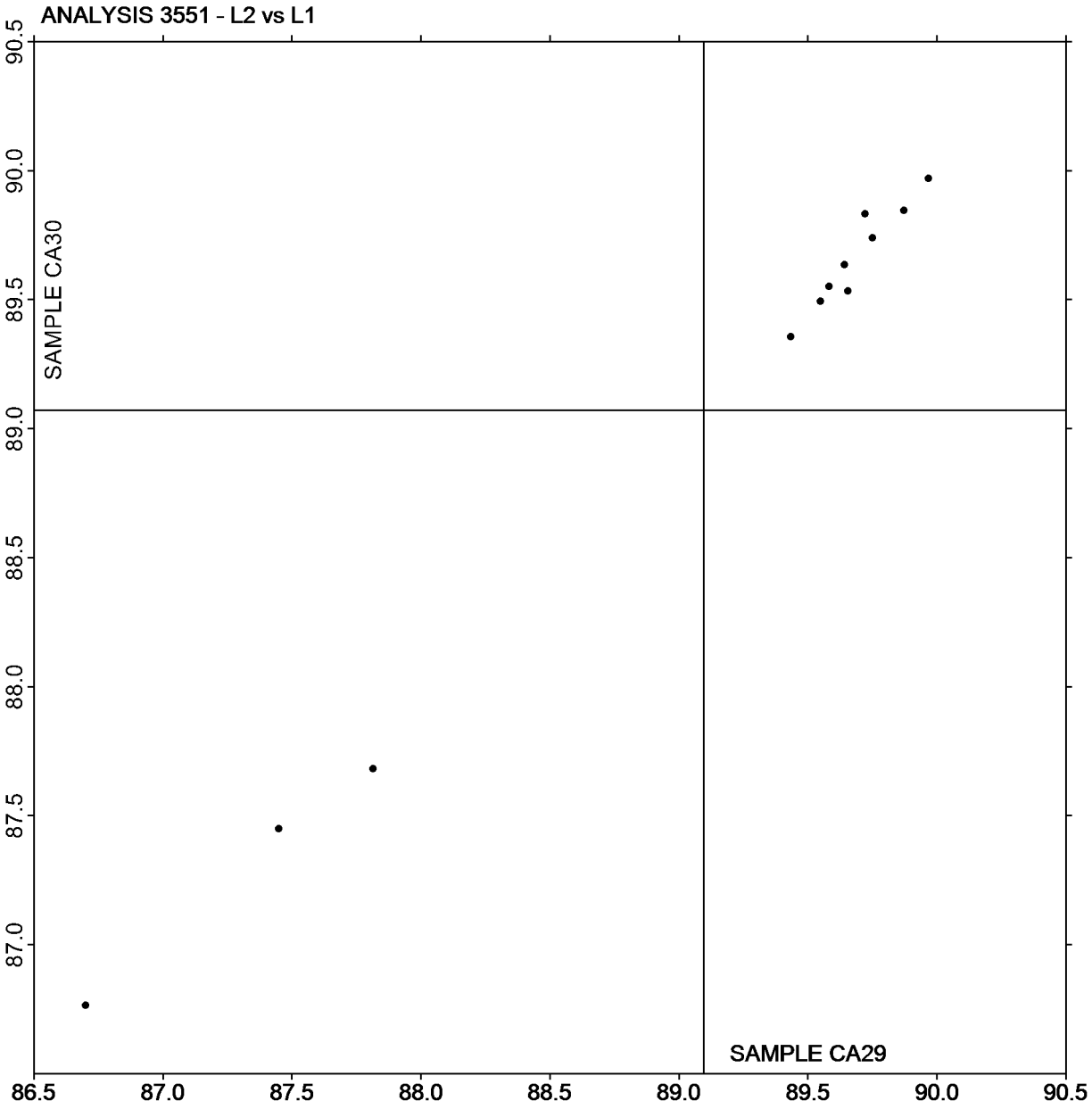
Grand Means							
CA29	89.095	-0.406	-0.361	-0.024	-0.002	-0.012	0.153
CA30	89.071	-0.408	-0.374				
Stnd Dev Btwn Labs							
CA29	1.105	0.262	0.206	0.069	0.058	0.176	0.120
CA30	1.101	0.235	0.231				

Statistics based on 12 of 12 reporting participants

Key to Instrument Codes Reported by Participants

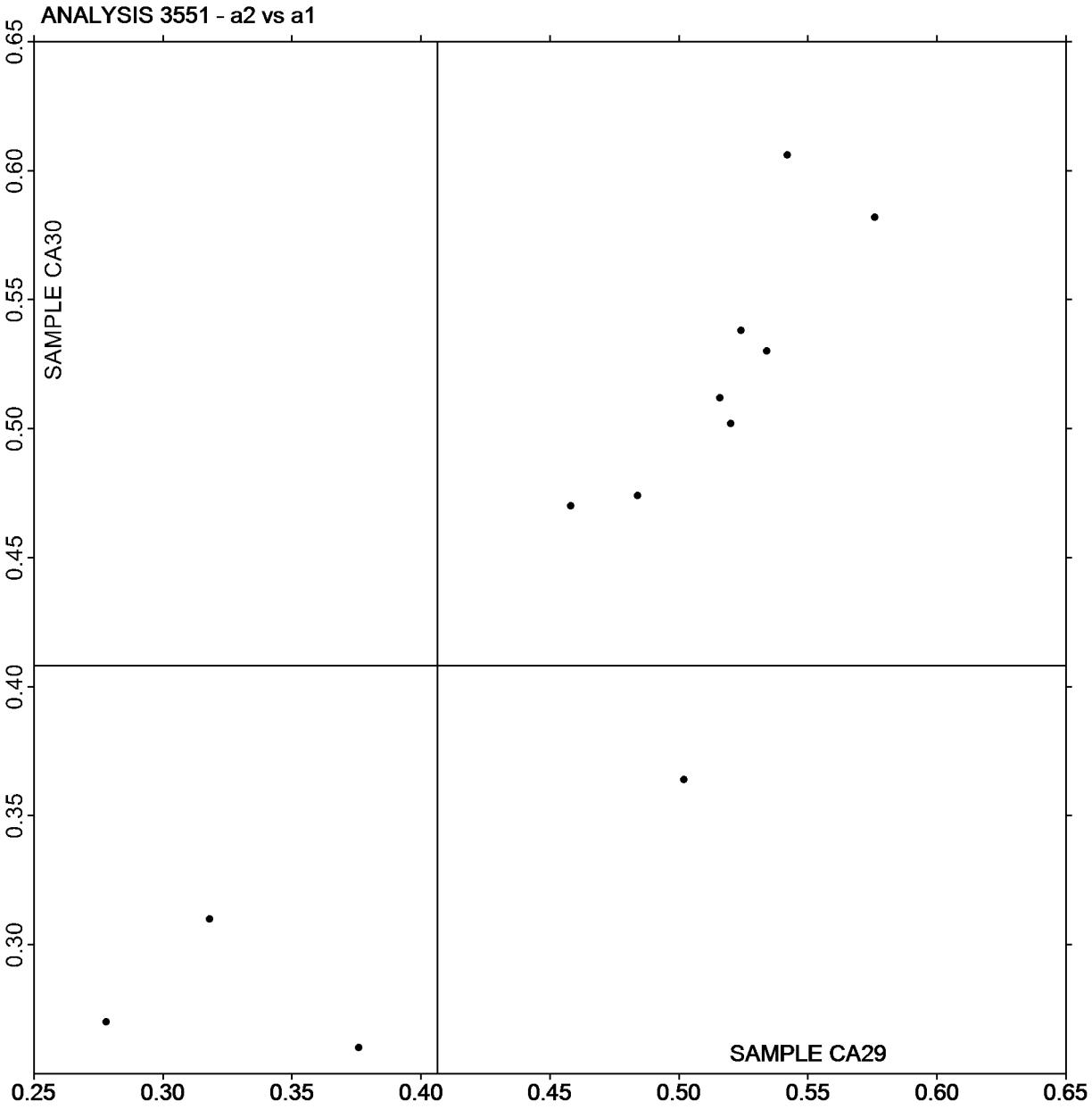
EG	Datacolor Elrepho	HL	Hunter Agera
LS	L & W Elrepho SE 070	LT	L & W Elrepho SE 071
NF	Minolta CM-3600d Spectrophotometer	NH	Minolta CM-3700A Spectrophotometer
TC	Technidyne Color Touch Series	XB	X-Rite Ci7
XC	X-Rite eXact Series	XX	Instrument make/model not specified by lab

Plot of L values CA30 vs L values CA29



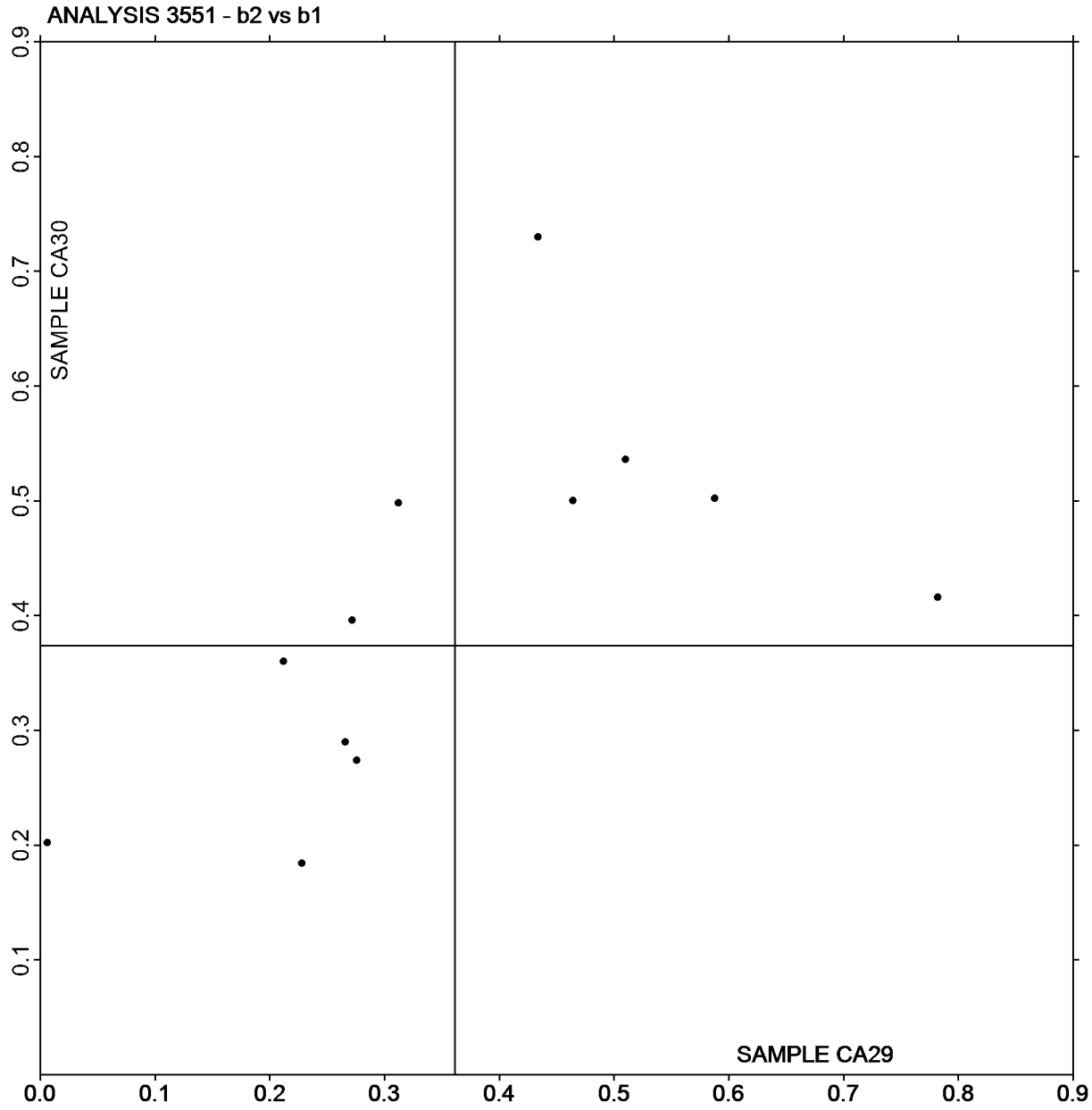
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

Plot of a values CA30 vs a values CA29



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 CA30 vs b values CA29



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

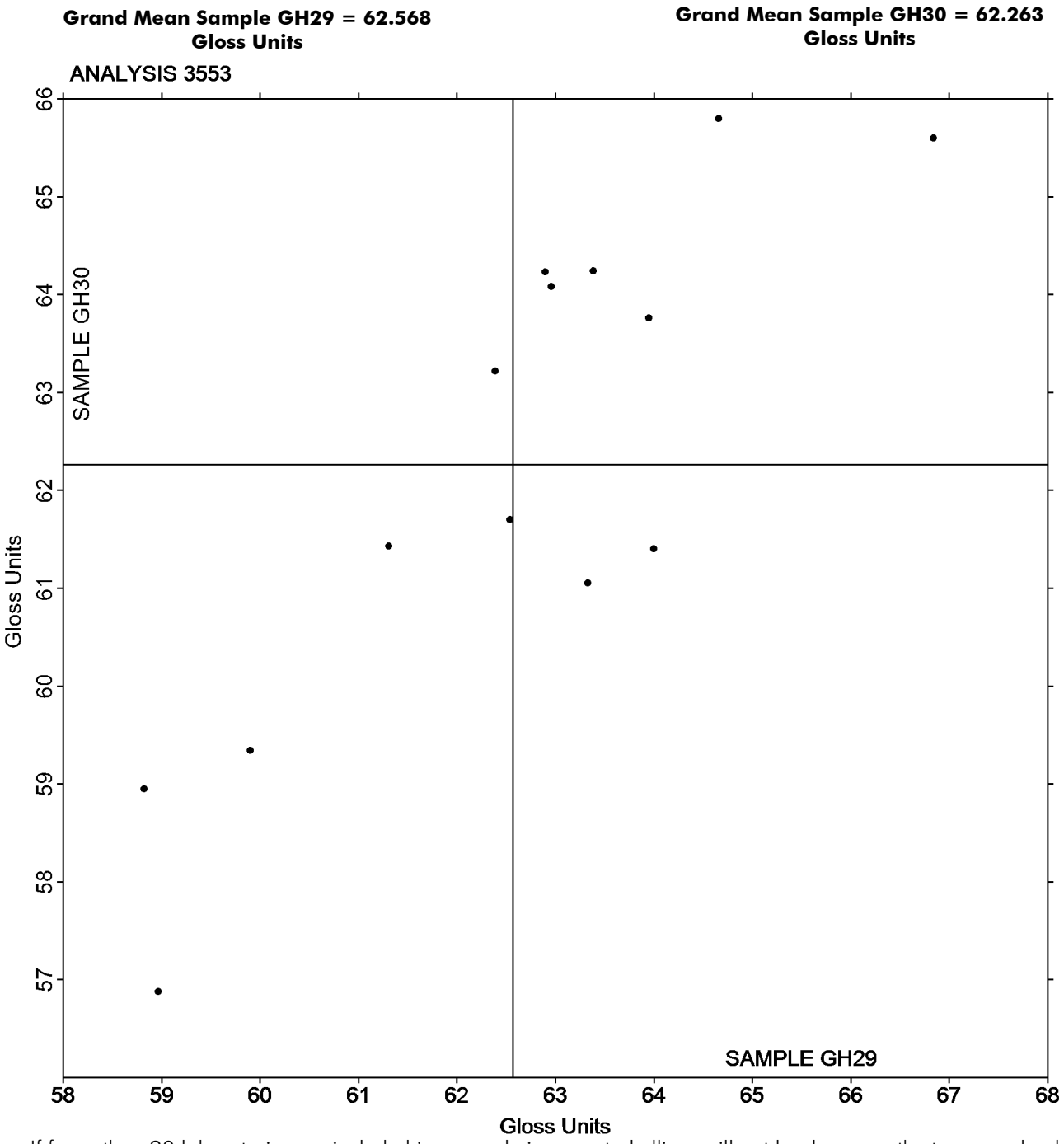
WebCode	Data Flag	Sample GH29 Lab Mean	Sample GH29 Diff from Grand Mean	Sample GH29 CPV	Sample GH30 Lab Mean	Sample GH30 Diff from Grand Mean	Sample GH30 CPV	Instr Code
2FKFR4		62.90	0.33	0.15	64.23	1.97	0.75	GM
6BDHAY		61.31	-1.26	-0.57	61.43	-0.83	-0.32	TH
9DA6EY		62.96	0.39	0.18	64.08	1.82	0.69	LW
AKNEFZ		59.90	-2.67	-1.20	59.34	-2.92	-1.11	GA
BYWTRV		62.54	-0.03	-0.01	61.70	-0.56	-0.21	GM
MLWU8F		58.82	-3.75	-1.69	58.95	-3.31	-1.26	TA
N69UZG		58.97	-3.60	-1.63	56.88	-5.38	-2.05	LG
REHP8H		64.66	2.09	0.94	65.80	3.54	1.35	LF
RMWE8B		62.39	-0.18	-0.08	63.22	0.96	0.36	TP
RQVP4B		63.95	1.38	0.62	63.76	1.50	0.57	PP
U9QZ76		66.84	4.27	1.93	65.60	3.34	1.27	VM
UPDHTE		63.33	0.76	0.34	61.05	-1.21	-0.46	LF
UX2HZB		64.00	1.43	0.65	61.40	-0.86	-0.33	LA
UXM6MZ		63.39	0.82	0.37	64.24	1.98	0.75	PP

Summary Statistics	Sample GH29	Sample GH30
Grand Means	62.57 Gloss Units	62.26 Gloss Units
Stnd Dev Btwn Labs	2.22 Gloss Units	2.63 Gloss Units

Statistics based on 14 of 14 reporting participants.

Key to Instrument Codes Reported by Participants

GA	BYK-Gardner (model not specified)	GM	BYK-Gardner micro-gloss
LA	L & W Gloss - Autoline 300	LF	L & W Autoline 400
LG	L & W Autoline 600	LW	L & W Gloss Tester
PP	Technidyne Profile/Plus	TA	Technidyne Test Plus Gloss 75 degree
TH	Technidyne T480A	TP	Technidyne Profile Plus
VM	Valmet PaperLab (was Kajaani/Robotest)		



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3555

Specular Gloss at 75 Degrees - Low Range

TAPPI Official Test Method T480

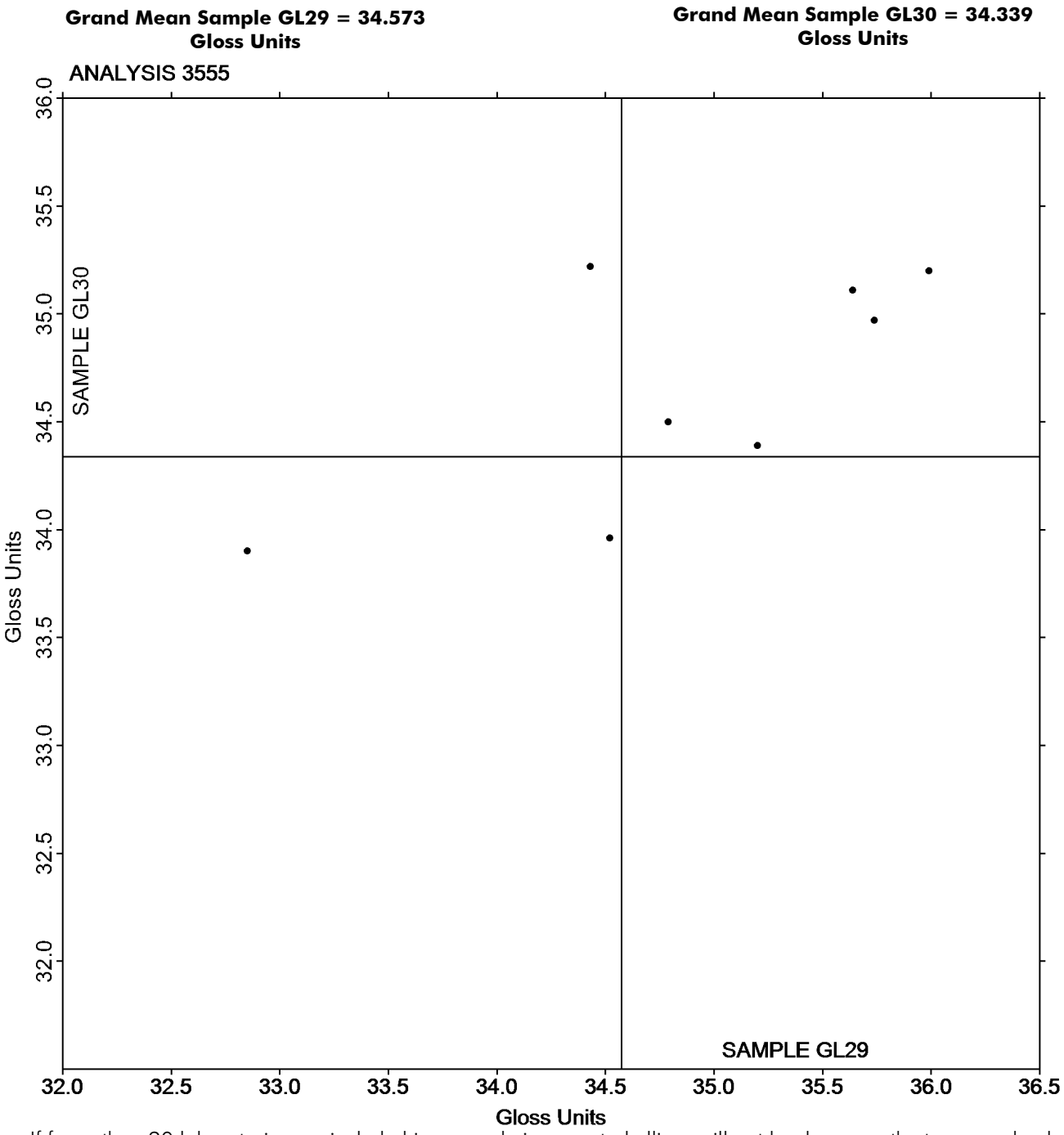
WebCode	Data Flag	Sample GL29 Lab Mean	Sample GL29 Diff from Grand Mean	Sample GL29 CPV	Sample GL30 Lab Mean	Sample GL30 Diff from Grand Mean	Sample GL30 CPV	Instr Code
9DA6EY		35.74	1.17	0.86	34.97	0.63	0.58	LW
AFW3MP		35.64	1.07	0.79	35.11	0.77	0.71	TP
CWT9MV		34.52	-0.05	-0.04	33.96	-0.38	-0.35	WJ
EMW6NQ		34.79	0.22	0.16	34.50	0.16	0.15	GS
G399DH		35.20	0.63	0.46	34.39	0.05	0.05	TH
KBLH3L		32.00	-2.57	-1.91	31.80	-2.54	-2.35	GM
MLWU8F		32.85	-1.72	-1.28	33.90	-0.44	-0.41	TA
R9WUAK		35.99	1.42	1.05	35.20	0.86	0.80	TH
VW7AED		34.43	-0.14	-0.11	35.22	0.88	0.82	PP

Summary Statistics	Sample GL29	Sample GL30
Grand Means	34.57 Gloss Units	34.34 Gloss Units
Stnd Dev Btwn Labs	1.35 Gloss Units	1.08 Gloss Units

Statistics based on 9 of 9 reporting participants.

Key to Instrument Codes Reported by Participants

GM	BYK-Gardner micro-gloss	GS	BYK-Gardner Glossgard II
LW	L & W Gloss Tester	PP	Technidyne Profile/Plus
TA	Technidyne Test Plus Gloss 75 degree	TH	Technidyne T480A
TP	Technidyne Profile Plus	WJ	Zehntner ZLR 1020



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3601

Folding Endurance (MIT) - Double Folds

TAPPI Official Test Method T511

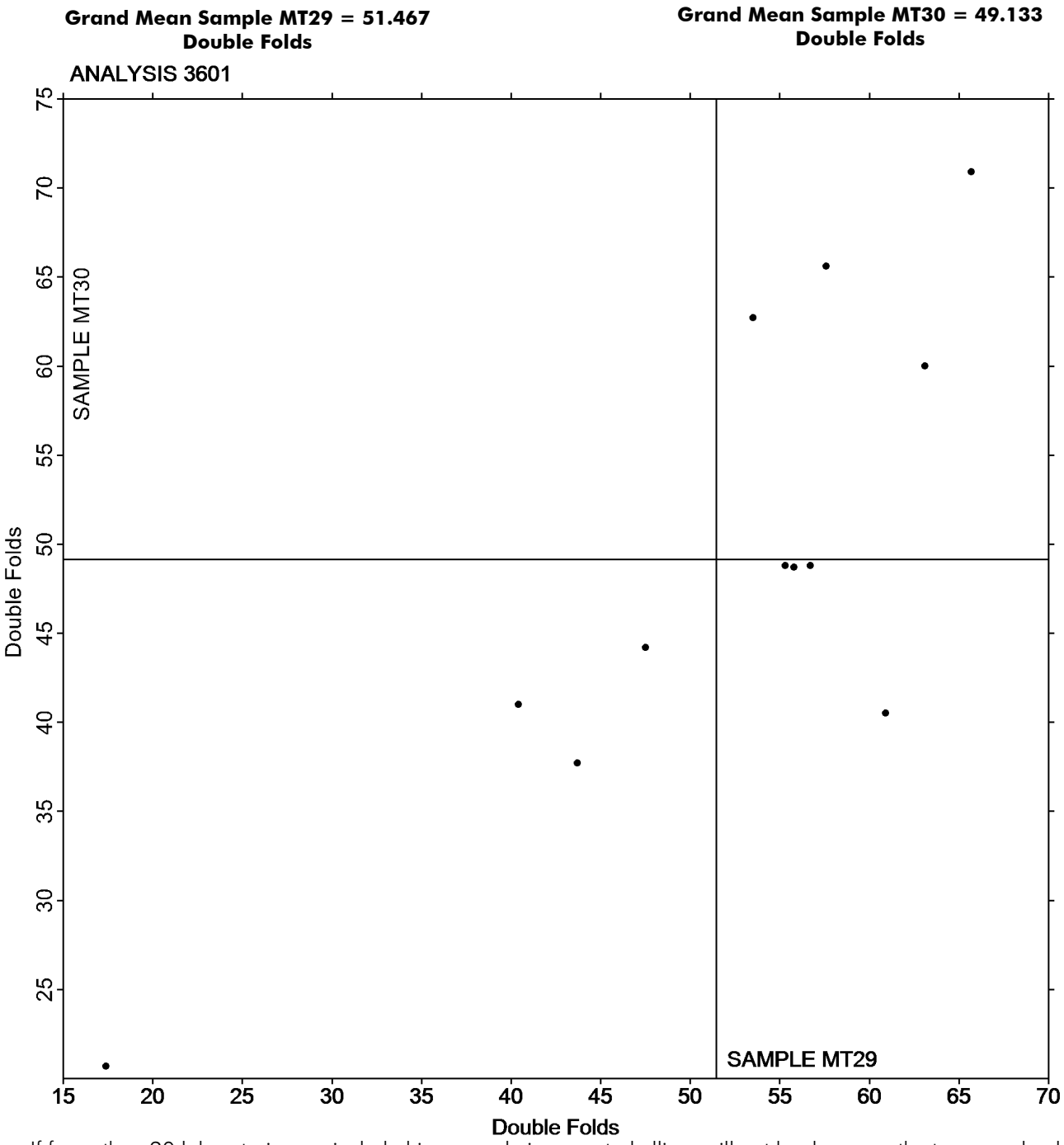
WebCode	Data Flag	Sample MT29 Lab Mean	Sample MT29 Diff from Grand Mean	Sample MT29 CPV	Sample MT30 Lab Mean	Sample MT30 Diff from Grand Mean	Sample MT30 CPV	Instr Code
6BDHAY		53.50	2.03	0.16	62.70	13.57	0.97	MT
6VP4CU		63.10	11.63	0.89	60.00	10.87	0.78	MT
9KRE3V		55.80	4.33	0.33	48.70	-0.43	-0.03	MT
AKNEFZ		40.40	-11.07	-0.84	41.00	-8.13	-0.58	MT
BAKHWV		57.60	6.13	0.47	65.60	16.47	1.18	MT
G399DH		17.40	-34.07	-2.60	20.70	-28.43	-2.03	MT
GJTYCH		65.70	14.23	1.09	70.90	21.77	1.56	XX
LRPK6C		56.70	5.23	0.40	48.80	-0.33	-0.02	MT
M9N2NF		55.30	3.83	0.29	48.80	-0.33	-0.02	MT
R9CY4C		47.50	-3.97	-0.30	44.20	-4.93	-0.35	XX
R9WUAK		43.70	-7.77	-0.59	37.70	-11.43	-0.82	MT
U9QZ76		60.90	9.43	0.72	40.50	-8.63	-0.62	MT

Summary Statistics	Sample MT29	Sample MT30
Grand Means	51.47 Double Folds	49.13 Double Folds
Stnd Dev Btwn Labs	13.10 Double Folds	13.99 Double Folds

Statistics based on 12 of 12 reporting participants.

Key to Instrument Codes Reported by Participants

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



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

Paper & Paperboard Interlaboratory Testing Program

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

WebCode	Data Flag	Sample BG29 Lab Mean	Sample BG29 Diff from Grand Mean	Sample BG29 CPV	Sample BG30 Lab Mean	Sample BG30 Diff from Grand Mean	Sample BG30 CPV	Instr Code
2MGJA8		357.4	15.7	0.21	374.3	33.2	0.42	ZZ
6BGRGY		349.6	7.9	0.10	348.5	7.4	0.09	ZZ
6VP4CU		383.6	41.9	0.55	394.7	53.6	0.68	ZZ
7GE4QZ		332.5	-9.2	-0.12	339.8	-1.3	-0.02	ZZ
7VK7GP		387.6	45.9	0.61	382.3	41.2	0.52	ZZ
89YQDM		415.1	73.4	0.97	411.9	70.8	0.90	ZZ
9KRE3V		368.0	26.3	0.35	371.2	30.0	0.38	ZZ
G399DH		369.4	27.7	0.37	382.7	41.6	0.53	ZZ
GXCLFN		168.5	-173.2	-2.28	169.2	-171.9	-2.19	ZZ
HKGUCV		408.5	66.8	0.88	381.0	39.8	0.51	ZZ
R9WUAK		360.1	18.4	0.24	365.9	24.8	0.31	ZZ
TLFGFC		416.1	74.3	0.98	440.5	99.4	1.26	ZZ
U9QZ76		234.2	-107.5	-1.42	218.3	-122.8	-1.56	ZZ
YXA23V		211.2	-130.5	-1.72	213.9	-127.2	-1.62	ZZ
Z7DMD3		363.9	22.2	0.29	322.7	-18.4	-0.23	ZZ

Summary Statistics	Sample BG29	Sample BG30
Grand Means	341.71 Gurley Units	341.12 Gurley Units
Stnd Dev Btwn Labs	75.84 Gurley Units	78.65 Gurley Units

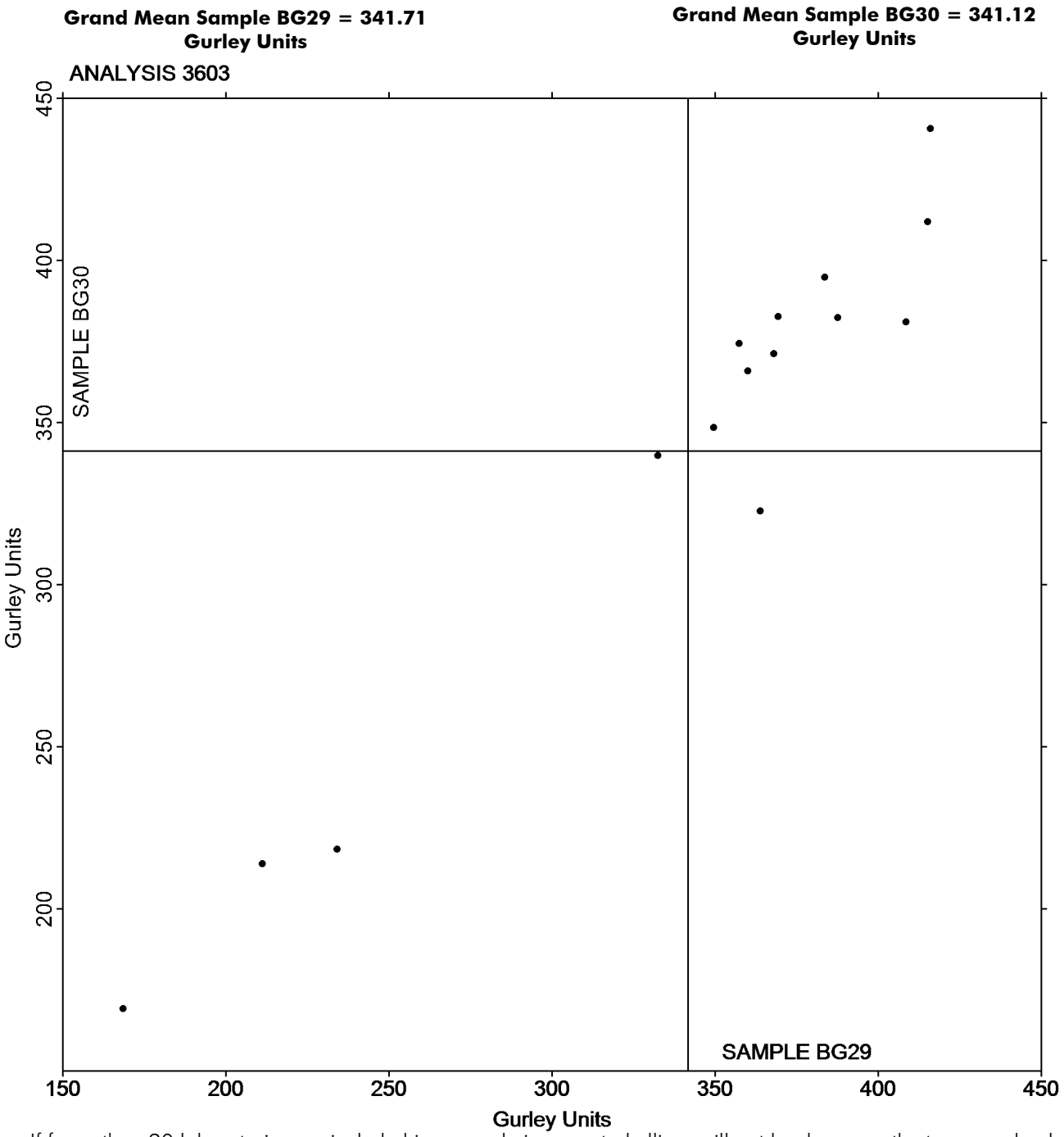
Statistics based on 15 of 15 reporting participants.

Analysis Notes:

89YQDM - One determination removed from the Lab Mean of Sample BG30 per Grubb's Test at 1% risk (TAPPI 1205)

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 CF29 Lab Mean	Sample CF29 Diff from Grand Mean	Sample CF29 CPV	Sample CF30 Lab Mean	Sample CF30 Diff from Grand Mean	Sample CF30 CPV	Instr Code
2MGJA8		0.6900	0.0886	1.36	0.6850	0.0809	1.16	TP
9KRE3V		0.6284	0.0270	0.42	0.6178	0.0137	0.20	TA
AFW3MP		0.5966	-0.0048	-0.07	0.6342	0.0301	0.43	TA
GMTA7W		0.6634	0.0620	0.95	0.6834	0.0793	1.14	TA
GU9ZGQ		0.5340	-0.0674	-1.04	0.5440	-0.0601	-0.87	TA
GXCLFN		0.4970	-0.1044	-1.61	0.4784	-0.1257	-1.81	TX
HKGUCV		0.5520	-0.0494	-0.76	0.5840	-0.0201	-0.29	TA
LRPK6C		0.6594	0.0580	0.89	0.6542	0.0501	0.72	TM
NHXTRJ		0.5920	-0.0094	-0.14	0.5560	-0.0481	-0.69	XX

Summary Statistics	Sample CF29	Sample CF30
Grand Means	0.60 COF	0.60 COF
Stnd Dev Btwn Labs	0.06 COF	0.07 COF

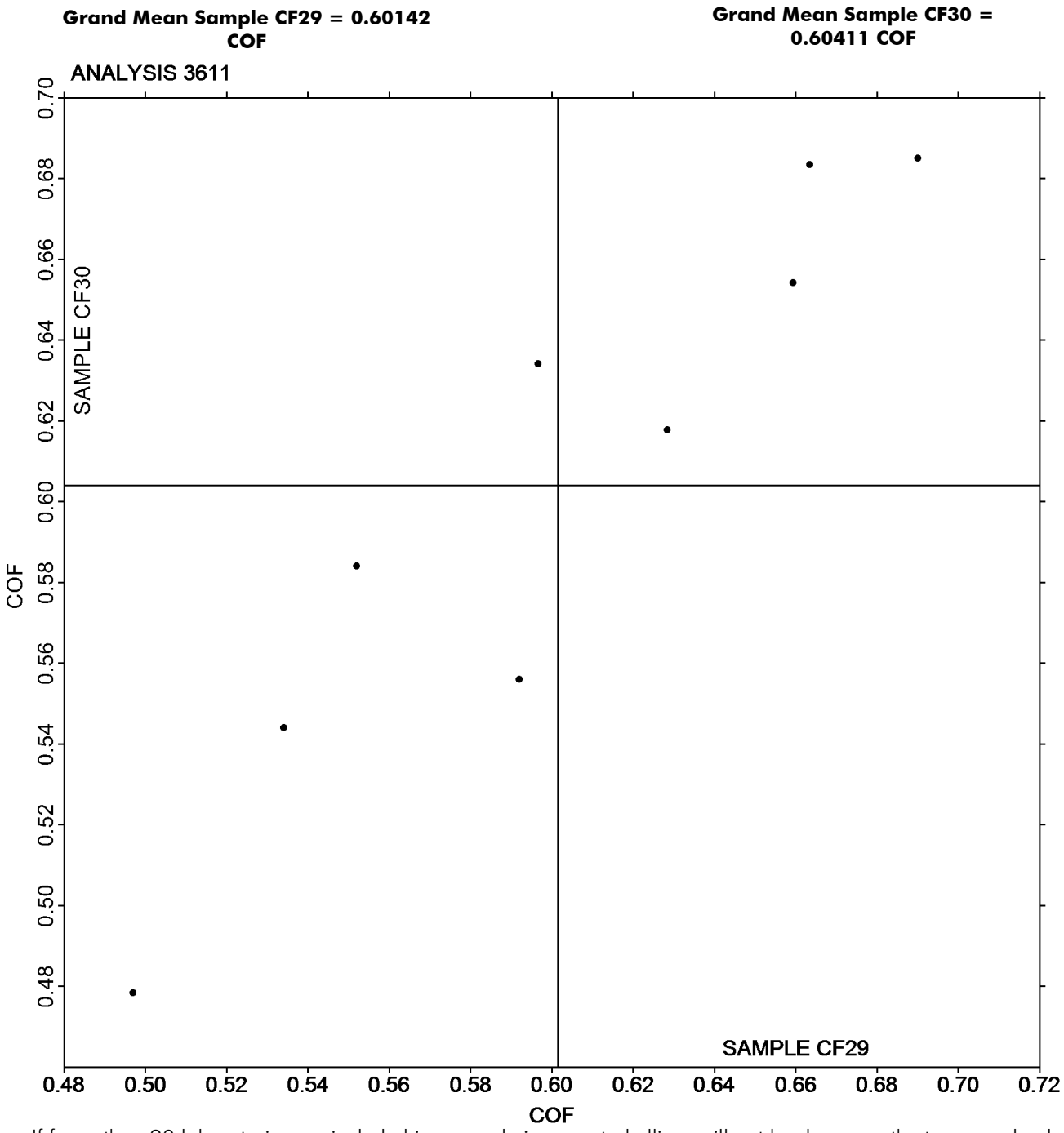
Statistics based on 9 of 9 reporting participants.

Analysis Notes:

2MGJA8 - One determination removed from the Lab Mean of Sample CF30 per Grubb's Test at 1% risk (TAPPI 1205).

Key to Instrument Codes Reported by Participants

TA	Thwing-Albert Friction Tester	TM	TMI 32-06 Monitor/Slip and Friction
TP	TMI 32-25 COF Tester (Inclined Plane)	TX	TMI (model not specified)
XX	Instrument make/model not specified by lab		



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

Paper & Paperboard Interlaboratory Testing Program

Analysis 3612

Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers

TAPPI Official Test Method T549

WebCode	Data Flag	Sample CF29 Lab Mean	Sample CF29 Diff from Grand Mean	Sample CF29 CPV	Sample CF30 Lab Mean	Sample CF30 Diff from Grand Mean	Sample CF30 CPV	Instr Code
9KRE3V		0.5108	0.0038	0.05	0.5344	0.0128	0.17	TA
AFW3MP		0.5118	0.0048	0.06	0.5618	0.0402	0.53	TA
GMTA7W		0.5778	0.0708	0.95	0.6074	0.0858	1.13	TA
GU9ZGQ		0.4780	-0.0290	-0.39	0.4440	-0.0776	-1.02	TA
GXCLFN		0.3718	-0.1352	-1.82	0.4290	-0.0926	-1.22	TX
HKGUCV		0.5040	-0.0030	-0.04	0.5260	0.0044	0.06	TA
LRPK6C		0.6242	0.1172	1.57	0.6258	0.1042	1.37	TM
NHXTRJ		0.4774	-0.0296	-0.40	0.4444	-0.0772	-1.01	XX

Summary Statistics	Sample CF29	Sample CF30
Grand Means	0.51 COF	0.52 COF
Stnd Dev Btwn Labs	0.07 COF	0.08 COF

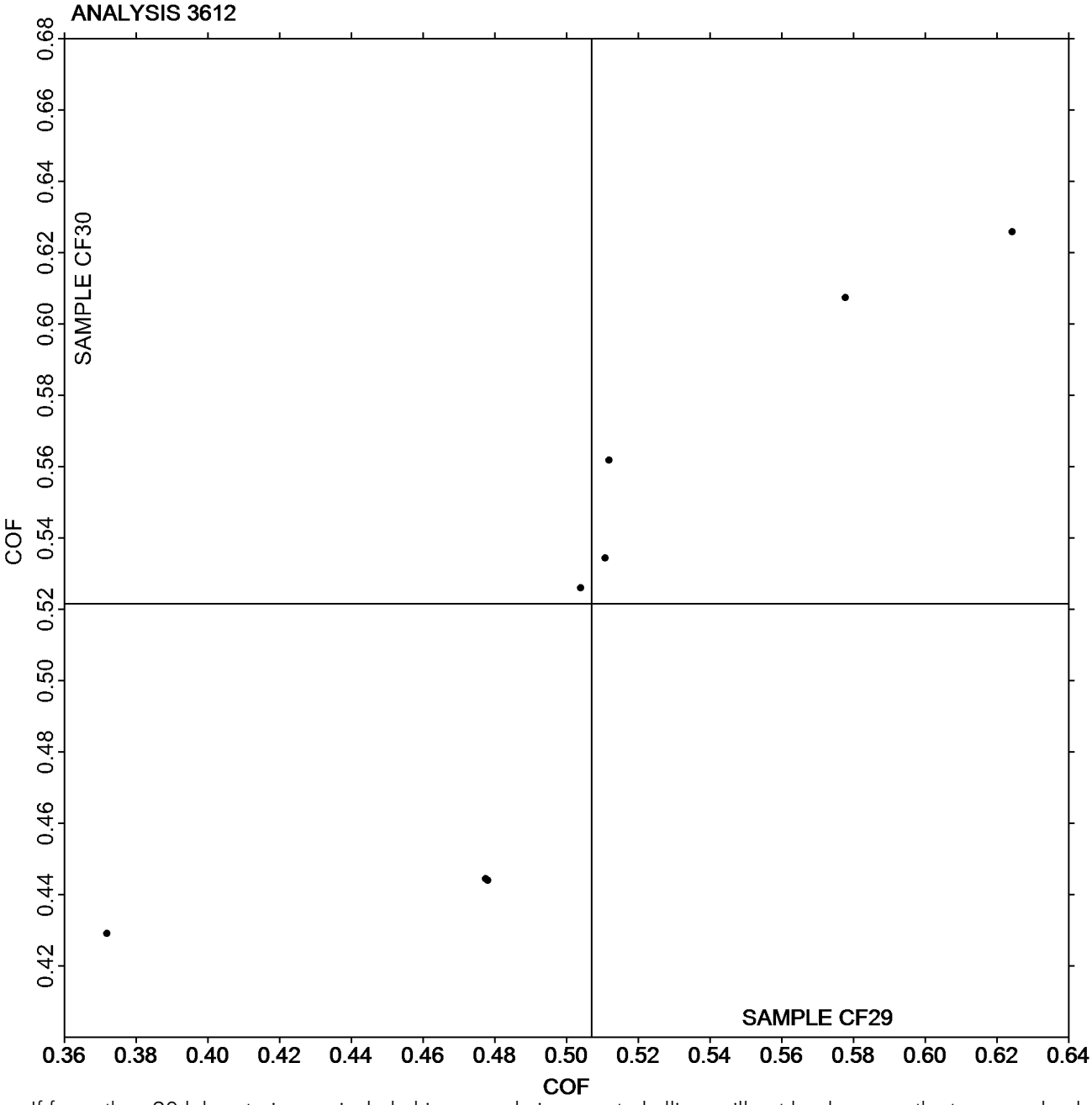
Statistics based on 8 of 8 reporting participants.

Key to Instrument Codes Reported by Participants

TA	Thwing-Albert Friction Tester	TM	TMI 32-06 Monitor/Slip and Friction
TX	TMI (model not specified)	XX	Instrument make/model not specified by lab

Grand Mean Sample CF29 = 0.50698 COF

Grand Mean Sample CF30 = 0.52160 COF



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

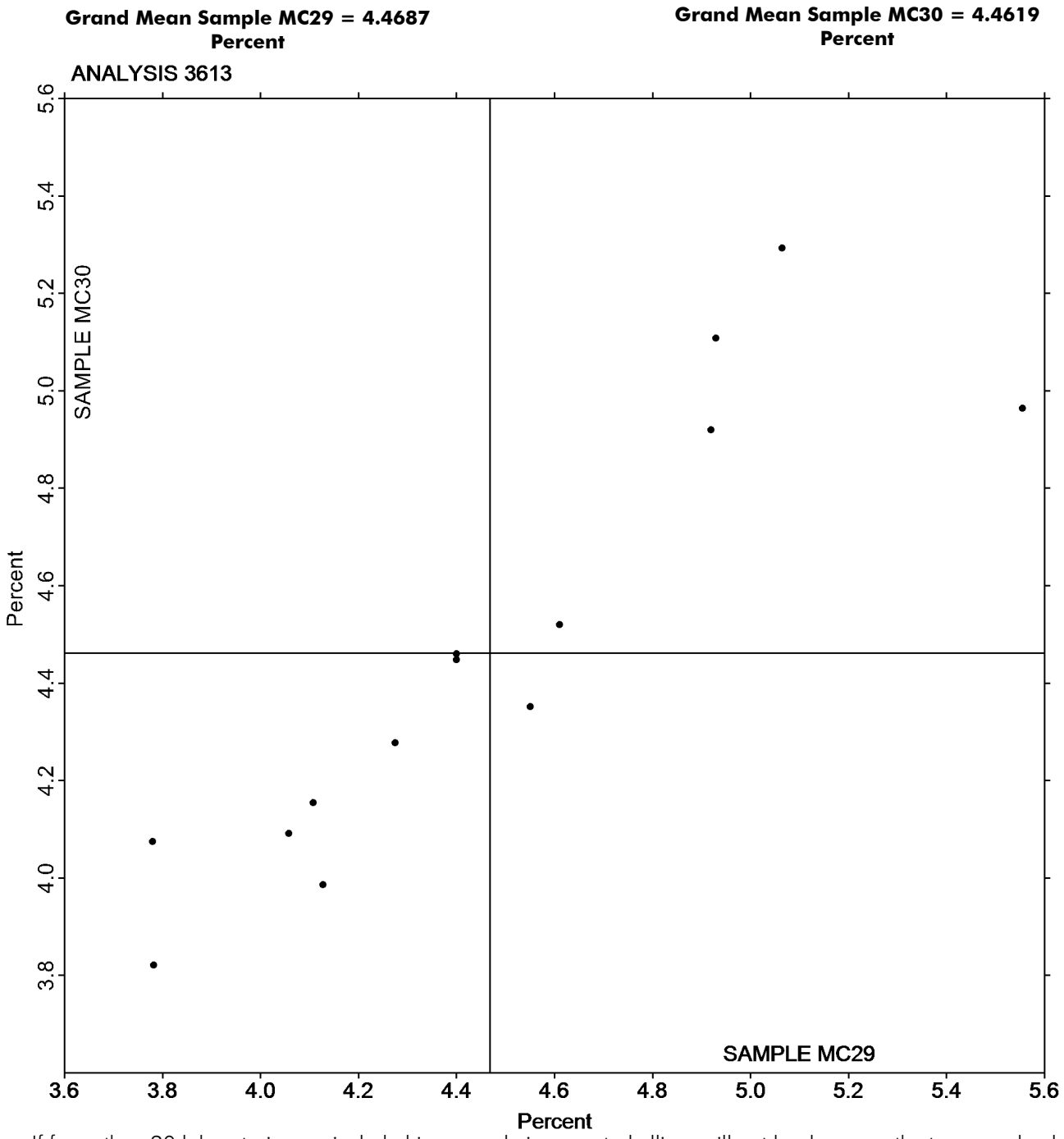
WebCode	Data Flag	Sample MC29 Lab Mean	Sample MC29 Diff from Grand Mean	Sample MC29 CPV	Sample MC30 Lab Mean	Sample MC30 Diff from Grand Mean	Sample MC30 CPV	Instr Code
262AA7		3.780	-0.689	-1.35	4.075	-0.387	-0.86	ZZ
49VQY7		3.782	-0.687	-1.35	3.821	-0.641	-1.42	ZZ
6VP4CU		4.930	0.461	0.90	5.108	0.646	1.43	ZZ
7GE4QZ		4.058	-0.411	-0.80	4.091	-0.371	-0.82	ZZ
8ZAWBY		4.551	0.083	0.16	4.351	-0.110	-0.25	ZZ
96JHPN		4.920	0.451	0.88	4.920	0.458	1.02	ZZ
ATGPPV		4.128	-0.341	-0.67	3.986	-0.476	-1.06	ZZ
CWT9MV		5.555	1.086	2.13	4.963	0.501	1.11	ZZ
HKGUCV		4.400	-0.069	-0.13	4.447	-0.014	-0.03	ZZ
KZ34YJ		4.610	0.141	0.28	4.520	0.058	0.13	ZZ
NYZCJF		5.065	0.596	1.17	5.292	0.830	1.84	ZZ
PU7T2G		4.108	-0.361	-0.71	4.154	-0.308	-0.68	ZZ
XPZ6T8		4.275	-0.194	-0.38	4.277	-0.185	-0.41	ZZ
XY8W78		4.400	-0.069	-0.13	4.460	-0.002	0.00	ZZ

Summary Statistics	Sample MC29	Sample MC30
Grand Means	4.47 Percent	4.46 Percent
Stnd Dev Btwn Labs	0.51 Percent	0.45 Percent

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

WebCode	Data Flag	Sample HS29 Lab Mean	Sample HS29 Diff from Grand Mean	Sample HS29 CPV	Sample HS30 Lab Mean	Sample HS30 Diff from Grand Mean	Sample HS30 CPV	Instr Code
2MGJA8		64.68	-9.41	-0.21	53.22	-18.44	-0.41	HE
6BGRGY		104.13	30.04	0.66	99.20	27.54	0.61	HE
7VK7GP		106.74	32.65	0.71	100.28	28.62	0.64	HE
89YQDM		101.20	27.11	0.59	93.23	21.57	0.48	XX
AFW3MP		77.24	3.15	0.07	75.32	3.66	0.08	HE
BAKHWV		115.90	41.81	0.91	111.80	40.14	0.89	HE
DZCL8H		59.76	-14.33	-0.31	62.37	-9.29	-0.21	HE
EXEJQT		13.24	-60.85	-1.33	12.11	-59.55	-1.33	HE
GMTA7W		13.64	-60.45	-1.32	16.54	-55.12	-1.23	HE
GU9ZGQ		86.00	11.91	0.26	80.56	8.90	0.20	HE
GXCLFN		27.90	-46.19	-1.01	28.20	-43.46	-0.97	HE
HKGUCV		67.64	-6.45	-0.14	66.24	-5.42	-0.12	HE
HWWPMN	*	87.80	13.71	0.30	67.17	-4.49	-0.10	HE
JCXXWM		77.50	3.41	0.07	75.80	4.14	0.09	HE
KBLH3L		84.20	10.11	0.22	96.20	24.54	0.55	HE
TU92BC	*	223.00	148.91	3.25	221.78	150.12	3.34	HE
U9QZ76		22.25	-51.84	-1.13	22.89	-48.77	-1.09	HE
UPDHTE		81.41	7.32	0.16	80.40	8.74	0.19	HE
V9ZNK2		42.30	-31.79	-0.69	43.40	-28.26	-0.63	HE
YCVG7V		40.41	-33.68	-0.73	39.50	-32.16	-0.72	HE
YXA23V		58.90	-15.19	-0.33	58.60	-13.06	-0.29	HE

Summary Statistics	Sample HS29	Sample HS30
Grand Means	74.09 Seconds	71.66 Seconds
Stnd Dev Btwn Labs	45.84 Seconds	44.89 Seconds

Statistics based on 21 of 21 reporting participants.

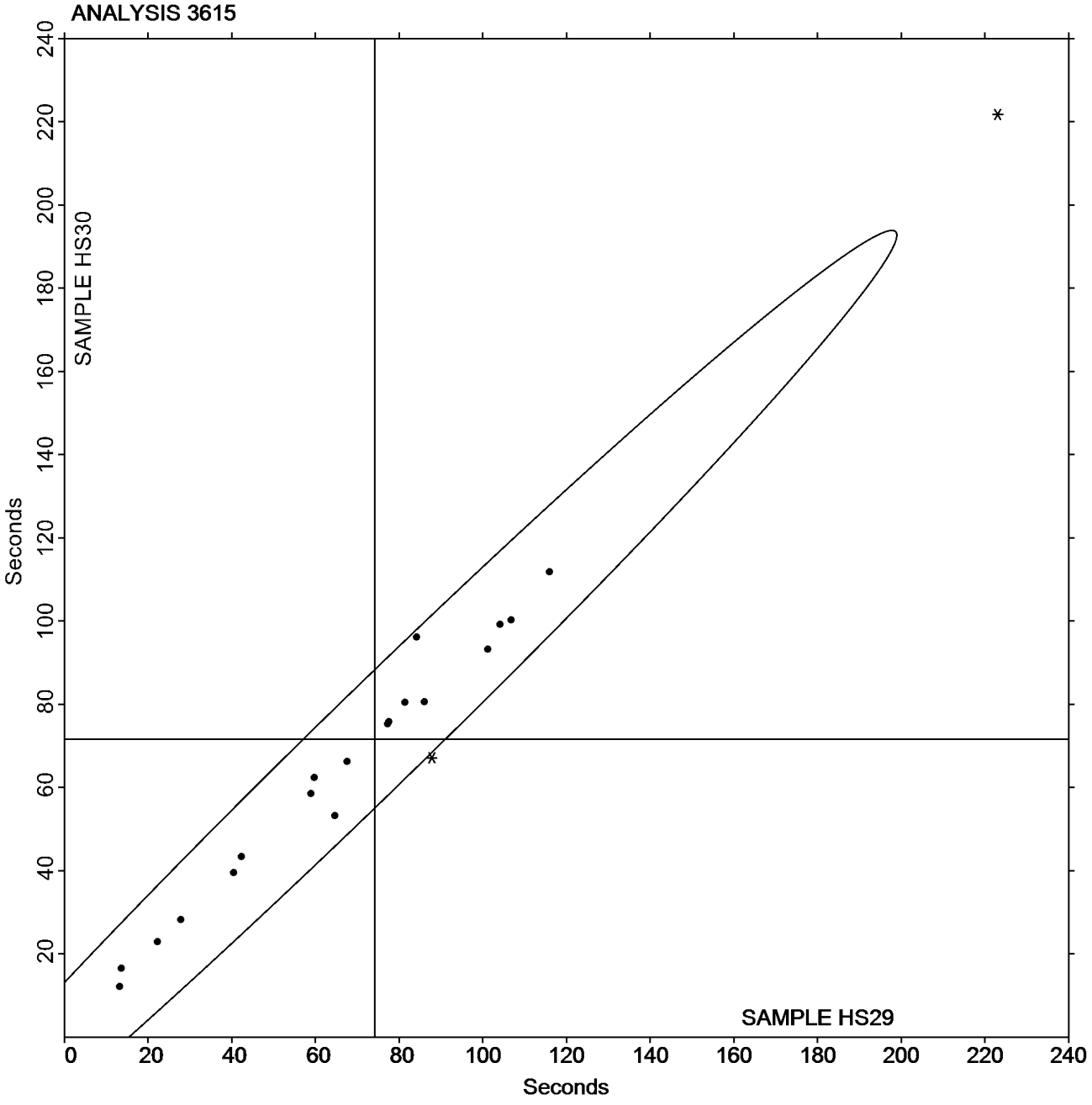
Key to Instrument Codes Reported by Participants

HE Hercules Sizing Tester

XX Instrument make/model not specified by lab

Grand Mean Sample HS29 = 74.088 Seconds

Grand Mean Sample HS30 = 71.658 Seconds



-End of Report-