



Paper & Paperboard Testing Program

Summary Report #2892 G-August 2017

[Introduction to the Paper & Paperboard Program](#)

[Explanation of Tables and Definitions of Terms](#)

Analysis	Analysis Name
<u>350</u>	<u>Color & Color Difference (Near White Papers),</u>
<u>351</u>	<u>Color & Color Difference (Near White Papers),</u>
<u>360</u>	<u>Thickness (Caliper), Printing papers,</u>
<u>361</u>	<u>Thickness (Caliper), Packaging papers,</u>
<u>364</u>	<u>Coefficient of Static Friction-Horizontal Plane,</u>
<u>365</u>	<u>Coefficient of Kinetic Friction-Horizontal Plane,</u>
<u>370</u>	<u>Air Resistance, Gurley Oil Type,</u>
<u>372</u>	<u>Porosity, Sheffield Type,</u>
<u>376</u>	<u>Roughness - Print Surf Method 0.5 to 4.0 Microns,</u>
<u>377</u>	<u>Roughness - Print Surf Method 2.5 to 6.0 Microns,</u>
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<u>382</u>	<u>Moisture Content,</u>
<u>384</u>	<u>Opacity (89% Backing) 82 to 95%,</u>
<u>386</u>	<u>Opacity (Paper Backing) 82 to 95%,</u>
<u>390</u>	<u>Brightness (Directional),</u>
<u>391</u>	<u>Directional Brightness of Fluorescent Samples,</u>
<u>392</u>	<u>Brightness (Diffuse),</u>
<u>394</u>	<u>Fluorescent Component of Directional Brightness,</u>
<u>395</u>	<u>Specular Gloss 75 Degree, 50-95 Units,</u>
<u>396</u>	<u>Specular Gloss 75 Degreee, 10-50 Units,</u>
<u>398</u>	<u>Grammage (Basis Weight),</u>
<u>399</u>	<u>Sizing Test, Hercules Type,</u>

The CTS Paper, Paperboard & Corrugated Fiberboard 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, wine, and color, 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.

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

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Key for Web Summary Reports (Page 1 of 2)

WebCode	Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Paper Report published on the CTS 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:

<u>DATA FLAG</u>	<u>STATISTICALLY INCLUDED/EXCLUDED</u>	<u>ACTION REQUIRED</u>
*	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**

**Report #2892 G,
August 2017**

**Color & Color Difference - Near White Papers - C/2deg obs
Hunter L,a,b - Illuminant C - 2 Degree Observer**

Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	ΔL	Δa	Δb	ΔE	
2Q8ERP		GA45	93.40	-0.51	3.45	0.30	-0.06	0.06	0.31	TS
		GA46	93.70	-0.58	3.51					
32LVZL		GA45	94.30	-0.69	3.52	0.34	0.00	0.05	0.34	MK
		GA46	94.63	-0.69	3.57					
4AX8QR		GA45	94.05	-0.76	3.92	0.45	0.03	0.24	0.51	VM
		GA46	94.51	-0.73	4.16					
8DJKHH		GA45	93.47	-0.97	2.90	0.35	0.00	0.05	0.35	HH
		GA46	93.82	-0.97	2.96					
8TUBEV		GA45	94.98	-0.64	3.66	0.26	0.03	0.08	0.27	LS
		GA46	95.24	-0.61	3.74					
994A6E		GA45	93.06	0.17	2.86	0.30	-0.02	0.03	0.30	TS
		GA46	93.36	0.14	2.89					
DZCM2B		GA45	93.68	-0.69	3.81	0.62	-0.04	0.06	0.63 X	NE
		GA46	94.30	-0.73	3.87					
FM4EGX		GA45	93.76	-0.69	3.75	0.45	0.03	0.04	0.45	TC
		GA46	94.20	-0.66	3.79					
FVT8L4		GA45	95.17	-0.75	3.60	0.31	0.00	0.06	0.31	TC
		GA46	95.47	-0.75	3.67					
J4G622		GA45	92.50	-0.32	2.88	-0.20	-0.12	-0.16	0.28	TS
		GA46	92.30	-0.44	2.72					
KB9YC6		GA45	92.95	-0.29	3.36	0.41	-0.05	0.05	0.41	HH
		GA46	93.36	-0.34	3.42					
LGGMP7		GA45	94.60	-0.68	3.49	0.31	0.05	0.03	0.32	HE
		GA46	94.91	-0.63	3.53					
LUXKNF		GA45	95.10	-0.74	3.72	0.29	0.04	0.08	0.30	EH
		GA46	95.38	-0.70	3.80					
MXHRR9		GA45	94.02	-0.29	3.32	0.38	-0.11	0.11	0.41	TS
		GA46	94.40	-0.39	3.42					
N2VVXG		GA45	93.83	-0.80	3.54	0.38	-0.02	0.13	0.41	XX
		GA46	94.21	-0.82	3.67					
NFVQCW		GA45	96.64	-0.70	2.79	0.36	-0.02	0.00	0.36	XS
		GA46	96.99	-0.72	2.79					



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**Color & Color Difference - Near White Papers - C/2deg obs
Hunter L,a,b - Illuminant C - 2 Degree Observer**

Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	ΔL	Δa	Δb	ΔE	
NT22JJ		GA45	93.81	-0.83	3.68	0.39	-0.01	0.09	0.40	LA
		GA46	94.20	-0.84	3.77					
PCRAKK		GA45	92.85	-0.15	3.38	0.39	-0.11	0.07	0.41	TS
		GA46	93.25	-0.25	3.45					
PMMP2A		GA45	93.72	-0.80	3.60	0.43	-0.02	0.15	0.45	TC
		GA46	94.15	-0.82	3.75					
TAU6CW		GA45	94.99	-0.85	3.65	0.28	0.01	0.03	0.29	LS
		GA46	95.27	-0.84	3.69					
V7ZDYG		GA45	93.84	-0.71	3.58	0.37	-0.02	0.08	0.38	TC
		GA46	94.22	-0.73	3.66					
VKZZJQ		GA45	95.04	-0.74	3.70	0.32	-0.01	0.10	0.33	EH
		GA46	95.36	-0.75	3.80					
Z3QNMA		GA45	95.12	-0.98	3.52	-0.10	0.04	-0.35	0.37	HE
		GA46	95.02	-0.94	3.17					

Grand Means		Summary Statistics							
	GA45	94.155	-0.627	3.463	0.321	-0.017	0.046	0.374	
	GA46	94.520	-0.644	3.528					
Stnd Dev Btwn Labs					0.168	0.047	0.111	0.084	
	GA45	0.915	0.276	0.326					
	GA46	0.889	0.249	0.374					

Statistics based on 23 of 23 reporting participants

Key to Instrument Codes Reported by Participants

EH	Datacolor Elrepho SF450	HE	Hunter LabScan
HH	Hunter D25DP - 9000	LA	L & W Elrepho AL300
LS	L & W Elrepho SE 070	MK	Macbeth Color-Eye 7000 Spectrophotometer
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



Paper & Paperboard Interlaboratory Testing Program Analysis 350

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Color & Color Difference - Near White Papers - C/2deg obs
Hunter L,a,b - Illuminant C - 2 Degree Observer

Web Code

F Samples

Hunter L, a, b Color Values

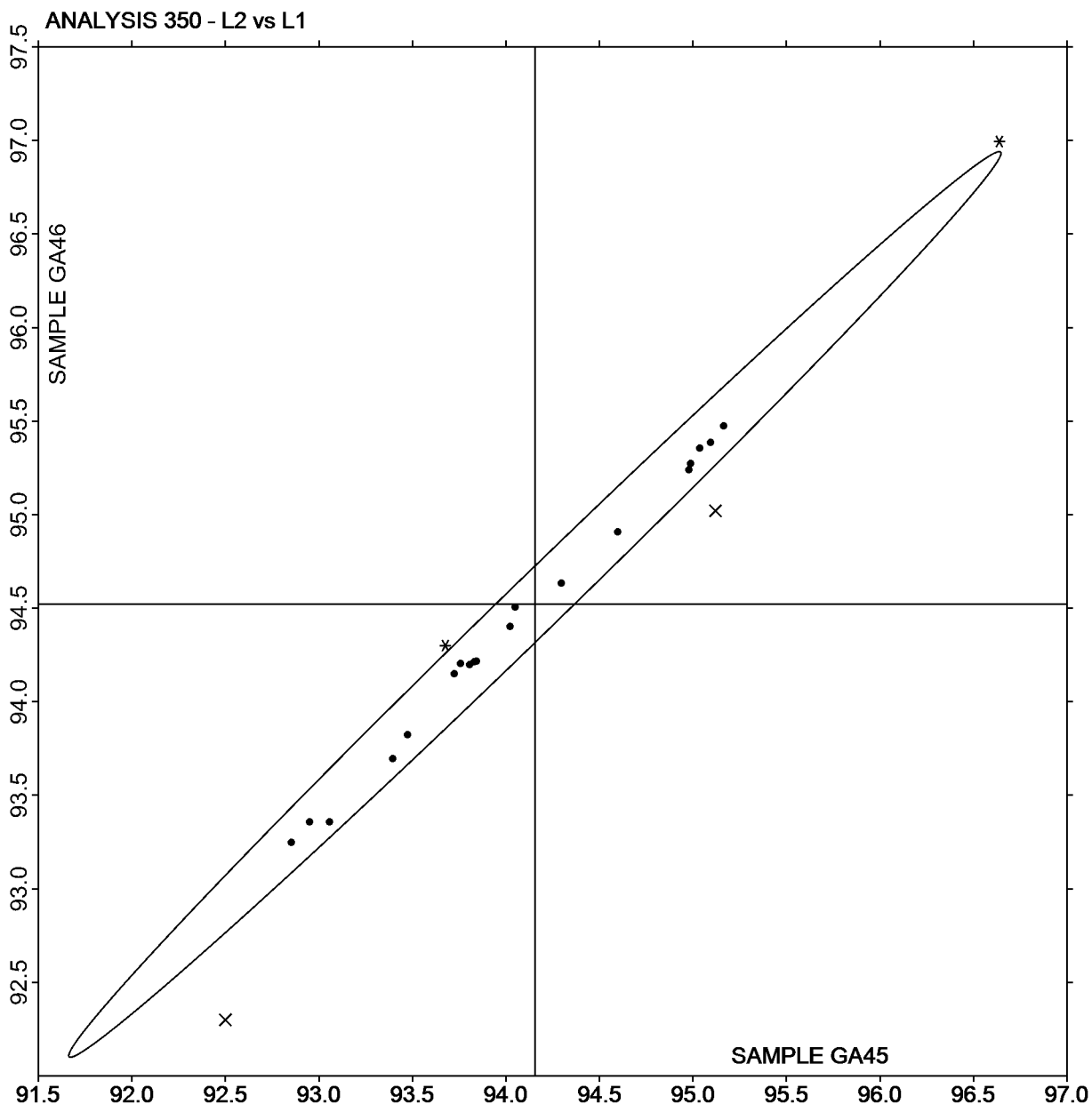
L a b

Color Difference Values

ΔL Δa Δb ΔE

Instr Code

Plot of L values GA46 v L values GA45



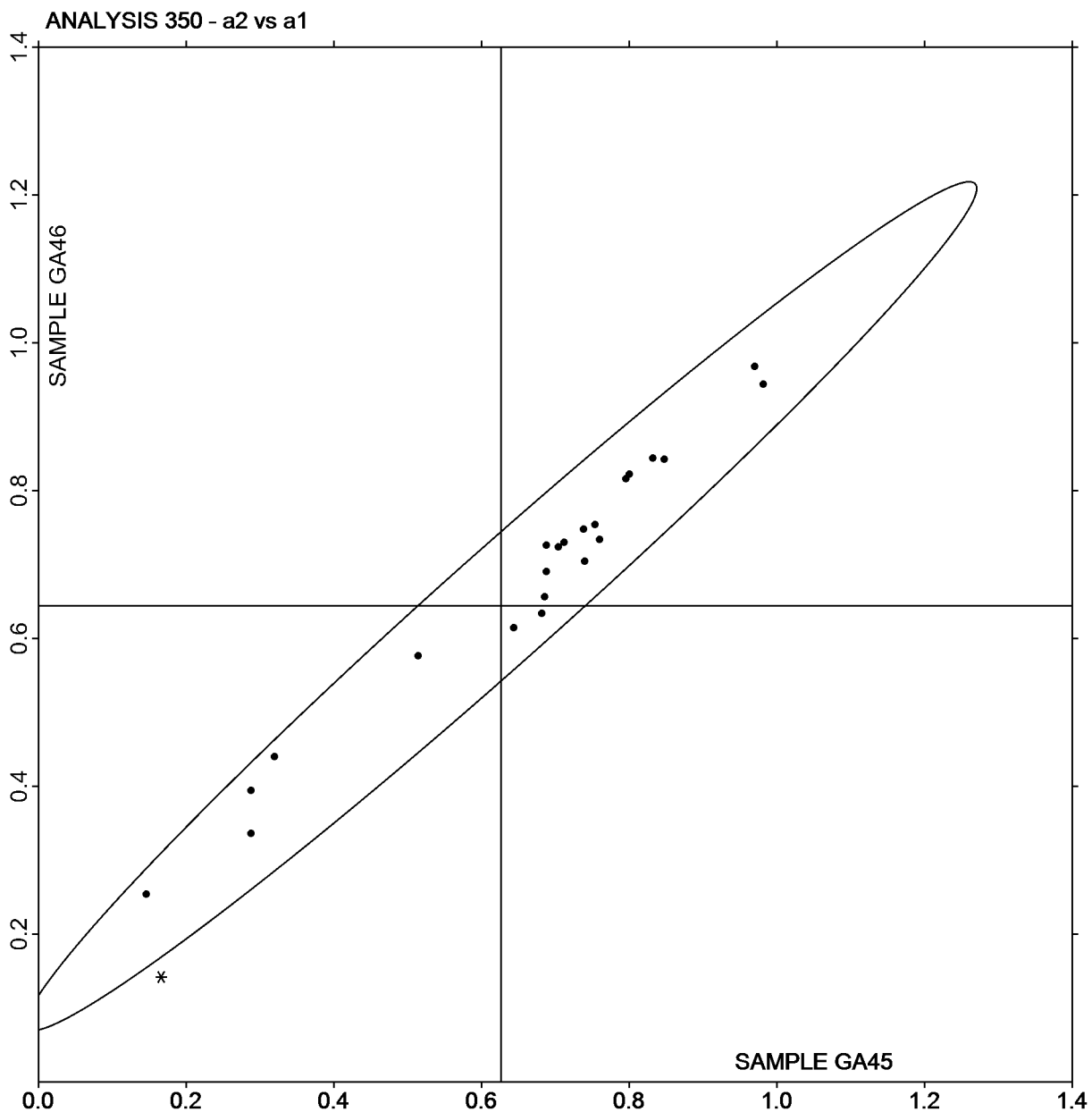


Paper & Paperboard Interlaboratory Testing Program
Analysis 350
Color & Color Difference - Near White Papers - C/2deg obs
Hunter L,a,b - Illuminant C - 2 Degree Observer

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Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	ΔL	Δa	Δb	ΔE	

Plot of a values GA46 v a values GA45

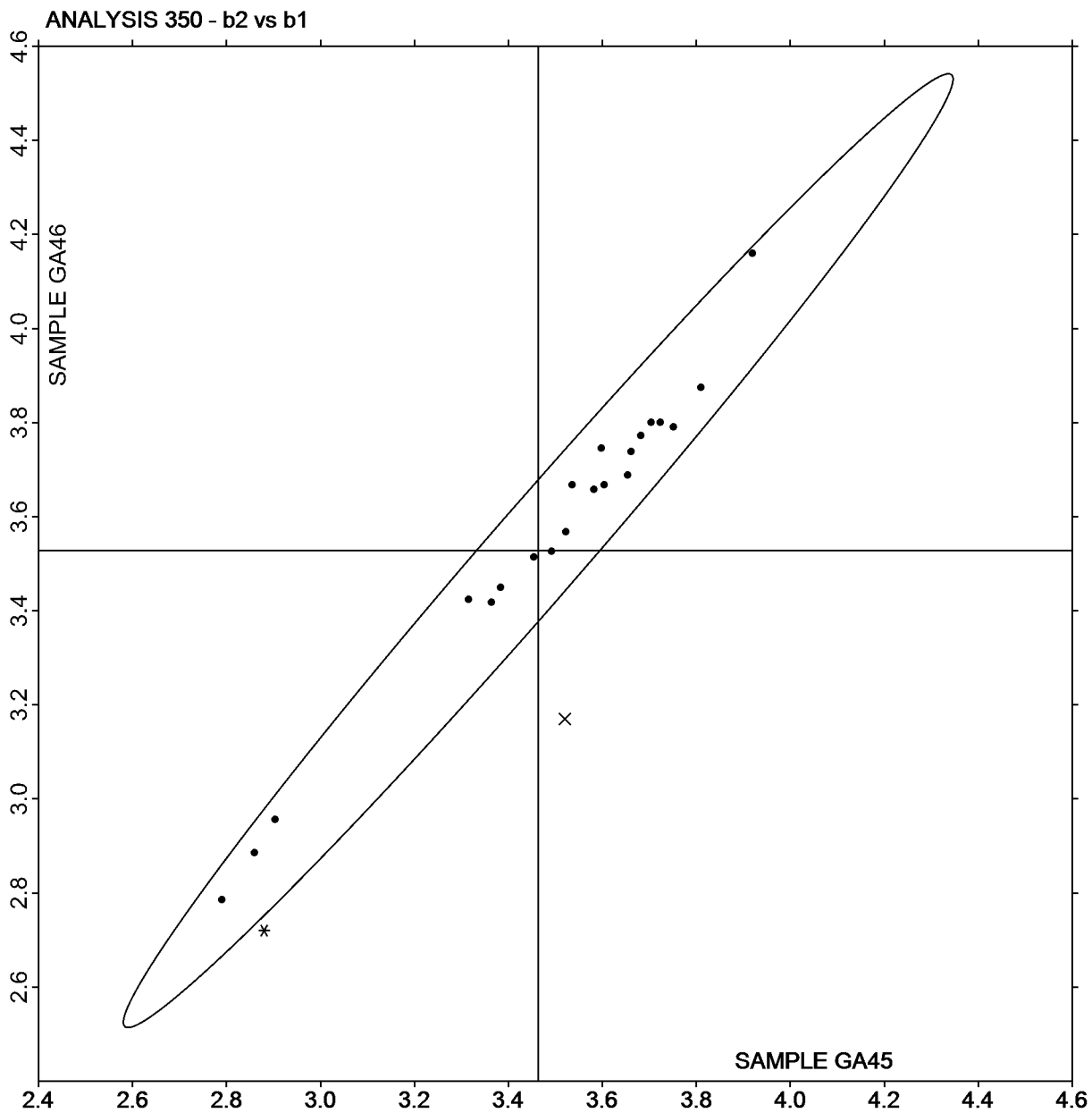




Paper & Paperboard Interlaboratory Testing Program
Analysis 350
Color & Color Difference - Near White Papers - C/2deg obs
Hunter L,a,b - Illuminant C - 2 Degree Observer

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Plot of b values GA46 v b values GA45





**Paper & Paperboard Interlaboratory Testing Program
Analysis 351**

**Report #2892 G,
August 2017**

**Color & Color Difference - Near White Papers - D65/10deg obs
Hunter L,a,b - Illuminant D65 - 10 Degree Observer**

8C9LLN	GA45 GA46	94.04 94.38	-0.79 -0.77	3.55 3.58	0.34	0.02	0.03	0.34	LS
8TUBEV	GA45 GA46	95.10 95.34	-0.77 -0.76	3.62 3.72	0.24	0.01	0.10	0.26	LS
BFYWAJ	GA45 GA46	95.31 95.58	-0.64 -0.62	3.68 3.74	0.26	0.02	0.06	0.27	HT
CTJTQ8	GA45 GA46	95.45 95.73	-0.67 -0.65	3.65 3.70	0.28	0.03	0.05	0.29	HT
CV7G4T	GA45 GA46	95.15 95.42	-0.60 -0.55	3.95 4.00	0.27	0.05	0.05	0.28	NG
E7XZF4	GA45 GA46	93.69 94.06	-0.65 -0.62	3.40 3.48	0.37	0.03	0.07	0.38	TC
EBTP33	GA45 GA46	95.38 95.64	-0.69 -0.65	3.47 3.51	0.25	0.04	0.04	0.26	XX
GTPUKV	GA45 GA46	95.16 95.44	-0.74 -0.70	3.70 3.74	0.28	0.04	0.04	0.29	EF
HCEAHX	GA45 GA46	95.11 95.39	-0.63 -0.59	3.76 3.64	0.28	0.04	-0.12	0.31	LS
J7K4TL	GA45 GA46	97.03 97.38	-0.67 -0.60	3.05 3.19	0.35	0.06	0.13	0.38	XP
KJMVBJ	GA45 GA46	95.23 95.51	-0.61 -0.55	3.92 3.93	0.28	0.06	0.01	0.28	NG
LGGMP7	GA45 GA46	94.54 94.94	-0.69 -0.63	3.49 3.53	0.40	0.05	0.04	0.41	HE
QYYCQZ	GA45 GA46	94.76 94.53	-0.74 -0.72	3.55 3.14	-0.23	0.03	-0.41	0.47	NG
R4QY3K	GA45 GA46	95.43 95.72	-0.62 -0.59	3.80 3.86	0.29	0.03	0.06	0.30	XM
UXVQP6	GA45 GA46	94.65 94.59	-0.84 -0.83	3.43 3.11	-0.06	0.01	-0.32	0.33	EH
WWTZBL	GA45 GA46	94.46 94.92	-0.55 -0.52	3.33 3.46	0.46	0.03	0.13	0.48	HV
YUX2AT	GA45 GA46	95.33 95.59	-0.56 -0.53	3.74 3.83	0.26	0.03	0.09	0.28	NF
YYBN4X	GA45 GA46	95.48 95.73	-0.66 -0.65	3.84 3.84	0.25	0.02	0.01	0.25	XV



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

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ZBY4MQ	GA45	94.25	-0.65	3.45	0.30	0.05	0.03	0.31	HE
	GA46	94.56	-0.60	3.49					
ZKNUAJ	GA45	95.30	-0.67	3.75	0.25	0.05	0.07	0.27	HT
	GA46	95.55	-0.62	3.82					

Grand Means				Summary Statistics					
GA45	95.043	-0.673	3.606						
GA46	95.300	-0.638	3.615	0.257	0.035	0.009	0.321		
Stnd Dev Btwn Labs									
GA45	0.694	0.074	0.218						
GA46	0.711	0.081	0.256	0.150	0.015	0.139	0.067		

Statistics based on 20 of 20 reporting participants

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		

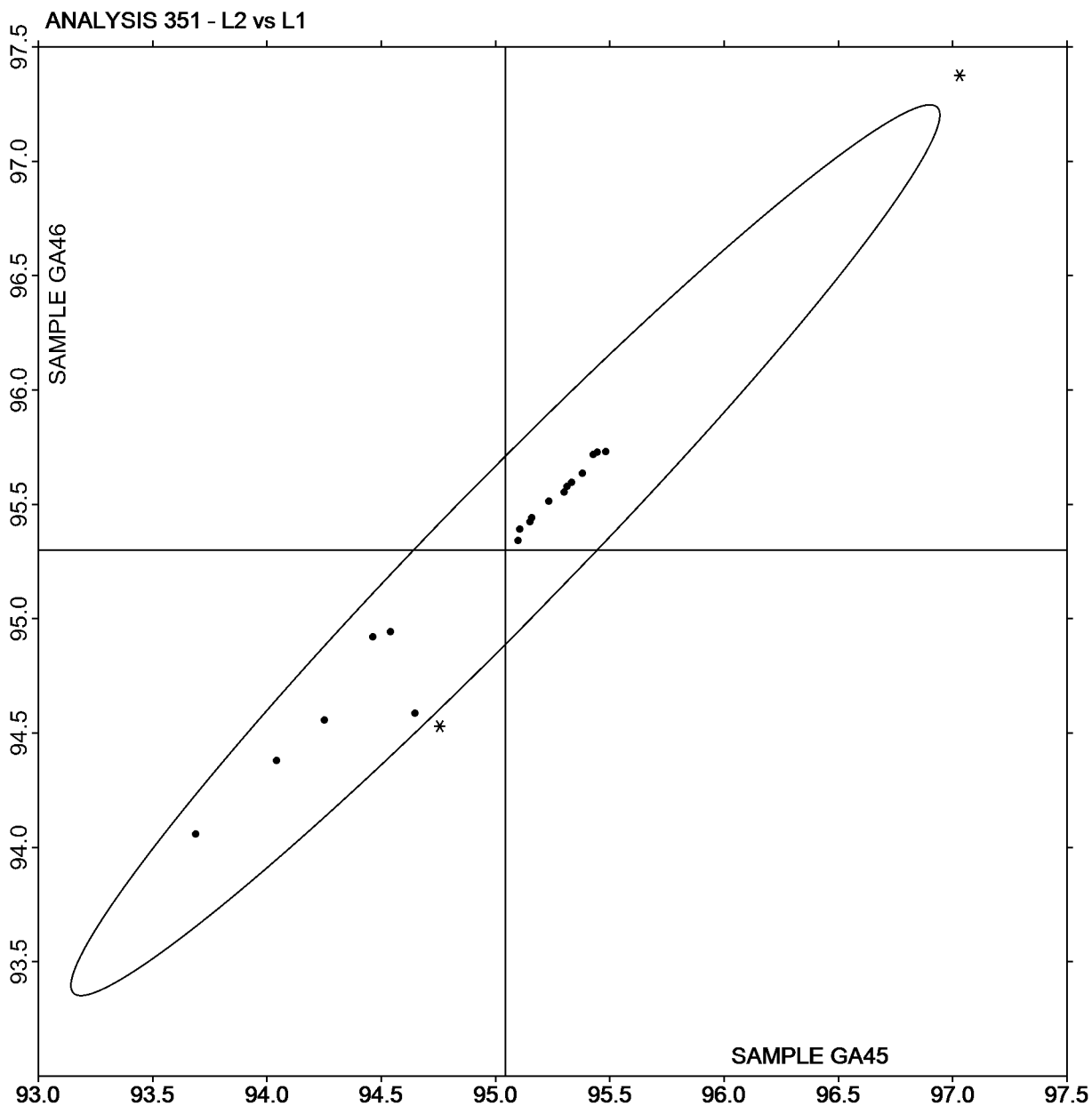


Paper & Paperboard Interlaboratory Testing Program
Analysis 351
Color & Color Difference - Near White Papers - D65/10deg obs
Hunter L,a,b - Illuminant D65 - 10 Degree Observer

Report #2892 G,
August 2017

Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	ΔL	Δa	Δb	ΔE	

Plot of L values GA46 v L values GA45



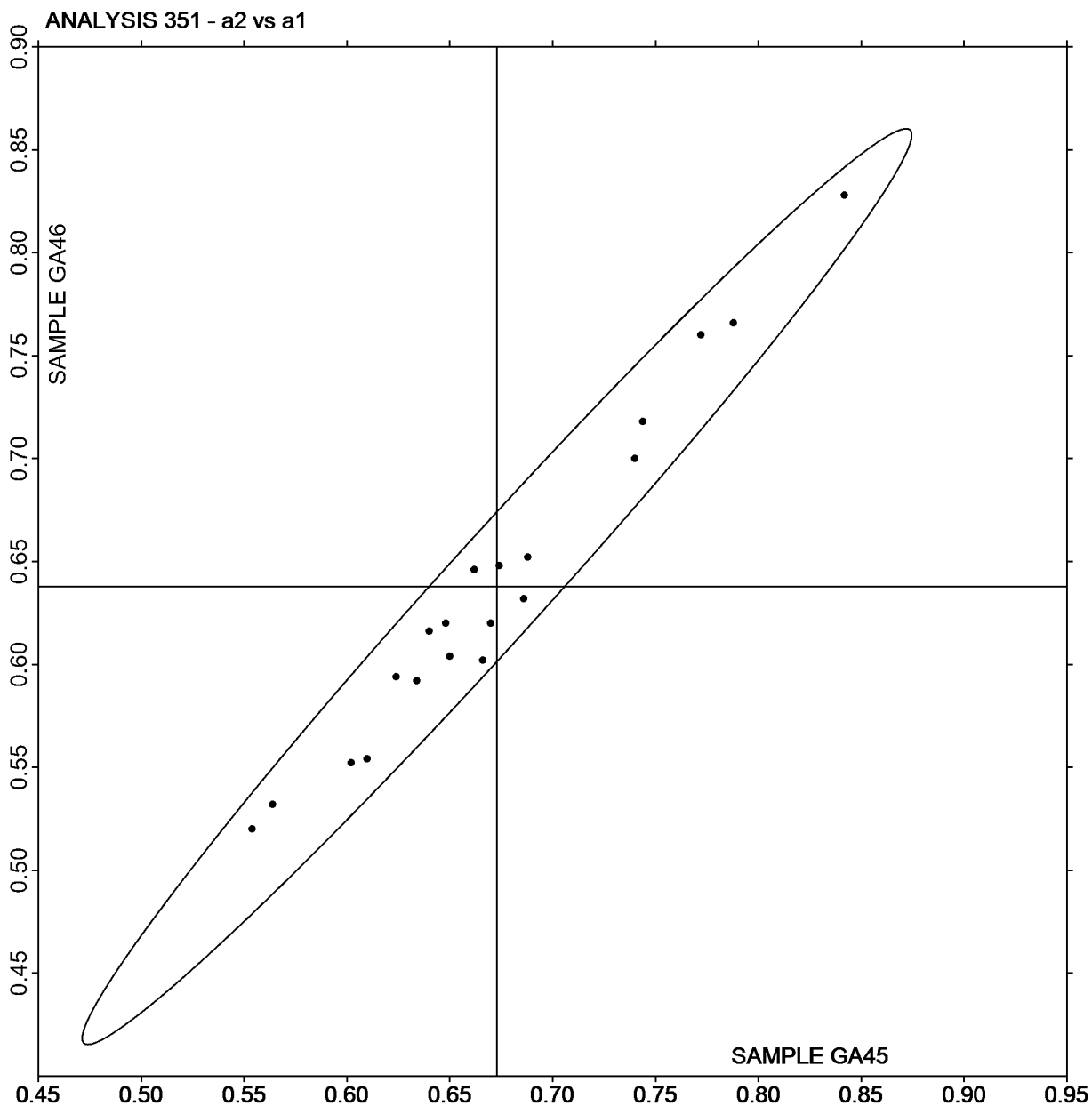


Paper & Paperboard Interlaboratory Testing Program
Analysis 351
Color & Color Difference - Near White Papers - D65/10deg obs
Hunter L,a,b - Illuminant D65 - 10 Degree Observer

Report #2892 G,
August 2017

Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	ΔL	Δa	Δb	ΔE	

Plot of a values GA46 v a values GA45

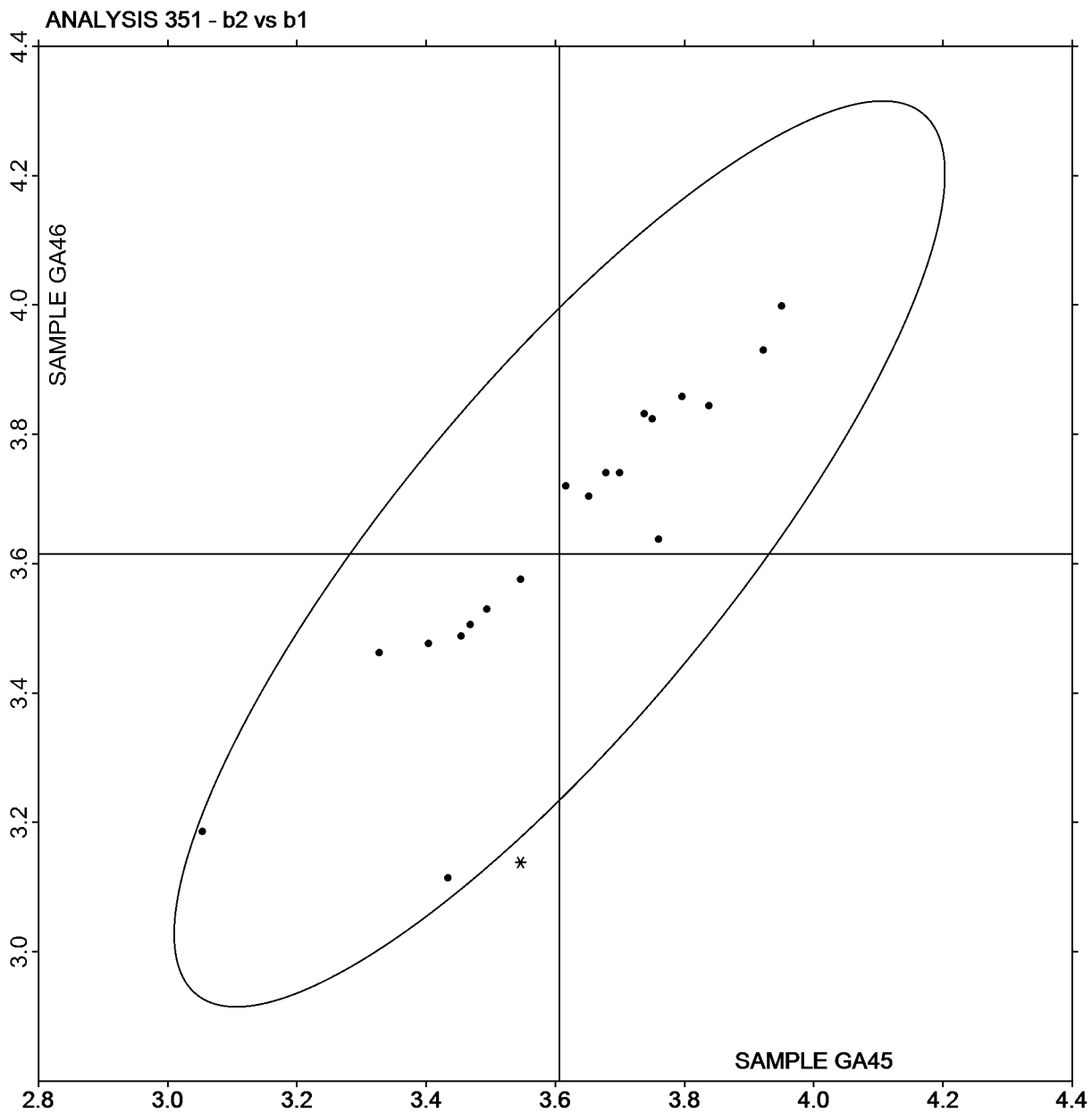




Paper & Paperboard Interlaboratory Testing Program
Analysis 351
Color & Color Difference - Near White Papers - D65/10deg obs
Hunter L,a,b - Illuminant D65 - 10 Degree Observer

Report #2892 G,
August 2017

Plot of b values GA46 v b values GA45





Paper & Paperboard Interlaboratory Testing Program
Analysis 360
Thickness (Caliper), Printing papers

Report # 2892 G
 August 2017

WebCode	Data Flag	Sample GV45			Sample GV46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2MMRVV		4.988	0.010	0.12	5.001	0.019	0.20	LW
2Q8ERP		4.880	-0.098	-1.23	4.922	-0.061	-0.66	LA
32LVZL		4.985	0.007	0.08	4.966	-0.017	-0.18	PP
32NHDU		4.961	-0.017	-0.22	4.986	0.003	0.03	EM
4DDWX9		5.055	0.077	0.96	5.039	0.056	0.61	LW
4JJHXY	X	4.703	-0.275	-3.44	4.933	-0.050	-0.54	TA
4KAW4N		5.042	0.064	0.80	4.942	-0.041	-0.44	EM
4PMJXT		5.087	0.108	1.35	5.083	0.100	1.08	TM
6ZLRYA		5.033	0.054	0.68	5.034	0.051	0.55	LW
73QKQN		5.076	0.097	1.22	5.036	0.053	0.57	LW
76RRQR		5.010	0.032	0.40	4.964	-0.019	-0.20	XX
8HDKWD		4.909	-0.070	-0.87	4.910	-0.073	-0.79	LW
8V3AY6		4.989	0.011	0.13	4.917	-0.066	-0.72	LW
994A6E		4.817	-0.161	-2.01	4.826	-0.156	-1.70	TM
9TVB33		5.000	0.022	0.27	5.020	0.037	0.40	LW
A7CQJ8		4.890	-0.088	-1.10	4.876	-0.107	-1.16	PP
A8Q8QT		4.940	-0.038	-0.48	4.940	-0.043	-0.47	XX
BFYWAJ		4.914	-0.064	-0.80	5.042	0.059	0.64	EM
BYBN7U		5.013	0.035	0.43	5.057	0.074	0.81	LA
CT2W6Z		5.069	0.091	1.13	5.033	0.050	0.55	LW
CV7G4T		4.887	-0.091	-1.14	4.868	-0.115	-1.25	PP
DTC7NJ		4.883	-0.095	-1.19	4.839	-0.144	-1.56	PP
EBTP33		4.924	-0.054	-0.68	4.940	-0.043	-0.47	LW
FVT8L4		4.918	-0.060	-0.75	4.981	-0.002	-0.02	LA
GRDUM2	*	4.880	-0.098	-1.23	4.737	-0.246	-2.67	EM
H8LB43		4.859	-0.119	-1.49	4.895	-0.088	-0.95	FR
HANB2D		4.965	-0.013	-0.17	4.953	-0.030	-0.32	TA
J7K4TL		5.025	0.047	0.58	5.050	0.067	0.73	TM
KJMVBJ		5.044	0.066	0.82	5.018	0.035	0.38	EM
LUXKNF		5.009	0.031	0.38	5.006	0.023	0.25	EM
MFUFYE		4.938	-0.040	-0.51	4.943	-0.040	-0.43	XX
MXHRR9		4.893	-0.085	-1.06	4.996	0.013	0.14	EM
N2ETDN		4.997	0.019	0.23	5.031	0.048	0.52	EM
N2VVXG		5.150	0.172	2.14	5.140	0.157	1.71	XX
ND8G3V		5.043	0.065	0.81	4.976	-0.007	-0.08	LW
NFVQCW		4.950	-0.028	-0.35	4.950	-0.033	-0.36	TM
NT22JJ		5.033	0.054	0.68	5.059	0.076	0.83	LA
PMMP2A		4.974	-0.004	-0.05	5.086	0.103	1.12	TA
PU64Z9		5.107	0.129	1.61	5.156	0.173	1.88	EM
PX8YQ3	*	4.782	-0.196	-2.45	4.762	-0.221	-2.40	EM
Q7HK96		4.996	0.017	0.22	4.979	-0.004	-0.04	EM



**Paper & Paperboard Interlaboratory Testing Program
Analysis 360
Thickness (Caliper), Printing papers**

Report # 2892 G
August 2017

WebCode	Data Flag	Sample GV45			Sample GV46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
QNGVXU		5.013	0.034	0.43	5.004	0.022	0.23	TM
QYYCQZ		5.004	0.026	0.32	4.994	0.012	0.13	LW
R4QY3K		4.972	-0.006	-0.07	5.071	0.088	0.96	LW
R8AWPQ		5.012	0.034	0.42	5.134	0.151	1.64	TM
RXJD9W		4.840	-0.138	-1.73	4.800	-0.183	-1.99	TM
TABL64		4.991	0.013	0.16	4.922	-0.061	-0.66	LA
TAU6CW		5.089	0.111	1.39	5.072	0.090	0.97	LW
TZMP6N		4.830	-0.148	-1.85	4.860	-0.123	-1.33	TM
UX9HGL		4.906	-0.073	-0.91	4.941	-0.042	-0.45	LW
V7ZDYG		5.052	0.074	0.92	5.041	0.058	0.63	TA
VU4CDZ		5.072	0.094	1.17	5.069	0.086	0.94	TM
WWTZBL		4.935	-0.043	-0.54	4.927	-0.056	-0.61	TA
XRCUCQ		4.968	-0.010	-0.13	4.998	0.015	0.16	PP
XUHFZQ		4.955	-0.024	-0.29	4.918	-0.065	-0.71	LW
XVWMNT		5.083	0.105	1.31	5.059	0.076	0.82	LW
Y6ELUP		5.020	0.041	0.52	4.985	0.003	0.03	LW
YUX2AT		5.115	0.136	1.70	5.157	0.175	1.90	TM
ZBY4MQ		5.063	0.084	1.05	5.062	0.079	0.86	TM
ZEJWH7		4.925	-0.053	-0.67	4.888	-0.095	-1.03	MT
ZKNUAJ	*	4.939	-0.039	-0.49	5.108	0.125	1.36	EM

	Sample GV45	Summary Statistics	Sample GV46
Grand Means	4.9783 mils		4.9828 mils
SD Btwn Labs	0.0801 mils		0.0921 mils
Statistics based on 60 of 61 reporting participants			

4JJHXY (X) - Data for sample GV45 are low.

Analysis Notes:

32NHDU - One determination removed from the Lab Mean of Sample GV46 per Grubb's Test at 1% risk (TAPPI 1205).

Key to Instrument Codes Reported by Participants

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



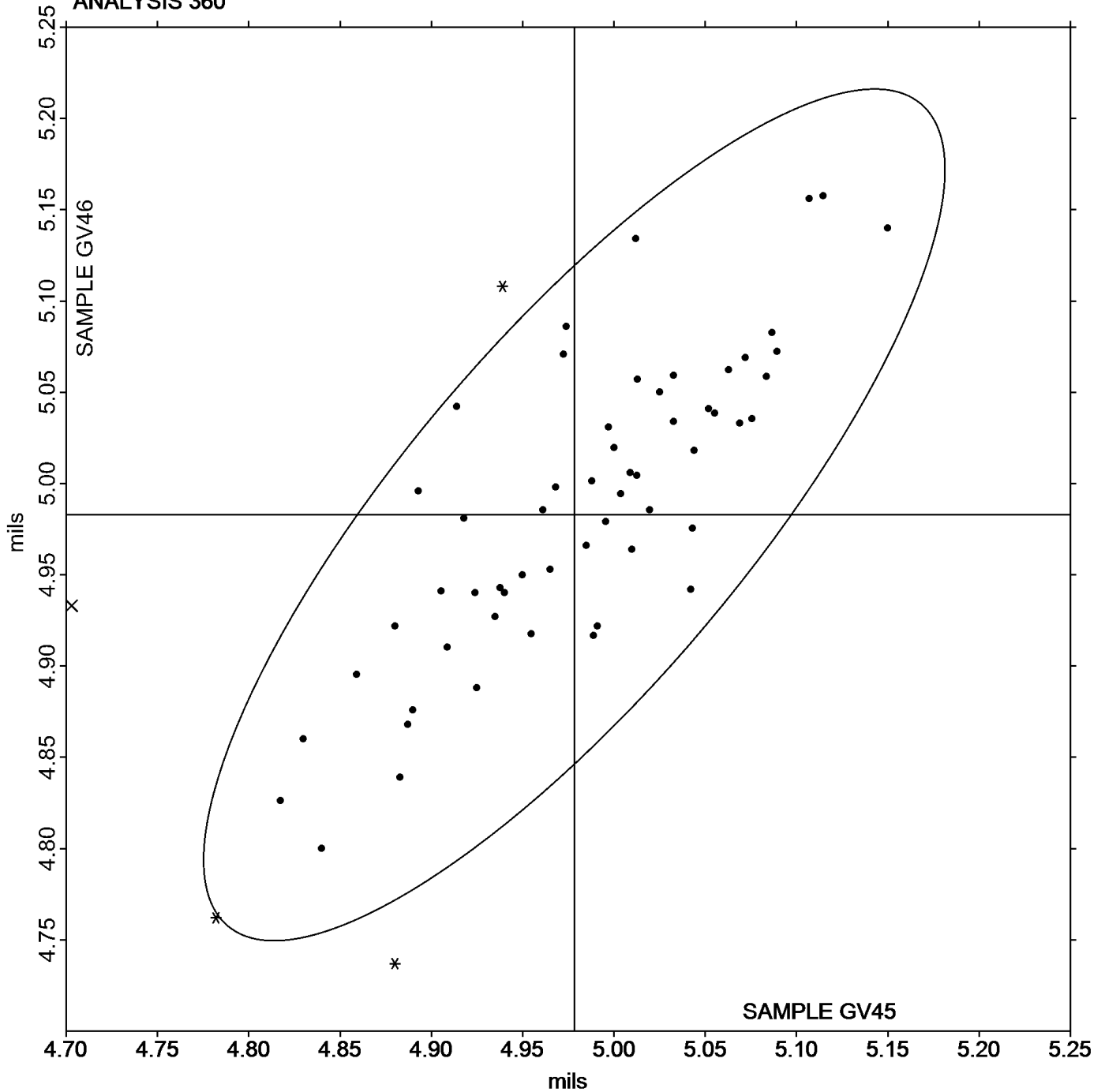
Paper & Paperboard Interlaboratory Testing Program
Analysis 360
Thickness (Caliper), Printing papers

Report # 2892 G
August 2017

Grand Mean Sample **GV45** = 4.9783 mils

Grand Mean Sample **GV46** = 4.9828 mils

ANALYSIS 360





Paper & Paperboard Interlaboratory Testing Program Report # 2892 G
Analysis 361 August 2017
Thickness (Caliper), Packaging papers

WebCode	Data Flag	Sample GY45			Sample GY46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2MMRVV		9.621	0.220	1.73	14.27	0.13	0.90	XX
32NHDU		9.531	0.130	1.02	14.36	0.22	1.50	EM
43CEGD		9.447	0.046	0.37	14.14	0.00	-0.01	TM
4AX8QR		9.476	0.075	0.59	14.30	0.17	1.15	EM
4JJHXY		9.193	-0.208	-1.64	13.98	-0.15	-1.04	TA
7N76MN		9.445	0.044	0.35	14.15	0.01	0.10	TA
87J6QP		9.362	-0.039	-0.31	14.03	-0.11	-0.75	LA
8DJKHH		9.344	-0.057	-0.45	14.11	-0.03	-0.20	EM
8TUBEV		9.433	0.032	0.25	14.05	-0.09	-0.61	TM
9TVB33		9.484	0.083	0.66	14.22	0.08	0.55	LW
A47A4N		9.146	-0.255	-2.01	13.92	-0.22	-1.49	LA
E7W369		9.465	0.064	0.50	14.23	0.09	0.63	LW
E7XZF4		9.323	-0.078	-0.61	14.15	0.01	0.08	EM
H9CGFL		9.150	-0.251	-1.97	13.85	-0.29	-1.96	TM
HANB2D		9.422	0.021	0.17	14.23	0.10	0.66	TA
HCEAHX		9.460	0.059	0.47	14.14	0.00	0.03	XX
J4G622	*	9.652	0.251	1.98	14.54	0.41	2.80	EM
JDM2RQ		9.210	-0.191	-1.50	13.97	-0.16	-1.13	PP
K67VL7		9.422	0.021	0.17	14.21	0.07	0.51	TM
KB9YC6		9.472	0.071	0.56	14.25	0.11	0.75	EM
LGGMP7		9.400	-0.001	-0.01	14.08	-0.05	-0.36	EM
NT22JJ		9.470	0.069	0.54	14.23	0.10	0.65	LA
Q3KWXP	*	9.160	-0.241	-1.89	14.05	-0.09	-0.59	TA
QNGT9P		9.460	0.059	0.46	14.16	0.02	0.16	LA
RXJD9W		9.240	-0.161	-1.27	13.85	-0.29	-1.96	TM
ULWZ2C		9.431	0.030	0.24	14.11	-0.02	-0.17	PP
UM83NB		9.410	0.009	0.07	14.09	-0.04	-0.30	PP
UR4LVZ		9.385	-0.016	-0.12	14.02	-0.12	-0.83	TA
UVA3BJ		9.503	0.102	0.80	14.28	0.14	0.95	XX
UXVQP6		9.464	0.063	0.50	14.19	0.06	0.39	EM
V6R9E2		9.563	0.162	1.28	14.30	0.16	1.12	LW
VFTDP3		9.344	-0.057	-0.45	14.13	0.00	-0.02	LW
W969CR		9.416	0.015	0.12	14.19	0.05	0.35	TM
XP7APQ		9.528	0.127	1.00	14.25	0.11	0.77	TM
XUHFZQ		9.468	0.067	0.53	14.14	0.00	0.01	LW
Z3QNMA		9.331	-0.070	-0.55	14.00	-0.14	-0.96	LA
ZFB9YQ		9.200	-0.201	-1.58	13.89	-0.25	-1.69	TM



Paper & Paperboard Interlaboratory Testing Program

Report # 2892 G

Analysis 361

August 2017

Thickness (Caliper), Packaging papers

	Sample GY45	Summary Statistics	Sample GY46
Grand Means	9.4008 mils		14.136 mils
SD Btwn Labs	0.1271 mils		0.146 mils
Statistics based on 37 of 37 reporting participants			

Key to Instrument Codes Reported by Participants

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

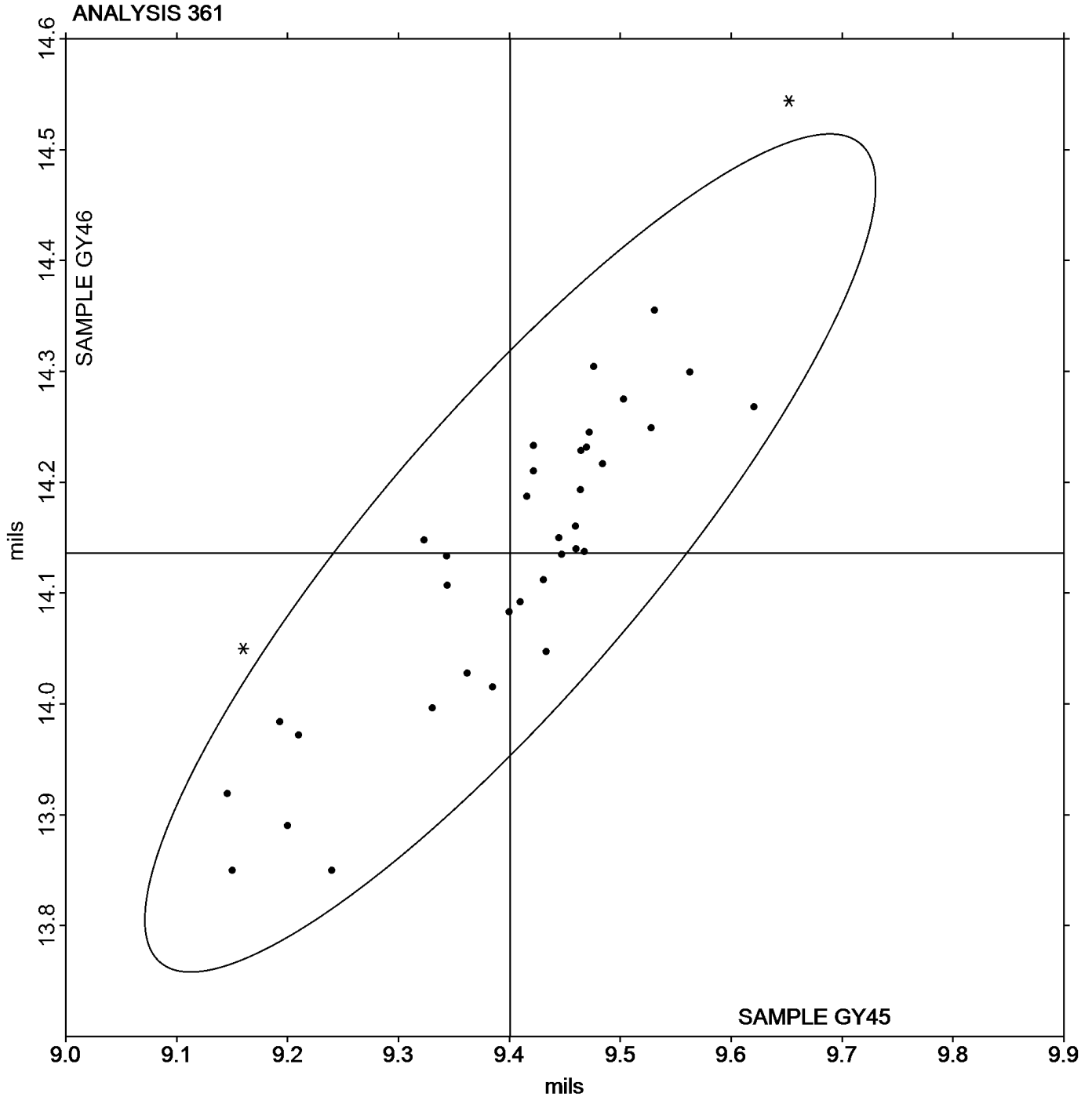


Paper & Paperboard Interlaboratory Testing Program
Analysis 361
Thickness (Caliper), Packaging papers

Report # 2892 G
August 2017

Grand Mean Sample **GY45** = 9.4008 mils

Grand Mean Sample **GY46** = 14.136 mils





**Paper & Paperboard Interlaboratory Testing Program
Analysis 364**

Report # 2892 G
August 2017

Coefficient of Static Friction - Horizontal Plane Method - Printing Papers

WebCode	Data Flag	Sample GD45			Sample GD46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2MMRVV		0.4872	-0.0342	-0.43	0.5582	-0.0008	-0.01	TL
87J6QP		0.4894	-0.0320	-0.41	0.5278	-0.0312	-0.36	TA
D3J2P4		0.5852	0.0638	0.81	0.6412	0.0822	0.96	IT
MXHRR9		0.5946	0.0732	0.93	0.5206	-0.0384	-0.45	XX
N2ETDN		0.3820	-0.1394	-1.77	0.4040	-0.1550	-1.81	TA
NFVQCW	X	0.1568	-0.3646	-4.62	0.2694	-0.2896	-3.38	XX
QYYCQZ		0.6000	0.0786	1.00	0.6474	0.0884	1.03	TM
RACWM2		0.5114	-0.0100	-0.13	0.6138	0.0548	0.64	TA

		Summary Statistics	
	Sample GD45		Sample GD46
Grand Means	0.52140 COF		0.55900 COF
SD Btwn Labs	0.07888 COF		0.08568 COF
Statistics based on 7 of 8 reporting participants			

Comments on Assigned Data Flags for Test #364

NFVQCW (X) - Data for both samples are low. Possible Systematic Error.

Key to Instrument Codes Reported by Participants

IT	IMASS SP-2100	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		



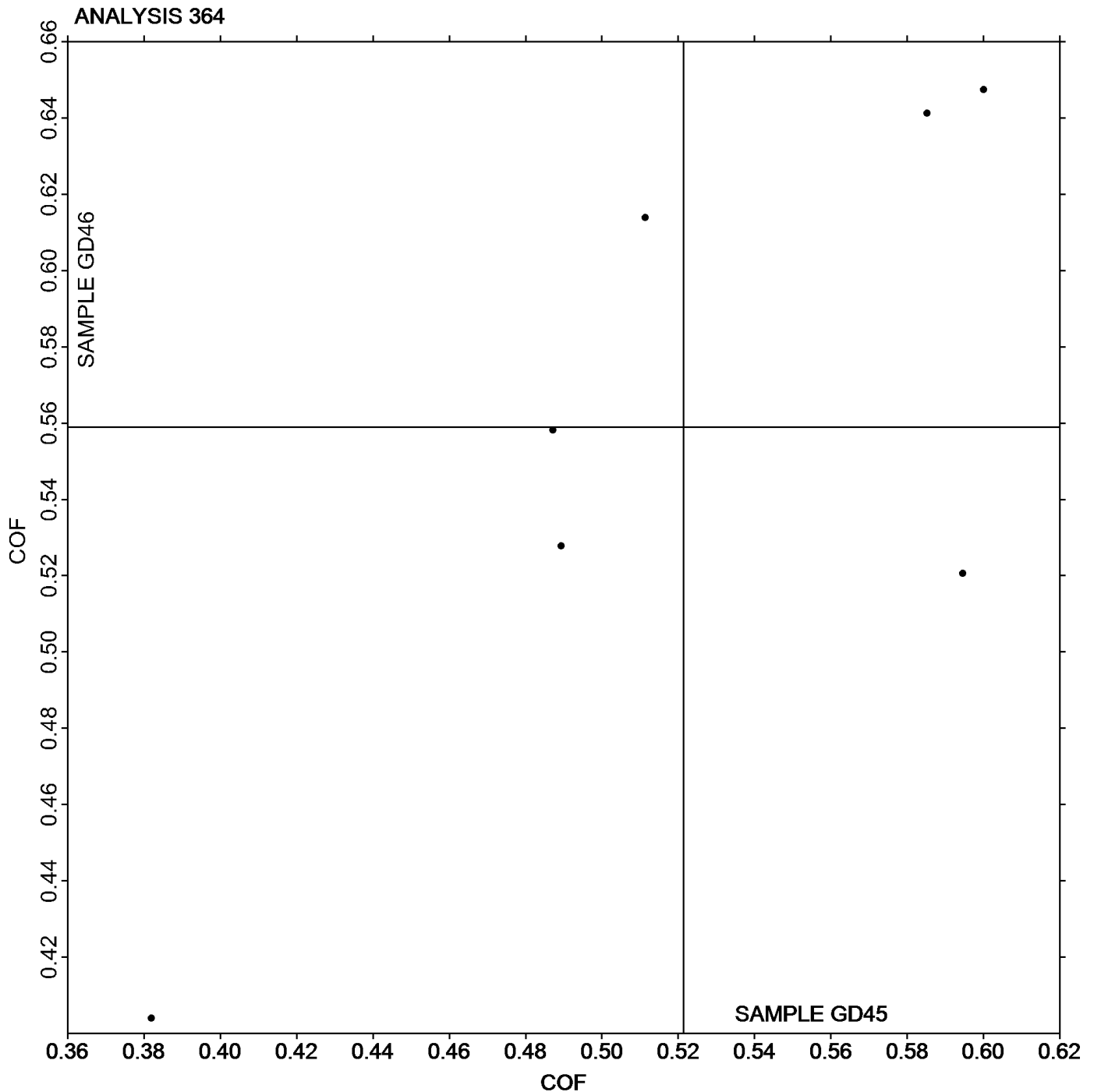
**Paper & Paperboard Interlaboratory Testing Program
Analysis 364**

Report # 2892 G
August 2017

Coefficient of Static Friction - Horizontal Plane Method - Printing Papers

Grand Mean Sample **GD45** = 0.52140 COF

Grand Mean Sample **GD46** = 0.55900 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 365**

Report # 2892 G
August 2017

Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers

WebCode	Data Flag	Sample GD45			Sample GD46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2MMRVV		0.4376	0.0241	0.38	0.5258	0.0537	0.66	TL
87J6QP		0.3770	-0.0365	-0.57	0.4942	0.0221	0.27	TA
A7CQJ8		0.4442	0.0307	0.48	0.4802	0.0081	0.10	TM
D3J2P4		0.3858	-0.0277	-0.43	0.4598	-0.0123	-0.15	IR
GRDUM2		0.5128	0.0993	1.55	0.5064	0.0343	0.42	TA
N6TFYF		0.3988	-0.0147	-0.23	0.4552	-0.0169	-0.21	TM
NFVQCW		0.3298	-0.0837	-1.31	0.2836	-0.1885	-2.30	XX
NT22JJ		0.4842	0.0707	1.10	0.5348	0.0627	0.77	TM
PCRAKK		0.3808	-0.0327	-0.51	0.4994	0.0273	0.33	TA
PMMP2A		0.3344	-0.0791	-1.23	0.3596	-0.1125	-1.38	TA
QYYCQZ		0.5118	0.0983	1.54	0.5974	0.1253	1.53	TM
RACWM2		0.3644	-0.0491	-0.77	0.4692	-0.0029	-0.04	TA

		Summary Statistics	
		Sample GD45	Sample GD46
Grand Means		0.41347 COF	0.47213 COF
SD Btwn Labs		0.06403 COF	0.08181 COF
Statistics based on 12 of 12 reporting participants			

Key to Instrument Codes Reported by Participants

IR	IMASS SP-2000	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		



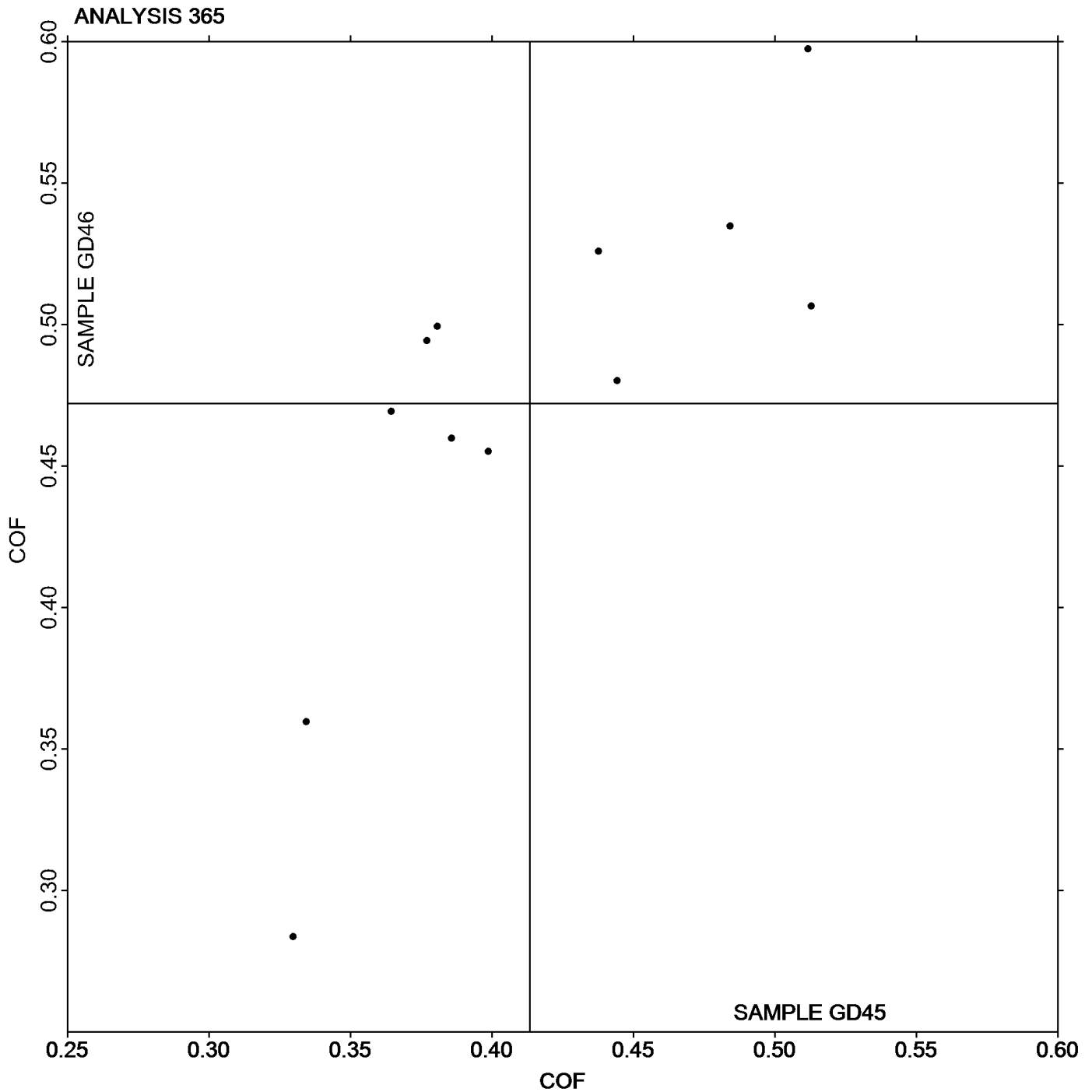
Paper & Paperboard Interlaboratory Testing Program
Analysis 365

Report # 2892 G
August 2017

Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers

Grand Mean Sample **GD45** = 0.41347 COF

Grand Mean Sample **GD46** = 0.47213 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

Report # 2892 G

Analysis 370

August 2017

Air Resistance - Gurley Oil Type

WebCode	Data Flag	Sample GE45			Sample GE46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2MMRVV		20.19	-0.78	-0.55	18.01	-0.23	-0.20	LP
2Q8ERP		20.73	-0.24	-0.17	18.41	0.17	0.14	LA
4AX8QR		18.95	-2.02	-1.43	16.90	-1.34	-1.15	PP
6ZLRYA		19.14	-1.83	-1.30	17.30	-0.94	-0.81	LP
87J6QP		21.53	0.56	0.40	18.32	0.08	0.07	LA
994A6E	X	17.45	-3.52	-2.49	14.16	-4.08	-3.52	LW
9TVB33		20.77	-0.20	-0.14	18.56	0.32	0.27	PP
A8Q8QT		22.15	1.18	0.84	19.30	1.06	0.91	WG
B3QFWM	*	17.04	-3.93	-2.79	14.66	-3.59	-3.09	TN
BFYWAJ		21.01	0.04	0.03	17.93	-0.31	-0.27	PP
DTC7NJ		21.57	0.60	0.42	18.77	0.53	0.46	PP
E7XZF4		22.12	1.15	0.81	19.39	1.15	0.99	PP
GTPUKV		22.98	2.01	1.42	19.68	1.44	1.24	LP
H9CGFL		22.85	1.88	1.33	19.53	1.29	1.11	TL
HANB2D		20.10	-0.87	-0.62	18.10	-0.14	-0.12	PP
JDM2RQ		23.19	2.22	1.57	20.43	2.19	1.88	LA
JR4ZWQ		22.41	1.44	1.02	18.99	0.74	0.64	LA
LUXKNF		21.74	0.77	0.55	18.93	0.69	0.59	HG
N2ETDN	X	13.98	-6.99	-4.96	11.49	-6.76	-5.82	PP
N2VVXG		19.89	-1.08	-0.77	17.99	-0.25	-0.22	XX
ND8G3V		20.58	-0.39	-0.28	18.42	0.18	0.15	LP
NFVQCW		19.80	-1.17	-0.83	17.00	-1.24	-1.07	GS
PFBPNL		20.76	-0.21	-0.15	18.48	0.24	0.20	XX
PU64Z9		21.78	0.81	0.58	18.48	0.23	0.20	XX
QYYB8N	*	24.19	3.22	2.28	21.26	3.02	2.60	GA
R4QY3K		19.40	-1.57	-1.11	16.90	-1.34	-1.16	LW
R8AWPQ		19.65	-1.32	-0.94	17.86	-0.38	-0.33	HG
RACWM2		22.05	1.08	0.77	18.65	0.41	0.35	WG
TABL64		22.94	1.97	1.40	19.63	1.38	1.19	LA
TAU6CW		20.13	-0.84	-0.60	17.73	-0.51	-0.44	LP
TGRWH6		20.76	-0.21	-0.15	17.20	-1.04	-0.90	LP
ULWZ2C		21.56	0.59	0.42	18.03	-0.21	-0.18	PP
UM83NB		20.54	-0.43	-0.30	17.25	-0.99	-0.85	PP
V6R9E2		19.32	-1.65	-1.17	17.96	-0.28	-0.24	LW
V7ZDYG		20.32	-0.65	-0.46	17.76	-0.48	-0.41	PP
VAJAKL		21.89	0.92	0.65	19.33	1.09	0.94	XX
VFTDP3		20.71	-0.26	-0.18	18.03	-0.21	-0.18	TL
VKZZJQ		18.98	-1.99	-1.41	15.88	-2.36	-2.04	RE
WG3TKF		22.21	1.24	0.88	18.09	-0.15	-0.13	LP
WWTZBL		21.16	0.19	0.13	18.07	-0.17	-0.15	PP
XRCUCQ		21.15	0.18	0.13	18.39	0.14	0.12	PP



Paper & Paperboard Interlaboratory Testing Program

Report # 2892 G

Analysis 370

August 2017

Air Resistance - Gurley Oil Type

WebCode	Data Flag	Sample GE45			Sample GE46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
Y6ELUP		20.63	-0.34	-0.24	18.38	0.14	0.12	LP
YUX2AT		19.40	-1.57	-1.11	16.99	-1.25	-1.08	PR
ZFB9YQ	X	7.51	-13.46	-9.54	7.91	-10.33	-8.91	TL
ZKNUAJ		22.46	1.49	1.06	19.27	1.03	0.88	HG

Sample GE45		Summary Statistics	Sample GE46	
Grand Means	20.970 sec/100 cc		18.244 sec/100 cc	
SD Btwn Labs	1.411 sec/100 cc		1.160 sec/100 cc	
Statistics based on 42 of 45 reporting participants				

Comments on Assigned Data Flags for Test #370

N2ETDN (X) - Data for both samples are low.

ZFB9YQ (X) - Extreme Data.

994A6E (X) - Data for sample GE46 are low.

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	WG W & LE Gurley Tester
XX Instrument make/model not specified by lab	

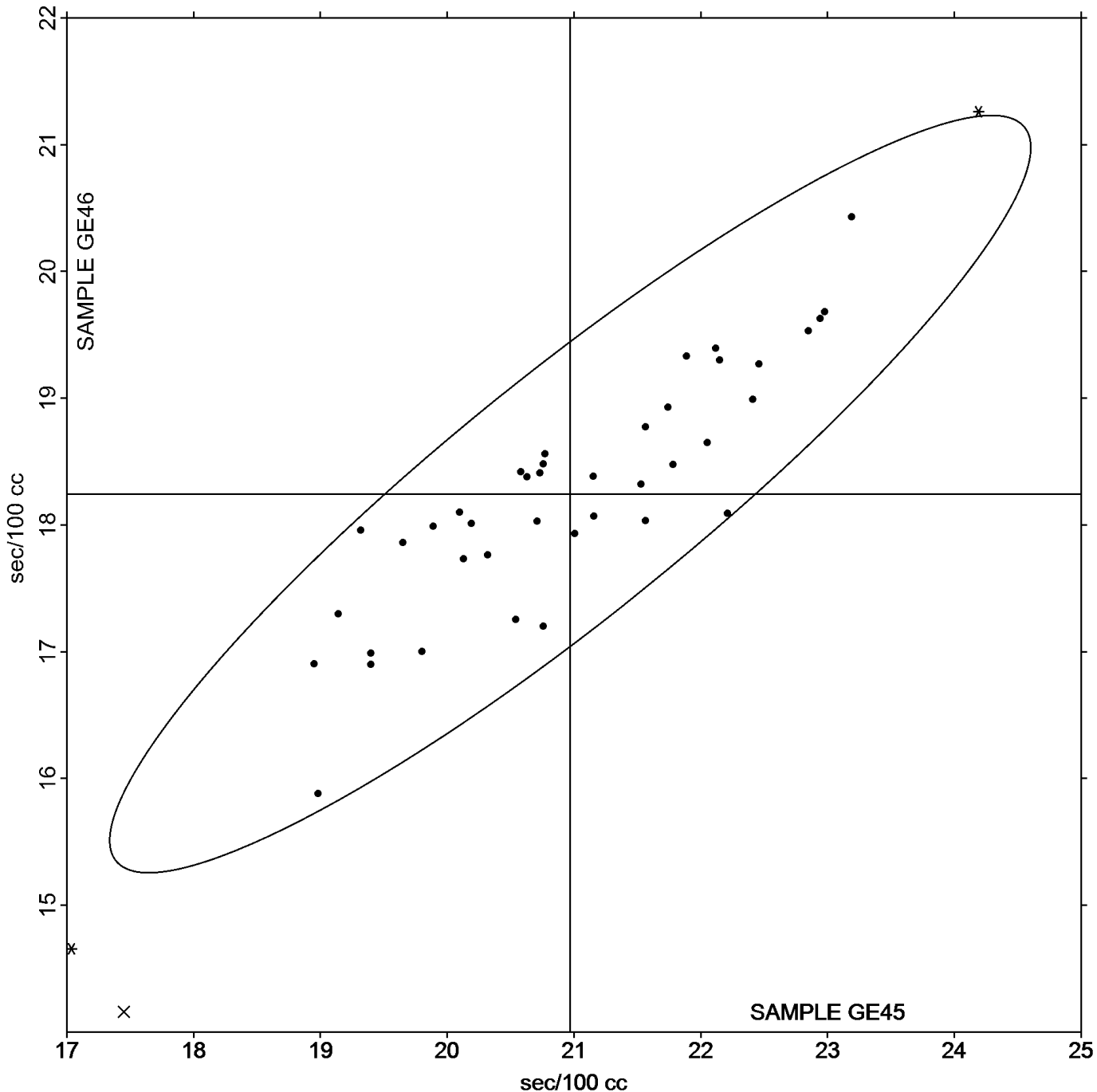


Air Resistance - Gurley Oil Type

Grand Mean Sample **GE45** = 20.970 sec/100 cc

Grand Mean Sample **GE46** = 18.244 sec/100 cc

ANALYSIS 370





**Paper & Paperboard Interlaboratory Testing Program
Analysis 372**

Report # 2892 G
August 2017

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

WebCode	Data Flag	Sample GE45			Sample GE46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4AX8QR		138.8	6.0	0.58	160.5	11.9	0.90	PP
BHND8X		130.4	-2.4	-0.23	148.9	0.3	0.03	GA
G9HBLM		154.9	22.2	2.13	173.4	24.8	1.87	VM
HANB2D		125.5	-7.2	-0.70	147.7	-0.9	-0.07	PP
J7K4TL		126.7	-6.0	-0.58	141.7	-6.9	-0.52	TT
N2VVXG		132.0	-0.7	-0.07	146.2	-2.4	-0.18	XX
NFVQCW		115.5	-17.2	-1.66	121.5	-27.1	-2.04	SH
QNGVXU		135.5	2.8	0.27	145.0	-3.6	-0.27	TT
V7ZDYG		129.4	-3.3	-0.32	147.1	-1.5	-0.11	HM
VU4CDZ		138.7	6.0	0.57	153.8	5.2	0.39	SH

Summary Statistics		
	Sample GE45	Sample GE46
Grand Means	132.73 Sheffield Units	148.58 Sheffield Units
SD Btwn Labs	10.40 Sheffield Units	13.28 Sheffield Units
Statistics based on 10 of 10 reporting participants		

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	VM	Valmet PaperLab (was Kajaani/Robotest)
XX	Instrument make/model not specified by lab		



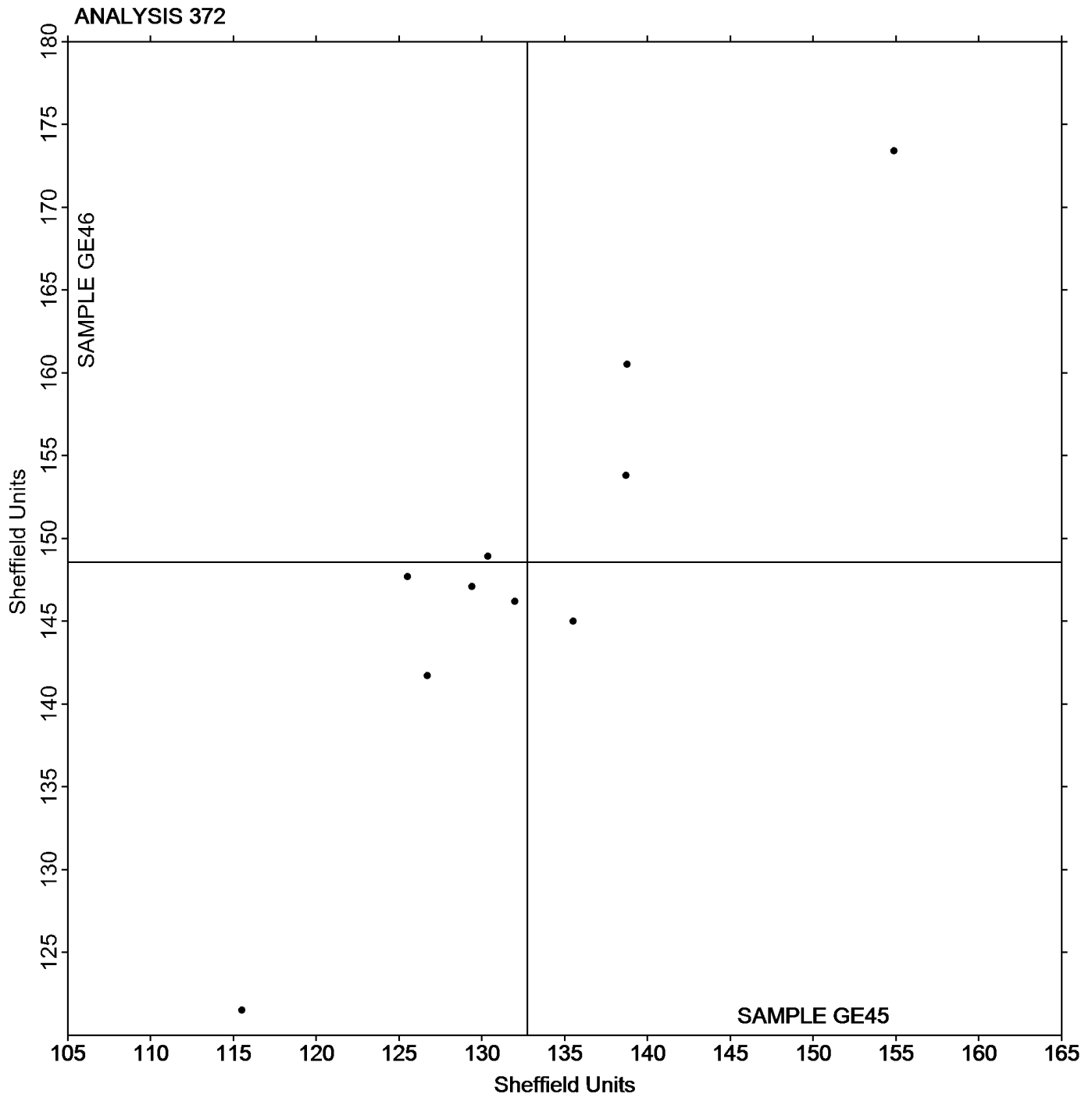
**Paper & Paperboard Interlaboratory Testing Program
Analysis 372**

Report # 2892 G
August 2017

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

Grand Mean Sample **GE45** = 132.73 Sheffield Units

Grand Mean Sample **GE46** = 148.58 Sheffield Units



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 # 2892 G

Analysis 376

August 2017

Roughness - Print Surf Method - 0.5 to 4.0 Microns

WebCode	Data Flag	Sample GJ45			Sample GJ46		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
32LVZL		0.8650	0.0112	0.13	0.8280	0.0309	0.34
32NHDU	X	1.4340	0.5802	6.94	1.4000	0.6029	6.63
4AX8QR	X	1.0500	0.1962	2.35	0.2980	-0.4991	-5.49
4KAW4N		0.9020	0.0482	0.58	0.8550	0.0579	0.64
8DJKHH		0.8090	-0.0448	-0.54	0.7670	-0.0301	-0.33
8HDKWD	X	0.9110	0.0572	0.68	0.9690	0.1719	1.89
8TUBEV		1.0240	0.1702	2.03	0.9680	0.1709	1.88
8V3AY6		0.8040	-0.0498	-0.59	0.7420	-0.0551	-0.61
A47A4N		0.7710	-0.0828	-0.99	0.7400	-0.0571	-0.63
CFT7EK		1.0260	0.1722	2.06	0.9580	0.1609	1.77
FM4EGX		0.8360	-0.0178	-0.21	0.7660	-0.0311	-0.34
HCEAHX		0.8800	0.0262	0.31	0.8260	0.0289	0.32
HHD48J		0.9860	0.1322	1.58	0.9410	0.1439	1.58
J4G622		0.7760	-0.0778	-0.93	0.7190	-0.0781	-0.86
JDM2RQ		0.8730	0.0192	0.23	0.8110	0.0139	0.15
KB9YC6		0.8130	-0.0408	-0.49	0.7330	-0.0641	-0.71
KDUT7K		0.8450	-0.0088	-0.10	0.8020	0.0049	0.05
LGGMP7		0.8310	-0.0228	-0.27	0.7690	-0.0281	-0.31
LUXKNF		0.8290	-0.0248	-0.30	0.7830	-0.0141	-0.16
LVWКУ8		0.7910	-0.0628	-0.75	0.7240	-0.0731	-0.80
PCRAKK		0.7600	-0.0938	-1.12	0.6930	-0.1041	-1.15
PMMP2A		0.9810	0.1272	1.52	0.9210	0.1239	1.36
PU64Z9		0.8170	-0.0368	-0.44	0.7520	-0.0451	-0.50
Q7HK96		0.8040	-0.0498	-0.59	0.7570	-0.0401	-0.44
QNGT9P	*	0.7250	-0.1288	-1.54	0.5940	-0.2031	-2.24
RACWM2		0.7180	-0.1358	-1.62	0.6360	-0.1611	-1.77
TZMP6N	*	0.7780	-0.0758	-0.91	0.7770	-0.0201	-0.22
ULWZ2C		0.8630	0.0092	0.11	0.8070	0.0099	0.11
UM83NB		0.8540	0.0002	0.00	0.7860	-0.0111	-0.12
UXVQP6		1.0170	0.1632	1.95	0.9510	0.1539	1.69
WWTZBL		0.8650	0.0112	0.13	0.7800	-0.0171	-0.19
XUHFZQ		0.8700	0.0162	0.19	0.8250	0.0279	0.31
Z3QNMA		0.9000	0.0462	0.55	0.9030	0.1059	1.16

Sample GJ45		Summary Statistics	Sample GJ46	
Grand Means	0.85377 Microns		0.79713 Microns	
SD Btwn Labs	0.08366 Microns		0.09088 Microns	
Statistics based on 30 of 33 reporting participants				



**Paper & Paperboard Interlaboratory Testing Program
Analysis 376**

**Report # 2892 G
August 2017**

Roughness - Print Surf Method - 0.5 to 4.0 Microns

Comments on Assigned Data Flags for Test #376

4AX8QR (X) - Data for sample GJ46 are low.

32NH DU (X) - Extreme Data.

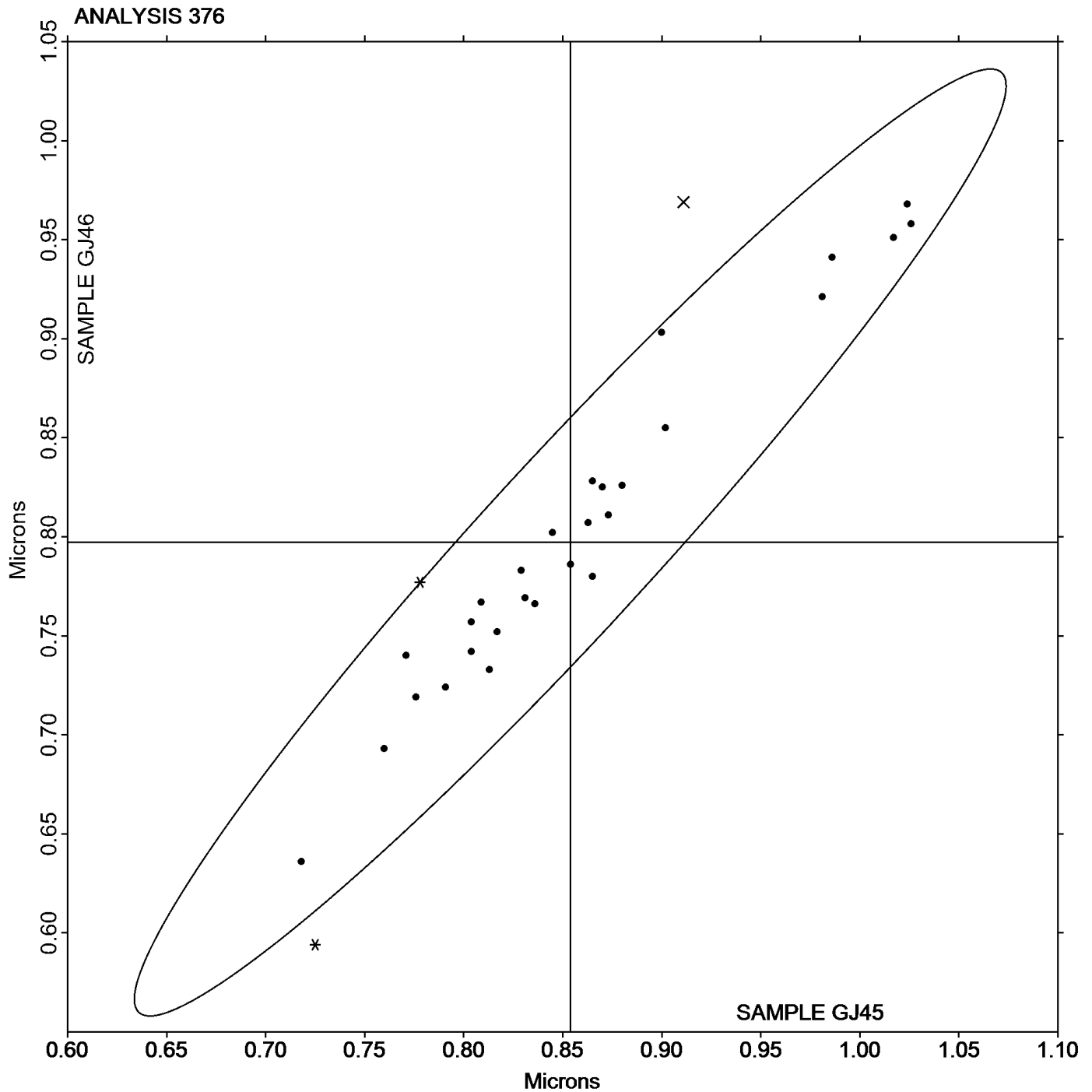
8HDKWD (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample GJ46.



Roughness - Print Surf Method - 0.5 to 4.0 Microns

Grand Mean Sample GJ45 = 0.85377 Microns

Grand Mean Sample GJ46 = 0.79713 Microns





Paper & Paperboard Interlaboratory Testing Program

Report # 2892 G

Analysis 377

August 2017

Roughness - Print Surf Method - 2.5 to 6.0 Microns

WebCode	Data Flag	Sample GK45			Sample GK46		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2MMRVV		4.226	0.026	0.14	3.921	0.008	0.04
2Q8ERP		4.131	-0.069	-0.38	3.710	-0.203	-1.18
9TVB33		4.129	-0.071	-0.39	3.823	-0.090	-0.53
E7XZF4		4.344	0.144	0.79	3.897	-0.016	-0.09
G9HBLM		3.900	-0.300	-1.65	4.234	0.321	1.86
LUXKNF		3.973	-0.227	-1.25	3.776	-0.137	-0.80
MXHRR9		4.430	0.230	1.27	4.095	0.182	1.06
N2ETDN		4.368	0.168	0.93	4.005	0.092	0.53
RACWM2		4.299	0.099	0.55	3.759	-0.154	-0.90

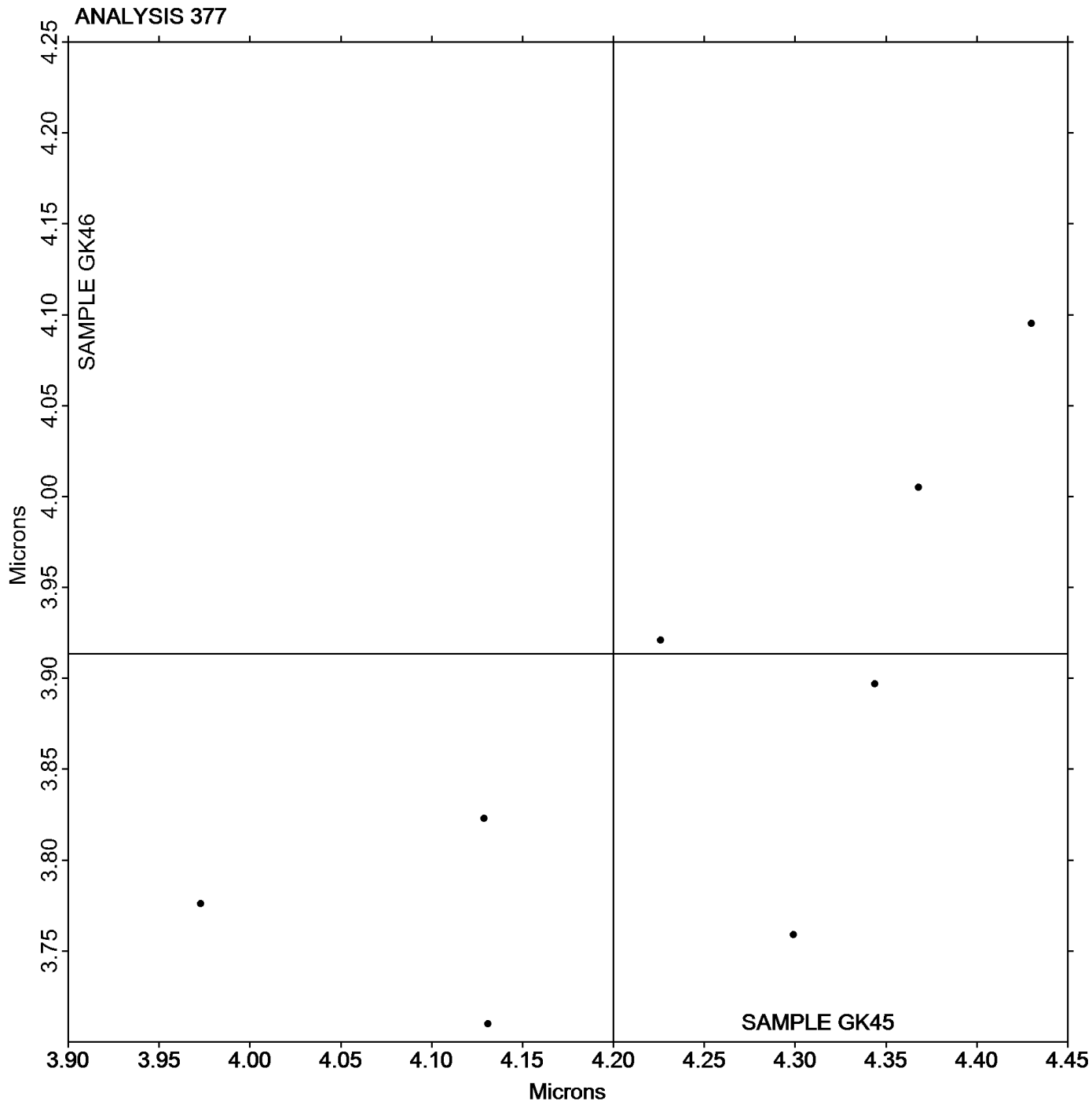
		Summary Statistics	
	Sample GK45		Sample GK46
Grand Means	4.2000 Microns		3.9133 Microns
SD Btwn Labs	0.1815 Microns		0.1720 Microns
Statistics based on 9 of 9 reporting participants			



Roughness - Print Surf Method - 2.5 to 6.0 Microns

Grand Mean Sample **GK45** = 4.2000 Microns

Grand Mean Sample **GK46** = 3.9133 Microns



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 378
Roughness - Sheffield Type

Report # 2892 G
 August 2017

WebCode	Data Flag	Sample GL45			Sample GL46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2MMRVV		255.8	15.6	0.97	242.8	-0.2	-0.01	LW
2Q8ERP		263.1	22.9	1.42	267.7	24.7	1.55	LA
32NHDU		252.5	12.3	0.77	256.8	13.8	0.87	HM
4AX8QR		210.0	-30.2	-1.87	218.0	-25.0	-1.58	VM
76RRQR	X	53.0	-187.2	-11.61	58.4	-184.6	-11.63	XX
7N76MN		243.0	2.8	0.17	244.5	1.5	0.09	PP
8DJKHH		252.3	12.1	0.75	256.4	13.4	0.84	PP
8TUBEV	X	297.7	57.5	3.57	304.0	61.0	3.84	TT
994A6E	X	248.1	7.9	0.49	172.0	-71.0	-4.47	SH
9PAETQ		237.4	-2.8	-0.17	240.2	-2.8	-0.18	XX
9TVB33		245.4	5.3	0.33	261.6	18.6	1.17	PP
A47A4N		212.8	-27.4	-1.70	215.6	-27.4	-1.73	LA
A8Q8QT		263.3	23.1	1.44	257.5	14.5	0.91	PG
BFYWAJ	*	219.0	-21.2	-1.31	204.0	-39.0	-2.46	SH
BHND8X		255.0	14.8	0.92	252.8	9.8	0.62	GA
BYBN7U		241.8	1.6	0.10	241.3	-1.7	-0.11	LA
CV7G4T		257.0	16.8	1.04	255.5	12.5	0.79	PP
DTC7NJ		263.6	23.4	1.45	263.2	20.2	1.27	PP
E7XZF4		239.5	-0.7	-0.04	245.6	2.6	0.16	PP
EBTP33		230.4	-9.7	-0.60	242.8	-0.3	-0.02	SH
EKHFJ4		241.4	1.2	0.08	247.2	4.2	0.26	TT
GTPUKV		226.0	-14.2	-0.88	227.7	-15.3	-0.97	LW
HANB2D		251.0	10.8	0.67	242.5	-0.5	-0.03	PP
HCEAHX		219.9	-20.3	-1.26	216.4	-26.6	-1.68	TT
HHD48J		201.9	-38.3	-2.37	208.4	-34.6	-2.18	TS
J4G622		225.5	-14.7	-0.91	225.0	-18.0	-1.14	GL
J7K4TL		225.2	-15.0	-0.93	224.1	-18.9	-1.19	TT
JDM2RQ		244.6	4.4	0.27	256.6	13.5	0.85	PP
K67VL7	X	257.1	16.9	1.05	224.5	-18.5	-1.17	GA
KB9YC6		240.5	0.3	0.02	236.7	-6.3	-0.40	PP
LGGMP7		228.9	-11.3	-0.70	238.4	-4.6	-0.29	PP
LX36H8		232.7	-7.5	-0.46	234.5	-8.5	-0.54	TS
MCE7R3		265.4	25.2	1.57	270.4	27.4	1.72	GA
MXHRR9		240.3	0.1	0.01	256.6	13.6	0.85	HM
N2ETDN		235.5	-4.7	-0.29	243.0	-0.1	0.00	PP
N2VVXG		229.3	-10.9	-0.67	237.5	-5.5	-0.35	XX
N6TFYF		232.1	-8.1	-0.50	235.2	-7.8	-0.49	TS
NFVQCW		226.3	-13.9	-0.86	230.6	-12.4	-0.78	XX
PCRAKK		244.5	4.3	0.27	238.8	-4.2	-0.27	HM
PMMP2A		253.0	12.8	0.80	246.7	3.7	0.23	PP
PU64Z9		242.3	2.1	0.13	246.6	3.6	0.23	HM



**Paper & Paperboard Interlaboratory Testing Program
Analysis 378
Roughness - Sheffield Type**

Report # 2892 G
August 2017

WebCode	Data Flag	Sample GL45			Sample GL46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
QNGT9P		233.8	-6.4	-0.39	248.5	5.5	0.34	LA
QNGVXU		200.0	-40.2	-2.49	211.0	-32.0	-2.02	TT
QYYCQZ		259.8	19.6	1.22	250.8	7.8	0.49	PP
R4QY3K		237.0	-3.2	-0.20	245.4	2.4	0.15	TS
R8AWPQ		263.2	23.0	1.43	256.1	13.1	0.82	TS
RACWM2		248.3	8.1	0.50	249.3	6.3	0.39	XX
RXJD9W		277.0	36.8	2.29	280.0	37.0	2.33	GL
TABL64		230.5	-9.7	-0.60	236.3	-6.7	-0.42	LA
ULWZ2C		246.3	6.1	0.38	245.2	2.2	0.14	PP
UM83NB		249.2	9.0	0.56	250.9	7.9	0.50	PP
UR4LVZ		235.6	-4.6	-0.28	236.5	-6.6	-0.41	PP
UXVQP6		238.8	-1.4	-0.08	255.0	12.0	0.75	LW
V7ZDYG		237.9	-2.3	-0.14	246.8	3.8	0.24	PP
VU4CDZ		223.8	-16.4	-1.01	220.8	-22.2	-1.40	SH
WWTZBL		252.7	12.5	0.78	253.5	10.5	0.66	PP
XRCUCQ	X	431.8	191.6	11.89	236.8	-6.3	-0.39	PP
Z3QNMA		235.6	-4.6	-0.28	252.6	9.6	0.60	LW
ZKNUAJ		251.3	11.1	0.69	255.5	12.5	0.79	HM

Sample GL45		Summary Statistics	Sample GL46	
Grand Means	240.16 Sheffield		243.03 Sheffield	
SD Btwn Labs	16.12 Sheffield		15.88 Sheffield	
Statistics based on 54 of 59 reporting participants				

Comments on Assigned Data Flags for Test #378

- K67VL7 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample GL45.
- 994A6E (X) - Data for sample GL46 are low.
- XRCUCQ (X) - Extreme Data for Sample GL45.
- 8TUBEV (X) - Data for both samples are high. Possible Systematic Error.
- 76RRQR (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	PG Precision Gage Smoothcheck
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



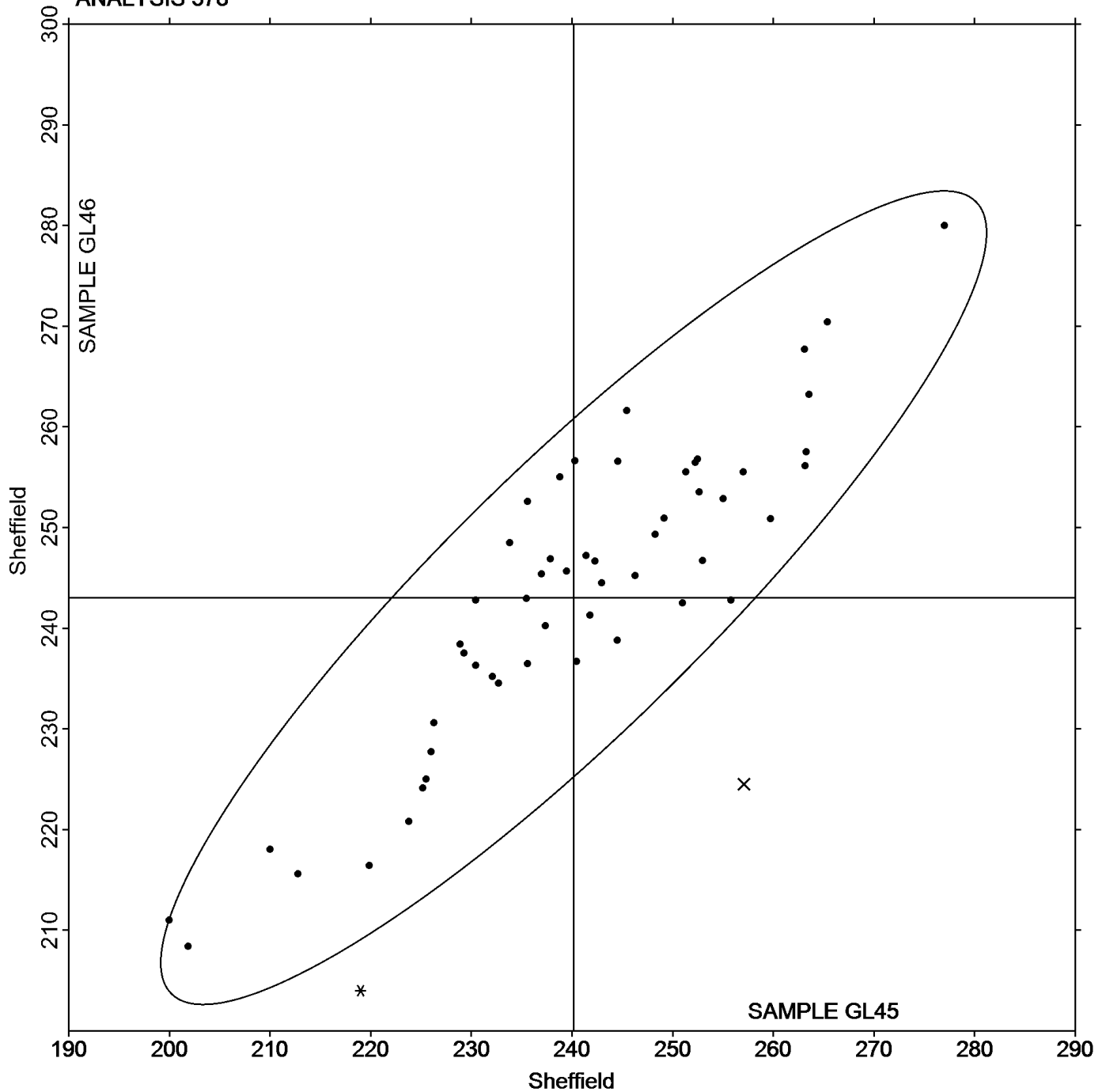
Paper & Paperboard Interlaboratory Testing Program
Analysis 378
Roughness - Sheffield Type

Report # 2892 G
August 2017

Grand Mean Sample **GL45** = 240.16 Sheffield

Grand Mean Sample **GL46** = 243.03 Sheffield

ANALYSIS 378





**Paper & Paperboard Interlaboratory Testing Program
Analysis 382
Moisture in Paper**

Report # 2892 G
August 2017

WebCode	Data Flag	Sample GM45			Sample GM46		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
8HDKWD		4.685	-0.083	-0.20	4.608	-0.021	-0.07
8TUBEV		5.410	0.642	1.51	5.250	0.620	1.97
9EVC7		4.087	-0.681	-1.60	4.238	-0.392	-1.24
DZCM2B		5.140	0.372	0.87	4.730	0.100	0.32
K92NDF		5.350	0.582	1.37	4.890	0.260	0.82
MXHRR9		5.040	0.272	0.64	4.820	0.190	0.60
N2ETDN		4.878	0.110	0.26	4.802	0.172	0.55
TAU6CW		4.235	-0.533	-1.25	4.361	-0.269	-0.85
TKCU4A		4.874	0.106	0.25	4.691	0.061	0.19
TUV7H9		4.602	-0.166	-0.39	4.674	0.044	0.14
WGEGXZ		4.330	-0.438	-1.03	4.102	-0.528	-1.67
XP7APQ		4.584	-0.184	-0.43	4.391	-0.239	-0.76

		Summary Statistics	
	Sample GM45		Sample GM46
Grand Means	4.7679	Percent	4.6297
SD Btwn Labs	0.4258	Percent	0.3156
Statistics based on 12 of 12 reporting participants			



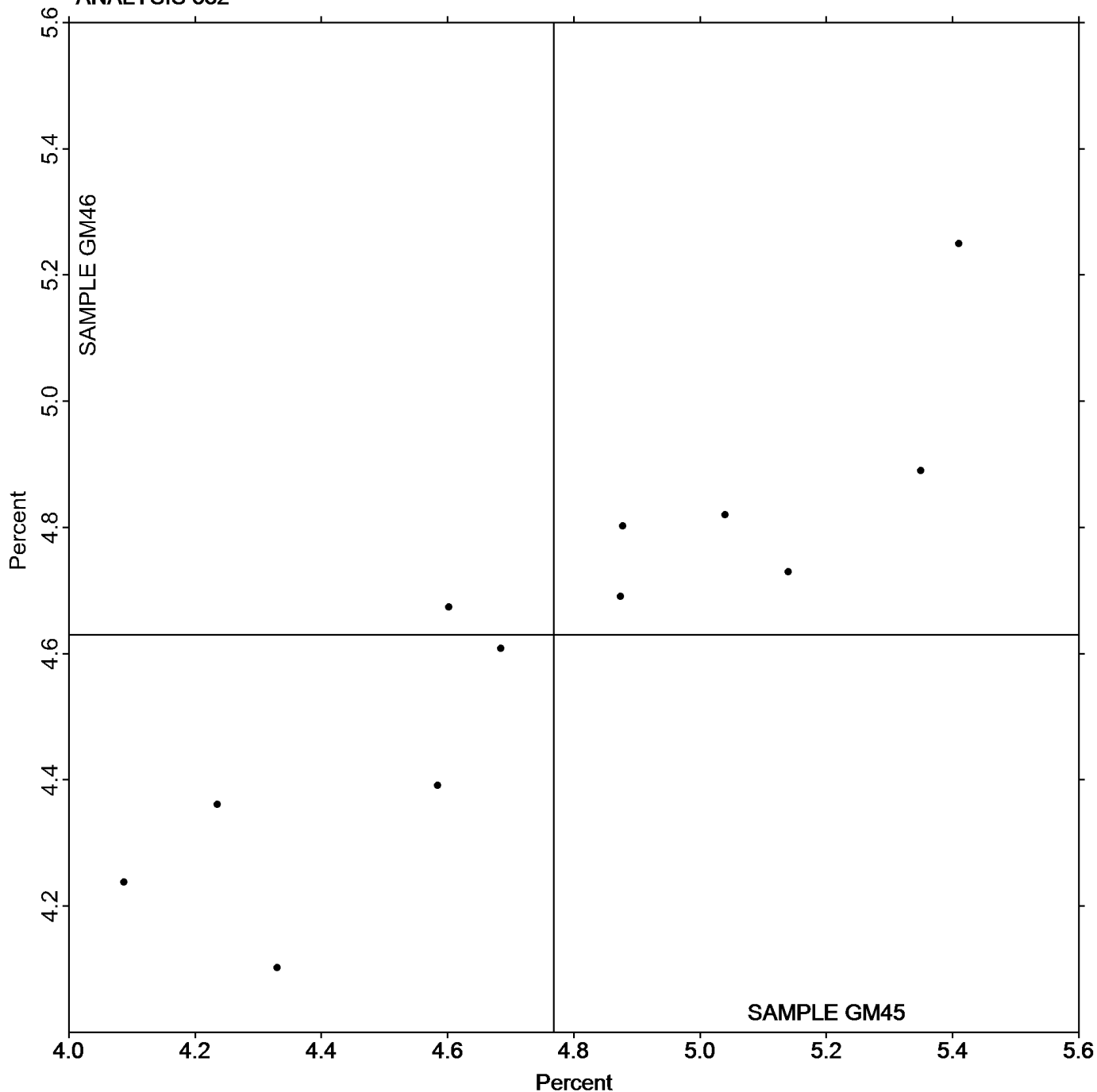
Paper & Paperboard Interlaboratory Testing Program
Analysis 382
Moisture in Paper

Report # 2892 G
August 2017

Grand Mean Sample **GM45** = 4.7679 Percent

Grand Mean Sample **GM46** = 4.6297 Percent

ANALYSIS 382



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 # 2892 G

Analysis 384

August 2017

Opacity (89% Reflectance Backing) - Fine Papers

WebCode	Data Flag	Sample GN45			Sample GN46		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2Q8ERP		93.62	0.08	0.24	93.37	-0.09	-0.25
32LVZL		94.06	0.52	1.55	93.36	-0.10	-0.28
32NHDU		92.80	-0.74	-2.19	92.83	-0.63	-1.80
76RRQR		93.53	-0.01	-0.03	93.36	-0.10	-0.29
9TVB33		93.22	-0.31	-0.93	92.98	-0.48	-1.37
A8Q8QT		93.65	0.12	0.34	93.16	-0.30	-0.85
BFYWAJ		93.07	-0.47	-1.39	92.75	-0.71	-2.03
CFT7EK		93.29	-0.25	-0.73	93.47	0.01	0.04
CV7G4T		93.56	0.02	0.07	93.52	0.06	0.19
DTC7NJ		93.44	-0.10	-0.29	93.64	0.18	0.51
EBTP33		93.72	0.18	0.54	93.82	0.36	1.04
FM4EGX		93.92	0.38	1.13	93.60	0.14	0.41
FVT8L4		93.56	0.02	0.06	93.59	0.13	0.37
H9CGFL		93.48	-0.06	-0.17	93.63	0.17	0.50
HANB2D		93.13	-0.41	-1.21	93.18	-0.28	-0.79
J7K4TL		93.95	0.41	1.22	94.15	0.69	1.99
KJMVBJ		93.66	0.12	0.36	93.96	0.50	1.44
LUXKNF		93.95	0.41	1.22	93.59	0.13	0.38
MXHRR9		93.68	0.14	0.43	93.44	-0.02	-0.05
N2ETDN		93.77	0.24	0.70	93.57	0.11	0.31
N2VVXG	X	94.99	1.45	4.30	95.05	1.59	4.57
NFVQCW	X	87.79	-5.75	-17.04	88.31	-5.15	-14.76
P32TN4		93.47	-0.07	-0.20	93.82	0.36	1.04
PCRAKK		93.46	-0.08	-0.23	93.23	-0.23	-0.65
PMMP2A	*	94.53	0.99	2.93	94.10	0.64	1.83
Q7HK96		93.58	0.04	0.13	93.75	0.29	0.84
QNGVXU		93.14	-0.40	-1.18	93.49	0.03	0.09
QYYCQZ		93.53	-0.01	-0.02	93.18	-0.28	-0.80
R4QY3K		93.97	0.43	1.28	93.51	0.05	0.15
R8AWPQ		93.46	-0.08	-0.23	93.81	0.35	1.01
RXJD9W	X	90.89	-2.65	-7.85	90.61	-2.85	-8.16
TABL64		93.25	-0.29	-0.85	92.88	-0.58	-1.65
VU4CDZ		93.09	-0.45	-1.33	93.52	0.06	0.18
WWTZBL		93.48	-0.06	-0.17	93.43	-0.03	-0.08
YUX2AT		93.65	0.11	0.32	93.12	-0.34	-0.98
ZBY4MQ		93.32	-0.22	-0.65	93.80	0.34	0.98
ZKNUAJ		93.29	-0.25	-0.73	92.96	-0.50	-1.43



**Paper & Paperboard Interlaboratory Testing Program
Analysis 384**

**Report # 2892 G
August 2017**

Opacity (89% Reflectance Backing) - Fine Papers

	Sample GN45	Summary Statistics	Sample GN46
Grand Means	93.538 Percent		93.457 Percent
SD Btwn Labs	0.337 Percent		0.349 Percent
Statistics based on 34 of 37 reporting participants			

Comments on Assigned Data Flags for Test #384

- NFVQCW (X) - Extreme Data.
- RXJD9W (X) - Extreme Data.
- N2VWXG (X) - Data for both samples are high.

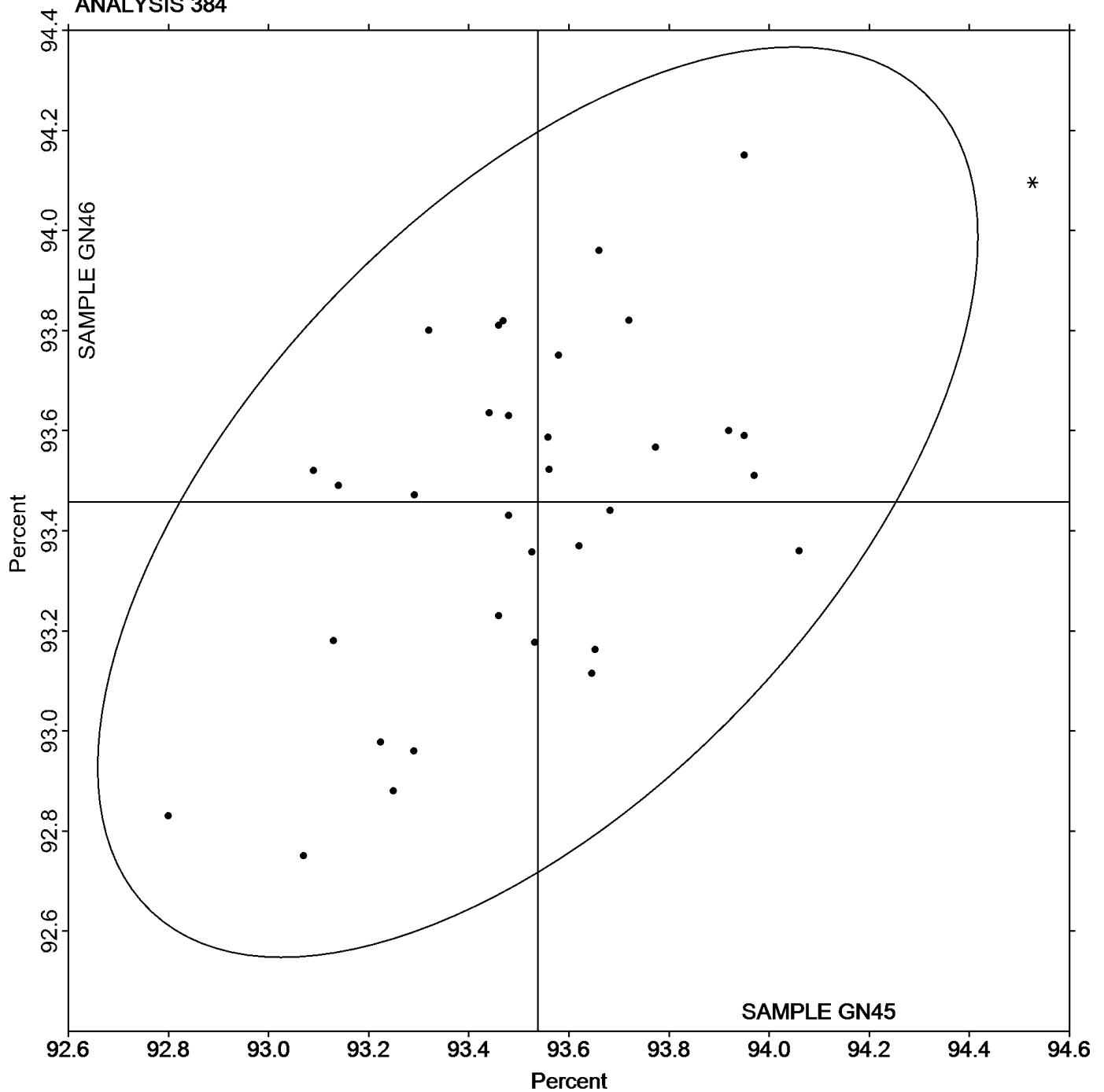


Opacity (89% Reflectance Backing) - Fine Papers

Grand Mean Sample GN45 = 93.538 Percent

Grand Mean Sample GN46 = 93.457 Percent

ANALYSIS 384





Paper & Paperboard Interlaboratory Testing Program
Analysis 386
Opacity (Paper Backing) - Fine Papers and Newsprint

Report # 2892 G
 August 2017

WebCode	Data Flag	Sample GP45			Sample GP46		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
32NHDU		95.11	-0.09	-0.67	93.39	-0.04	-0.32
4DDWX9		95.25	0.05	0.34	93.40	-0.03	-0.21
4PMJXT		95.10	-0.11	-0.78	93.34	-0.09	-0.69
6ZLRYA		95.08	-0.12	-0.86	93.29	-0.15	-1.15
CT2W6Z		95.22	0.01	0.10	93.42	-0.02	-0.12
ND8G3V		95.13	-0.07	-0.50	93.42	-0.02	-0.12
NT22JJ		95.24	0.03	0.24	93.49	0.06	0.50
PMMP2A		95.24	0.03	0.24	93.39	-0.04	-0.31
TAU6CW		95.15	-0.05	-0.37	93.40	-0.03	-0.27
TZMP6N	*	95.68	0.47	3.44	93.87	0.44	3.49
V6R9E2		95.21	0.01	0.08	93.41	-0.03	-0.20
V7ZDYG		95.20	0.00	-0.03	93.45	0.02	0.15
VKZZJQ		95.19	-0.02	-0.13	93.37	-0.06	-0.45
XUHFZQ		95.14	-0.06	-0.44	93.41	-0.02	-0.13
XVWMNT		95.10	-0.10	-0.71	93.45	0.02	0.14
ZFB9YQ		95.21	0.01	0.05	93.39	-0.04	-0.32

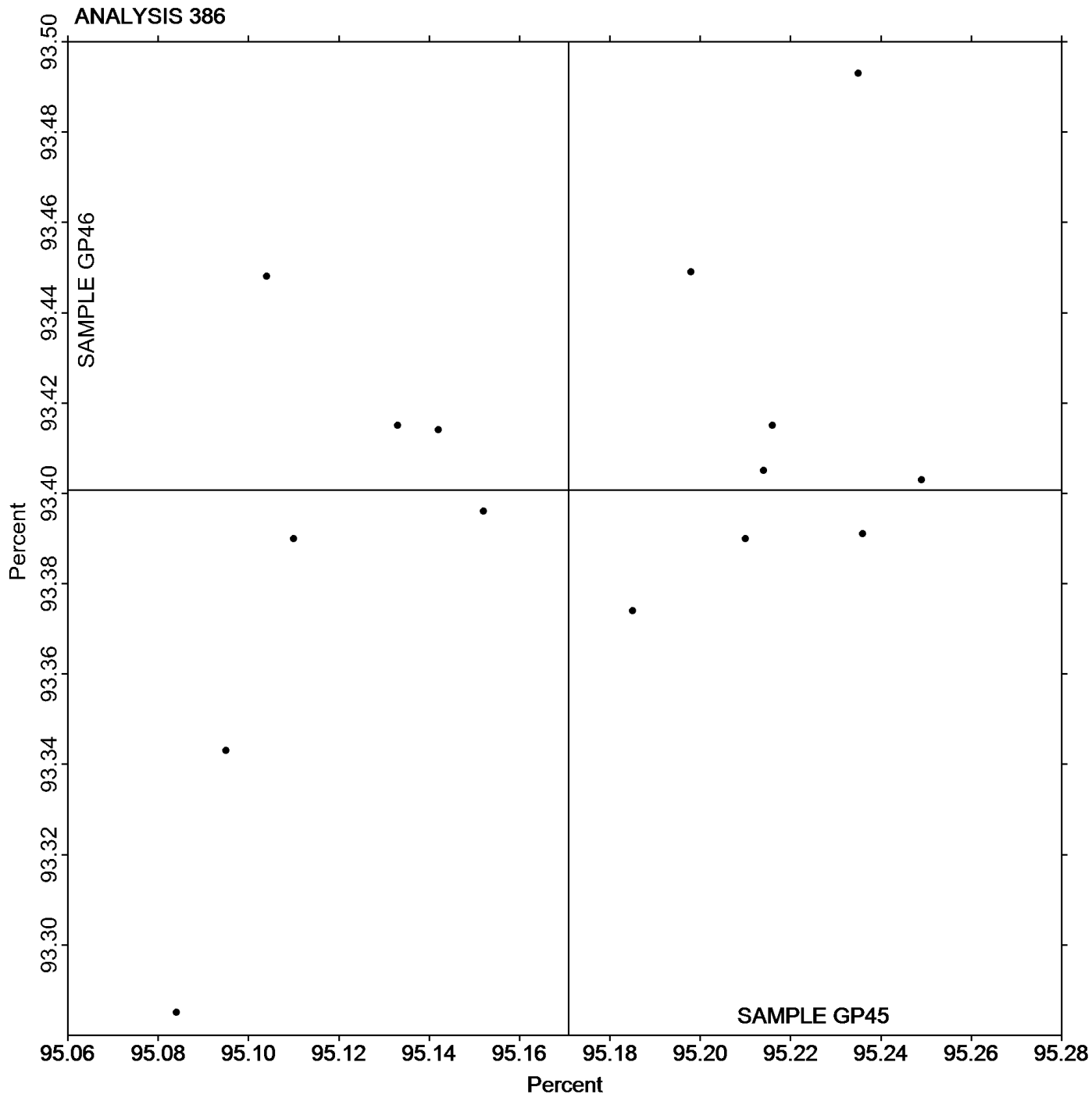
	Sample GP45	Summary Statistics	Sample GP46
Grand Means	95.203 Percent		93.430 Percent
SD Btwn Labs	0.138 Percent		0.126 Percent
Statistics based on 16 of 16 reporting participants			



Opacity (Paper Backing) - Fine Papers and Newsprint

Grand Mean Sample GP45 = 95.203 Percent

Grand Mean Sample GP46 = 93.430 Percent



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 390
Directional Brightness**

Report # 2892 G
August 2017

WebCode	Data Flag	Sample GR45			Sample GR46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2Q8ERP		83.28	-0.54	-0.56	84.00	-0.33	-0.33	TS
32LVZL		84.38	0.56	0.59	84.92	0.59	0.59	MK
32NHDU		82.84	-0.98	-1.04	83.40	-0.93	-0.92	TS
463KTX		83.19	-0.63	-0.66	83.64	-0.69	-0.68	TS
76RRQR		85.61	1.79	1.89	85.98	1.65	1.64	XX
7N76MN		83.45	-0.37	-0.39	84.26	-0.07	-0.07	TS
8DJKHH		84.44	0.62	0.66	85.04	0.71	0.70	HD
8UPRRT		83.34	-0.48	-0.51	84.07	-0.26	-0.26	TS
A8Q8QT		85.20	1.38	1.45	85.74	1.41	1.40	TS
ALMLQM		83.40	-0.42	-0.45	84.09	-0.24	-0.24	TS
CFT7EK		85.48	1.66	1.75	86.06	1.73	1.72	TS
CV7G4T		84.99	1.17	1.23	85.43	1.09	1.09	XX
DTC7NJ		83.15	-0.67	-0.71	83.24	-1.09	-1.08	TS
E7XZF4		83.31	-0.51	-0.53	83.98	-0.36	-0.35	TS
EBTP33		83.10	-0.72	-0.76	83.69	-0.64	-0.64	TA
H9CGFL		84.85	1.03	1.09	85.66	1.33	1.32	TS
HANB2D		84.25	0.43	0.45	84.66	0.33	0.33	XS
HCEAHX		85.01	1.19	1.26	85.39	1.06	1.05	TT
J4G622	*	82.61	-1.21	-1.27	82.54	-1.79	-1.78	TS
JDM2RQ	X	79.34	-4.48	-4.73	80.78	-3.55	-3.53	PP
KB9YC6		83.83	0.01	0.01	84.48	0.15	0.15	HD
KJMVBJ		83.53	-0.29	-0.31	84.18	-0.16	-0.15	TS
LGGMP7		85.54	1.72	1.81	85.98	1.64	1.63	TT
LUXKNF		83.65	-0.17	-0.18	84.11	-0.22	-0.22	TT
N2VVXG	X	87.61	3.79	4.00	96.23	11.89	11.81	XX
NFVQCW	X	90.67	6.85	7.22	91.27	6.94	6.89	PE
PCRAKK		82.78	-1.04	-1.10	83.33	-1.01	-1.00	TT
PMMP2A		82.88	-0.94	-0.99	83.50	-0.83	-0.82	TS
PNH7FR		82.96	-0.86	-0.91	83.45	-0.88	-0.87	TS
QNGVXU		84.96	1.14	1.21	85.48	1.14	1.14	TS
R8AWPQ		83.44	-0.38	-0.40	84.24	-0.09	-0.09	TS
UR4LVZ		82.77	-1.05	-1.11	83.13	-1.20	-1.19	TS
UXVQP6		83.33	-0.49	-0.52	84.00	-0.33	-0.33	TT
WWTZBL	*	82.86	-0.96	-1.01	82.60	-1.73	-1.72	TT

Sample GR45		Summary Statistics	Sample GR46	
Grand Means	83.819 Percent		84.331 Percent	
SD Btwn Labs	0.948 Percent		1.007 Percent	
Statistics based on 31 of 34 reporting participants				



Paper & Paperboard Interlaboratory Testing Program
Analysis 390
Directional Brightness

Report # 2892 G
August 2017

Comments on Assigned Data Flags for Test #390

JDM2RQ (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of both samples.

NFVQCW (X) - Extreme Data.

N2VWXG (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

HD	Hunter D25DP - 9000	MK	Macbeth Color-Eye 7000 Spectrophotometer
PE	Photovolt 577	PP	Technidyne Profile/Plus
TA	Technidyne, Diano, M.S. S-4	TS	Technidyne Brightimeter Micro S-5
TT	Technidyne Brightimeter Micro S4-M	XS	X-Rite 938 Spectrodensitometer
XX	Instrument make/model not specified by lab		

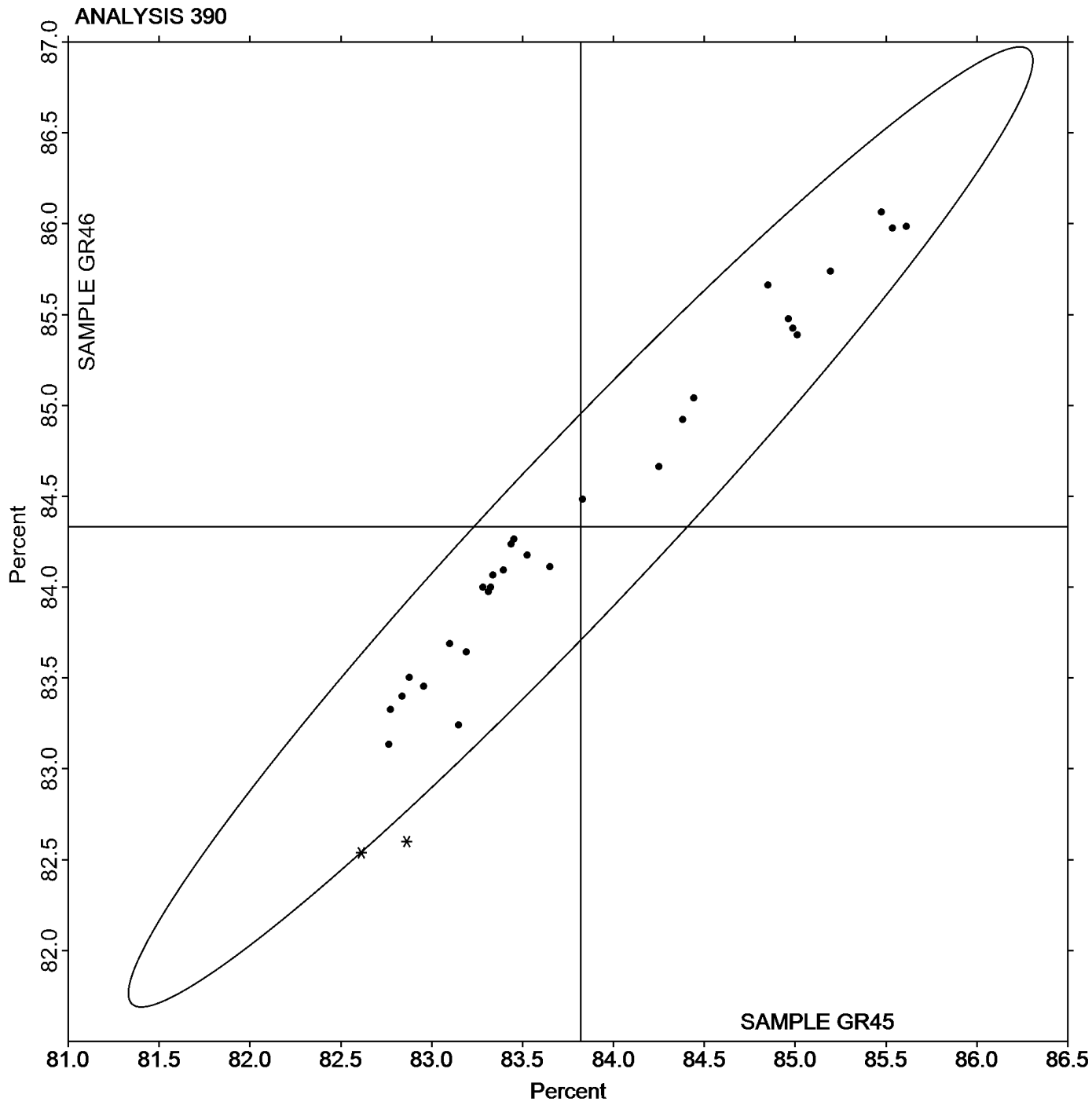


Paper & Paperboard Interlaboratory Testing Program
Analysis 390
Directional Brightness

Report # 2892 G
August 2017

Grand Mean Sample **GR45** = 83.819 Percent

Grand Mean Sample **GR46** = 84.331 Percent





**Paper & Paperboard Interlaboratory Testing Program
Analysis 391**

**Report # 2892 G
August 2017**

Directional Brightness of Fluorescent Samples

WebCode	Data Flag	Sample GZ45			Sample GZ46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4JX2HV		98.29	0.16	0.25	97.67	0.33	0.41	TS
76RRQR		99.32	1.19	1.84	98.90	1.55	1.94	XX
8TUBEV	*	98.08	-0.05	-0.08	95.84	-1.51	-1.88	EF
9TVB33		98.65	0.52	0.80	97.96	0.62	0.77	TS
BFYWAJ		96.68	-1.45	-2.25	96.01	-1.34	-1.67	HT
FM4EGX		97.66	-0.47	-0.72	97.01	-0.34	-0.42	PP
FVT8L4		98.27	0.14	0.22	97.57	0.23	0.28	TS
J7K4TL		98.48	0.35	0.54	97.68	0.34	0.42	TT
N2ETDN		97.47	-0.66	-1.02	96.79	-0.55	-0.69	TS
Q7HK96		98.26	0.13	0.20	97.72	0.38	0.47	TT
QYYCQZ		98.75	0.62	0.95	98.02	0.68	0.84	TS
R4QY3K		98.82	0.69	1.07	98.18	0.84	1.04	TS
R8AWPQ		97.92	-0.21	-0.33	97.09	-0.25	-0.32	TS
TABL64		98.02	-0.11	-0.17	97.12	-0.23	-0.28	TT
YUX2AT		98.14	0.01	0.01	97.42	0.08	0.09	TS
ZKNUAJ		97.28	-0.85	-1.31	96.54	-0.80	-1.00	HT

Sample GZ45		Summary Statistics	Sample GZ46	
Grand Means	98.131 Percent		97.345 Percent	
SD Btwn Labs	0.644 Percent		0.800 Percent	
Statistics based on 16 of 16 reporting participants				

Key to Instrument Codes Reported by Participants

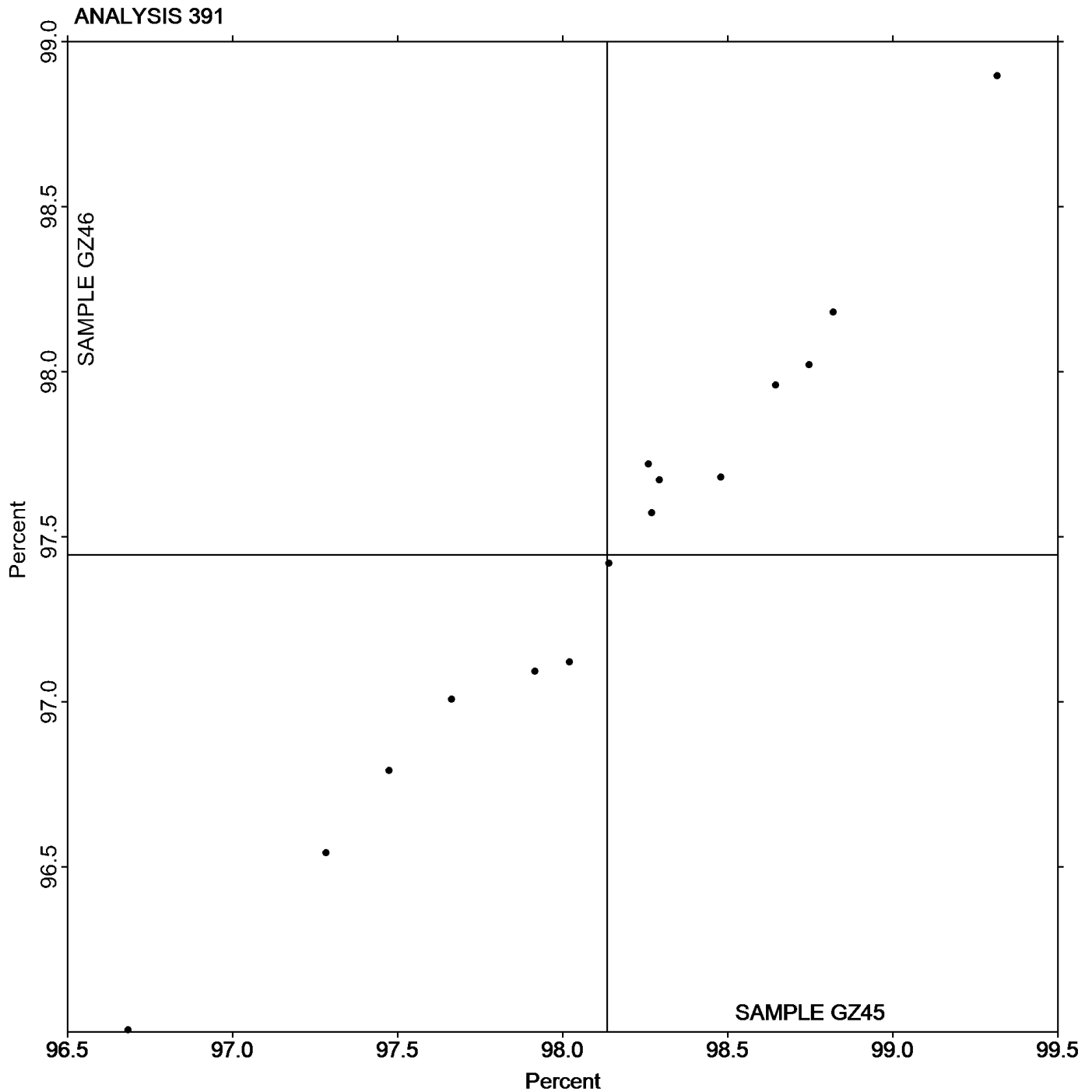
EF	L & W Datacolor Elrepho	HT	Hunter UltraScan Vis
PP	Technidyne Profile/Plus	TS	Technidyne Brightimeter Micro S-5
TT	Technidyne Brightimeter Micro S4-M	XX	Instrument make/model not specified by lab



Directional Brightness of Fluorescent Samples

Grand Mean Sample **GZ45** = 98.131 Percent

Grand Mean Sample **GZ46** = 97.345 Percent



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 392
Diffuse Brightness**

Report # 2892 G
August 2017

WebCode	Data Flag	Sample GR45			Sample GR46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2Q8ERP		83.58	0.13	0.48	84.20	0.17	0.73	TC
32NHDU		83.79	0.34	1.26	84.30	0.27	1.14	TC
4JX2HV		83.68	0.23	0.86	84.20	0.17	0.72	TC
4KAW4N		83.43	-0.02	-0.08	84.10	0.07	0.29	TC
8C9LLN	*	84.08	0.63	2.35	84.69	0.66	2.79	LA
8TUBEV		83.19	-0.26	-0.99	83.76	-0.27	-1.14	LA
8V3AY6		83.57	0.12	0.46	84.13	0.10	0.41	TC
ALMLQM		83.32	-0.14	-0.51	83.98	-0.06	-0.24	TM
E7XZF4	*	83.71	0.26	0.98	84.00	-0.03	-0.13	TC
GRDUM2		83.18	-0.27	-1.02	83.87	-0.17	-0.70	TC
GTPUKV		83.66	0.21	0.79	84.24	0.21	0.87	EF
HCEAHX	*	82.84	-0.61	-2.31	83.66	-0.37	-1.56	EG
LGGMP7	X	85.53	2.07	7.80	86.18	2.14	9.06	TL
NT22JJ		83.50	0.05	0.17	84.11	0.08	0.34	LA
PCRAKK		83.44	-0.02	-0.06	84.09	0.05	0.23	LT
PMMP2A		83.43	-0.02	-0.08	84.05	0.02	0.08	TC
PNH7FR		83.78	0.33	1.24	84.20	0.17	0.72	TC
PX8YQ3		83.25	-0.21	-0.78	83.80	-0.23	-0.96	TC
QTAX2T		83.34	-0.11	-0.41	83.88	-0.16	-0.65	TC
TAU6CW		83.14	-0.31	-1.17	83.70	-0.33	-1.38	LS
ULWZ2C		83.50	0.05	0.18	83.96	-0.07	-0.29	PP
UM83NB		83.57	0.12	0.46	84.12	0.09	0.37	TC
UX9HGL		83.33	-0.12	-0.44	84.07	0.04	0.15	TC
UXVQP6	X	83.12	-0.33	-1.26	83.23	-0.81	-3.41	EG
V7ZDYG		83.77	0.32	1.20	84.33	0.30	1.27	TC
VKZZJQ		83.12	-0.33	-1.23	83.69	-0.35	-1.46	EG
WG3TKF		83.60	0.15	0.55	84.27	0.24	1.01	TC
XUHFZQ		83.46	0.01	0.02	83.87	-0.16	-0.69	LS
XVWMNT		83.11	-0.34	-1.27	83.71	-0.32	-1.36	TM
ZFB9YQ		83.28	-0.18	-0.66	83.90	-0.13	-0.55	TM

Sample GR45		Summary Statistics	Sample GR46	
Grand Means	83.451 Percent		84.031 Percent	
SD Btwn Labs	0.266 Percent		0.237 Percent	
Statistics based on 28 of 30 reporting participants				

Comments on Assigned Data Flags for Test #392

UXVQP6 (X) - Data for sample GR46 are low.

LGGMP7 (X) - Extreme Data.



Paper & Paperboard Interlaboratory Testing Program
Analysis 392
Diffuse Brightness

Report # 2892 G
August 2017

Key to Instrument Codes Reported by Participants

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	PP	Technidyne Profile/Plus
TC	Technidyne Color Touch Series	TL	Technidyne Technibrite TB-1
TM	Technidyne Technibrite Micro TB-1C		



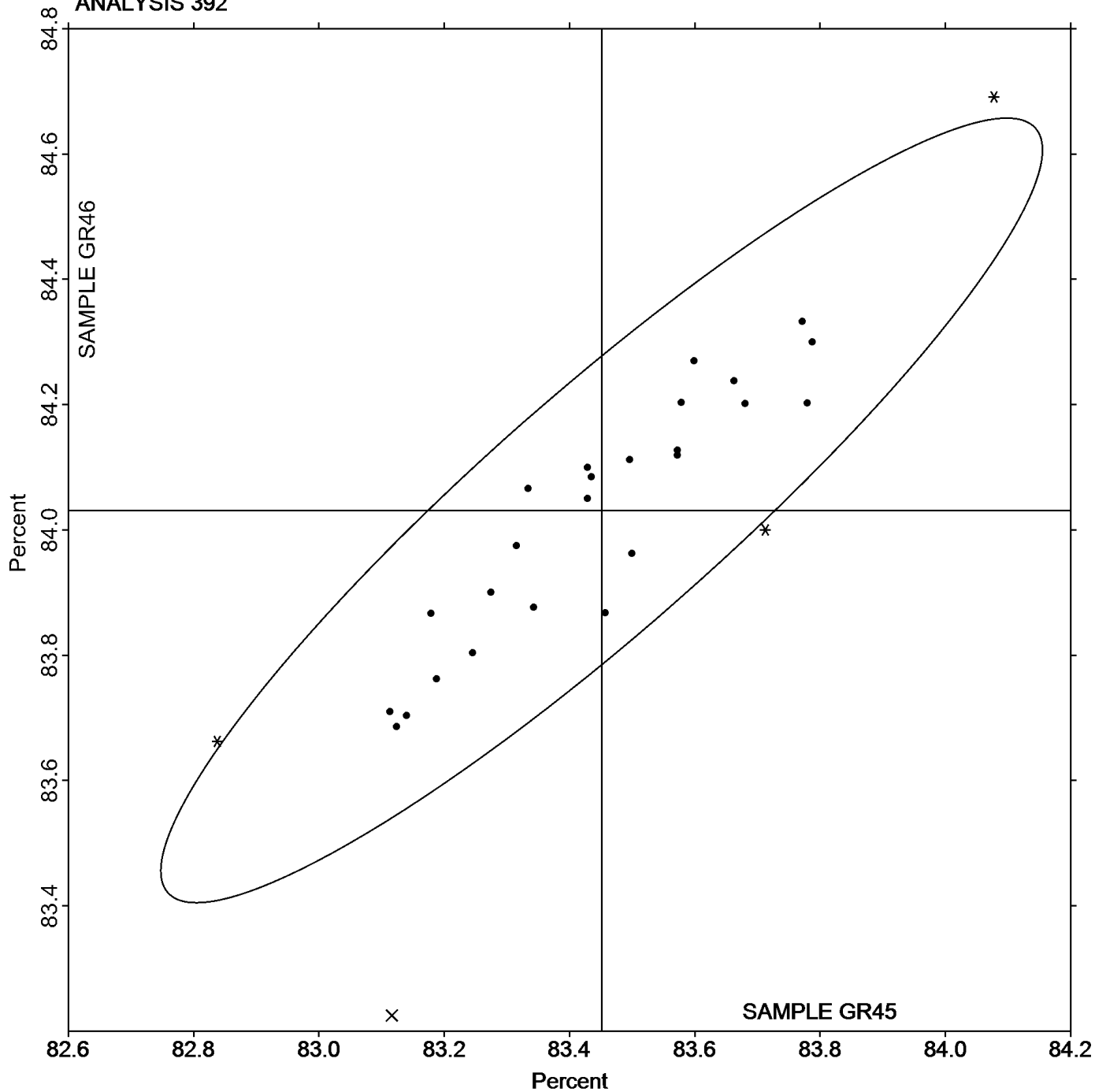
Paper & Paperboard Interlaboratory Testing Program
Analysis 392
Diffuse Brightness

Report # 2892 G
August 2017

Grand Mean Sample **GR45** = 83.451 Percent

Grand Mean Sample **GR46** = 84.031 Percent

ANALYSIS 392





**Paper & Paperboard Interlaboratory Testing Program
Analysis 394
Fluorescent Component of Directional Brightness**

Report # 2892 G
August 2017

WebCode	Data Flag	Sample GZ45			Sample GZ46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4JX2HV		8.568	-0.241	-0.64	7.756	-0.472	-1.19	TS
76RRQR		8.712	-0.097	-0.26	8.288	0.060	0.15	XX
8TUBEV	X	11.280	2.471	6.57	10.420	2.192	5.52	EF
9TVB33		9.400	0.591	1.57	8.746	0.518	1.30	TS
FM4EGX		8.342	-0.467	-1.24	7.872	-0.356	-0.90	PP
FVT8L4		8.632	-0.177	-0.47	8.030	-0.198	-0.50	TS
N2ETDN		8.860	0.051	0.14	8.346	0.118	0.30	TS
QYYCQZ		9.434	0.625	1.66	8.830	0.602	1.52	TS
R8AWPQ		8.362	-0.447	-1.19	7.656	-0.572	-1.44	TS
TABL64		8.920	0.111	0.30	8.440	0.212	0.53	TT
YUX2AT		8.860	0.051	0.14	8.320	0.092	0.23	TS

Sample GZ45		Summary Statistics		Sample GZ46	
Grand Means	8.8090 Percent			8.2284 Percent	
SD Btwn Labs	0.3763 Percent			0.3969 Percent	
Statistics based on 10 of 11 reporting participants					

Comments on Assigned Data Flags for Test #394

8TUBEV (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		

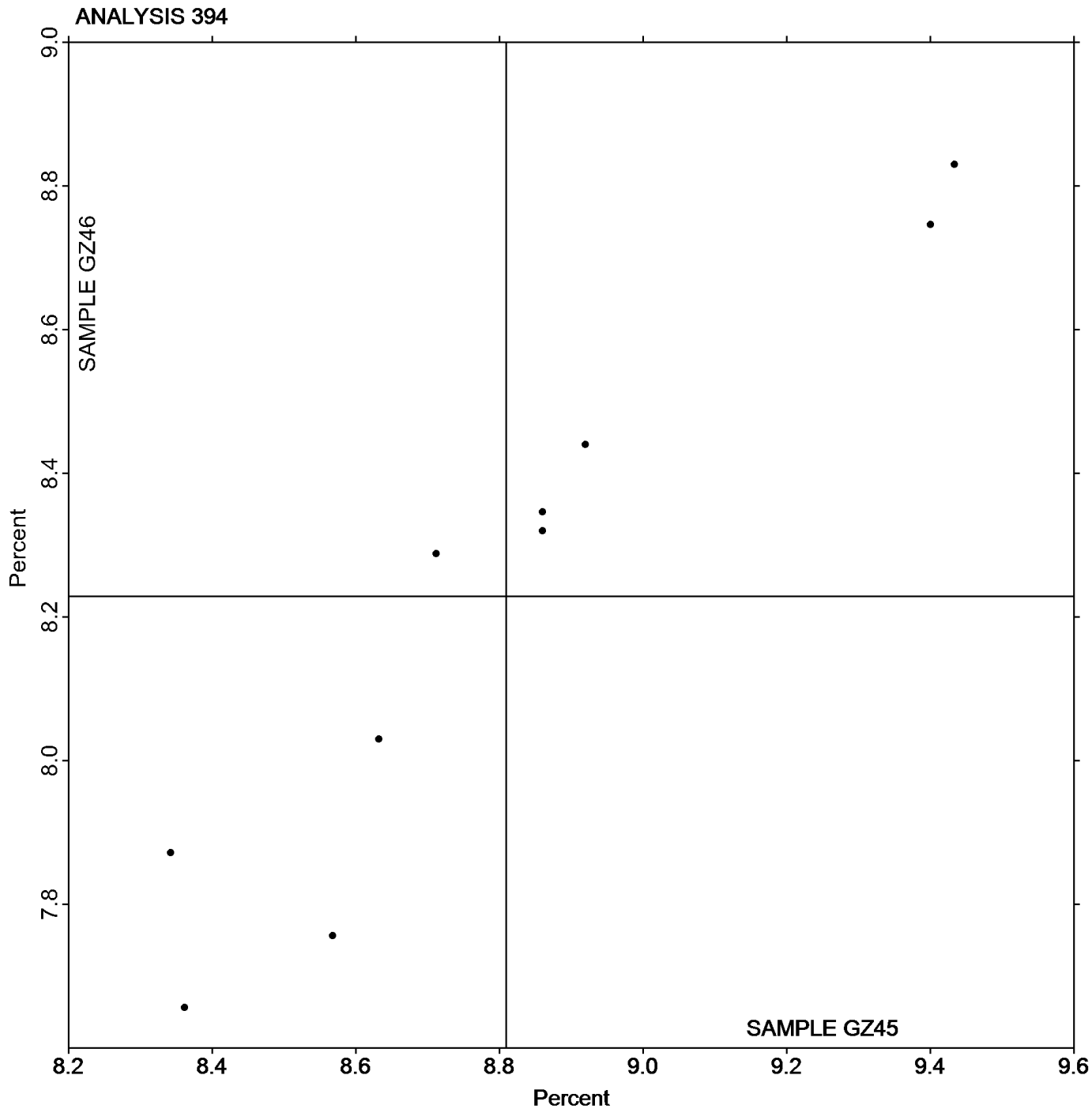


Paper & Paperboard Interlaboratory Testing Program
Analysis 394
Fluorescent Component of Directional Brightness

Report # 2892 G
August 2017

Grand Mean Sample **GZ45** = 8.8090 Percent

Grand Mean Sample **GZ46** = 8.2284 Percent



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



Specular Gloss at 75 Degrees - High Range

WebCode	Data Flag	Sample GT45			Sample GT46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
32LVZL		76.48	0.06	0.01	77.82	-0.09	-0.02	PP
32NHDU		77.38	0.95	0.21	79.12	1.21	0.25	TG
4AX8QR	*	91.37	14.95	3.24	94.40	16.49	3.36	VM
4PMJXT		73.87	-2.55	-0.55	76.21	-1.70	-0.35	GM
8DJKHH		78.65	2.23	0.48	80.59	2.68	0.55	TH
A47A4N		74.56	-1.86	-0.40	76.13	-1.78	-0.36	LA
CFT7EK		72.94	-3.48	-0.76	74.95	-2.96	-0.60	LA
FM4EGX		75.44	-0.98	-0.21	77.31	-0.60	-0.12	PP
FVT8L4		76.79	0.37	0.08	76.68	-1.23	-0.25	LA
HCEAHX		74.84	-1.58	-0.34	76.57	-1.34	-0.27	GM
KB9YC6		77.16	0.74	0.16	78.51	0.60	0.12	TH
LGGMP7		82.15	5.73	1.24	82.10	4.19	0.85	GS
LUXKNF		76.28	-0.14	-0.03	77.53	-0.38	-0.08	TH
PMMP2A		75.26	-1.16	-0.25	76.17	-1.74	-0.36	TH
Q7HK96		76.56	0.13	0.03	79.80	1.89	0.38	TG
QNGT9P		68.98	-7.44	-1.62	69.29	-8.62	-1.76	XX
QTAX2T		70.33	-6.09	-1.32	72.05	-5.86	-1.20	ZH
UXVQP6		76.51	0.09	0.02	77.19	-0.72	-0.15	TH
XUHFZQ		76.53	0.11	0.02	77.96	0.05	0.01	LB

Sample GT45		Summary Statistics	Sample GT46	
Grand Means	76.425 Gloss Units		77.915 Gloss Units	
SD Btwn Labs	4.609 Gloss Units		4.904 Gloss Units	
Statistics based on 19 of 19 reporting participants				

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

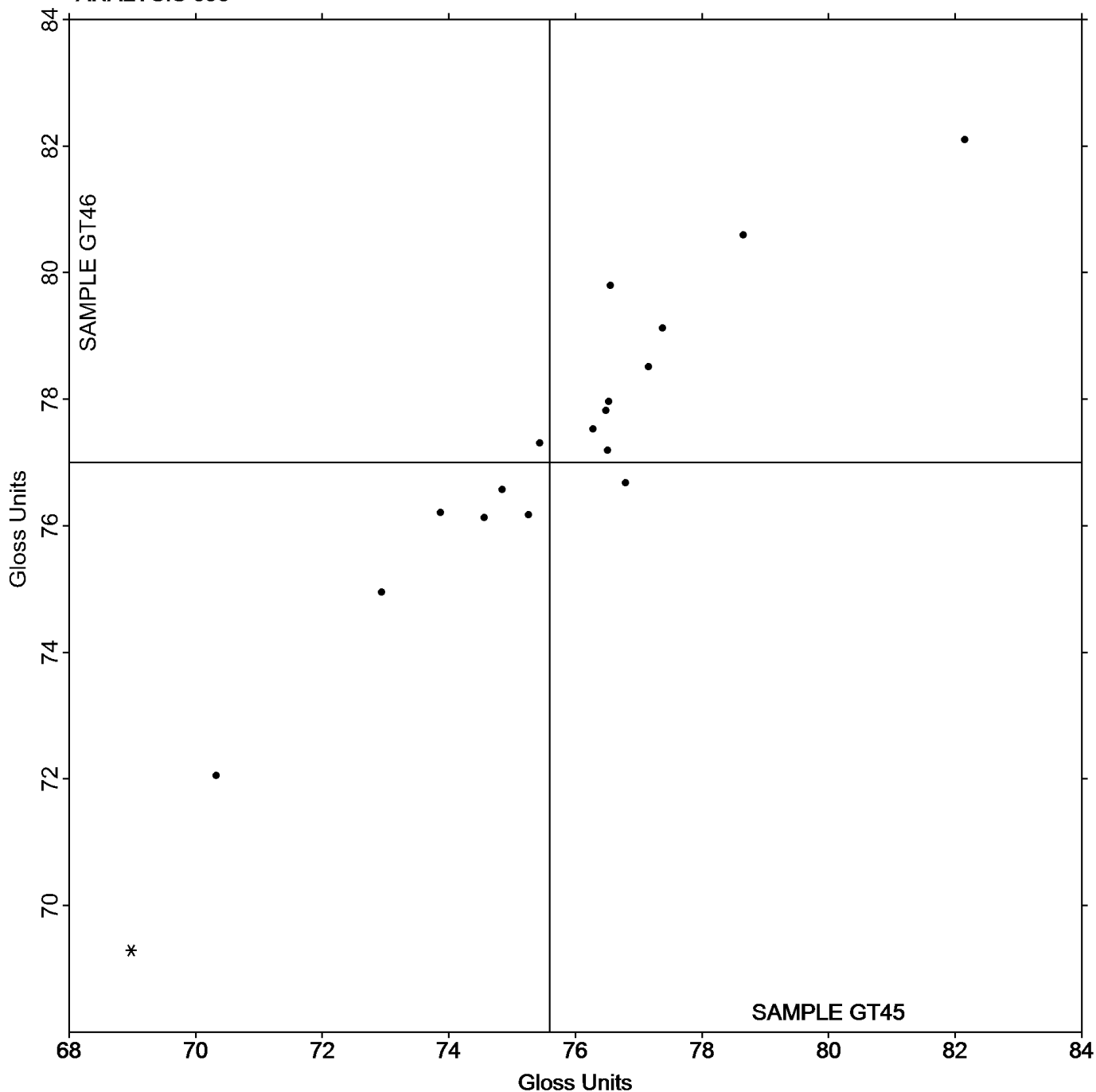


Specular Gloss at 75 Degrees - High Range

Grand Mean Sample **GT45** = 76.425 Gloss Units

Grand Mean Sample **GT46** = 77.915 Gloss Units

ANALYSIS 395



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 396**

**Report # 2892 G
August 2017**

Specular Gloss at 75 Degrees - Low Range

WebCode	Data Flag	Sample GU45			Sample GU46			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
32NHDU		47.21	5.52	1.58	39.55	5.06	2.02	TG
8HDKWD		41.06	-0.63	-0.18	34.06	-0.43	-0.17	XX
8TUBEV		34.63	-7.06	-2.02	30.81	-3.68	-1.47	TG
E7XZF4		42.88	1.19	0.34	35.82	1.33	0.53	TH
EBTP33		43.32	1.63	0.47	34.18	-0.31	-0.13	TH
HANB2D		41.00	-0.69	-0.20	33.93	-0.56	-0.22	TH
MXHRR9		41.61	-0.08	-0.02	32.91	-1.58	-0.63	PP
XUHFZQ		41.79	0.10	0.03	34.66	0.17	0.07	LA

		Summary Statistics	
		Sample GU45	Sample GU46
Grand Means		41.687 Gloss Units	34.489 Gloss Units
SD Btwn Labs		3.489 Gloss Units	2.508 Gloss Units
Statistics based on 8 of 8 reporting participants			

Key to Instrument Codes Reported by Participants

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

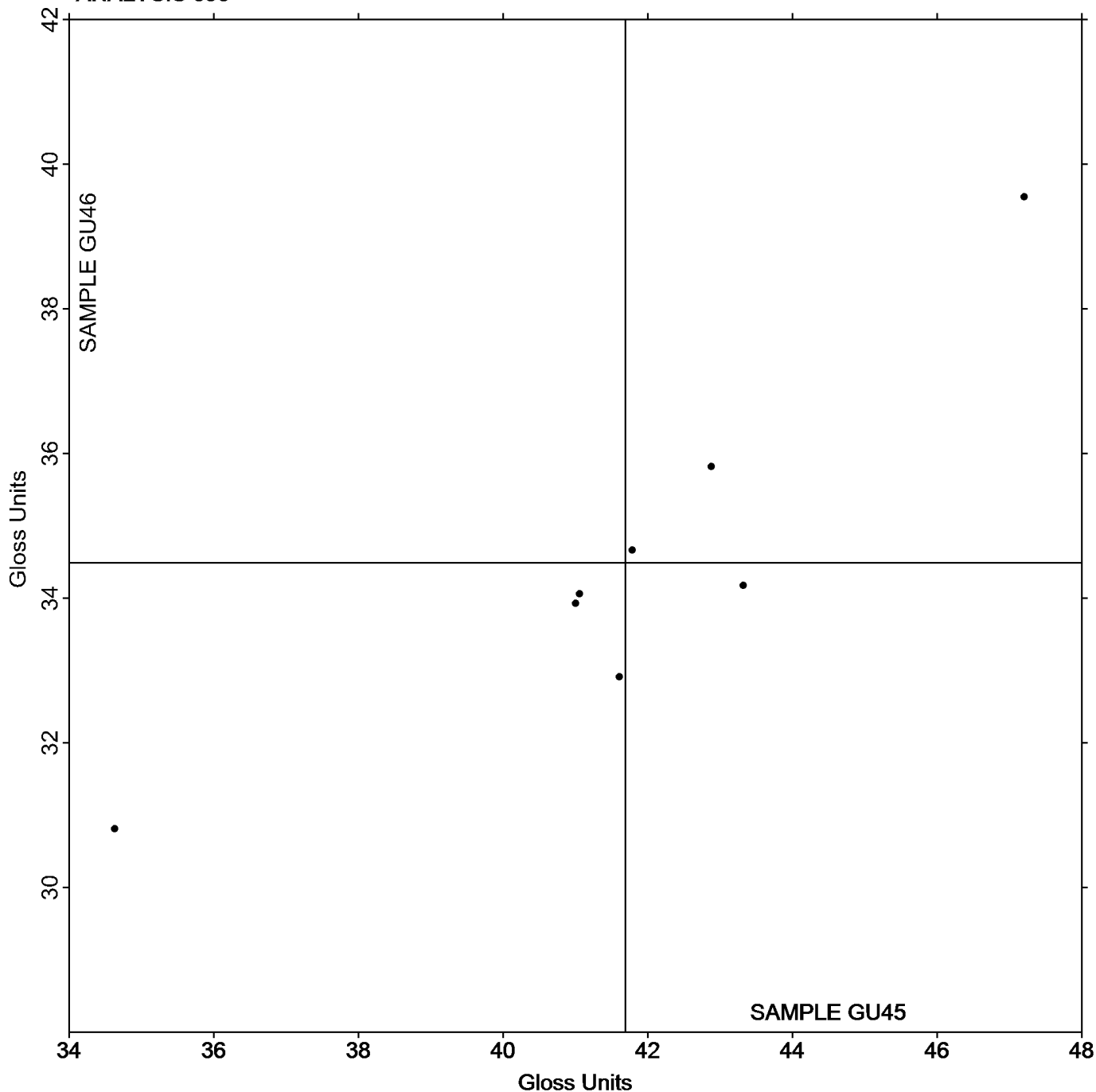


Specular Gloss at 75 Degrees - Low Range

Grand Mean Sample **GU45** = 41.687 Gloss Units

Grand Mean Sample **GU46** = 34.489 Gloss Units

ANALYSIS 396



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 398
Grammage (Mass per Unit Area)**

Report # 2892 G
August 2017

WebCode	Data Flag	Sample GW45			Sample GW46		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
43CEGD		90.12	0.83	1.41	104.0	0.3	0.37
4DDWX9		89.12	-0.17	-0.29	104.1	0.4	0.49
4PMJXT		88.62	-0.67	-1.14	103.0	-0.6	-0.68
87J6QP		89.61	0.32	0.54	105.0	1.4	1.58
8HDKWD		89.06	-0.23	-0.39	103.5	-0.2	-0.21
8TUBEV		88.50	-0.79	-1.35	101.5	-2.1	-2.42
BFYWAJ		89.94	0.65	1.11	104.9	1.3	1.43
BYBN7U		89.44	0.15	0.25	104.2	0.6	0.65
CV7G4T		89.07	-0.22	-0.38	103.2	-0.4	-0.48
E7W369		89.39	0.09	0.16	103.5	-0.1	-0.15
EBTP33		88.35	-0.94	-1.61	103.2	-0.4	-0.46
FJX72L		88.96	-0.33	-0.56	103.3	-0.3	-0.34
H8LB43		88.81	-0.48	-0.81	102.8	-0.8	-0.95
HANB2D		88.64	-0.65	-1.11	103.0	-0.7	-0.75
KJMVBJ		88.84	-0.45	-0.77	103.0	-0.6	-0.70
PNH7FR		89.97	0.68	1.16	103.8	0.2	0.18
R4QY3K		89.28	-0.01	-0.02	103.6	0.0	-0.05
TAU6CW		89.03	-0.26	-0.45	103.4	-0.3	-0.29
TKCU4A	*	90.42	1.13	1.93	106.0	2.4	2.69
UVA3BJ	*	90.35	1.06	1.81	103.2	-0.5	-0.56
V6R9E2		89.38	0.09	0.15	104.5	0.9	1.00
VU4CDZ		89.31	0.02	0.03	103.1	-0.6	-0.67
XP7APQ		88.62	-0.67	-1.14	103.2	-0.5	-0.54
XUHFZQ		88.82	-0.47	-0.81	103.7	0.0	0.04
YUX2AT		89.35	0.06	0.10	103.4	-0.2	-0.23
ZBY4MQ		90.25	0.96	1.64	104.9	1.3	1.46
ZKNUAJ		89.60	0.31	0.53	103.3	-0.3	-0.39

	Sample GW45	Summary Statistics	Sample GW46
Grand Means	89.291 g/sq m		103.64 g/sq m
SD Btwn Labs	0.586 g/sq m		0.88 g/sq m
Statistics based on 27 of 27 reporting participants			

Analysis Notes:

ZKNUAJ - One determination removed from the Lab Mean of Sample GW46 per Grubb's Test at 1% risk (TAPPI 1205).

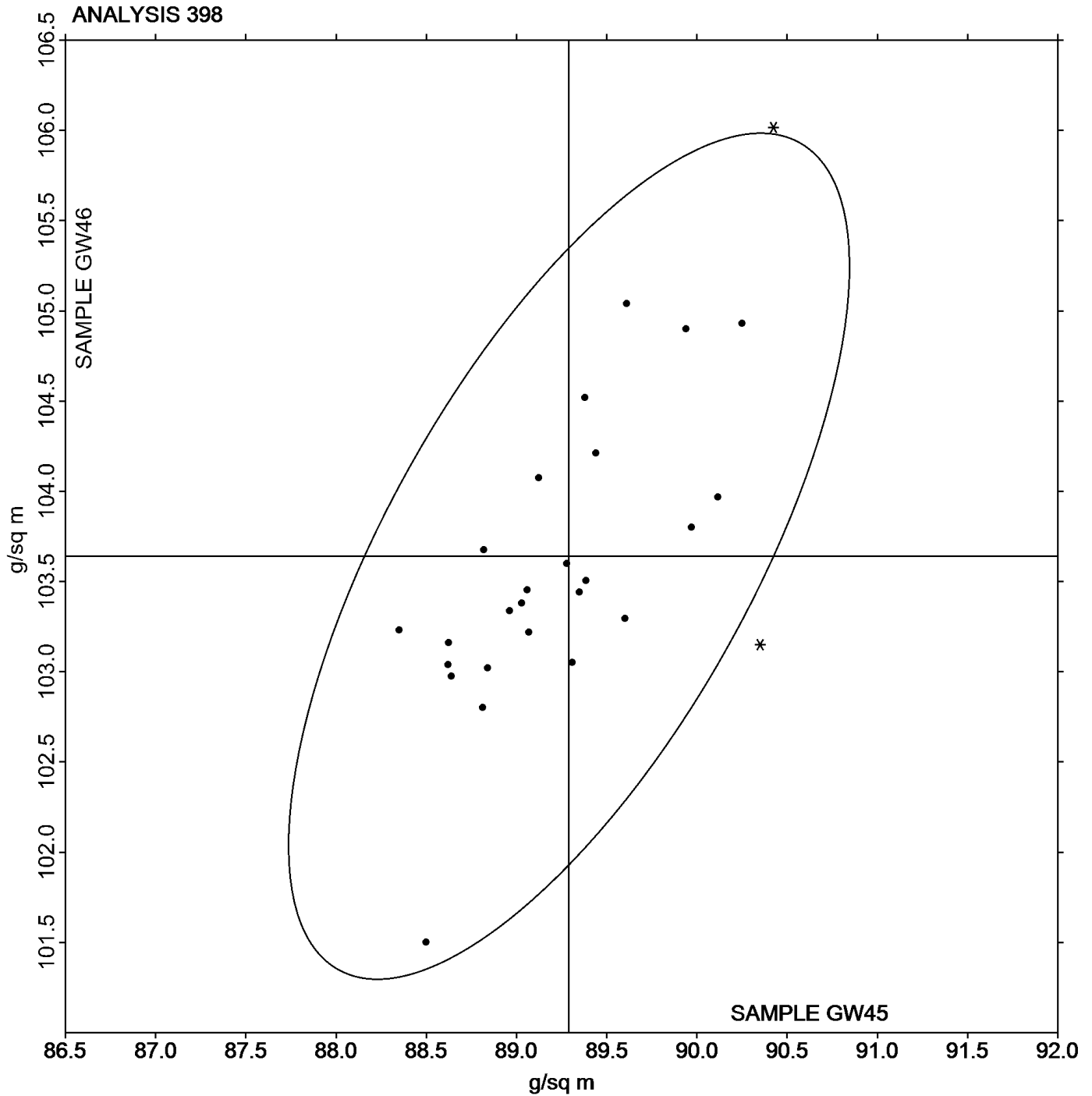


Paper & Paperboard Interlaboratory Testing Program
Analysis 398
Grammage (Mass per Unit Area)

Report # 2892 G
August 2017

Grand Mean Sample **GW45** = 89.291 g/sq m

Grand Mean Sample **GW46** = 103.64 g/sq m





**Paper & Paperboard Interlaboratory Testing Program
Analysis 399
Sizing Test (Hercules Type)**

Report # 2892 G
August 2017

WebCode	Data Flag	Sample GX45			Sample GX46		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2MMRVV		13.46	-1.99	-0.40	13.80	-0.56	-0.13
2Q8ERP		22.76	7.31	1.48	18.82	4.46	1.05
32LVZL		12.26	-3.18	-0.64	14.72	0.36	0.08
4AX8QR		11.80	-3.65	-0.74	11.76	-2.60	-0.61
4JJHXY		14.80	-0.65	-0.13	17.20	2.84	0.67
7N76MN		13.55	-1.90	-0.38	14.50	0.14	0.03
9TVB33		11.99	-3.46	-0.70	12.40	-1.96	-0.46
A7CQJ8		13.27	-2.18	-0.44	12.83	-1.53	-0.36
CFT7EK		10.46	-4.99	-1.01	10.68	-3.68	-0.87
CV7G4T	*	23.21	7.76	1.57	27.12	12.76	3.01
DTC7NJ		22.15	6.70	1.36	21.10	6.74	1.59
FVT8L4		15.59	0.14	0.03	13.76	-0.60	-0.14
HV3Z9G		13.39	-2.06	-0.42	11.00	-3.36	-0.79
J7K4TL		9.31	-6.14	-1.24	13.76	-0.60	-0.14
JR4ZWQ		18.57	3.12	0.63	11.01	-3.35	-0.79
KJMVBJ		23.70	8.25	1.67	15.90	1.54	0.36
LUXKNF		28.00	12.55	2.54	21.50	7.14	1.69
MXHRR9		13.91	-1.54	-0.31	12.23	-2.13	-0.50
N2ETDN		12.23	-3.22	-0.65	13.43	-0.93	-0.22
N2VVXG		9.44	-6.01	-1.21	7.93	-6.43	-1.52
NFVQCW		17.50	2.05	0.42	13.89	-0.47	-0.11
PCRAKK		15.86	0.41	0.08	15.78	1.42	0.34
QNGVXU		11.40	-4.05	-0.82	12.30	-2.06	-0.49
QYYB8N		13.17	-2.28	-0.46	10.37	-3.99	-0.94
QYYCQZ		13.66	-1.79	-0.36	13.45	-0.91	-0.22
R4QY3K		10.60	-4.85	-0.98	9.20	-5.16	-1.22
R8AWPQ		16.28	0.83	0.17	13.95	-0.41	-0.10
RXJD9W		24.50	9.05	1.83	24.40	10.04	2.37
UR4LVZ		11.35	-4.10	-0.83	12.30	-2.06	-0.49
VU4CDZ	*	21.04	5.59	1.13	10.76	-3.60	-0.85
WWTZBL		12.38	-3.07	-0.62	13.35	-1.01	-0.24
X7R383		12.68	-2.77	-0.56	14.37	0.01	0.00

	Sample GX45	Summary Statistics	Sample GX46
Grand Means	15.446 Seconds		14.362 Seconds
SD Btwn Labs	4.946 Seconds		4.233 Seconds
Statistics based on 32 of 32 reporting participants			



Paper & Paperboard Interlaboratory Testing Program
Analysis 399
Sizing Test (Hercules Type)

Report # 2892 G
August 2017

Grand Mean Sample **GX45** = 15.446 Seconds

Grand Mean Sample **GX46** = 14.362 Seconds

ANALYSIS 399

