Collaborative Testing Services, Inc.

Paper & Paperboard Testing Program

Summary Report #2912 G - December 2017

Introduction to the Paper & Paperboard Interlaboratory Program

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The CTS Paper & Paperboard Interlaboratory Program

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

About CTS

Founded in 1971, Collaborative Testing Services, Inc. (CTS) is a privately - owned company that specializes in interlaboratory tests for a variety of industrial sectors: rubber, plastics, fasteners and metals, CKPG, paper, color 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 80 countries, currently participate in 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 Web site. 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.

ΔE — The calculated total color difference between the two samples. For the Hunter L,a,b analyses it is calculated in Hunter units (ΔE). For the L*,a*,b* analyses it is calculated in CIELAB units (ΔE*).

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 350

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

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

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L	a	b	Color Difference Values ΔL	Δa	Δb	ΔE	Instr Code
22C4HY		**GA49**	88.84	-0.96	2.31	-0.11	-0.02	0.04	0.12	HE
		GA50	88.73	-0.99	2.36					
282JAQ		**GA49**	87.81	-0.77	2.08	-0.10	-0.04	0.07	0.13	XX
		GA50	87.71	-0.81	2.15					
2V79YY	X	**GA49**	90.34	-1.43	0.76	0.06	-0.03	0.05	0.09	HE
		GA50	90.40	-1.45	0.81					
7YUBTZ	X	**GA49**	88.23	0.38	1.50	0.18	-0.16	0.13	0.28	TS
		GA50	88.41	0.22	1.63					
9HXZW9		**GA49**	88.02	-0.52	2.03	-0.18	0.01	-0.03	0.18	TC
		GA50	87.84	-0.52	2.00					
9TFCCR		**GA49**	87.72	-0.49	2.12	-0.28	0.00	0.05	0.28	TS
		GA50	87.44	-0.49	2.17					
A4VN4U		**GA49**	88.51	-0.56	2.20	-0.43	-0.06	-0.10	0.44 X	NE
		GA50	88.08	-0.61	2.10					
CVQQ9M	X	**GA49**	90.23	-1.40	0.51	0.01	-0.01	0.03	0.03	HE
		GA50	90.25	-1.41	0.53					
CXHMWG		**GA49**	90.42	-0.75	2.29	-0.03	0.07	0.00	0.08	EH
		GA50	90.38	-0.68	2.29					
FF6CGZ	X	**GA49**	87.47	0.05	1.94	-0.10	-0.02	0.03	0.11	TS
		GA50	87.37	0.03	1.97					
H39ATN		**GA49**	87.96	-0.59	2.20	-0.13	-0.03	0.01	0.13	LA
		GA50	87.83	-0.62	2.21					
HK9Z9R	X	**GA49**	90.70	-1.12	2.83	0.35	-0.36	0.04	0.51 X	HE
		GA50	91.05	-1.48	2.87					
JJUTLP		**GA49**	87.91	-0.78	2.28	0.03	0.03	-0.10	0.11	TC
		GA50	87.93	-0.75	2.18					
L4C4ZK		**GA49**	89.91	-0.64	1.24	-0.21	-0.04	0.12	0.25	XS
		GA50	89.70	-0.68	1.36					
NTYQWL	X	**GA49**	87.22	0.23	1.87	-0.44	-0.05	0.01	0.44 X	TS
		GA50	86.78	0.18	1.87					
RQLZJM		**GA49**	87.91	-0.78	2.17	-0.07	-0.07	0.08	0.13	TC
		GA50	87.83	-0.84	2.24					

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Paper & Paperboard Interlaboratory Testing Program

Analysis 350

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

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

Web Code	Data Flag	Samples	Hunter L, a, b Color Values L	a	b	Color Difference Values ΔL	Δa	Δb	ΔE	Instr Code
UFGRVZ		GA49	90.36	-0.65	2.33	-0.16	-0.08	0.06	0.19	LS
		GA50	90.20	-0.73	2.40					
UYATKC		GA49	90.29	-0.66	2.29	0.01	-0.04	0.09	0.10	EH
		GA50	90.30	-0.70	2.38					
VRNXKT		GA49	90.39	-0.67	2.12	-0.10	-0.02	-0.02	0.11	TC
		GA50	90.28	-0.69	2.10					
WCURQ6	X	GA49	87.69	-0.05	1.79	-0.29	0.01	0.05	0.30	TS
		GA50	87.39	-0.04	1.84					
Z6CTKF		GA49	89.76	-0.48	3.25	-0.08	0.02	-0.09	0.12	VM
		GA50	89.68	-0.46	3.16					
ZD9QA4		GA49	90.36	-0.82	2.32	-0.10	0.00	0.00	0.10	LS
		GA50	90.25	-0.82	2.32					

Summary Statistics

Grand Means							
GA49	89.001	-0.675	2.020	-0.131	-0.017	0.013	0.165
GA50	88.902	-0.693	2.043				
Stnd Dev Btwn Labs							
GA49	1.244	0.136	0.603	0.114	0.040	0.070	0.096
GA50	1.336	0.142	0.580				

Statistics based on 15 of 22 reporting participants

Comments on Assigned Data Flags for Test #350

NTYQWL (X) - Extreme data for a values. Low delta L values, high delta E values.

HK9Z9R (X) - Low a values for both samples. Inconsistent within a values for sample GA49. High delta L values, low delta a values and high delta E values.

FF6CGZ (X) - High a values for both samples. Inconsistent within a values for Sample GA49.

WCURQ6 (X) - High a values for both samples. Inconsistent within a values for Sample GA49.

2V79YY (X) - Low a values for both samples.

CVQQ9M (X) - Low a values for both samples.

7YUBTZ (X) - Extreme data for a values. Inconsistent within a values for both samples. High delta L values, low delta a values.

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Key to Instrument Codes Reported by Participants

EH	Datacolor Elrepho SF450	HE	Hunter LabScan
LA	L & W Elrepho AL300	LS	L & W Elrepho SE 070
NE	Minolta CM-3500d Spectrophotometer	TC	Technidyne Color Touch Series
TS	Technidyne Brightimeter Micro S-5	VM	Valmet PaperLab (was Kajaani/Robotest)
XS	X-Rite 938 Spectrodensitometer	XX	Instrument make/model not specified by lab

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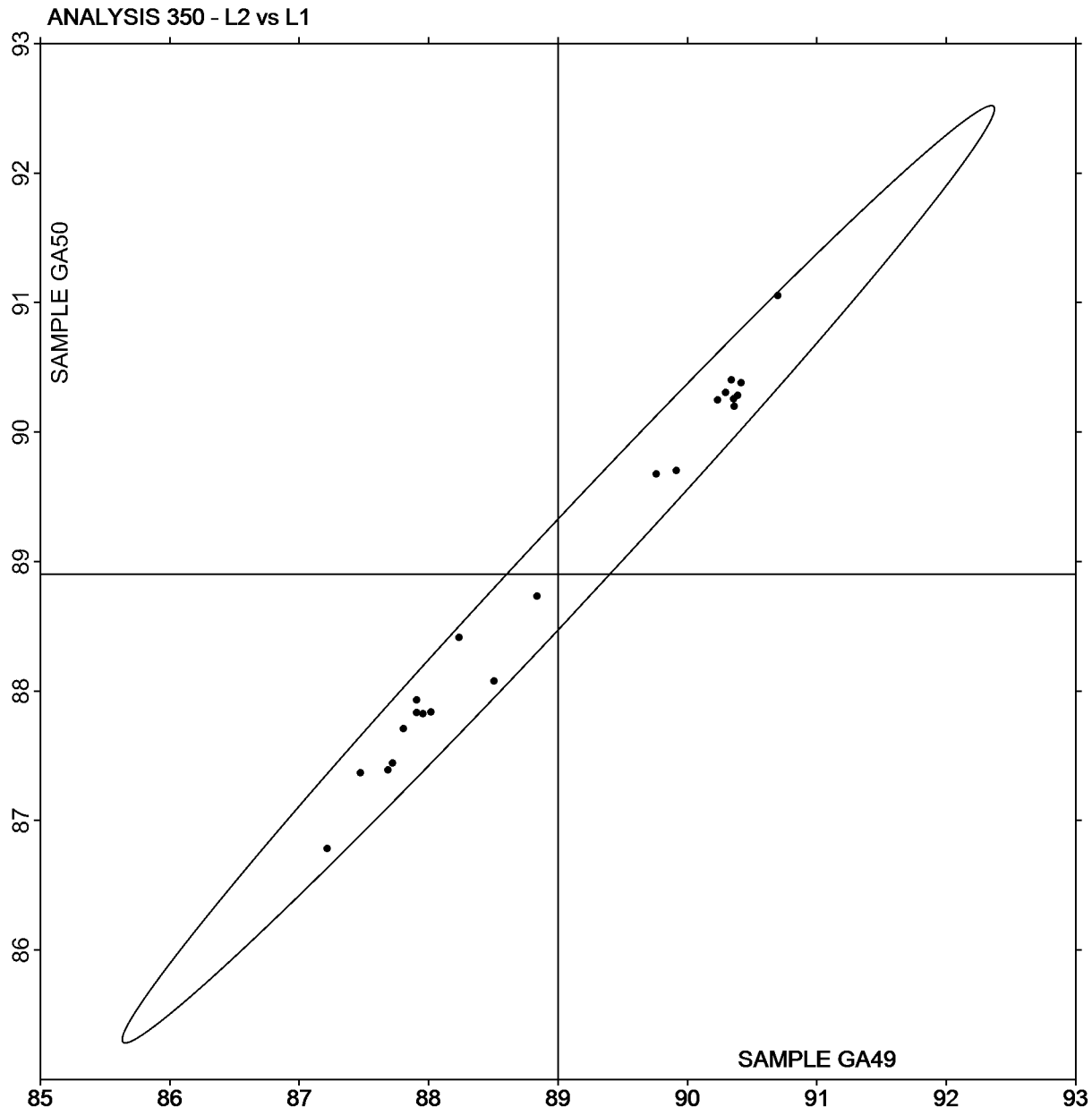
Plot of L values GA50 v L values GA49



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

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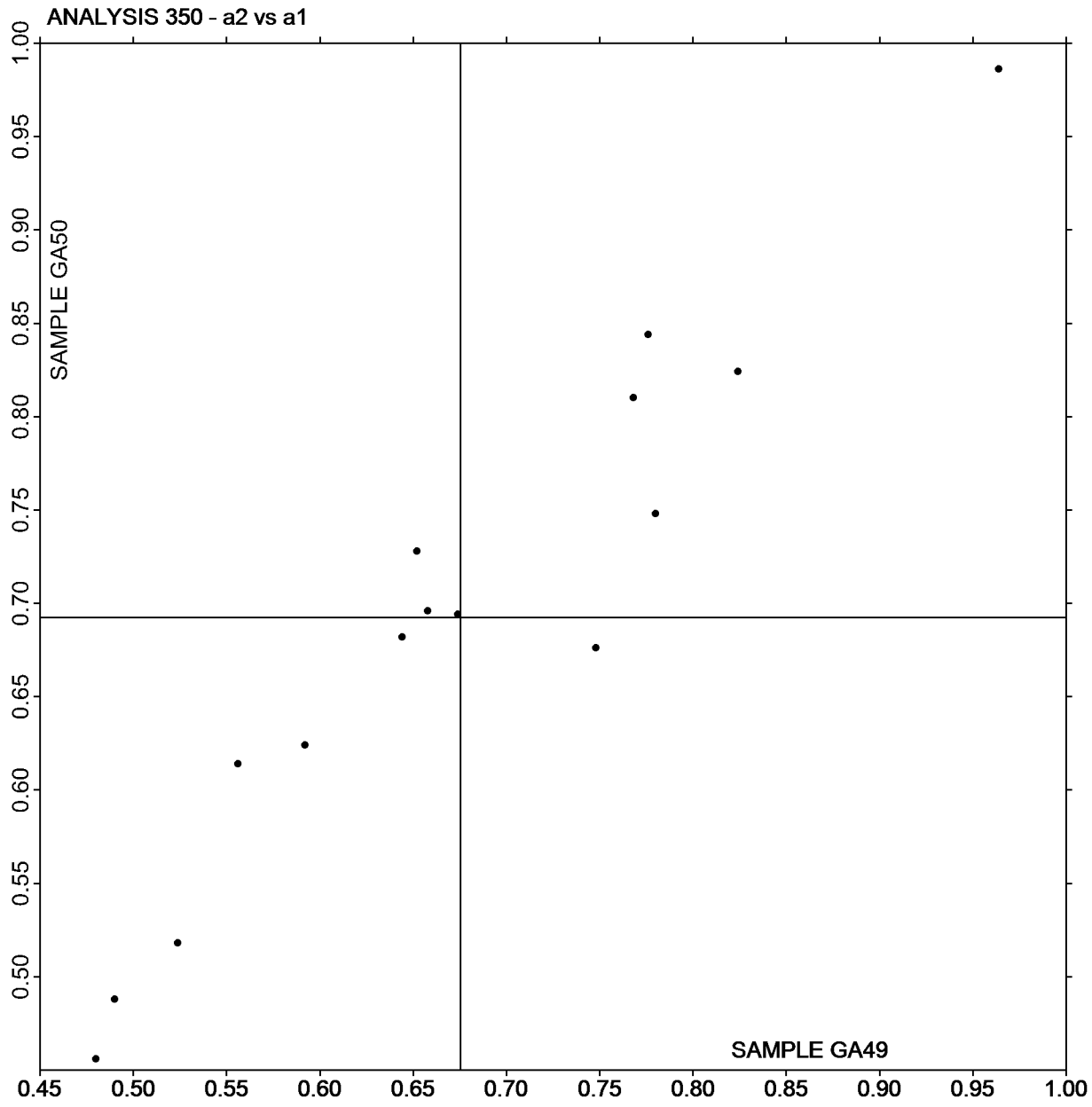
Plot of a values GA50 v a values GA49



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

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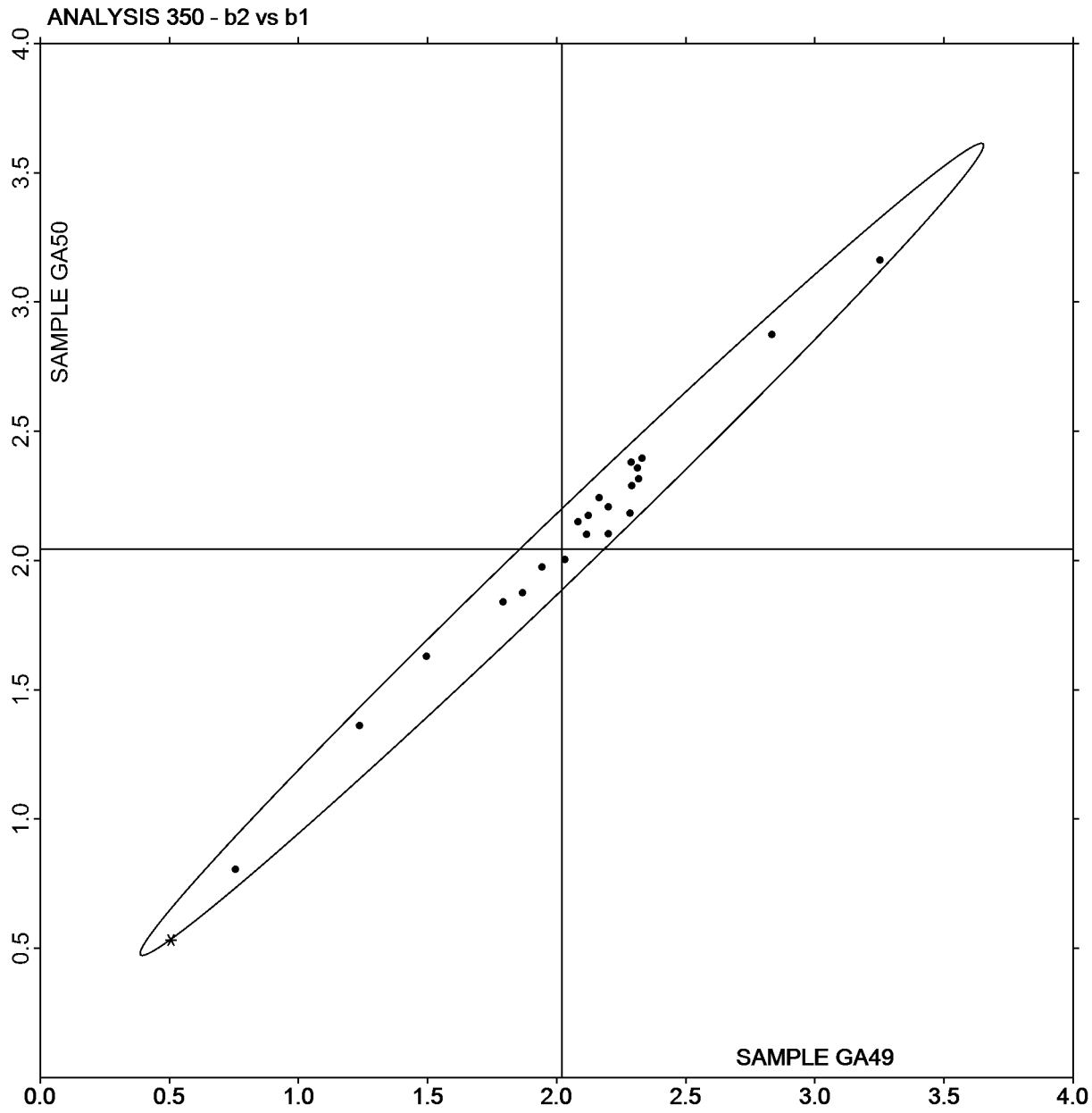
Plot of b values GA50 v b values GA49



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

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Paper & Paperboard Interlaboratory Testing Program

Analysis 351

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

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

Web Code	Data Flag	Samples	CIE L* a* b* Color Values L*	a*	b*	Color Difference Values ΔL*	Δa*	Δb*	ΔE*	InstrCode
22C4HY		GA49	88.89	-0.99	2.34	-0.16	0.00	0.02	0.16	HE
		GA50	88.73	-0.99	2.36					
2UW8UR	X	GA49	92.50	-0.98	1.84	-0.20	0.02	-0.06	0.21	XP
		GA50	92.30	-0.96	1.78					
4KYA2A		GA49	90.71	-1.17	2.35	-0.06	-0.01	-0.03	0.07	XX
		GA50	90.64	-1.18	2.32					
6JJERM		GA49	90.48	-1.18	2.88	-0.09	0.01	0.03	0.10	NG
		GA50	90.39	-1.17	2.91					
9J83KT		GA49	90.75	-1.15	2.50	-0.17	-0.03	0.09	0.20	NF
		GA50	90.58	-1.18	2.59					
APDX4T		GA49	90.45	-1.14	2.35	-0.05	0.01	0.02	0.06	EH
		GA50	90.40	-1.13	2.37					
B3FNLQ		GA49	90.47	-1.16	2.75	0.16	0.01	0.18	0.24	NG
		GA50	90.63	-1.15	2.93					
GB9868		GA49	90.81	-1.11	2.40	-0.01	-0.02	0.09	0.09	HT
		GA50	90.80	-1.13	2.49					
JQWY3D		GA49	90.56	-1.17	2.50	-0.08	-0.03	0.06	0.11	HT
		GA50	90.48	-1.20	2.56					
JURTXT		GA49	87.98	-1.14	2.32	-0.12	-0.02	0.04	0.13	TC
		GA50	87.86	-1.17	2.36					
LJATJB	X	GA49	88.12	-1.06	1.84	-0.06	0.01	0.09	0.10	TC
		GA50	88.06	-1.04	1.93					
N4873U		GA49	90.46	-1.30	2.56	-0.10	0.00	0.08	0.13	EF
		GA50	90.36	-1.30	2.64					
NGBLQA		GA49	88.28	-1.13	2.28	-0.15	0.03	0.03	0.15	HE
		GA50	88.13	-1.10	2.31					
Q4F672		GA49	90.57	-1.11	2.77	-0.15	-0.01	0.10	0.18	NG
		GA50	90.42	-1.12	2.87					
Q4HP2G		GA49	90.78	-1.10	2.72	-0.21	-0.12	-0.04	0.25	HT
		GA50	90.57	-1.22	2.68					
UFGRVZ		GA49	90.20	-1.17	2.65	0.00	-0.07	0.07	0.10	LS
		GA50	90.20	-1.24	2.72					

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Paper & Paperboard Interlaboratory Testing Program

Analysis 351

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

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

Web Code	Data Flag	Samples	CIE L* a* b* Color Values L*	a*	b*	Color Difference Values ΔL*	Δa*	Δb*	ΔE*	InstrCode
VEFCXU		GA49	90.37	-1.14	2.58	-0.10	-0.02	0.07	0.12	LS
		GA50	90.28	-1.16	2.66					
VZGAFM		GA49	90.69	-1.12	2.62	-0.17	-0.01	0.03	0.17	XM
		GA50	90.53	-1.13	2.65					
WGNQ6Z	X	GA49	88.92	-0.86	2.21	-0.23	-0.06	-0.01	0.24	HV
		GA50	88.69	-0.91	2.20					
Z9VRVP		GA49	90.80	-1.11	2.56	-0.06	-0.01	0.02	0.07	XV
		GA50	90.74	-1.11	2.58					

Summary Statistics

Grand Means							
GA49	90.139	-1.127	2.519	-0.090	-0.018	0.051	0.137
GA50	90.038	-1.142	2.567				
Stnd Dev Btwn Labs							
GA49	1.123	0.070	0.190	0.086	0.034	0.052	0.057
GA50	1.131	0.080	0.216				

Statistics based on 17 of 20 reporting participants

Comments on Assigned Data Flags for Test #351

LJATJB (X) - Low b values for both samples.

WGNQ6Z (X) - High a values for both samples.

2UW8UR (X) - Low b values for both samples. Inconsistent within b values for Sample GA50.

Key to Instrument Codes Reported by Participants

EF	Datacolor Elrepho 3000	EH	Datacolor Elrepho SF450
HE	Hunter LabScan	HT	Hunter UltraScan Vis
HV	Hunter Ultrascan XE	LS	L & W Elrepho SE 070
NF	Minolta CM-3600d Spectrophotometer	NG	Minolta CM-3700d Spectrophotometer
TC	Technidyne Color Touch Series	XM	X-Rite CA-22
XP	X-Rite Spectrophotometer DTP	XV	X-Rite SP60 Series
XX	Instrument make/model not specified by lab		

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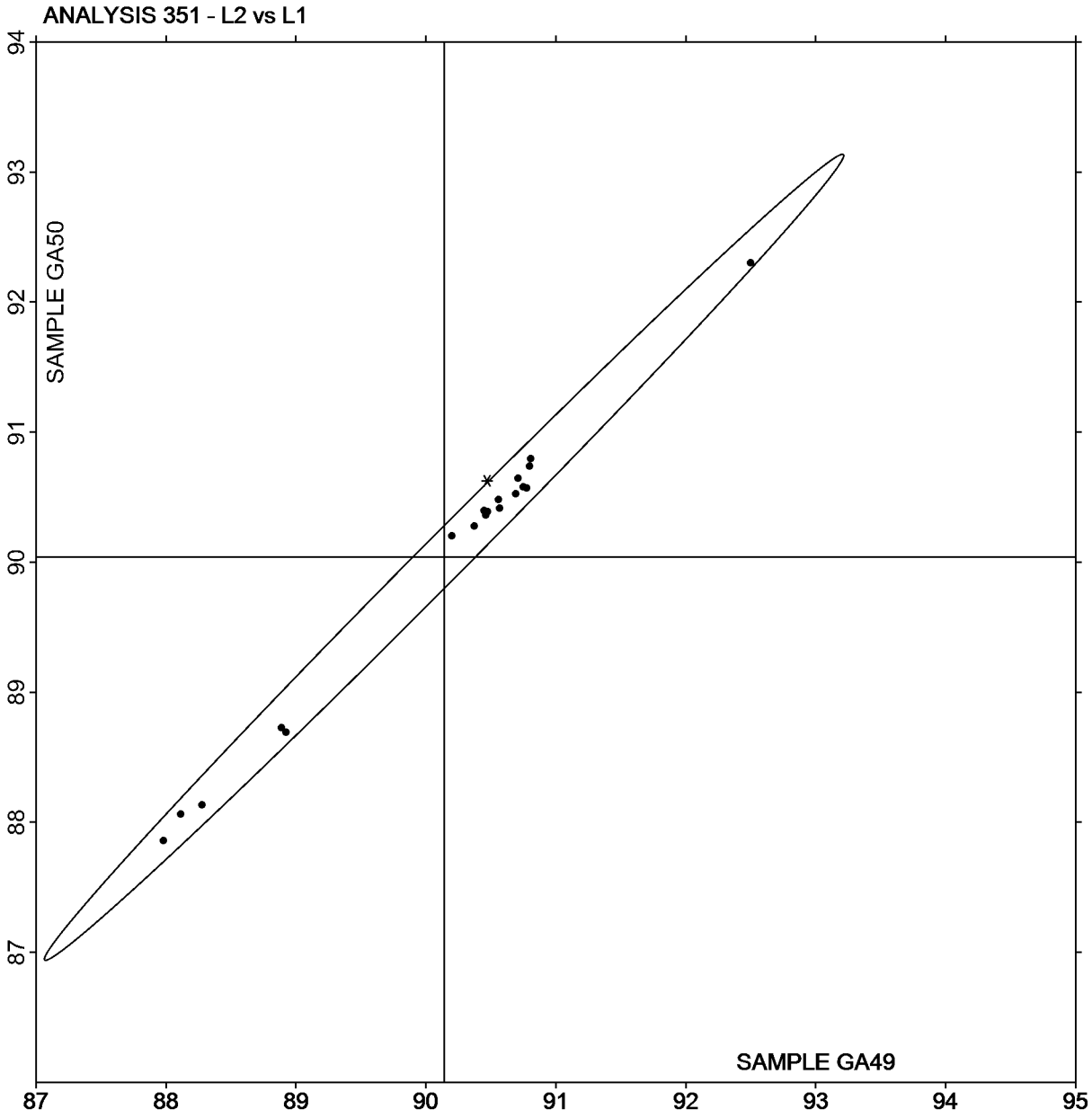
Plot of L values GA50 v L values GA49



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

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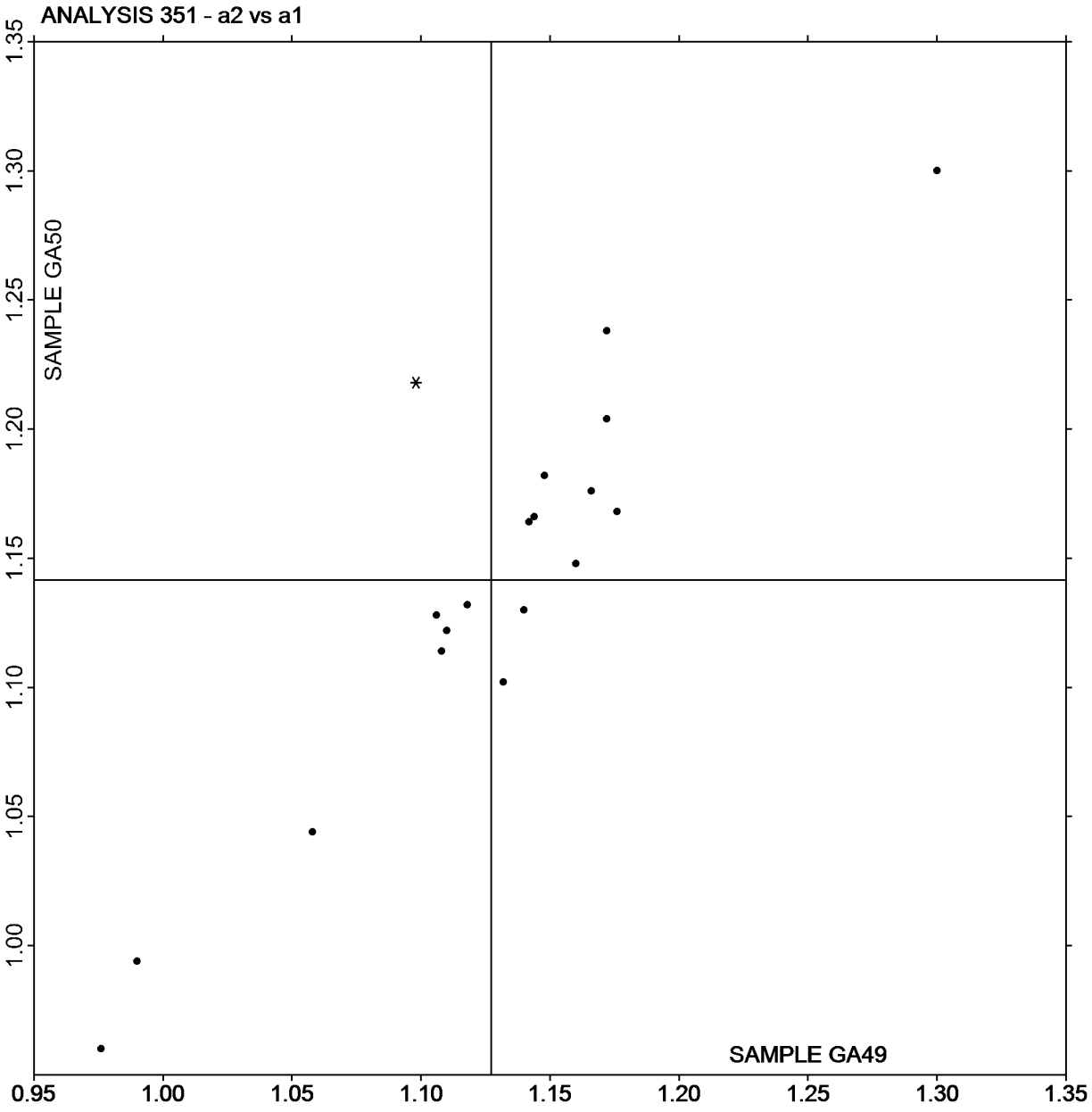
Plot of a values GA50 v a values GA49



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

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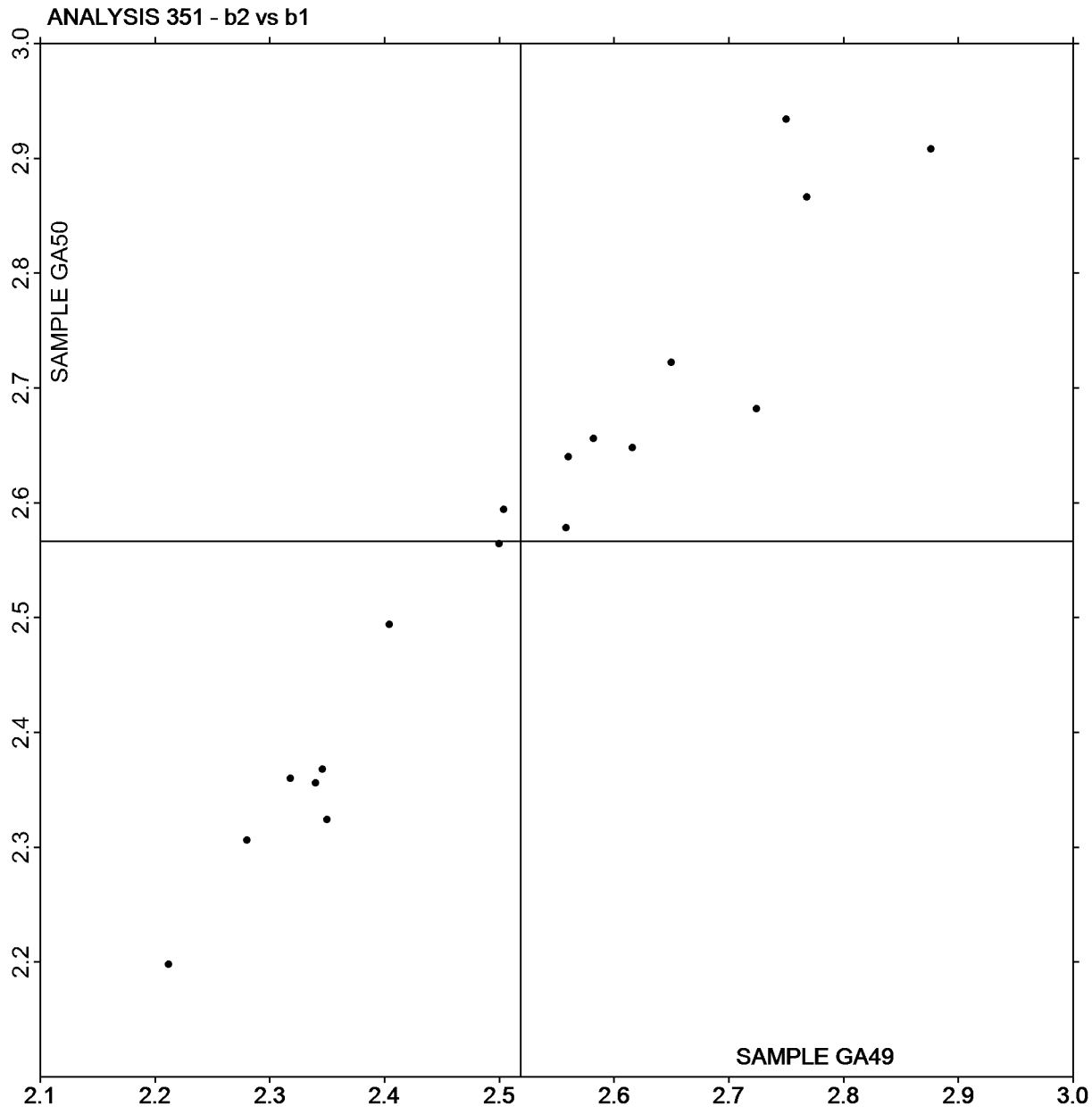
Plot of b values GA50 v b values GA49



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

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Paper & Paperboard Interlaboratory Testing Program

Report #2912G, December 2017

Analysis 360

Thickness (Caliper), Printing papers

TAPPI Official Test Method T411

WebCode	Data Flag	Sample GV49 Lab Mean	Sample GV49 Diff from Grand Mean	Sample GV49 CPV	Sample GV50 Lab Mean	Sample GV50 Diff from Grand Mean	Sample GV50 CPV	Instr Code
282JAQ	*	5.180	0.187	2.36	5.060	0.075	0.86	XX
2A79AE		5.053	0.060	0.76	5.090	0.105	1.21	TM
2HH7HR		4.996	0.003	0.04	4.943	-0.042	-0.48	XX
2UW8UR		5.010	0.017	0.22	5.060	0.075	0.86	TM
39R2LC		4.933	-0.060	-0.76	4.985	0.000	0.00	TA
3RFLGV		5.106	0.113	1.43	5.007	0.022	0.26	LW
3VHB2P		4.986	-0.007	-0.09	4.946	-0.039	-0.45	LA
46GNBN		4.888	-0.105	-1.32	4.865	-0.120	-1.38	MT
4KYA2A		5.072	0.079	1.00	5.051	0.066	0.76	LW
6JJERM	*	4.817	-0.176	-2.22	4.769	-0.216	-2.48	PP
6PQVAM	*	4.878	-0.115	-1.45	4.745	-0.240	-2.76	TA
74HZ8J		4.990	-0.003	-0.04	4.994	0.009	0.11	EM
7MEH47		4.956	-0.037	-0.46	4.930	-0.055	-0.63	LW
7YUBTZ		4.967	-0.026	-0.33	4.828	-0.157	-1.81	TM
9HXZW9	*	5.124	0.131	1.66	4.975	-0.010	-0.11	TA
9J83KT		5.161	0.168	2.12	5.096	0.112	1.28	TM
9TFCCR		4.981	-0.012	-0.15	4.873	-0.112	-1.29	LA
AW83V9		4.996	0.003	0.03	4.990	0.005	0.06	LW
B3FNLQ		4.982	-0.011	-0.13	5.026	0.041	0.47	LW
BJ4YBE		5.077	0.084	1.06	5.105	0.120	1.38	LW
BKFY6M		5.051	0.058	0.73	5.040	0.055	0.63	TM
BVWLEN		5.070	0.077	0.97	5.116	0.131	1.51	LW
BW7QRC		4.957	-0.036	-0.46	5.083	0.098	1.13	LW
CXHMWG		4.975	-0.018	-0.23	4.996	0.011	0.13	EM
ED4WNC		4.977	-0.016	-0.20	4.980	-0.005	-0.06	XX
EFAAEQ		4.933	-0.060	-0.76	4.981	-0.004	-0.04	PP
EX9MPC		5.024	0.031	0.39	5.035	0.051	0.58	MS
FF6CGZ		5.006	0.013	0.16	5.049	0.064	0.74	EM
G2FYHV	*	4.812	-0.181	-2.29	4.912	-0.073	-0.84	EM
H39ATN		5.050	0.057	0.73	5.125	0.140	1.61	LA
J9E3KY		5.003	0.010	0.13	5.043	0.058	0.67	LW
JQWY3D		4.991	-0.002	-0.02	5.029	0.044	0.51	EM
JURTXT		5.008	0.015	0.19	5.061	0.076	0.88	TA
KHV6HK		4.989	-0.004	-0.05	4.975	-0.010	-0.11	LW
L4C4ZK		4.870	-0.123	-1.55	4.880	-0.105	-1.21	TM
LC2RVM		4.936	-0.057	-0.72	4.904	-0.081	-0.93	TM
MP86RD		4.930	-0.063	-0.80	4.869	-0.116	-1.33	EM
N8JBFE		5.069	0.076	0.96	5.039	0.054	0.62	LW
NGBLQA		5.124	0.131	1.65	5.125	0.141	1.62	TM
NNQ9XT		4.970	-0.023	-0.29	4.920	-0.065	-0.75	LW

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Paper & Paperboard Interlaboratory Testing Program

Analysis 360
Thickness (Caliper), Printing papers
TAPPI Official Test Method T411

WebCode	Data Flag	Sample GV49 Lab Mean	Sample GV49 Diff from Grand Mean	Sample GV49 CPV	Sample GV50 Lab Mean	Sample GV50 Diff from Grand Mean	Sample GV50 CPV	Instr Code
P6BHYL		4.988	-0.005	-0.06	5.023	0.038	0.44	EM
PZGJKQ		5.084	0.091	1.15	5.109	0.124	1.42	LW
Q4F672		4.984	-0.009	-0.11	5.040	0.055	0.63	EM
Q4HP2G		5.110	0.117	1.48	5.087	0.102	1.18	EM
QDJA3N		4.917	-0.076	-0.96	4.958	-0.027	-0.31	EM
QPCUKZ		5.058	0.065	0.82	5.068	0.083	0.96	TM
RQLZJM		4.937	-0.056	-0.71	4.987	0.002	0.03	TA
RXJWZX		5.063	0.070	0.88	5.036	0.051	0.59	EM
TE4Z3J		4.919	-0.074	-0.93	4.947	-0.038	-0.44	PP
V4LZM2	X	4.770	-0.223	-2.82	4.680	-0.305	-3.51	TM
V4YPNT		4.976	-0.017	-0.22	4.934	-0.051	-0.59	LW
VD9YD8		4.900	-0.093	-1.17	4.842	-0.143	-1.64	LA
VRNXKT		5.015	0.022	0.28	5.081	0.096	1.11	LA
VZGAFM		5.008	0.015	0.19	4.965	-0.020	-0.23	LW
WCURQ6		5.063	0.070	0.88	4.909	-0.076	-0.87	TM
WGNQ6Z		4.988	-0.005	-0.06	4.953	-0.032	-0.37	TA
WZD6G4		5.002	0.009	0.11	4.936	-0.049	-0.56	EM
XLA4G8		4.920	-0.073	-0.93	4.904	-0.081	-0.93	LW
XNHD8J		5.041	0.048	0.61	5.030	0.045	0.52	LW
XRFW9H		4.918	-0.075	-0.95	4.950	-0.035	-0.40	PP
XX4HHP		4.968	-0.025	-0.32	4.952	-0.033	-0.38	FR
Y3XX74	*	4.790	-0.203	-2.56	4.830	-0.155	-1.78	TM
YQ4K78		4.965	-0.028	-0.35	4.985	0.000	0.00	TM
ZD9QA4		5.046	0.053	0.67	5.017	0.032	0.37	LW

Summary Statistics	Sample GV49	Sample GV50
Grand Means	4.99 mils	4.98 mils
Stnd Dev Btwn Labs	0.08 mils	0.09 mils

Statistics based on 63 of 64 reporting participants.

Comments on Assigned Data Flags for Test #360

V4LZM2 (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of sample GV50.

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Key to Instrument Codes Reported by Participants

EM	Emveco	FR	Frank Instruments
LA	L & W Autoline	LW	L & W
MS	Messmer	MT	Mitutoyo
PP	Technidyne Profile/Plus	TA	Thwing-Albert
TM	TMI	XX	Instrument make/model not specified by lab

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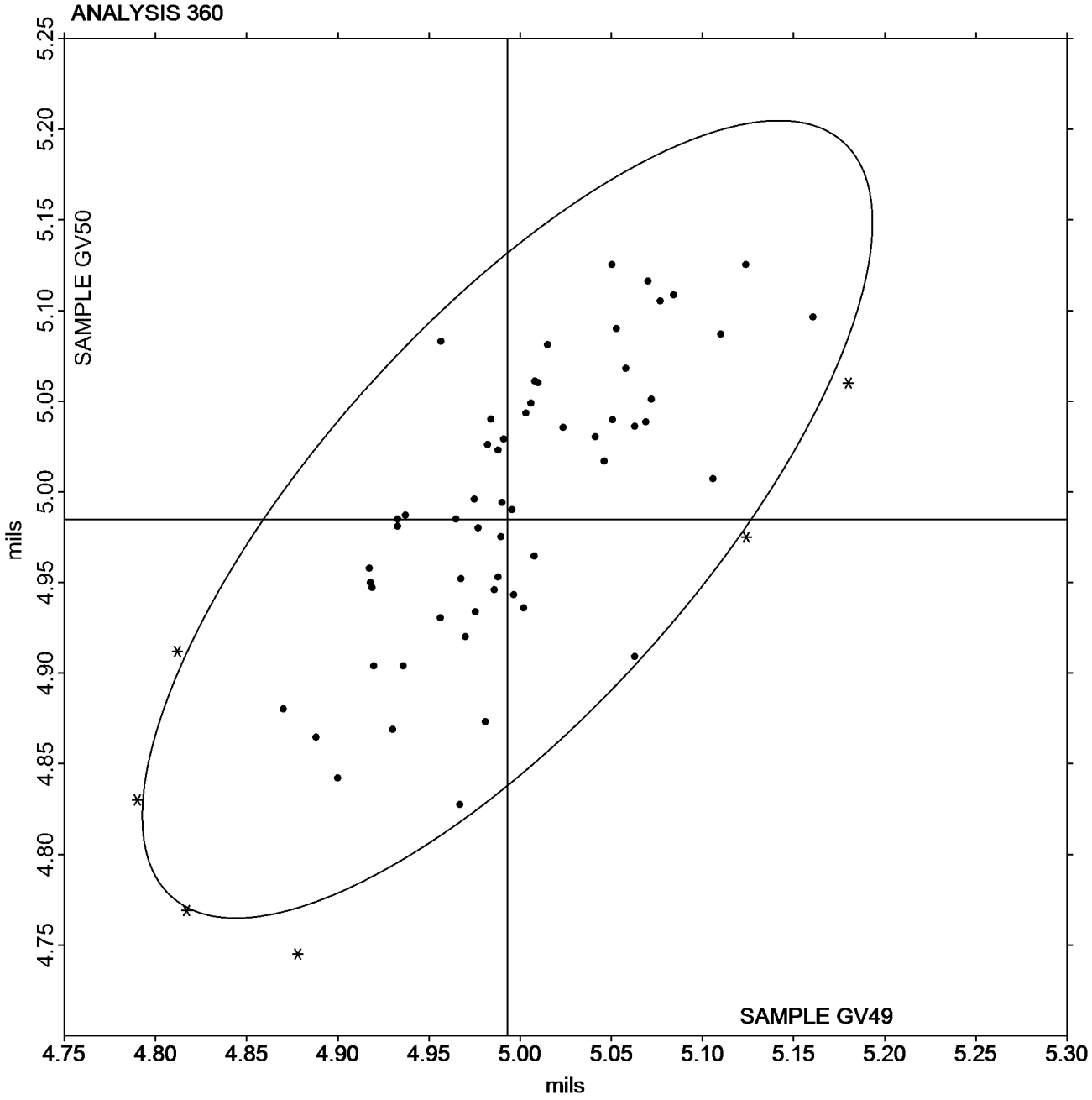
Grand Mean Sample GV49 = 4.9930 mils

Grand Mean Sample GV50 = 4.9848 mils



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Paper & Paperboard Interlaboratory Testing Program

Analysis 361
Thickness (Caliper), Packaging papers
TAPPI Official Test Method T411

WebCode	Data Flag	Sample GY49 Lab Mean	Sample GY49 Diff from Grand Mean	Sample GY49 CPV	Sample GY50 Lab Mean	Sample GY50 Diff from Grand Mean	Sample GY50 CPV	Instr Code
22C4HY		9.476	0.048	0.36	9.407	-0.017	-0.12	EM
2V79YY		9.558	0.130	0.98	9.570	0.146	1.01	EM
39R2LC		9.478	0.050	0.38	9.536	0.112	0.78	TA
3EDUZW		9.320	-0.108	-0.82	9.370	-0.054	-0.37	TM
6DDH9M		9.327	-0.102	-0.77	9.342	-0.081	-0.56	LW
6PQVAM	*	9.129	-0.299	-2.27	9.217	-0.207	-1.43	TA
7CJAK3		9.484	0.056	0.42	9.482	0.058	0.40	XX
7MEH47		9.386	-0.043	-0.32	9.480	0.057	0.39	LW
ADX4QE		9.414	-0.014	-0.11	9.388	-0.036	-0.25	TM
APDX4T		9.450	0.022	0.16	9.447	0.023	0.16	EM
CVQQ9M		9.471	0.043	0.32	9.471	0.047	0.33	EM
DW3MDR		9.440	0.012	0.09	9.435	0.011	0.08	TM
FEBN3B		9.211	-0.218	-1.65	9.124	-0.300	-2.07	TM
H39ATN		9.627	0.199	1.51	9.677	0.253	1.75	LA
HK9Z9R	X	234.700	225.272	1,707.65	233.700	224.276	1,550.28	LA
HPHFFV		9.490	0.062	0.47	9.380	-0.044	-0.30	LA
KHV6HK		9.550	0.122	0.92	9.573	0.149	1.03	LW
LJATJB		9.545	0.117	0.88	9.543	0.119	0.82	EM
MTTPY3		9.391	-0.037	-0.28	9.388	-0.036	-0.25	LA
NMWKJ4		9.561	0.133	1.00	9.540	0.116	0.80	TM
PEWQF3		9.340	-0.088	-0.67	9.330	-0.094	-0.65	TM
PMET4R		9.550	0.122	0.92	9.580	0.156	1.08	LW
PR4C32		9.319	-0.109	-0.83	9.256	-0.168	-1.16	LA
PZGJKQ		9.640	0.212	1.61	9.630	0.206	1.43	XX
QDJA3N		9.430	0.002	0.01	9.412	-0.011	-0.08	EM
QFRKW8	X	9.350	-0.078	-0.59	8.910	-0.514	-3.55	TA
T86ED6		9.315	-0.113	-0.86	9.300	-0.124	-0.86	TA
U9EHN9		9.634	0.206	1.56	9.647	0.223	1.54	LA
UFGRVZ		9.327	-0.102	-0.77	9.287	-0.136	-0.94	TM
VEFCXU		9.350	-0.078	-0.59	9.290	-0.134	-0.92	XX
Y3XX74		9.160	-0.268	-2.03	9.120	-0.304	-2.10	TM
Z6CTKF	X	9.194	-0.234	-1.77	9.396	-0.028	-0.19	XX
ZRVX9P		9.480	0.052	0.39	9.490	0.066	0.46	TA

Summary Statistics	Sample GY49	Sample GY50
Grand Means	9.43 mils	9.42 mils
Stnd Dev Btwn Labs	0.13 mils	0.14 mils

Statistics based on 30 of 33 reporting participants.

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Comments on Assigned Data Flags for Test #361

HK9Z9R (X) - Extreme Data.

Z6CTKF (X) - Inconsistent in testing between samples. Inconsistent within the replicate measurements for Sample GY49.

QFRKW8 (X) - Data for sample GY50 are low.

Analysis Notes:

PMET4R - Data appear to be reported as mils, not micrometers as indicated on datasheet. Units corrected by CTS.

Z6CTKF - Data originally flagged for Extreme Data for GY49, one determination removed from Lab Mean of Sample GY49 per Grubb's Test at 1% risk (TAPPI 1205).

Key to Instrument Codes Reported by Participants

EM	Emveco	LA	L & W Autoline
LW	L & W	TA	Thwing-Albert
TM	TMI	XX	Instrument make/model not specified by lab

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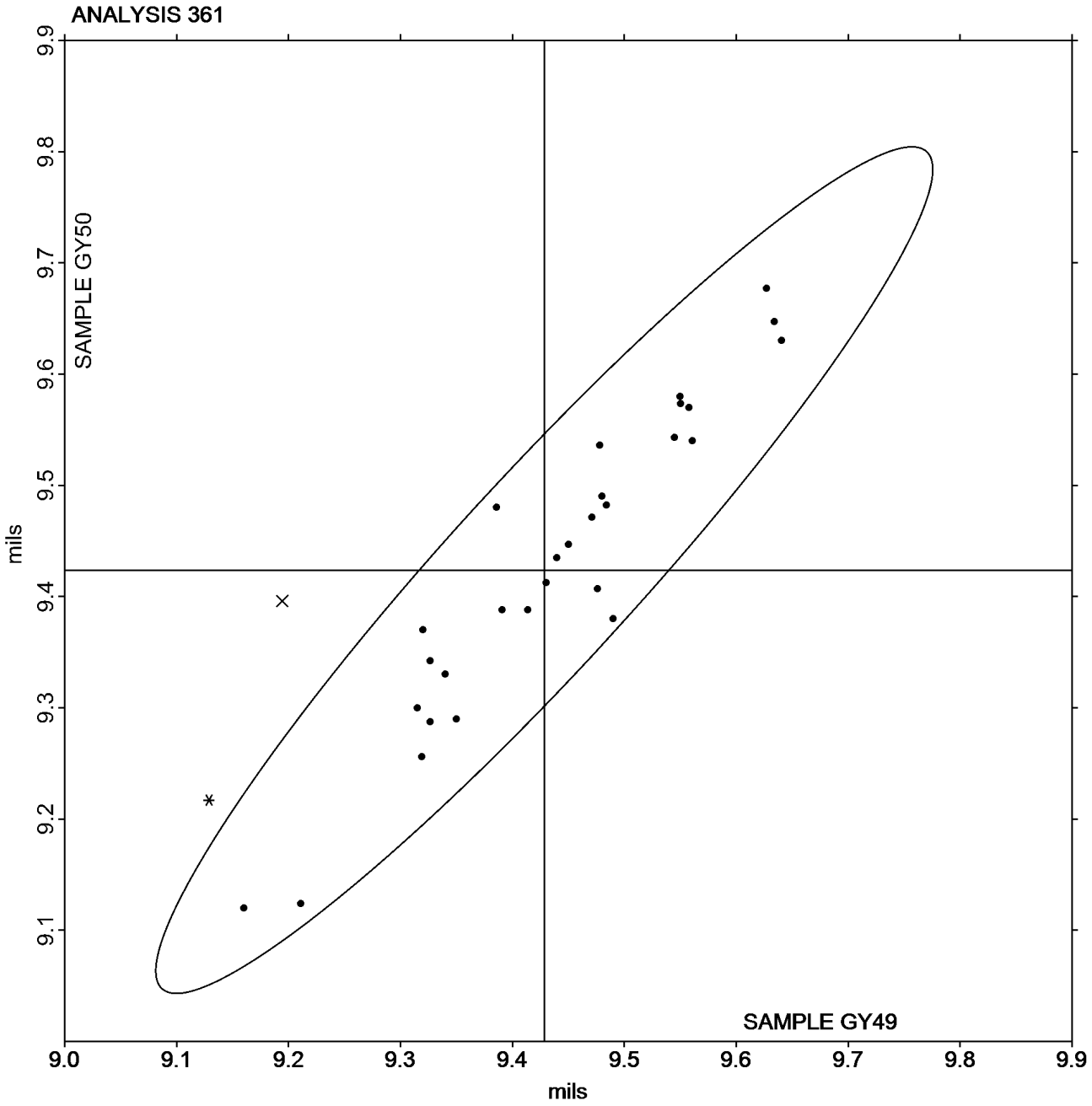
Grand Mean Sample GY49 = 9.4284 mils

Grand Mean Sample GY50 = 9.4238 mils



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Paper & Paperboard Interlaboratory Testing Program

Analysis 364

Coefficient of Static Friction - Horizontal Plane Method - Printing Papers

TAPPI Official Test Method T549

WebCode	Data Flag	Sample GD49 Lab Mean	Sample GD49 Diff from Grand Mean	Sample GD49 CPV	Sample GD50 Lab Mean	Sample GD50 Diff from Grand Mean	Sample GD50 CPV	Instr Code
B3FNLQ		0.6178	0.0814	0.99	0.6350	0.0976	1.39	TM
FF6CGZ		0.6222	0.0858	1.04	0.5416	0.0042	0.06	XX
L4C4ZK		0.3898	-0.1466	-1.78	0.4284	-0.1090	-1.56	XX
MCH72B		0.5812	0.0448	0.54	0.5752	0.0378	0.54	TA
P6BHYL		0.5500	0.0136	0.17	0.5800	0.0426	0.61	TA
PR4C32		0.4914	-0.0450	-0.54	0.5332	-0.0042	-0.06	TA
PZGJKQ		0.5022	-0.0342	-0.41	0.4684	-0.0690	-0.98	TL

Summary Statistics	Sample GD49	Sample GD50
Grand Means	0.54 COF	0.54 COF
Stnd Dev Btwn Labs	0.08 COF	0.07 COF

Statistics based on 7 of 7 reporting participants.

Key to Instrument Codes Reported by Participants

TA	Thwing-Albert Friction Tester	TL	TMI 32-90 Lab Master/Slip and Friction
TM	TMI 32-06 Monitor/Slip and Friction	XX	Instrument make/model not specified by lab

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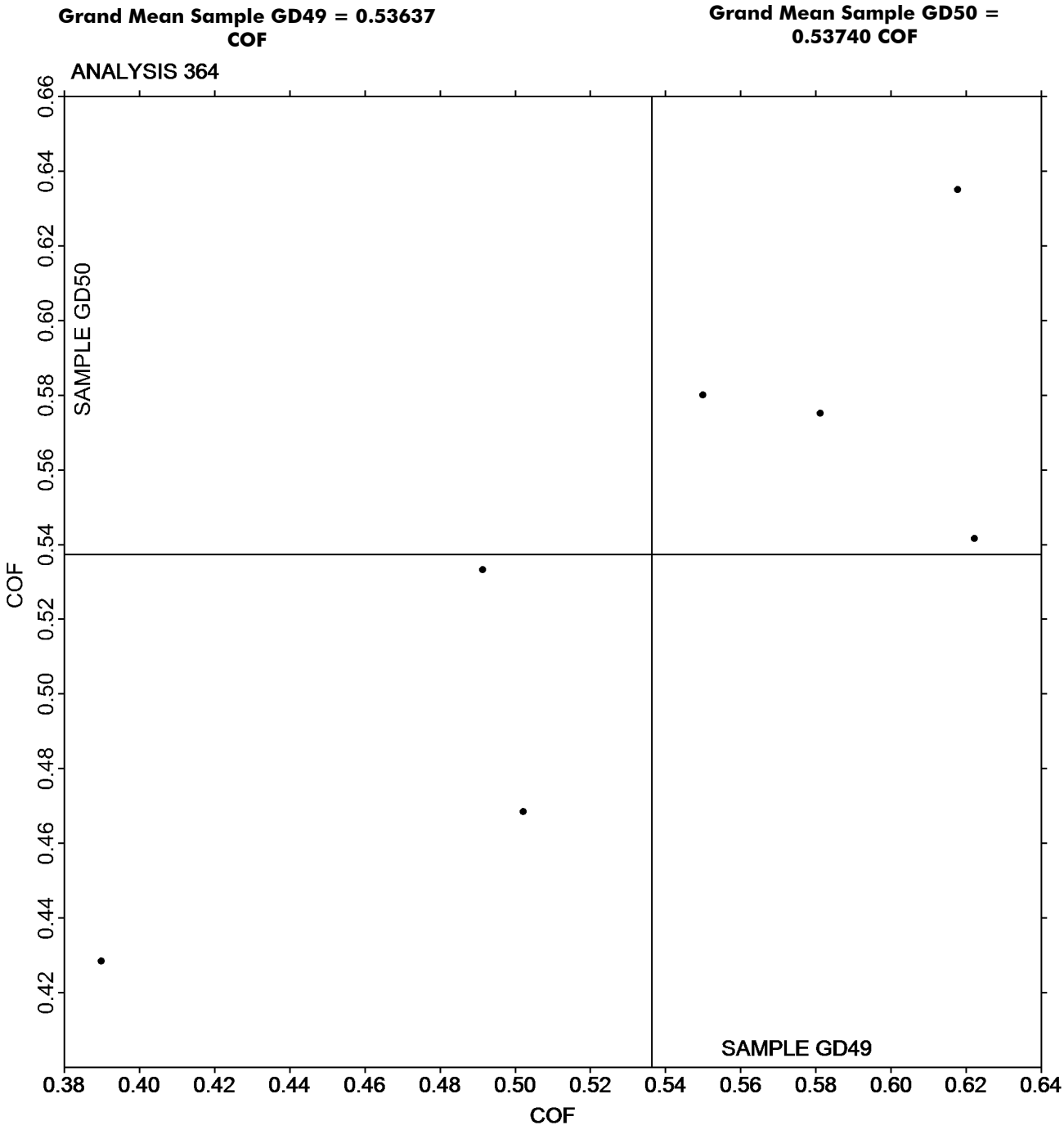

If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

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Paper & Paperboard Interlaboratory Testing Program

Analysis 365

Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers

TAPPI Official Test Method T549

WebCode	Data Flag	Sample GD49 Lab Mean	Sample GD49 Diff from Grand Mean	Sample GD49 CPV	Sample GD50 Lab Mean	Sample GD50 Diff from Grand Mean	Sample GD50 CPV	Instr Code
B3FNLQ		0.5136	0.0790	1.45	0.5020	0.0318	0.77	TM
G2FYHV		0.4672	0.0326	0.60	0.4952	0.0250	0.60	TA
GT96GB		0.3826	-0.0520	-0.96	0.4650	-0.0052	-0.13	TM
H39ATN		0.4742	0.0396	0.73	0.4930	0.0228	0.55	TM
L4C4ZK		0.3746	-0.0600	-1.10	0.4664	-0.0038	-0.09	XX
MCH72B		0.4434	0.0088	0.16	0.4616	-0.0086	-0.21	TA
NTYQWL		0.4590	0.0244	0.45	0.5186	0.0484	1.17	TA
PR4C32		0.4340	-0.0006	-0.01	0.4834	0.0132	0.32	TA
PZGJKQ		0.4626	0.0280	0.52	0.4480	-0.0222	-0.54	TL
RQLZJM		0.3346	-0.1000	-1.84	0.3692	-0.1010	-2.44	TA

Summary Statistics	Sample GD49	Sample GD50
Grand Means	0.43 COF	0.47 COF
Stnd Dev Btwn Labs	0.05 COF	0.04 COF

Statistics based on 10 of 10 reporting participants.

Key to Instrument Codes Reported by Participants

TA	Thwing-Albert Friction Tester	TL	TMI 32-90 Lab Master/Slip and Friction
TM	TMI 32-06 Monitor/Slip and Friction	XX	Instrument make/model not specified by lab

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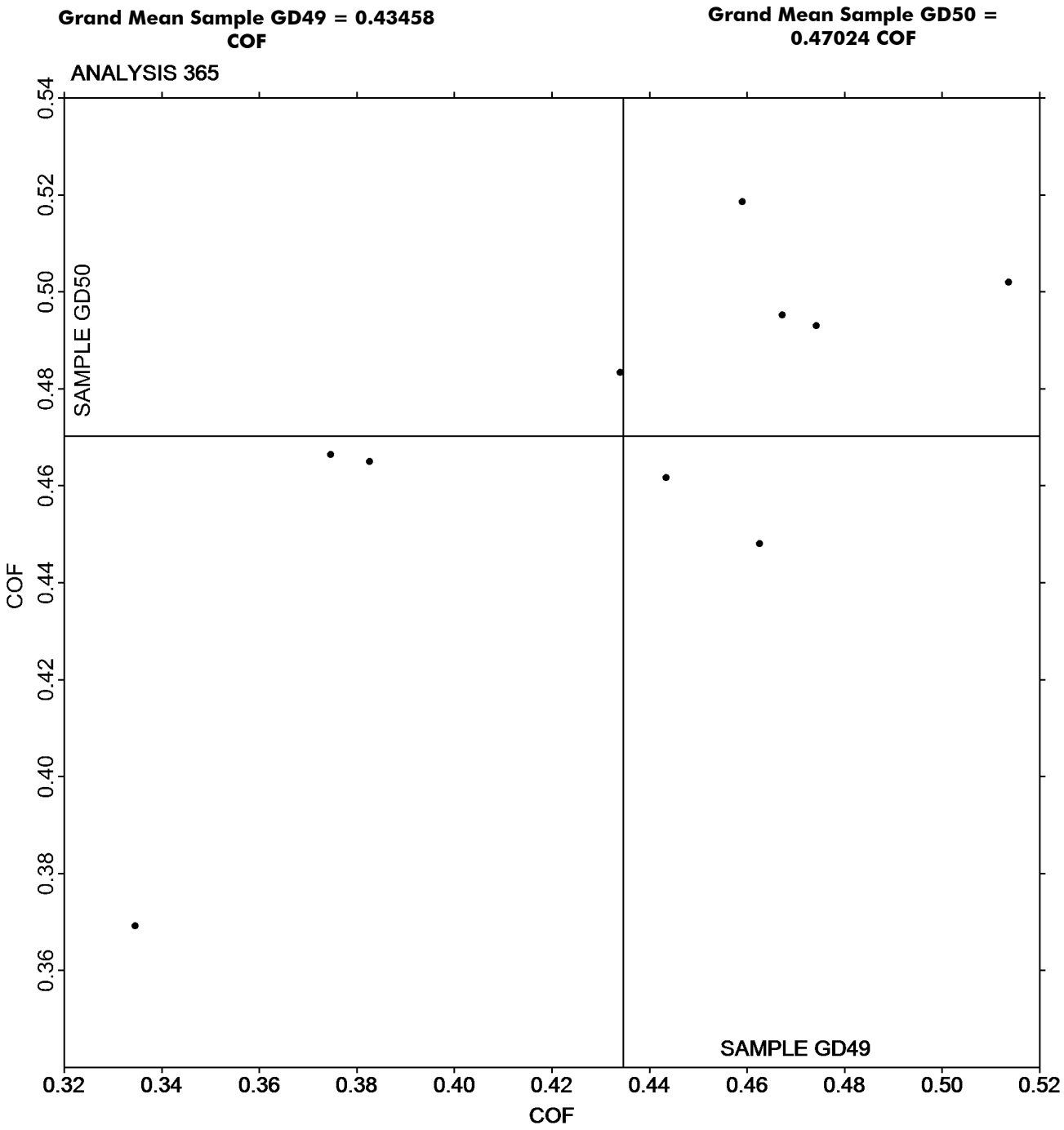

If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

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Paper & Paperboard Interlaboratory Testing Program

Analysis 370

Air Resistance - Gurley Oil Type

TAPPI Official Test Method T460

WebCode	Data Flag	Sample GE49 Lab Mean	Sample GE49 Diff from Grand Mean	Sample GE49 CPV	Sample GE50 Lab Mean	Sample GE50 Diff from Grand Mean	Sample GE50 CPV	Instr Code
282JAQ		17.11	0.02	0.03	17.88	-0.39	-0.48	XX
2XDPVA		17.13	0.04	0.05	18.27	0.00	0.01	XX
39R2LC		15.37	-1.72	-2.28	16.69	-1.58	-1.97	PP
6DDH9M		17.36	0.27	0.36	17.95	-0.32	-0.40	TL
6KETL7		16.94	-0.15	-0.20	18.97	0.70	0.88	LP
6NCCN6		17.60	0.51	0.67	18.72	0.46	0.57	LA
7MEH47		17.55	0.46	0.61	18.30	0.03	0.04	PP
7YUBTZ	X	12.06	-5.03	-6.67	13.10	-5.17	-6.44	LW
9HXZW9		17.34	0.25	0.33	18.18	-0.09	-0.11	PP
9J83KT		15.63	-1.46	-1.94	17.07	-1.20	-1.49	PR
9TFCCR		17.11	0.02	0.03	18.93	0.66	0.83	LA
BJ4YBE		16.17	-0.92	-1.22	16.92	-1.35	-1.68	LP
BW7QRC		18.41	1.32	1.75	19.61	1.34	1.68	LP
CXHMWG		18.05	0.96	1.27	18.91	0.64	0.80	HG
DLXULC		17.24	0.15	0.20	19.12	0.85	1.06	XX
EFAAEQ		16.28	-0.81	-1.08	18.80	0.53	0.66	PP
GRUVAV		15.85	-1.24	-1.64	17.17	-1.10	-1.37	LP
HPHFFV	X	163.80	146.71	194.69	155.10	136.83	170.55	LA
JQWY3D		17.52	0.43	0.57	18.10	-0.17	-0.21	HG
JURTXT		16.57	-0.52	-0.69	17.91	-0.36	-0.44	HG
L4C4ZK		16.40	-0.69	-0.91	17.40	-0.87	-1.08	GS
LJATJB		16.99	-0.10	-0.13	18.79	0.52	0.65	PP
MCH72B		17.67	0.58	0.77	18.86	0.59	0.74	WG
N4873U	X	220.40	203.31	269.79	230.40	212.13	264.41	LP
N8JBFE		17.05	-0.04	-0.05	18.21	-0.06	-0.07	LP
NGTKZ2	X	12.20	-4.89	-6.48	12.34	-5.92	-7.38	TN
P6BHYL		17.39	0.30	0.39	17.32	-0.95	-1.18	PP
PEWQF3		17.65	0.56	0.74	19.34	1.07	1.34	TL
PMET4R		16.32	-0.77	-1.02	18.41	0.14	0.18	LW
PR4C32		16.78	-0.31	-0.41	18.63	0.36	0.45	LA
PZGJKQ		17.35	0.26	0.35	17.97	-0.30	-0.37	LP
Q4HP2G		18.59	1.50	1.99	19.43	1.16	1.45	PP
QPCUKZ		17.21	0.12	0.16	18.66	0.39	0.49	HG
RXJWZX		16.07	-1.02	-1.35	17.91	-0.35	-0.44	PP
UYATKC		16.20	-0.89	-1.18	16.75	-1.51	-1.89	RE
VD9YD8		17.91	0.82	1.09	19.43	1.16	1.45	LA
VZGAFM		17.00	-0.09	-0.12	17.60	-0.67	-0.83	LW
WBFPGB	X	20.20	3.11	4.13	21.68	3.41	4.26	GA
WCURQ6		17.80	0.71	0.94	18.85	0.58	0.73	LP
WGNQ6Z		16.80	-0.29	-0.38	17.32	-0.95	-1.18	PP

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Paper & Paperboard Interlaboratory Testing Program

Analysis 370

Air Resistance - Gurley Oil Type

TAPPI Official Test Method T460

WebCode	Data Flag	Sample GE49 Lab Mean	Sample GE49 Diff from Grand Mean	Sample GE49 CPV	Sample GE50 Lab Mean	Sample GE50 Diff from Grand Mean	Sample GE50 CPV	Instr Code
XRFW9H		18.23	1.14	1.52	19.06	0.80	0.99	PP
Z6CTKF		17.76	0.67	0.89	18.97	0.70	0.88	VM
ZD9QA4		17.00	-0.09	-0.12	17.70	-0.57	-0.71	LP

Summary Statistics	Sample GE49	Sample GE50
Grand Means	17.09 sec/100 cc	18.27 sec/100 cc
Stnd Dev Btwn Labs	0.75 sec/100 cc	0.80 sec/100 cc

Statistics based on 38 of 43 reporting participants.

Comments on Assigned Data Flags for Test #370

WBFPGB (X) - Data for both samples are high. Possible Systematic Error.

N4873U (X) - Extreme Data.

HPHFFV (X) - Extreme Data.

7YUBTZ (X) - Extreme Data.

NGTKZ2 (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

GA	Gurley Precision #4340 Automatic Densometer	GS	Gurley-Hill S-P-S Tester #4190
HG	Technidyne - Hagerty Model #1	LA	L & W Autoline
LP	L & W Densometer, Air Permeance	LW	L & W Type Gurley Densometer, Oil Flotation
PP	Technidyne Profile/Plus	PR	Parker Print-Surf (PPS) Model M590
RE	Regmed Gurley Densometer PGH-T	TL	Gurley Densometer #4110, Oil Flotation
TN	Gurley S-P-S Tester #4190	VM	Valmet PaperLab (was Kajaani/Robotest)
WG	W & LE Gurley Tester	XX	Instrument make/model not specified by lab

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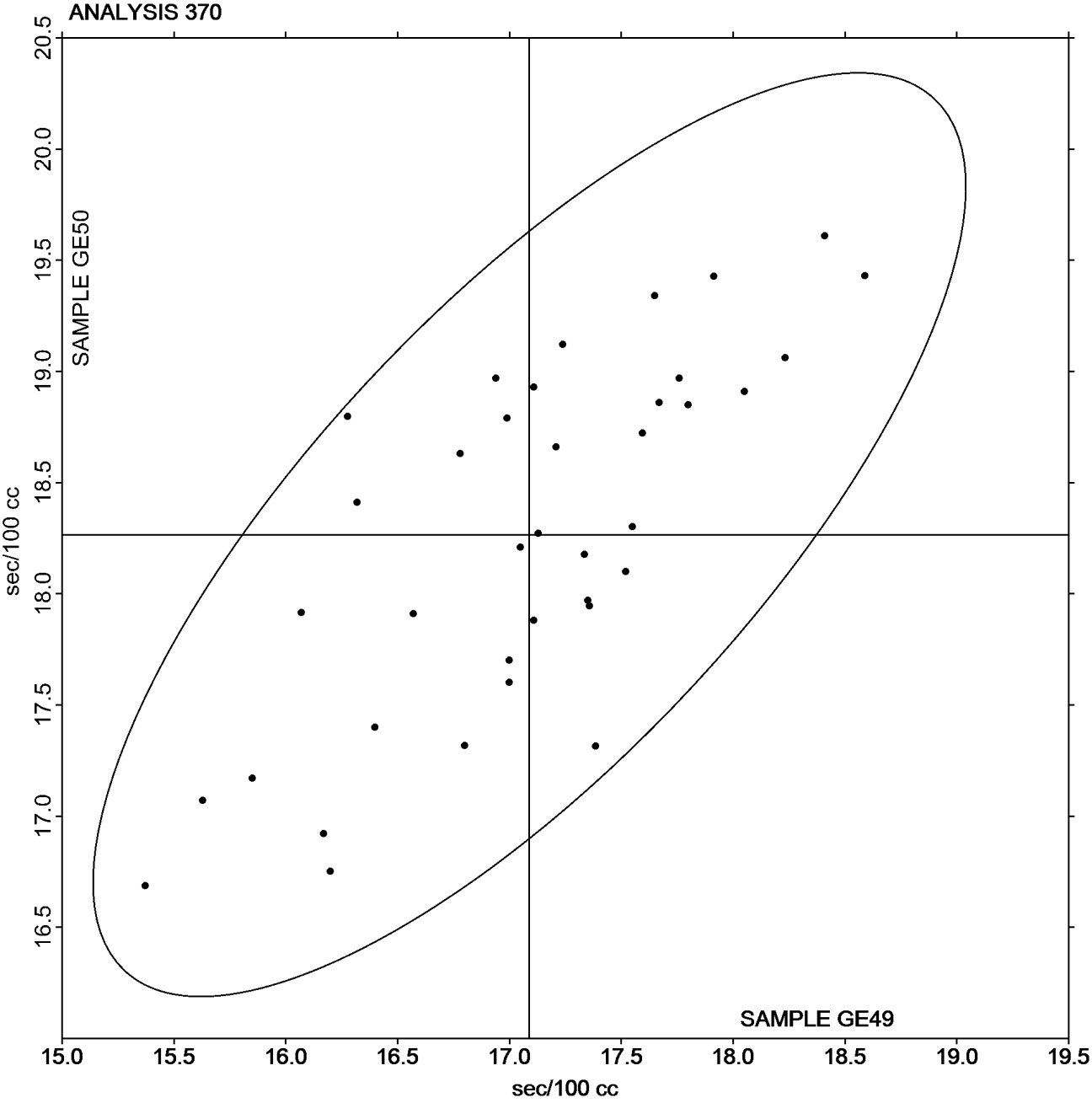
Grand Mean Sample GE49 = 17.089 sec/100 cc

Grand Mean Sample GE50 = 18.266 sec/100 cc



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Paper & Paperboard Interlaboratory Testing Program

Analysis 372

Porosity - Sheffield Type - Sheffield Units for 3/4 inch Diameter Orifice

TAPPI Official Test Method T547

		Sample GE49			Sample GE50			
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	Instr Code
282JAQ	X	16.6	-138.5	-23.21	15.0	-133.4	-19.95	XX
2UW8UR	X	191.0	35.9	6.01	187.5	39.2	5.86	TT
39R2LC		158.0	2.9	0.48	157.5	9.1	1.37	PP
6XGJ36		155.5	0.4	0.07	148.9	0.5	0.08	GA
9HXZW9		159.8	4.7	0.79	147.5	-0.8	-0.13	HM
DEYAHW		162.8	7.7	1.29	155.7	7.4	1.10	TT
JURTXT		148.0	-7.1	-1.19	140.1	-8.2	-1.23	TT
L4C4ZK		143.4	-11.7	-1.96	136.4	-11.9	-1.79	SH
UNPB86		157.5	2.3	0.39	150.2	1.9	0.28	XX
YQ4K78		154.5	-0.6	-0.10	150.5	2.2	0.32	TT
Z6CTKF		156.5	1.4	0.23	148.3	0.0	-0.01	PP

Summary Statistics	Sample GE49	Sample GE50
Grand Means	155.11 Sheffield Units	148.34 Sheffield Units
Stnd Dev Btwn Labs	5.97 Sheffield Units	6.68 Sheffield Units

Statistics based on 9 of 11 reporting participants.

Comments on Assigned Data Flags for Test #372

282JAQ (X) - Extreme Data.

2UW8UR (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

GA	Gurley Precision #4340 Automatic Densometer	HM	Technidyne - Hagerty Model #538
PP	Technidyne Profile/Plus	SH	Sheffield
TT	TMI Monitor/Smoothness II, Model 58-24	XX	Instrument make/model not specified by lab

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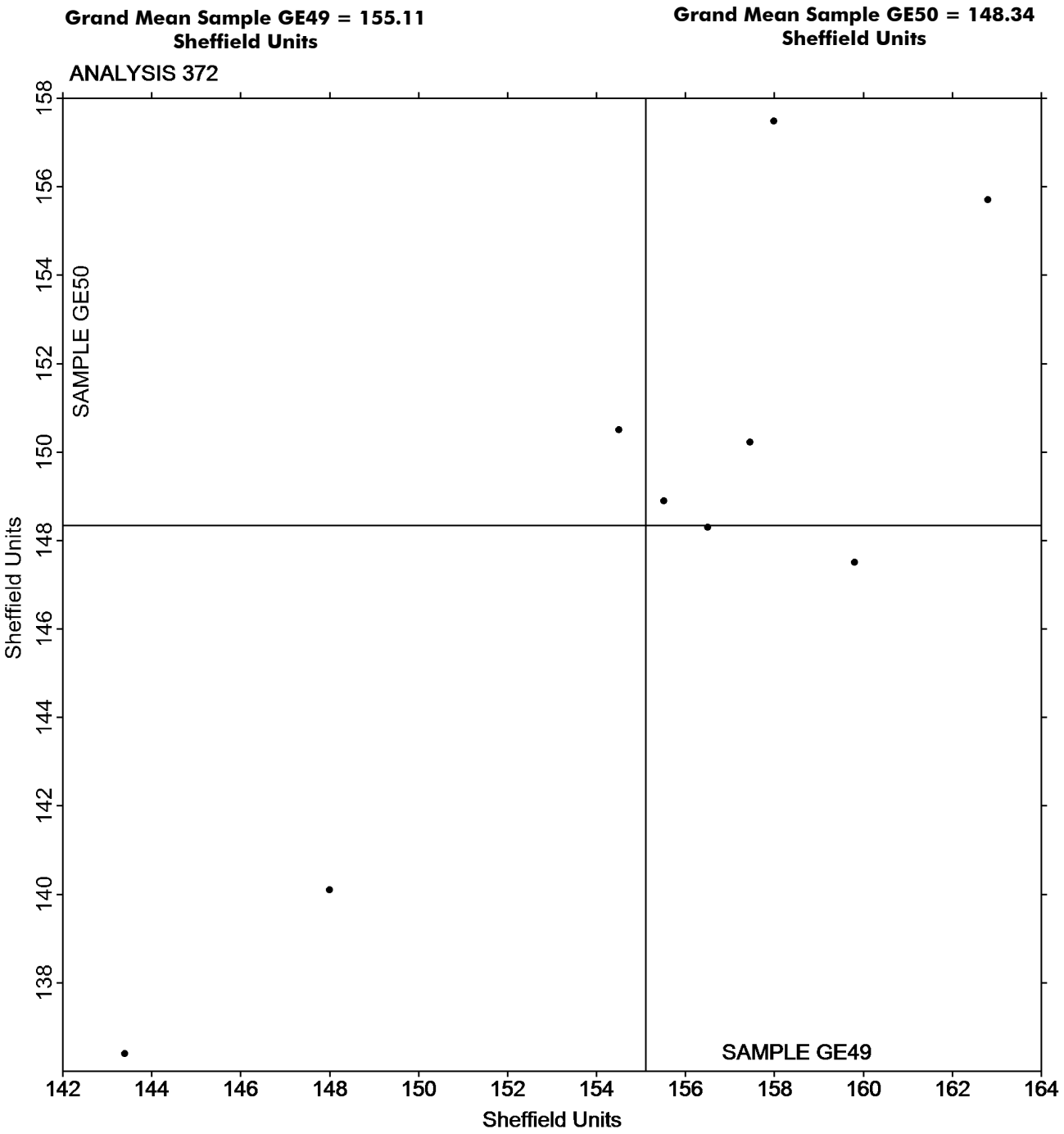

If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

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Paper & Paperboard Interlaboratory Testing Program

Analysis 376

Roughness - Print Surf Method - 0.5 to 4.0 Microns

TAPPI Official Test Method T555

WebCode	Data Flag	Sample GJ49 Lab Mean	Sample GJ49 Diff from Grand Mean	Sample GJ49 CPV	Sample GJ50 Lab Mean	Sample GJ50 Diff from Grand Mean	Sample GJ50 CPV	Instr Code
22C4HY		0.7410	-0.0639	-0.57	0.7120	-0.0859	-0.75	ZZ
2UW8UR		1.0670	0.2621	2.33	1.0690	0.2711	2.37	ZZ
2V79YY		0.7370	-0.0679	-0.60	0.7340	-0.0639	-0.56	ZZ
74HZ8J	X	0.8180	0.0131	0.12	0.8930	0.0951	0.83	ZZ
APDX4T		0.8220	0.0171	0.15	0.8370	0.0391	0.34	ZZ
AW83V9		0.7240	-0.0809	-0.72	0.7340	-0.0639	-0.56	ZZ
CVQQ9M		0.7410	-0.0639	-0.57	0.7450	-0.0529	-0.46	ZZ
CXHMWG		1.0470	0.2421	2.15	1.0160	0.2181	1.91	ZZ
DQCGCB		0.9570	0.1521	1.35	0.9270	0.1291	1.13	ZZ
HK9Z9R	X	5.1240	4.3191	38.33	5.1060	4.3081	37.73	ZZ
JJUTLP		0.7280	-0.0769	-0.68	0.7360	-0.0619	-0.54	ZZ
JURTXT		0.7670	-0.0379	-0.34	0.7760	-0.0219	-0.19	ZZ
KHV6HK		0.7870	-0.0179	-0.16	0.8000	0.0021	0.02	ZZ
MCH72B		0.6990	-0.1059	-0.94	0.7070	-0.0909	-0.80	ZZ
MP86RD		0.9990	0.1941	1.72	1.0020	0.2041	1.79	ZZ
NTYQWL		0.6990	-0.1059	-0.94	0.7080	-0.0899	-0.79	ZZ
PEYCBH		0.8080	0.0031	0.03	0.7940	-0.0039	-0.03	ZZ
QDJA3N		0.8110	0.0061	0.05	0.8060	0.0081	0.07	ZZ
QJRT33	X	1.4090	0.6041	5.36	1.3580	0.5601	4.91	ZZ
RQLZJM		0.8780	0.0731	0.65	0.8640	0.0661	0.58	ZZ
RXJWZX		0.7790	-0.0259	-0.23	0.7690	-0.0289	-0.25	ZZ
U9EHN9		0.8980	0.0931	0.83	0.9010	0.1031	0.90	ZZ
UFGRVZ		0.6700	-0.1349	-1.20	0.6530	-0.1449	-1.27	ZZ
V4LZM2		0.7960	-0.0089	-0.08	0.7540	-0.0439	-0.38	ZZ
VEFCXU		0.8030	-0.0019	-0.02	0.7990	0.0011	0.01	ZZ
VRNXKT	*	0.5890	-0.2159	-1.92	0.5370	-0.2609	-2.28	ZZ
WCURQ6		0.7080	-0.0969	-0.86	0.7120	-0.0859	-0.75	ZZ
WGNQ6Z	X	1.0240	0.2191	1.94	0.8730	0.0751	0.66	ZZ
XLA4G8		0.8480	0.0431	0.38	0.8570	0.0591	0.52	ZZ
Z6CTKF		0.7900	-0.0149	-0.13	0.7720	-0.0259	-0.23	ZZ
ZA8TDG		0.8390	0.0341	0.30	0.8220	0.0241	0.21	ZZ

Summary Statistics	Sample GJ49	Sample GJ50
Grand Means	0.80 Microns	0.80 Microns
Stnd Dev Btwn Labs	0.11 Microns	0.11 Microns

Statistics based on 27 of 31 reporting participants.

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Comments on Assigned Data Flags for Test #376

HK9Z9R (X) - Extreme Data.

WGNQ6Z (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample GJ50.

QJRT33 (X) - Data for both samples are high. Possible Systematic Error.

74HZ8J (X) - Inconsistent in testing between samples.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

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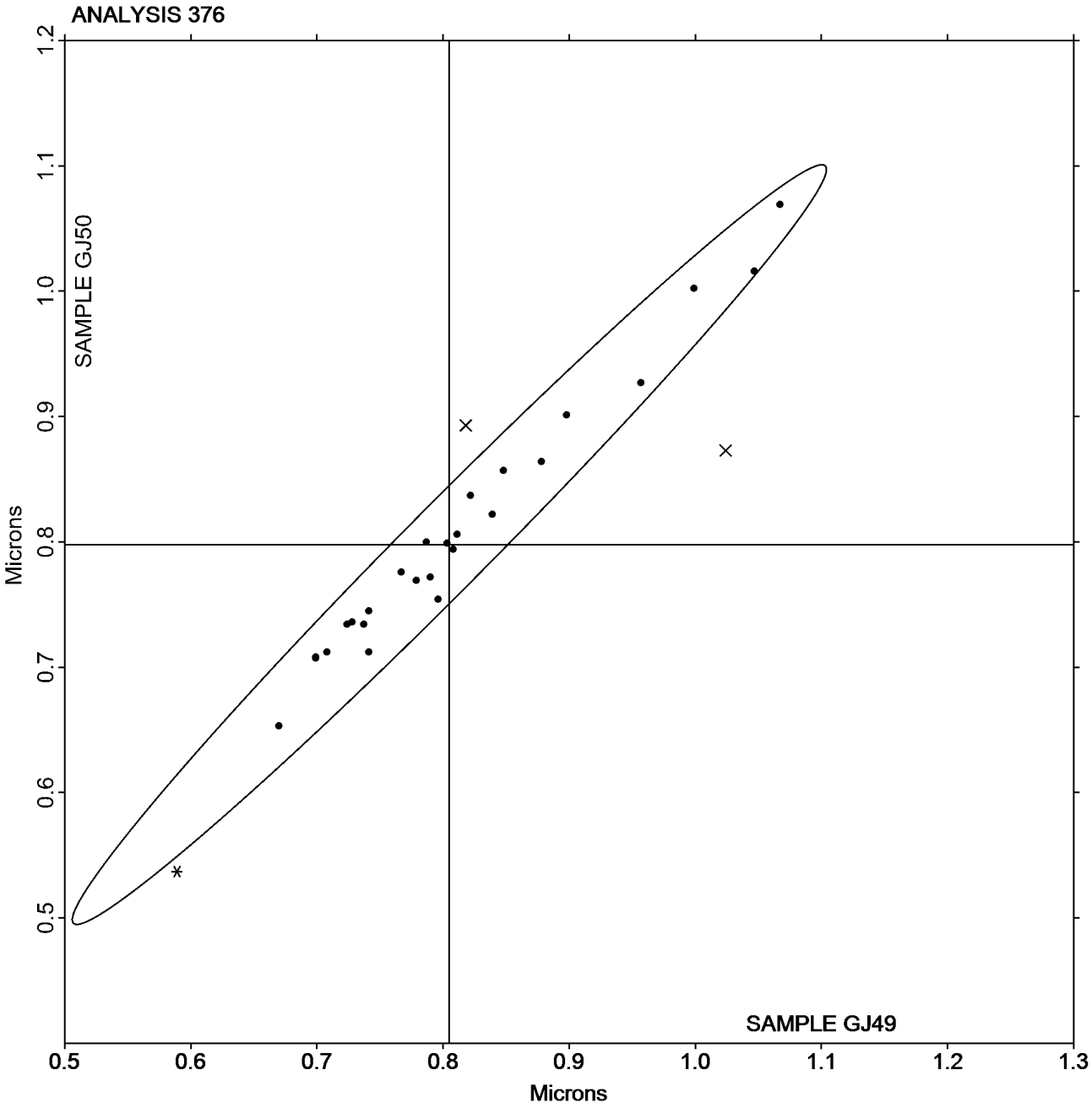
Grand Mean Sample GJ49 = 0.80489 Microns

Grand Mean Sample GJ50 = 0.79789 Microns



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Paper & Paperboard Interlaboratory Testing Program

Analysis 377

Roughness - Print Surf Method - 2.5 to 6.0 Microns

TAPPI Official Test Method T555

WebCode	Data Flag	Sample GK49 Lab Mean	Sample GK49 Diff from Grand Mean	Sample GK49 CPV	Sample GK50 Lab Mean	Sample GK50 Diff from Grand Mean	Sample GK50 CPV	Instr Code
7MEH47		3.244	-0.050	-0.42	3.295	-0.024	-0.20	ZZ
9TFCCR		3.098	-0.196	-1.65	3.157	-0.162	-1.35	ZZ
ADX4QE		3.260	-0.034	-0.29	3.250	-0.069	-0.57	ZZ
CXHMWG		3.265	-0.029	-0.25	3.226	-0.093	-0.77	ZZ
FF6CGZ		3.410	0.116	0.97	3.399	0.080	0.67	ZZ
LJATJB		3.298	0.004	0.03	3.353	0.034	0.28	ZZ
MCH72B		3.219	-0.075	-0.63	3.294	-0.025	-0.21	ZZ
P6BHYL		3.516	0.222	1.86	3.578	0.259	2.16	ZZ
PZGJKQ		3.339	0.045	0.38	3.318	-0.001	-0.01	ZZ

Summary Statistics	Sample GK49	Sample GK50
Grand Means	3.29 Microns	3.32 Microns
Stnd Dev Btwn Labs	0.12 Microns	0.12 Microns

Statistics based on 9 of 9 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

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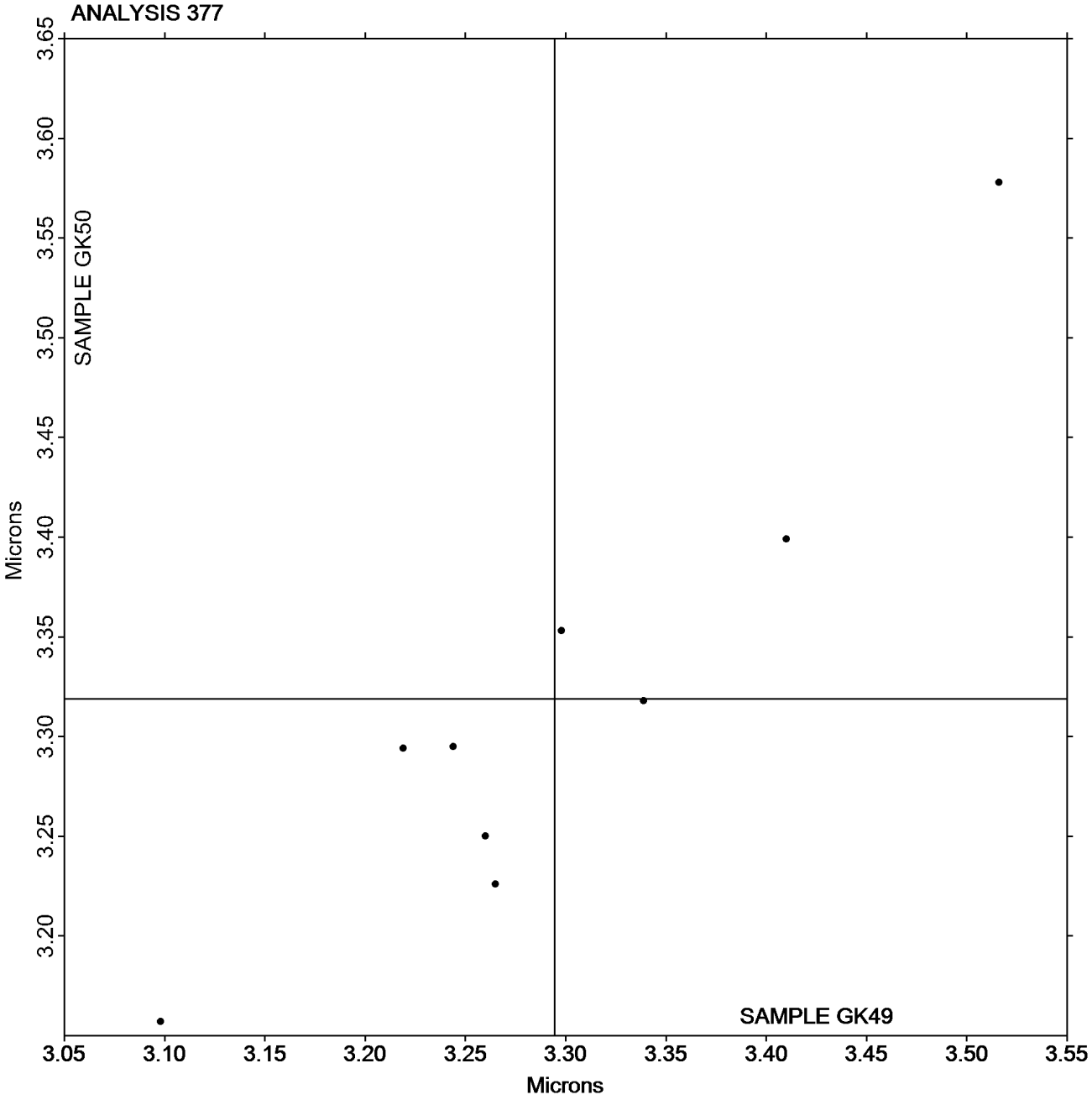
Grand Mean Sample GK49 = 3.2943 Microns

Grand Mean Sample GK50 = 3.3189 Microns



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

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Paper & Paperboard Interlaboratory Testing Program

Analysis 378

Roughness - Sheffield Type

TAPPI Official Test Method T538

WebCode	Data Flag	Sample GL49 Lab Mean	Sample GL49 Diff from Grand Mean	Sample GL49 CPV	Sample GL50 Lab Mean	Sample GL50 Diff from Grand Mean	Sample GL50 CPV	Instr Code
22C4HY		111.3	-7.3	-0.71	114.3	-6.9	-0.73	PP
282JAQ	X	325.3	206.7	20.10	333.8	212.6	22.46	XX
2UW8UR		112.1	-6.5	-0.63	124.6	3.4	0.36	TT
2V79YY		116.8	-1.8	-0.17	124.4	3.2	0.34	PP
39R2LC	X	437.0	318.4	30.96	432.5	311.3	32.90	PP
3EDUZW		138.1	19.5	1.89	137.7	16.5	1.74	GA
3VHB2P		114.6	-4.0	-0.39	116.6	-4.6	-0.49	LA
4KYA2A		117.9	-0.6	-0.06	111.2	-10.0	-1.06	SH
6JJERM		112.5	-6.1	-0.59	116.9	-4.3	-0.46	PP
6XGJ36	*	148.7	30.1	2.93	149.2	28.0	2.95	GA
7MEH47		122.4	3.8	0.37	125.3	4.0	0.43	PP
7YUBTZ		118.3	-0.3	-0.03	116.3	-4.9	-0.52	SH
9HXZW9		108.8	-9.8	-0.95	119.2	-2.1	-0.22	PP
9TFCCR		118.9	0.3	0.03	125.6	4.4	0.46	LA
APDX4T		108.1	-10.5	-1.02	123.9	2.7	0.28	LW
B3FNLQ		120.5	1.9	0.19	121.4	0.2	0.02	PP
CVQQ9M		128.6	10.0	0.98	118.0	-3.2	-0.34	PP
ED4WNC		98.1	-20.5	-1.99	104.3	-16.9	-1.79	XX
EFAAEQ		107.1	-11.4	-1.11	122.8	1.6	0.17	PP
FF6CGZ		124.5	5.9	0.58	115.7	-5.5	-0.58	HM
GT96GB		102.3	-16.3	-1.58	107.0	-14.2	-1.50	TS
HGCBRK		106.8	-11.8	-1.14	110.5	-10.7	-1.14	XX
JQWY3D		113.0	-5.6	-0.54	113.0	-8.2	-0.87	HM
JURTXT		133.2	14.6	1.42	127.5	6.3	0.66	TT
KT9DXW		121.2	2.6	0.26	124.2	3.0	0.31	HM
L4C4ZK		139.4	20.8	2.03	140.5	19.3	2.04	XX
LJATJB		122.3	3.7	0.36	112.3	-9.0	-0.95	PP
MCH72B		123.1	4.5	0.44	132.1	10.9	1.15	XX
MTTPY3		112.0	-6.6	-0.64	123.1	1.9	0.20	LA
N4873U	X	7.9	-110.7	-10.77	7.3	-114.0	-12.04	LW
NTYQWL		122.3	3.7	0.36	122.5	1.3	0.13	HM
P6BHYL		123.3	4.7	0.46	124.1	2.8	0.30	PP
PZGJKQ		114.8	-3.8	-0.37	124.9	3.7	0.39	LW
Q4F672		119.7	1.1	0.11	128.0	6.8	0.72	XX
Q4HP2G		117.9	-0.7	-0.07	113.5	-7.7	-0.82	SH
QDJA3N		119.8	1.2	0.12	120.3	-0.9	-0.10	HM
QFRKW8		124.1	5.6	0.54	114.6	-6.6	-0.70	PP
QJRT33		115.1	-3.5	-0.34	113.9	-7.3	-0.77	TS
QPCUKZ		116.7	-1.9	-0.18	122.6	1.4	0.14	TS
RQLZJM		120.9	2.3	0.23	123.2	2.0	0.21	PP

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Paper & Paperboard Interlaboratory Testing Program

Analysis 378
Roughness - Sheffield Type
TAPPI Official Test Method T538

WebCode	Data Flag	Sample GL49 Lab Mean	Sample GL49 Diff from Grand Mean	Sample GL49 CPV	Sample GL50 Lab Mean	Sample GL50 Diff from Grand Mean	Sample GL50 CPV	Instr Code
RXJWZX		103.4	-15.2	-1.48	113.3	-7.9	-0.84	PP
T86ED6		122.8	4.3	0.42	117.4	-3.8	-0.40	PP
U9EHN9		107.5	-11.1	-1.08	112.1	-9.1	-0.97	LA
UFGRVZ		129.7	11.1	1.08	131.2	10.0	1.05	TT
UGD6HT		115.8	-2.8	-0.27	123.2	2.0	0.21	TT
UNPB86		115.2	-3.3	-0.32	118.8	-2.4	-0.25	XX
VD9YD8		110.2	-8.4	-0.82	107.2	-14.0	-1.48	LA
VEFCXU		115.6	-3.0	-0.29	118.1	-3.1	-0.33	PP
VZGAFM		117.9	-0.7	-0.07	127.3	6.1	0.64	TS
WCURQ6		120.5	1.9	0.19	122.5	1.3	0.13	TS
WGNQ6Z		128.5	9.9	0.97	122.1	0.9	0.09	PP
XRFW9H		123.9	5.3	0.52	126.6	5.4	0.57	PP
Y3XX74		129.5	10.9	1.06	134.5	13.3	1.40	GL
YQ4K78		138.0	19.4	1.89	141.5	20.3	2.14	TT
Z6CTKF	*	91.0	-27.6	-2.68	95.2	-26.0	-2.75	VM
ZA8TDG		120.4	1.8	0.18	124.3	3.1	0.32	LW
ZG8264		117.8	-0.8	-0.07	125.9	4.7	0.49	GA

Summary Statistics	Sample GL49	Sample GL50
Grand Means	118.57 Sheffield	121.23 Sheffield
Stnd Dev Btwn Labs	10.28 Sheffield	9.46 Sheffield

Statistics based on 54 of 57 reporting participants.

Comments on Assigned Data Flags for Test #378

N4873U (X) - Extreme Data.

39R2LC (X) - Extreme Data.

282JAQ (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

GA	Gurley Precision #4340 Automatic Densometer	GL	Giddings and Lewis Sheffield
HM	Technidyne - Hagerty Model #538	LA	L & W Roughness Sheffield - Autoline
LW	L & W Roughness Tester	PP	Technidyne Profile/Plus
SH	Sheffield (Bendix Precisionaire)	TS	TMI Monitor/Smoothness, Model 58-02
TT	TMI Monitor/Smoothness II, Model 58-24	VM	Valmet PaperLab (was Kajaani\Robotest)
XX	Instrument make/model not specified by lab		

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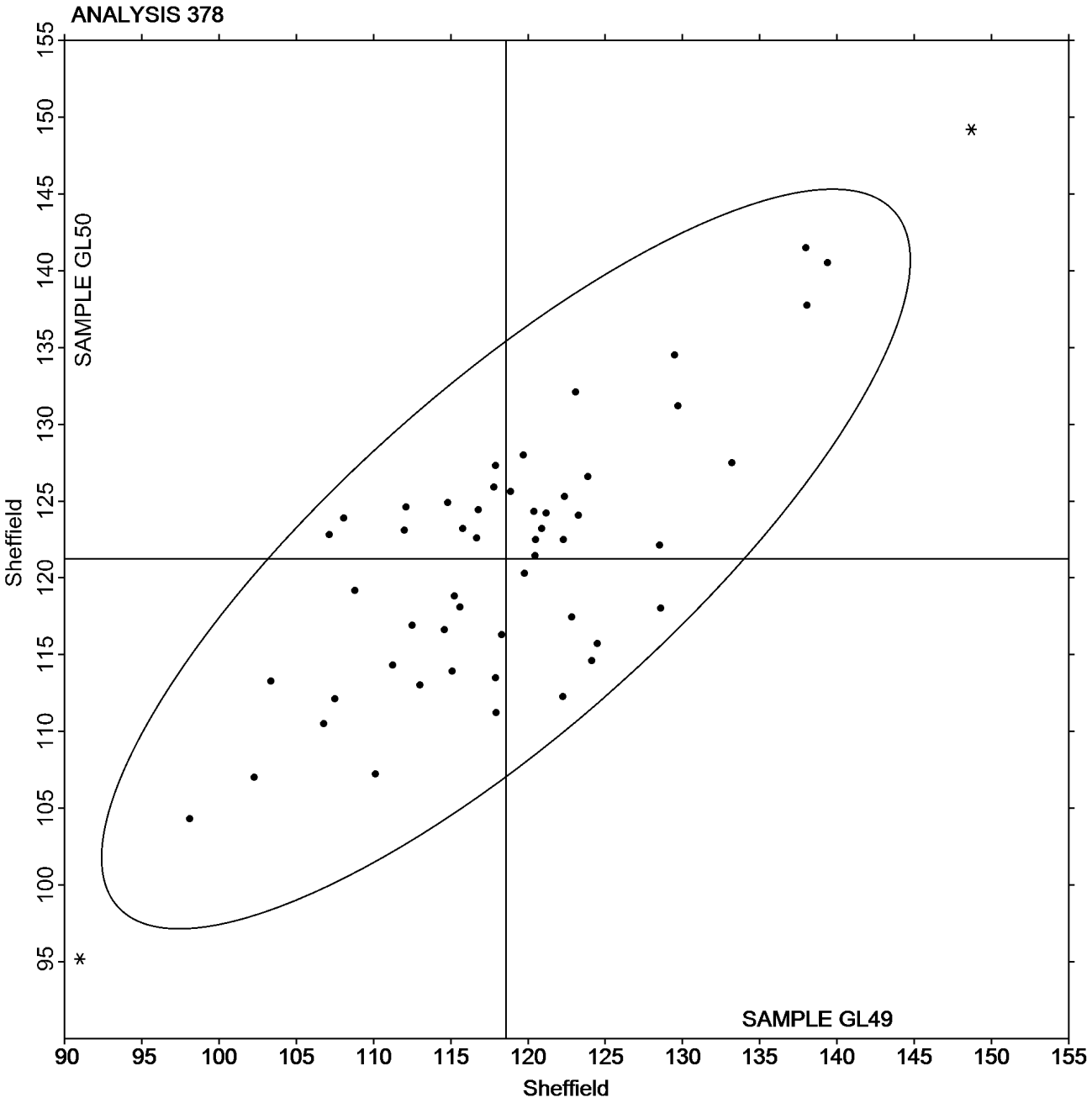
Grand Mean Sample GL49 = 118.57
Sheffield

Grand Mean Sample GL50 = 121.23
Sheffield



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Paper & Paperboard Interlaboratory Testing Program

Analysis 382
Moisture in Paper
TAPPI Official Test Method T412

WebCode	Data Flag	Sample GM49 Lab Mean	Sample GM49 Diff from Grand Mean	Sample GM49 CPV	Sample GM50 Lab Mean	Sample GM50 Diff from Grand Mean	Sample GM50 CPV	Instr Code
34Q8GF		4.650	0.181	0.54	4.590	0.103	0.28	ZZ
9BWJNN		4.967	0.498	1.49	5.295	0.808	2.17	ZZ
A4VN4U		4.800	0.331	0.99	4.512	0.025	0.07	ZZ
ADX4QE		4.240	-0.229	-0.69	4.300	-0.187	-0.50	ZZ
EX9MPC		4.480	0.011	0.03	4.405	-0.082	-0.22	ZZ
FF6CGZ		4.330	-0.139	-0.42	4.250	-0.237	-0.64	ZZ
FGEJJT		4.504	0.035	0.10	4.391	-0.096	-0.26	ZZ
FNU8CA		4.229	-0.240	-0.72	4.412	-0.075	-0.20	ZZ
NMWKJ4		4.319	-0.150	-0.45	4.237	-0.250	-0.67	ZZ
UFGRVZ		5.100	0.631	1.89	5.090	0.603	1.62	ZZ
XLA4G8		4.333	-0.137	-0.41	4.348	-0.140	-0.38	ZZ
YMZVGJ		4.258	-0.211	-0.63	4.657	0.170	0.46	ZZ
ZD9QA4		3.892	-0.577	-1.73	3.846	-0.641	-1.72	ZZ

Summary Statistics	Sample GM49	Sample GM50
Grand Means	4.47 Percent	4.49 Percent
Stnd Dev Btwn Labs	0.33 Percent	0.37 Percent

Statistics based on 13 of 13 reporting participants.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

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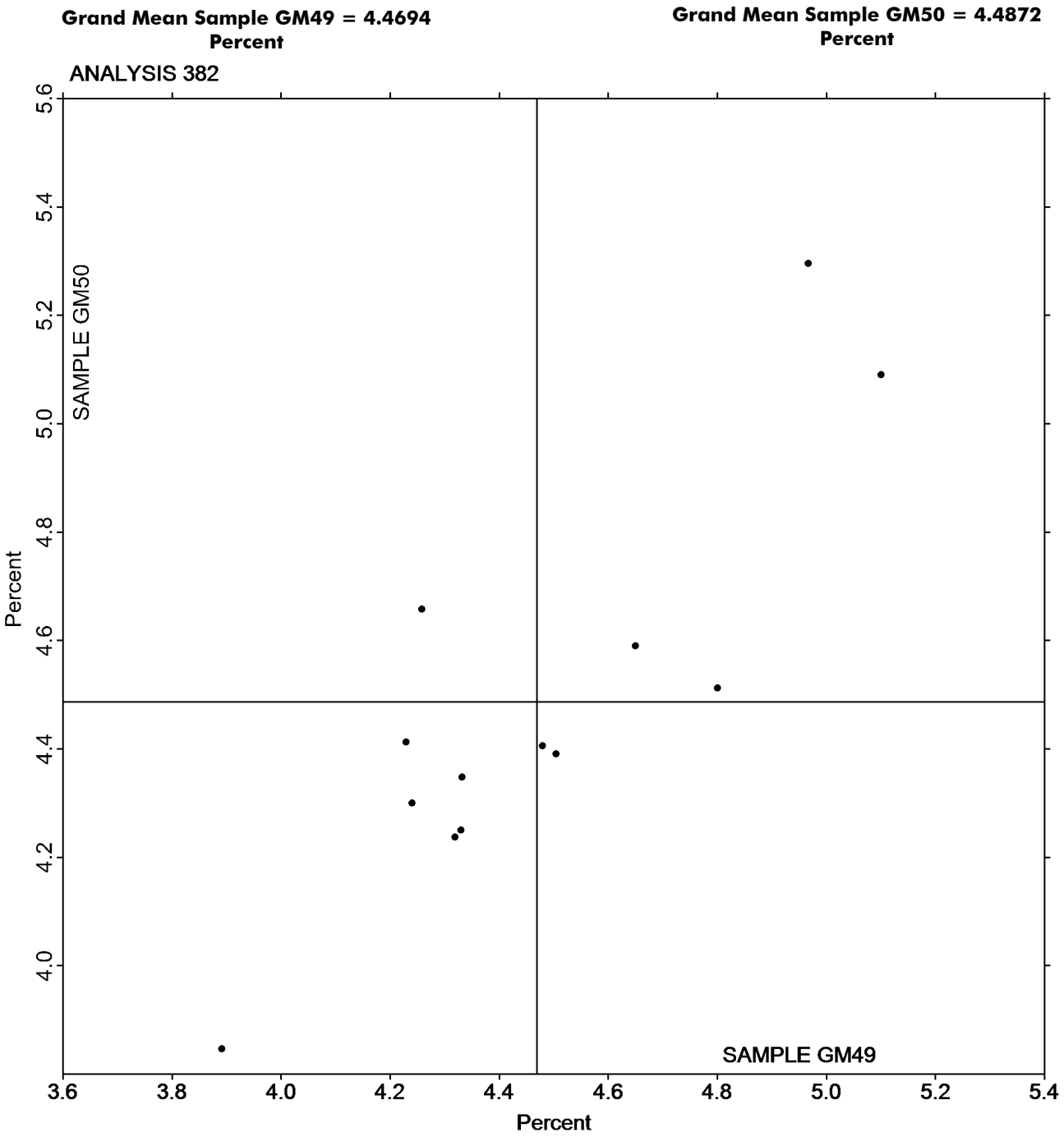

If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

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Paper & Paperboard Interlaboratory Testing Program

Report #2912G, December 2017

Analysis 384

Opacity (89% Reflectance Backing) - Fine Papers

TAPPI Official Test Method T425

		Sample GN49			Sample GN50			
WebCode	Data Flag	Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	Instr Code
282JAQ	*	91.93	-1.31	-2.91	92.79	-1.01	-2.61	ZZ
2UW8UR	X	102.85	9.61	21.30	94.48	0.68	1.77	ZZ
39R2LC		93.09	-0.15	-0.34	93.86	0.06	0.16	ZZ
4KYA2A		93.72	0.48	1.06	94.38	0.58	1.51	ZZ
6JJERM		93.33	0.09	0.20	93.94	0.14	0.37	ZZ
74HZ8J		93.22	-0.02	-0.05	93.70	-0.10	-0.25	ZZ
7MEH47		93.31	0.06	0.14	93.58	-0.21	-0.55	ZZ
9J83KT		93.35	0.11	0.24	93.97	0.17	0.45	ZZ
9TFCCR		93.24	0.00	0.00	93.62	-0.18	-0.46	ZZ
B3FNLQ		93.15	-0.09	-0.20	93.44	-0.36	-0.93	ZZ
CXHMWG		94.06	0.82	1.81	94.13	0.33	0.86	ZZ
DQCGCB		93.13	-0.11	-0.24	93.63	-0.17	-0.45	ZZ
ED4WNC		93.03	-0.21	-0.48	93.82	0.02	0.05	ZZ
FF6CGZ		93.18	-0.06	-0.14	93.81	0.01	0.03	ZZ
JJUTLP		93.63	0.39	0.86	93.89	0.09	0.24	ZZ
JQWY3D		93.47	0.23	0.51	93.97	0.17	0.45	ZZ
JURTXT		93.52	0.28	0.61	94.03	0.23	0.59	ZZ
L4C4ZK		93.20	-0.04	-0.09	93.60	-0.20	-0.51	ZZ
NGBLQA		93.33	0.09	0.20	93.84	0.04	0.11	ZZ
NTYQWL		93.75	0.51	1.13	94.40	0.60	1.56	ZZ
P6BHYL		93.43	0.19	0.42	94.29	0.49	1.27	ZZ
PEWQF3		92.81	-0.43	-0.96	93.53	-0.27	-0.69	ZZ
Q4F672		93.26	0.02	0.04	94.05	0.25	0.65	ZZ
Q4HP2G		93.03	-0.21	-0.47	93.90	0.10	0.27	ZZ
QDJA3N		92.31	-0.93	-2.07	93.07	-0.73	-1.89	ZZ
QPCUKZ		93.31	0.07	0.15	93.41	-0.39	-1.00	ZZ
RQLZJM	*	94.49	1.25	2.78	94.83	1.03	2.68	ZZ
VD9YD8		93.05	-0.19	-0.42	93.59	-0.21	-0.54	ZZ
VRNXKT		93.07	-0.17	-0.37	93.71	-0.08	-0.22	ZZ
VZGAFM		92.92	-0.32	-0.71	93.69	-0.11	-0.28	ZZ
WGNQ6Z		93.19	-0.05	-0.11	93.92	0.12	0.32	ZZ
XRFW9H		92.87	-0.37	-0.82	93.42	-0.37	-0.97	ZZ
Y3XX74	X	94.97	1.73	3.83	95.57	1.77	4.59	ZZ
YQ4K78		93.34	0.10	0.22	93.72	-0.08	-0.20	ZZ

Summary Statistics	Sample GN49	Sample GN50
Grand Means	93.24 Percent	93.80 Percent
Stnd Dev Btwn Labs	0.45 Percent	0.39 Percent

Statistics based on 32 of 34 reporting participants.

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Comments on Assigned Data Flags for Test #384

Y3XX74 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.

2UW8UR (X) - Extreme Data for Sample GN49.

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

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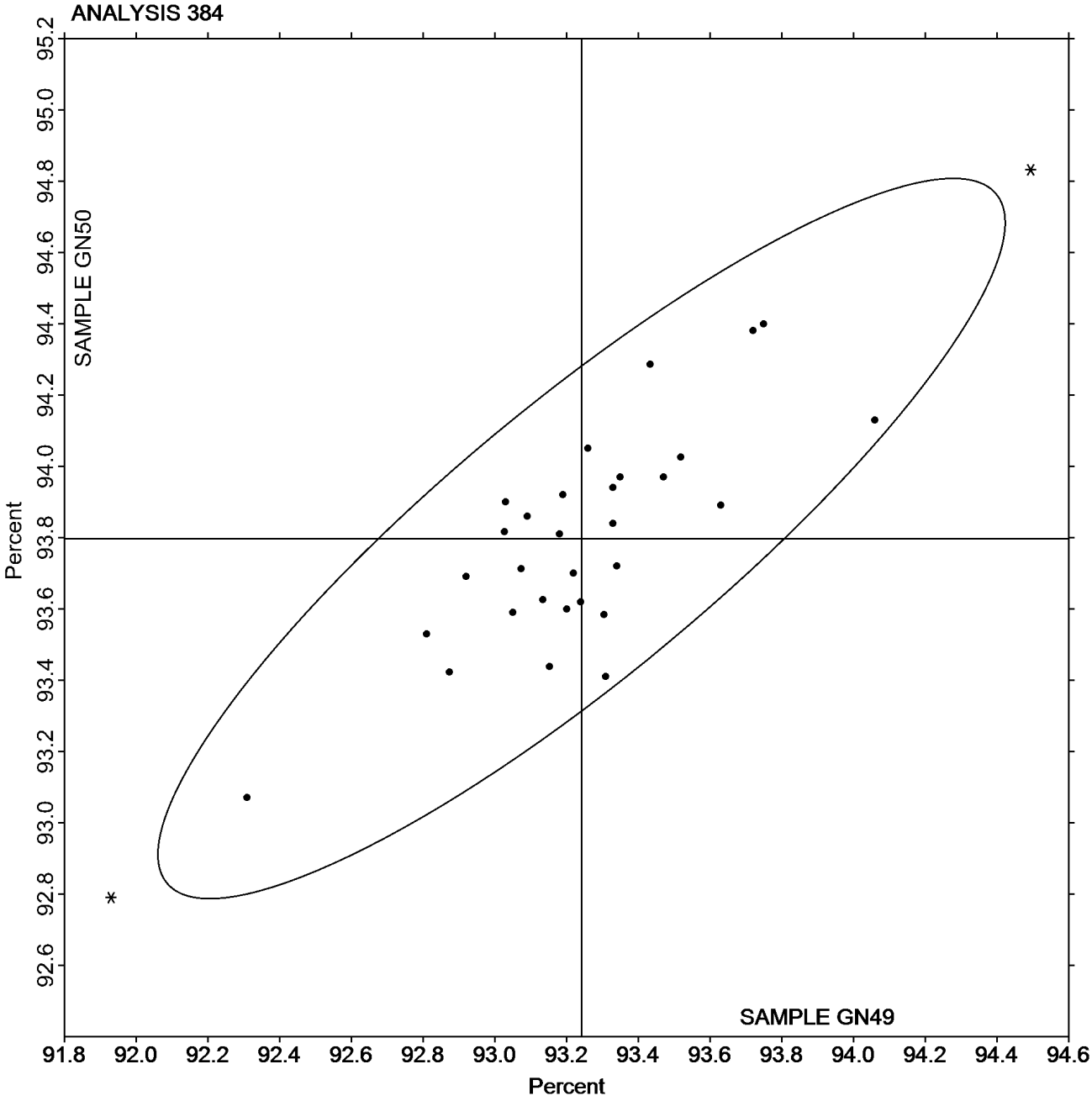
Grand Mean Sample GN49 = 93.242
Percent

Grand Mean Sample GN50 = 93.798
Percent



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Paper & Paperboard Interlaboratory Testing Program

Analysis 386

Opacity (Paper Backing) - Fine Papers and Newsprint

TAPPI Official Test Method T519

WebCode	Data Flag	Sample GP49 Lab Mean	Sample GP49 Diff from Grand Mean	Sample GP49 CPV	Sample GP50 Lab Mean	Sample GP50 Diff from Grand Mean	Sample GP50 CPV	Instr Code
9HXZW9		93.36	-0.01	-0.07	93.51	-0.21	-1.80	ZZ
BJ4YBE		93.36	0.00	-0.05	93.74	0.03	0.23	ZZ
BVWLEN		93.35	-0.01	-0.13	93.73	0.01	0.11	ZZ
BW7QRC		93.35	-0.01	-0.10	93.72	0.00	0.01	ZZ
G3WXT8		93.52	0.16	2.11	93.69	-0.02	-0.21	ZZ
H39ATN		93.33	-0.03	-0.36	93.83	0.11	0.96	ZZ
J9E3KY		93.26	-0.10	-1.32	93.55	-0.17	-1.42	ZZ
KHV6HK		93.25	-0.11	-1.52	93.84	0.12	1.02	ZZ
NNQ9XT		93.36	0.00	0.03	93.81	0.09	0.79	ZZ
PMET4R		93.26	-0.10	-1.29	93.84	0.13	1.08	ZZ
QDJA3N		93.42	0.06	0.78	93.79	0.07	0.60	ZZ
RQLZJM	X	93.27	-0.09	-1.20	92.99	-0.73	-6.20	ZZ
UYATKC		93.43	0.07	0.90	93.73	0.02	0.14	ZZ
V4LZM2	X	93.70	0.33	4.45	93.55	-0.17	-1.46	ZZ
XNHD8J		93.44	0.08	1.11	93.50	-0.22	-1.84	ZZ
ZD9QA4		93.35	-0.01	-0.09	93.76	0.04	0.34	ZZ

Summary Statistics	Sample GP49	Sample GP50
Grand Means	93.36 Percent	93.72 Percent
Stnd Dev Btwn Labs	0.08 Percent	0.12 Percent

Statistics based on 14 of 16 reporting participants.

Comments on Assigned Data Flags for Test #386

RQLZJM (X) - Extreme Data for Sample GP50.

V4LZM2 (X) - Data for sample GP49 are high.

Analysis Notes:

XNHD8J - One determination removed from the Lab Mean of Sample GP50 per Grubb's Test at 1% risk (TAPPI 1205).

Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

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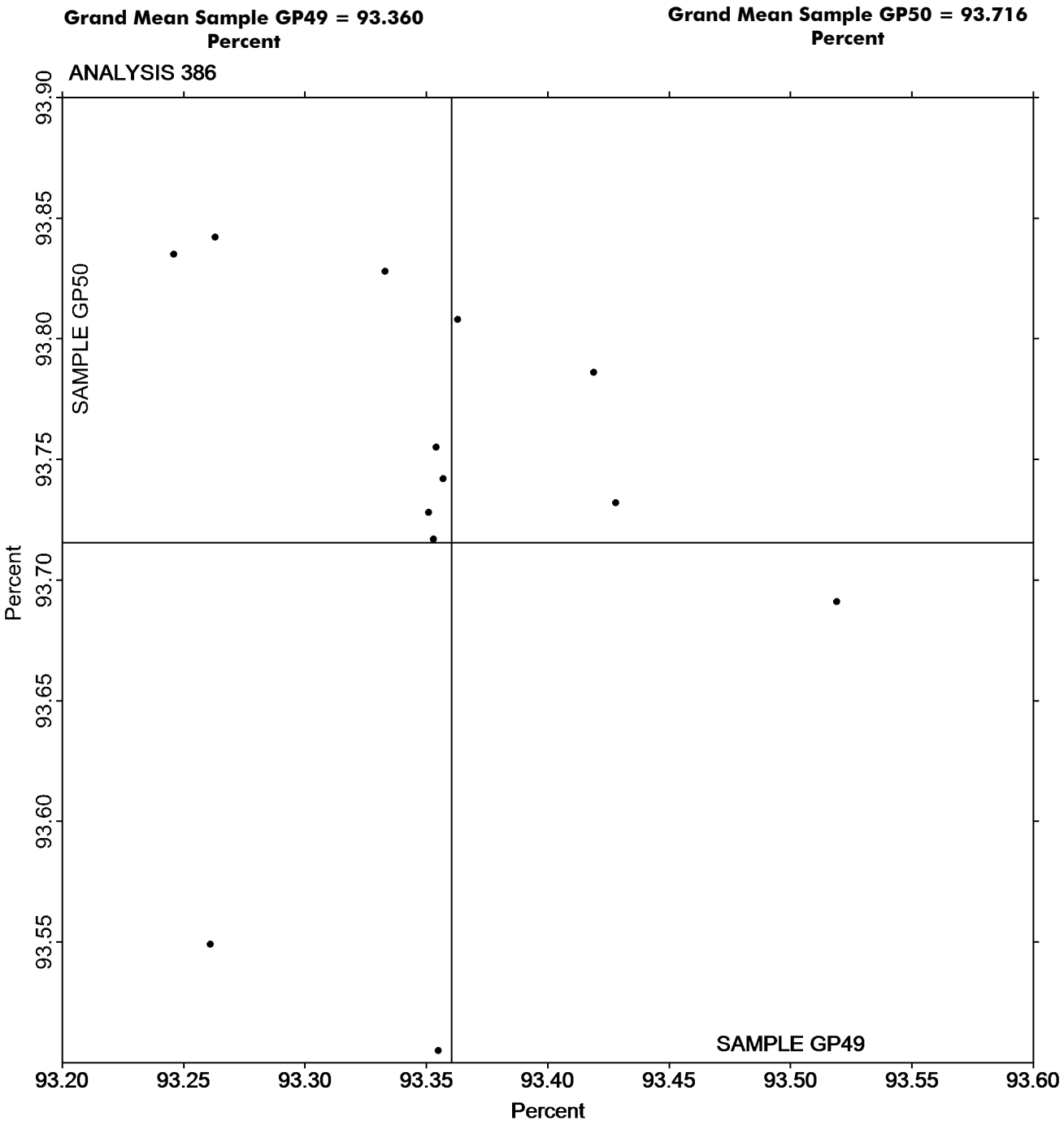

If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

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Paper & Paperboard Interlaboratory Testing Program

Analysis 390
Directional Brightness
TAPPI Official Test Method T452

WebCode	Data Flag	Sample GR49 Lab Mean	Sample GR49 Diff from Grand Mean	Sample GR49 CPV	Sample GR50 Lab Mean	Sample GR50 Diff from Grand Mean	Sample GR50 CPV	Instr Code
22C4HY		76.28	0.31	0.20	76.41	0.68	0.41	TT
282JAQ		76.23	0.26	0.17	76.20	0.47	0.28	XX
2V79YY	X	80.65	4.69	3.07	80.72	4.99	2.99	HG
39R2LC	*	74.50	-1.47	-0.96	75.37	-0.36	-0.22	XC
4KYA2A		74.98	-0.99	-0.65	74.41	-1.32	-0.79	TA
6JJERM		75.85	-0.11	-0.08	75.09	-0.64	-0.39	XX
9TFCCR		75.16	-0.81	-0.53	74.66	-1.07	-0.64	TS
APDX4T		75.24	-0.73	-0.48	74.84	-0.89	-0.54	TT
CPHAQL		75.03	-0.93	-0.61	74.69	-1.04	-0.63	TS
CVQQ9M	*	80.46	4.50	2.95	80.42	4.69	2.81	HG
CXHMWG		75.04	-0.93	-0.61	74.99	-0.74	-0.45	TT
DQCGCB		75.94	-0.03	-0.02	75.98	0.24	0.15	TS
ED4WNC		78.43	2.46	1.61	78.98	3.25	1.95	XX
EX9MPC		75.29	-0.68	-0.44	74.69	-1.04	-0.63	XX
FMPBBE		76.25	0.29	0.19	76.87	1.14	0.68	TS
GKFKLB		75.62	-0.35	-0.23	75.82	0.09	0.06	TS
L4C4ZK	*	80.64	4.67	3.06	80.45	4.72	2.83	PE
LC2RVM		76.78	0.81	0.53	76.45	0.72	0.43	HG
LJATJB		75.26	-0.70	-0.46	74.81	-0.92	-0.55	TS
NTYQWL		74.71	-1.25	-0.82	74.36	-1.37	-0.82	TT
PEWQF3	X	76.74	0.77	0.51	74.76	-0.97	-0.58	TS
Q4F672		75.40	-0.56	-0.37	74.95	-0.78	-0.47	TS
QDJA3N		74.81	-1.15	-0.75	74.35	-1.38	-0.83	TS
QFRKW8		75.50	-0.47	-0.31	75.12	-0.62	-0.37	TS
QPCUKZ		75.56	-0.40	-0.26	75.08	-0.66	-0.39	TS
RQLZJM		74.76	-1.20	-0.79	74.41	-1.32	-0.79	TS
T86ED6		75.21	-0.76	-0.50	74.51	-1.22	-0.73	TS
VEFCXU		76.16	0.20	0.13	75.83	0.09	0.06	TT
WGNQ6Z		75.28	-0.69	-0.45	74.70	-1.03	-0.62	TT
XRFW9H		75.19	-0.78	-0.51	74.64	-1.09	-0.66	TS
YQ4K78	X	65.39	-10.58	-6.94	65.14	-10.59	-6.35	TS
ZA8TDG		77.45	1.49	0.98	77.15	1.41	0.85	HZ

Summary Statistics	Sample GR49	Sample GR50
Grand Means	75.96 Percent	75.73 Percent
Stnd Dev Btwn Labs	1.53 Percent	1.67 Percent

Statistics based on 29 of 32 reporting participants.

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Comments on Assigned Data Flags for Test #390

YQ4K78 (X) - Extreme Data.

PEWQF3 (X) - Inconsistent in testing between samples.

2V79YY (X) - Data for both samples are high. Possible Systematic Error.

Key to Instrument Codes Reported by Participants

HG	Hunter Labscan / XE	HZ	Hunter Lab ColorFlex EZ Series
PE	Photovolt 577	TA	Technidyne, Diano, M.S. S-4
TS	Technidyne Brightimeter Micro S-5	TT	Technidyne Brightimeter Micro S4-M
XC	X-Rite Color i5	XX	Instrument make/model not specified by lab

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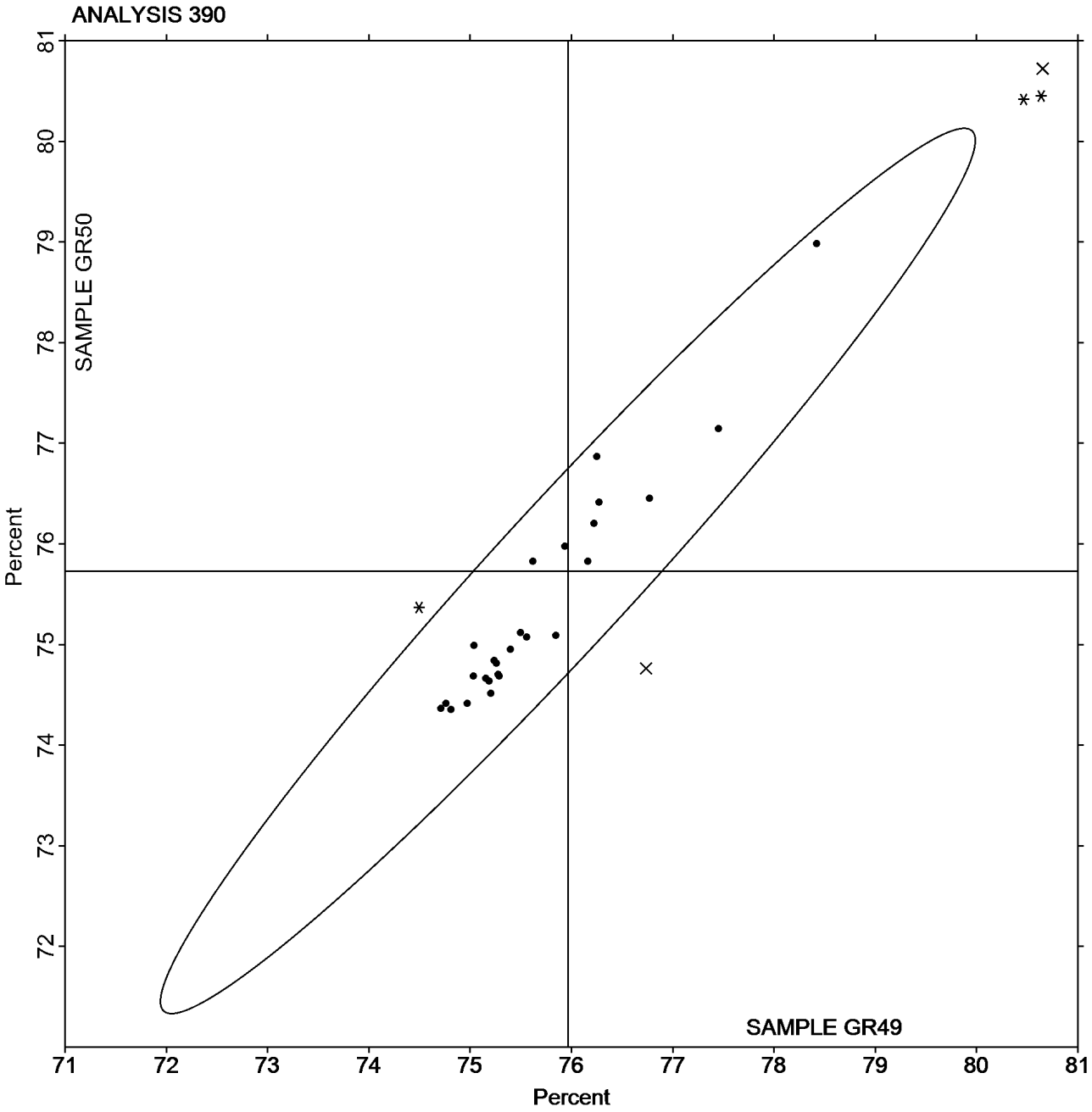
Grand Mean Sample GR49 = 75.964 Percent

Grand Mean Sample GR50 = 75.731 Percent



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Paper & Paperboard Interlaboratory Testing Program

Analysis 391

Directional Brightness of Fluorescent Samples

TAPPI Official Test Method T452

WebCode	Data Flag	Sample GZ49 Lab Mean	Sample GZ49 Diff from Grand Mean	Sample GZ49 CPV	Sample GZ50 Lab Mean	Sample GZ50 Diff from Grand Mean	Sample GZ50 CPV	Instr Code
2UW8UR		97.44	0.36	0.62	98.48	0.69	1.13	TT
74HZ8J		97.16	0.08	0.14	97.86	0.07	0.11	TT
7MEH47		97.25	0.17	0.30	98.04	0.25	0.41	TS
9J83KT		97.54	0.46	0.79	98.26	0.47	0.77	TS
B3FNLQ		98.31	1.23	2.10	98.85	1.06	1.74	TS
ED4WNC	X	81.56	-15.52	-26.49	81.49	-16.30	-26.61	XX
G3WXT8		97.35	0.27	0.46	98.00	0.21	0.34	TS
JJUTLP		96.53	-0.55	-0.94	97.41	-0.38	-0.62	PP
JQWY3D		96.01	-1.07	-1.82	96.42	-1.37	-2.24	HT
P6BHYL		97.10	0.02	0.04	97.76	-0.03	-0.05	TS
Q4HP2G		96.06	-1.02	-1.74	96.88	-0.91	-1.48	HT
QPCUKZ		97.08	0.00	0.00	97.84	0.05	0.08	TS
UFGRVZ	X	99.52	2.44	4.17	99.90	2.11	3.45	EF
VD9YD8		97.16	0.08	0.14	97.96	0.17	0.28	TT
VRNXKT		97.11	0.03	0.06	97.74	-0.05	-0.07	TS
VZGAFM		97.00	-0.08	-0.13	97.56	-0.23	-0.37	TS

Summary Statistics	Sample GZ49	Sample GZ50
Grand Means	97.08 Percent	97.79 Percent
Stnd Dev Btwn Labs	0.59 Percent	0.61 Percent

Statistics based on 14 of 16 reporting participants.

Comments on Assigned Data Flags for Test #391

UFGRVZ (X) - Data for both samples are high. Possible Systematic Error.

ED4WNC (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

EF	L & W Datacolor Elrepho	HT	Hunter UltraScan Vis
PP	Technidyne Profile/Plus	TS	Technidyne Brightimeter Micro S-5
TT	Technidyne Brightimeter Micro S4-M	XX	Instrument make/model not specified by lab

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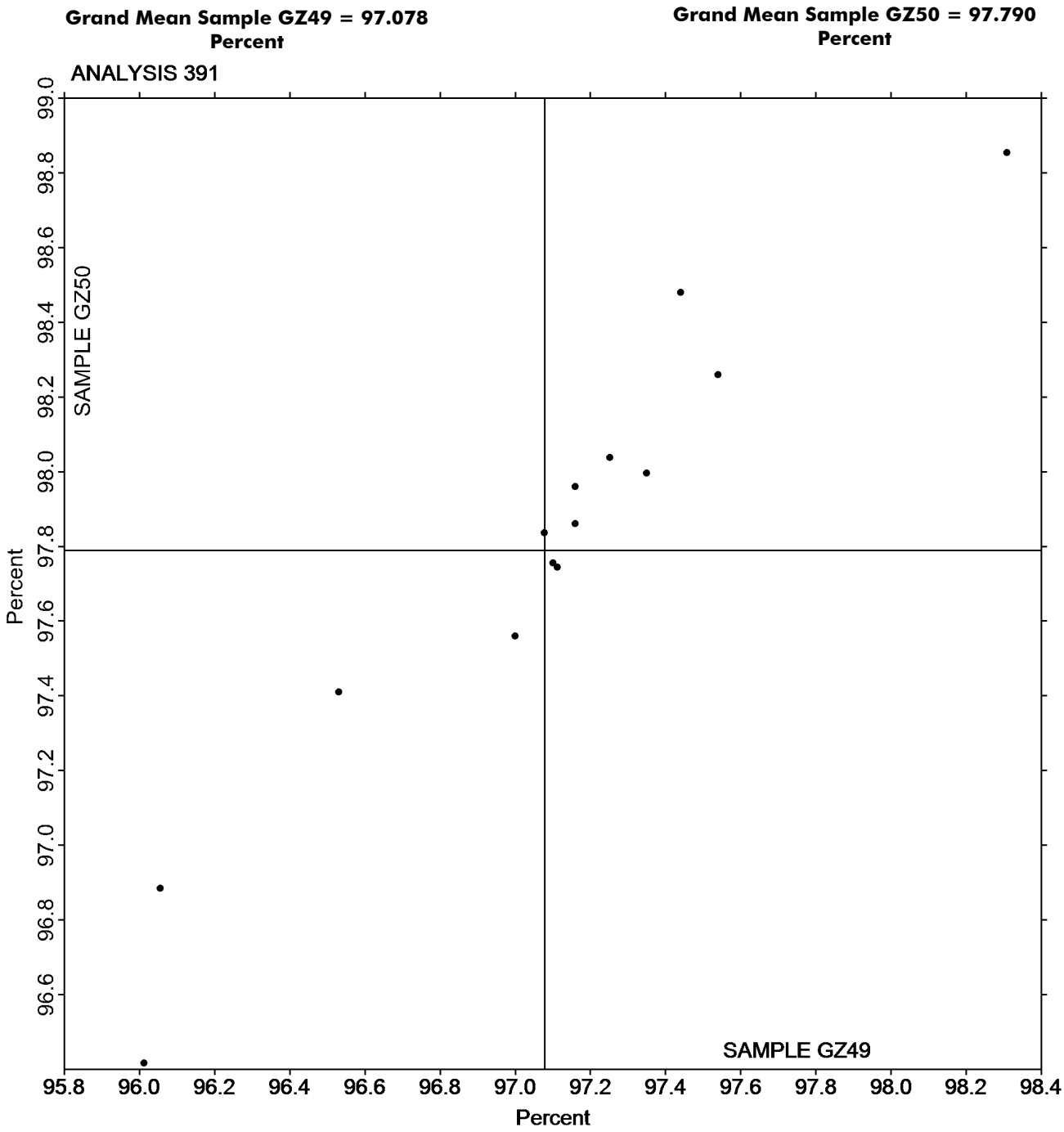

If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

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Paper & Paperboard Interlaboratory Testing Program

Analysis 392
Diffuse Brightness
TAPPI Official Test Method T525

WebCode	Data Flag	Sample GR49 Lab Mean	Sample GR49 Diff from Grand Mean	Sample GR49 CPV	Sample GR50 Lab Mean	Sample GR50 Diff from Grand Mean	Sample GR50 CPV	Instr Code
22C4HY		75.11	-0.04	-0.14	74.80	-0.14	-0.57	TL
2A79AE		75.24	0.09	0.32	75.12	0.17	0.69	TC
6KETL7		75.31	0.16	0.58	74.93	-0.01	-0.04	TC
9HXZW9		75.45	0.30	1.10	75.20	0.25	1.01	TC
9TFCCR		75.02	-0.13	-0.47	74.78	-0.16	-0.64	TC
APDX4T		75.32	0.16	0.60	75.15	0.20	0.81	EG
AW83V9		75.01	-0.14	-0.51	74.93	-0.01	-0.04	TC
BVWLEN		75.38	0.23	0.84	75.01	0.06	0.25	TM
EX9MPC		75.44	0.28	1.04	75.23	0.29	1.14	EE
G2FYHV		74.93	-0.22	-0.83	74.85	-0.09	-0.37	TC
G3WXT8		75.64	0.48	1.78	75.44	0.50	1.99	TC
GKFKLB		75.25	0.10	0.35	74.95	0.00	0.01	TC
H39ATN		75.07	-0.08	-0.29	75.02	0.08	0.30	LA
JURTXT		75.51	0.36	1.31	75.17	0.23	0.90	TC
KHV6HK		75.13	-0.02	-0.07	74.97	0.03	0.12	LS
LJATJB	X	75.74	0.59	2.18	75.85	0.91	3.63	TC
MP86RD	X	74.89	-0.26	-0.96	74.15	-0.79	-3.14	TC
N4873U		74.91	-0.24	-0.88	74.79	-0.15	-0.62	EF
NNQ9XT		75.34	0.19	0.70	75.10	0.16	0.64	TC
NTYQWL		75.35	0.20	0.73	75.21	0.27	1.06	LT
QDJA3N		75.52	0.37	1.36	75.28	0.33	1.33	TC
RQLZJM		75.22	0.07	0.26	75.00	0.05	0.21	TC
TRURQU		75.05	-0.10	-0.38	74.79	-0.15	-0.59	TC
UFGRVZ		74.51	-0.64	-2.35	74.43	-0.52	-2.06	LA
UYATKC		74.77	-0.38	-1.40	74.49	-0.45	-1.78	EG
V4YPNT		75.02	-0.13	-0.47	74.95	0.01	0.05	TC
VEFCXU		74.73	-0.43	-1.57	74.54	-0.40	-1.61	EG
WZD6G4		75.08	-0.07	-0.26	74.76	-0.19	-0.74	TC
ZD9QA4		74.78	-0.37	-1.37	74.58	-0.37	-1.46	LS

Summary Statistics	Sample GR49	Sample GR50
Grand Means	75.15 Percent	74.94 Percent
Stnd Dev Btwn Labs	0.27 Percent	0.25 Percent

Statistics based on 27 of 29 reporting participants.

Comments on Assigned Data Flags for Test #392

MP86RD (X) - Data for sample GR50 are low. Inconsistent within the determinations of sample GR50.

LJATJB (X) - Data for sample GR50 are high. Inconsistent within the determinations of sample GR49.

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Key to Instrument Codes Reported by Participants

EE	Datacolor Elrepho 2000	EF	Datacolor Elrepho 3000
EG	Datacolor Elrepho 450X	LA	L & W Elrepho - Autoline
LS	L & W Elrepho SE 070	LT	L & W Elrepho SE 071
TC	Technidyne Color Touch Series	TL	Technidyne Technibrite TB-1
TM	Technidyne Technibrite Micro TB-1C		

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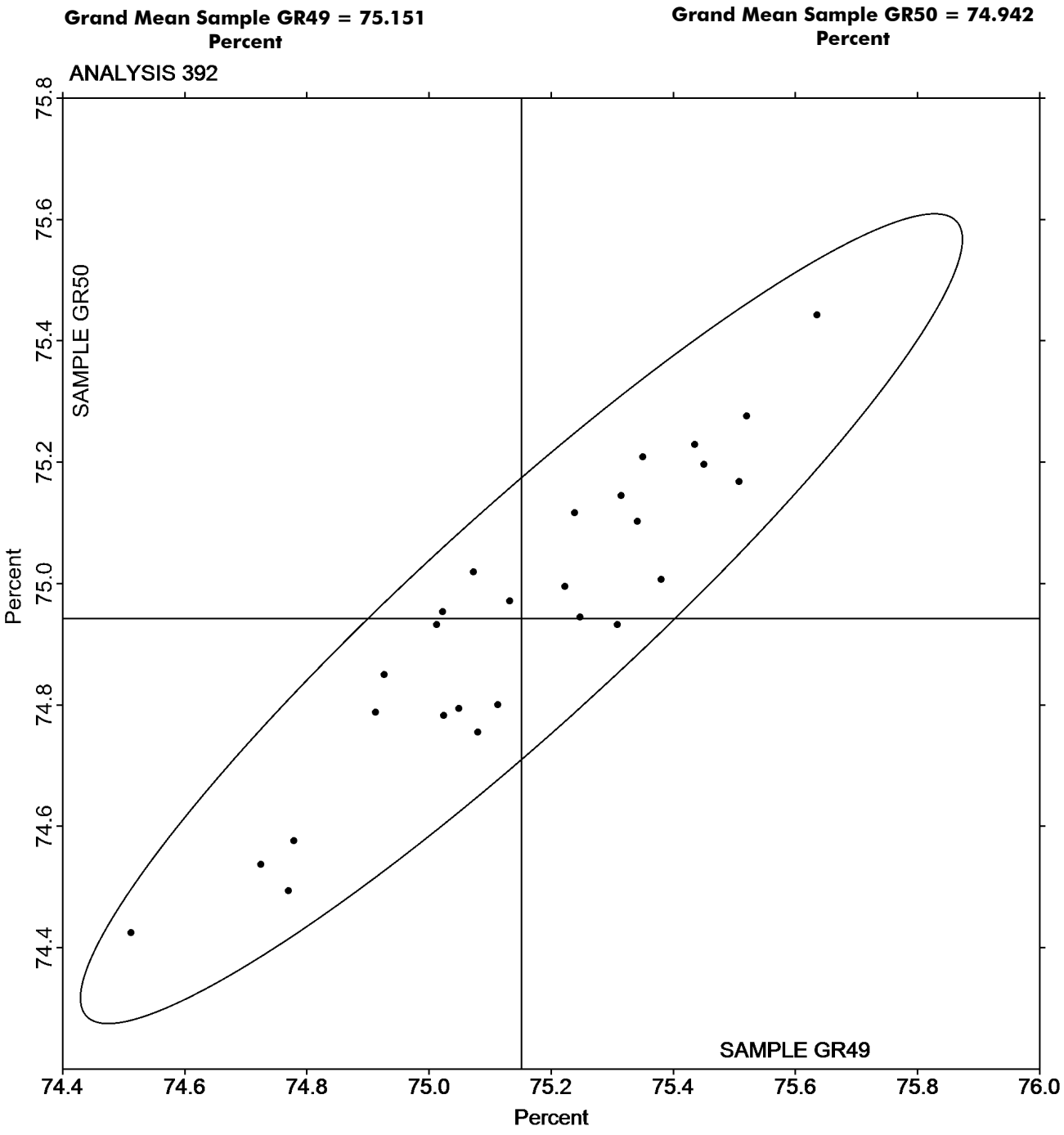

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Paper & Paperboard Interlaboratory Testing Program

Analysis 394

Fluorescent Component of Directional Brightness

TAPPI Official Test Method T452

WebCode	Data Flag	Sample GZ49 Lab Mean	Sample GZ49 Diff from Grand Mean	Sample GZ49 CPV	Sample GZ50 Lab Mean	Sample GZ50 Diff from Grand Mean	Sample GZ50 CPV	Instr Code
7MEH47		8.790	0.768	1.80	9.300	0.714	1.67	TS
9J83KT		8.320	0.298	0.70	8.880	0.294	0.69	TS
B3FNLQ		7.934	-0.088	-0.21	8.572	-0.014	-0.03	TS
ED4WNC	X	0.204	-7.818	-18.34	0.172	-8.414	-19.71	XX
G3WXT8		7.404	-0.618	-1.45	8.094	-0.492	-1.15	TS
JJUTLP		7.914	-0.108	-0.25	8.582	-0.004	-0.01	PP
P6BHYL		8.332	0.310	0.73	8.914	0.328	0.77	TS
QPCUKZ		7.692	-0.330	-0.77	8.016	-0.570	-1.33	TS
UFGRVZ	X	11.160	3.138	7.36	12.000	3.414	8.00	EF
VD9YD8		7.640	-0.382	-0.90	8.180	-0.406	-0.95	TT
VRNXKT		8.176	0.154	0.36	8.734	0.148	0.35	TS

Summary Statistics	Sample GZ49	Sample GZ50
Grand Means	8.02 Percent	8.59 Percent
Stnd Dev Btwn Labs	0.43 Percent	0.43 Percent

Statistics based on 9 of 11 reporting participants.

Comments on Assigned Data Flags for Test #394

UFGRVZ (X) - Extreme Data.

ED4WNC (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

EF	Datacolor Elrepho 3000	PP	Technidyne Profile/Plus
TS	Technidyne Brightimeter Micro S-5	TT	Technidyne Brightimeter Micro S4-M
XX	Instrument make/model not specified by lab		

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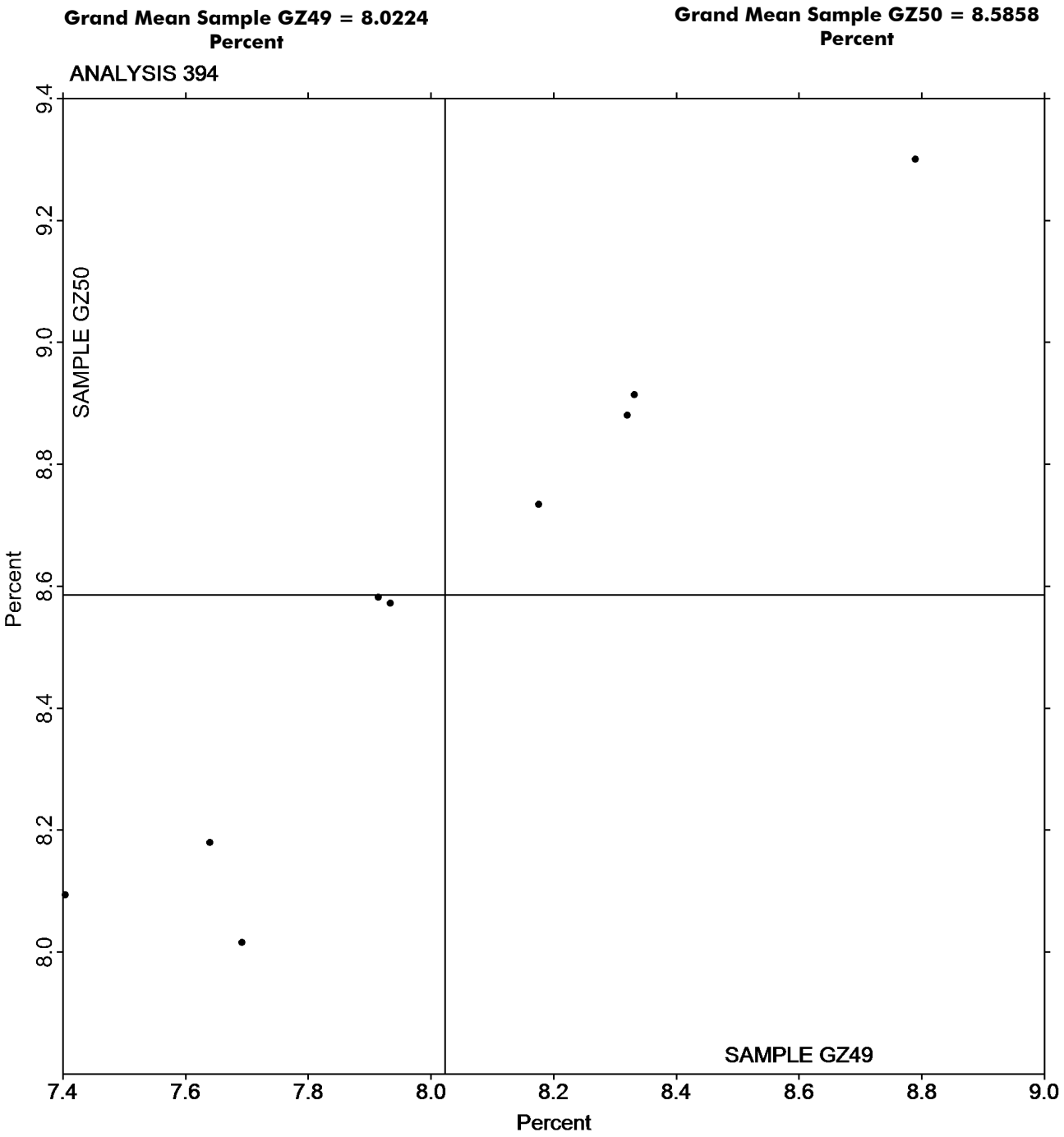

If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

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Analysis 395

Specular Gloss at 75 Degrees - High Range

TAPPI Official Test Method T480

WebCode	Data Flag	Sample GT49 Lab Mean	Sample GT49 Diff from Grand Mean	Sample GT49 CPV	Sample GT50 Lab Mean	Sample GT50 Diff from Grand Mean	Sample GT50 CPV	Instr Code
22C4HY	X	81.03	-2.96	-2.22	100.09	16.25	12.69	GS
2V79YY		85.81	1.82	1.36	85.46	1.62	1.27	TH
74HZ8J		84.66	0.67	0.50	84.38	0.54	0.42	TG
APDX4T		84.67	0.68	0.51	84.48	0.64	0.50	TH
CVQQ9M		86.71	2.72	2.04	86.35	2.51	1.96	TH
CXHMWG		84.50	0.51	0.38	84.19	0.35	0.27	TH
DQCGCB		82.22	-1.77	-1.33	82.48	-1.36	-1.06	LA
G3WXT8		83.26	-0.73	-0.55	83.64	-0.20	-0.15	LA
JJUTLP		84.31	0.32	0.24	84.38	0.54	0.42	PP
KHV6HK		83.56	-0.43	-0.32	83.47	-0.37	-0.29	LB
QDJA3N		85.01	1.02	0.77	84.98	1.14	0.89	TG
RQLZJM		84.19	0.20	0.15	83.86	0.02	0.02	TH
TRURQU		81.13	-2.86	-2.14	80.85	-2.99	-2.33	ZH
U9EHN9		83.31	-0.68	-0.51	83.25	-0.59	-0.46	LA
VEFCXU		83.60	-0.39	-0.29	83.55	-0.29	-0.22	GM
VRNXKT		82.98	-1.01	-0.76	82.49	-1.35	-1.05	LA
WCURQ6		83.91	-0.08	-0.06	83.60	-0.24	-0.19	XX
Z6CTKF	X	96.10	12.11	9.07	83.53	-0.31	-0.24	VM

Summary Statistics	Sample GT49	Sample GT50
Grand Means	83.99 Gloss Units	83.84 Gloss Units
Stnd Dev Btwn Labs	1.34 Gloss Units	1.28 Gloss Units

Statistics based on 16 of 18 reporting participants.

Comments on Assigned Data Flags for Test #395

Z6CTKF (X) - Extreme Data for Sample GT49.

22C4HY (X) - Extreme Data for Sample GT50.

Key to Instrument Codes Reported by Participants

GM	BYK-Gardner micro-gloss	GS	BYK-Gardner Glossgard II
LA	L & W Gloss - Autoline 300	LB	L & W Gloss Tester Code 224
PP	Technidyne Profile/Plus	TG	Technidyne T480
TH	Technidyne T480A	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab	ZH	Zehntner ZLR 1050

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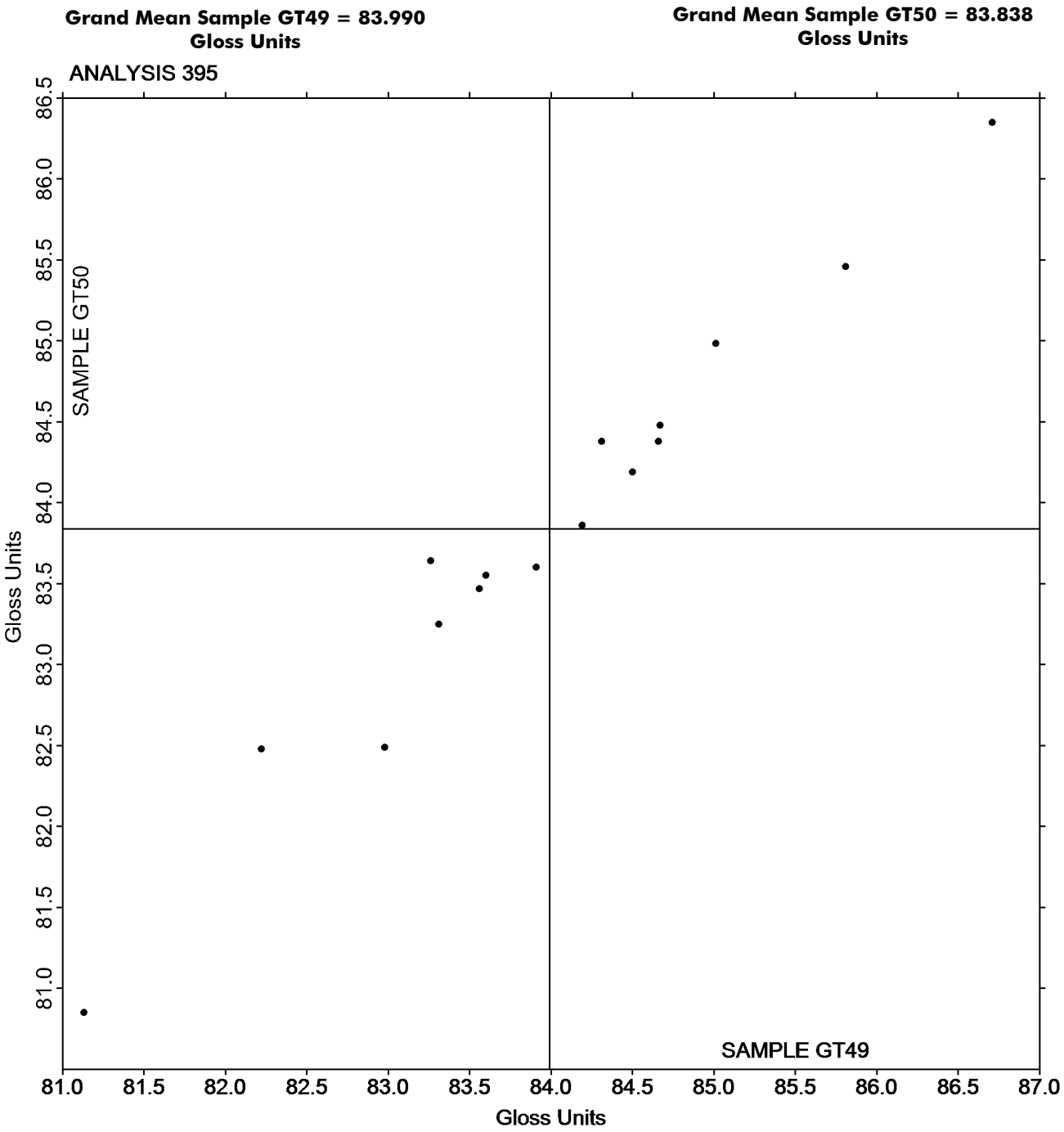

If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

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Analysis 396

Specular Gloss at 75 Degrees - Low Range

TAPPI Official Test Method T480

WebCode	Data Flag	Sample GU49 Lab Mean	Sample GU49 Diff from Grand Mean	Sample GU49 CPV	Sample GU50 Lab Mean	Sample GU50 Diff from Grand Mean	Sample GU50 CPV	Instr Code
39R2LC		42.54	0.40	0.24	34.00	0.16	0.14	TH
4KYA2A		42.60	0.46	0.27	33.50	-0.35	-0.30	TH
FF6CGZ		42.31	0.17	0.10	32.80	-1.04	-0.90	PP
G3WXT8		39.21	-2.93	-1.72	33.28	-0.56	-0.49	LA
JURTXT	X	46.90	4.76	2.79	33.26	-0.58	-0.51	TH
KHV6HK		41.32	-0.82	-0.48	34.11	0.27	0.23	LA
LJATJB		44.57	2.43	1.43	36.73	2.89	2.50	TH
QDJA3N	X	47.20	5.07	2.97	40.00	6.15	5.34	TG
UFGRVZ		43.92	1.78	1.05	33.58	-0.26	-0.23	TG
XLA4G8		42.68	0.54	0.32	33.38	-0.46	-0.40	XX
ZA8TDG		40.08	-2.06	-1.21	33.21	-0.63	-0.55	GS

Summary Statistics	Sample GU49	Sample GU50
Grand Means	42.14 Gloss Units	33.84 Gloss Units
Stnd Dev Btwn Labs	1.71 Gloss Units	1.15 Gloss Units

Statistics based on 9 of 11 reporting participants.

Comments on Assigned Data Flags for Test #396

JURTXT (X) - Data for sample GU49 are high.

QDJA3N (X) - Data for both samples are high.

Key to Instrument Codes Reported by Participants

GS	BYK-Gardner Glossgard II	LA	L & W Gloss - Autoline 300
PP	Technidyne Profile/Plus	TG	Technidyne T480
TH	Technidyne T480A	XX	Instrument make/model not specified by lab

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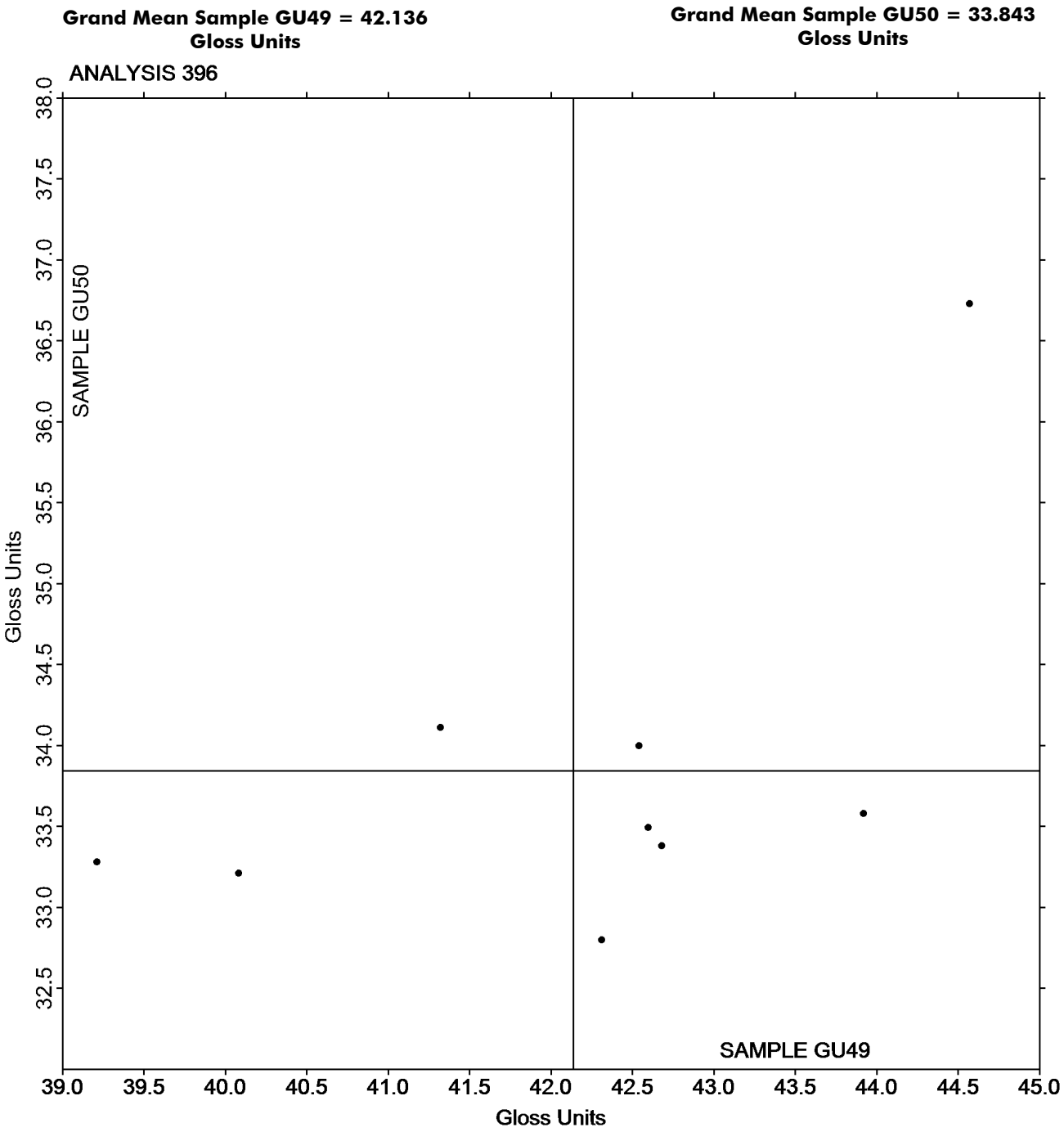

If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.

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Paper & Paperboard Interlaboratory Testing Program

Analysis 398

Grammage (Mass per Unit Area)

TAPPI Official Test Method T410

WebCode	Data Flag	Sample GW49 Lab Mean	Sample GW49 Diff from Grand Mean	Sample GW49 CPV	Sample GW50 Lab Mean	Sample GW50 Diff from Grand Mean	Sample GW50 CPV	Instr Code
39R2LC		72.83	-0.63	-1.46	88.40	-0.72	-1.61	ZZ
3VHB2P		73.61	0.15	0.36	89.02	-0.10	-0.23	ZZ
4KYA2A		73.06	-0.40	-0.92	88.85	-0.27	-0.61	ZZ
6JJERM		72.86	-0.60	-1.39	88.51	-0.61	-1.37	ZZ
7CJAK3		74.05	0.59	1.38	89.15	0.03	0.06	ZZ
94E8BM		73.56	0.11	0.25	89.46	0.34	0.75	ZZ
9BWJNN		74.30	0.85	1.97	90.01	0.88	1.97	ZZ
9J83KT		73.56	0.10	0.24	89.45	0.33	0.73	ZZ
EX9MPC		73.33	-0.13	-0.29	89.27	0.15	0.33	ZZ
FEBN3B	X	70.96	-2.49	-5.80	89.32	0.20	0.44	ZZ
J9E3KY	X	75.50	2.04	4.76	89.74	0.61	1.37	ZZ
JQWY3D		74.50	1.04	2.43	89.77	0.65	1.44	ZZ
JURTXT		73.23	-0.23	-0.52	88.50	-0.62	-1.38	ZZ
KHV6HK		73.27	-0.18	-0.43	88.99	-0.13	-0.30	ZZ
LC2RVM		73.43	-0.03	-0.06	89.05	-0.07	-0.17	ZZ
NGBLQA		73.82	0.36	0.85	89.66	0.54	1.20	ZZ
NMWKJ4		73.49	0.04	0.09	88.76	-0.36	-0.81	ZZ
PMET4R		73.62	0.16	0.38	89.31	0.19	0.41	ZZ
PR4C32	X	73.96	0.50	1.17	88.14	-0.98	-2.20	ZZ
Q4F672		73.04	-0.42	-0.97	88.83	-0.29	-0.66	ZZ
Q4HP2G		73.28	-0.18	-0.42	89.44	0.32	0.71	ZZ
UFGRVZ	X	72.40	-1.06	-2.46	86.90	-2.22	-4.96	ZZ
VZGAFM		72.97	-0.49	-1.13	88.58	-0.54	-1.21	ZZ
XLA4G8		73.22	-0.24	-0.55	88.78	-0.34	-0.76	ZZ
XX4HHP		73.49	0.03	0.07	89.68	0.56	1.25	ZZ
ZD9QA4		73.50	0.04	0.10	89.25	0.13	0.28	ZZ

Summary Statistics	Sample GW49	Sample GW50
Grand Means	73.46 g/sq m	89.12 g/sq m
Stnd Dev Btwn Labs	0.43 g/sq m	0.45 g/sq m

Statistics based on 22 of 26 reporting participants.

Comments on Assigned Data Flags for Test #398

J9E3KY (X) - Data for sample GW49 are high. Inconsistent within the determinations of sample GW49.

FEBN3B (X) - Data for sample GW49 are low. Inconsistent within the determinations of sample GW49.

UFGRVZ (X) - Data for sample GW50 are low. Inconsistent within the determinations of sample GW50.

PR4C32 (X) - Inconsistent in testing between samples.

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Key to Instrument Codes Reported by Participants

ZZ Instruments No Longer Tracked

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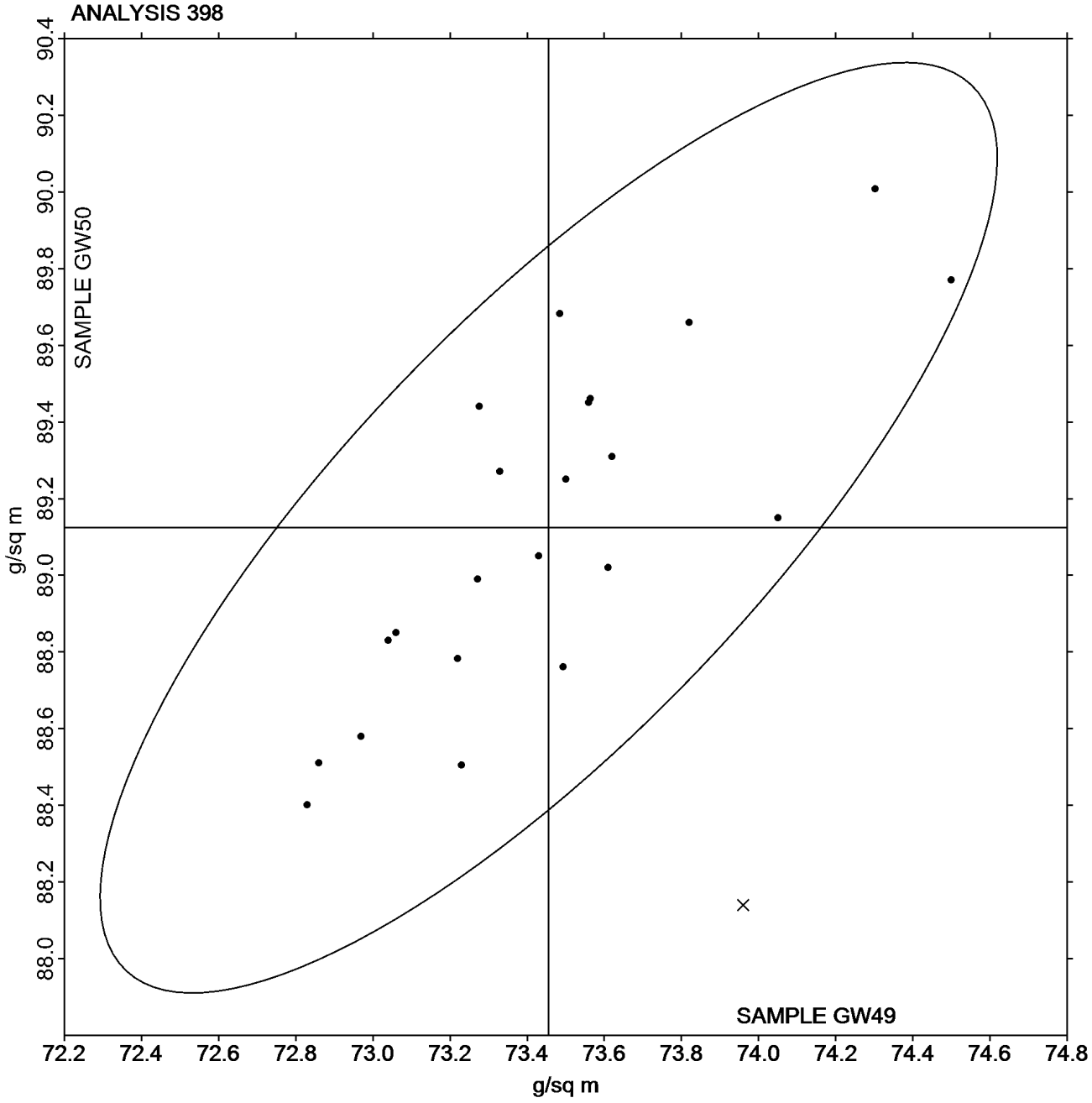
Grand Mean Sample GW49 = 73.456 g/sq m

Grand Mean Sample GW50 = 89.124 g/sq m



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Paper & Paperboard Interlaboratory Testing Program

Analysis 399

Sizing Test (Hercules Type)

TAPPI Official Test Method T530

WebCode	Data Flag	Sample GX49 Lab Mean	Sample GX49 Diff from Grand Mean	Sample GX49 CPV	Sample GX50 Lab Mean	Sample GX50 Diff from Grand Mean	Sample GX50 CPV	Instr Code
282JAQ		12.02	-0.69	-0.17	12.40	-1.25	-0.38	XX
2UW8UR		14.20	1.49	0.38	14.90	1.25	0.38	HE
6JJERM		15.10	2.39	0.61	16.30	2.65	0.80	XX
6NCCN6		9.43	-3.28	-0.83	11.20	-2.45	-0.74	HE
6PQVAM		17.70	4.99	1.27	15.30	1.65	0.50	HE
7MEH47		12.58	-0.13	-0.03	11.88	-1.77	-0.54	HE
9TFCCR		19.26	6.55	1.67	14.95	1.30	0.39	XX
B3FNLQ	M	24.67	11.96	3.05	No data reported for this sample			HE
CXHMWG		7.68	-5.03	-1.28	13.96	0.31	0.09	HE
DQCGCB		11.97	-0.74	-0.19	10.07	-3.58	-1.08	HE
FF6CGZ		11.54	-1.17	-0.30	13.44	-0.21	-0.06	HE
JURTXT	*	16.37	3.66	0.93	22.73	9.08	2.74	HE
KT9DXW		6.88	-5.83	-1.48	8.73	-4.92	-1.49	XX
L4C4ZK		11.80	-0.91	-0.23	11.20	-2.45	-0.74	HE
NTYQWL		21.85	9.14	2.33	19.53	5.88	1.78	HE
P6BHYL		11.12	-1.59	-0.40	13.24	-0.41	-0.13	HE
PZGJKQ		7.22	-5.49	-1.40	9.91	-3.74	-1.13	HE
Q4F672		21.50	8.79	2.24	18.00	4.35	1.31	HE
QFRKW8		11.83	-0.88	-0.22	11.07	-2.58	-0.78	HE
QPCUKZ	X	19.35	6.64	1.69	26.85	13.20	3.99	HE
T86ED6		11.03	-1.68	-0.43	12.50	-1.15	-0.35	HE
TE4Z3J	*	7.99	-4.72	-1.20	17.46	3.81	1.15	HE
UNPB86		12.10	-0.61	-0.15	12.20	-1.45	-0.44	XX
VRNXKT		12.52	-0.19	-0.05	10.88	-2.77	-0.84	HE
VZGAFM		9.20	-3.51	-0.89	9.70	-3.95	-1.20	HE
WBFPGB		14.16	1.45	0.37	11.58	-2.07	-0.63	HE
WGNQ6Z		10.93	-1.78	-0.45	17.30	3.65	1.10	HE
XRFW9H	X	10.80	-1.91	-0.49	27.31	13.66	4.13	HE
Y3XX74	X	35.65	22.94	5.84	31.97	18.32	5.54	HE
YQ4K78		13.35	0.65	0.16	15.00	1.35	0.41	HE
Z6CTKF		11.75	-0.96	-0.24	13.23	-0.42	-0.13	HE

Summary Statistics	Sample GX49	Sample GX50
Grand Means	12.71 Seconds	13.65 Seconds
Stnd Dev Btwn Labs	3.93 Seconds	3.31 Seconds

Statistics based on 27 of 31 reporting participants.

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Comments on Assigned Data Flags for Test #399

XRFW9H (X) - Data for sample GX50 are high. Inconsistent within the determinations of sample GX50.

B3FNLQ (M) - Participant did not submit data for sample GX50. Data for sample GX49 are high.

Y3XX74 (X) - Data for both samples are high. Inconsistent within the determinations of both samples.

QPCUKZ (X) - Data for sample GX50 are high. Inconsistent within the determinations of both samples.

Key to Instrument Codes Reported by Participants

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

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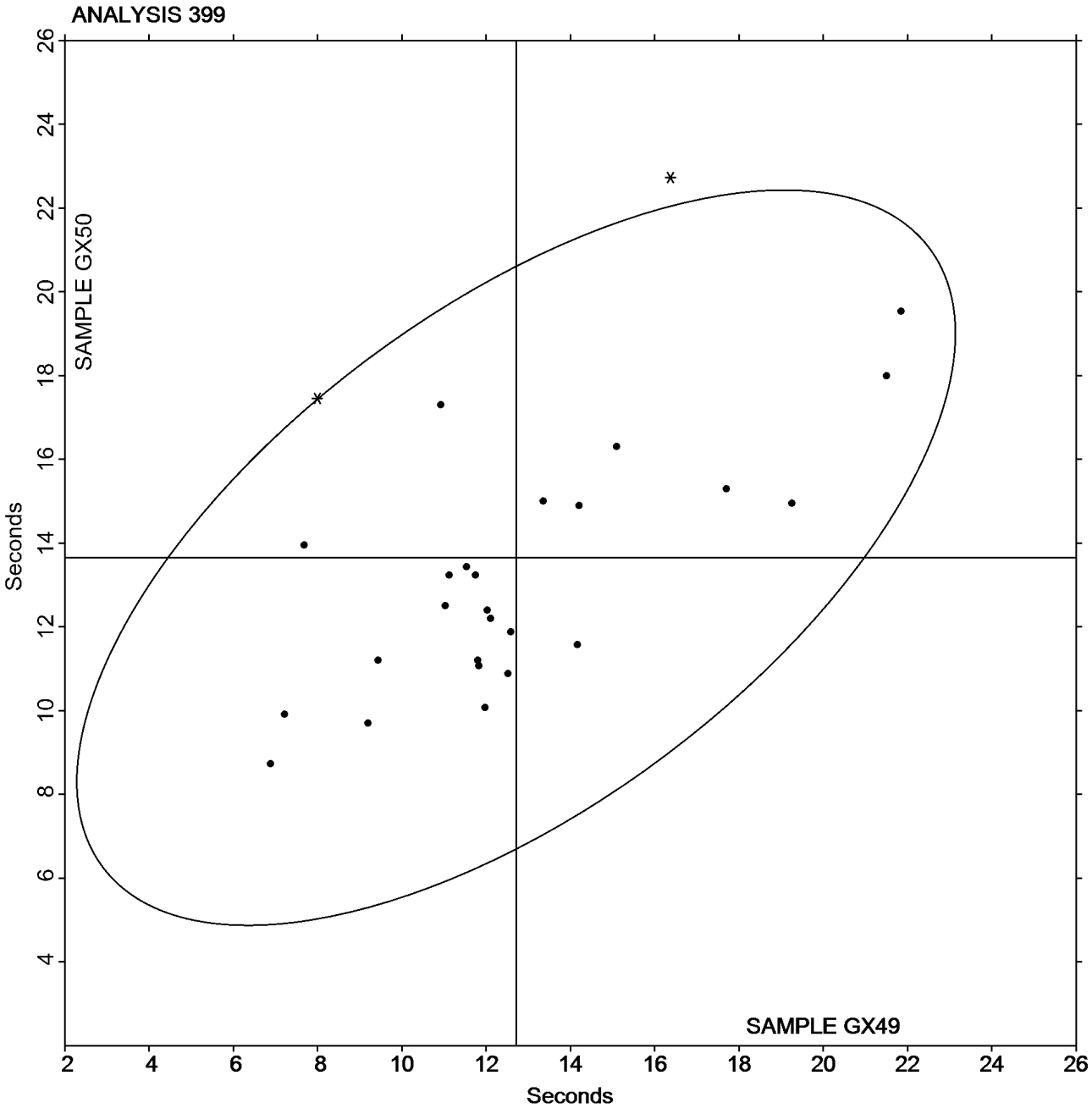
Grand Mean Sample GX49 = 12.707 Seconds

Grand Mean Sample GX50 = 13.654 Seconds



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