



Paper & Paperboard Testing Program

Summary Report #282G-June 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 Degreee, 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:

Collaborative Testing Services, Inc.
21331 Gentry Drive
Sterling, Virginia 20166 USA
+1-571-434-1925
FAX #: +1-571-434-1937
paper@cts-interlab.com

Office Hours: 8:00 a.m. - 4:30 p.m. ET

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 #282G
June 2016

Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	ΔL	Δa	Δb	ΔE	
2MLTL4		GA31	91.81	1.47	-3.37	-0.01	0.00	0.05	0.06	MK
		GA32	91.79	1.47	-3.32					
46FBN4		GA31	91.64	1.30	-2.36	-0.36	-0.18	0.10	0.41	TS
		GA32	91.28	1.12	-2.26					
9XKYF4		GA31	93.03	1.63	-8.04	-0.06	-0.01	0.00	0.07	HE
		GA32	92.96	1.61	-8.04					
EBARQ8		GA31	93.48	1.00	-3.08	-0.14	0.02	0.04	0.14	HE
		GA32	93.35	1.02	-3.04					
ERZTKR		GA31	93.53	1.07	-2.32	-0.07	0.02	-0.07	0.10	EH
		GA32	93.46	1.09	-2.39					
G78T8R		GA31	91.51	1.35	-3.80	-0.03	0.03	0.00	0.04	HH
		GA32	91.48	1.38	-3.80					
HM9RUL		GA31	91.89	1.18	-2.14	-0.25	-0.20	0.37	0.48	NE
		GA32	91.64	0.98	-1.77					
HPFATH		GA31	92.32	1.36	-3.10	0.19	0.30	0.20	0.40	XX
		GA32	92.50	1.66	-2.89					
HXT47Y		GA31	91.75	1.06	-2.71	-0.01	-0.01	0.00	0.01	TC
		GA32	91.74	1.05	-2.71					
JYWEDL		GA31	91.54	1.19	-2.98	-0.15	-0.04	-0.04	0.16	LA
		GA32	91.39	1.15	-3.02					
KNXZTF		GA31	93.41	1.04	-2.69	0.00	0.00	0.00	0.01	TC
		GA32	93.41	1.04	-2.69					
KPC8EW		GA31	91.68	1.61	-2.74	-0.02	0.00	0.17	0.17	TS
		GA32	91.67	1.61	-2.56					
KTCHAW		GA31	91.86	2.67	-7.32	-0.12	-0.04	0.01	0.12	HG
		GA32	91.75	2.63	-7.31					
MFVAMV		GA31	91.74	1.03	-2.53	-0.10	0.20	-0.41	0.46	TC
		GA32	91.64	1.23	-2.94					
MH3TLQ		GA31	92.00	1.08	-4.50	-0.03	0.00	0.09	0.10	HH
		GA32	91.98	1.08	-4.41					
PV3BAW		GA31	91.76	2.75	-6.80	0.07	-0.01	-0.05	0.09	HG
		GA32	91.83	2.74	-6.85					



**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	
QXNCRP		GA31	91.17	1.04	-2.30	0.02	0.03	0.04	0.06	TM
		GA32	91.20	1.08	-2.25					
TCUHVJ		GA31	91.60	1.37	-3.69	-0.23	0.15	-0.17	0.32	HH
		GA32	91.37	1.52	-3.86					
TLMQFB		GA31	93.21	1.18	-3.02	0.01	0.03	-0.05	0.06	LS
		GA32	93.22	1.21	-3.07					
U33JHJ		GA31	91.17	1.69	-2.45	-0.03	0.02	-0.03	0.04	TS
		GA32	91.14	1.70	-2.47					
YJWDHZ		GA31	93.24	1.26	-3.17	-0.02	0.02	-0.02	0.03	EH
		GA32	93.22	1.28	-3.19					
YKQ4NE		GA31	92.45	0.99	-2.50	-0.11	-0.03	-0.01	0.12	TS
		GA32	92.34	0.96	-2.51					

Grand Means			Summary Statistics						
GA31	92.172	1.378	-3.527						
GA32	92.107	1.391	-3.516	-0.065	0.013	0.011	0.157		
Std Dev Btwn Labs									
GA31	0.778	0.480	1.677						
GA32	0.801	0.481	1.694	0.115	0.103	0.144	0.153		

Statistics based on 22 of 22 reporting participants

Key to Instrument Codes Reported by Participants

EH	Datacolor Elrepho SF450	HE	Hunter LabScan
HG	Hunter ColorQUEST	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	XX	Instrument make/model not specified by lab

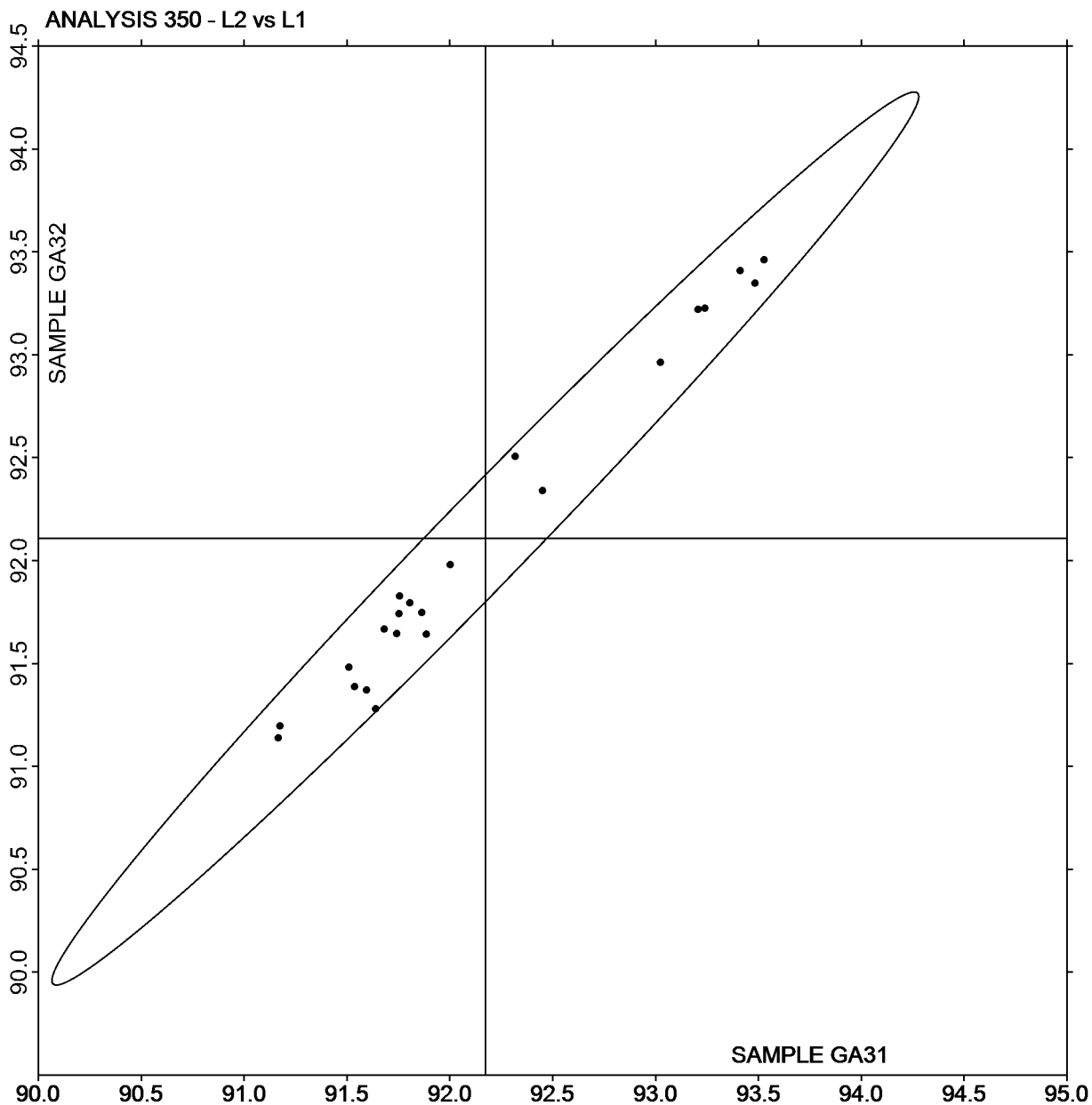


Paper & Paperboard Interlaboratory Testing Program
Analysis 350
Color & Color Difference - Near White Papers - C/2deg obs
Hunter L,a,b - Illuminant C - 2 Degree Observer

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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 GA32 v L values GA31





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

L

a

b

Color Difference Values

ΔL

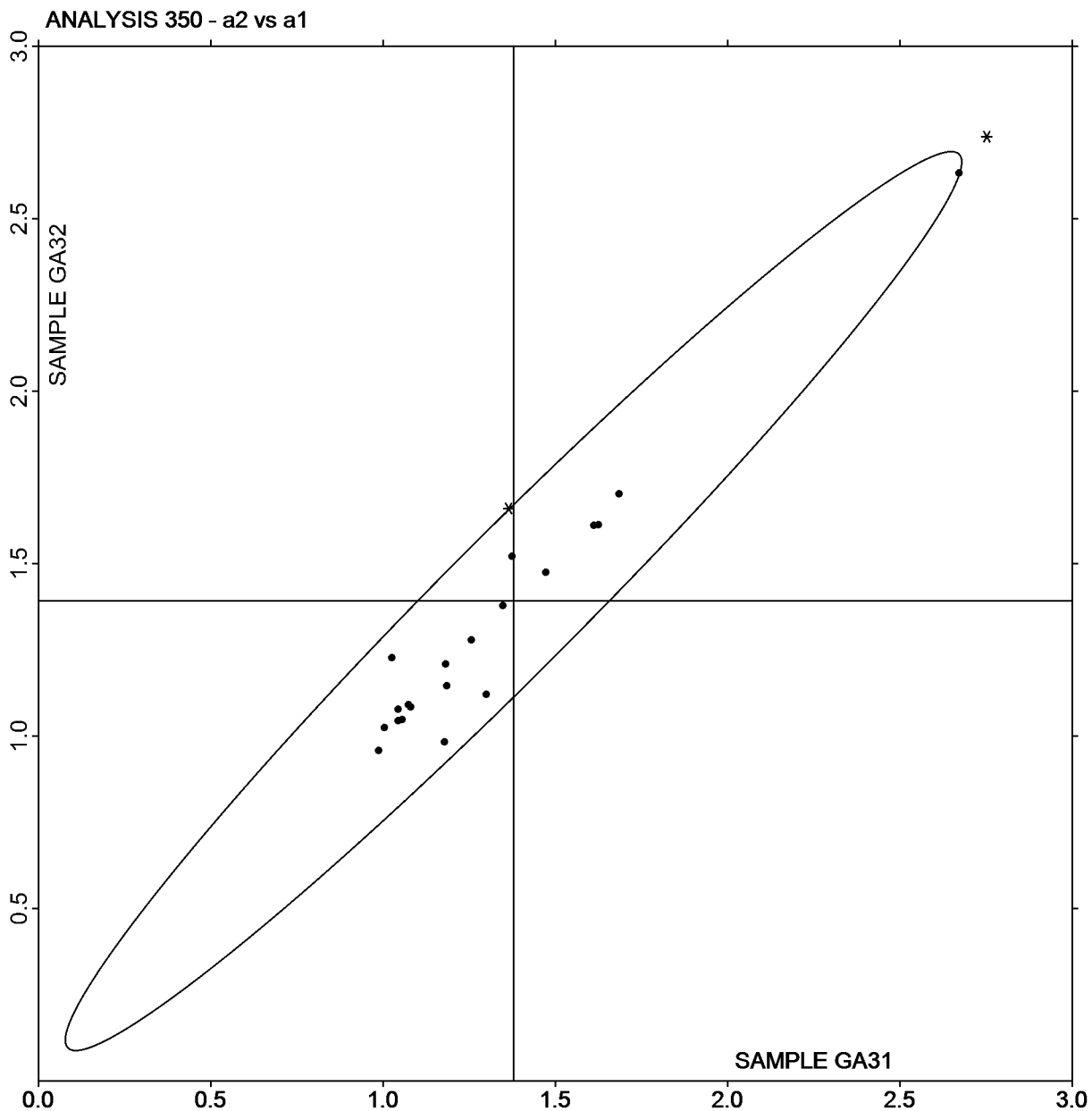
Δa

Δb

ΔE

Instr Code

Plot of a values GA32 v a values GA31

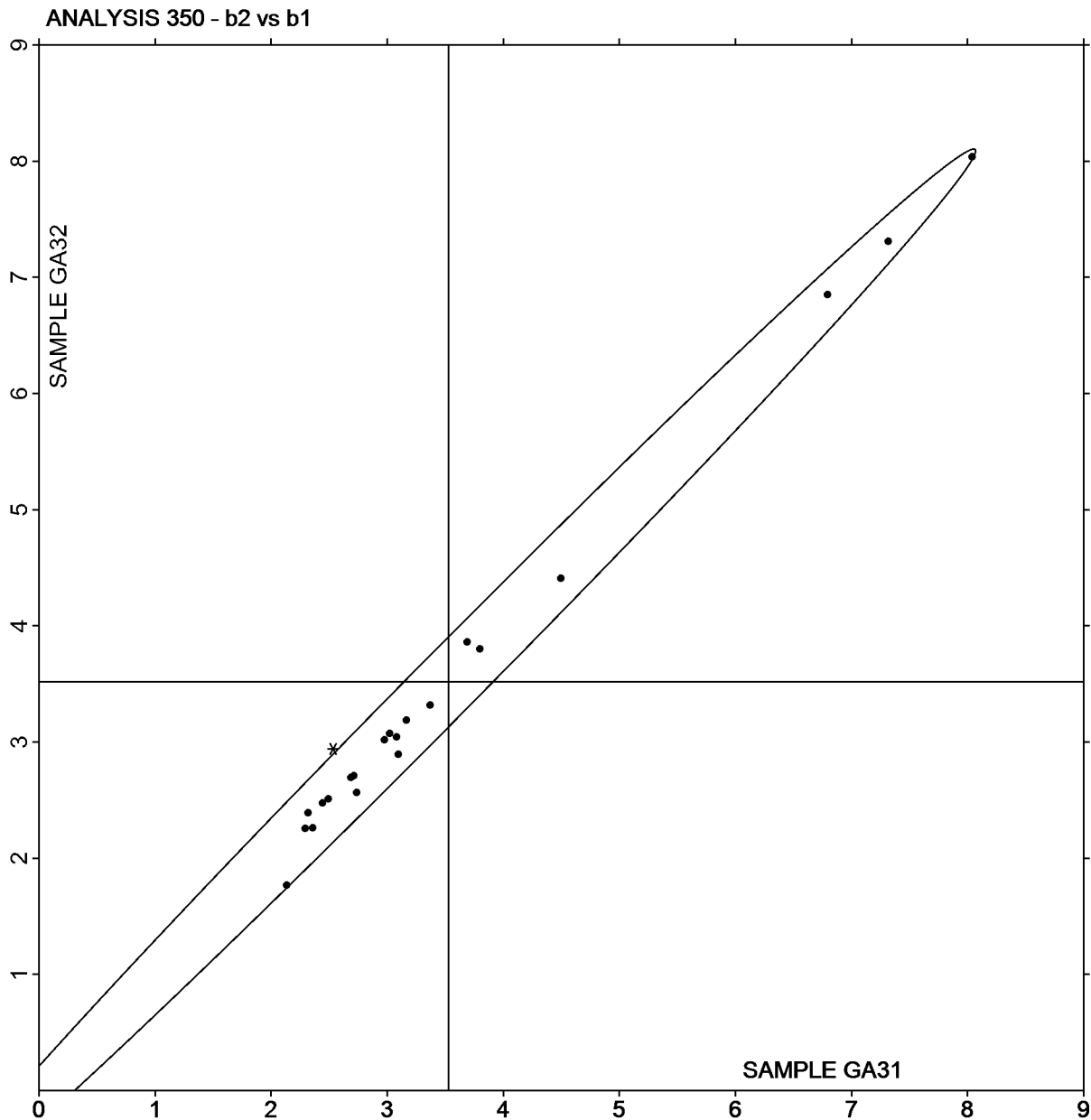




Paper & Paperboard Interlaboratory Testing Program
Analysis 350
Color & Color Difference - Near White Papers - C/2deg obs
Hunter L,a,b - Illuminant C - 2 Degree Observer

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Plot of b values GA32 v b values GA31





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

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4PMGDY	GA31	93.93	0.59	-5.10	-0.02	0.01	0.02	0.03	HT
	GA32	93.91	0.59	-5.08					
6WG789	GA31	89.58	-0.88	0.50	-0.02	-0.01	0.14	0.15	NG
	GA32	89.56	-0.88	0.65					
7LDAN3	GA31	92.09	0.86	-5.01	-0.01	-0.03	0.04	0.05	HE
	GA32	92.09	0.83	-4.97					
8TV3D8	GA31	93.63	0.08	-2.13	0.02	0.03	0.04	0.05	TC
	GA32	93.65	0.11	-2.09					
93V3HY	GA31	93.22	-0.84	1.44	-0.12	0.04	0.06	0.14	NG
	GA32	93.10	-0.80	1.50					
9XKYF4	GA31	92.99	1.62	-8.09	0.03	-0.04	-0.04	0.06	HE
	GA32	93.02	1.58	-8.14					
BAM8AQ	GA31	93.73	3.03	-13.13	0.02	-0.02	0.06	0.06	HV
	GA32	93.75	3.02	-13.07					
BEZTGC	GA31	94.11	1.85	-8.27	-0.06	-0.02	-0.14	0.15	XX
	GA32	94.05	1.83	-8.41					
E8AGXR	GA31	93.73	0.46	-4.12	0.00	0.00	0.05	0.05	HT
	GA32	93.73	0.46	-4.07					
G39EJ3	GA31	91.75	0.09	-2.34	-0.16	-0.04	-0.02	0.17	TC
	GA32	91.59	0.05	-2.36					
GW697K	GA31	93.18	-0.28	-0.30	0.01	-0.01	0.03	0.04	LS
	GA32	93.19	-0.29	-0.26					
JXPY7F	GA31	95.25	0.72	-2.80	-0.13	0.01	0.02	0.13	XP
	GA32	95.12	0.74	-2.78					
KPRQYU	GA31	93.64	-0.02	-2.20	-0.04	0.04	0.07	0.09	TC
	GA32	93.61	0.02	-2.12					
LQY9XQ	GA31	93.37	-0.26	-0.75	0.01	0.02	0.02	0.02	EH
	GA32	93.38	-0.24	-0.73					
RNTVFQ	GA31	93.72	1.24	-5.84	-0.02	0.02	0.06	0.07	EF
	GA32	93.70	1.26	-5.78					
RVEPUB	GA31	92.26	1.14	-5.28	-0.01	0.04	-0.10	0.11	TC
	GA32	92.25	1.18	-5.38					
T9YNXH	GA31	93.75	-0.09	1.37	0.10	0.03	0.10	0.15	NF
	GA32	93.85	-0.06	1.48					
UY48LJ	GA31	91.35	0.52	-1.00	-0.06	0.00	-0.03	0.07	LS
	GA32	91.29	0.52	-1.03					



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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WYFNPB	GA31	92.17	0.89	-5.18	-0.07	0.00	0.06	0.09	XP
	GA32	92.10	0.89	-5.12					
XQZ7QA	GA31	93.12	-0.81	1.65	-0.09	-0.01	-0.04	0.10	NG
	GA32	93.03	-0.82	1.62					
ZEXHWH	GA31	92.09	0.48	-2.11	0.16	0.03	-0.07	0.18	XM
	GA32	92.25	0.51	-2.19					

Grand Means				Summary Statistics					
GA31	92.984	0.496	-3.270						
GA32	92.962	0.500	-3.255	-0.022	0.004	0.015	0.093		
Std Dev Btwn Labs									
GA31	1.208	0.957	3.704						
GA32	1.208	0.950	3.722	0.073	0.026	0.069	0.048		
Statistics based on 21 of 21 reporting participants									

Analysis Notes:

JXPY7F - One determination removed from the Lab Mean for Sample GA31 (TAPPI T1205 using Grubbs test at 1% risk level).

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

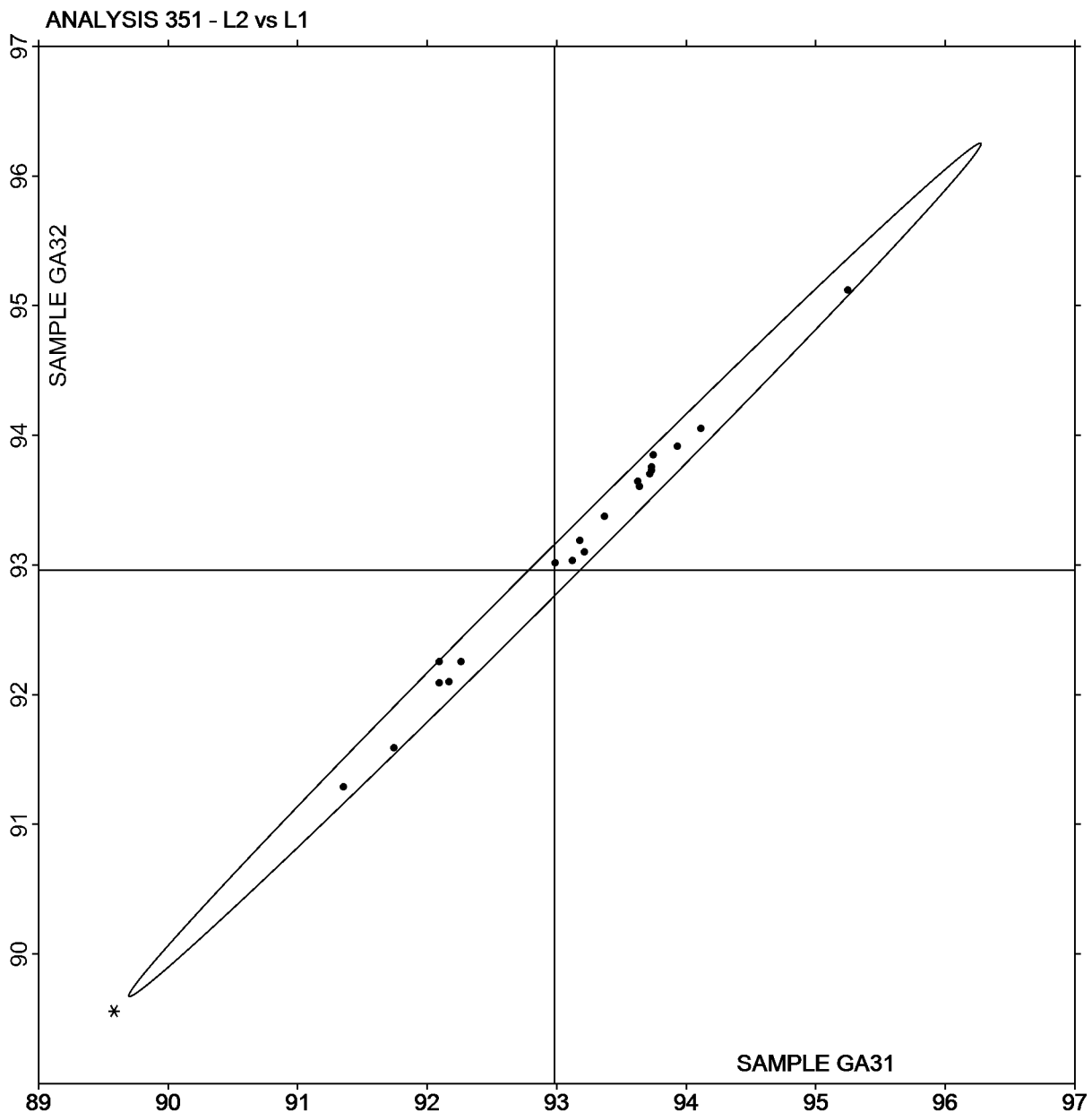


Paper & Paperboard Interlaboratory Testing Program
Analysis 351
Color & Color Difference - Near White Papers - D65/10deg obs
Hunter L,a,b - Illuminant D65 - 10 Degree Observer

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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 GA32 v L values GA31





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

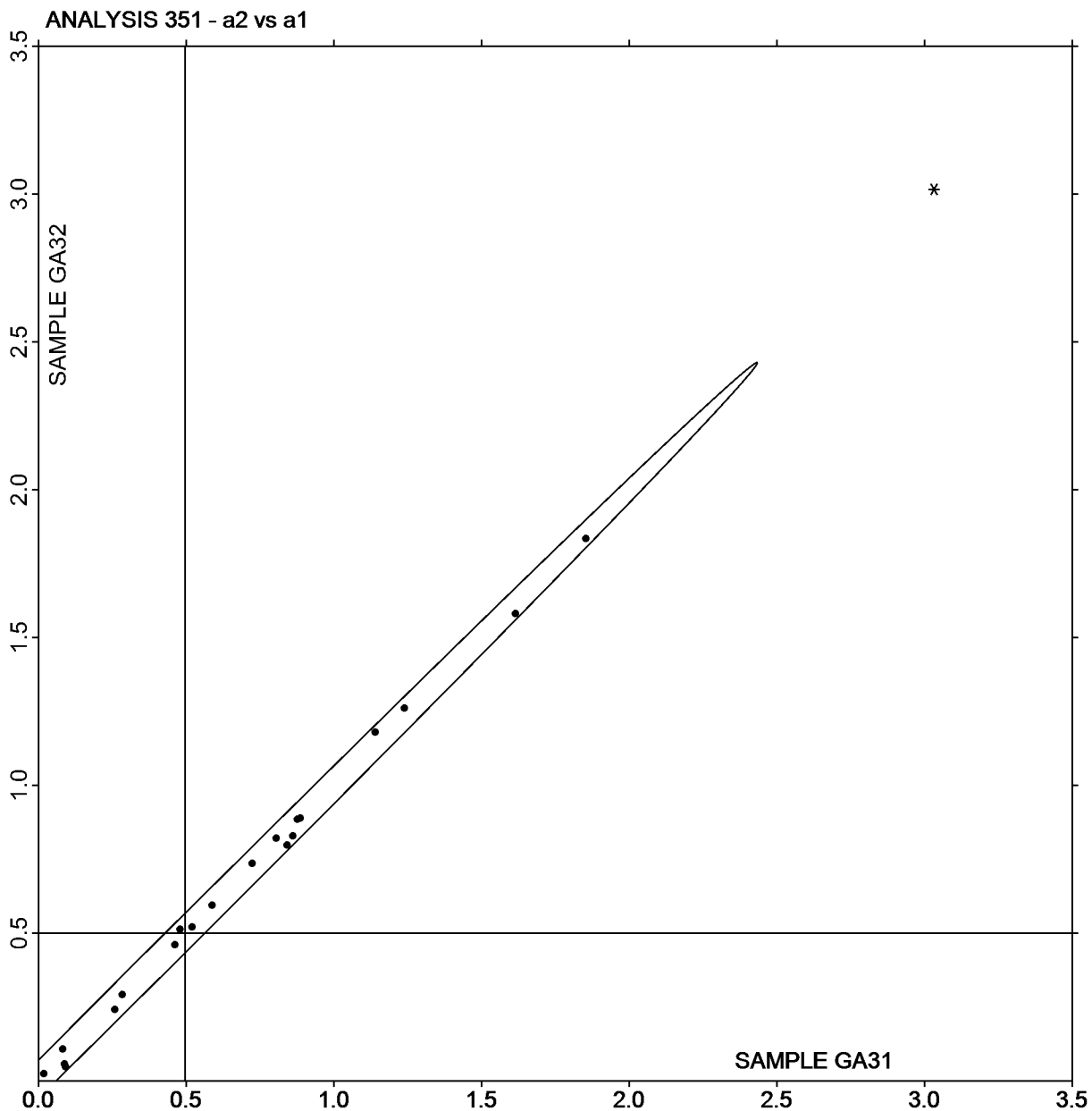
L a b

Color Difference Values

ΔL Δa Δb ΔE

Instr Code

Plot of a values GA32 v a values GA31

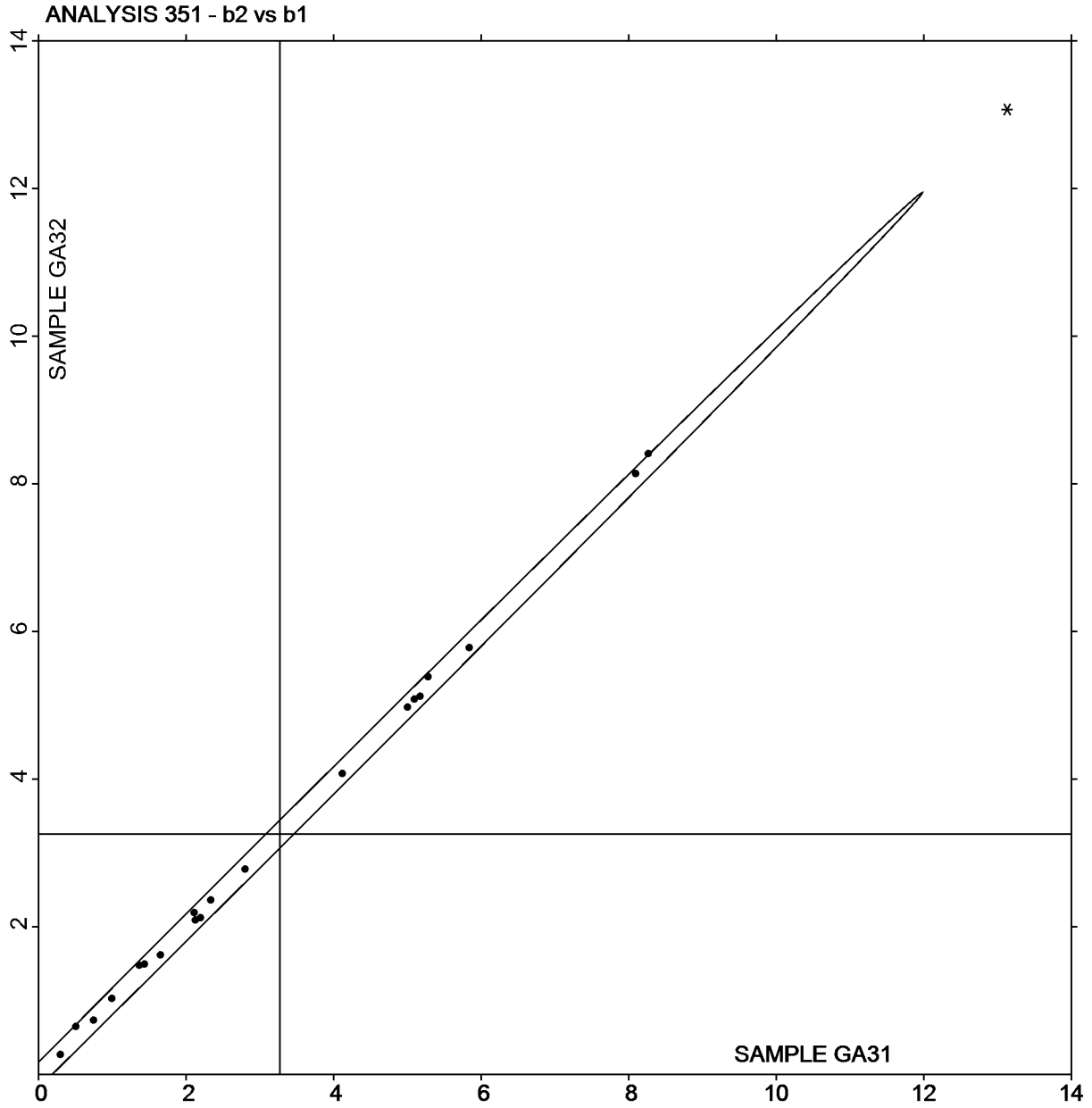




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Hunter L,a,b - Illuminant D65 - 10 Degree Observer

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Plot of b values GA32 v b values GA31





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

Report #282G
June 2016

WebCode	Data Flag	Sample GV31			Sample GV32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
24WHWJ		3.614	-0.181	-2.15	4.839	-0.156	-1.60	TM
29PGDZ		3.669	-0.126	-1.49	4.902	-0.093	-0.95	TA
2MLTL4		3.895	0.100	1.19	5.054	0.060	0.61	PP
38AHTB		3.748	-0.047	-0.56	4.887	-0.107	-1.10	EM
4PMGDY		3.880	0.085	1.01	5.009	0.015	0.15	EM
6DPZ23		3.760	-0.035	-0.42	4.937	-0.057	-0.59	LW
6WG789		3.975	0.180	2.15	5.148	0.153	1.57	LW
7LDAN3		3.840	0.045	0.53	5.041	0.046	0.47	TM
7WLPVB		3.843	0.048	0.57	5.119	0.125	1.28	LW
8NLPV9		3.812	0.018	0.21	5.011	0.016	0.17	EM
93V3HY	*	3.845	0.050	0.60	4.929	-0.065	-0.67	XX
B2DJWR		3.663	-0.132	-1.57	4.852	-0.142	-1.46	FR
B2WL4T		3.797	0.002	0.03	5.020	0.025	0.26	LW
BAM8AQ	*	3.569	-0.226	-2.69	4.685	-0.309	-3.17	TA
BEZTGC		3.836	0.041	0.49	5.040	0.046	0.47	LW
BNPGEZ		3.830	0.035	0.41	5.028	0.033	0.34	LW
BNUZ24		3.889	0.094	1.12	5.112	0.117	1.20	LW
D2RRXR		3.756	-0.039	-0.46	5.058	0.064	0.65	TM
E4QLUZ		3.791	-0.004	-0.05	4.927	-0.067	-0.69	PP
E8AGXR		3.827	0.032	0.38	5.072	0.078	0.79	EM
G39EJ3		3.853	0.058	0.69	5.012	0.018	0.18	TA
H9TUPL		3.894	0.099	1.18	5.135	0.140	1.44	LW
HN3HZZ		3.887	0.092	1.09	5.081	0.086	0.88	LW
HPFATH		3.860	0.065	0.78	5.090	0.096	0.98	XX
HYQCEH		3.782	-0.013	-0.15	4.990	-0.004	-0.05	TA
J8CXXL		3.831	0.036	0.43	4.984	-0.010	-0.10	MS
JURHUL		3.640	-0.155	-1.84	4.860	-0.134	-1.38	TM
JXPY7F	X	3.844	0.049	0.58	4.800	-0.194	-1.99	TM
JYWEDL		3.856	0.061	0.73	5.093	0.098	1.00	LA
KNXZTF		3.823	0.028	0.33	5.000	0.006	0.06	LA
KPRQYU		3.750	-0.045	-0.54	4.963	-0.031	-0.32	LW
LL2T2N		3.813	0.018	0.22	4.991	-0.003	-0.04	XX
LZ2P4M		3.849	0.054	0.64	5.087	0.093	0.95	EM
MFVAMV		3.872	0.077	0.92	5.077	0.083	0.85	TA
MLLRYL		3.794	-0.001	-0.01	5.003	0.008	0.08	EM
MRTDQP		3.801	0.006	0.07	5.102	0.108	1.10	LA
NK2Q9P		3.780	-0.015	-0.18	4.989	-0.005	-0.06	EM
PKJW9E	X	3.839	0.044	0.53	4.836	-0.158	-1.62	PP
Q22CPG		3.827	0.032	0.38	5.085	0.090	0.93	TM
Q6K8R9		3.720	-0.075	-0.89	4.950	-0.044	-0.46	XX
Q7GM3K		3.762	-0.032	-0.39	4.928	-0.067	-0.68	TM



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

Report #282G
June 2016

WebCode	Data Flag	Sample GV31			Sample GV32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
QWVLLB		3.879	0.084	1.00	5.052	0.058	0.59	LW
QXNCRP	*	3.596	-0.199	-2.37	4.736	-0.258	-2.65	TA
QZRAZW		3.753	-0.042	-0.50	4.970	-0.024	-0.25	TA
RWM2AR		3.817	0.022	0.26	5.078	0.084	0.86	LW
RXJGLN		3.831	0.036	0.43	5.019	0.025	0.25	TM
T9YNXH		3.835	0.040	0.48	5.082	0.088	0.90	TM
TBZRP6		3.779	-0.016	-0.19	4.963	-0.031	-0.32	PP
TLMQFB		3.800	0.005	0.06	5.007	0.013	0.13	LW
TNM2AP	X	3.760	-0.035	-0.42	3.769	-1.225	-12.55	LW
U33JHJ		3.814	0.019	0.23	5.025	0.031	0.31	EM
UUTU4K		3.610	-0.185	-2.20	4.800	-0.194	-1.99	LW
VLUPNN		3.684	-0.111	-1.32	4.900	-0.094	-0.97	EM
VWDBNC		3.763	-0.032	-0.38	4.885	-0.109	-1.12	TA
WTP96B		3.848	0.053	0.63	5.109	0.115	1.17	PP
XDV2M3		3.920	0.126	1.49	5.183	0.189	1.94	LW
XQZ7QA		3.791	-0.004	-0.05	4.959	-0.035	-0.36	XX
YJWDHZ	*	3.895	0.100	1.19	4.990	-0.004	-0.05	EM
YKQ4NE		3.727	-0.068	-0.81	4.961	-0.033	-0.34	LA
YMUY9G		3.801	0.006	0.07	4.974	-0.020	-0.21	EM
YMXHVK		3.847	0.052	0.62	4.985	-0.009	-0.10	EM
ZEXHWH		3.780	-0.015	-0.18	5.028	0.033	0.34	LW
ZLW9E8		3.654	-0.141	-1.68	4.854	-0.140	-1.43	TM
ZQQ3C9		3.831	0.037	0.44	5.013	0.019	0.19	LW

	Sample GV31	Summary Statistics	Sample GV32
Grand Means	3.7949 mils		4.9944 mils
SD Btwn Labs	0.0841 mils		0.0977 mils
Statistics based on 61 of 64 reporting participants			

Comments on Assigned Data Flags for Test #360

- TNM2AP (X) - Extreme Data for Sample GV32.
- PKJW9E (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample GV31.
- JXPY7F (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample GV31.



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

Report #282G
June 2016

Key to Instrument Codes Reported by Participants

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

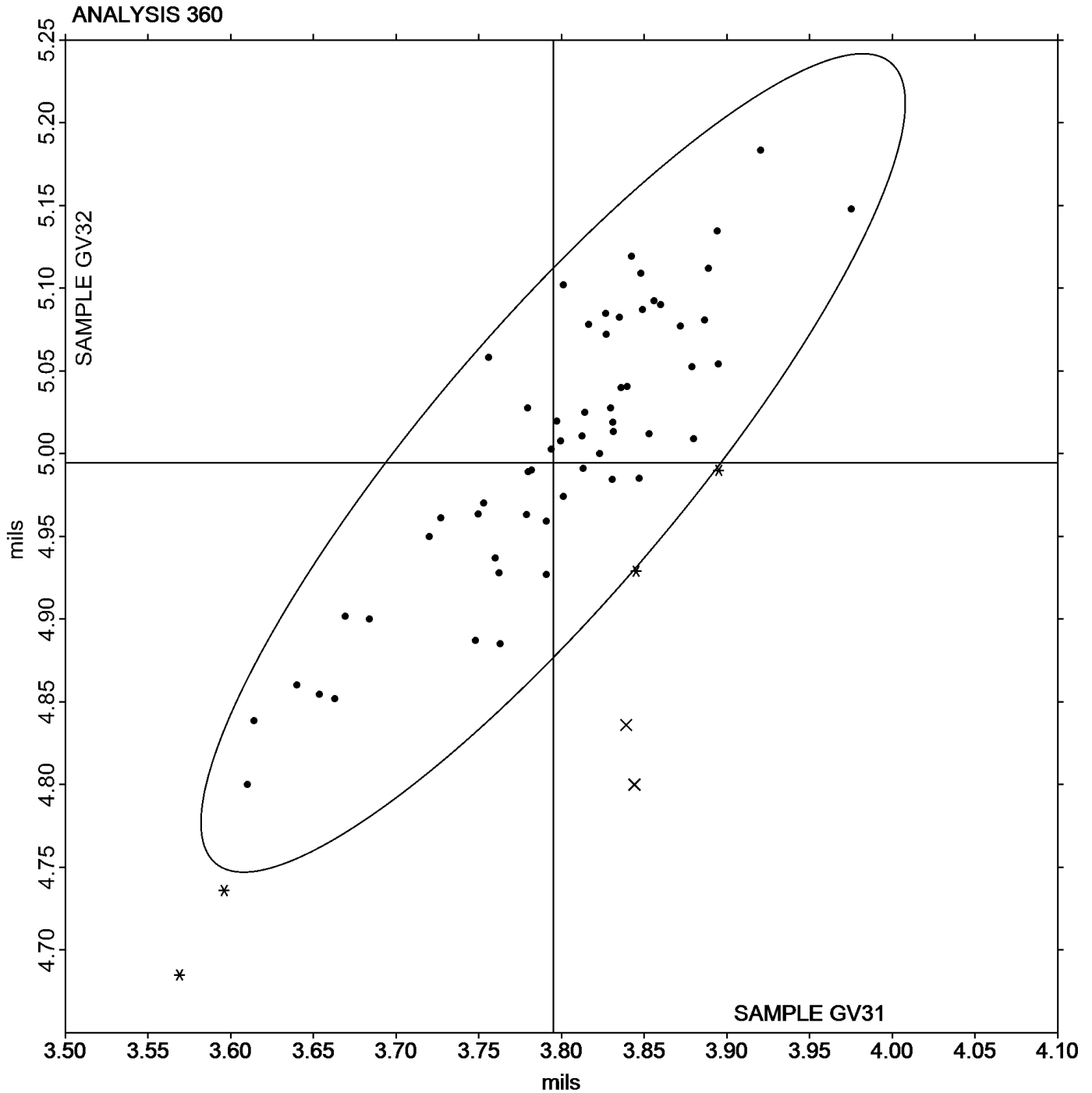


Paper & Paperboard Interlaboratory Testing Program
Analysis 360
Thickness (Caliper), Printing papers

Report #282G
June 2016

Grand Mean Sample **GV31** = 3.7949 mils

Grand Mean Sample **GV32** = 4.9944 mils





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

**Report #282G
June 2016**

WebCode	Data Flag	Sample GY31			Sample GY32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3ECRZ3		14.14	0.03	0.20	9.216	0.051	0.43	TM
3Q6BE9		14.39	0.29	1.86	9.426	0.261	2.18	LA
3YJWPX		14.12	0.01	0.06	9.121	-0.044	-0.37	PP
46FBN4		14.00	-0.11	-0.72	9.069	-0.096	-0.80	EM
8Q48QY		13.99	-0.12	-0.75	9.020	-0.145	-1.21	TA
9XKYF4		13.87	-0.24	-1.52	9.010	-0.155	-1.29	EM
B2WL4T		14.15	0.04	0.28	9.281	0.116	0.97	LW
BNUZ24		14.38	0.28	1.79	9.389	0.224	1.87	XX
DZW9WQ		14.20	0.10	0.63	9.150	-0.015	-0.13	LW
EBARQ8		13.99	-0.11	-0.74	9.087	-0.078	-0.65	LA
EN2EYM	X	13.51	-0.60	-3.88	8.576	-0.589	-4.91	TM
FE6YMN		14.14	0.03	0.20	9.177	0.012	0.10	TM
G6U7MR		13.93	-0.17	-1.12	9.106	-0.059	-0.49	LA
G78T8R		14.10	-0.01	-0.06	9.285	0.120	1.00	EM
GW697K		14.15	0.04	0.28	9.140	-0.025	-0.21	XX
HYQCEH		14.12	0.02	0.11	9.137	-0.028	-0.23	TA
JURHUL		13.94	-0.17	-1.07	8.990	-0.175	-1.46	TM
JYWEDL		14.26	0.15	0.99	9.339	0.174	1.45	LA
LQY9XQ		14.36	0.26	1.66	9.332	0.167	1.39	EM
MH3TLQ		14.21	0.11	0.68	9.092	-0.073	-0.61	EM
QH6X7G		13.91	-0.20	-1.27	9.020	-0.145	-1.21	TM
RDVV4L		13.97	-0.14	-0.88	9.120	-0.045	-0.37	TM
RVEPUB		14.06	-0.05	-0.31	9.177	0.012	0.10	EM
RWM2AR		14.10	-0.01	-0.05	9.020	-0.145	-1.21	LW
T44WPL		13.93	-0.18	-1.17	9.043	-0.122	-1.01	XX
TCUHVJ		14.41	0.30	1.93	9.304	0.139	1.16	EM
UJDZQ7		14.14	0.03	0.22	9.260	0.095	0.79	LA
WQM96D		14.03	-0.08	-0.49	9.095	-0.070	-0.58	TA
X9LN64		14.01	-0.10	-0.62	9.120	-0.045	-0.37	TA
YBYUVB		13.92	-0.19	-1.20	9.080	-0.085	-0.71	LW
YJGFQZ		14.02	-0.09	-0.58	9.129	-0.036	-0.30	PP
Z6TBGH		14.09	-0.01	-0.08	9.197	0.032	0.27	XX
ZZ24XA		14.38	0.27	1.75	9.344	0.179	1.49	TM

	Sample GY31	Summary Statistics	Sample GY32
Grand Means	14.106 mils		9.1648 mils
SD Btwn Labs	0.155 mils		0.1200 mils
Statistics based on 32 of 33 reporting participants			



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

Report #282G
June 2016

Comments on Assigned Data Flags for Test #361

EN2EYM (X) - Data for both samples are low.

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		



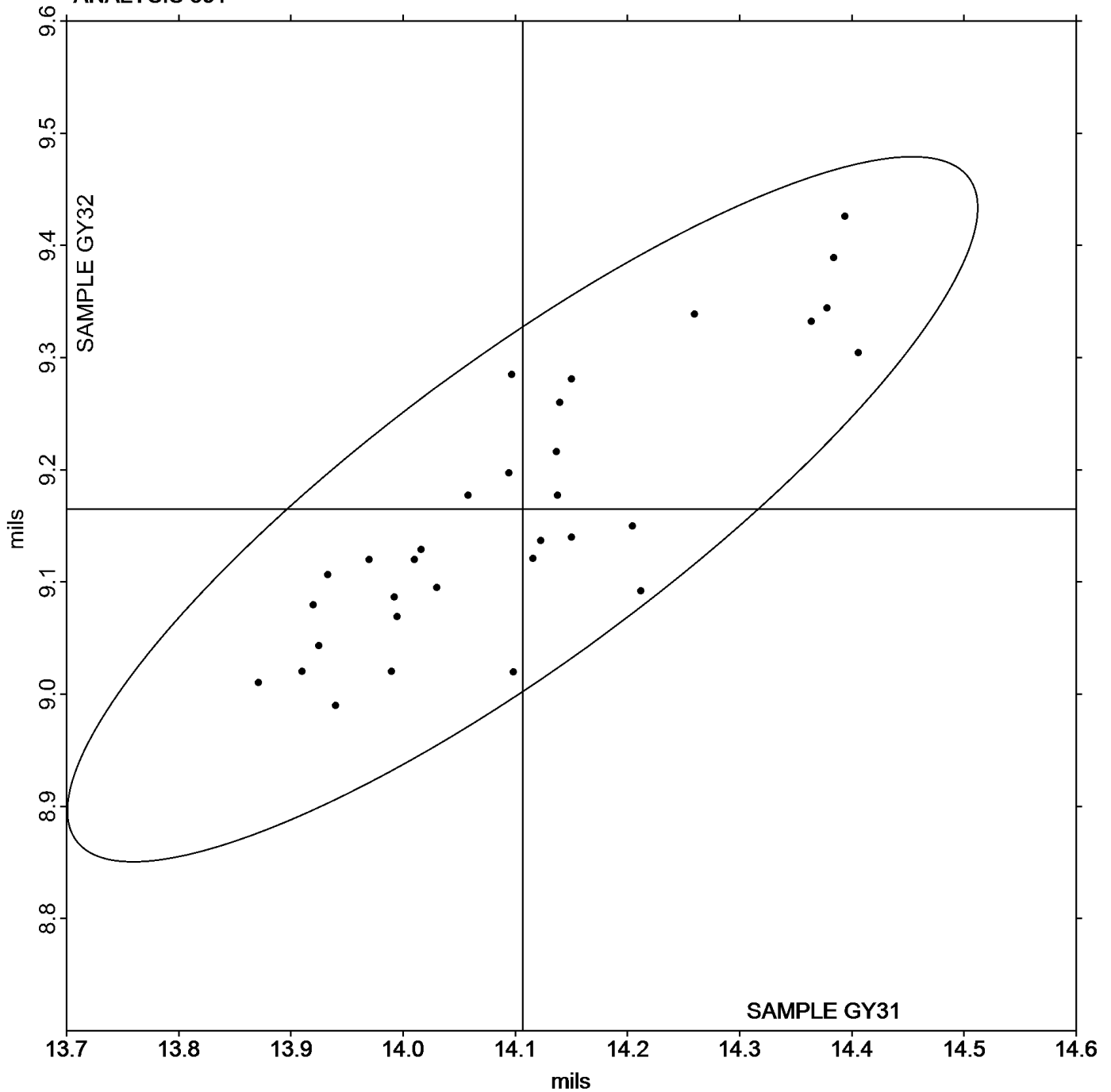
Paper & Paperboard Interlaboratory Testing Program
Analysis 361
Thickness (Caliper), Packaging papers

Report #282G
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Grand Mean Sample **GY31** = 14.106 mils

Grand Mean Sample **GY32** = 9.1648 mils

ANALYSIS 361





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

**Report #282G
June 2016**

Coefficient of Static Friction - Horizontal Plane Method - Printing Papers

WebCode	Data Flag	Sample GD31			Sample GD32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6WG789	X	0.2718	-0.2824	-4.99	0.3020	-0.2657	-4.31	TM
BNUZ24		0.6520	0.0978	1.73	0.6420	0.0743	1.21	TL
G6U7MR		0.4964	-0.0578	-1.02	0.5628	-0.0049	-0.08	TA
NNKKAV		0.5488	-0.0054	-0.09	0.6140	0.0463	0.75	IT
P7MH9K		0.5258	-0.0284	-0.50	0.5678	0.0001	0.00	TA
U33JHJ		0.5844	0.0302	0.53	0.5578	-0.0099	-0.16	XX
YJWDHZ		0.5176	-0.0366	-0.65	0.4618	-0.1059	-1.72	XX

Sample GD31		Summary Statistics		Sample GD32	
Grand Means	0.55417 COF			0.56770 COF	
SD Btwn Labs	0.05656 COF			0.06165 COF	
Statistics based on 6 of 7 reporting participants					

Comments on Assigned Data Flags for Test #364

6WG789 (X) - Data for both samples are low.

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		



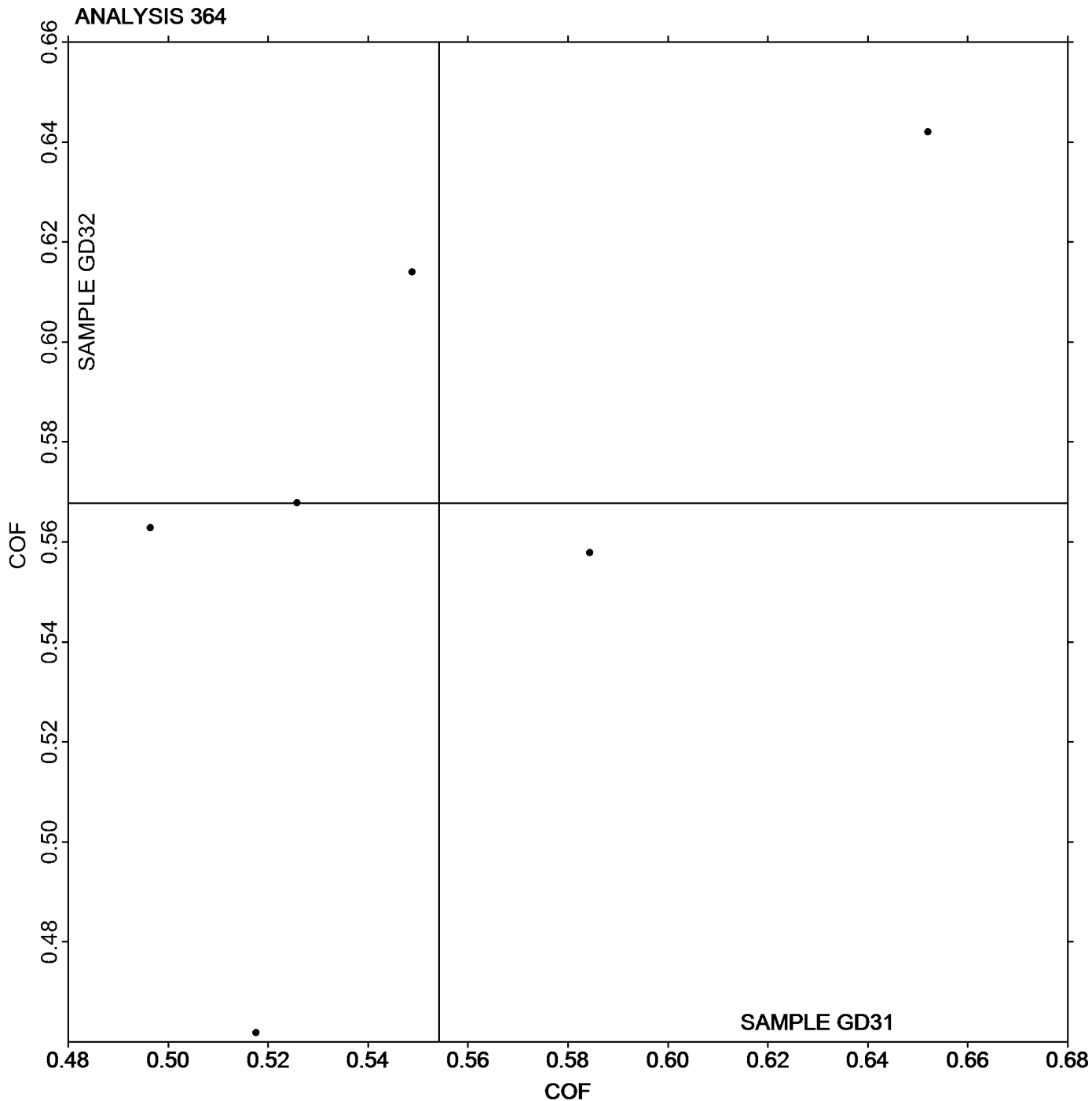
**Paper & Paperboard Interlaboratory Testing Program
Analysis 364**

**Report #282G
June 2016**

Coefficient of Static Friction - Horizontal Plane Method - Printing Papers

Grand Mean Sample **GD31** = 0.55417 COF

Grand Mean Sample **GD32** = 0.56770 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 #282G

June 2016

Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers

WebCode	Data Flag	Sample GD31			Sample GD32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2DJKV7		0.4632	-0.0008	-0.01	0.5026	0.0307	0.25	TM
6WG789		0.2928	-0.1712	-1.90	0.2980	-0.1739	-1.44	TM
BNUZ24		0.6040	0.1400	1.55	0.5620	0.0901	0.75	TL
G6U7MR		0.4418	-0.0222	-0.25	0.5264	0.0545	0.45	TA
JYWEDL		0.5412	0.0772	0.86	0.5730	0.1011	0.84	TM
NNKKAV		0.4756	0.0116	0.13	0.4906	0.0187	0.16	IR
P7MH9K		0.4166	-0.0474	-0.53	0.4412	-0.0307	-0.25	TA
PV3BAW		0.5338	0.0698	0.78	0.5566	0.0847	0.70	TA
QXNCRP		0.3256	-0.1384	-1.54	0.3150	-0.1569	-1.30	TA
QZRAZW		0.3914	-0.0726	-0.81	0.4346	-0.0373	-0.31	TM
VBBBM8		0.5418	0.0778	0.86	0.6561	0.1842	1.53	TA
VLUPNN		0.4754	0.0114	0.13	0.5302	0.0583	0.48	TA
YJWDHZ	*	0.5284	0.0644	0.72	0.2484	-0.2235	-1.85	TA

		Summary Statistics	
		Sample GD31	Sample GD32
Grand Means		0.46397 COF	0.47190 COF
SD Btwn Labs		0.09008 COF	0.12051 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



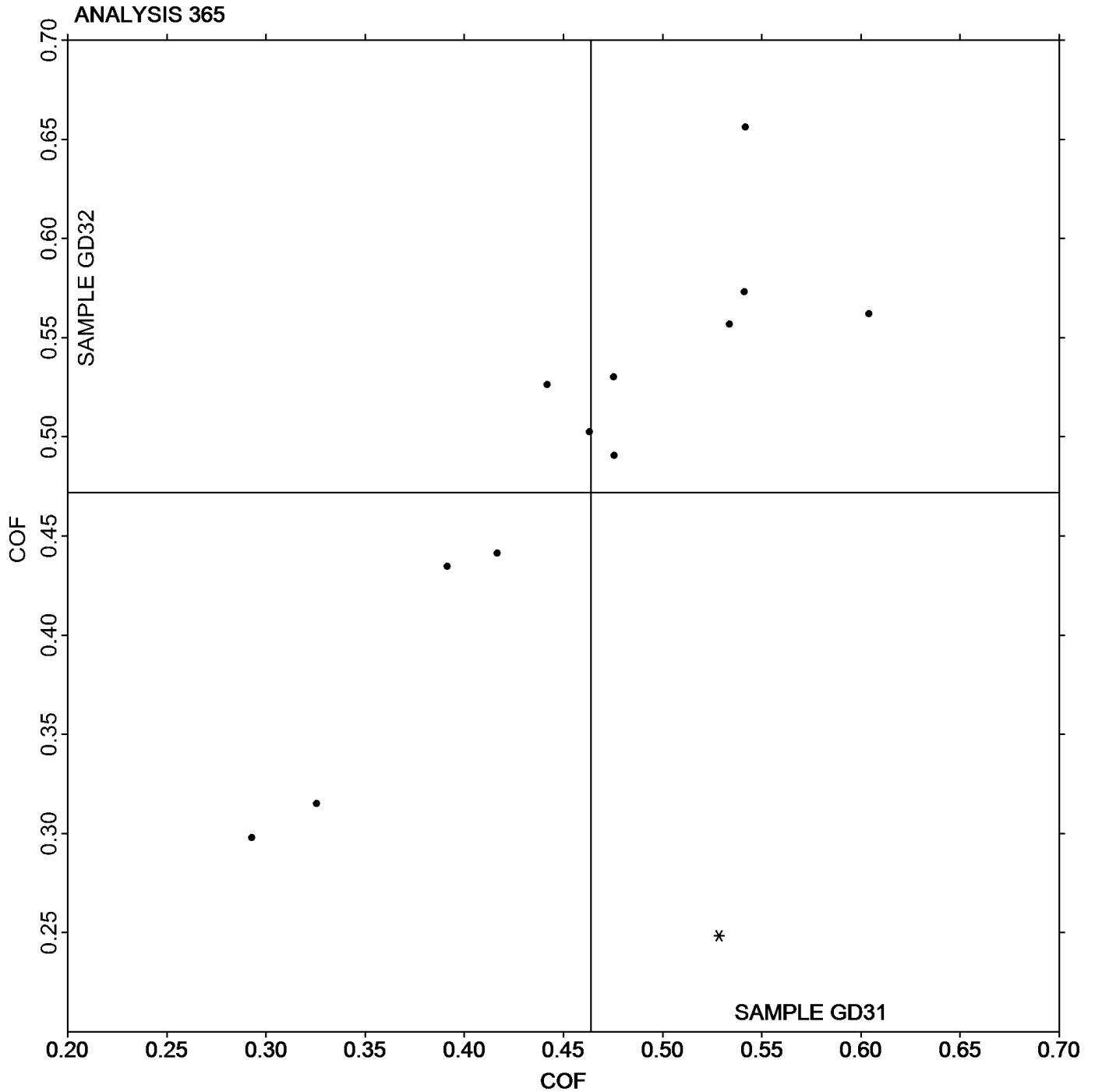
Paper & Paperboard Interlaboratory Testing Program Analysis 365

Report #282G
June 2016

Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers

Grand Mean Sample **GD31** = 0.46397 COF

Grand Mean Sample **GD32** = 0.47190 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 #282G
June 2016

WebCode	Data Flag	Sample GE31			Sample GE32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3YJWPX		33.38	-0.91	-0.45	18.49	-0.23	-0.23	PP
4PMGDY		37.42	3.12	1.53	19.79	1.07	1.09	HG
6QFW2F		34.34	0.04	0.02	18.76	0.04	0.04	LA
BAM8AQ	X	26.70	-7.60	-3.71	48.29	29.57	30.14	PP
BNUZ24	X	11.05	-23.25	-11.37	18.66	-0.06	-0.06	LP
D2RRXR		35.10	0.80	0.39	19.33	0.61	0.62	HG
E4QLUZ		34.18	-0.12	-0.06	18.79	0.07	0.07	PP
E8AGXR		32.75	-1.55	-0.76	18.13	-0.59	-0.60	PP
ERZTKR		32.48	-1.82	-0.89	16.87	-1.86	-1.89	RE
G39EJ3		34.84	0.54	0.27	19.01	0.29	0.29	HG
G6U7MR		36.66	2.36	1.16	18.05	-0.67	-0.68	LA
H9TUPL		33.03	-1.27	-0.62	18.50	-0.22	-0.23	LP
HPFATH		37.44	3.14	1.54	18.74	0.02	0.02	XX
J282CZ		33.25	-1.05	-0.51	18.91	0.19	0.19	XX
JNYD2H		37.45	3.15	1.54	19.91	1.19	1.21	XX
LZ2P4M		36.40	2.10	1.03	19.57	0.85	0.86	HG
MFVAMV		32.81	-1.49	-0.73	18.93	0.20	0.21	PP
MH3TLQ		34.69	0.39	0.19	19.79	1.07	1.09	PP
MRTDQP		36.90	2.60	1.27	20.48	1.76	1.80	LA
NA4M6V		33.61	-0.69	-0.34	18.79	0.07	0.07	LP
P7MH9K		35.38	1.08	0.53	18.64	-0.08	-0.08	WG
PKJW9E		31.90	-2.40	-1.17	18.19	-0.53	-0.54	HG
Q6K8R9		38.84	4.54	2.22	20.41	1.69	1.72	WG
QH6X7G		34.98	0.68	0.33	19.38	0.66	0.67	TL
QWVLLB		30.81	-3.49	-1.71	17.07	-1.65	-1.68	LP
RDVV4L		34.97	0.67	0.33	18.35	-0.37	-0.38	TL
RNTVFQ		34.58	0.28	0.14	19.91	1.19	1.21	LP
RVEPUB		34.74	0.44	0.22	19.68	0.95	0.97	PP
RWM2AR		33.75	-0.55	-0.27	18.43	-0.29	-0.30	PP
T44WPL		32.38	-1.92	-0.94	17.33	-1.39	-1.42	XX
TBZRP6		35.21	0.91	0.45	19.00	0.28	0.28	HG
TLMQFB		32.86	-1.44	-0.70	18.67	-0.05	-0.05	LP
XDV2M3	*	29.27	-5.03	-2.46	15.86	-2.86	-2.92	LP
YBYUVB		34.95	0.65	0.32	19.41	0.69	0.70	TL
YJGFQZ		32.68	-1.62	-0.79	17.67	-1.06	-1.08	PP
YJWDHZ		36.83	2.53	1.24	19.46	0.74	0.75	HG
YKQ4NE		33.33	-0.97	-0.47	18.75	0.03	0.03	LA
YMUY9G	X	24.06	-10.24	-5.01	16.67	-2.05	-2.09	GL
YMXHVK		33.26	-1.04	-0.51	19.19	0.47	0.48	PP
YP44L7	*	30.53	-3.77	-1.84	18.81	0.09	0.09	TN
Z6TBGH		35.22	0.92	0.45	17.50	-1.22	-1.24	LW



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

**Report #282G
June 2016**

WebCode	Data Flag	Sample GE31			Sample GE32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
ZEXHWH		34.40	0.10	0.05	17.60	-1.12	-1.14	LW

Sample GE31		Summary Statistics	Sample GE32	
Grand Means	34.297 sec/100 cc		18.721 sec/100 cc	
SD Btwn Labs	2.045 sec/100 cc		0.981 sec/100 cc	
Statistics based on 39 of 42 reporting participants				

Comments on Assigned Data Flags for Test #370

BNUZ24 (X) - Extreme Data for Sample GE31.

YMUY9G (X) - Data for sample GE31 are low. Inconsistent within the determinations of sample GE31.

BAM8AQ (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

GL Gurley #4110	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	



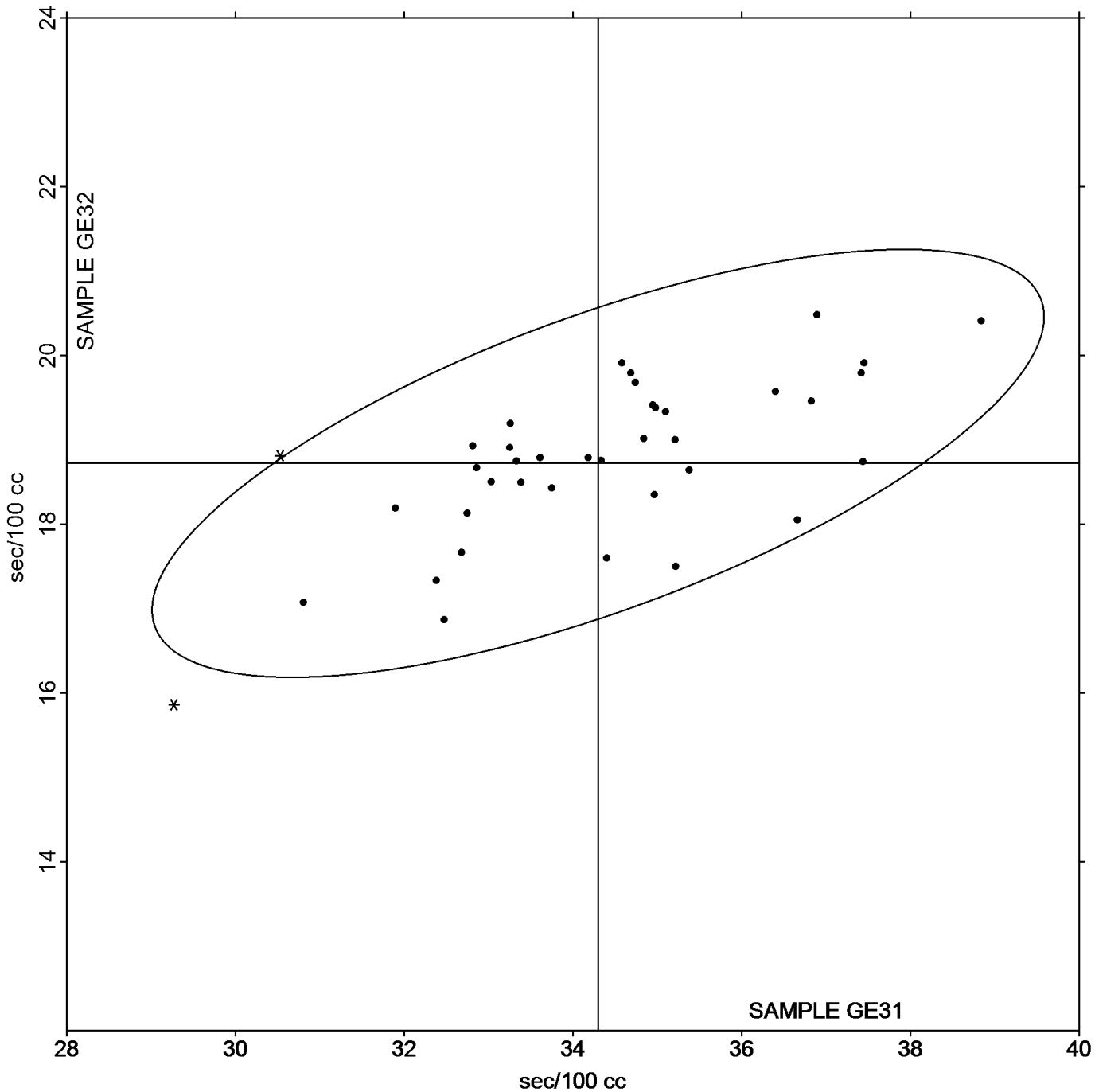
Paper & Paperboard Interlaboratory Testing Program
Analysis 370
Air Resistance - Gurley Oil Type

Report #282G
June 2016

Grand Mean Sample **GE31** = 34.297 sec/100 cc

Grand Mean Sample **GE32** = 18.721 sec/100 cc

ANALYSIS 370





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

Report #282G
June 2016

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

WebCode	Data Flag	Sample GE31			Sample GE32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
8NXLZD		78.16	-10.13	-1.89	147.4	1.2	0.16	GA
G39EJ3		91.20	2.91	0.54	142.3	-3.9	-0.50	TT
HPFATH		78.96	-9.33	-1.74	140.4	-5.8	-0.75	XX
JXPY7F	X	146.60	58.31	10.87	239.3	93.1	12.15	TT
KPRQYU		89.90	1.61	0.30	141.3	-4.9	-0.63	HM
KXKYJL		88.03	-0.26	-0.05	138.3	-7.9	-1.02	LP
MFVAMV		91.10	2.81	0.52	147.8	1.6	0.21	HM
MH3TLQ		92.10	3.81	0.71	152.3	6.1	0.80	SH
P9MQCV		86.08	-2.21	-0.41	136.5	-9.7	-1.26	LP
PJ8Z3A		88.30	0.01	0.00	163.3	17.1	2.24	VM
Q22CPG		93.00	4.71	0.88	147.0	0.8	0.11	TT
RXJGLN		94.40	6.11	1.14	151.1	4.9	0.65	SH

Sample GE31		Summary Statistics		Sample GE32	
Grand Means	88.294 Sheffield Units			146.15 Sheffield Units	
SD Btwn Labs	5.363 Sheffield Units			7.67 Sheffield Units	
Statistics based on 11 of 12 reporting participants					

Comments on Assigned Data Flags for Test #372

JXPY7F (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

GA	Gurley Precision #4340 Automatic Densometer	HM	Technidyne - Hagerty Model #538
LP	L & W Densometer, Air Permeance	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

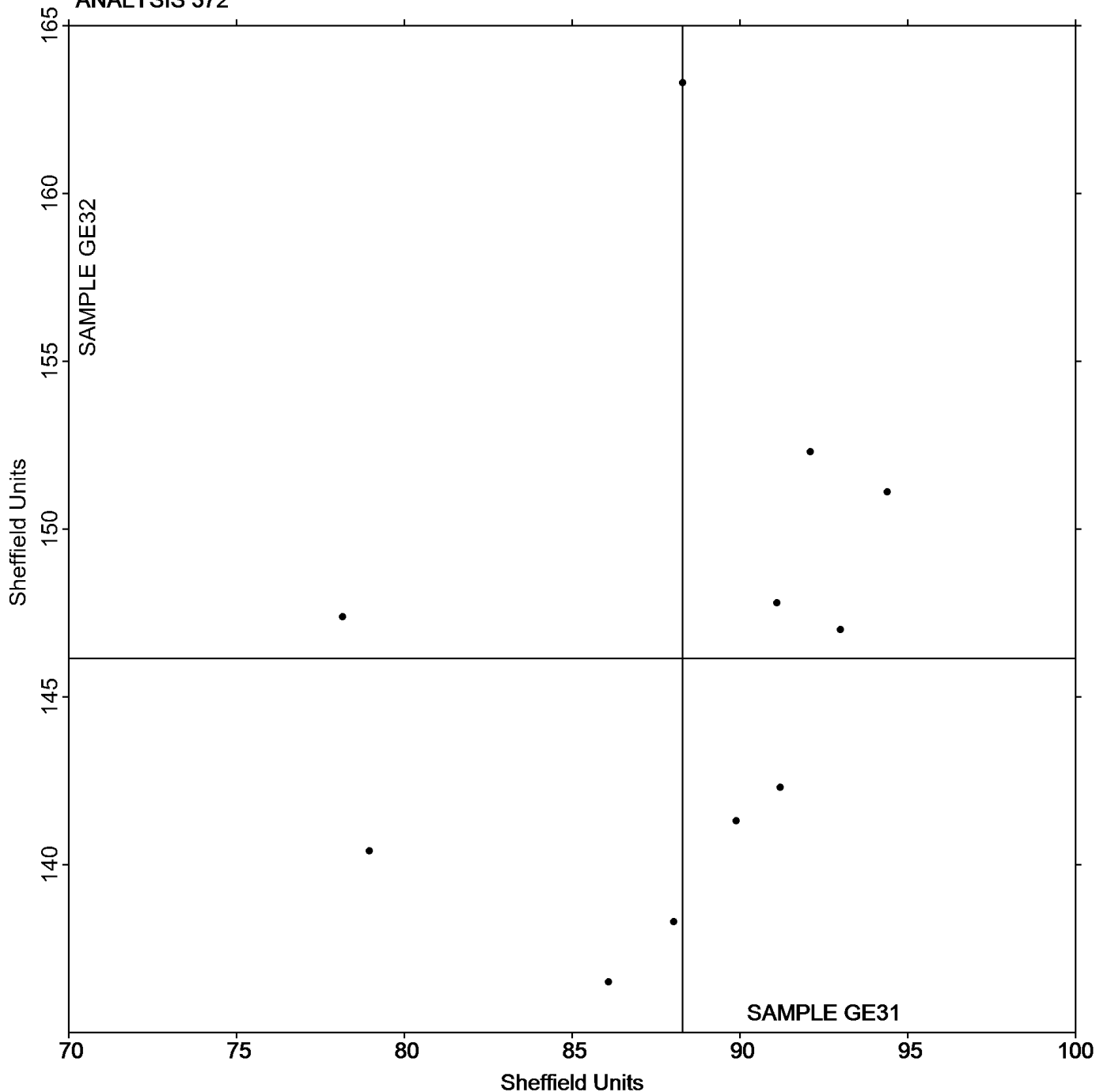
Report #282G
June 2016

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

Grand Mean Sample **GE31** = 88.294 Sheffield Units

Grand Mean Sample **GE32** = 146.15 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 #282G
June 2016

WebCode	Data Flag	Sample GJ31			Sample GJ32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2MLTL4		0.6780	-0.0136	-0.18	1.207	0.051	0.68
3Q6BE9		0.7470	0.0554	0.74	1.093	-0.063	-0.85
3YJWPX		0.6670	-0.0246	-0.33	1.150	-0.006	-0.09
46FBN4		0.6960	0.0044	0.06	1.227	0.071	0.95
4YD3JW		0.6390	-0.0526	-0.70	1.149	-0.007	-0.10
7WLPVB		0.6810	-0.0106	-0.14	1.128	-0.028	-0.38
8NLPV9		0.7500	0.0584	0.78	1.198	0.042	0.56
9XKYF4		0.6480	-0.0436	-0.58	1.192	0.036	0.48
ABNKHT		0.6920	0.0004	0.00	1.246	0.090	1.21
B2WL4T		0.6830	-0.0086	-0.11	1.143	-0.013	-0.18
BAM8AQ		0.6060	-0.0856	-1.14	1.159	0.003	0.04
EBARQ8	*	0.8650	0.1734	2.30	1.354	0.198	2.67
G39EJ3		0.7350	0.0434	0.58	1.132	-0.024	-0.33
G78T8R		0.6880	-0.0036	-0.05	1.163	0.007	0.09
GDN77Q	X	2.9860	2.2944	30.49	1.594	0.438	5.91
GW697K	*	0.8600	0.1684	2.24	1.116	-0.040	-0.54
HXT47Y		0.6040	-0.0876	-1.16	1.076	-0.080	-1.08
JXPY7F		0.5750	-0.1166	-1.55	1.200	0.044	0.59
LQY9XQ		0.6650	-0.0266	-0.35	1.214	0.058	0.78
LZ2P4M		0.6610	-0.0306	-0.41	1.127	-0.029	-0.40
MH3TLQ	*	0.8950	0.2034	2.70	1.282	0.126	1.70
MLLRYL		0.7090	0.0174	0.23	1.132	-0.024	-0.33
NK2Q9P		0.6300	-0.0616	-0.82	1.136	-0.020	-0.27
P7MH9K		0.6670	-0.0246	-0.33	1.032	-0.124	-1.68
PV3BAW		0.6340	-0.0576	-0.77	1.137	-0.019	-0.26
QXNCRP		0.7330	0.0414	0.55	1.273	0.117	1.58
TBZRP6		0.6640	-0.0276	-0.37	1.152	-0.004	-0.06
TCUHVJ		0.6420	-0.0496	-0.66	1.083	-0.073	-0.99
UJDZQ7		0.6820	-0.0096	-0.13	1.034	-0.122	-1.65
YJGFQZ		0.6190	-0.0726	-0.97	1.111	-0.045	-0.61
YJWDHZ	X	1.4220	0.7304	9.71	1.418	0.262	3.53
ZHKXNY		0.7340	0.0424	0.56	1.043	-0.113	-1.53

	Sample GJ31	Summary Statistics	Sample GJ32
Grand Means	0.69163 Microns		1.1563 Microns
SD Btwn Labs	0.07525 Microns		0.0741 Microns
Statistics based on 30 of 32 reporting participants			



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

Report #282G
June 2016

Comments on Assigned Data Flags for Test #376

YJWDHZ (X) - Extreme Data.

GDN77Q (X) - Extreme Data.



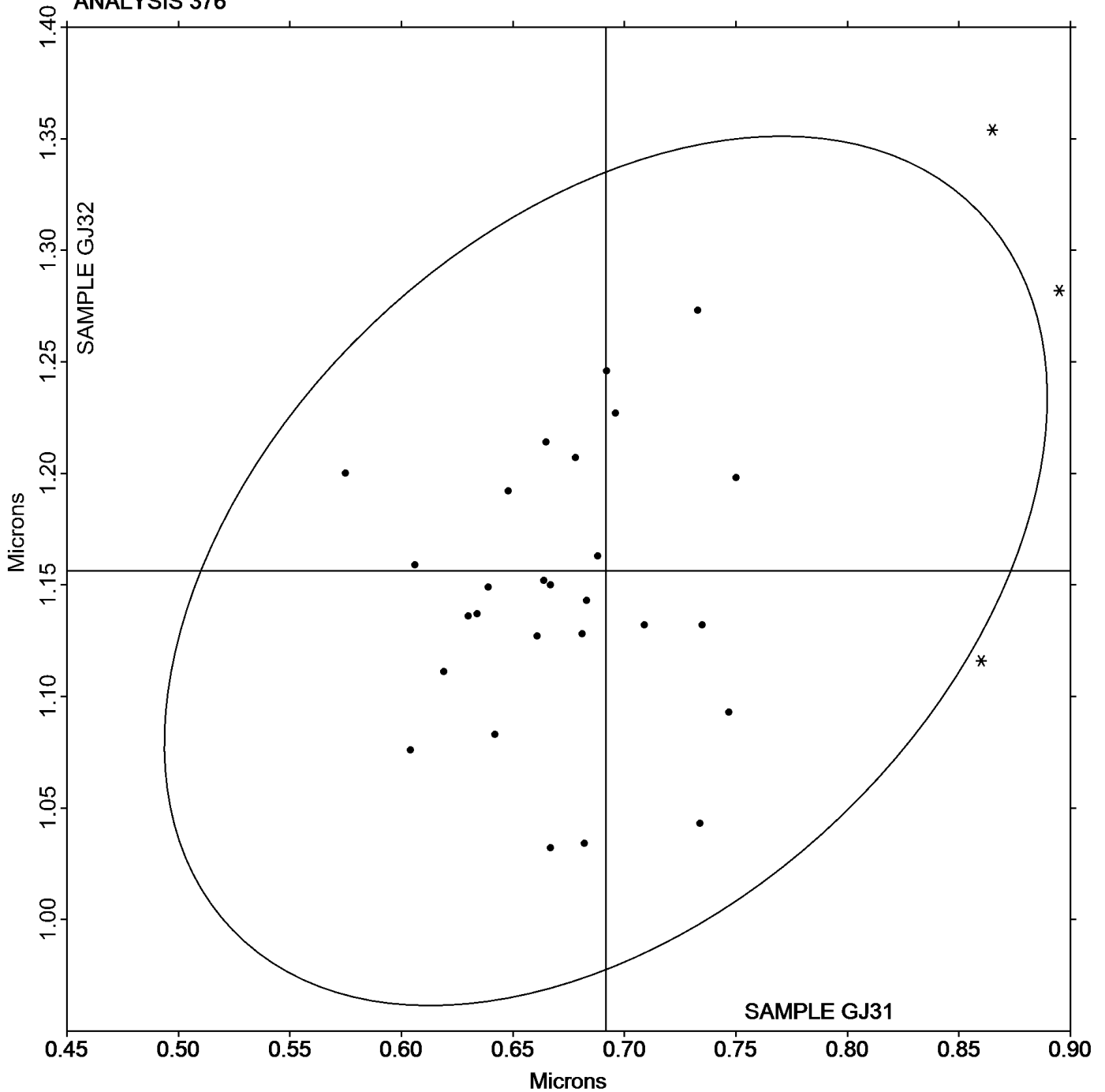
Paper & Paperboard Interlaboratory Testing Program
Analysis 376
Roughness - Print Surf Method - 0.5 to 4.0 Microns

Report #282G
June 2016

Grand Mean Sample **GJ31** = 0.69163 Microns

Grand Mean Sample **GJ32** = 1.1563 Microns

ANALYSIS 376





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

**Report #282G
June 2016**

WebCode	Data Flag	Sample GK31			Sample GK32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
ABNKHT		5.075	0.812	2.22	4.709	0.727	2.08
BNUZ24		4.062	-0.201	-0.55	4.028	0.046	0.13
P7MH9K		4.173	-0.090	-0.25	3.878	-0.105	-0.30
PJ8Z3A		4.275	0.012	0.03	4.039	0.057	0.16
RVEPUB		4.315	0.052	0.14	4.054	0.072	0.20
RWM2AR		4.211	-0.052	-0.14	3.765	-0.218	-0.62
U33JHJ		4.458	0.195	0.53	4.216	0.234	0.67
YJWDHZ		3.638	-0.625	-1.71	3.390	-0.593	-1.70
YKQ4NE		4.045	-0.218	-0.60	3.685	-0.298	-0.85
YMXHVK		4.376	0.113	0.31	4.061	0.079	0.22

		Summary Statistics	
	Sample GK31		Sample GK32
Grand Means	4.2628 Microns		3.9825 Microns
SD Btwn Labs	0.3655 Microns		0.3491 Microns
Statistics based on 10 of 10 reporting participants			



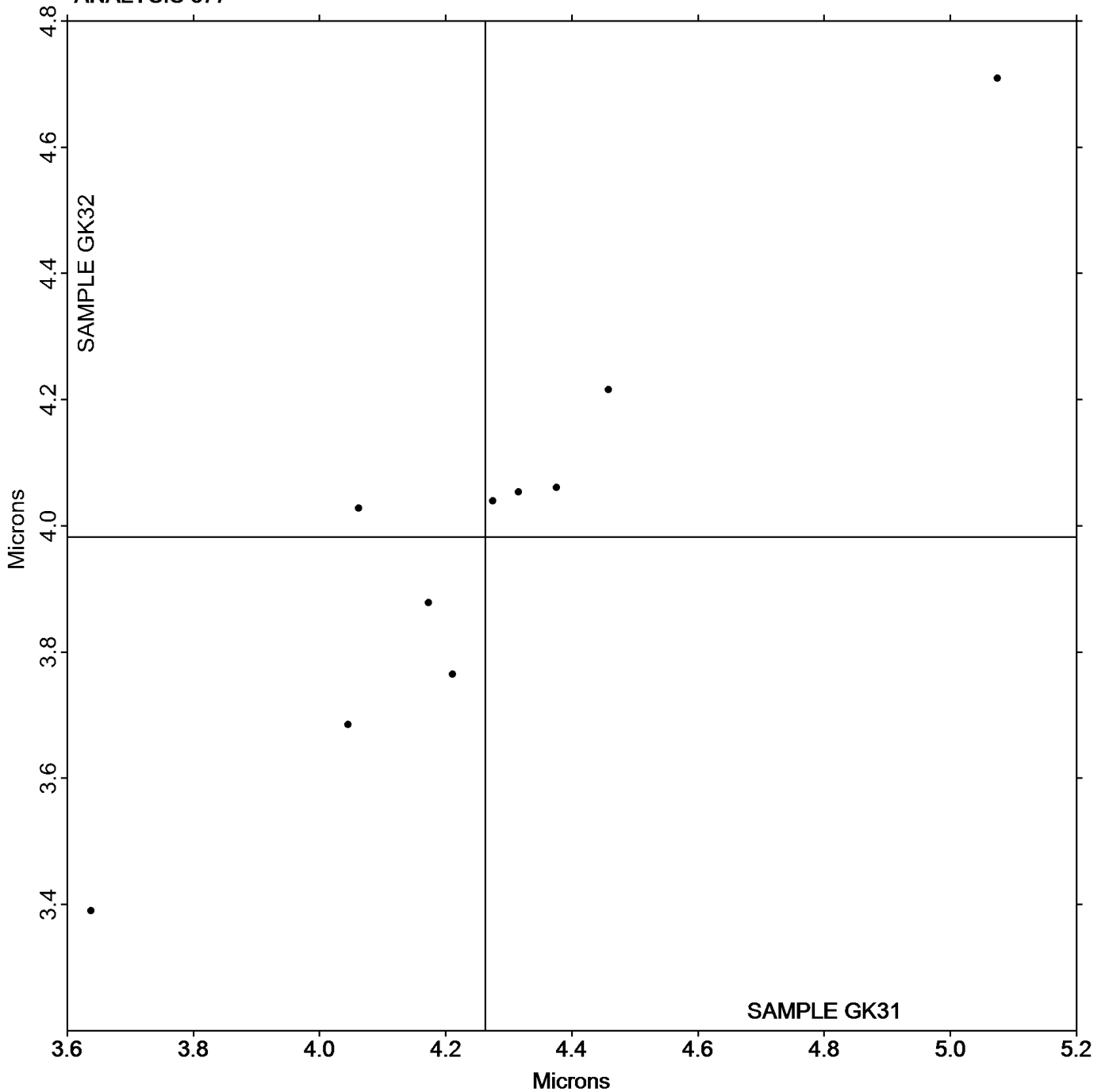
Paper & Paperboard Interlaboratory Testing Program
Analysis 377
Roughness - Print Surf Method - 2.5 to 6.0 Microns

Report #282G
June 2016

Grand Mean Sample **GK31** = 4.2628 Microns

Grand Mean Sample **GK32** = 3.9825 Microns

ANALYSIS 377



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 #282G
June 2016

WebCode	Data Flag	Sample GL31			Sample GL32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2DJKV7	X	147.9	-13.5	-1.62	349.9	102.0	8.21	TS
3Q6BE9		160.0	-1.4	-0.17	238.7	-9.2	-0.74	LA
3YJWPX		160.1	-1.3	-0.15	236.8	-11.1	-0.89	PP
46FBN4	X	222.0	60.6	7.26	249.5	1.6	0.13	GL
4DVU84		170.0	8.6	1.03	240.6	-7.3	-0.59	TS
4PMGDY		159.5	-1.9	-0.23	258.8	10.9	0.88	HM
6VMF2T	X	193.1	31.7	3.80	282.1	34.2	2.75	TT
6WG789		162.5	1.1	0.13	262.1	14.2	1.14	PP
8NLPV9		159.4	-2.0	-0.24	252.2	4.2	0.34	XX
8NXLZD	*	158.3	-3.1	-0.37	275.7	27.7	2.23	GA
8Q48QY		149.3	-12.1	-1.45	245.3	-2.6	-0.21	PP
9AXZCW	X	163.6	2.2	0.27	304.3	56.4	4.54	MP
9XKYF4		157.9	-3.5	-0.42	241.6	-6.3	-0.51	PP
BAM8AQ		160.0	-1.4	-0.17	250.6	2.7	0.21	PP
BEZTGC		161.5	0.1	0.01	238.3	-9.6	-0.77	SH
BNUZ24	X	50.2	-111.2	-13.33	247.6	-0.3	-0.03	LW
D2RRXR		160.5	-0.9	-0.11	258.3	10.4	0.84	TS
E4QLUZ		177.1	15.7	1.89	257.5	9.6	0.77	PP
E8AGXR		151.5	-9.9	-1.19	244.0	-3.9	-0.31	SH
EBARQ8		162.2	0.8	0.10	240.7	-7.2	-0.58	LW
G39EJ3		166.4	5.0	0.60	251.1	3.2	0.26	SH
G78T8R		169.4	8.1	0.97	253.4	5.4	0.44	PP
GN8JMV		155.3	-6.1	-0.73	249.2	1.3	0.10	XX
GW697K		177.0	15.6	1.87	256.6	8.7	0.70	TT
GXZQ9L		163.1	1.7	0.20	233.4	-14.5	-1.17	TT
HPFATH		150.1	-11.3	-1.35	235.7	-12.2	-0.98	XX
JURHUL		172.2	10.8	1.30	256.0	8.1	0.65	GL
JXPY7F	X	84.5	-76.9	-9.22	137.6	-110.3	-8.88	TT
KPRQYU		167.2	5.8	0.70	263.8	15.9	1.28	HM
KXKYJL		165.2	3.8	0.46	258.5	10.6	0.85	PP
LL2T2N		149.7	-11.7	-1.40	240.6	-7.3	-0.59	LA
LQY9XQ		162.7	1.3	0.16	243.1	-4.8	-0.39	LW
LVC9UG		157.0	-4.4	-0.53	269.1	21.2	1.71	GA
LZ2P4M		154.6	-6.8	-0.81	250.7	2.8	0.22	HM
MFVAMV		141.4	-20.0	-2.39	226.1	-21.8	-1.76	PP
MH3TLQ		171.7	10.3	1.24	272.0	24.1	1.94	PP
MRTDQP		159.3	-2.1	-0.25	238.4	-9.5	-0.77	LA
P7MH9K		164.0	2.6	0.31	250.0	2.1	0.17	XX
PKJW9E		162.1	0.7	0.09	254.8	6.9	0.55	HM
PV3BAW		164.8	3.4	0.41	239.5	-8.4	-0.68	HM
Q22CPG		179.0	17.6	2.11	264.0	16.1	1.29	TT



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

**Report #282G
June 2016**

WebCode	Data Flag	Sample GL31			Sample GL32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
Q6K8R9		174.0	12.6	1.51	253.5	5.6	0.45	PG
QXNCRP		171.7	10.3	1.24	243.4	-4.5	-0.36	PP
RNTVFAQ		151.4	-10.0	-1.20	228.1	-19.8	-1.59	LW
RVEPUB		153.1	-8.2	-0.99	247.3	-0.7	-0.05	PP
RWM2AR		162.5	1.1	0.13	256.8	8.9	0.72	PP
RXJGLN		142.9	-18.5	-2.22	226.6	-21.3	-1.72	SH
TBZRP6		168.3	6.9	0.83	251.9	4.0	0.32	HM
TCUHVJ		164.4	3.0	0.36	241.5	-6.4	-0.51	PP
U33JHJ		166.4	5.0	0.60	240.9	-7.0	-0.56	HM
UJDZQ7		157.0	-4.4	-0.53	233.7	-14.2	-1.14	LA
WQM96D		151.5	-9.9	-1.19	235.2	-12.7	-1.03	PP
XQZ7QA		162.1	0.7	0.09	251.1	3.2	0.26	PP
YJGFQZ		162.3	0.9	0.11	249.1	1.2	0.10	PP
YKQ4NE		160.8	-0.6	-0.07	235.4	-12.5	-1.01	LA
YMUY9G		161.3	-0.1	-0.01	245.3	-2.6	-0.21	PP
YMXHVK		175.3	13.9	1.66	265.8	17.9	1.44	PP
ZEXHWH		151.2	-10.2	-1.22	218.0	-29.9	-2.41	TS
ZHKXNY	X	27.0	-134.4	-16.11	25.3	-222.6	-17.92	TS
ZZ24XA		155.6	-5.8	-0.70	268.7	20.8	1.68	GA

Sample GL31		Summary Statistics	Sample GL32	
Grand Means	161.39 Sheffield		247.91 Sheffield	
SD Btwn Labs	8.34 Sheffield		12.42 Sheffield	
Statistics based on 53 of 60 reporting participants				

Comments on Assigned Data Flags for Test #378

- BNUZ24 (X) - Extreme Data for Sample GL31.
- 46FBN4 (X) - Extreme Data for Sample GL31.
- 9AXZCW (X) - Data for sample GL32 are high. Inconsistent within the determinations of sample GL32.
- 6VMF2T (X) - Data for both samples are high.
- ZHKXNY (X) - Extreme Data.
- JXPY7F (X) - Extreme Data.
- 2DJKV7 (X) - Extreme Data for Sample GL32.



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

Report #282G
June 2016

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

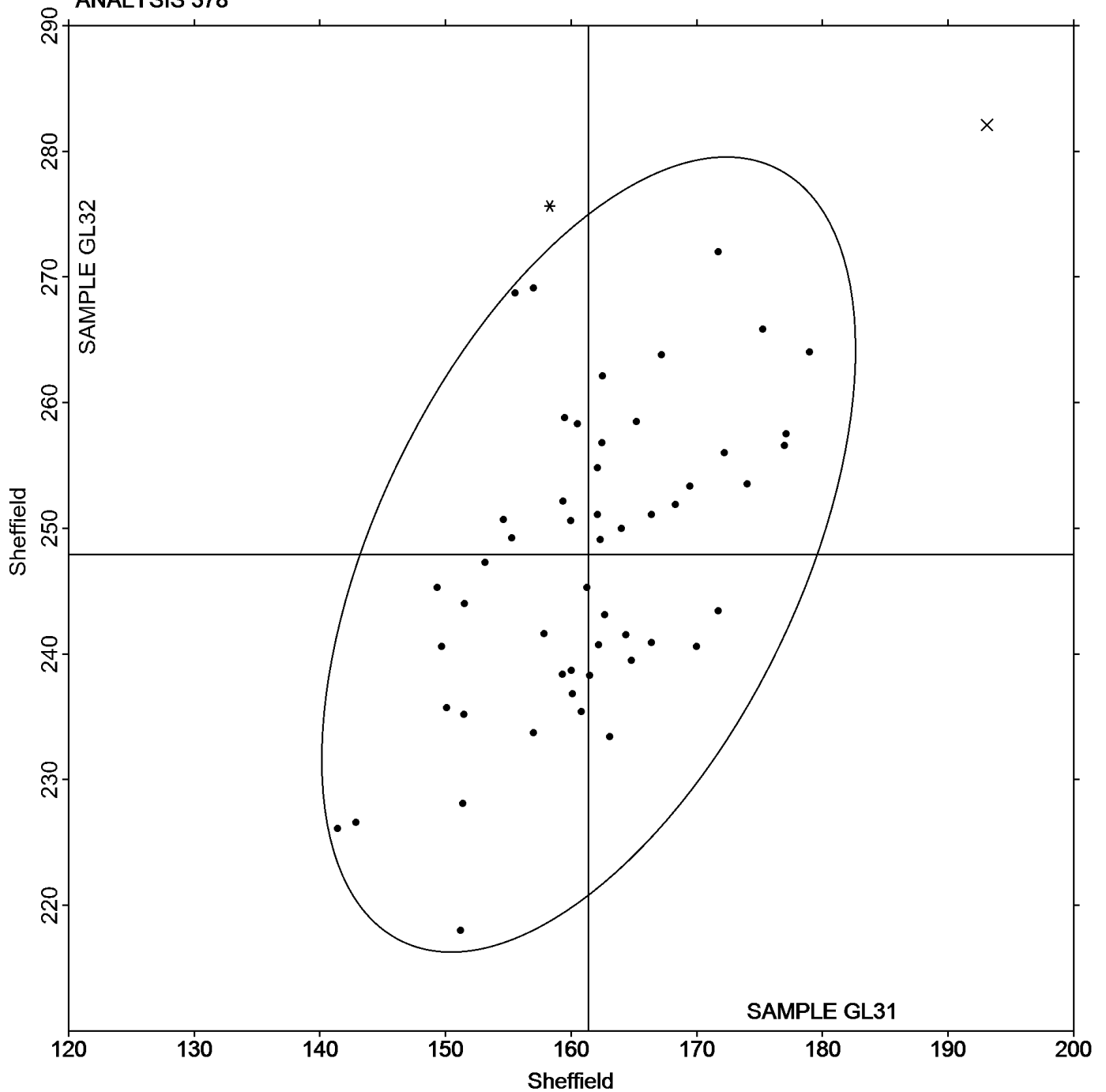
Roughness - Sheffield Type

Report #282G
June 2016

Grand Mean Sample **GL31** = 161.39 Sheffield

Grand Mean Sample **GL32** = 247.91 Sheffield

ANALYSIS 378





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

**Report #282G
June 2016**

WebCode	Data Flag	Sample GM31			Sample GM32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3ECRZ3		4.894	0.286	0.78	4.915	0.302	1.17
6DPZ23		4.413	-0.195	-0.53	4.410	-0.203	-0.78
6VMF2T		4.730	0.122	0.33	4.920	0.307	1.18
7ZXTJR	X	2.905	-1.703	-4.63	2.888	-1.725	-6.65
B7NWEQ		5.370	0.762	2.07	4.892	0.279	1.08
HM9RUL		4.770	0.162	0.44	4.630	0.017	0.07
J8CXXL		4.405	-0.203	-0.55	4.435	-0.178	-0.69
TLMQFB		4.229	-0.379	-1.03	4.214	-0.399	-1.54
U33JHJ		4.310	-0.298	-0.81	4.680	0.067	0.26
YMXHVK		4.351	-0.257	-0.70	4.419	-0.193	-0.75

		Summary Statistics	
	Sample GM31		Sample GM32
Grand Means	4.6080 Percent		4.6129 Percent
SD Btwn Labs	0.3676 Percent		0.2593 Percent
Statistics based on 9 of 10 reporting participants			

Comments on Assigned Data Flags for Test #382

7ZXTJR (X) - Extreme Data.



Paper & Paperboard Interlaboratory Testing Program

Analysis 382

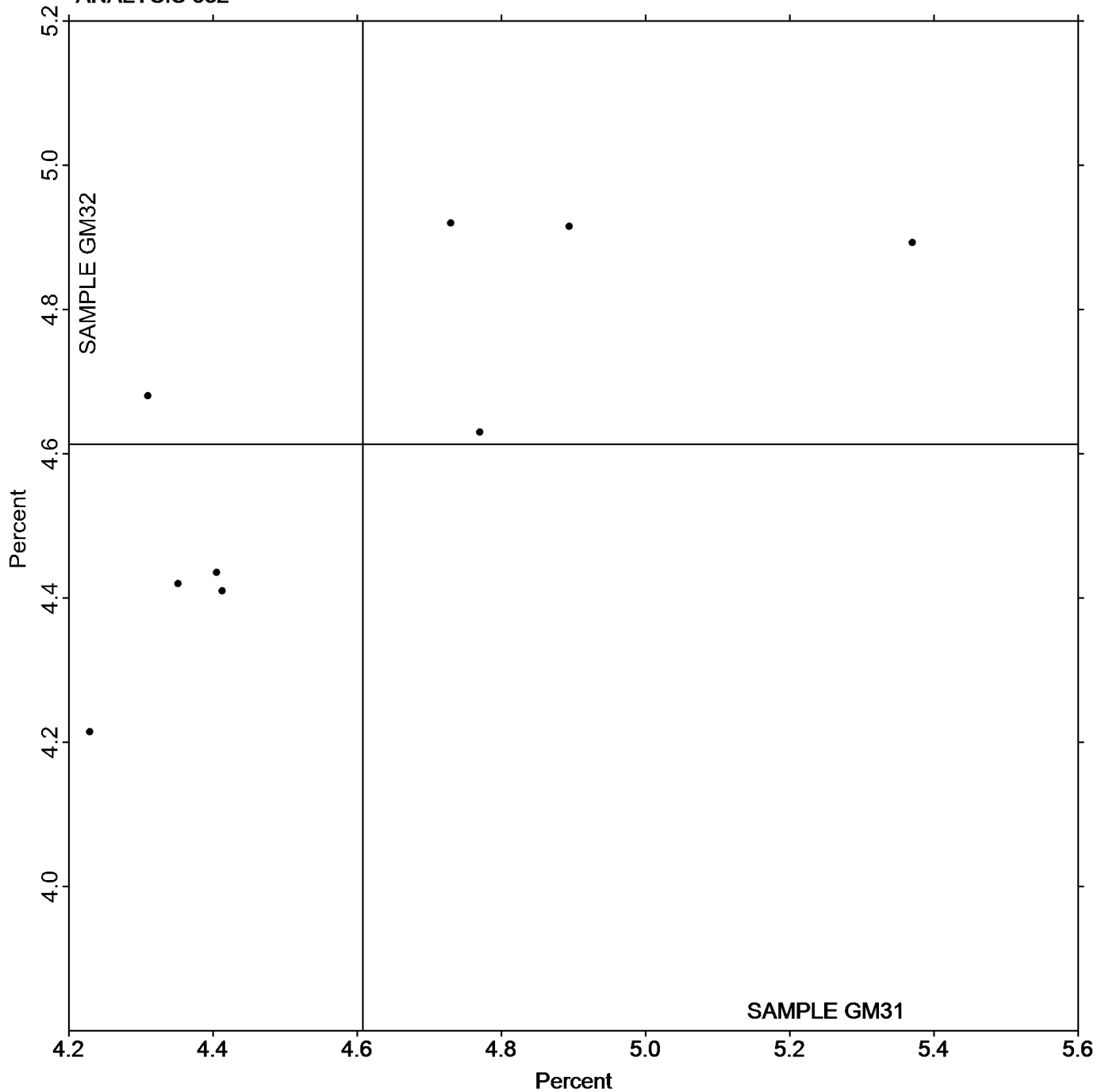
Moisture in Paper

Report #282G
June 2016

Grand Mean Sample **GM31** = 4.6080 Percent

Grand Mean Sample **GM32** = 4.6129 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 #282G
June 2016

WebCode	Data Flag	Sample GN31			Sample GN32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2MLTL4		87.06	0.27	0.51	93.89	0.49	1.46
4PMGDY		87.12	0.33	0.62	93.82	0.42	1.25
6WG789		86.57	-0.22	-0.41	93.07	-0.33	-0.99
7LDAN3		86.72	-0.07	-0.13	92.96	-0.44	-1.32
8NLPV9		86.46	-0.33	-0.62	93.12	-0.28	-0.84
93V3HY		87.03	0.24	0.45	93.18	-0.22	-0.66
AZ82XW		86.31	-0.48	-0.91	93.50	0.10	0.30
BAM8AQ		86.72	-0.07	-0.13	93.24	-0.16	-0.49
BEZTGC		87.24	0.45	0.84	93.45	0.05	0.14
D2RRXR		87.37	0.58	1.09	93.42	0.02	0.05
E4QLUZ		86.82	0.03	0.05	93.33	-0.07	-0.22
E8AGXR		87.65	0.86	1.61	93.57	0.17	0.50
G39EJ3		87.20	0.41	0.77	93.72	0.32	0.95
GDN77Q		85.97	-0.82	-1.54	93.10	-0.30	-0.90
HPFATH		85.99	-0.80	-1.50	92.57	-0.83	-2.49
HXT47Y		87.32	0.53	0.99	93.64	0.24	0.71
JURHUL		87.52	0.73	1.37	94.02	0.62	1.84
JXPY7F		87.26	0.47	0.88	93.81	0.41	1.22
KNXZTF		86.96	0.17	0.32	93.58	0.18	0.53
MLLRYL		87.32	0.53	0.99	93.72	0.32	0.95
MRTDQP		85.64	-1.15	-2.16	92.87	-0.53	-1.59
PV3BAW		87.06	0.27	0.51	93.98	0.58	1.73
Q22CPG	X	89.20	2.41	4.52	94.41	1.01	3.01
Q6K8R9		86.45	-0.34	-0.64	93.27	-0.13	-0.40
QH6X7G		86.44	-0.35	-0.66	93.42	0.02	0.05
QXNCRP	*	87.03	0.24	0.45	92.80	-0.60	-1.80
RWM2AR		85.60	-1.19	-2.23	93.13	-0.27	-0.81
RXJGLN		87.09	0.30	0.56	93.65	0.25	0.74
T9YNXH		86.92	0.13	0.24	93.54	0.14	0.41
TBZRP6		87.01	0.22	0.41	93.37	-0.03	-0.10
U33JHJ		86.16	-0.63	-1.18	93.47	0.07	0.20
XQZ7QA		87.03	0.24	0.45	93.50	0.10	0.29
YJWDHZ		87.31	0.52	0.97	93.54	0.14	0.41
YKQ4NE		86.60	-0.19	-0.36	93.52	0.12	0.35
YMUY9G		85.72	-1.07	-2.01	93.24	-0.16	-0.49
YMXHVK		86.91	0.12	0.23	93.46	0.06	0.17
ZEXHWH		86.89	0.10	0.19	93.01	-0.39	-1.17



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

**Report #282G
June 2016**

Opacity (89% Reflectance Backing) - Fine Papers

	Sample GN31	Summary Statistics	Sample GN32
Grand Means	86.791 Percent		93.402 Percent
SD Btwn Labs	0.533 Percent		0.335 Percent
Statistics based on 36 of 37 reporting participants			

Comments on Assigned Data Flags for Test #384

Q22CPG (X) - Data for both samples are high.



Paper & Paperboard Interlaboratory Testing Program

Report #282G

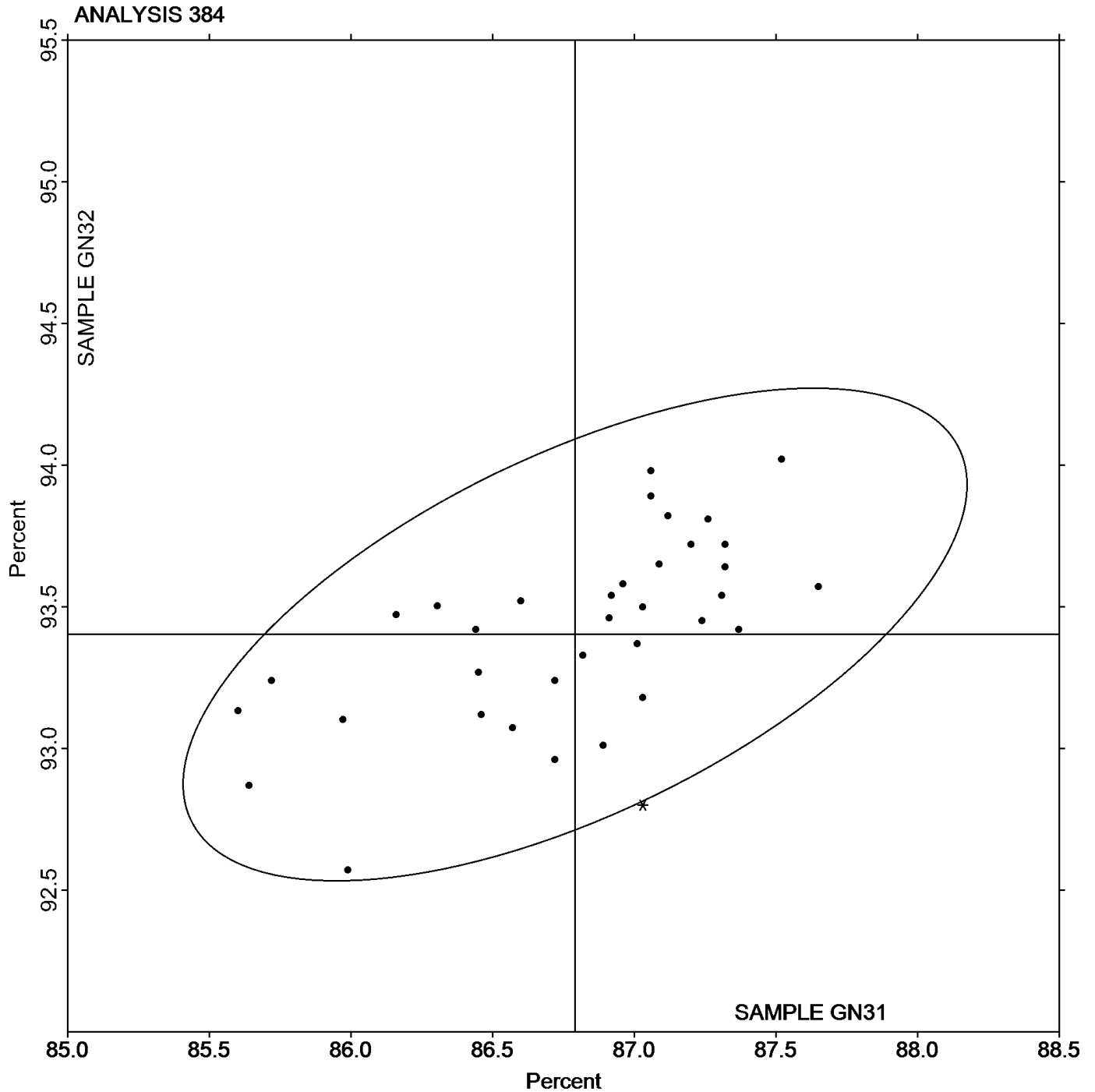
Analysis 384

June 2016

Opacity (89% Reflectance Backing) - Fine Papers

Grand Mean Sample **GN31** = 86.791 Percent

Grand Mean Sample **GN32** = 93.402 Percent





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

Report #282G
June 2016

WebCode	Data Flag	Sample GP31			Sample GP32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
8NLPV9	X	87.00	-1.97	-11.43	93.23	-1.15	-8.16
8TV3D8		88.97	0.00	0.00	94.48	0.10	0.74
B2WL4T		88.83	-0.14	-0.82	94.32	-0.05	-0.38
ERZTKR		88.59	-0.38	-2.21	94.37	-0.01	-0.08
G8K3KY		89.02	0.04	0.25	94.25	-0.12	-0.87
HN3HZZ		88.97	0.00	0.00	94.42	0.04	0.30
JYWEDL		89.07	0.09	0.54	94.38	0.00	0.02
KPRQYU		89.14	0.17	0.98	94.52	0.14	1.01
MFVAMV		89.26	0.29	1.68	94.44	0.06	0.44
QWVLLB		89.01	0.04	0.21	94.17	-0.20	-1.44
QXNCRP	X	97.67	8.70	50.48	98.84	4.47	31.72
RDVV4L		88.76	-0.21	-1.24	94.38	0.00	0.03
T44WPL		88.75	-0.22	-1.30	94.18	-0.20	-1.39
TLMQFB		88.89	-0.09	-0.51	94.53	0.16	1.11
TNM2AP		88.97	-0.01	-0.04	94.29	-0.08	-0.59
UUTU4K		88.85	-0.12	-0.70	94.60	0.23	1.62
XDV2M3		89.00	0.02	0.12	94.12	-0.26	-1.84
Z6TBGH		89.11	0.14	0.79	94.46	0.08	0.59
ZLW9E8		89.13	0.16	0.91	94.57	0.19	1.38
ZQQ3C9		89.21	0.23	1.35	94.29	-0.09	-0.63

		Summary Statistics	
	Sample GP31		Sample GP32
Grand Means	88.974 Percent		94.376 Percent
SD Btwn Labs	0.172 Percent		0.141 Percent
Statistics based on 18 of 20 reporting participants			

Comments on Assigned Data Flags for Test #386

8NLPV9 (X) - Extreme Data.

QXNCRP (X) - Extreme Data.

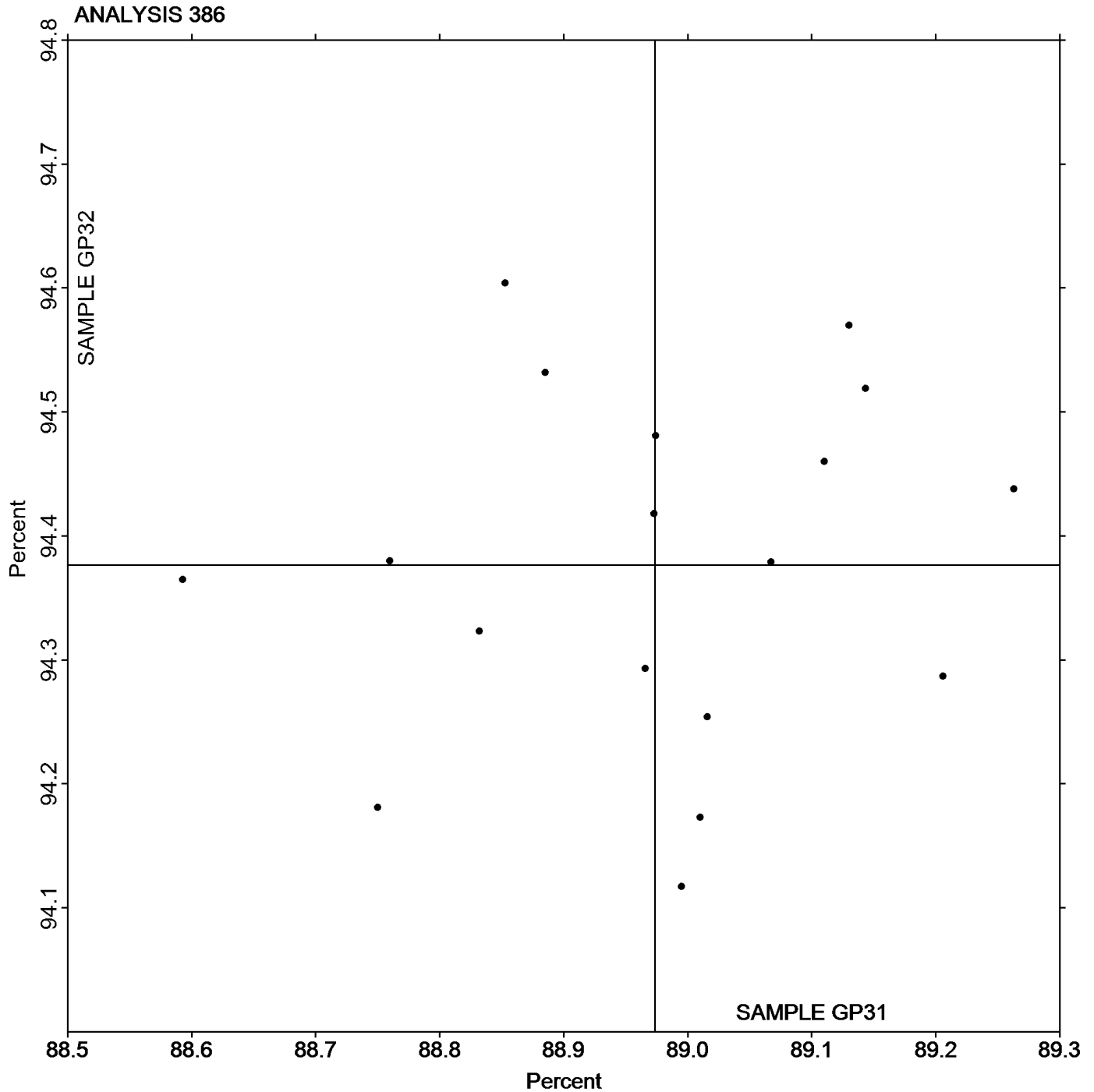


Paper & Paperboard Interlaboratory Testing Program
Analysis 386
Opacity (Paper Backing) - Fine Papers and Newsprint

Report #282G
June 2016

Grand Mean Sample **GP31** = 88.974 Percent

Grand Mean Sample **GP32** = 94.376 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 #282G
June 2016**

WebCode	Data Flag	Sample GR31			Sample GR32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
24WHWJ		84.88	-1.95	-1.60	84.51	-2.25	-1.77	HG
2MLTL4		88.23	1.40	1.15	88.07	1.30	1.02	MK
46FBN4		86.71	-0.12	-0.09	86.59	-0.18	-0.14	TS
8NLPV9		85.75	-1.08	-0.88	85.77	-1.00	-0.78	TT
8Q48QY		87.70	0.88	0.72	87.46	0.69	0.54	TS
93V3HY		86.30	-0.53	-0.43	86.26	-0.50	-0.39	XX
9XKYF4		86.98	0.15	0.12	86.91	0.15	0.11	TT
BAM8AQ		87.00	0.17	0.14	86.90	0.13	0.11	TT
BEZTGC		86.54	-0.29	-0.24	86.50	-0.27	-0.21	TA
D2RRXR		86.50	-0.33	-0.27	86.44	-0.33	-0.26	TS
E4QLUZ	*	86.74	-0.09	-0.07	87.55	0.78	0.61	TT
G78T8R		88.11	1.28	1.05	88.23	1.46	1.15	HD
GDN77Q		86.71	-0.12	-0.09	86.60	-0.17	-0.13	TS
GW697K		87.15	0.32	0.26	87.23	0.46	0.36	TT
HPFATH		89.64	2.81	2.30	89.65	2.88	2.26	XX
J8CXXL	*	83.34	-3.49	-2.86	83.20	-3.57	-2.80	XX
LQY9XQ		86.44	-0.39	-0.32	86.49	-0.28	-0.22	TT
PV3BAW		86.71	-0.12	-0.09	86.73	-0.04	-0.03	TT
Q22CPG		88.00	1.17	0.96	87.96	1.20	0.94	TT
Q6K8R9		86.96	0.13	0.11	86.88	0.11	0.09	TS
QH6X7G		87.29	0.46	0.38	86.54	-0.23	-0.18	TS
QXNCRP		87.30	0.47	0.39	87.13	0.36	0.28	TS
RVEPUB		84.64	-2.19	-1.79	84.68	-2.09	-1.64	XX
TCUHVJ		86.34	-0.49	-0.40	86.24	-0.53	-0.42	HD
WQM96D		87.05	0.22	0.18	87.14	0.37	0.29	TS
XQZ7QA		87.29	0.46	0.38	86.70	-0.07	-0.05	XX
YJWDHZ		86.41	-0.42	-0.34	86.28	-0.49	-0.39	TT
YKQ4NE		88.49	1.66	1.36	88.85	2.09	1.64	TS

	Sample GR31	Summary Statistics	Sample GR32
Grand Means	86.828 Percent		86.766 Percent
SD Btwn Labs	1.222 Percent		1.275 Percent
Statistics based on 28 of 28 reporting participants			



Paper & Paperboard Interlaboratory Testing Program
Analysis 390
Directional Brightness

Report #282G
June 2016

Key to Instrument Codes Reported by Participants

HD	Hunter D25DP - 9000	HG	Hunter Labscan / XE
MK	Macbeth Color-Eye 7000 Spectrophotometer	TA	Technidyne, Diano, M.S. S-4
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 390

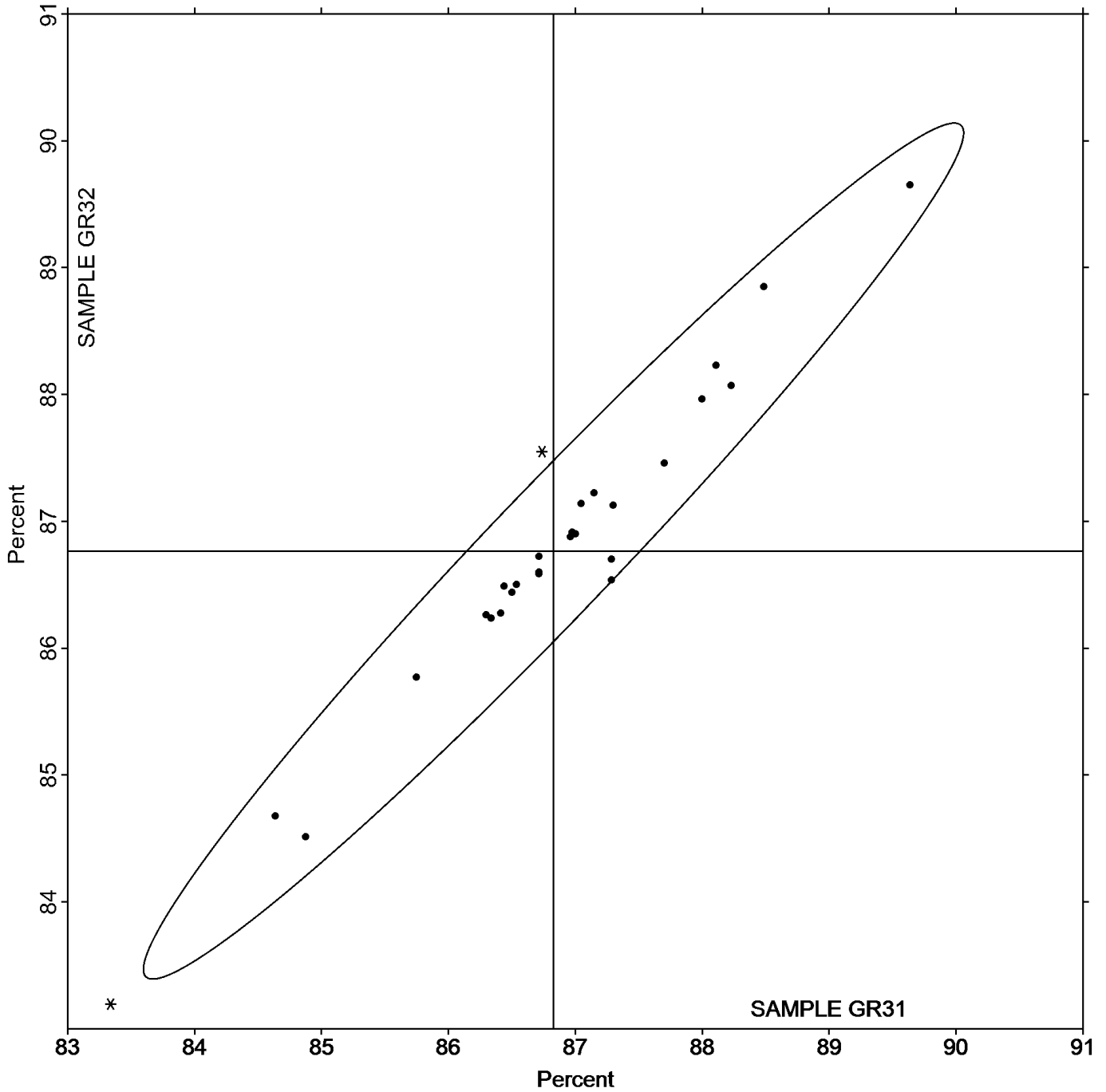
Directional Brightness

Report #282G
June 2016

Grand Mean Sample **GR31** = 86.828 Percent

Grand Mean Sample **GR32** = 86.766 Percent

ANALYSIS 390





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

Report #282G
June 2016

WebCode	Data Flag	Sample GZ31			Sample GZ32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4PMGDY		89.36	-0.66	-0.99	89.75	-1.19	-1.54	HT
6VMF2T	X	98.48	8.46	12.76	93.74	2.80	3.62	EF
6WG789		90.91	0.90	1.35	92.55	1.60	2.07	TS
D2RRXR		90.22	0.20	0.30	91.02	0.08	0.10	TS
E8AGXR		88.50	-1.52	-2.29	89.65	-1.30	-1.68	HT
HXT47Y		90.13	0.12	0.18	91.04	0.09	0.12	PP
JXPY7F		89.58	-0.44	-0.66	91.40	0.46	0.59	TT
KNXZTF		90.50	0.48	0.73	90.66	-0.28	-0.37	TS
KPC8EW		90.71	0.69	1.05	92.28	1.33	1.72	TS
MLLRYL		89.60	-0.42	-0.63	90.58	-0.36	-0.47	TT
MRTDQP		90.28	0.26	0.40	91.34	0.40	0.51	TT
PV3BAW	X	102.36	12.34	18.61	98.46	7.52	9.73	TS
RWM2AR		90.25	0.23	0.35	91.03	0.08	0.11	TS
T9YNXH		89.96	-0.06	-0.09	91.04	0.10	0.12	TS
TBZRP6		90.80	0.78	1.18	90.98	0.04	0.05	TT
VBBBM8		90.28	0.26	0.39	90.96	0.02	0.02	TS
YMXHVK		90.22	0.20	0.30	90.85	-0.10	-0.13	TS
ZEXHWH		88.98	-1.04	-1.56	90.00	-0.94	-1.22	TS

Sample GZ31		Summary Statistics		Sample GZ32	
Grand Means	90.018 Percent			90.945 Percent	
SD Btwn Labs	0.663 Percent			0.773 Percent	
Statistics based on 16 of 18 reporting participants					

Comments on Assigned Data Flags for Test #391

- PV3BAW (X) - Extreme Data.
- 6VMF2T (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

EF	L & W Datacolor Elrepho	HT	Hunter UltraScan Vis
PP	Technidyne Profile/Plus	TS	Technidyne Brightimeter Micro S-5
TT	Technidyne Brightimeter Micro S4-M		

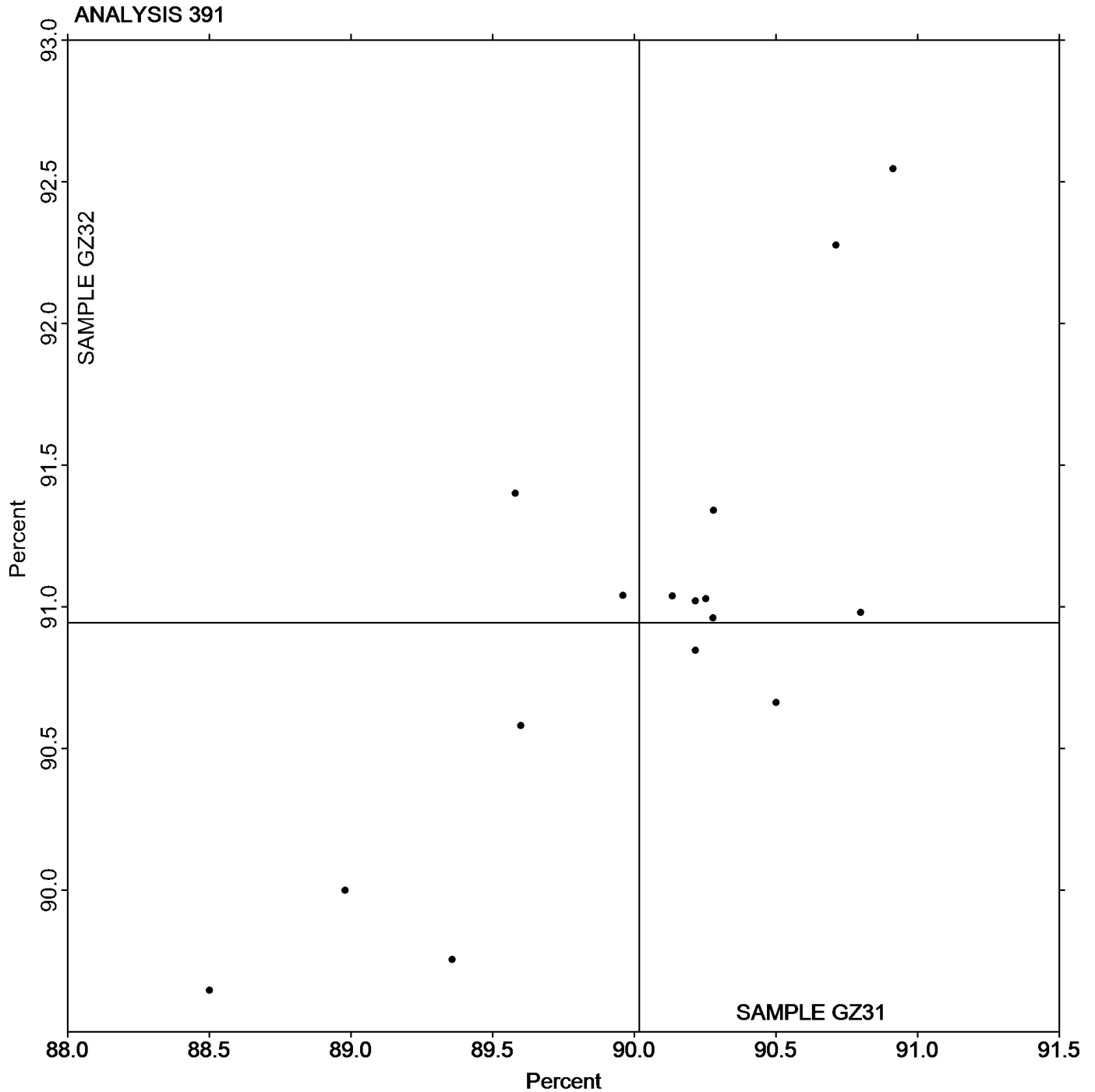


Paper & Paperboard Interlaboratory Testing Program
Analysis 391
Directional Brightness of Fluorescent Samples

Report #282G
June 2016

Grand Mean Sample **GZ31** = 90.018 Percent

Grand Mean Sample **GZ32** = 90.945 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 #282G
June 2016

WebCode	Data Flag	Sample GR31			Sample GR32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
29PGDZ		87.75	0.46	0.95	87.45	0.23	0.44	TC
38AHTB		87.38	0.09	0.19	87.36	0.14	0.27	TC
3YJWPX		87.60	0.31	0.63	87.45	0.23	0.45	PP
6VMF2T		87.24	-0.05	-0.11	87.30	0.08	0.15	LA
7WLPVB		87.45	0.16	0.33	87.37	0.14	0.28	TC
8NLPV9		86.39	-0.90	-1.84	86.33	-0.89	-1.77	TM
8TV3D8		87.75	0.46	0.94	87.76	0.53	1.05	TC
9XKYF4	*	85.80	-1.49	-3.05	85.75	-1.47	-2.91	TL
ABNKHT		87.29	0.00	0.00	87.20	-0.03	-0.05	TC
B2WL4T		87.35	0.05	0.11	87.29	0.07	0.13	LS
ERZTKR		87.28	-0.01	-0.03	87.15	-0.07	-0.14	EG
G39EJ3		87.61	0.32	0.65	87.46	0.24	0.47	TC
G8K3KY		87.45	0.16	0.32	87.55	0.32	0.64	TC
GW697K		87.29	0.00	-0.01	87.31	0.09	0.18	EG
J8CXXL		87.03	-0.26	-0.53	86.85	-0.38	-0.74	EE
JYWEDL		87.55	0.26	0.53	87.30	0.08	0.16	LA
KPRQYU		87.50	0.20	0.42	87.64	0.41	0.82	TC
LQY9XQ		87.77	0.48	0.99	87.72	0.50	0.98	EG
MFVAMV		87.44	0.15	0.30	87.42	0.20	0.39	TC
NA4M6V		87.47	0.18	0.37	87.49	0.27	0.52	TC
NK2Q9P		87.39	0.10	0.20	87.45	0.22	0.44	TC
PV3BAW		88.02	0.73	1.50	87.95	0.73	1.44	LT
QXNCRP		86.25	-1.04	-2.13	86.14	-1.09	-2.14	TM
RDVV4L	X	84.35	-2.94	-6.02	84.24	-2.99	-5.90	TM
RNTVFAQ		87.24	-0.05	-0.11	87.01	-0.21	-0.42	EF
RVEPUB	X	92.05	4.76	9.75	92.18	4.96	9.79	TC
TLMQFB	X	87.23	-0.06	-0.13	85.33	-1.89	-3.73	LS
UUTU4K		87.37	0.08	0.16	87.28	0.05	0.10	TC
UY48LJ	X	84.81	-2.48	-5.08	84.78	-2.44	-4.83	LA
VLUPNN		87.56	0.27	0.55	87.46	0.23	0.46	TC
YJGFQZ		87.39	0.10	0.21	87.38	0.16	0.31	TC
YKQ4NE		87.43	0.14	0.28	87.45	0.23	0.45	TC
ZQQ3C9		86.42	-0.87	-1.79	86.23	-0.99	-1.96	TM

Sample GR31		Summary Statistics	Sample GR32	
Grand Means	87.292 Percent		87.224 Percent	
SD Btwn Labs	0.488 Percent		0.507 Percent	
Statistics based on 29 of 33 reporting participants				



Paper & Paperboard Interlaboratory Testing Program
Analysis 392
Diffuse Brightness

Report #282G
June 2016

Comments on Assigned Data Flags for Test #392

UY48LJ (X) - Data for both samples are low. Possible Systematic Error.

RDV4L (X) - Extreme Data.

TLMQFB (X) - Data for sample GR32 are low. Inconsistent within the determinations of sample GR32.

RVEPUB (X) - Extreme Data.

Key to Instrument Codes Reported by Participants

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

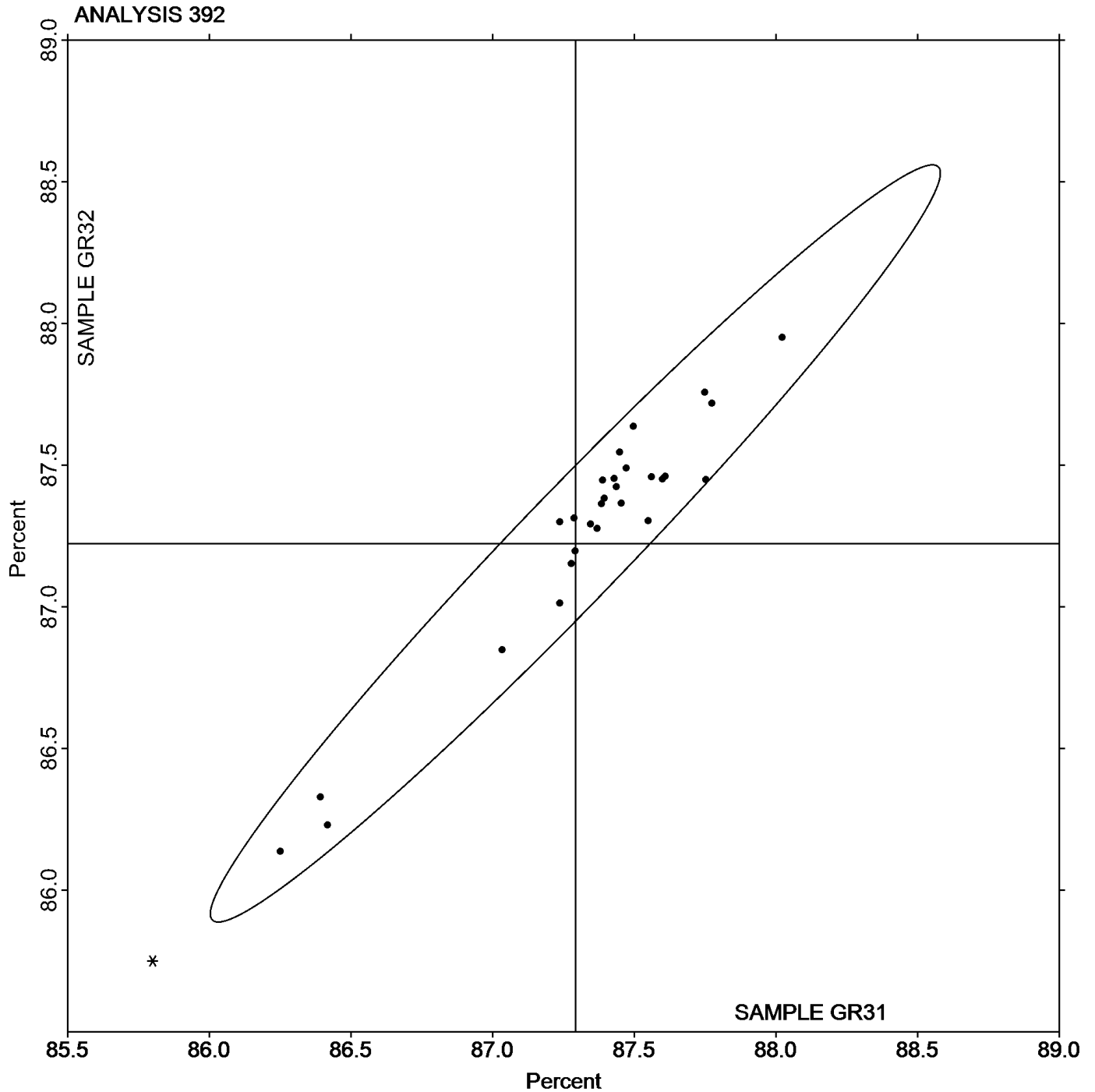


Paper & Paperboard Interlaboratory Testing Program
Analysis 392
Diffuse Brightness

Report #282G
June 2016

Grand Mean Sample **GR31** = 87.292 Percent

Grand Mean Sample **GR32** = 87.224 Percent





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

**Report #282G
June 2016**

WebCode	Data Flag	Sample GZ31			Sample GZ32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6VMF2T	X	18.700	11.293	59.20	10.260	6.658	34.60	EF
6WG789		7.430	0.023	0.12	3.578	-0.024	-0.13	TS
D2RRXR		7.216	-0.191	-1.00	3.234	-0.368	-1.91	TS
HXT47Y		7.346	-0.061	-0.32	3.418	-0.184	-0.96	PP
KNXZTF		7.296	-0.111	-0.58	3.610	0.008	0.04	TS
KPC8EW		6.984	-0.423	-2.22	3.460	-0.142	-0.74	TS
MRTDQP		7.480	0.073	0.38	3.720	0.118	0.61	TT
PV3BAW	X	17.618	10.211	53.53	10.278	6.676	34.70	TS
RWM2AR		7.576	0.169	0.89	3.780	0.178	0.92	TS
T9YNXH		7.440	0.033	0.17	3.720	0.118	0.61	TS
TBZRP6		7.600	0.193	1.01	3.900	0.298	1.55	TT
VBBM8		7.466	0.059	0.31	3.476	-0.126	-0.66	TS
YMXHVK		7.644	0.237	1.24	3.728	0.126	0.65	TS

Sample GZ31		Summary Statistics		Sample GZ32	
Grand Means	7.4071 Percent			3.6022 Percent	
SD Btwn Labs	0.1908 Percent			0.1924 Percent	
Statistics based on 11 of 13 reporting participants					

Comments on Assigned Data Flags for Test #394

- PV3BAW (X) - Extreme Data.
- 6VMF2T (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



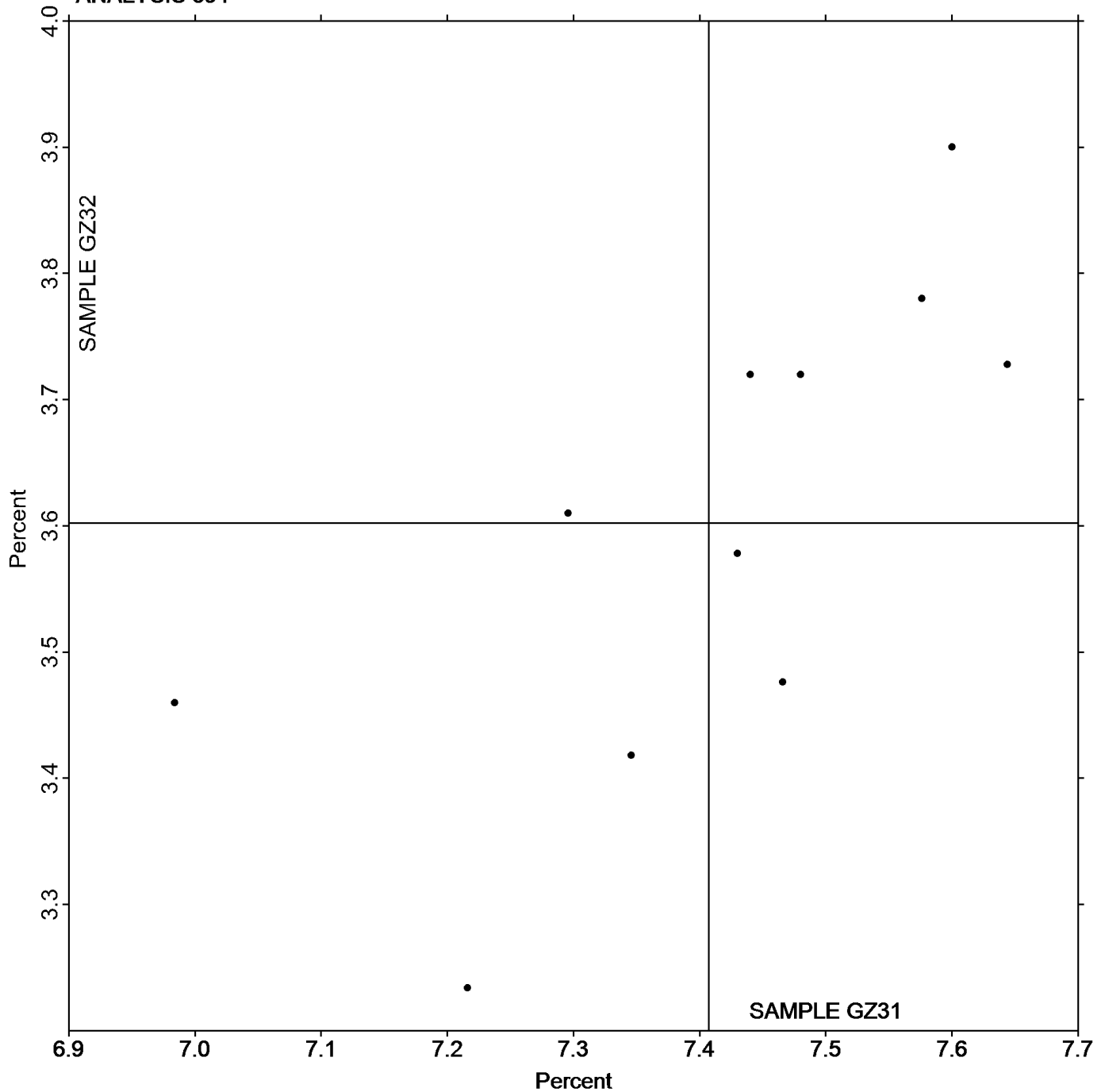
Paper & Paperboard Interlaboratory Testing Program
Analysis 394
Fluorescent Component of Directional Brightness

Report #282G
June 2016

Grand Mean Sample **GZ31** = 7.4071 Percent

Grand Mean Sample **GZ32** = 3.6022 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 #282G
June 2016

WebCode	Data Flag	Sample GT31			Sample GT32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2MLTL4		82.76	-0.64	-0.63	70.45	0.87	0.47	PP
3Q6BE9		81.22	-2.18	-2.13	67.30	-2.28	-1.24	LA
8NLPV9		84.05	0.64	0.63	72.18	2.60	1.41	TG
9XKYF4		81.70	-1.70	-1.66	67.90	-1.68	-0.91	GS
ABNKHT		83.40	0.00	0.00	66.80	-2.78	-1.51	ZH
B2WL4T		84.77	1.37	1.33	70.23	0.65	0.35	LB
G78T8R		84.19	0.79	0.77	72.11	2.53	1.38	TH
GDN77Q		83.30	-0.10	-0.10	67.86	-1.72	-0.93	LA
GW697K		83.50	0.10	0.09	66.87	-2.71	-1.47	GM
HXT47Y		84.27	0.87	0.84	69.90	0.32	0.18	PP
KNXZTF		82.75	-0.65	-0.64	68.26	-1.32	-0.72	LA
LQY9XQ		83.96	0.56	0.54	71.03	1.45	0.79	TH
MH3TLQ		84.00	0.60	0.58	69.33	-0.25	-0.13	GM
MLLRYL		84.41	1.01	0.98	72.09	2.51	1.36	TG
QXNCRP		82.88	-0.52	-0.51	72.08	2.50	1.36	TH
TBZRP6		83.11	-0.30	-0.29	69.75	0.17	0.09	PP
TCUHVJ		84.28	0.88	0.85	71.30	1.72	0.94	TH
UJDZQ7		84.26	0.86	0.83	68.47	-1.11	-0.60	XX
YJWDHZ		83.89	0.49	0.47	69.85	0.27	0.15	TH
ZLW9E8		81.40	-2.00	-1.96	67.80	-1.78	-0.97	GA

Summary Statistics		
	Sample GT31	Sample GT32
Grand Means	83.405 Gloss Units	69.578 Gloss Units
SD Btwn Labs	1.025 Gloss Units	1.841 Gloss Units
Statistics based on 20 of 20 reporting participants		

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



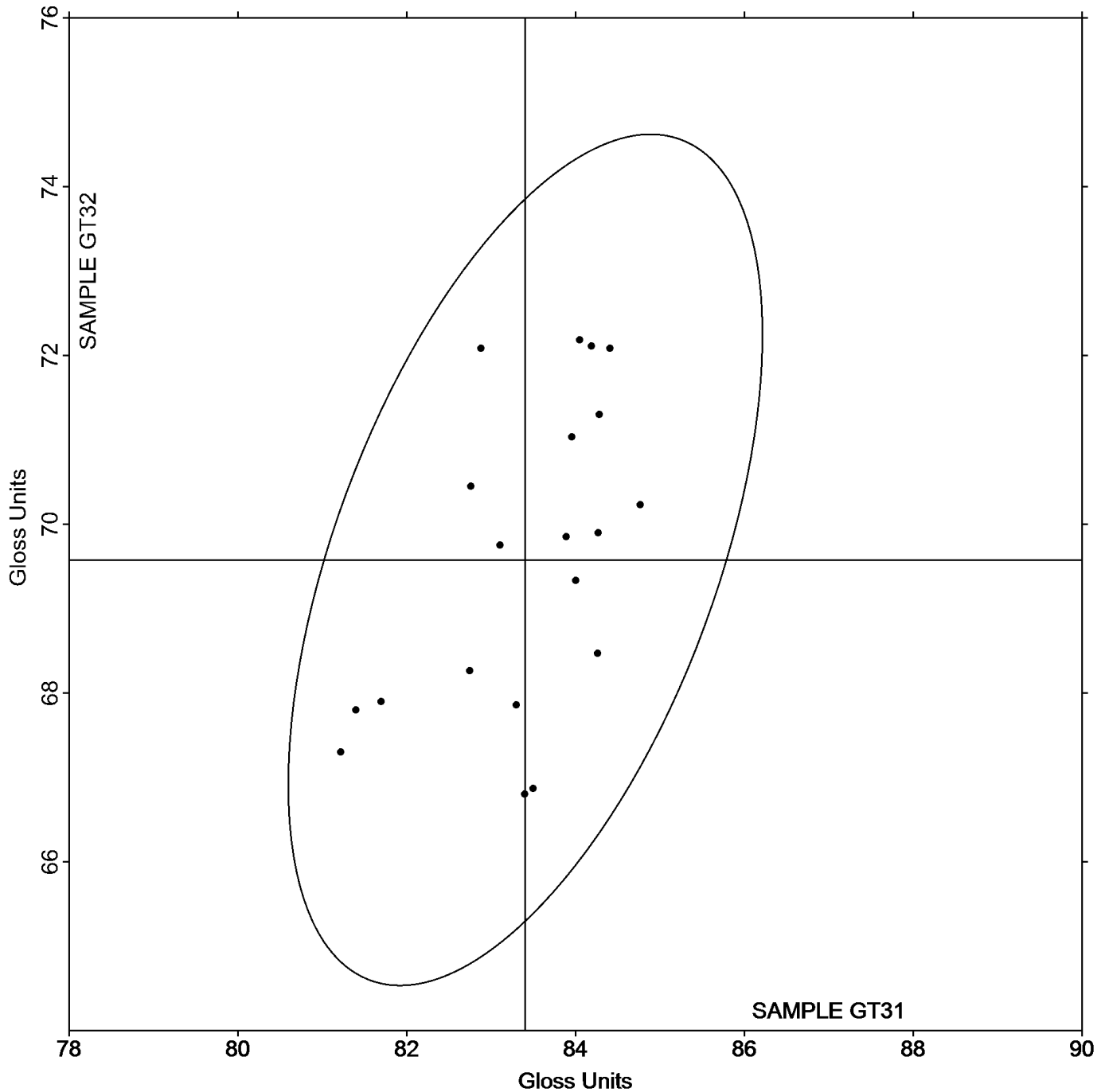
Paper & Paperboard Interlaboratory Testing Program
Analysis 395
Specular Gloss at 75 Degrees - High Range

Report #282G
June 2016

Grand Mean Sample **GT31** = 83.405 Gloss Units

Grand Mean Sample **GT32** = 69.578 Gloss Units

ANALYSIS 395





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

**Report #282G
June 2016**

WebCode	Data Flag	Sample GU31			Sample GU32			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6DPZ23		26.01	-0.66	-1.03	42.88	0.28	0.22	XX
8NLPV9		27.35	0.68	1.05	43.80	1.20	0.97	TG
B2WL4T		26.24	-0.43	-0.67	42.33	-0.27	-0.22	LA
BEZTGC		26.46	-0.22	-0.34	42.71	0.10	0.08	TH
D2RRXR		26.58	-0.09	-0.14	40.27	-2.33	-1.87	GN
G39EJ3		27.79	1.12	1.74	44.11	1.51	1.21	TH
RVEPUB		26.94	0.27	0.42	43.19	0.59	0.47	TH
U33JHJ		26.01	-0.66	-1.03	41.52	-1.08	-0.87	PP

Sample GU31		Summary Statistics		Sample GU32	
Grand Means	26.672 Gloss Units			42.601 Gloss Units	
SD Btwn Labs	0.644 Gloss Units			1.244 Gloss Units	
Statistics based on 8 of 8 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

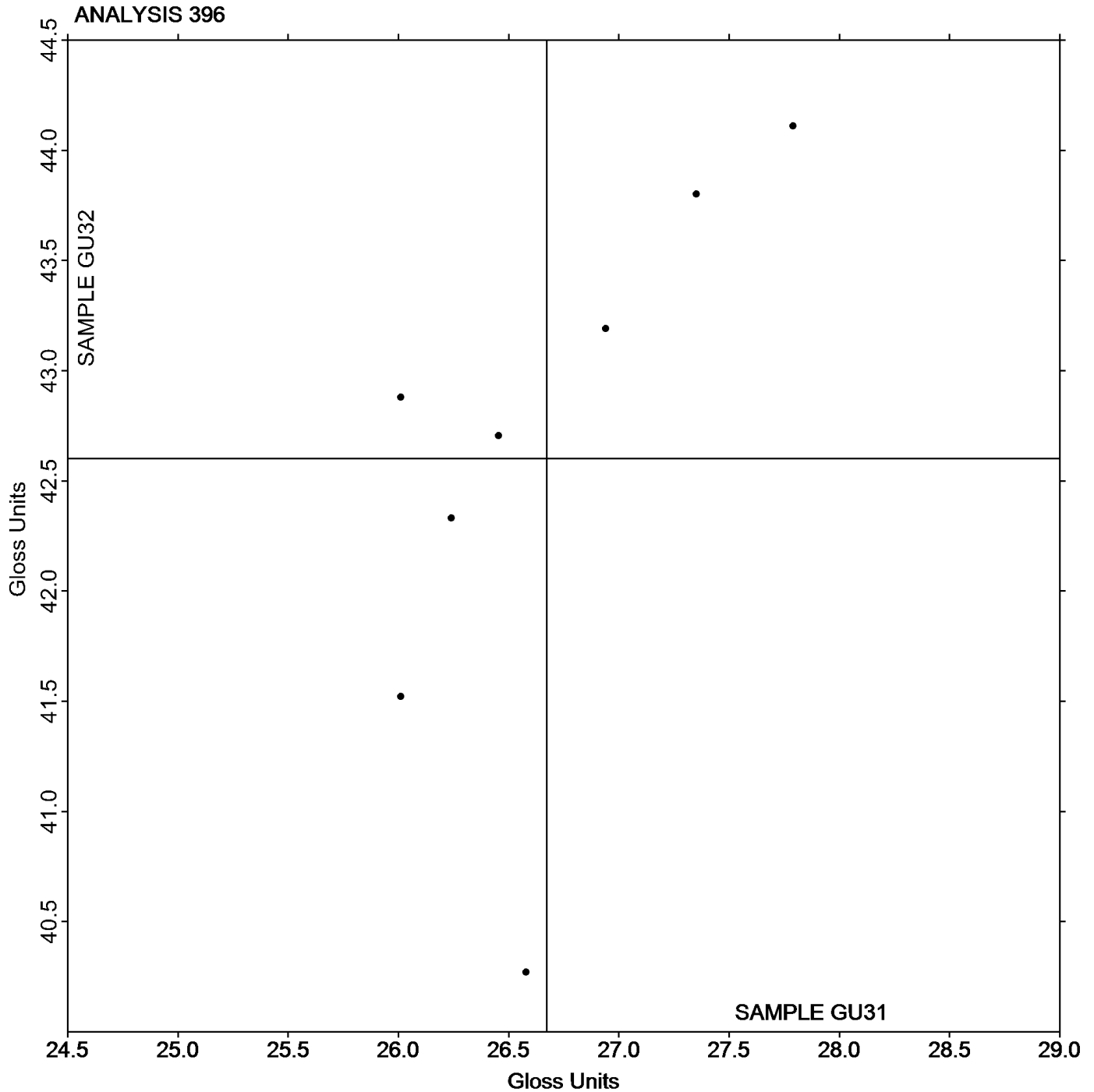


Paper & Paperboard Interlaboratory Testing Program
Analysis 396
Specular Gloss at 75 Degrees - Low Range

Report #282G
June 2016

Grand Mean Sample **GU31** = 26.672 Gloss Units

Grand Mean Sample **GU32** = 42.601 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 398
Grammage (Mass per Unit Area)**

Report #282G
June 2016

WebCode	Data Flag	Sample GW31			Sample GW32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
24WHWJ		85.98	-0.10	-0.20	71.97	-0.61	-1.60
3ECRZ3		85.30	-0.78	-1.59	72.09	-0.49	-1.29
4PMGDY		85.97	-0.11	-0.22	72.59	0.01	0.02
63Q9A4	*	87.43	1.35	2.76	72.70	0.12	0.31
6DPZ23		85.81	-0.27	-0.55	73.07	0.49	1.27
7LDAN3		85.49	-0.59	-1.20	72.62	0.04	0.10
93V3HY		85.94	-0.14	-0.28	72.59	0.01	0.02
B2DJWR		86.26	0.18	0.36	72.83	0.25	0.65
B2WL4T		85.90	-0.18	-0.36	72.37	-0.22	-0.57
BEZTGC		85.71	-0.37	-0.76	72.22	-0.36	-0.94
DZW9WQ		86.38	0.30	0.61	72.52	-0.07	-0.17
E7W8KL		85.75	-0.33	-0.68	72.45	-0.13	-0.35
E8AGXR		85.81	-0.27	-0.56	72.27	-0.32	-0.83
EN2EYM		86.48	0.40	0.81	72.63	0.05	0.12
G39EJ3		85.90	-0.18	-0.37	72.82	0.23	0.61
G6U7MR		85.75	-0.33	-0.67	72.52	-0.06	-0.16
HN3HZZ		85.72	-0.36	-0.74	72.44	-0.15	-0.38
HVJ42R	X	4.33	-81.75	-166.79	3.64	-68.94	-180.46
HXVUCG		86.81	0.73	1.50	72.86	0.28	0.73
J8CXXL		86.46	0.38	0.78	72.91	0.33	0.86
KPRQYU		86.29	0.21	0.43	72.71	0.13	0.34
LL2T2N	*	87.08	1.00	2.04	73.67	1.09	2.85
T44WPL		85.78	-0.30	-0.61	71.96	-0.63	-1.64
T9YNXH		85.82	-0.26	-0.53	72.32	-0.26	-0.69
TLMQFB		85.75	-0.33	-0.67	72.11	-0.47	-1.24
U3L8YE		85.83	-0.25	-0.51	72.35	-0.23	-0.60
XQZ7QA		85.71	-0.37	-0.76	72.61	0.03	0.07
Z6TBGH		86.49	0.41	0.84	72.90	0.32	0.83
ZEXHWH		86.64	0.56	1.14	73.22	0.64	1.67

Sample GW31		Summary Statistics	Sample GW32	
Grand Means	86.080 g/sq m		72.582 g/sq m	
SD Btwn Labs	0.490 g/sq m		0.382 g/sq m	
Statistics based on 28 of 29 reporting participants				

Comments on Assigned Data Flags for Test #398

HVJ42R (X) - Extreme Data.



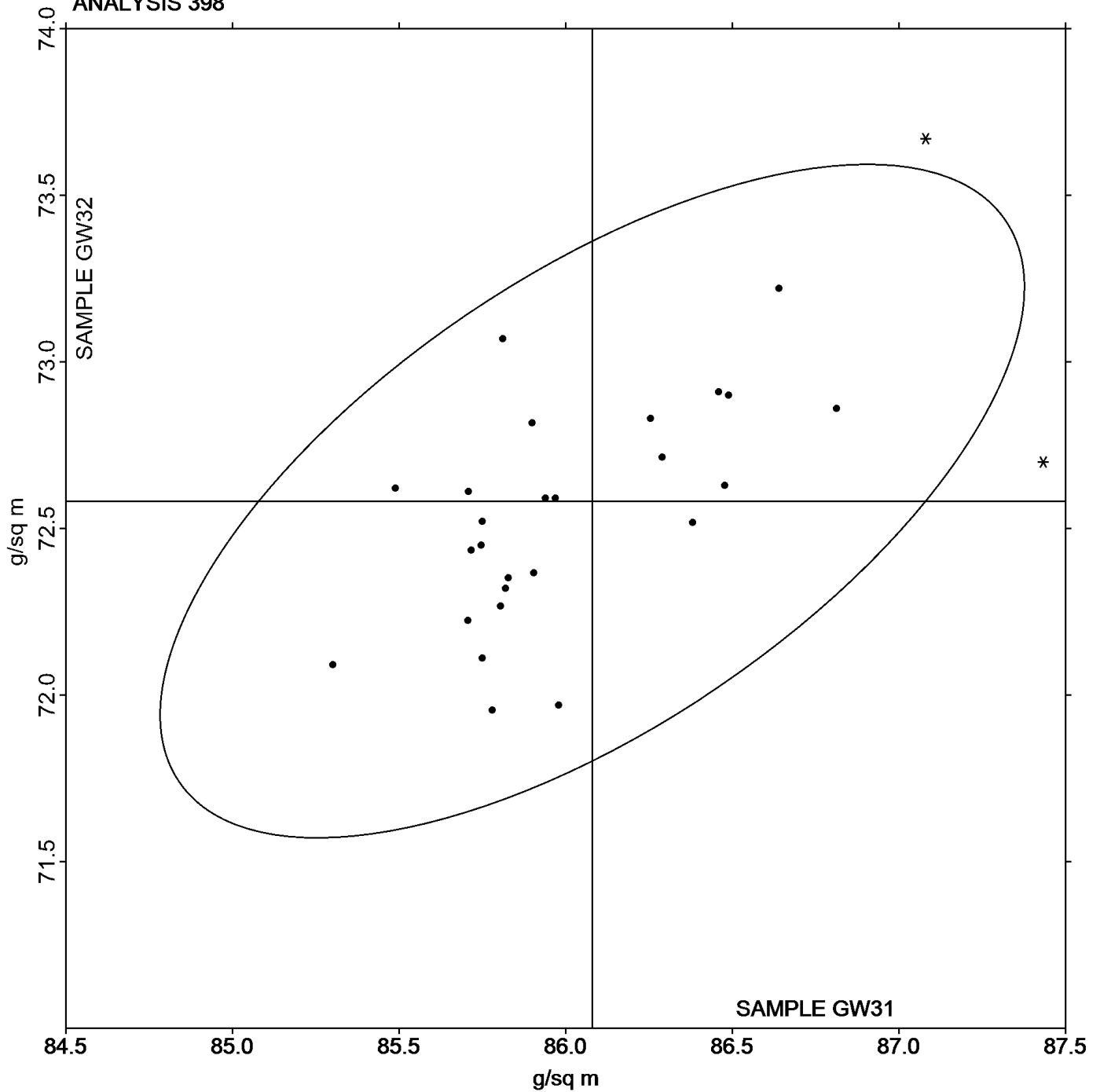
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Grand Mean Sample **GW31** = 86.080 g/sq m

Grand Mean Sample **GW32** = 72.582 g/sq m

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Sizing Test (Hercules Type)**

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WebCode	Data Flag	Sample GX31			Sample GX32		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2MLTL4		16.37	-3.21	-0.49	18.44	-2.47	-0.43
6QFW2F		16.26	-3.32	-0.51	13.98	-6.93	-1.21
6WG789		14.67	-4.91	-0.75	15.93	-4.98	-0.87
8Q48QY		14.52	-5.06	-0.77	17.56	-3.35	-0.59
93V3HY		28.60	9.02	1.37	30.60	9.69	1.69
BAM8AQ		21.97	2.39	0.36	17.26	-3.65	-0.64
BNUZ24		14.98	-4.60	-0.70	26.90	5.99	1.05
D2RRXR		22.26	2.68	0.41	19.54	-1.37	-0.24
E4QLUZ		35.37	15.79	2.40	31.21	10.30	1.80
G39EJ3	*	34.72	15.14	2.30	20.74	-0.17	-0.03
GDN77Q		12.52	-7.06	-1.07	14.32	-6.59	-1.15
HPFATH		13.73	-5.85	-0.89	13.12	-7.79	-1.36
HYQCEH		26.00	6.42	0.98	33.70	12.79	2.23
JURHUL		28.17	8.59	1.31	27.86	6.95	1.21
JXPY7F		17.00	-2.58	-0.39	18.50	-2.41	-0.42
KNXZTF		16.20	-3.38	-0.51	20.10	-0.81	-0.14
MH3TLQ		16.30	-3.28	-0.50	24.10	3.19	0.56
PV3BAW		23.24	3.66	0.56	24.23	3.32	0.58
Q22CPG		15.30	-4.28	-0.65	16.80	-4.11	-0.72
QZRAZW		13.89	-5.69	-0.87	19.03	-1.88	-0.33
RWM2AR		22.54	2.96	0.45	24.79	3.88	0.68
RXJGLN		25.55	5.97	0.91	19.51	-1.40	-0.25
U33JHJ		12.70	-6.88	-1.05	13.68	-7.23	-1.26
WQM96D		15.17	-4.41	-0.67	23.63	2.72	0.47
WTP96B		29.93	10.35	1.58	26.82	5.91	1.03
XQZ7QA		19.08	-0.50	-0.08	27.28	6.37	1.11
YJWDHZ		19.36	-0.22	-0.03	21.76	0.85	0.15
YKQ4NE		20.18	0.60	0.09	19.63	-1.28	-0.22
YMUY9G		14.50	-5.08	-0.77	20.50	-0.41	-0.07
YMXHVK		14.56	-5.02	-0.76	15.59	-5.32	-0.93
ZEXHWH		11.30	-8.28	-1.26	11.20	-9.71	-1.70

	Sample GX31	Summary Statistics	Sample GX32
Grand Means	19.579 Seconds		20.913 Seconds
SD Btwn Labs	6.571 Seconds		5.723 Seconds
Statistics based on 31 of 31 reporting participants			



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Sizing Test (Hercules Type)

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Grand Mean Sample **GX31** = 19.579 Seconds

Grand Mean Sample **GX32** = 20.913 Seconds

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