



Paper & Paperboard Testing Program

Summary Report #281G-April 2016

[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>
<u>378</u>	<u>Roughness, Sheffield Type,</u>
<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 Degree, 20-65 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
Color & Color Difference - Near White Papers - C/2deg obs
Hunter L,a,b - Illuminant C - 2 Degree Observer

Report #281G
April 2016

Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	ΔL	Δa	Δb	ΔE	
3C76LW		GA29	91.41	1.23	-3.24	0.04	-0.02	-0.04	0.06	LS
		GA30	91.45	1.21	-3.28					
4HRG2P		GA29	92.41	1.55	-2.97	0.18	0.03	-0.05	0.19	XX
		GA30	92.59	1.58	-3.02					
6MHBBV		GA29	93.19	1.29	-2.98	-0.02	-0.01	-0.06	0.06	EH
		GA30	93.18	1.28	-3.04					
AKCEUN		GA29	92.96	1.55	-3.63	-0.03	0.01	-0.08	0.09	XS
		GA30	92.93	1.56	-3.71					
AP82RH		GA29	91.15	1.13	-2.43	-0.05	-0.05	0.00	0.07	TM
		GA30	91.10	1.08	-2.43					
CF8P3Q		GA29	91.98	-1.48	-1.44	-0.08	-0.08	0.00	0.11	TS
		GA30	91.90	-1.56	-1.44					
CWYHUJ		GA29	90.57	1.73	-2.85	0.13	-0.02	0.07	0.15	TS
		GA30	90.70	1.70	-2.78					
EVX6LG		GA29	91.86	1.25	-5.13	0.05	0.03	-0.03	0.07	HH
		GA30	91.91	1.28	-5.16					
GGQ3VJ		GA29	91.43	1.47	-2.60	0.16	-0.05	0.01	0.17	TS
		GA30	91.59	1.41	-2.59					
GH26GH		GA29	91.13	1.21	-3.54	0.04	0.01	-0.03	0.05	HH
		GA30	91.17	1.22	-3.57					
HBXKUD		GA29	93.48	1.01	-2.57	-0.03	0.03	-0.12	0.12	TC
		GA30	93.46	1.05	-2.69					
K4AGYF		GA29	91.48	1.11	-2.61	-0.06	-0.01	-0.07	0.09	LA
		GA30	91.42	1.10	-2.69					
L3XWVC		GA29	93.47	1.09	-3.04	0.07	0.00	0.03	0.08	HE
		GA30	93.54	1.09	-3.01					
LCJ23C		GA29	91.64	1.06	-2.70	0.03	0.00	-0.09	0.09	TC
		GA30	91.67	1.06	-2.78					
NNQV4E	X	GA29	93.65	2.14	-9.83	0.00	0.01	-0.08	0.08	HE
		GA30	93.65	2.15	-9.92					
PQRDL8		GA29	91.36	1.48	-2.55	0.03	-0.01	0.04	0.05	TS
		GA30	91.39	1.47	-2.52					



**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			Color Difference Values				Instr Code
			L	a	b	ΔL	Δa	Δb	ΔE	
QNYLA2		GA29	93.10	1.37	-3.42	0.06	0.03	0.08	0.10	LS
		GA30	93.16	1.40	-3.34					
UCAWZ7		GA29	91.09	1.78	-3.82	-0.49	0.53	-0.57	0.92 X	HH
		GA30	90.61	2.32	-4.39					
VPUYW4		GA29	91.52	0.93	-1.98	0.02	-0.03	0.08	0.09	NE
		GA30	91.55	0.90	-1.90					
VV484Y		GA29	90.71	1.30	-2.39	-0.14	0.09	-0.05	0.17	TS
		GA30	90.58	1.39	-2.44					
W2K8UW		GA29	93.14	1.14	-2.87	0.12	-0.02	0.11	0.17	EH
		GA30	93.26	1.11	-2.76					
WPTKN2		GA29	91.64	1.47	-3.41	0.09	0.01	0.03	0.09	MK
		GA30	91.73	1.49	-3.38					
XGXXCV		GA29	91.59	1.00	-2.60	-0.03	0.09	-0.21	0.23	TC
		GA30	91.55	1.08	-2.81					
Z37RDX		GA29	91.14	1.16	-2.38	0.04	-0.06	0.00	0.07	TS
		GA30	91.18	1.10	-2.38					

Grand Means		Summary Statistics							
GA29	92.001	1.182	-2.879						
GA30	92.028	1.180	-2.897	0.006	0.021	-0.042	0.144		
Std Dev Btwn Labs									
GA29	0.955	0.640	0.718						
GA30	0.963	0.657	0.725	0.133	0.119	0.136	0.176		

Statistics based on 23 of 24 reporting participants

Comments on Assigned Data Flags for Test #350

NNQV4E (X) - Low b values for both samples.

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
TM	Technidyne Technibrite Micro TB-1C	TS	Technidyne Brightimeter Micro S-5
XS	X-Rite 938 Spectrodensitometer	XX	Instrument make/model not specified by lab

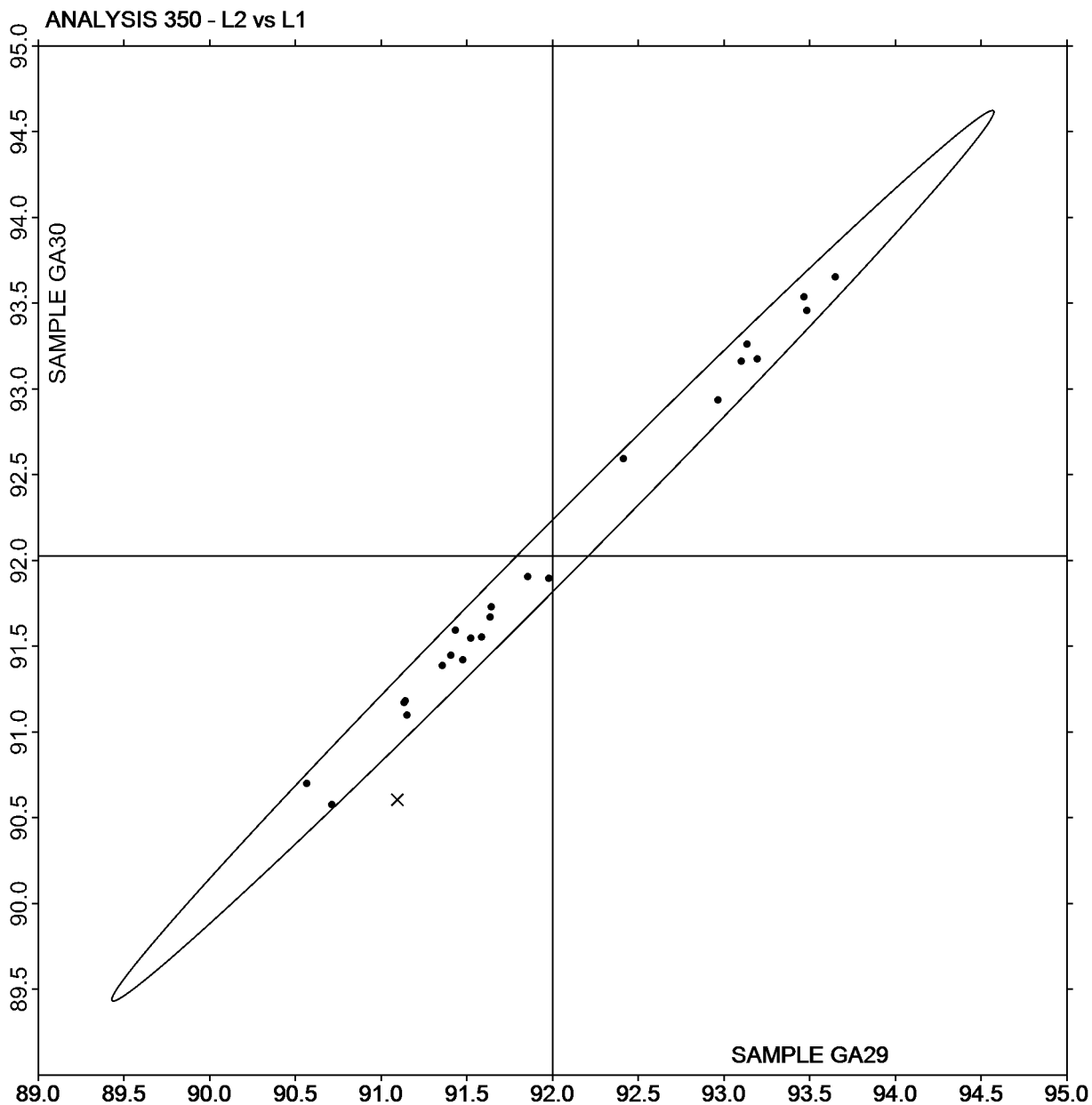


Paper & Paperboard Interlaboratory Testing Program
Analysis 350
Color & Color Difference - Near White Papers - C/2deg obs
Hunter L,a,b - Illuminant C - 2 Degree Observer

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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 L values GA30 v L values GA29



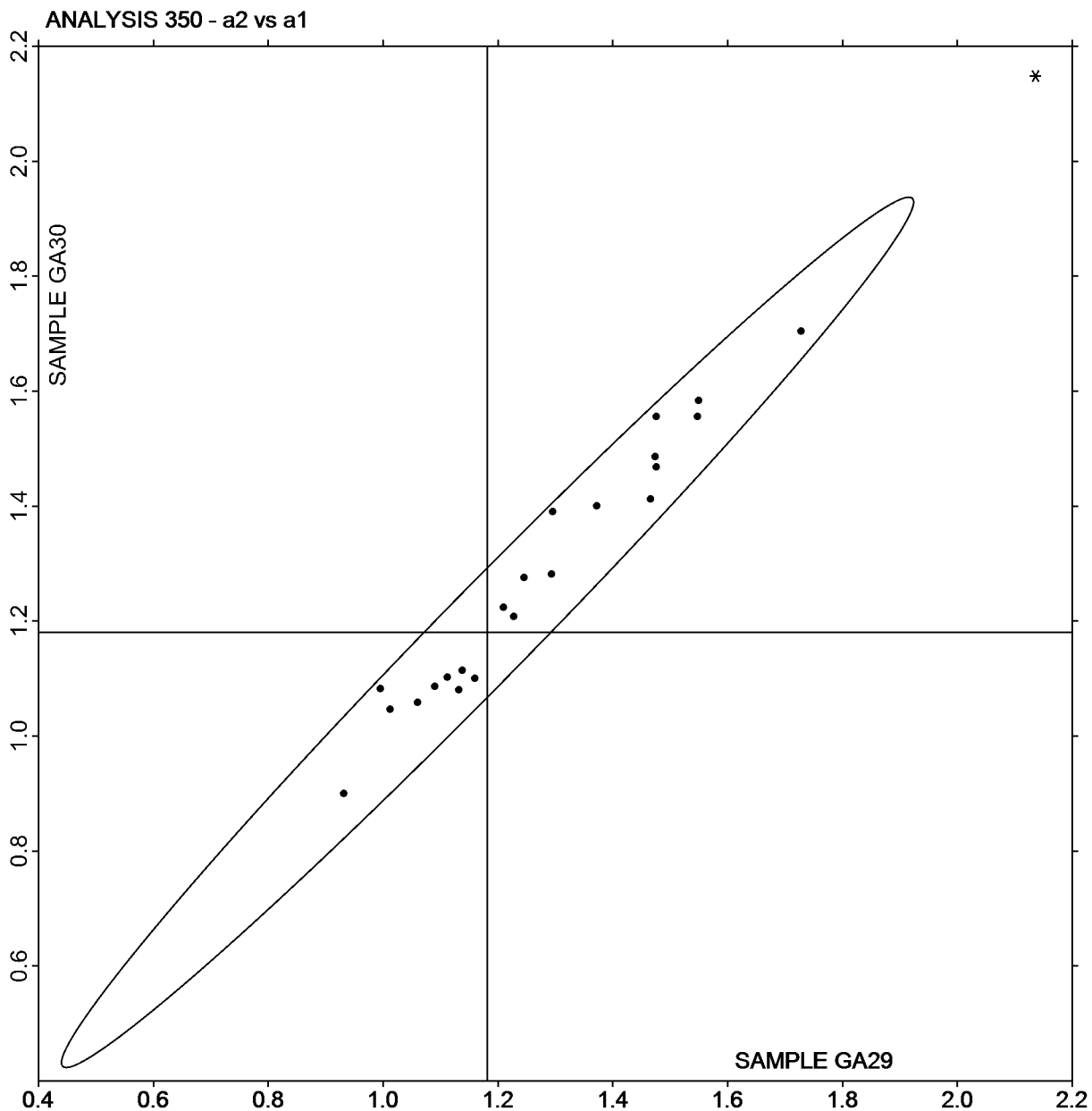


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Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	ΔL	Δa	Δb	ΔE	

Plot of a values GA30 v a values GA29

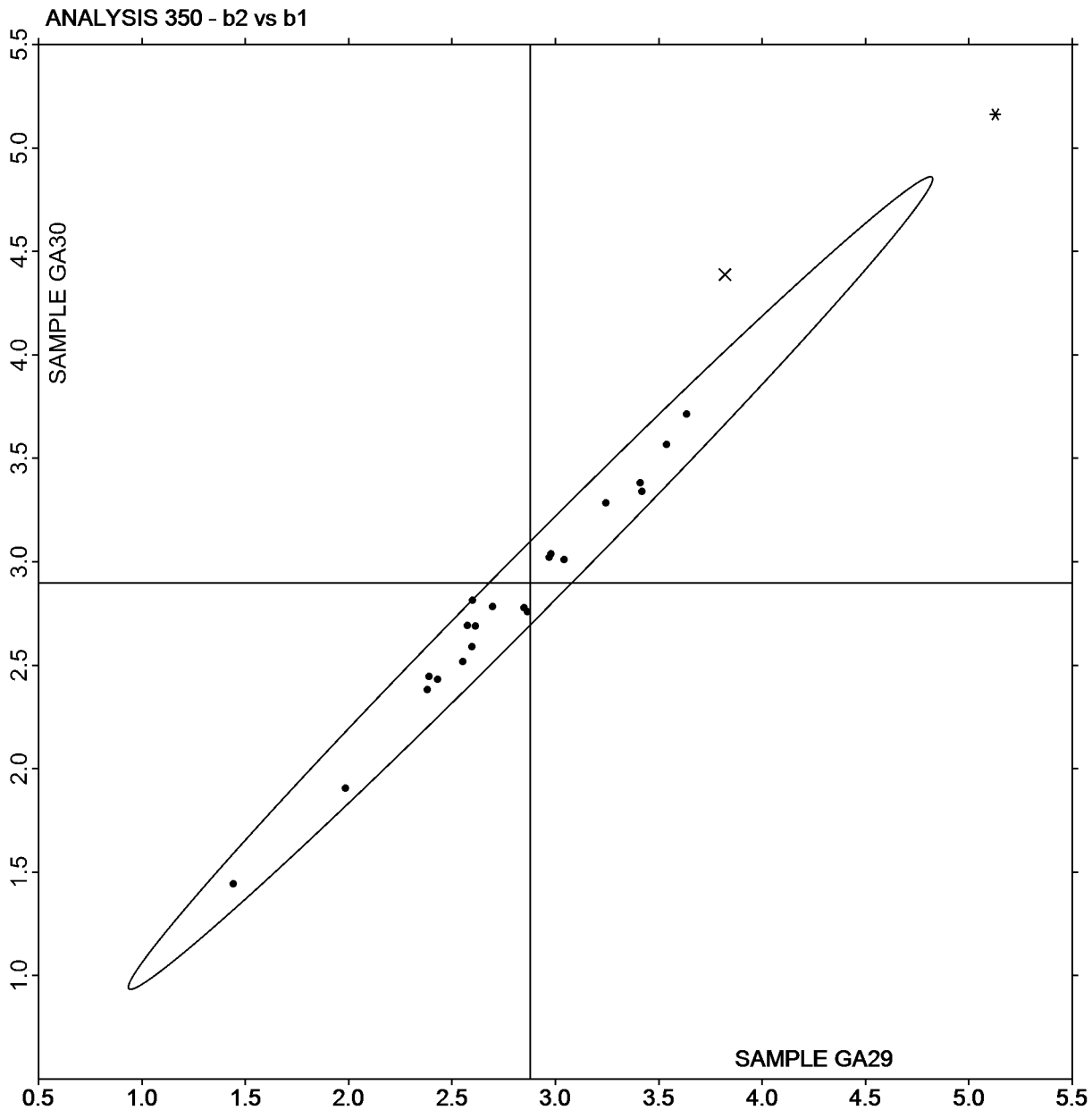




Paper & Paperboard Interlaboratory Testing Program
Analysis 350
Color & Color Difference - Near White Papers - C/2deg obs
Hunter L,a,b - Illuminant C - 2 Degree Observer

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Plot of b values GA30 v b values GA29





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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237AUT	GA29	93.78	1.28	-5.78	-0.10	-0.06	-0.16	0.20	EF
	GA30	93.68	1.22	-5.94					
7Z2FWX	GA29	93.24	-0.83	1.57	0.04	-0.01	-0.06	0.07	NG
	GA30	93.28	-0.84	1.51					
A9XGNJ	GA29	93.03	-0.35	-0.43	0.03	0.00	-0.02	0.04	LS
	GA30	93.07	-0.35	-0.45					
CEZ7LH	GA29	91.98	0.49	-2.12	0.00	0.08	-0.04	0.09	XM
	GA30	91.98	0.57	-2.17					
DPGA7M	GA29	92.21	1.08	-5.76	-0.08	0.00	-0.18	0.19	TC
	GA30	92.13	1.07	-5.94					
H7PXKH	GA29	94.07	1.86	-8.42	0.09	0.02	-0.06	0.11	XX
	GA30	94.16	1.88	-8.48					
HLE6DA	GA29	88.99	0.57	1.91	0.19	-0.01	-0.04	0.19	TC
	GA30	89.18	0.56	1.88					
K8TC39	GA29	93.89	0.57	-5.19	0.02	0.00	0.02	0.03	HT
	GA30	93.91	0.56	-5.17					
NNQV4E	GA29	93.26	1.64	-8.56	0.08	0.00	0.02	0.09	HE
	GA30	93.35	1.64	-8.53					
NTG6DD	GA29	93.70	0.46	-4.24	0.03	-0.02	0.01	0.03	HT
	GA30	93.73	0.44	-4.24					
P4WEGW	GA29	93.59	0.55	-2.43	-0.02	-0.22	0.23	0.32	XP
	GA30	93.57	0.32	-2.20					
QNYLA2	GA29	93.50	1.37	-6.12	0.12	-2.85	-0.18	2.86 X	LS
	GA30	93.62	-1.48	-6.30					
QX4TN2	GA29	93.20	2.41	-11.22	0.09	-0.01	0.08	0.12	HV
	GA30	93.29	2.40	-11.14					
TE3NEX	GA29	93.19	-0.25	-0.81	-0.03	-0.02	-0.06	0.07	EH
	GA30	93.15	-0.27	-0.87					
UZ2CJY	GA29	93.76	0.97	-4.15	0.04	0.01	-0.03	0.05	NF
	GA30	93.80	0.98	-4.18					
WF3ZH3	GA29	92.04	0.84	-5.03	0.13	0.02	0.00	0.13	HE
	GA30	92.17	0.85	-5.03					
YL7KLQ	GA29	94.84	0.62	-2.67	0.09	-0.01	0.03	0.10	XP
	GA30	94.93	0.60	-2.64					



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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Grand Means				Summary Statistics				
GA29	93.074	0.781	-4.085					
GA30	93.117	0.598	-4.111	0.043	-0.183	-0.026	0.276	
Stnd Dev Btwn Labs								
GA29	1.284	0.815	3.555					
GA30	1.261	0.967	3.557	0.075	0.690	0.099	0.670	

Statistics based on 17 of 17 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	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

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April 2016

Web
Code

F Samples

Hunter L, a, b Color Values

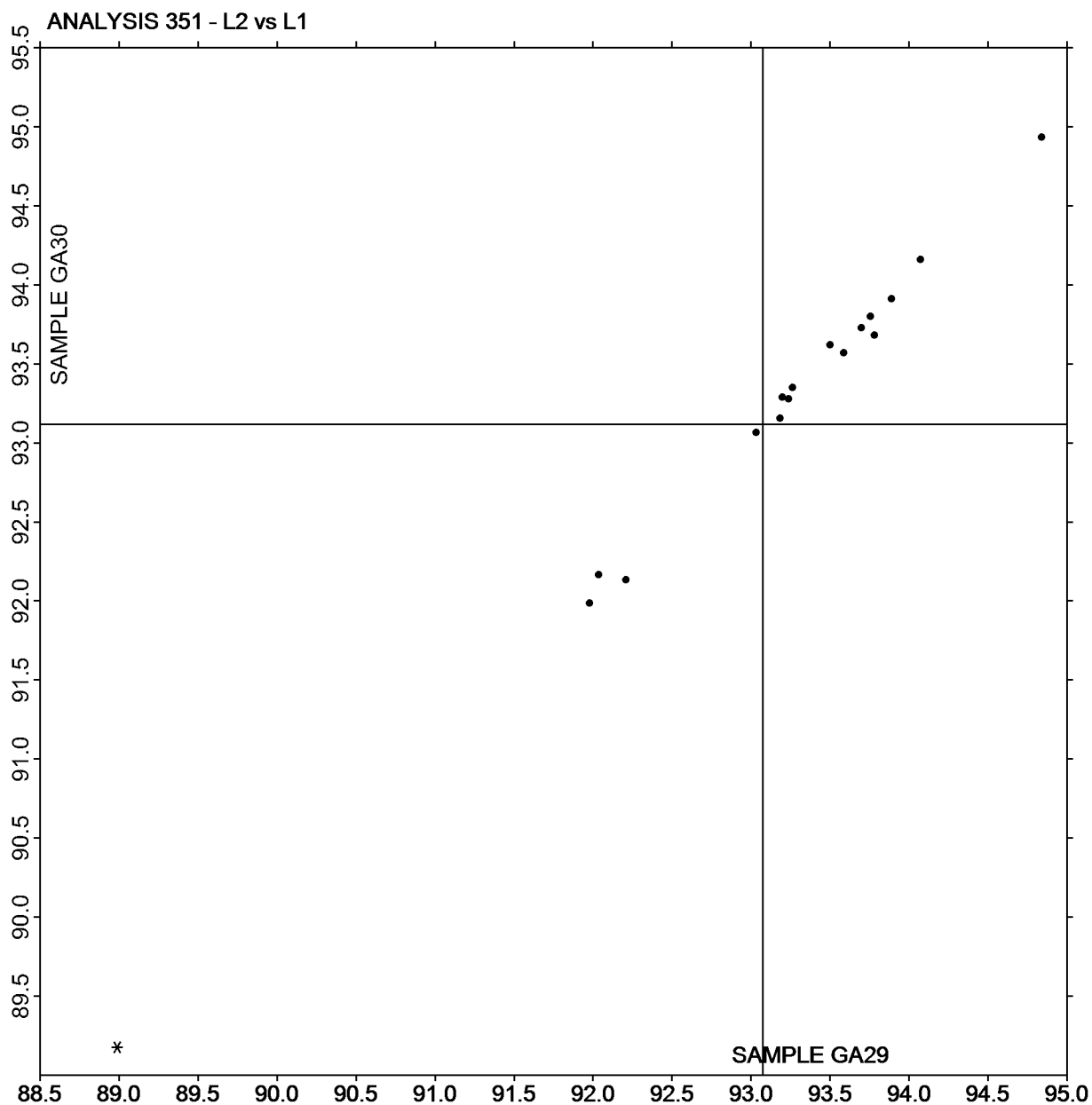
L a b

Color Difference Values

ΔL Δa Δb ΔE

Instr Code

Plot of L values GA30 v L values GA29



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 351
Color & Color Difference - Near White Papers - D65/10deg obs
Hunter L,a,b - Illuminant D65 - 10 Degree Observer

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Web
Code

F Samples

Hunter L, a, b Color Values

L

a

b

Color Difference Values

ΔL

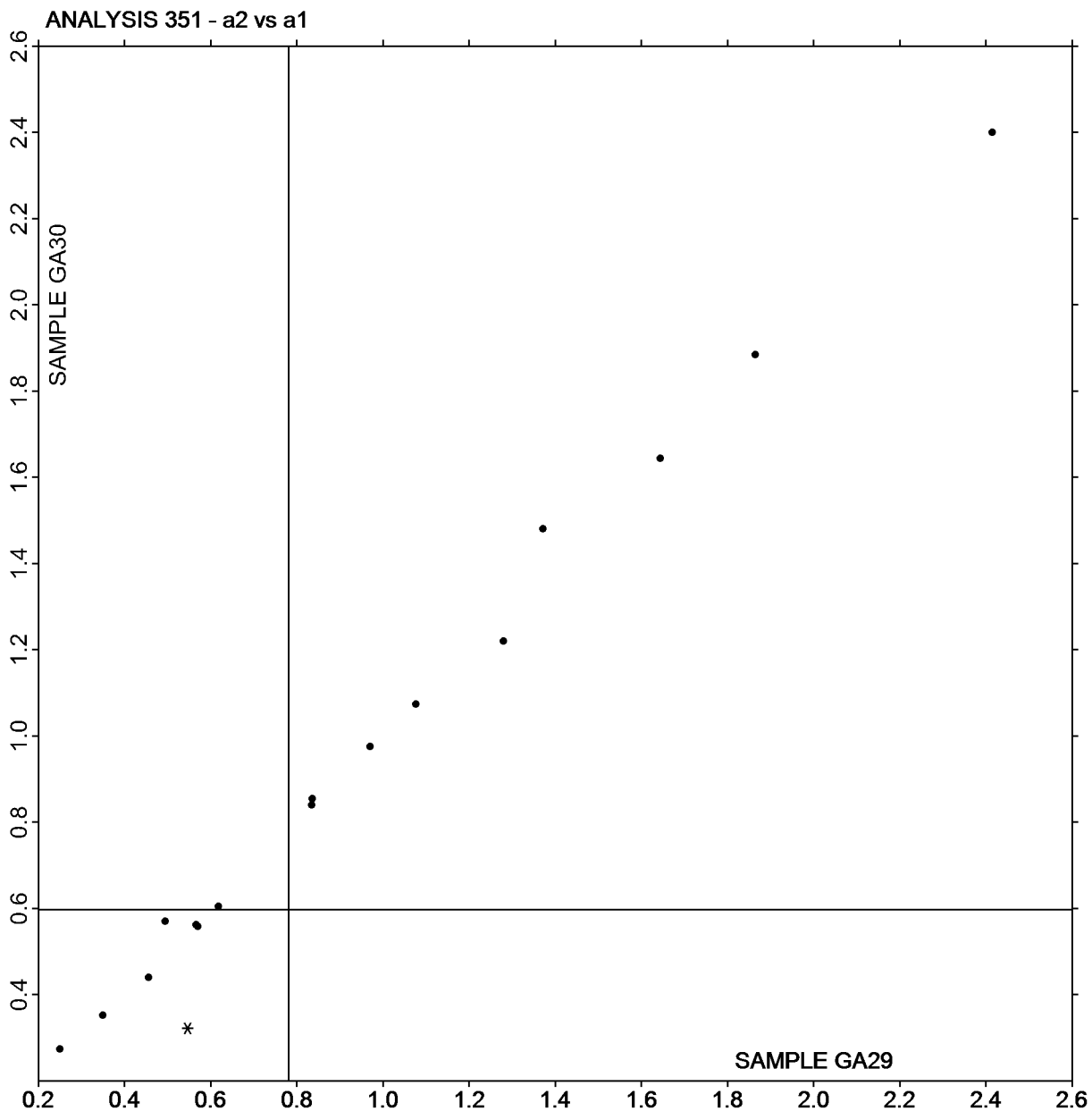
Δa

Δb

ΔE

Instr Code

Plot of a values GA30 v a values GA29



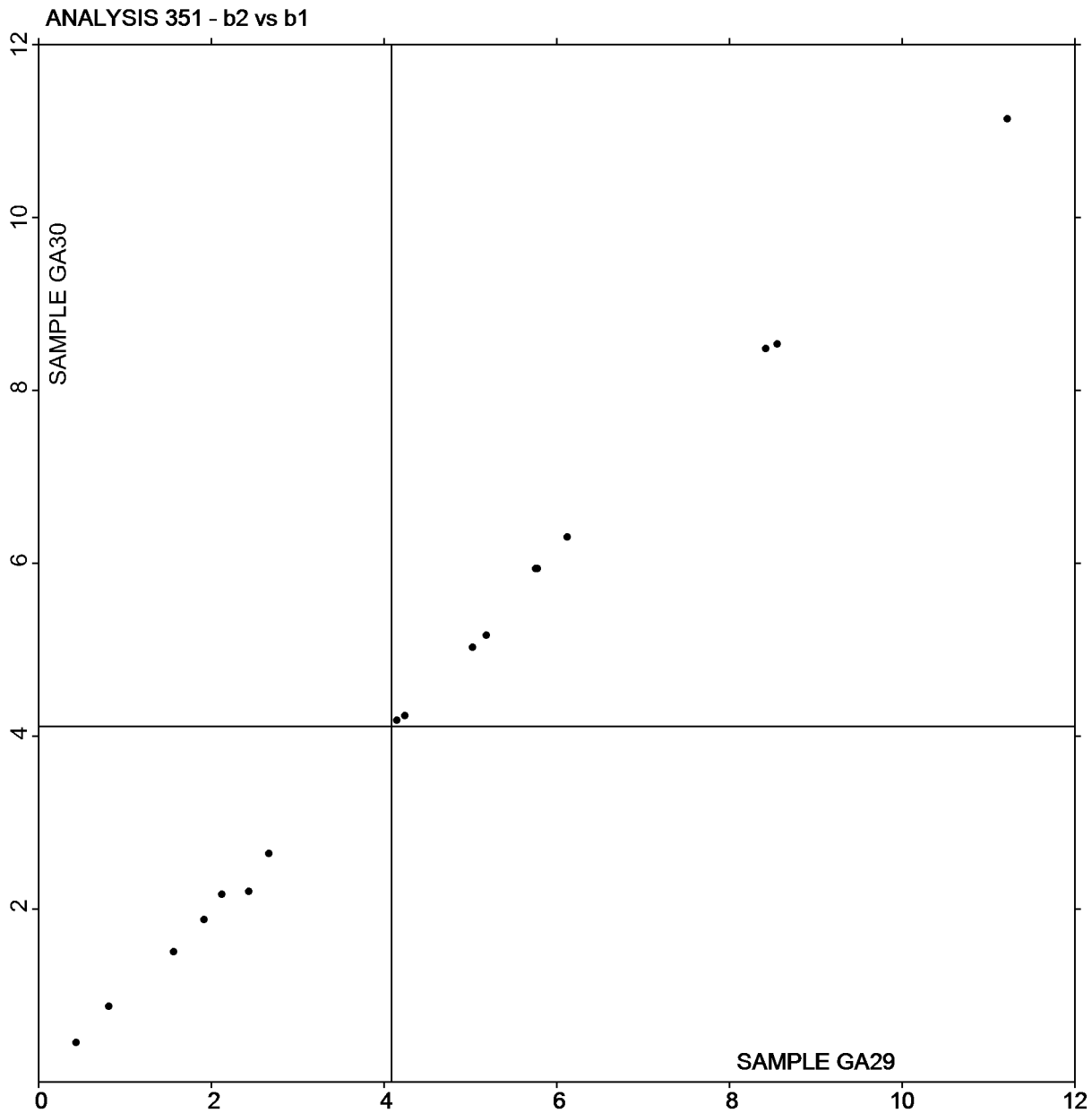
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.



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

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Plot of b values GA30 v b values GA29



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 360
Thickness (Caliper), Printing papers**

Report #281G
April 2016

WebCode	Data Flag	Sample GV29			Sample GV30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
28B7ET		5.056	0.083	1.11	3.838	0.037	0.57	TM
2UBC2Y		4.894	-0.078	-1.05	3.750	-0.051	-0.77	LW
2Y3JLR		4.848	-0.125	-1.67	3.742	-0.059	-0.89	TA
32PD3T		5.075	0.102	1.37	3.857	0.056	0.85	LW
3C76LW		4.944	-0.029	-0.39	3.803	0.003	0.04	LW
44BGBQ		5.056	0.083	1.11	3.872	0.072	1.08	LW
4HRG2P		4.970	-0.003	-0.04	3.710	-0.091	-1.37	XX
646QER	*	4.941	-0.032	-0.43	3.898	0.097	1.47	TM
69V2PQ		4.877	-0.096	-1.28	3.727	-0.074	-1.12	FR
6PNNYP	X	3.787	-1.185	-15.83	3.769	-0.031	-0.47	LW
734D8Q		4.987	0.014	0.18	3.778	-0.023	-0.34	LW
7DMMYQ		4.947	-0.026	-0.34	3.809	0.008	0.13	EM
7N4EJT		5.022	0.049	0.65	3.824	0.024	0.36	LW
7UTRKG		4.986	0.013	0.17	3.832	0.032	0.48	XX
7Z2FWX		5.093	0.121	1.61	3.942	0.141	2.14	LW
8J834M		5.009	0.036	0.48	3.795	-0.005	-0.08	EM
A9JVEH		4.840	-0.133	-1.77	3.690	-0.111	-1.68	XX
AKCEUN		4.940	-0.033	-0.44	3.740	-0.061	-0.92	TM
ALP7NP		4.920	-0.053	-0.71	3.757	-0.044	-0.66	TA
AP82RH		4.840	-0.133	-1.77	3.669	-0.132	-1.99	TA
AYCDGK		5.012	0.039	0.52	3.839	0.038	0.58	MS
BZKLNJ		5.021	0.048	0.65	3.822	0.021	0.32	LW
CEZ7LH		4.984	0.011	0.15	3.815	0.014	0.22	LW
CF8P3Q		4.948	-0.025	-0.33	3.752	-0.049	-0.74	LA
CRP6CK		4.866	-0.107	-1.43	3.656	-0.144	-2.18	EM
DLDJWL		4.965	-0.007	-0.10	3.770	-0.030	-0.46	TM
DPGA7M		4.976	0.003	0.04	3.851	0.050	0.76	TA
DWYM6L		5.052	0.079	1.06	3.842	0.041	0.63	PP
DZX2RB	*	4.888	-0.085	-1.13	3.833	0.032	0.49	EM
GGQ3VJ		4.824	-0.149	-1.99	3.654	-0.146	-2.22	TM
GKT27C		4.938	-0.035	-0.47	3.766	-0.035	-0.52	PP
H7PXKH		5.035	0.062	0.83	3.808	0.007	0.11	LW
HBXKUD		4.976	0.003	0.04	3.785	-0.016	-0.24	LA
HHGJQD		4.967	-0.006	-0.08	3.834	0.033	0.51	PP
JD6XBE		5.013	0.041	0.54	3.820	0.019	0.29	LW
JMQ2JE		4.972	0.000	-0.01	3.839	0.038	0.58	TM
K4AGYF		4.939	-0.033	-0.45	3.857	0.057	0.86	LA
K8TC39		4.998	0.025	0.34	3.810	0.009	0.14	EM
KWQB39		5.044	0.071	0.95	3.818	0.017	0.26	TM
MDNA48	*	5.172	0.199	2.66	3.942	0.141	2.14	LW
MMEQY4		4.972	-0.001	-0.01	3.802	0.001	0.02	LA



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

Report #281G
April 2016

WebCode	Data Flag	Sample GV29			Sample GV30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
MNUVQA		4.924	-0.049	-0.66	3.772	-0.029	-0.44	LW
N9CPU2		4.910	-0.063	-0.84	3.740	-0.060	-0.91	MT
NTG6DD		4.968	-0.005	-0.06	3.803	0.002	0.04	EM
P6TUR9		4.860	-0.113	-1.51	3.650	-0.151	-2.28	TM
PDHFX8		5.000	0.027	0.36	3.864	0.064	0.96	LW
Q62LWV		5.055	0.082	1.10	3.846	0.045	0.69	EM
Q8RM64		4.932	-0.041	-0.55	3.782	-0.019	-0.28	TM
QFKZXC		4.964	-0.009	-0.12	3.812	0.011	0.17	EM
QX4TN2		5.087	0.114	1.53	3.852	0.051	0.78	EM
R7AXCB		4.855	-0.118	-1.57	3.768	-0.033	-0.49	EM
UZ2CJY		5.114	0.141	1.88	3.865	0.065	0.98	TM
VV484Y		4.966	-0.007	-0.09	3.808	0.007	0.11	EM
W2K8UW		5.003	0.030	0.40	3.836	0.035	0.54	EM
W2MW3Z		4.990	0.017	0.23	3.814	0.014	0.21	LW
WF3ZH3		5.018	0.045	0.60	3.846	0.046	0.69	TM
WPTKN2		5.109	0.136	1.82	3.955	0.154	2.34	PP
XGXXCV		5.001	0.028	0.38	3.780	-0.021	-0.31	TA
YL7KLQ		4.936	-0.037	-0.49	3.750	-0.051	-0.77	TM
ZK2KXV		4.898	-0.075	-1.00	3.740	-0.060	-0.91	TA

Sample GV29		Summary Statistics	Sample GV30	
Grand Means	4.9728 mils		3.8005 mils	
SD Btwn Labs	0.0749 mils		0.0660 mils	
Statistics based on 59 of 60 reporting participants				

Comments on Assigned Data Flags for Test #360

6PNNYP (X) - Extreme data for sample GV29.

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

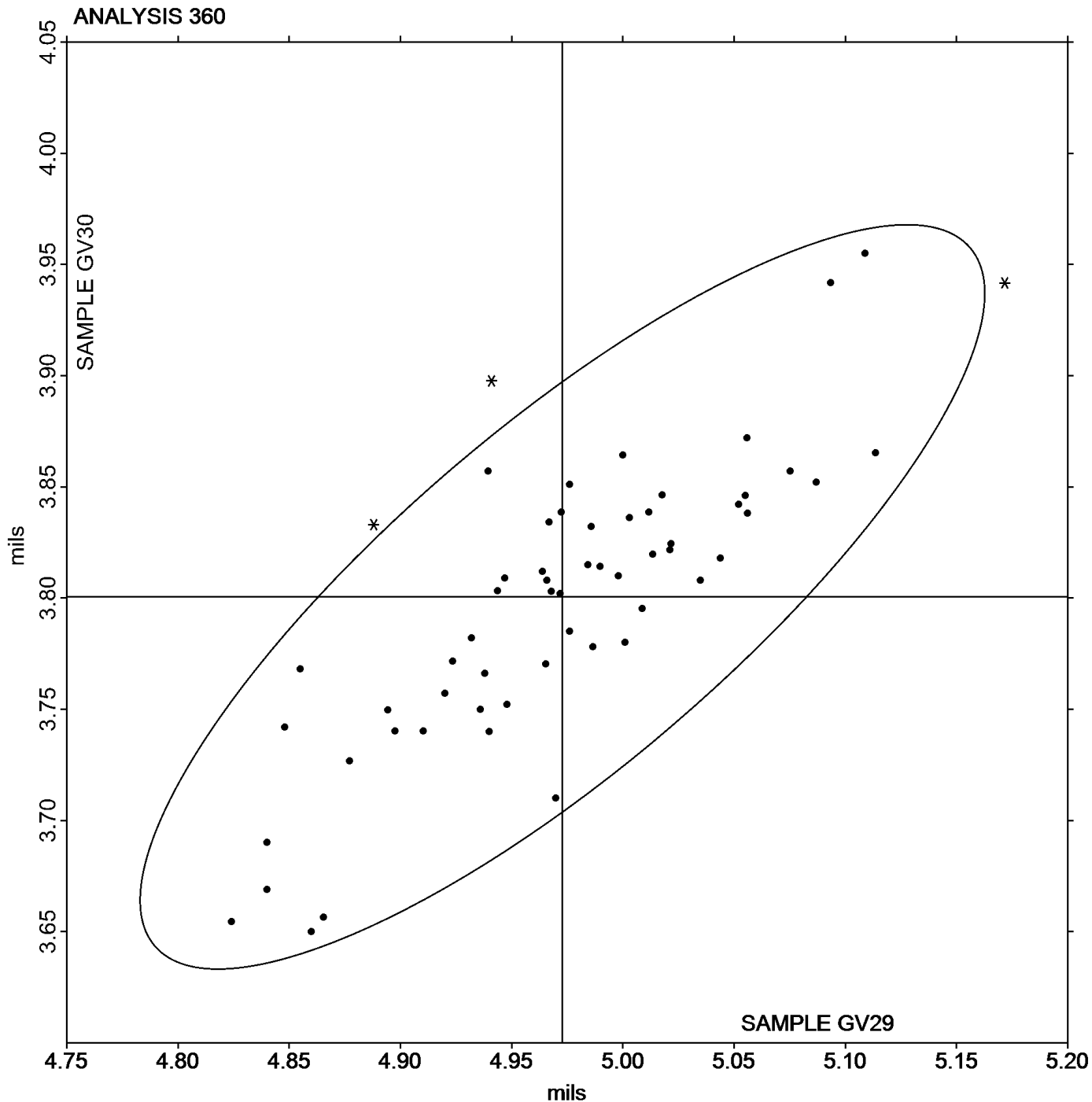


Paper & Paperboard Interlaboratory Testing Program
Analysis 360
Thickness (Caliper), Printing papers

Report #281G
April 2016

Grand Mean Sample **GV29** = 4.9728 mils

Grand Mean Sample **GV30** = 3.8005 mils





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

Report #281G
April 2016

WebCode	Data Flag	Sample GY29			Sample GY30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2XAMWY		9.350	0.160	1.07	14.42	0.29	1.96	TM
2Y3JLR		9.118	-0.072	-0.48	14.16	0.03	0.17	TA
32PD3T		9.327	0.137	0.91	14.43	0.30	2.03	XX
3DGY9N		9.100	-0.090	-0.60	14.15	0.02	0.13	LA
44LN8R		9.140	-0.050	-0.33	14.26	0.13	0.87	LA
4NTTWM		9.137	-0.052	-0.35	14.00	-0.13	-0.85	LW
734D8Q		9.154	-0.035	-0.24	14.11	-0.02	-0.12	LW
7QVB9M		9.147	-0.043	-0.28	14.07	-0.07	-0.44	PP
A9XGNJ		9.370	0.180	1.20	14.22	0.09	0.60	XX
B6VY7H		9.236	0.047	0.31	14.26	0.13	0.90	XX
CBZYZK		9.182	-0.008	-0.05	14.14	0.01	0.08	TM
DAJ38K		9.390	0.200	1.33	14.22	0.09	0.63	LA
EVX6LG		9.161	-0.029	-0.19	14.14	0.01	0.06	EM
EZT4UK		9.115	-0.075	-0.50	14.03	-0.11	-0.71	TA
GH26GH		9.323	0.133	0.89	14.27	0.14	0.94	EM
HLE6DA		9.226	0.036	0.24	14.19	0.06	0.41	EM
JZE427		8.940	-0.250	-1.66	13.87	-0.26	-1.76	TM
K4AGYF		9.429	0.239	1.60	14.33	0.20	1.35	LA
KY3QWA	X	8.596	-0.594	-3.95	13.50	-0.64	-4.28	TM
L3XWVC		9.102	-0.087	-0.58	14.06	-0.07	-0.48	LA
MD9UBZ		9.149	-0.041	-0.27	14.01	-0.12	-0.83	LA
NNQV4E		9.069	-0.121	-0.80	14.01	-0.12	-0.81	EM
P6TUR9		8.860	-0.330	-2.20	13.81	-0.32	-2.16	TM
Q8RM64		9.236	0.046	0.31	14.15	0.02	0.13	TM
QNYLA2		8.894	-0.296	-1.97	13.89	-0.24	-1.62	TM
RVU4YX		9.284	0.094	0.63	14.15	0.02	0.15	PP
TB4E3B		9.160	-0.030	-0.20	14.09	-0.04	-0.27	TM
TE3NEX		9.251	0.061	0.41	14.23	0.09	0.63	EM
TYQAXZ		9.118	-0.072	-0.48	13.98	-0.15	-0.99	XX
U4ZMEY		9.362	0.172	1.15	14.34	0.21	1.39	LA
UCAWZ7		9.396	0.206	1.37	14.25	0.11	0.77	EM
W2MW3Z		9.256	0.066	0.44	14.02	-0.11	-0.77	LW
WLTAR2		9.450	0.260	1.73	14.19	0.06	0.38	TM
XRWF84		9.065	-0.125	-0.83	14.04	-0.10	-0.64	TA
Z37RDX		8.951	-0.239	-1.59	13.97	-0.17	-1.12	EM



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

**Report #281G
April 2016**

	Sample GY29	Summary Statistics	Sample GY30
Grand Means	9.1896 mils		14.131 mils
SD Btwn Labs	0.1501 mils		0.149 mils
Statistics based on 34 of 35 reporting participants			

Comments on Assigned Data Flags for Test #361

KY3QWA (X) - Data for both samples are low. Possible Systematic Error.

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		

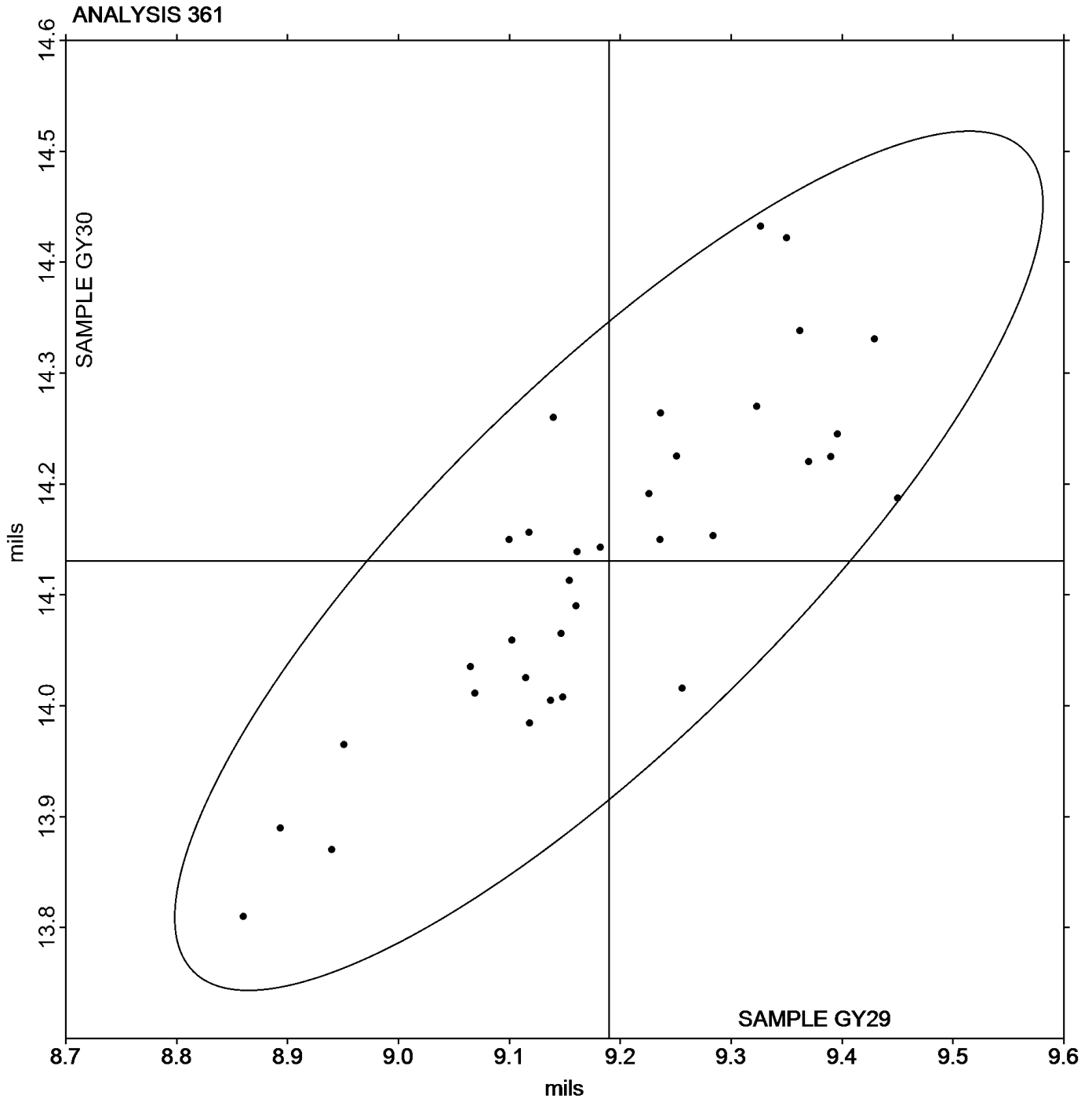


Paper & Paperboard Interlaboratory Testing Program
Analysis 361
Thickness (Caliper), Packaging papers

Report #281G
April 2016

Grand Mean Sample **GY29** = 9.1896 mils

Grand Mean Sample **GY30** = 14.131 mils





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

**Report #281G
April 2016**

Coefficient of Static Friction - Horizontal Plane Method - Printing Papers

WebCode	Data Flag	Sample GD29			Sample GD30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
32PD3T		0.6500	0.0722	0.82	0.5620	0.0649	1.06	TL
7DMMYQ		0.5956	0.0178	0.20	0.5134	0.0163	0.27	TM
7Z2FWX		0.4090	-0.1688	-1.92	0.3736	-0.1235	-2.02	TM
8AGL9R		0.5948	0.0170	0.19	0.5400	0.0429	0.70	TA
AKCEUN	X	0.2314	-0.3464	-3.95	0.2488	-0.2483	-4.05	XX
MD9UBZ		0.5282	-0.0496	-0.56	0.4836	-0.0135	-0.22	TA
VF9PD2		0.5932	0.0154	0.18	0.4852	-0.0119	-0.19	IT
VV484Y		0.6736	0.0958	1.09	0.5216	0.0245	0.40	XX
W2K8UW	X	0.2654	-0.3124	-3.56	0.2552	-0.2419	-3.95	XX

Sample GD29		Summary Statistics	Sample GD30	
Grand Means	0.57777 COF		0.49706 COF	
SD Btwn Labs	0.08774 COF		0.06123 COF	
Statistics based on 7 of 9 reporting participants				

Comments on Assigned Data Flags for Test #364

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

W2K8UW (X) - Data for both samples are low. Inconsistent within the determinations for both samples.

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		



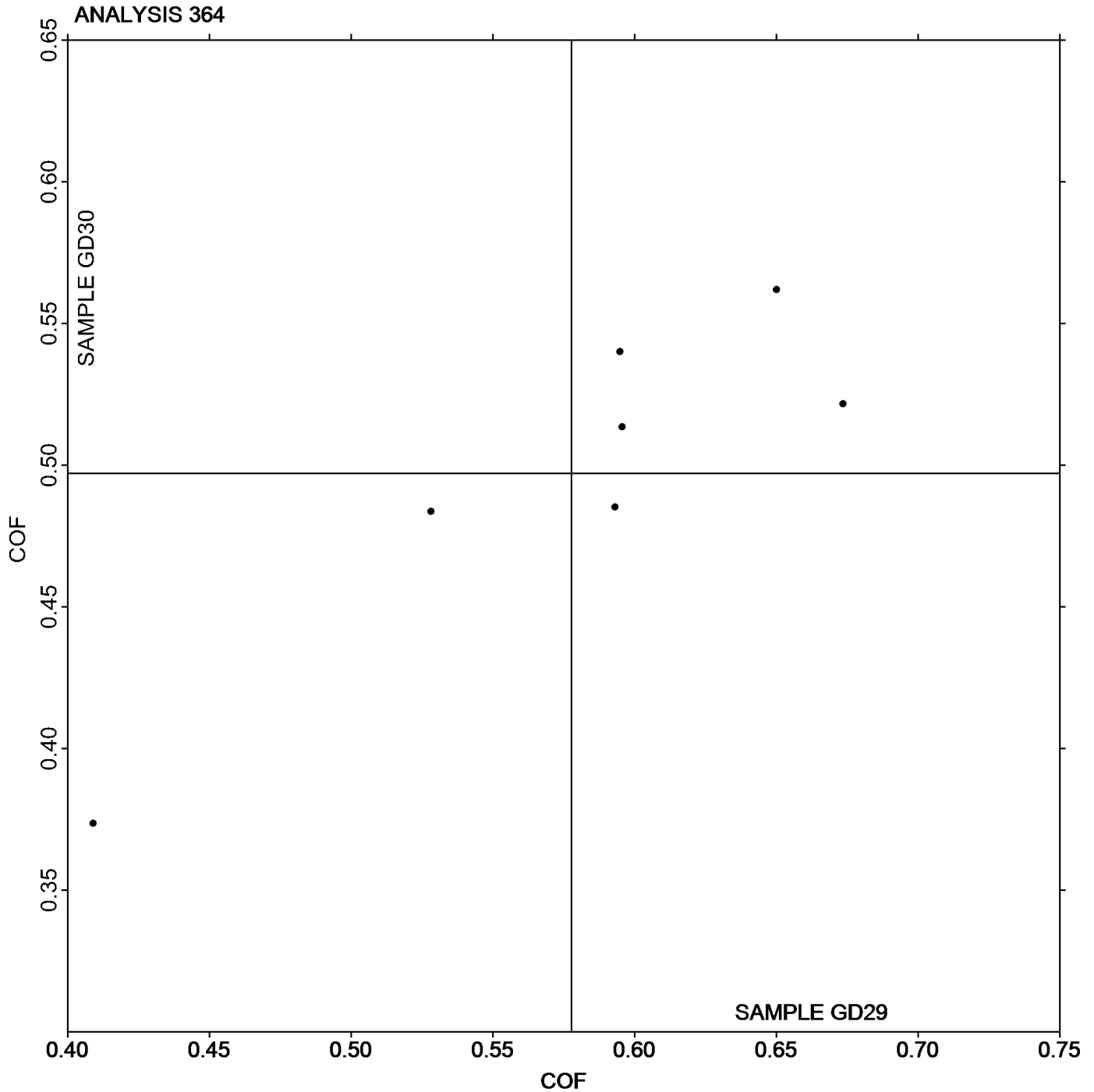
**Paper & Paperboard Interlaboratory Testing Program
Analysis 364**

**Report #281G
April 2016**

Coefficient of Static Friction - Horizontal Plane Method - Printing Papers

Grand Mean Sample **GD29** = 0.57777 COF

Grand Mean Sample **GD30** = 0.49706 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 #281G

April 2016

Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers

WebCode	Data Flag	Sample GD29			Sample GD30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
32PD3T		0.6260	0.1740	1.43	0.4940	0.0778	0.71	TL
7Z2FWX		0.3590	-0.0930	-0.76	0.2796	-0.1366	-1.26	TM
8AGL9R		0.4806	0.0286	0.23	0.4154	-0.0008	-0.01	TA
AKCEUN		0.2326	-0.2194	-1.80	0.1844	-0.2318	-2.13	XX
ALP7NP		0.4222	-0.0298	-0.24	0.4022	-0.0140	-0.13	TM
AP82RH		0.2684	-0.1836	-1.50	0.3188	-0.0974	-0.90	TA
CRP6CK		0.5430	0.0910	0.75	0.5254	0.1092	1.00	TA
CWYHUJ		0.3674	-0.0846	-0.69	0.4754	0.0592	0.54	TA
EEAYAG		0.6225	0.1705	1.40	0.5640	0.1478	1.36	TA
GWLMC8		0.4354	-0.0166	-0.14	0.3916	-0.0246	-0.23	TM
K4AGYF		0.5404	0.0884	0.72	0.5038	0.0876	0.81	TM
VF9PD2		0.4692	0.0172	0.14	0.3652	-0.0510	-0.47	IR
W2K8UW		0.5098	0.0578	0.47	0.4914	0.0752	0.69	TA

		Summary Statistics	
		Sample GD29	Sample GD30
Grand Means		0.45204 COF	0.41625 COF
SD Btwn Labs		0.12204 COF	0.10876 COF
Statistics based on 13 of 13 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		



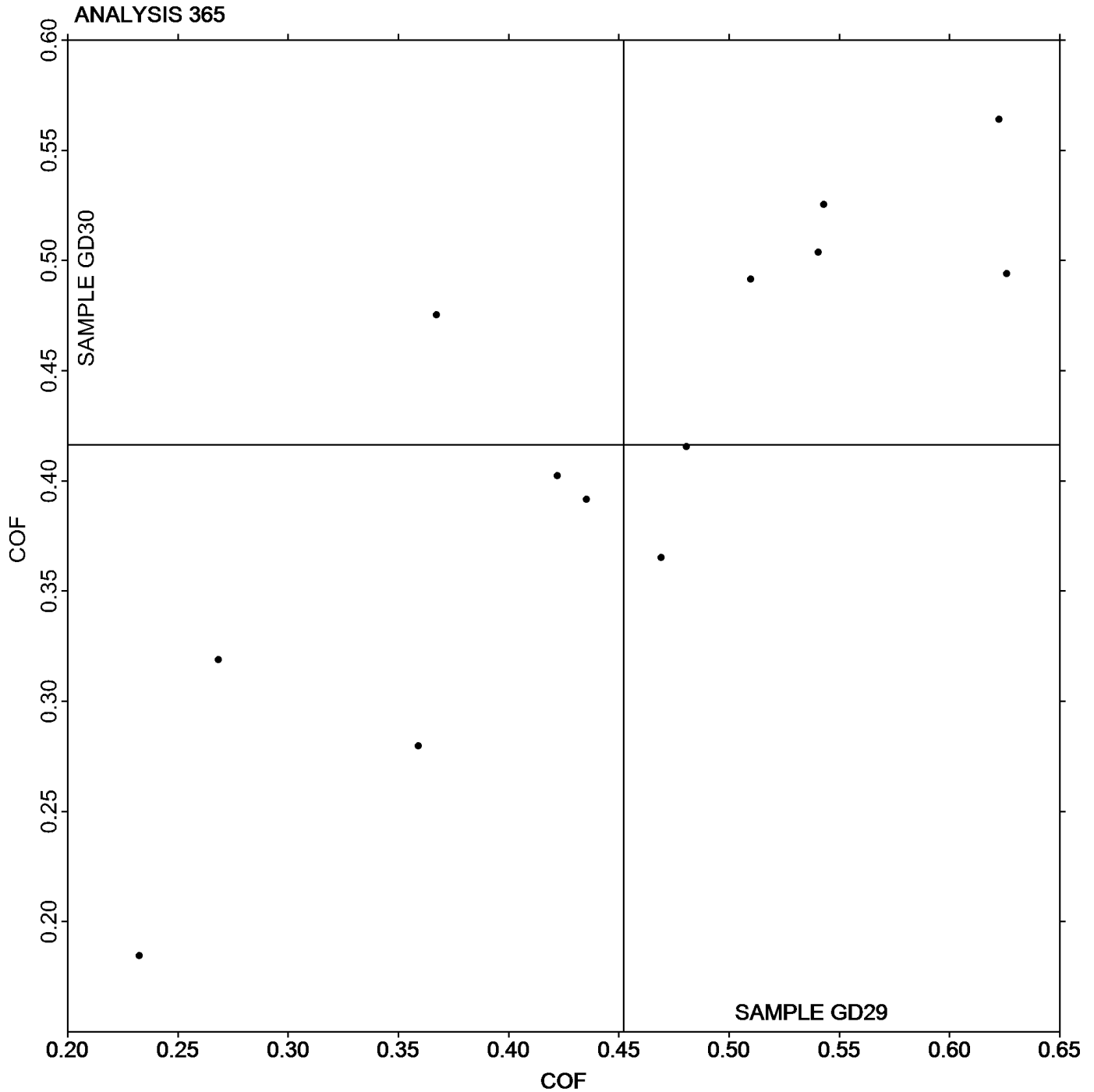
Paper & Paperboard Interlaboratory Testing Program Analysis 365

Report #281G
April 2016

Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers

Grand Mean Sample **GD29** = 0.45204 COF

Grand Mean Sample **GD30** = 0.41625 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 370
Air Resistance - Gurley Oil Type**

Report #281G
April 2016

WebCode	Data Flag	Sample GE29			Sample GE30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
237AUT		17.87	0.32	0.36	32.41	-1.18	-0.73	LP
32PD3T		17.66	0.11	0.12	31.46	-2.13	-1.32	LP
3C76LW		17.75	0.20	0.23	31.80	-1.79	-1.11	LP
3DGY9N		18.60	1.05	1.20	35.40	1.81	1.12	LA
4HRG2P		18.38	0.83	0.94	33.56	-0.03	-0.02	XX
4NTTWM		16.67	-0.88	-1.00	34.14	0.55	0.34	TL
6FY3TQ		17.73	0.18	0.20	32.68	-0.91	-0.56	LP
6MHBBV		16.07	-1.49	-1.69	32.35	-1.23	-0.76	RE
7QVB9M		16.37	-1.18	-1.34	32.68	-0.91	-0.56	PP
8AGL9R		18.62	1.07	1.22	33.83	0.24	0.15	WG
9948KH		16.01	-1.54	-1.76	30.46	-3.13	-1.94	LP
A9JVEH		18.64	1.09	1.24	34.14	0.55	0.34	WG
AKCEUN		17.00	-0.55	-0.63	33.60	0.01	0.01	GS
AVERUN		17.91	0.36	0.41	35.34	1.75	1.09	LA
B6VY7H		17.10	-0.45	-0.51	35.04	1.45	0.90	LW
CEZ7LH		16.20	-1.35	-1.54	32.90	-0.69	-0.42	LW
CF8P3Q		17.90	0.35	0.40	35.15	1.56	0.97	LA
DPGA7M		18.75	1.20	1.37	36.85	3.26	2.02	HG
DWYM6L		16.97	-0.58	-0.66	34.95	1.36	0.84	HG
EQ764F		19.37	1.82	2.07	35.02	1.43	0.89	XX
EVX6LG		15.96	-1.59	-1.81	30.91	-2.68	-1.66	PP
GGQ3VJ	X	12.96	-4.59	-5.23	24.17	-9.42	-5.83	LW
GKT27C		17.42	-0.13	-0.15	33.40	-0.19	-0.12	HG
HHGJQD		17.66	0.11	0.13	36.24	2.65	1.64	PP
HLE6DA		17.85	0.30	0.34	35.27	1.68	1.04	PP
JD6XBE		17.37	-0.18	-0.21	33.52	-0.07	-0.04	LP
JZE427		17.79	0.24	0.27	35.86	2.27	1.41	TL
K8TC39		18.43	0.88	1.00	35.57	1.98	1.23	HG
KWQB39		17.31	-0.24	-0.27	35.52	1.93	1.20	HG
MD9UBZ		17.06	-0.49	-0.56	33.50	-0.09	-0.05	LA
MDNA48	X	15.41	-2.14	-2.44	27.42	-6.17	-3.82	LP
MMEQY4		18.70	1.15	1.31	35.08	1.50	0.93	LA
NTG6DD		16.53	-1.03	-1.17	33.05	-0.54	-0.33	PP
PDHFX8		16.18	-1.37	-1.56	29.83	-3.76	-2.33	LP
Q62LWV		17.95	0.40	0.45	34.53	0.94	0.58	HG
Q8RM64		18.13	0.57	0.65	32.96	-0.62	-0.39	PP
QBTTF4		18.38	0.83	0.94	31.42	-2.17	-1.34	TN
QX4TN2		16.40	-1.15	-1.31	32.47	-1.12	-0.69	PP
RVU4YX		17.96	0.41	0.46	34.44	0.86	0.53	PP
TB4E3B		17.99	0.44	0.50	33.17	-0.42	-0.26	TL
TQFTLT	X	8.15	-9.40	-10.71	18.38	-15.20	-9.42	TN



**Paper & Paperboard Interlaboratory Testing Program
Analysis 370
Air Resistance - Gurley Oil Type**

**Report #281G
April 2016**

WebCode	Data Flag	Sample GE29			Sample GE30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
TYQAXZ		16.75	-0.80	-0.91	33.55	-0.04	-0.02	XX
W2K8UW		18.97	1.42	1.62	32.33	-1.26	-0.78	HG
W2MW3Z		17.30	-0.25	-0.29	33.30	-0.29	-0.18	PP
XGXXCV		17.57	0.02	0.02	32.96	-0.63	-0.39	PP
Z82GZW		17.48	-0.07	-0.08	31.56	-2.03	-1.25	XX

Sample GE29		Summary Statistics		Sample GE30	
Grand Means	17.551 sec/100 cc			33.586 sec/100 cc	
SD Btwn Labs	0.878 sec/100 cc			1.615 sec/100 cc	
Statistics based on 43 of 46 reporting participants					

Comments on Assigned Data Flags for Test #370

- GGQ3VJ (X) - Data for both samples are low.
- MDNA48 (X) - Data for sample GE30 are low.
- TQFTLT (X) - Extreme data.

Key to Instrument Codes Reported by Participants

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
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		



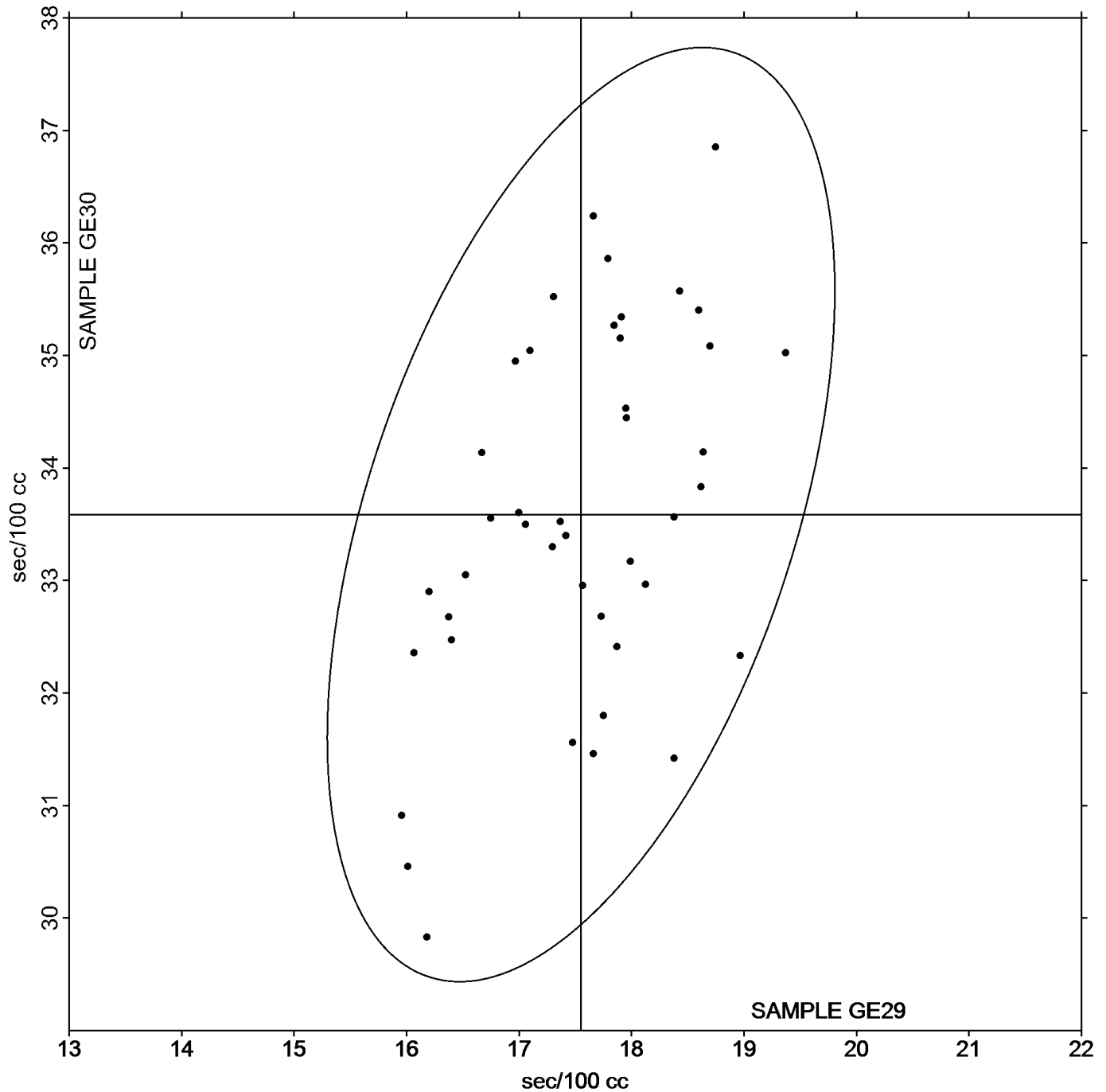
Paper & Paperboard Interlaboratory Testing Program
Analysis 370
Air Resistance - Gurley Oil Type

Report #281G
April 2016

Grand Mean Sample **GE29** = 17.551 sec/100 cc

Grand Mean Sample **GE30** = 33.586 sec/100 cc

ANALYSIS 370





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

Report #281G
April 2016

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

WebCode	Data Flag	Sample GE29			Sample GE30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
28B7ET		160.9	8.6	1.04	89.70	-0.30	-0.05	SH
4HRG2P		143.6	-8.7	-1.05	84.75	-5.25	-0.80	XX
4RTWQU		147.0	-5.3	-0.64	84.36	-5.64	-0.86	LP
AKCEUN		142.1	-10.2	-1.23	104.20	14.20	2.17	SH
DPGA7M		146.9	-5.4	-0.65	89.40	-0.60	-0.09	TT
E VX6LG		169.8	17.5	2.11	89.00	-1.00	-0.15	SH
JMQ2JE		162.1	9.8	1.18	93.90	3.90	0.59	TT
NUR3PA		153.7	1.4	0.17	81.50	-8.50	-1.30	GA
PLGZ49		151.2	-1.1	-0.13	98.30	8.30	1.27	TT
Q8RM64		154.5	2.2	0.27	86.95	-3.06	-0.47	PP
WBTLZ4		145.9	-6.4	-0.77	82.00	-8.00	-1.22	LP
XGXXCV		156.6	4.3	0.52	94.50	4.50	0.69	HM
YL7KLQ		145.8	-6.5	-0.79	91.50	1.50	0.23	TT

Sample GE29			Summary Statistics	Sample GE30		
Grand Means	152.32 Sheffield Units			90.005 Sheffield Units		
SD Btwn Labs	8.28 Sheffield Units			6.549 Sheffield Units		
Statistics based on 13 of 13 reporting participants						

Key to Instrument Codes Reported by Participants

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



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

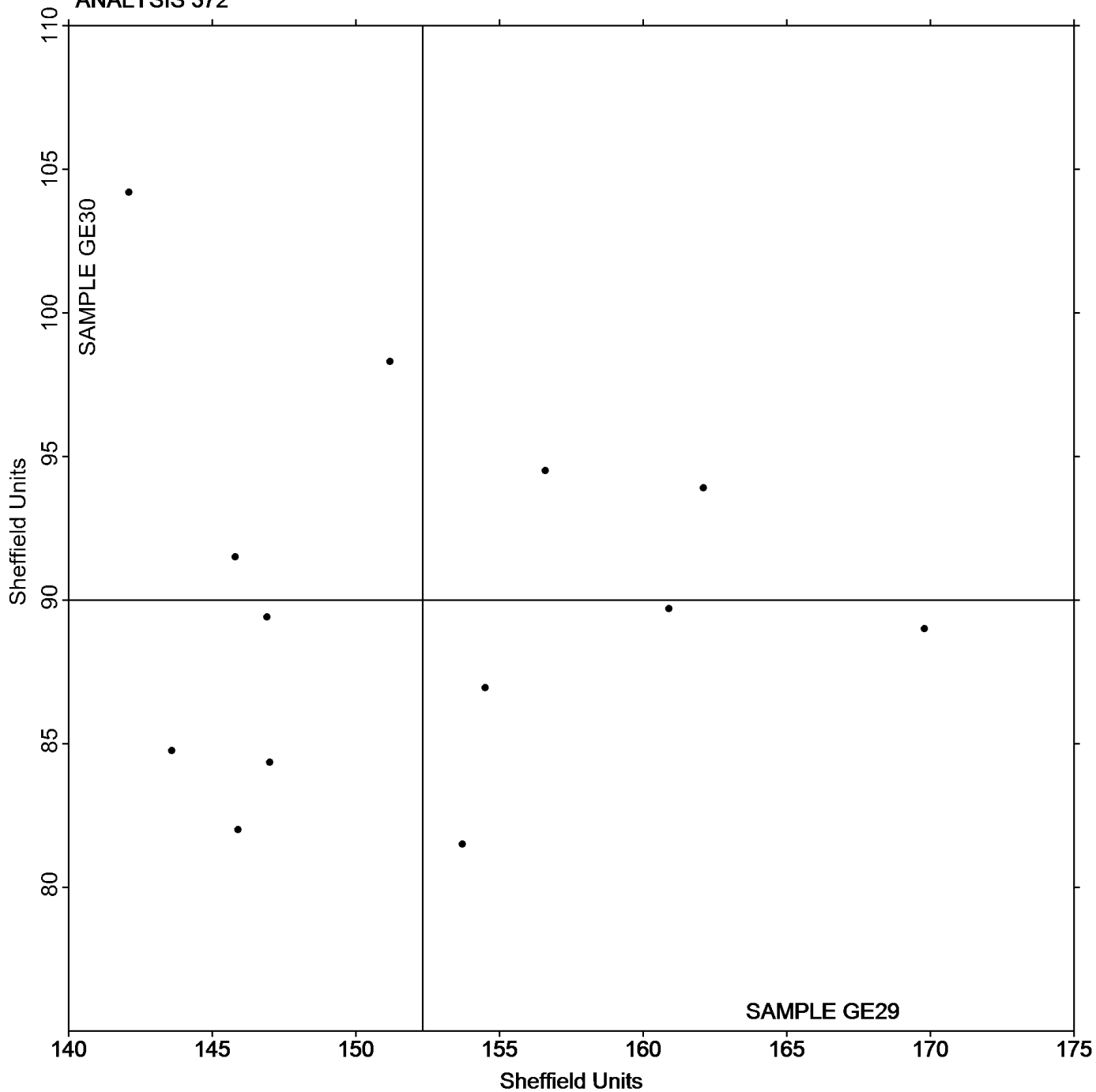
**Report #281G
April 2016**

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

Grand Mean Sample **GE29** = 152.32 Sheffield Units

Grand Mean Sample **GE30** = 90.005 Sheffield Units

ANALYSIS 372



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 376
Roughness - Print Surf Method - 0.5 to 4.0 Microns**

Report #281G
April 2016

WebCode	Data Flag	Sample GJ29			Sample GJ30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
44LN8R		1.017	-0.128	-1.54	0.7140	0.0342	0.55
69WV9W		1.247	0.102	1.22	0.8040	0.1242	2.01
6CUCKQ		1.262	0.117	1.40	0.6650	-0.0148	-0.24
734D8Q		1.104	-0.041	-0.50	0.6540	-0.0258	-0.42
7QVB9M		1.121	-0.024	-0.29	0.5990	-0.0808	-1.31
8AGL9R		0.995	-0.150	-1.81	0.6630	-0.0168	-0.27
8J834M	X	1.411	0.265	3.19	0.9155	0.2357	3.81
A9XGNJ		1.114	-0.031	-0.38	0.7840	0.1042	1.68
AP82RH		1.251	0.106	1.27	0.6930	0.0132	0.21
BZKLNJ		1.195	0.050	0.60	0.6640	-0.0158	-0.26
CWYHUJ		1.085	-0.060	-0.72	0.6220	-0.0578	-0.93
DPGA7M		1.161	0.016	0.19	0.6290	-0.0508	-0.82
DZX2RB		1.251	0.106	1.27	0.6890	0.0092	0.15
EVX6LG		1.119	-0.026	-0.32	0.6880	0.0082	0.13
GH26GH		1.113	-0.032	-0.39	0.6540	-0.0258	-0.42
GKT27C		1.145	0.000	0.00	0.6800	0.0002	0.00
L3XWVC		1.215	0.070	0.84	0.7690	0.0892	1.44
LCJ23C		1.136	-0.009	-0.11	0.5910	-0.0888	-1.43
M3BQ77		1.119	-0.026	-0.32	0.6390	-0.0408	-0.66
MNUVQA		1.268	0.123	1.48	0.8060	0.1262	2.04
NNQV4E		1.166	0.021	0.25	0.6570	-0.0228	-0.37
Q62LWV		1.149	0.004	0.05	0.6820	0.0022	0.04
QFKZXC		1.134	-0.011	-0.14	0.6220	-0.0578	-0.93
QNYLA2		0.969	-0.176	-2.12	0.6700	-0.0098	-0.16
QX4TN2		0.975	-0.170	-2.05	0.6090	-0.0708	-1.14
RVU4YX		1.129	-0.016	-0.20	0.6580	-0.0218	-0.35
TE3NEX		1.187	0.042	0.50	0.6480	-0.0318	-0.51
U4ZMEY		1.088	-0.057	-0.69	0.7160	0.0362	0.58
UCAWZ7		1.157	0.012	0.14	0.6820	0.0022	0.04
W2K8UW		1.071	-0.074	-0.89	0.7330	0.0532	0.86
WPTKN2		1.207	0.062	0.74	0.6260	-0.0538	-0.87
YL7KLQ		1.237	0.092	1.10	0.6170	-0.0628	-1.01
Z37RDX		1.261	0.116	1.39	0.8270	0.1472	2.38
Z42D7N	X	1.315	0.170	2.04	2.2520	1.5722	25.39

Sample GJ29		Summary Statistics	Sample GJ30	
Grand Means	1.1453 Microns		0.67981 Microns	
SD Btwn Labs	0.0832 Microns		0.06192 Microns	
Statistics based on 32 of 34 reporting participants				



Paper & Paperboard Interlaboratory Testing Program
Analysis 376
Roughness - Print Surf Method - 0.5 to 4.0 Microns

Report #281G
April 2016

Comments on Assigned Data Flags for Test #376

8J834M (X) - Data for both samples are high. Inconsistent within the determinations of sample GJ29.

Z42D7N (X) - Extreme data for Sample GJ30.

DZX2RB - One determination removed from the Lab Mean of Sample GJ29 per Grubb's Test at 1% risk (TAPPI 1205).

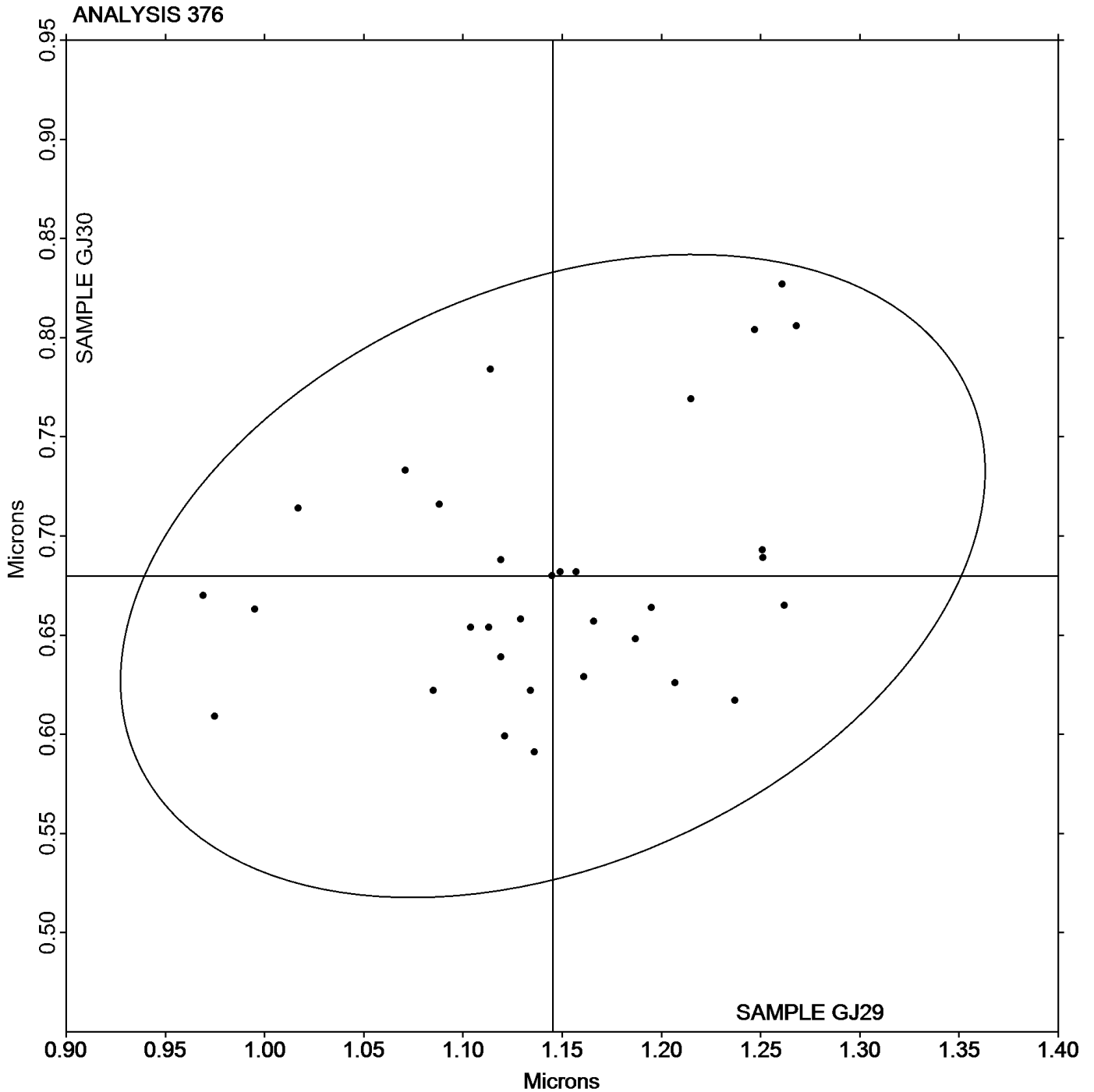


Paper & Paperboard Interlaboratory Testing Program
Analysis 376
Roughness - Print Surf Method - 0.5 to 4.0 Microns

Report #281G
April 2016

Grand Mean Sample **GJ29** = 1.1453 Microns

Grand Mean Sample **GJ30** = 0.67981 Microns





**Paper & Paperboard Interlaboratory Testing Program
Analysis 377
Roughness - Print Surf Method - 2.5 to 6.0 Microns**

**Report #281G
April 2016**

WebCode	Data Flag	Sample GK29			Sample GK30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
32PD3T		3.976	0.069	0.67	4.306	0.120	0.99
6CUCKQ	X	4.652	0.745	7.18	5.018	0.832	6.87
7DMMYQ		4.005	0.098	0.95	4.298	0.112	0.93
8AGL9R		3.918	0.011	0.11	4.090	-0.096	-0.79
CF8P3Q		3.724	-0.183	-1.76	3.991	-0.195	-1.61
HLE6DA		3.950	0.043	0.42	4.120	-0.066	-0.54
VV484Y		4.015	0.108	1.04	4.270	0.084	0.69
W2K8UW		3.794	-0.113	-1.09	4.116	-0.070	-0.58
W2MW3Z		3.873	-0.034	-0.33	4.296	0.110	0.91

		Summary Statistics	
		Sample GK29	Sample GK30
Grand Means		3.9069 Microns	4.1859 Microns
SD Btwn Labs		0.1038 Microns	0.1211 Microns
Statistics based on 8 of 9 reporting participants			

Comments on Assigned Data Flags for Test #377

6CUCKQ (X) - Extreme data.

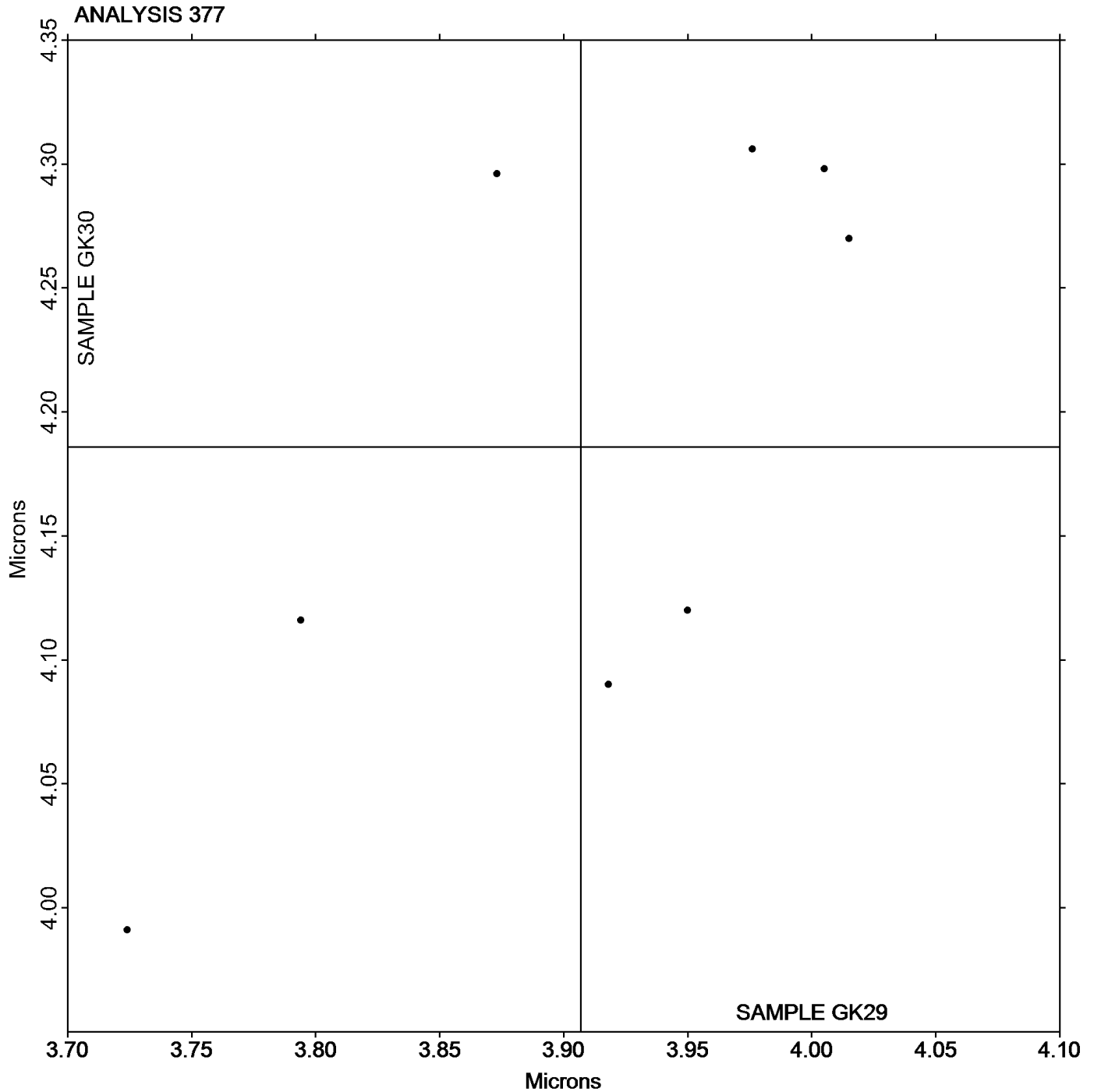


Paper & Paperboard Interlaboratory Testing Program
Analysis 377
Roughness - Print Surf Method - 2.5 to 6.0 Microns

Report #281G
April 2016

Grand Mean Sample **GK29** = 3.9069 Microns

Grand Mean Sample **GK30** = 4.1859 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 #281G
April 2016

WebCode	Data Flag	Sample GL29			Sample GL30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
237AUT		219.2	-6.1	-0.55	142.4	-8.4	-1.15	LW
28B7ET	*	197.5	-27.8	-2.49	150.5	-0.3	-0.04	SH
2XAMWY		220.5	-4.8	-0.43	148.9	-1.9	-0.25	GA
32PD3T		231.4	6.1	0.54	153.2	2.4	0.33	LW
44LN8R		221.1	-4.2	-0.38	149.0	-1.8	-0.24	LA
4CZ8QR	X	293.2	67.9	6.07	165.5	14.7	2.02	MP
4HRG2P	X	169.6	-55.7	-4.98	132.4	-18.4	-2.52	XX
7QVB9M		231.5	6.1	0.55	147.2	-3.5	-0.48	PP
7UTRKG		249.5	24.2	2.16	160.0	9.2	1.27	XX
7Z2FWX		244.1	18.8	1.68	158.1	7.4	1.01	PP
8AGL9R		230.0	4.7	0.42	166.5	15.7	2.16	XX
8J834M		225.3	0.0	0.00	153.9	3.1	0.43	XX
A9JVEH		237.8	12.5	1.11	151.6	0.8	0.11	PG
A9XGNJ		250.3	25.0	2.23	166.9	16.1	2.21	TT
AKCEUN		236.4	11.1	0.99	162.2	11.4	1.57	XX
AP82RH		220.5	-4.8	-0.43	147.4	-3.4	-0.46	PP
CEZ7LH		206.0	-19.3	-1.73	142.8	-8.0	-1.09	TS
CF8P3Q		239.2	13.9	1.24	151.8	1.0	0.14	LA
CWYHUJ		225.3	0.0	0.00	155.4	4.6	0.64	HM
DPGA7M		231.1	5.8	0.52	159.2	8.4	1.16	SH
DWYM6L		222.1	-3.2	-0.29	139.5	-11.3	-1.55	HM
EVX6LG		228.7	3.4	0.30	150.4	-0.4	-0.05	PP
EZT4UK		212.3	-13.0	-1.17	147.2	-3.5	-0.49	PP
GGQ3VJ	X	155.2	-70.1	-6.27	115.5	-35.3	-4.84	SH
GH26GH	*	208.5	-16.8	-1.50	158.0	7.2	0.99	PP
GKT27C		233.2	7.9	0.70	153.5	2.7	0.38	HM
GKTWVA		217.9	-7.4	-0.66	143.9	-6.9	-0.95	XX
GWLMC8		222.3	-3.0	-0.27	140.8	-10.0	-1.37	TS
H7PXKH		219.2	-6.1	-0.55	154.4	3.6	0.50	SH
HHGJQD		225.0	-0.3	-0.03	156.4	5.6	0.77	PP
HLE6DA		220.3	-5.0	-0.45	138.8	-11.9	-1.64	PP
JMQ2JE		228.7	3.4	0.30	150.6	-0.2	-0.02	TT
K8TC39		233.3	8.0	0.71	151.7	0.9	0.13	HM
KWQB39		230.5	5.2	0.46	148.8	-2.0	-0.27	TS
L3XWVC		228.6	3.3	0.29	146.0	-4.8	-0.65	LW
MMEQY4		214.3	-11.0	-0.99	142.4	-8.4	-1.15	LA
NNQV4E		213.2	-12.1	-1.09	141.2	-9.5	-1.31	PP
NTG6DD		206.5	-18.8	-1.68	145.0	-5.8	-0.79	SH
NUR3PA		220.1	-5.3	-0.47	139.1	-11.7	-1.61	GA
P6TUR9		243.0	17.7	1.58	165.0	14.2	1.95	GL
Q62LWV	X	263.4	38.1	3.40	149.6	-1.2	-0.16	HM



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

Report #281G
April 2016

WebCode	Data Flag	Sample GL29			Sample GL30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
Q8RM64		224.2	-1.1	-0.10	149.4	-1.4	-0.19	HM
QNYLA2		221.3	-4.0	-0.36	158.0	7.2	0.99	TT
QX4TN2		217.5	-7.8	-0.70	146.8	-4.0	-0.54	HM
RJYUEA		215.7	-9.6	-0.86	158.1	7.3	1.01	TS
RVU4YX		229.6	4.3	0.38	148.3	-2.5	-0.34	PP
TE3NEX		229.7	4.4	0.39	150.0	-0.8	-0.10	LW
U4ZMEY		233.3	8.0	0.71	152.1	1.3	0.18	LA
UCAWZ7		234.9	9.5	0.85	149.7	-1.1	-0.15	PP
VV484Y		237.5	12.2	1.09	155.3	4.5	0.62	HM
W2MW3Z		220.0	-5.3	-0.47	154.8	4.0	0.55	PP
WBT LZ4		228.4	3.1	0.27	159.6	8.8	1.21	PP
WGJWB3		237.0	11.7	1.04	154.0	3.2	0.44	GA
XGXXCV		216.7	-8.6	-0.77	138.6	-12.2	-1.67	PP
XRWF84		223.5	-1.8	-0.16	146.3	-4.4	-0.61	PP
YL7KLQ		203.7	-21.6	-1.93	139.1	-11.7	-1.60	TT
Z37RDX	X	272.2	46.9	4.19	201.5	50.7	6.96	GL
ZVMN7V	X	176.9	-48.4	-4.33	147.4	-3.4	-0.46	TT

Sample GL29		Summary Statistics	Sample GL30	
Grand Means	225.34 Sheffield		150.76 Sheffield	
SD Btwn Labs	11.18 Sheffield		7.29 Sheffield	
Statistics based on 52 of 58 reporting participants				

Comments on Assigned Data Flags for Test #378

- GGQ3VJ (X) - Extreme data.
- Z37RDX (X) - Extreme data.
- 4CZ8QR (X) - Extreme data for Sample GL29.
- ZVMN7V (X) - Data for sample GL29 are low.
- 4HRG2P (X) - Data for sample GL29 are low.
- Q62LWW (X) - Data for sample GL29 are high. Inconsistent within the determinations of sample GL29.

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	MP Metso Paperlab
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	XX Instrument make/model not specified by lab



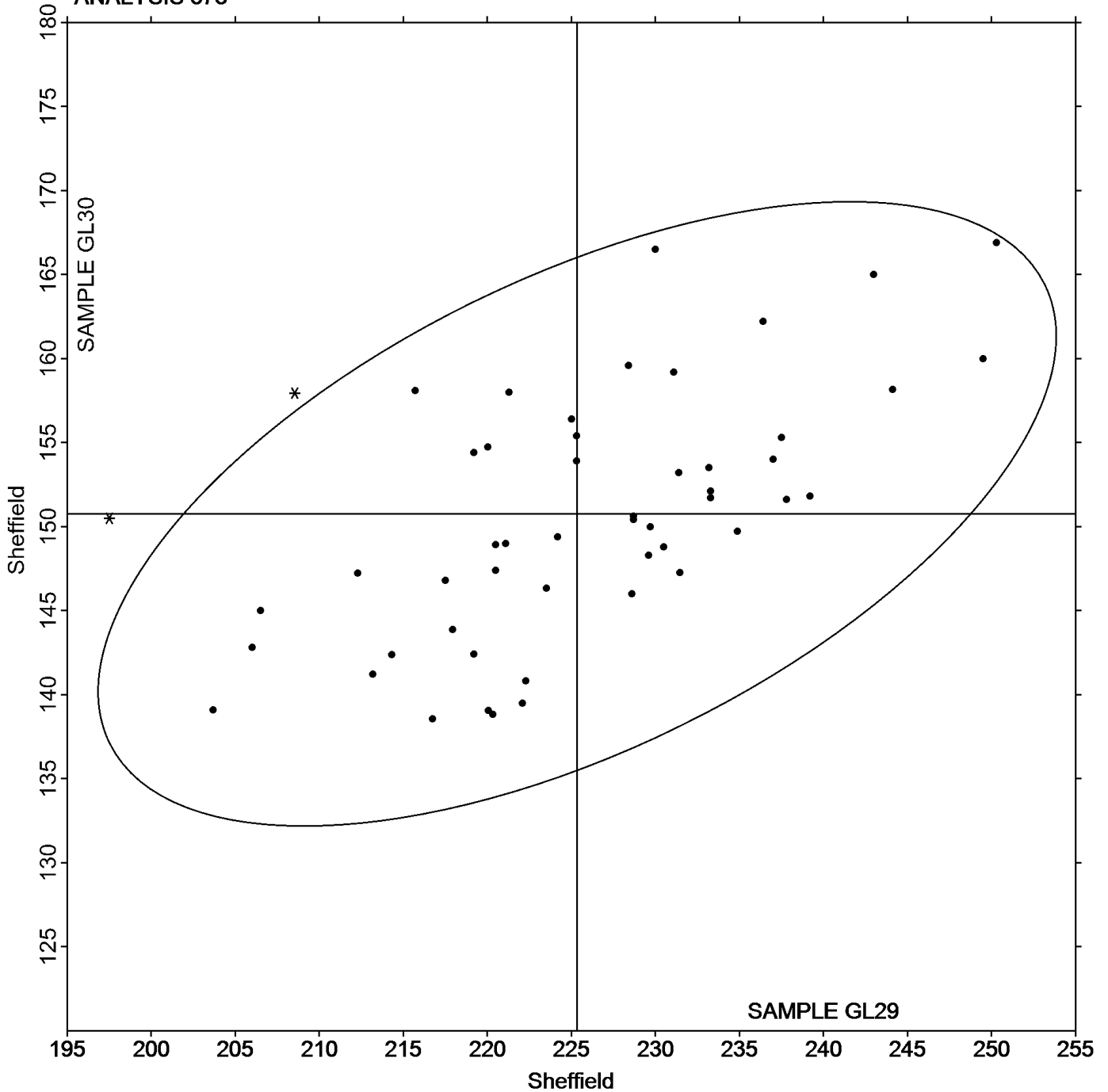
Paper & Paperboard Interlaboratory Testing Program
Analysis 378
Roughness - Sheffield Type

Report #281G
April 2016

Grand Mean Sample **GL29** = 225.34 Sheffield

Grand Mean Sample **GL30** = 150.76 Sheffield

ANALYSIS 378





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

**Report #281G
April 2016**

WebCode	Data Flag	Sample GM29			Sample GM30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3C76LW		4.365	-0.304	-0.69	4.097	-0.532	-1.29
7DMMYQ		4.797	0.128	0.29	4.610	-0.019	-0.05
AYCDGK		4.515	-0.154	-0.35	4.430	-0.199	-0.48
FKAXXC		5.592	0.923	2.11	5.530	0.902	2.19
MNUVQA		4.398	-0.271	-0.62	4.402	-0.227	-0.55
QNYLA2		4.970	0.301	0.69	5.030	0.401	0.98
TE2TPZ		3.993	-0.676	-1.54	4.887	0.258	0.63
VPUYW4		4.762	0.093	0.21	4.832	0.203	0.49
VV484Y		5.030	0.361	0.82	4.320	-0.309	-0.75
WLTAR2		4.687	0.018	0.04	4.503	-0.126	-0.31
ZGQA8M		4.250	-0.419	-0.96	4.276	-0.353	-0.86

		Summary Statistics	
		Sample GM29	Sample GM30
Grand Means	4.6689	Percent	4.6288
SD Btwn Labs	0.4381	Percent	0.4113
Statistics based on 11 of 11 reporting participants			



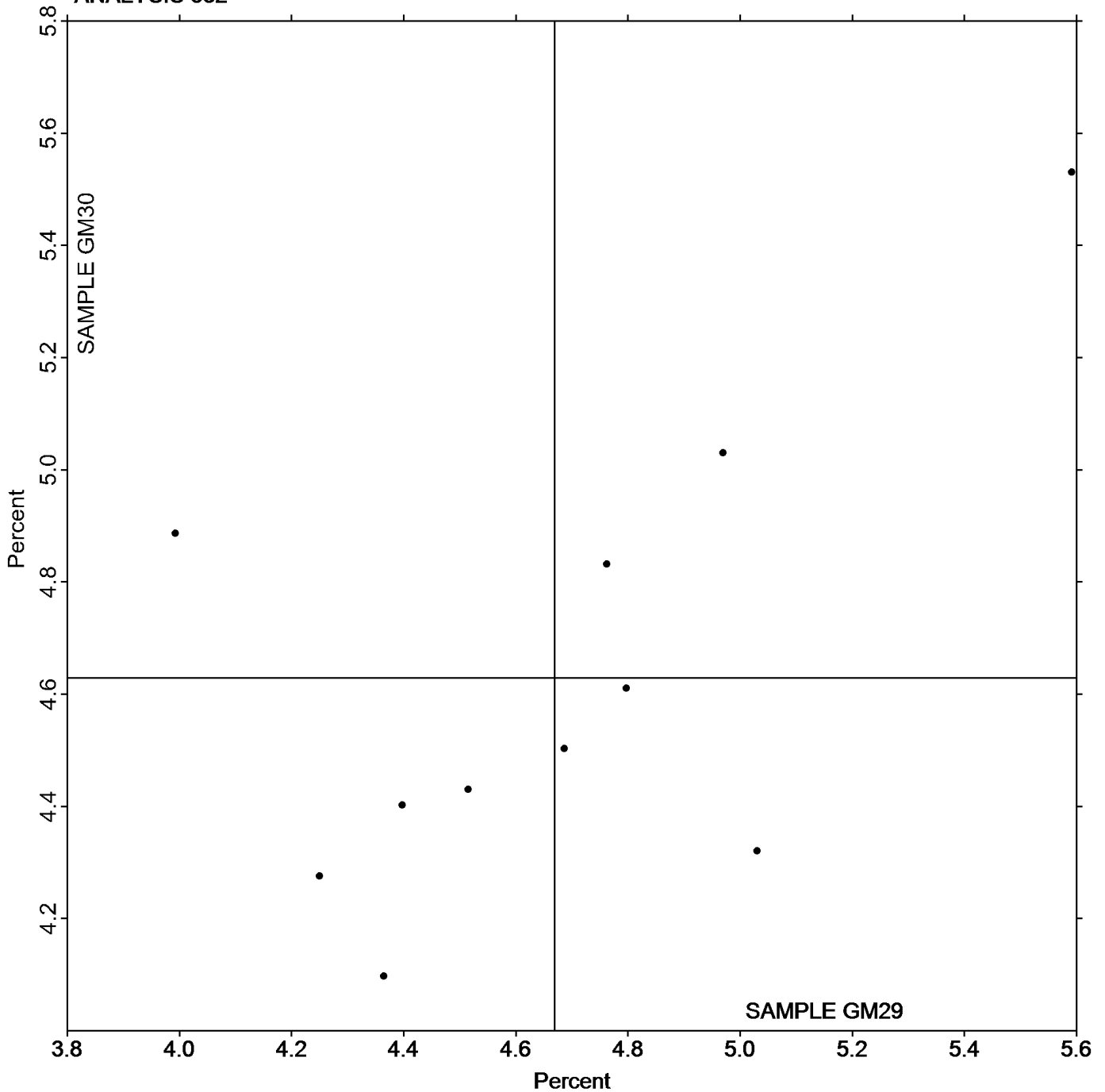
Paper & Paperboard Interlaboratory Testing Program
Analysis 382
Moisture in Paper

Report #281G
April 2016

Grand Mean Sample **GM29** = 4.6689 Percent

Grand Mean Sample **GM30** = 4.6288 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
Analysis 384
Opacity (89% Reflectance Backing) - Fine Papers**

Report #281G
April 2016

WebCode	Data Flag	Sample GN29			Sample GN30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
28B7ET		93.58	-0.16	-0.34	86.52	-0.37	-0.43
4HRG2P		92.94	-0.80	-1.73	85.51	-1.38	-1.57
7DMMYQ		93.67	-0.07	-0.15	86.88	-0.01	-0.01
7UTRKG		93.86	0.12	0.27	87.17	0.28	0.32
7Z2FWX		93.42	-0.32	-0.69	86.66	-0.23	-0.26
8J834M		93.10	-0.64	-1.38	85.76	-1.13	-1.29
A9JVEH		93.40	-0.34	-0.74	86.03	-0.85	-0.97
AKCEUN		93.44	-0.30	-0.64	85.93	-0.96	-1.09
AP82RH		93.51	-0.23	-0.49	86.82	-0.07	-0.08
CEZ7LH		93.37	-0.37	-0.79	86.38	-0.51	-0.58
CF8P3Q		93.36	-0.38	-0.82	86.32	-0.57	-0.65
CWYHUJ		94.13	0.39	0.86	87.49	0.60	0.69
DPGA7M		93.62	-0.12	-0.25	87.39	0.50	0.57
DZX2RB		94.29	0.55	1.20	87.52	0.63	0.72
GKT27C		94.00	0.26	0.57	87.09	0.20	0.23
H7PXKH		94.56	0.82	1.79	88.29	1.40	1.60
HBXKUD		94.04	0.30	0.66	86.96	0.07	0.08
HHGJQD		93.58	-0.16	-0.34	86.76	-0.13	-0.15
JMQ2JE	*	94.48	0.74	1.61	89.31	2.42	2.76
JZE427		93.19	-0.55	-1.18	86.61	-0.28	-0.32
K8TC39		93.42	-0.32	-0.69	86.34	-0.55	-0.63
KWQB39		93.86	0.12	0.27	86.57	-0.32	-0.36
LCJ23C		94.00	0.26	0.57	87.01	0.12	0.14
M3R8YE		92.98	-0.75	-1.63	86.44	-0.45	-0.51
MMEQY4		93.59	-0.15	-0.32	85.73	-1.16	-1.32
NTG6DD		93.59	-0.15	-0.32	86.92	0.03	0.04
Q8RM64	X	92.94	-0.80	-1.73	88.16	1.27	1.45
QX4TN2		94.03	0.29	0.64	87.82	0.93	1.06
UZ2CJY		93.70	-0.04	-0.08	86.49	-0.40	-0.45
VV484Y		94.43	0.69	1.51	87.33	0.44	0.50
W2K8UW		93.70	-0.04	-0.08	86.31	-0.58	-0.66
W2MW3Z		93.35	-0.39	-0.84	86.59	-0.29	-0.34
WF3ZH3		93.74	0.00	0.01	86.42	-0.47	-0.53
WPTKN2		93.69	-0.05	-0.10	86.44	-0.45	-0.51
YL7KLQ		94.13	0.39	0.86	87.86	0.97	1.11
Z42D7N	*	95.02	1.28	2.78	89.44	2.55	2.91



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

**Report #281G
April 2016**

Opacity (89% Reflectance Backing) - Fine Papers

	Sample GN29	Summary Statistics	Sample GN30
Grand Means	93.736 Percent		86.889 Percent
SD Btwn Labs	0.461 Percent		0.877 Percent
Statistics based on 35 of 36 reporting participants			

Comments on Assigned Data Flags for Test #384

Q8RM64 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample GN30.



Paper & Paperboard Interlaboratory Testing Program

Report #281G

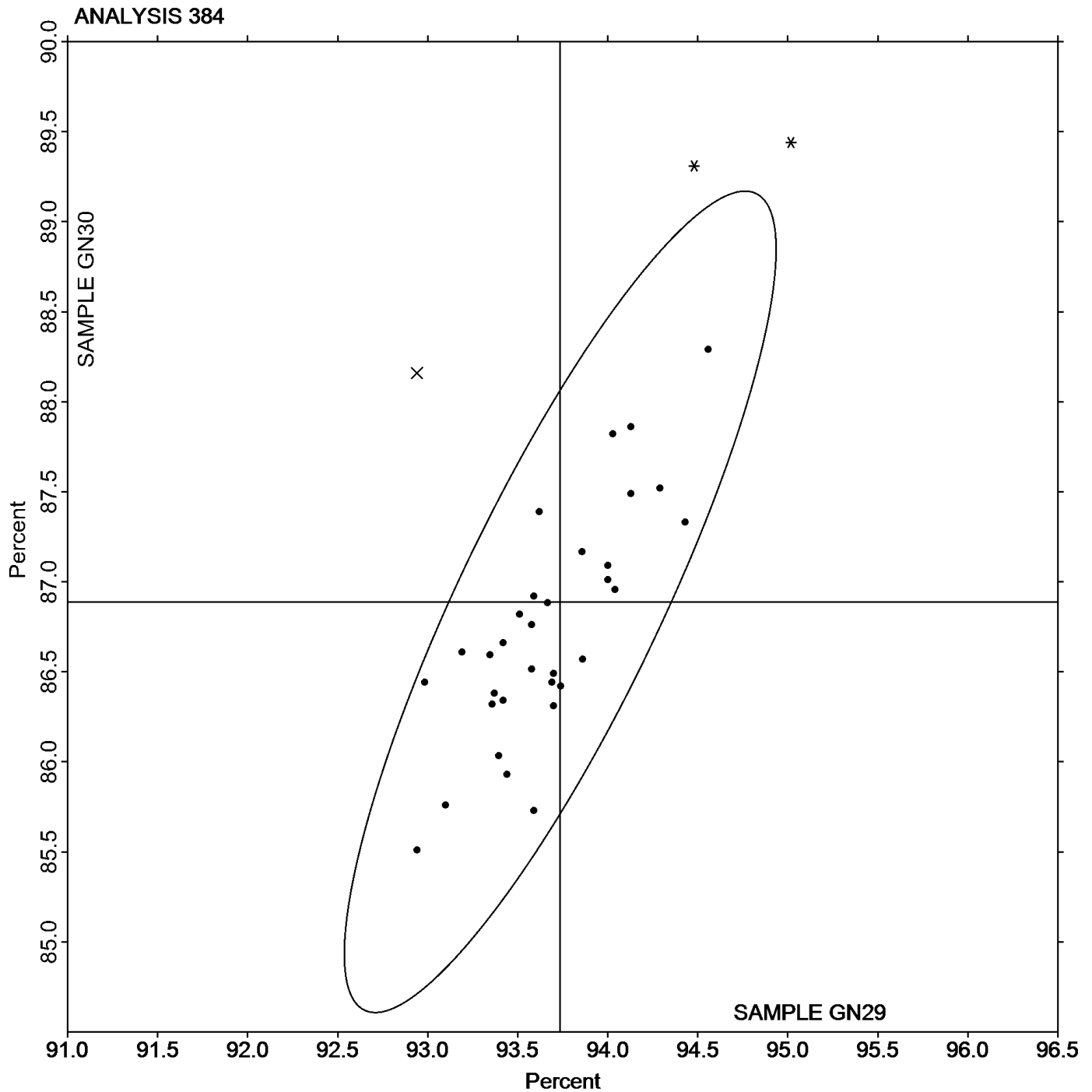
Analysis 384

April 2016

Opacity (89% Reflectance Backing) - Fine Papers

Grand Mean Sample **GN29** = 93.736 Percent

Grand Mean Sample **GN30** = 86.889 Percent





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

**Report #281G
April 2016**

WebCode	Data Flag	Sample GP29			Sample GP30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2UBC2Y		94.25	-0.20	-1.47	89.29	0.09	0.69
3C76LW		94.53	0.07	0.54	88.93	-0.27	-2.00
44BGBQ		94.57	0.11	0.82	89.36	0.16	1.18
646QER		94.68	0.23	1.65	89.21	0.01	0.07
6MHBBV		94.16	-0.29	-2.12	89.11	-0.09	-0.69
6PNNYP		94.38	-0.07	-0.50	89.20	0.00	-0.03
734D8Q		94.37	-0.08	-0.58	89.21	0.01	0.07
8J834M	X	93.61	-0.84	-6.03	87.02	-2.18	-16.21
AP82RH		94.61	0.16	1.14	88.96	-0.24	-1.79
B6VY7H		94.38	-0.07	-0.51	89.34	0.14	1.04
K4AGYF		94.56	0.11	0.80	89.22	0.02	0.13
MDNA48		94.42	-0.03	-0.20	89.20	0.00	0.00
PDHFX8		94.37	-0.08	-0.58	89.40	0.20	1.50
TB4E3B		94.45	0.00	-0.01	89.38	0.18	1.34
TYQAXZ		94.33	-0.12	-0.89	89.08	-0.12	-0.88
UQF8CY		94.49	0.04	0.29	89.18	-0.02	-0.14
XGXXCV		94.51	0.06	0.41	89.11	-0.09	-0.69
YZ4RJR		94.62	0.17	1.22	89.23	0.03	0.20

	Sample GP29	Summary Statistics	Sample GP30
Grand Means	94.451 Percent		89.200 Percent
SD Btwn Labs	0.139 Percent		0.134 Percent
Statistics based on 17 of 18 reporting participants			

Comments on Assigned Data Flags for Test #386

8J834M (X) - Extreme data.

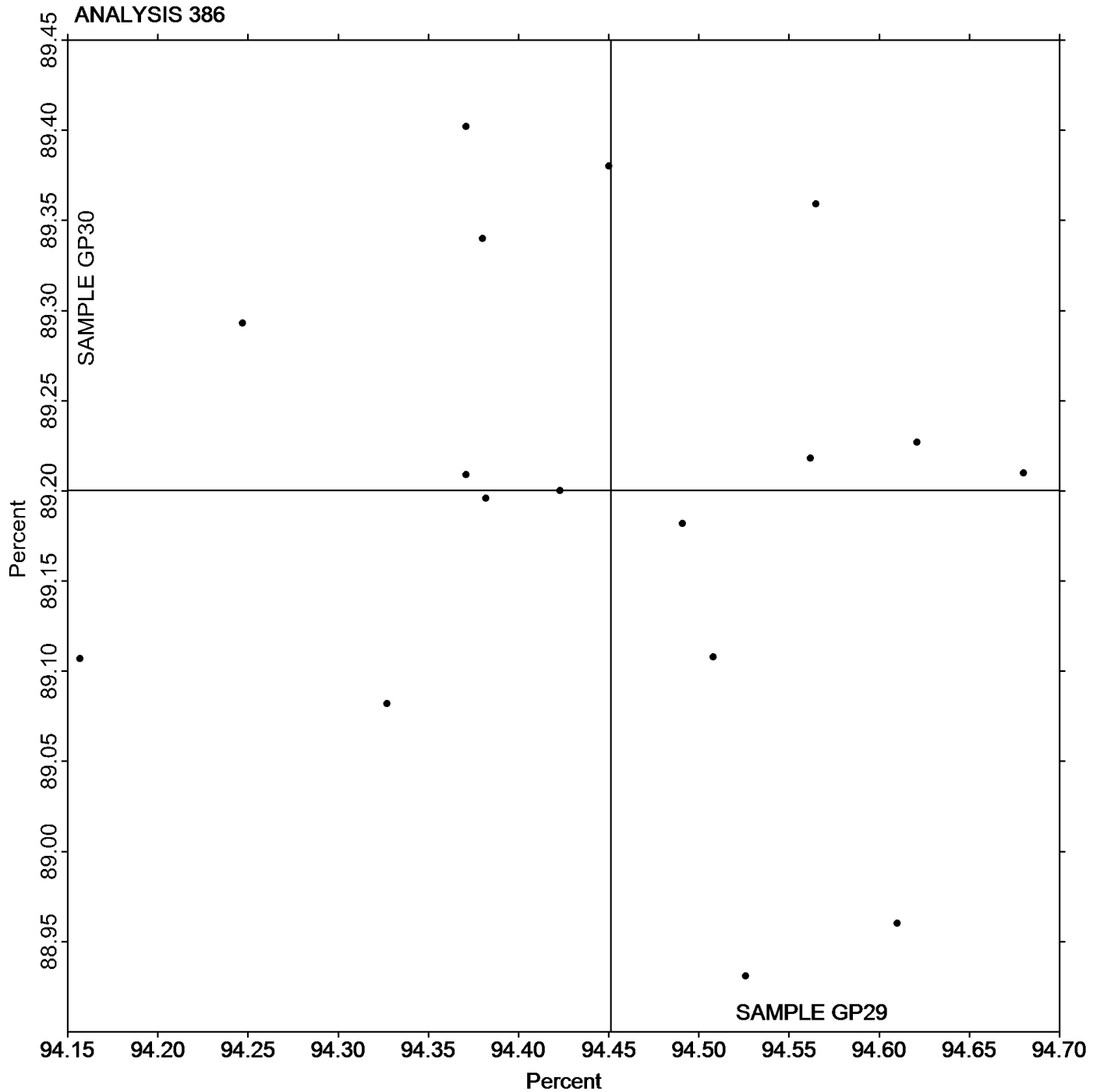


Paper & Paperboard Interlaboratory Testing Program
Analysis 386
Opacity (Paper Backing) - Fine Papers and Newsprint

Report #281G
April 2016

Grand Mean Sample **GP29** = 94.451 Percent

Grand Mean Sample **GP30** = 89.200 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 #281G
April 2016

WebCode	Data Flag	Sample GR29			Sample GR30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4HRG2P		89.21	2.14	1.21	89.68	2.49	1.36	XX
7UTRKG		87.44	0.36	0.21	87.73	0.54	0.29	XX
8J834M		85.81	-1.26	-0.71	85.80	-1.38	-0.75	TT
A9JVEH		88.16	1.08	0.61	88.52	1.34	0.73	TS
A9XGNJ		87.11	0.04	0.02	87.05	-0.13	-0.07	TT
AKCEUN		91.45	4.37	2.47	91.62	4.44	2.42	PE
AP82RH		87.33	0.25	0.14	87.45	0.27	0.15	TS
AYCDGK		83.12	-3.95	-2.23	83.11	-4.07	-2.22	XX
CF8P3Q		86.44	-0.64	-0.36	86.06	-1.13	-0.61	TS
CWYHUJ		86.17	-0.90	-0.51	86.21	-0.97	-0.53	TS
EZT4UK		88.19	1.11	0.63	88.60	1.41	0.77	TS
GH26GH		86.85	-0.22	-0.13	86.90	-0.28	-0.15	HD
H7PXKH		86.30	-0.77	-0.44	86.54	-0.65	-0.35	TA
HAQXKE		83.85	-3.22	-1.82	84.08	-3.11	-1.69	HG
HHGJQD		86.25	-0.82	-0.47	86.70	-0.48	-0.26	TT
HLE6DA		84.35	-2.72	-1.54	84.09	-3.10	-1.69	XX
JMQ2JE	*	89.23	2.15	1.22	88.63	1.44	0.79	TT
JZE427		86.64	-0.44	-0.25	87.36	0.18	0.10	TS
KWQB39		86.66	-0.41	-0.23	86.59	-0.60	-0.32	TS
NNQV4E		87.08	0.00	0.00	87.18	-0.01	0.00	TT
Q8RM64		91.04	3.97	2.24	91.58	4.39	2.39	XS
QX4TN2		86.81	-0.26	-0.15	86.73	-0.46	-0.25	TT
TE3NEX		86.29	-0.79	-0.44	86.55	-0.63	-0.35	TT
UCAWZ7		87.75	0.67	0.38	87.89	0.71	0.38	HD
W2K8UW		86.31	-0.76	-0.43	86.58	-0.61	-0.33	TT
WPTKN2		88.32	1.25	0.71	88.30	1.12	0.61	MK
XRWF84		87.97	0.89	0.50	87.90	0.71	0.39	TS
YL7KLQ		85.84	-1.23	-0.70	85.88	-1.30	-0.71	XX
Z37RDX		86.59	-0.49	-0.27	86.74	-0.45	-0.24	TS
Z42D7N		87.67	0.60	0.34	87.51	0.32	0.18	TS

Sample GR29		Summary Statistics	Sample GR30	
Grand Means	87.074 Percent		87.184 Percent	
SD Btwn Labs	1.769 Percent		1.836 Percent	
Statistics based on 30 of 30 reporting participants				

Analysis Notes:

Q8RM64 - One determination removed from the Lab Mean of Sample GR29 per Grubb's Test at 1% risk (TAPPI 1205).



Paper & Paperboard Interlaboratory Testing Program
Analysis 390
Directional Brightness

Report #281G
April 2016

Key to Instrument Codes Reported by Participants

HD	Hunter D25DP - 9000	HG	Hunter Labscan / XE
MK	Macbeth Color-Eye 7000 Spectrophotometer	PE	Photovolt 577
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

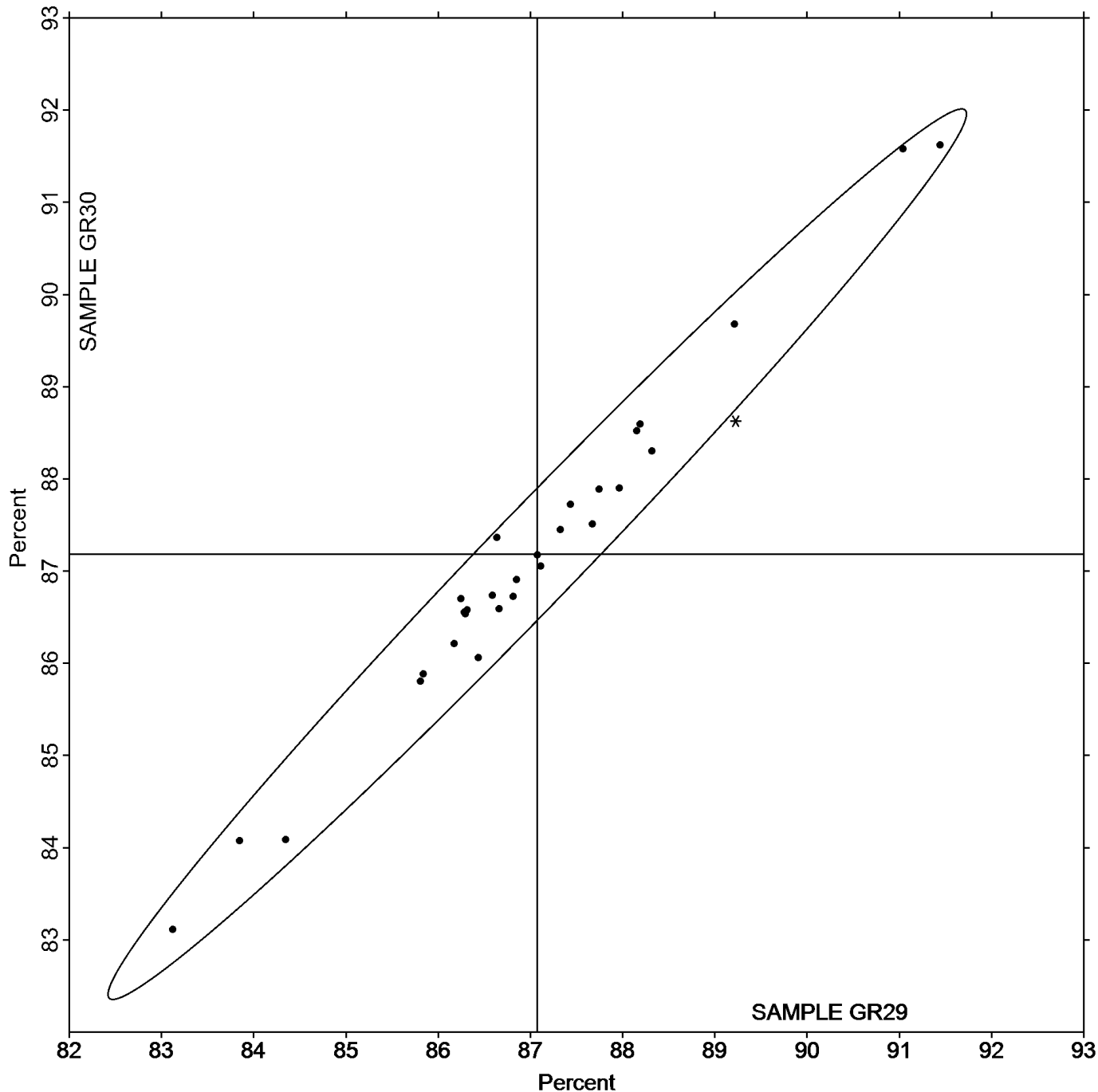
Directional Brightness

Report #281G
April 2016

Grand Mean Sample **GR29** = 87.074 Percent

Grand Mean Sample **GR30** = 87.184 Percent

ANALYSIS 390





**Paper & Paperboard Interlaboratory Testing Program
Analysis 391
Directional Brightness of Fluorescent Samples**

Report #281G
April 2016

WebCode	Data Flag	Sample GZ29			Sample GZ30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
7DMMYQ		90.75	-0.41	-0.47	89.97	-0.01	-0.02	TS
7UTRKG		93.14	1.99	2.27	90.84	0.86	1.35	XX
7Z2FWX		91.00	-0.15	-0.17	89.84	-0.14	-0.22	TS
CEZ7LH		91.72	0.57	0.65	89.46	-0.52	-0.83	TS
CWYHUJ		91.06	-0.09	-0.10	90.04	0.05	0.09	TS
DZX2RB		92.30	1.15	1.31	90.40	0.42	0.66	TT
EEAYAG		92.18	1.03	1.18	90.49	0.51	0.80	TS
GKT27C		90.60	-0.55	-0.63	90.24	0.26	0.40	TT
HBXKUD		90.70	-0.45	-0.52	90.19	0.20	0.32	TS
K8TC39		89.81	-1.34	-1.53	89.02	-0.97	-1.52	HT
KWQB39		91.25	0.10	0.11	90.39	0.40	0.64	TS
LCJ23C		90.72	-0.44	-0.50	89.72	-0.27	-0.42	PP
MMEQY4		91.36	0.21	0.24	90.22	0.24	0.37	TT
NTG6DD	*	89.64	-1.51	-1.73	88.22	-1.76	-2.77	HT
PQRDL8		91.72	0.57	0.65	90.73	0.74	1.17	TS
QNYLA2	M	93.12	1.97	2.24	No data reported for this sample			EF
UZ2CJY		90.70	-0.45	-0.52	89.92	-0.06	-0.10	TS
W2MW3Z		90.95	-0.20	-0.23	90.04	0.06	0.09	TS

Sample GZ29		Summary Statistics	Sample GZ30	
Grand Means	91.154 Percent		89.984 Percent	
SD Btwn Labs	0.876 Percent		0.635 Percent	
Statistics based on 17 of 18 reporting participants				

Comments on Assigned Data Flags for Test #391

QNYLA2 (M) - Participant did not submit data for sample GZ30.

Key to Instrument Codes Reported by Participants

EF	L & W Dacolor 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

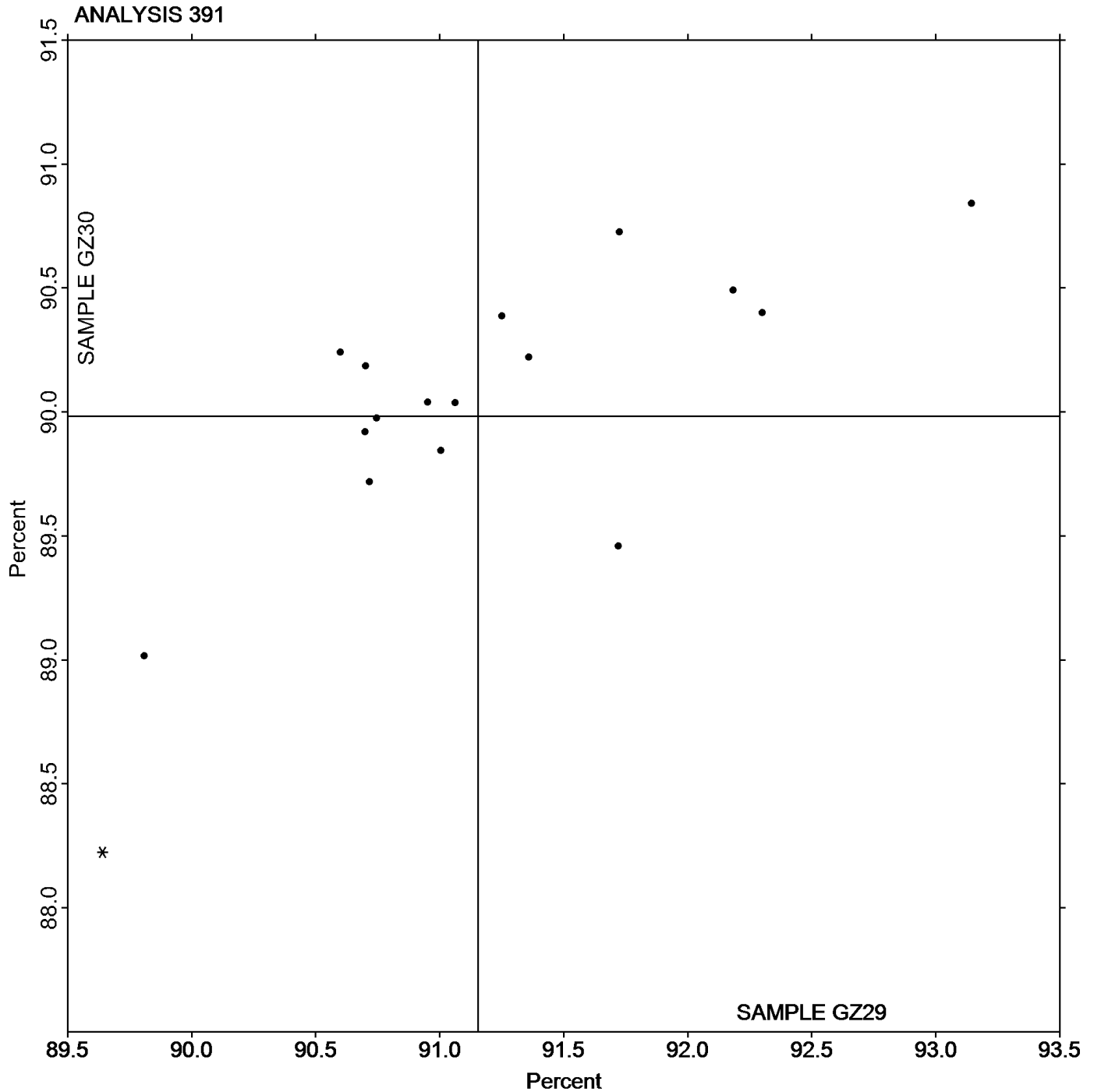


Paper & Paperboard Interlaboratory Testing Program
Analysis 391
Directional Brightness of Fluorescent Samples

Report #281G
April 2016

Grand Mean Sample **GZ29** = 91.154 Percent

Grand Mean Sample **GZ30** = 89.984 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 #281G
April 2016**

WebCode	Data Flag	Sample GR29			Sample GR30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
237AUT	X	92.40	5.20	8.43	92.70	5.41	8.50	EF
2UBC2Y		86.22	-0.98	-1.60	86.34	-0.95	-1.49	TM
3C76LW		87.61	0.41	0.66	87.62	0.33	0.51	LS
6CUCKQ		87.20	-0.01	-0.01	87.47	0.18	0.28	TC
6FY3TQ		87.46	0.26	0.42	87.64	0.35	0.55	TC
6MHBBV		87.28	0.08	0.12	87.36	0.08	0.12	EG
734D8Q		88.18	0.98	1.59	88.15	0.86	1.35	LS
7QVB9M		87.41	0.21	0.34	87.70	0.41	0.65	TC
8J834M		86.40	-0.81	-1.31	86.43	-0.86	-1.36	TM
A9XGNJ		87.75	0.55	0.89	87.95	0.66	1.04	EG
AP82RH		86.19	-1.02	-1.65	86.28	-1.01	-1.59	TM
AYCDGK		86.84	-0.36	-0.59	87.02	-0.27	-0.43	EE
BZKLNJ		87.23	0.02	0.03	87.45	0.16	0.25	TC
CF8P3Q		87.59	0.38	0.62	87.61	0.32	0.50	TC
CKQK7J		87.27	0.07	0.11	87.20	-0.08	-0.13	TC
CRP6CK		87.84	0.63	1.03	87.87	0.58	0.91	TC
CWYHUJ		87.56	0.36	0.58	87.83	0.55	0.86	LT
DPGA7M		87.59	0.39	0.63	87.74	0.45	0.71	TC
HLE6DA	X	77.21	-10.00	-16.22	76.32	-10.97	-17.22	TC
K4AGYF		86.90	-0.31	-0.50	87.01	-0.28	-0.43	LA
NNQV4E		85.76	-1.44	-2.34	85.84	-1.45	-2.28	TL
QFKZXC	X	92.62	5.42	8.79	92.70	5.42	8.51	TC
QNYLA2	*	87.74	0.53	0.87	87.46	0.17	0.27	LA
R7AXCB	X	92.24	5.04	8.17	92.42	5.14	8.07	TC
RVU4YX		87.54	0.34	0.55	87.66	0.37	0.58	PP
TB4E3B	*	85.98	-1.23	-1.99	85.80	-1.49	-2.34	TM
TE3NEX		87.43	0.23	0.37	87.55	0.26	0.41	EG
UQF8CY		87.30	0.09	0.15	87.46	0.17	0.27	TC
XGXXCV		87.47	0.27	0.43	87.42	0.13	0.21	TC
YZ4RJR	X	80.34	-6.86	-11.14	80.20	-7.09	-11.14	TC
ZK2KXV		87.57	0.37	0.59	87.65	0.36	0.56	TC

	Sample GR29	Summary Statistics	Sample GR30
Grand Means	87.204 Percent		87.288 Percent
SD Btwn Labs	0.616 Percent		0.637 Percent
Statistics based on 26 of 31 reporting participants			



Paper & Paperboard Interlaboratory Testing Program
Analysis 392
Diffuse Brightness

Report #281G
April 2016

Comments on Assigned Data Flags for Test #392

237AUT (X) - Extreme data.

YZ4RJR (X) - Extreme data.

QFKZXC (X) - Extreme data.

R7AXCB (X) - Extreme data.

HLE6DA (X) - Extreme data.

Key to Instrument Codes Reported by Participants

EE Datacolor Elrepho 2000

EG Datacolor Elrepho 450X

LS L & W Elrepho SE 070

PP Technidyne Profile/Plus

TL Technidyne Technibrite TB-1

EF Datacolor Elrepho 3000

LA L & W Elrepho - Autoline

LT L & W Elrepho SE 071

TC Technidyne Color Touch Series

TM Technidyne Technibrite Micro TB-1C

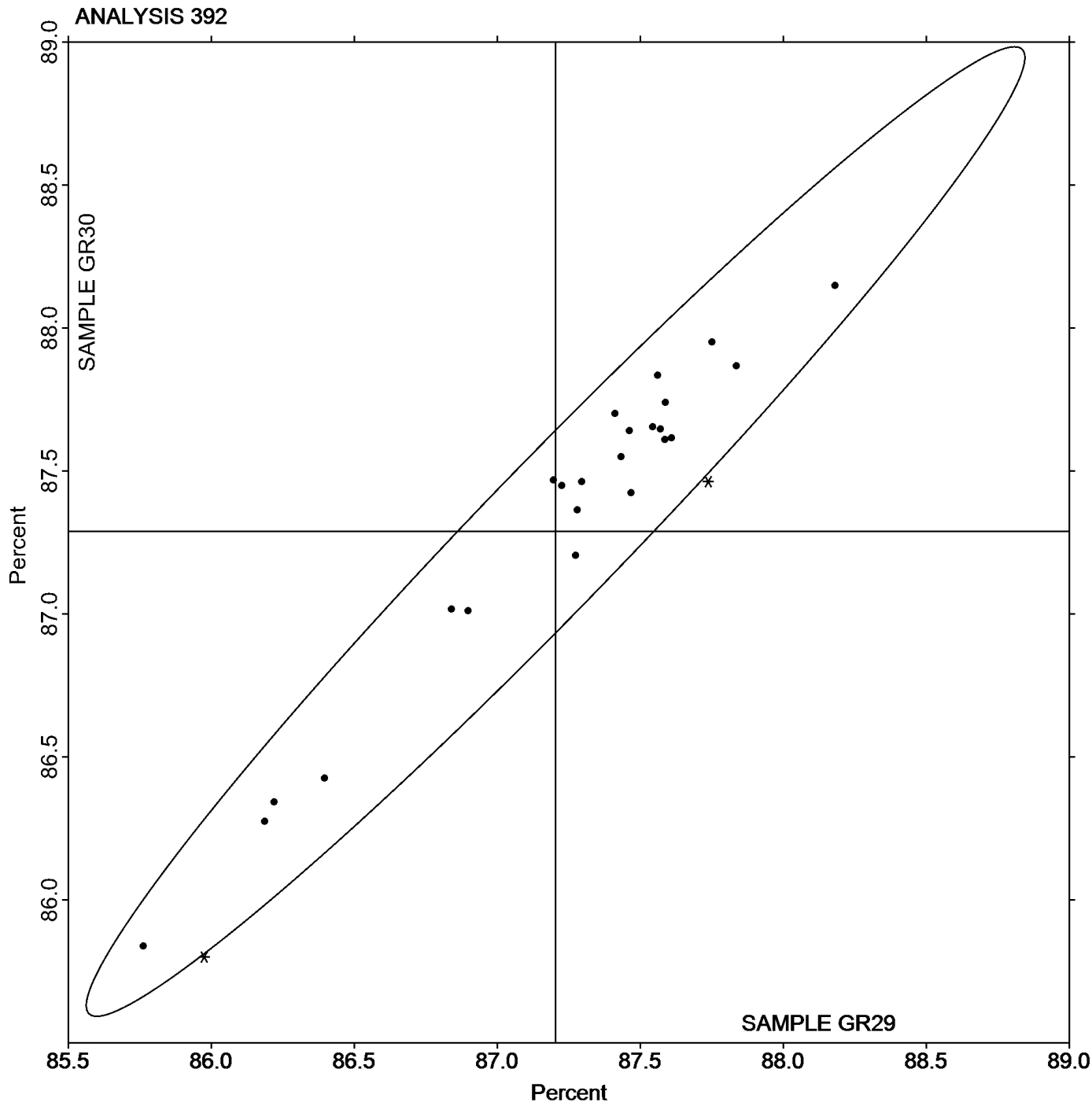


Paper & Paperboard Interlaboratory Testing Program
Analysis 392
Diffuse Brightness

Report #281G
April 2016

Grand Mean Sample **GR29** = 87.204 Percent

Grand Mean Sample **GR30** = 87.288 Percent





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

Report #281G
April 2016

WebCode	Data Flag	Sample GZ29			Sample GZ30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
7DMMYQ		3.840	0.163	0.71	7.336	0.169	0.51	TS
7UTRKG		3.162	-0.515	-2.25	6.300	-0.867	-2.63	XX
7Z2FWX		3.654	-0.023	-0.10	6.828	-0.339	-1.03	TS
CWYHUJ		4.058	0.381	1.66	7.506	0.339	1.03	TS
EEAYAG		3.816	0.139	0.61	7.468	0.301	0.91	TS
GKT27C		3.880	0.203	0.89	7.340	0.173	0.52	TT
HBXKUD		3.676	-0.001	0.00	7.188	0.021	0.06	TS
KWQB39		3.416	-0.261	-1.14	6.956	-0.211	-0.64	TS
LCJ23C		3.608	-0.069	-0.30	7.088	-0.079	-0.24	PP
MMEQY4		3.820	0.143	0.63	7.460	0.293	0.89	TT
PQRDL8		3.494	-0.183	-0.80	7.296	0.129	0.39	TS
QNYLA2	M	5.700	2.023	8.83	No data reported for this sample			EF
UZ2CJY		3.640	-0.037	-0.16	7.300	0.133	0.40	TS
W2MW3Z		3.734	0.057	0.25	7.106	-0.061	-0.19	TS

Sample GZ29		Summary Statistics		Sample GZ30	
Grand Means	3.6768 Percent			7.1671 Percent	
SD Btwn Labs	0.2290 Percent			0.3299 Percent	
Statistics based on 13 of 14 reporting participants					

Comments on Assigned Data Flags for Test #394

QNYLA2 (M) - Participant did not submit data for sample GZ30.

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		



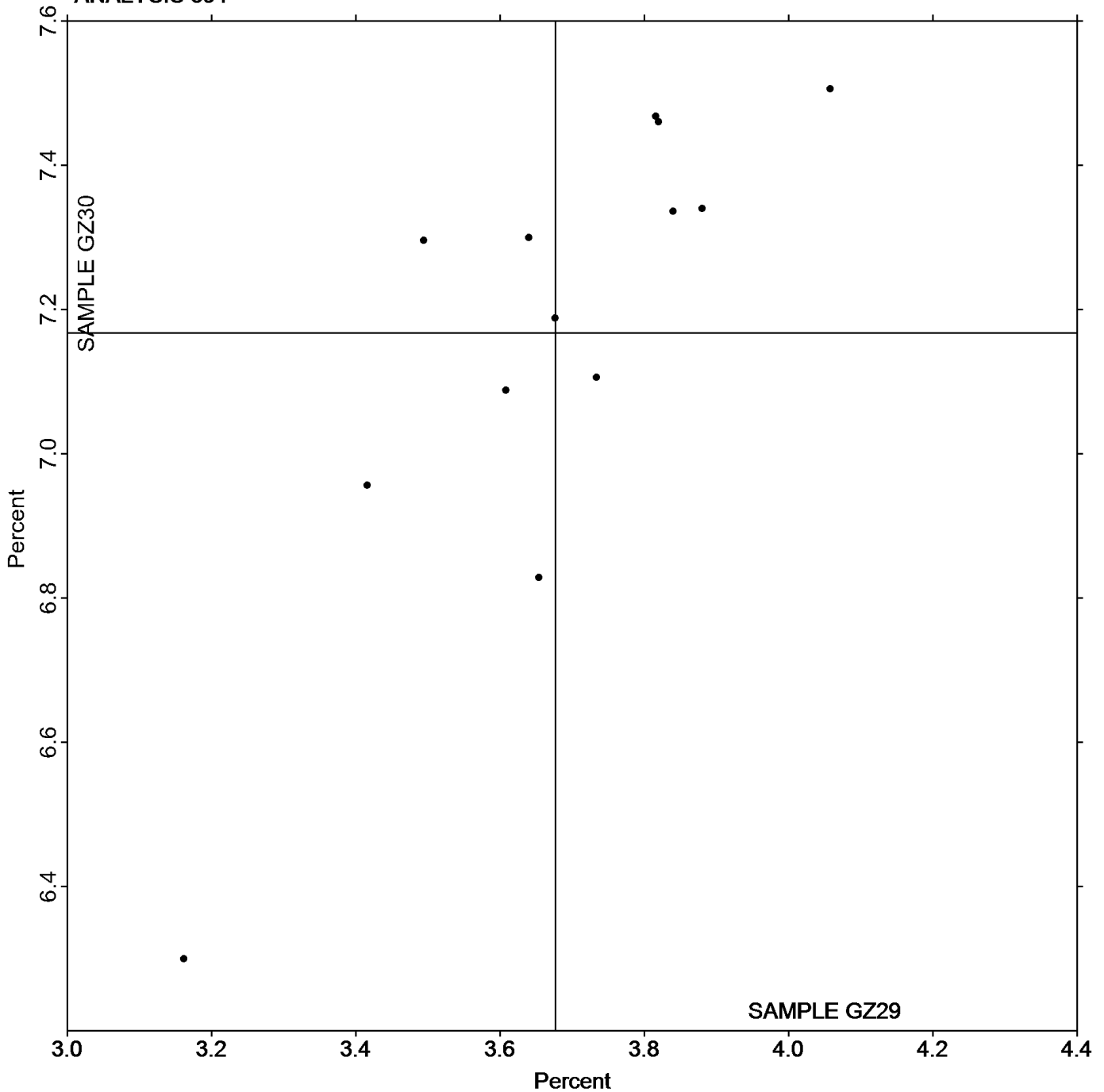
Paper & Paperboard Interlaboratory Testing Program
Analysis 394
Fluorescent Component of Directional Brightness

Report #281G
April 2016

Grand Mean Sample **GZ29** = 3.6768 Percent

Grand Mean Sample **GZ30** = 7.1671 Percent

ANALYSIS 394



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 395
Specular Gloss at 75 Degrees - High Range**

Report #281G
April 2016

WebCode	Data Flag	Sample GT29			Sample GT30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
44LN8R	X	64.76	-4.73	-3.10	77.46	-5.23	-5.29	XX
646QER		68.20	-1.29	-0.85	82.00	-0.69	-0.70	GA
6CUCKQ		66.75	-2.74	-1.79	82.51	-0.18	-0.18	ZH
734D8Q		69.44	-0.05	-0.03	82.00	-0.69	-0.70	LB
8J834M		71.98	2.49	1.63	82.44	-0.25	-0.26	TG
A9XGNJ		66.76	-2.73	-1.79	83.76	1.07	1.08	GM
AP82RH		69.19	-0.30	-0.20	83.05	0.36	0.36	TH
DZX2RB		69.87	0.38	0.25	83.66	0.97	0.98	TG
EVX6LG		67.96	-1.53	-1.00	81.49	-1.20	-1.21	GM
GH26GH		69.43	-0.06	-0.04	83.88	1.19	1.20	TH
GKT27C		69.82	0.33	0.22	81.59	-1.10	-1.12	PP
HBXKUD		68.75	-0.74	-0.49	81.72	-0.97	-0.98	LA
LCJ23C		69.92	0.43	0.28	81.73	-0.96	-0.97	PP
NNQV4E		69.01	-0.48	-0.32	83.58	0.89	0.90	GS
TE3NEX		69.57	0.08	0.05	82.24	-0.45	-0.46	TH
U4ZMEY		70.95	1.46	0.96	84.60	1.91	1.93	LA
UCAWZ7		72.58	3.09	2.02	84.07	1.38	1.40	TH
W2K8UW		70.52	1.03	0.68	82.18	-0.51	-0.52	TH
WPTKN2		70.14	0.65	0.42	81.93	-0.76	-0.77	PP
Z42D7N	X	51.83	-17.66	-11.56	51.51	-31.18	-31.56	LA

Sample GT29		Summary Statistics	Sample GT30	
Grand Means	69.491 Gloss Units		82.690 Gloss Units	
SD Btwn Labs	1.527 Gloss Units		0.988 Gloss Units	
Statistics based on 18 of 20 reporting participants				

Comments on Assigned Data Flags for Test #395

- 44LN8R (X) - Data for both samples are low.
- Z42D7N (X) - Extreme data.

Key to Instrument Codes Reported by Participants

GA BYK-Gardner (model not specified)	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
XX Instrument make/model not specified by lab	ZH Zehntner ZLR 1050

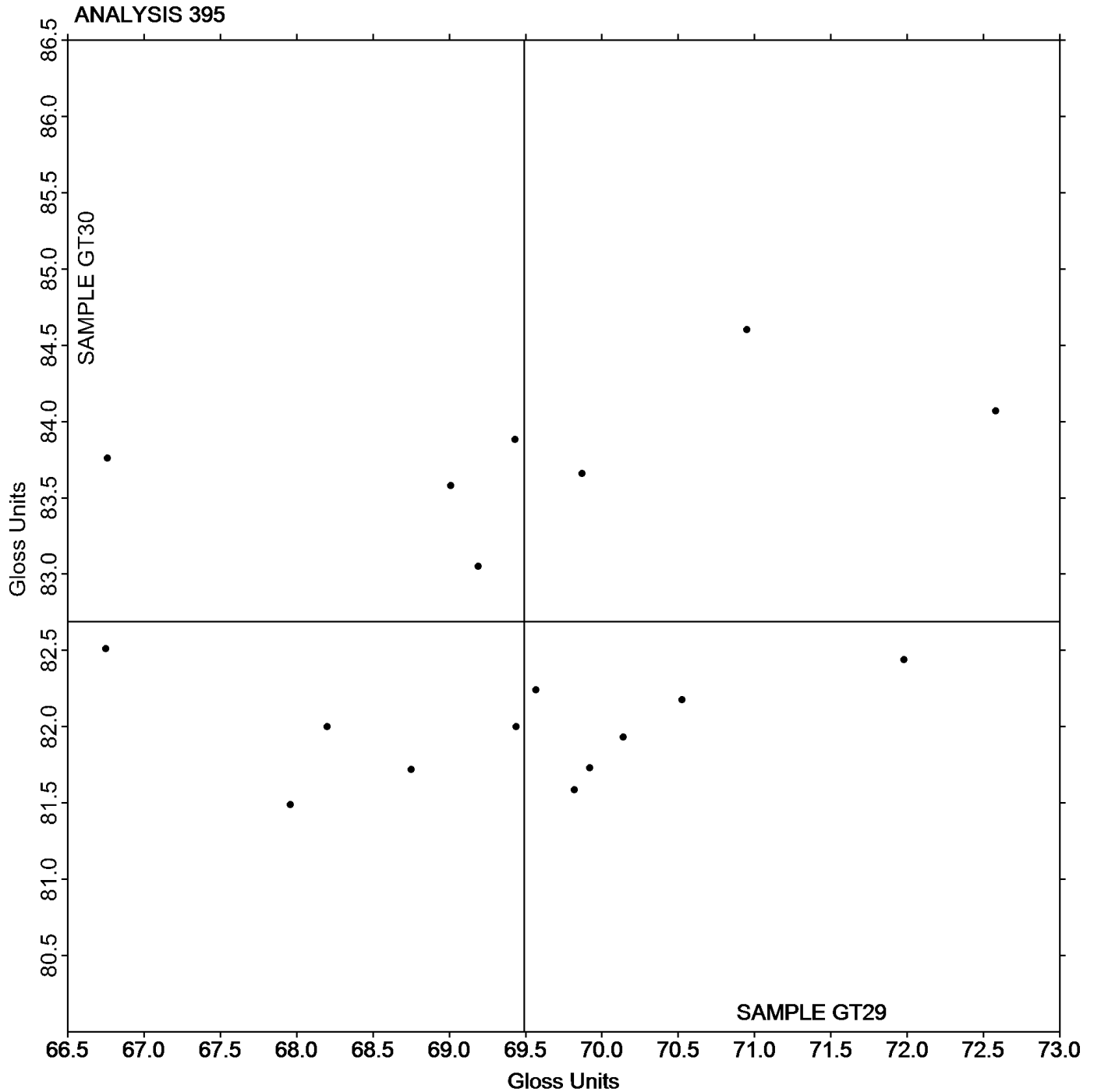


Paper & Paperboard Interlaboratory Testing Program
Analysis 395
Specular Gloss at 75 Degrees - High Range

Report #281G
April 2016

Grand Mean Sample **GT29** = 69.491 Gloss Units

Grand Mean Sample **GT30** = 82.690 Gloss 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
Analysis 396
Specular Gloss at 75 Degrees - Low Range**

**Report #281G
April 2016**

WebCode	Data Flag	Sample GU29			Sample GU30			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
734D8Q		43.65	1.10	0.50	25.93	0.00	0.00	LA
8J834M		43.06	0.51	0.23	26.42	0.49	0.36	TG
DPGA7M		43.67	1.12	0.51	27.51	1.58	1.15	TH
H7PXKH		42.84	0.29	0.13	26.09	0.16	0.12	TH
HLE6DA		43.86	1.31	0.59	26.90	0.97	0.71	TH
KWQB39		38.56	-3.99	-1.80	25.40	-0.53	-0.38	GN
MNUVQA		39.13	-3.42	-1.54	22.39	-3.54	-2.58	XX
Q8RM64		41.86	-0.69	-0.31	25.96	0.03	0.03	TH
QNYLA2		45.95	3.40	1.53	26.57	0.64	0.47	TG
VV484Y		42.91	0.36	0.16	26.09	0.16	0.12	PP

Summary Statistics		
	Sample GU29	Sample GU30
Grand Means	42.549 Gloss Units	25.925 Gloss Units
SD Btwn Labs	2.219 Gloss Units	1.372 Gloss Units
Statistics based on 10 of 10 reporting participants		

Key to Instrument Codes Reported by Participants

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



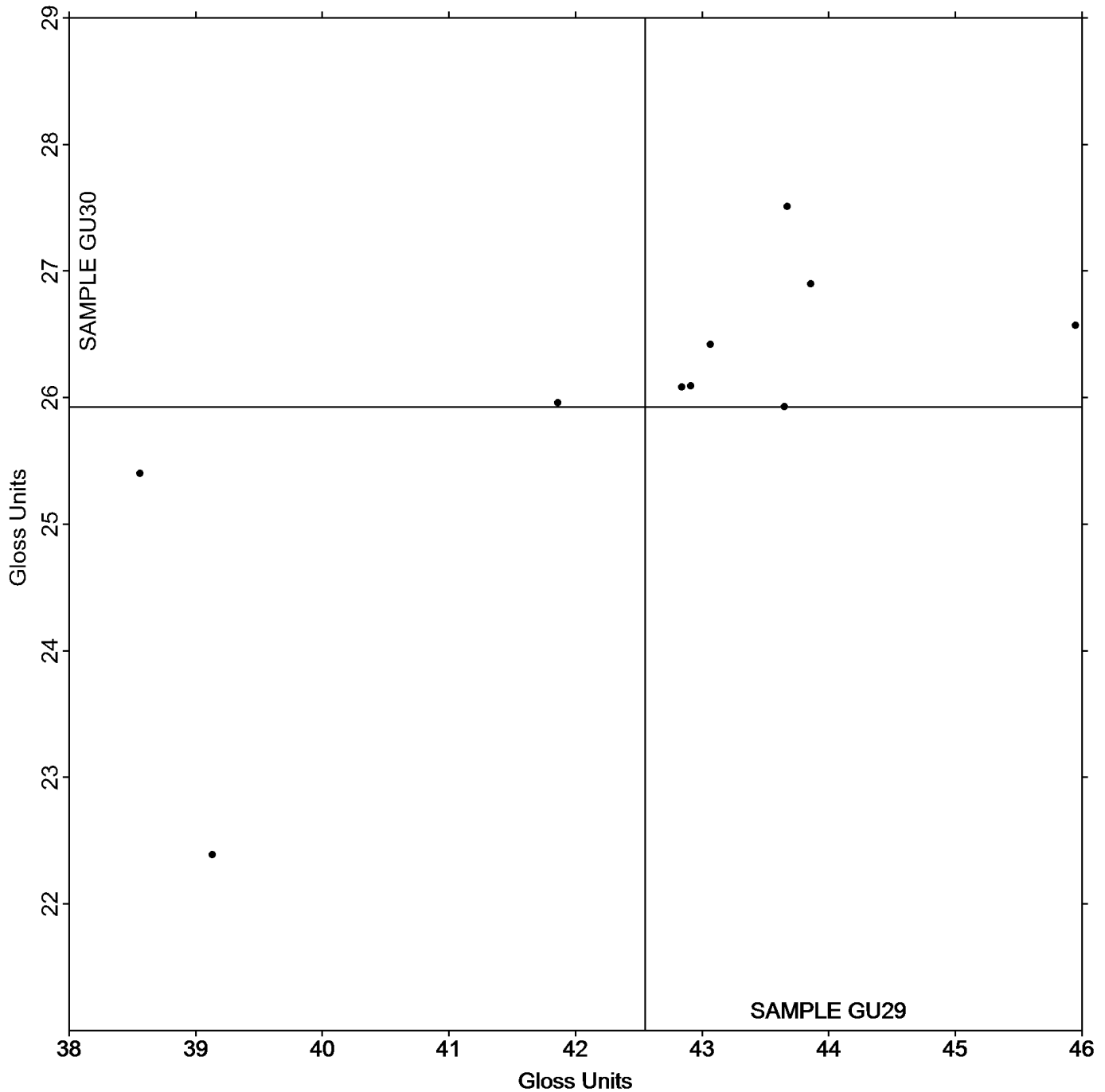
Paper & Paperboard Interlaboratory Testing Program
Analysis 396
Specular Gloss at 75 Degrees - Low Range

Report #281G
April 2016

Grand Mean Sample **GU29** = 42.549 Gloss Units

Grand Mean Sample **GU30** = 25.925 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 #281G
April 2016

WebCode	Data Flag	Sample GW29			Sample GW30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3C76LW		72.12	-0.40	-0.74	85.75	-0.13	-0.26
44BGBQ		72.83	0.31	0.57	86.18	0.31	0.63
69V2PQ		72.29	-0.24	-0.43	85.89	0.02	0.03
734D8Q		72.79	0.26	0.48	85.52	-0.36	-0.74
9JPDDF	X	71.81	-0.71	-1.31	82.29	-3.59	-7.38
AYCDGK		73.02	0.50	0.91	86.65	0.77	1.58
B6VY7H		72.88	0.36	0.65	86.68	0.80	1.65
CEZ7LH		72.41	-0.11	-0.21	85.71	-0.17	-0.35
CKQK7J		73.46	0.94	1.72	86.76	0.88	1.81
DAJ38K		73.44	0.92	1.69	86.66	0.78	1.61
DPGA7M		71.75	-0.77	-1.42	85.60	-0.28	-0.57
DY2LFE		72.84	0.31	0.57	86.15	0.27	0.56
H7PXKH		71.60	-0.93	-1.70	85.47	-0.41	-0.84
HAQXKE		71.86	-0.66	-1.22	85.39	-0.49	-1.00
K8TC39		71.98	-0.54	-1.00	85.04	-0.84	-1.72
KY3QWA		71.95	-0.58	-1.06	85.65	-0.23	-0.46
MA9HEZ	X	3.65	-68.87	-126.39	4.30	-81.57	-167.57
MD9UBZ		72.39	-0.13	-0.25	86.28	0.40	0.82
MNUVQA		72.33	-0.20	-0.36	85.94	0.06	0.12
NTG6DD		72.57	0.04	0.08	85.13	-0.75	-1.54
Q8RM64		72.29	-0.23	-0.43	85.26	-0.62	-1.27
QNYLA2		72.80	0.28	0.51	86.10	0.22	0.45
TYQAXZ		71.73	-0.79	-1.45	85.67	-0.21	-0.44
UZ2CJY		72.53	0.01	0.01	85.82	-0.06	-0.12
WF3ZH3		72.62	0.10	0.18	85.65	-0.23	-0.47
WLTAR2		72.47	-0.05	-0.09	86.24	0.36	0.74
WPC6VT	*	73.61	1.09	1.99	85.42	-0.46	-0.94
Y4J6HU		73.07	0.55	1.00	86.23	0.35	0.72

	Sample GW29	Summary Statistics	Sample GW30
Grand Means	72.524 g/sq m		85.879 g/sq m
SD Btwn Labs	0.545 g/sq m		0.487 g/sq m
Statistics based on 26 of 28 reporting participants			

MA9HEZ (X) - Extreme data

9JPDDF (X) - Extreme data for Sample GW30.

UZ2CJY - Data appear to be transposed between samples. Switched by CTS.



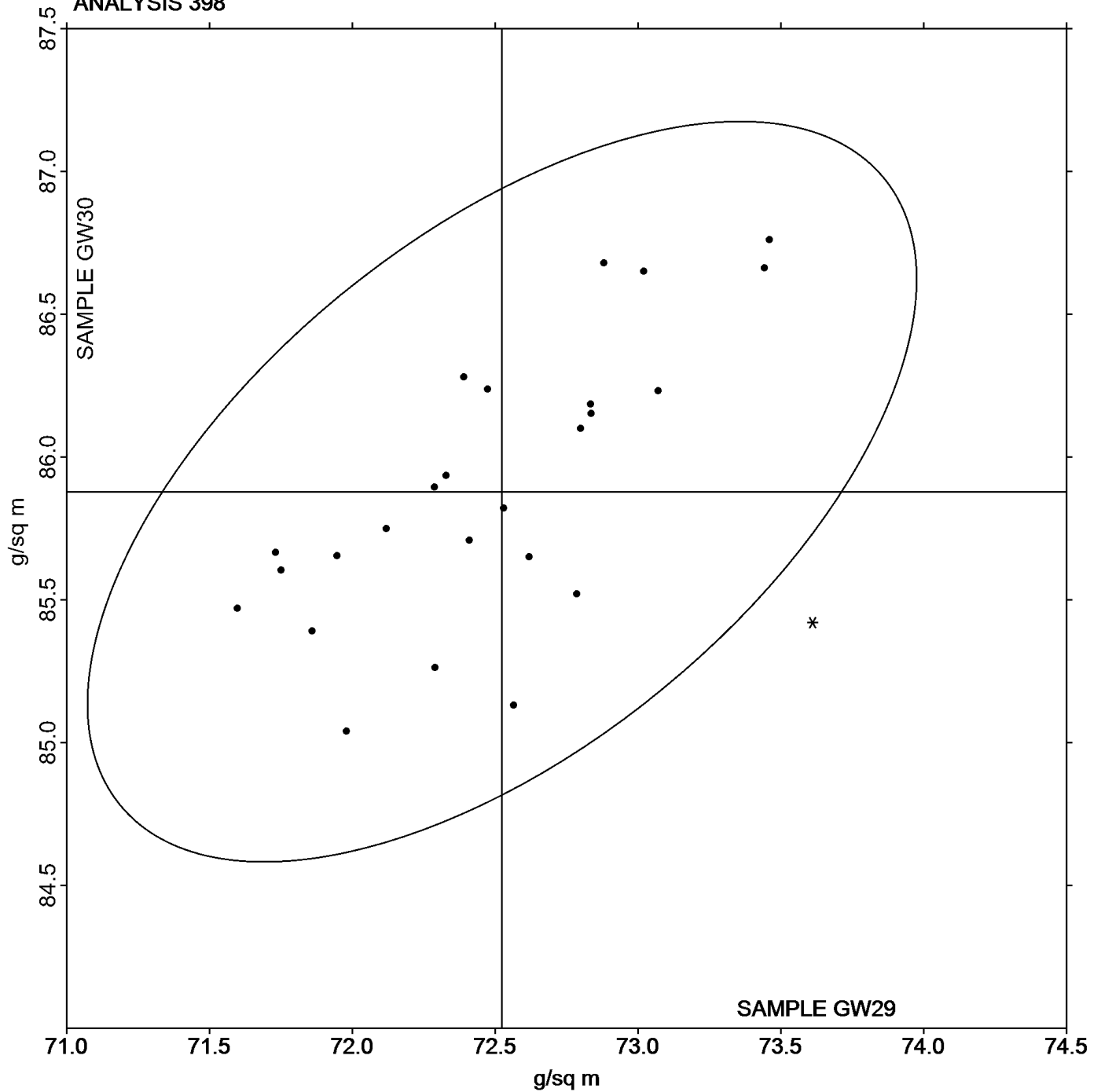
Paper & Paperboard Interlaboratory Testing Program
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Grammage (Mass per Unit Area)

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Grand Mean Sample **GW29** = 72.524 g/sq m

Grand Mean Sample **GW30** = 85.879 g/sq m

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

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WebCode	Data Flag	Sample GX29			Sample GX30		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
28B7ET		17.81	3.35	0.69	11.78	0.73	0.39
2Y3JLR		23.50	9.04	1.86	13.00	1.95	1.05
32PD3T		10.99	-3.47	-0.71	9.52	-1.53	-0.83
4HRG2P		12.85	-1.61	-0.33	9.49	-1.56	-0.84
7DMMYQ		12.00	-2.46	-0.51	10.54	-0.51	-0.28
7Z2FWX		23.40	8.94	1.84	13.90	2.85	1.54
AKCEUN		16.26	1.80	0.37	10.34	-0.71	-0.38
ALP7NP		11.03	-3.43	-0.71	9.46	-1.59	-0.86
CEZ7LH		8.60	-5.86	-1.21	7.70	-3.35	-1.81
CF8P3Q		17.98	3.52	0.72	14.71	3.66	1.97
CWYHUJ		12.00	-2.46	-0.51	10.61	-0.44	-0.24
DPGA7M		17.43	2.97	0.61	13.29	2.24	1.21
EVX6LG		13.80	-0.66	-0.14	9.30	-1.75	-0.95
EZT4UK		7.51	-6.95	-1.43	9.40	-1.65	-0.89
HBXKUD		10.60	-3.86	-0.79	9.40	-1.65	-0.89
HHGJQD		23.66	9.20	1.89	14.17	3.12	1.68
JMQ2JE	X	21.90	7.44	1.53	18.60	7.55	4.07
KWQB39		21.53	7.07	1.45	12.95	1.90	1.02
P6TUR9		18.97	4.51	0.93	12.36	1.31	0.71
QX4TN2		17.02	2.56	0.53	11.01	-0.04	-0.02
VV484Y		11.86	-2.60	-0.53	9.71	-1.34	-0.72
W2K8UW	*	10.80	-3.66	-0.75	12.87	1.82	0.98
W2MW3Z		14.07	-0.39	-0.08	11.52	0.47	0.25
WPTKN2		10.45	-4.01	-0.82	11.33	0.27	0.15
XRWF84		9.06	-5.40	-1.11	9.03	-2.02	-1.09
YL7KLQ		13.70	-0.76	-0.16	10.20	-0.85	-0.46
Z42D7N		9.04	-5.42	-1.11	9.76	-1.29	-0.70

	Sample GX29	Summary Statistics	Sample GX30
Grand Means	14.458 Seconds		11.052 Seconds
SD Btwn Labs	4.861 Seconds		1.853 Seconds
Statistics based on 26 of 27 reporting participants			

Comments on Assigned Data Flags for Test #399

JMQ2JE (X) - Data for sample GX30 are high.



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

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Grand Mean Sample **GX29** = 14.458 Seconds

Grand Mean Sample **GX30** = 11.052 Seconds

ANALYSIS 399

