



## Paper & Paperboard Testing Program

### Summary Report #280G-February 2016

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

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## **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)

<b>WebCode</b>	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.
<b>Lab Mean</b>	The average of the values obtained for each sample by the participant.
<b>Grand Mean</b>	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.
<b><math>\Delta E</math></b>	The calculated total color difference between the two samples. For the Hunter L,a,b analyses it is calculated in Hunter units ( $\Delta E$ ). For the L*,a*,b* analyses it is calculated in CIELAB units ( $\Delta E^*$ ).
<b>Difference from Grand Mean</b>	The difference of the LAB MEAN from the GRAND MEAN.
<b>Between-Lab Standard Deviation</b>	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).
<b>Comparative Performance Value</b>	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.
<b>Inst Code</b>	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.
<b>Data Flag</b>	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	<b>CAUTION</b> - 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	<b>STOP</b> - 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	<b>PROCEED</b> - 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.

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### 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.

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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 #280G**  
**February 2016**

Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	$\Delta L$	$\Delta a$	$\Delta b$	$\Delta E$	
36CZWD		GA27	92.71	-0.52	3.50	-0.56	0.17	-0.76	0.95	LA
		GA28	92.15	-0.35	2.74					
3YNAC3		GA27	94.04	-0.83	3.44	-0.38	0.12	-0.77	0.87	EH
		GA28	93.67	-0.71	2.66					
6WQJG9		GA27	92.40	-0.92	3.48	-0.40	0.13	-0.65	0.78	LS
		GA28	92.00	-0.79	2.83					
ACBVWX		GA27	93.05	-0.69	2.68	-0.45	0.13	-0.53	0.71	XX
		GA28	92.60	-0.56	2.14					
C869V6		GA27	92.25	-1.22	1.52	-0.37	0.10	-0.27	0.47	HH
		GA28	91.88	-1.12	1.25					
CJWZFA		GA27	92.55	-0.79	3.27	-0.47	0.15	-0.67	0.83	TC
		GA28	92.08	-0.64	2.60					
CJYPK7		GA27	91.99	-0.30	3.31	-0.65	0.14	-0.73	0.99	TS
		GA28	91.34	-0.16	2.59					
CNBBTD		GA27	91.36	0.27	2.90	-0.70	0.13	-0.78	1.06	TS
		GA28	90.66	0.40	2.12					
D3PXH2		GA27	91.77	0.13	2.86	-0.48	0.01	-0.47	0.67	TS
		GA28	91.29	0.14	2.39					
DFQUE9		GA27	92.51	-0.75	3.67	-0.50	0.01	-0.60	0.78	HH
		GA28	92.01	-0.75	3.07					
F8VD3A		GA27	91.89	-1.38	1.59	-0.19	0.07	-0.26	0.33	HG
		GA28	91.70	-1.31	1.33					
GCYWFT		GA27	94.14	-0.85	3.47	-0.42	0.13	-0.69	0.82	TC
		GA28	93.71	-0.72	2.78					
HAQ4YY		GA27	91.58	-1.23	1.61	-0.29	-0.01	-0.33	0.45	HH
		GA28	91.29	-1.24	1.27					
NLMZNU		GA27	93.27	-0.66	3.48	-0.52	0.01	-0.67	0.85	HE
		GA28	92.75	-0.65	2.81					
PDQKCU		GA27	92.36	-0.34	2.83	-1.75	0.19	-0.82	1.94 X	TM
		GA28	90.62	-0.15	2.01					
PXYP2P		GA27	93.40	-0.74	2.72	-0.42	0.13	-0.66	0.79	XS
		GA28	92.98	-0.60	2.05					



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 350**  
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**Hunter L,a,b - Illuminant C - 2 Degree Observer**

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**February 2016**

Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	$\Delta L$	$\Delta a$	$\Delta b$	$\Delta E$	
QXTVVN		GA27	93.94	-0.81	3.57	-0.40	0.13	-0.67	0.79	EH
		GA28	93.54	-0.68	2.90					
R8928H		GA27	91.90	-0.77	2.80	0.08	0.18	-0.21	0.28	NE
		GA28	91.98	-0.60	2.59					
TQGN7V		GA27	92.67	-0.20	2.86	-0.24	0.15	-0.57	0.63	TS
		GA28	92.43	-0.05	2.29					
UGA9ZN	X	GA27	91.51	0.14	3.04	-0.70	0.37	-0.76	1.09	TS
		GA28	90.81	0.51	2.28					
VHL8UW		GA27	94.09	-0.75	3.81	-0.31	0.15	-1.04	1.10	MI
		GA28	93.77	-0.60	2.77					
WHHZ6A		GA27	94.15	-0.68	3.67	-0.40	0.10	-0.73	0.84	LS
		GA28	93.75	-0.58	2.94					
XKZGXE		GA27	92.72	-0.71	3.22	-0.40	0.21	-0.65	0.79	MK
		GA28	92.31	-0.50	2.57					
XM6AQR		GA27	95.41	-0.96	2.85	-0.35	0.03	-0.78	0.85	HE
		GA28	95.06	-0.92	2.07					
Y88HKG		GA27	91.73	-0.31	2.96	-0.46	0.09	-0.64	0.79	TS
		GA28	91.28	-0.22	2.32					
YJZ2YM		GA27	92.36	-0.86	3.46	-0.47	0.15	-0.66	0.82	EH
		GA28	91.89	-0.72	2.80					

Grand Means			Summary Statistics						
	GA27	92.775	-0.675	3.023	-0.460	0.112	-0.625	0.808	
	GA28	92.356	-0.563	2.392					
Std Dev Btwn Labs					0.307	0.061	0.192	0.309	
	GA27	1.043	0.386	0.629					
	GA28	1.079	0.400	0.507					

Statistics based on 25 of 26 reporting participants

**Comments on Assigned Data Flags for Test #350**

UGA9ZN (X) - High a values and inconsistent within the determinations for Sample GA28.

**Analysis Notes:**

ACBVWX - One determination removed from b values for Sample GA27 (TAPPI T1205 using Grubbs test at 1% risk level).



**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 #280G**  
**February 2016**

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Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	$\Delta L$	$\Delta a$	$\Delta b$	$\Delta E$	

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**Key to Instrument Codes Reported by Participants**

<b>EH</b>	Datacolor Elrepho SF450	<b>HE</b>	Hunter LabScan
<b>HG</b>	Hunter ColorQUEST	<b>HH</b>	Hunter D25DP - 9000
<b>LA</b>	L & W Elrepho AL300	<b>LS</b>	L & W Elrepho SE 070
<b>MI</b>	Macbeth Color i 5	<b>MK</b>	Macbeth Color-Eye 7000 Spectrophotometer
<b>NE</b>	Minolta CM-3500d Spectrophotometer	<b>TC</b>	Technidyne Color Touch Series
<b>TM</b>	Technidyne Technibrite Micro TB-1C	<b>TS</b>	Technidyne Brightimeter Micro S-5
<b>XS</b>	X-Rite 938 Spectrodensitometer	<b>XX</b>	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**

Report #280G  
February 2016

Web  
Code

F Samples

Hunter L, a, b Color Values

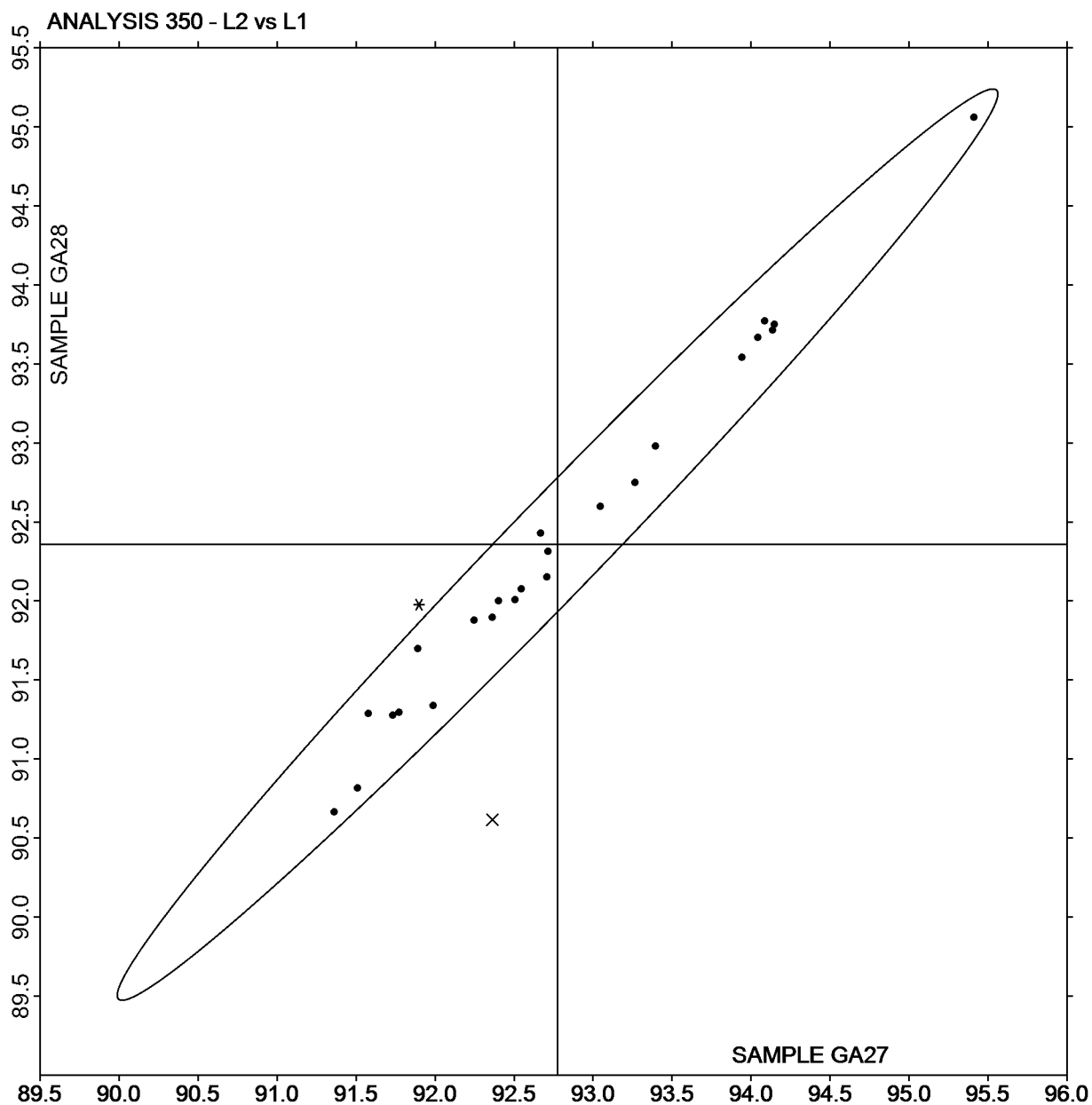
L a b

Color Difference Values

$\Delta L$   $\Delta a$   $\Delta b$   $\Delta E$

Instr Code

Plot of L values GA28 v L values GA27



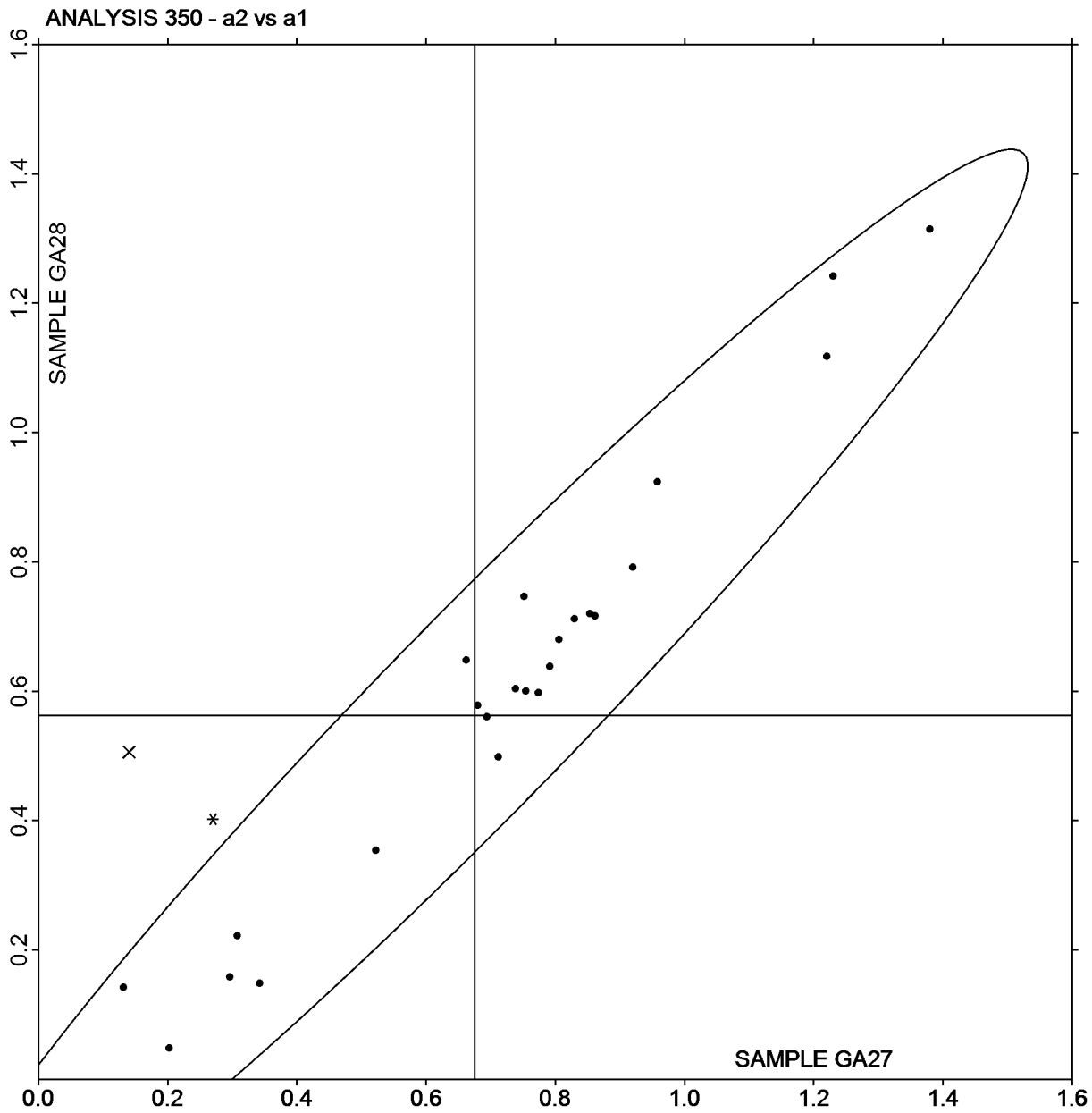




**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 350**  
**Color & Color Difference - Near White Papers - C/2deg obs**  
**Hunter L,a,b - Illuminant C - 2 Degree Observer**

Report #280G  
February 2016

Plot of a values GA28 v a values GA27

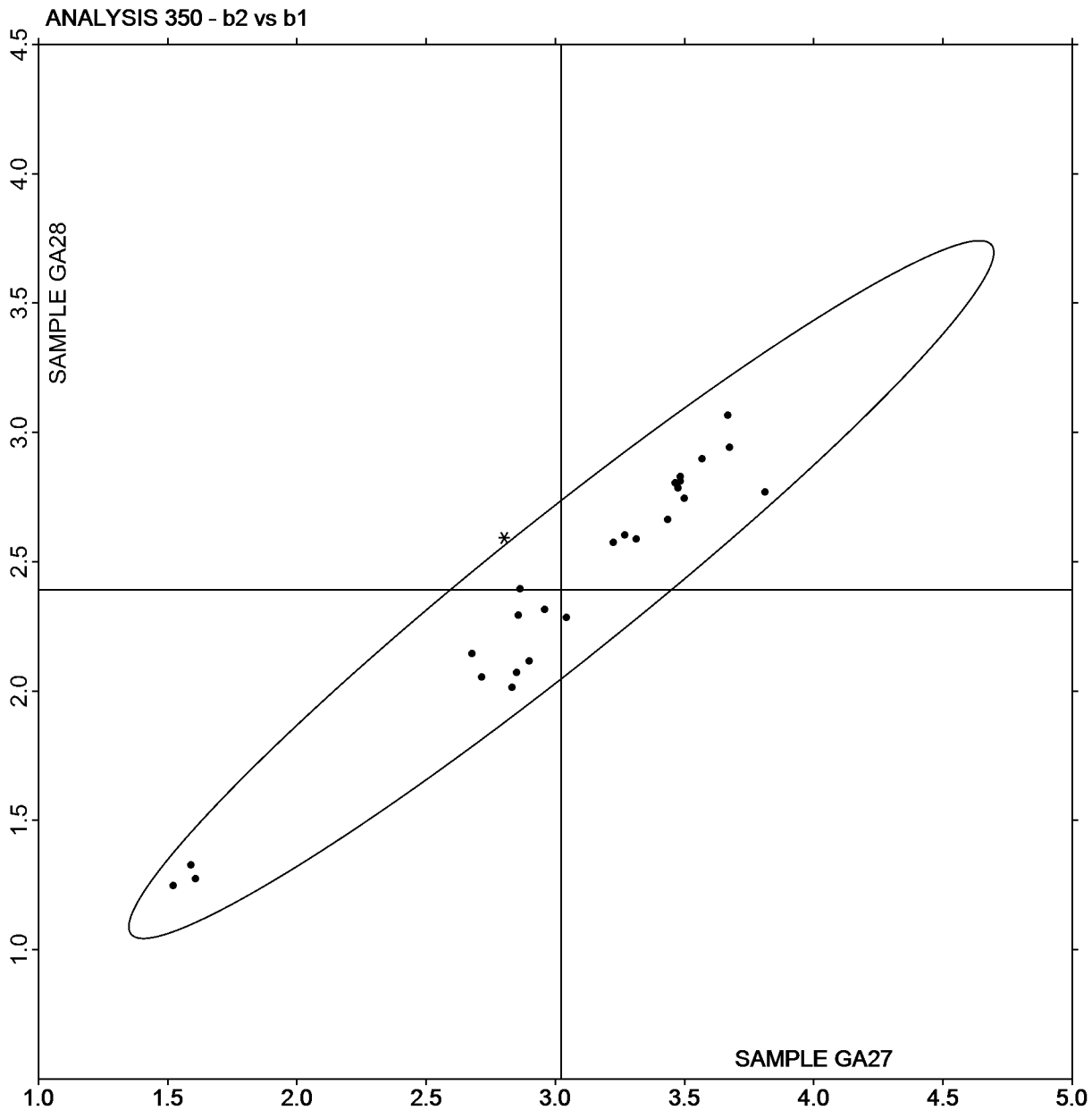




**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 350**  
**Color & Color Difference - Near White Papers - C/2deg obs**  
**Hunter L,a,b - Illuminant C - 2 Degree Observer**

**Report #280G**  
**February 2016**

Plot of b values GA28 v b values GA27





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

**Report #280G**  
**February 2016**

4F44DC	GA27	94.23	-0.69	3.80	-0.36	-0.01	-0.61	0.71	NG
	GA28	93.87	-0.69	3.19					
6Z8B7F	GA27	92.37	-0.64	3.52	-0.36	-0.01	-0.59	0.69	XM
	GA28	92.00	-0.65	2.93					
7FX98B	GA27	94.32	-0.75	3.60	-0.39	0.00	-0.63	0.74	NF
	GA28	93.93	-0.75	2.97					
7J27H4	GA27	91.83	-0.60	3.98	-0.20	-0.02	-0.27	0.34 X	TC
	GA28	91.63	-0.62	3.70					
8JTL6K	GA27	94.47	-0.71	3.52	-0.38	-0.01	-0.73	0.82	XX
	GA28	94.10	-0.72	2.79					
BLNC3A	GA27	94.04	-0.79	3.61	-0.38	0.63	-0.62	0.96	TC
	GA28	93.66	-0.16	2.99					
BLQ29R	GA27	94.13	-0.69	3.85	-0.29	-0.01	-0.63	0.70	NG
	GA28	93.84	-0.70	3.22					
J8KXYJ	GA27	93.91	-0.70	3.74	-0.31	0.02	-0.57	0.65	NG
	GA28	93.59	-0.68	3.16					
K72GGV	GA27	94.01	-0.74	3.61	-0.41	0.01	-0.71	0.82	EH
	GA28	93.61	-0.73	2.90					
KTZHVK	GA27	93.13	-0.63	3.68	-0.45	0.07	-0.69	0.83	XP
	GA28	92.68	-0.56	2.99					
LU8G3X	GA27	94.07	-0.88	3.70	-0.33	-0.03	-0.64	0.72	TC
	GA28	93.74	-0.91	3.06					
MHRMPK	GA27	95.32	-0.50	3.28	-0.46	-0.02	-0.62	0.77	XP
	GA28	94.86	-0.52	2.66					
N2HK6G	GA27	93.40	-0.64	3.32	-0.57	0.00	-0.68	0.89	HV
	GA28	92.83	-0.64	2.63					
NLMZNU	GA27	93.20	-0.67	3.47	-0.47	0.02	-0.63	0.79	HE
	GA28	92.73	-0.65	2.84					
NU2MWX	GA27	93.88	-0.90	3.50	-0.46	0.00	-0.70	0.84	EF
	GA28	93.42	-0.90	2.80					
PBK3DY	GA27	92.53	-0.84	3.40	-0.47	-0.08	-0.68	0.83	TC
	GA28	92.06	-0.92	2.72					
PQWD7R	GA27	92.77	-0.67	3.43	-0.23	0.29	-0.81	0.89	HE
	GA28	92.54	-0.37	2.63					
QG6HJH	GA27	93.95	-0.76	3.74	-0.36	0.00	-0.64	0.73	LS
	GA28	93.59	-0.76	3.10					



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

**Report #280G**  
**February 2016**

Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	$\Delta L$	$\Delta a$	$\Delta b$	$\Delta E$	
RNZY9D		GA27	94.35	-0.75	3.74	-0.34	0.03	-0.64	0.72	HT
		GA28	94.01	-0.72	3.10					
V8HALM		GA27	92.67	-0.86	3.54	-0.48	0.10	-0.69	0.85	LS
		GA28	92.19	-0.75	2.84					
VHZU7J		GA27	94.38	-0.63	3.78	-0.42	-0.03	-0.66	0.78	HT
		GA28	93.96	-0.66	3.12					
WHHZ6A		GA27	94.08	-0.71	3.62	-0.38	0.17	-0.81	0.91	LS
		GA28	93.71	-0.54	2.82					

Grand Means		Summary Statistics							
GA27	93.684	-0.711	3.592	-0.396	0.026	-0.668	0.784		
GA28	93.298	-0.688	2.927						
Std Dev Btwn Labs									
GA27	0.839	0.097	0.159	0.079	0.083	0.063	0.074		
GA28	0.832	0.130	0.186						

Statistics based on 20 of 22 reporting participants

**Comments on Assigned Data Flags for Test #351**

- BLNC3A (X) - High a values for Sample GA28. Large delta a.
- 7J27H4 (X) - High b values for Sample GA28. Large delta b and delta E.

**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

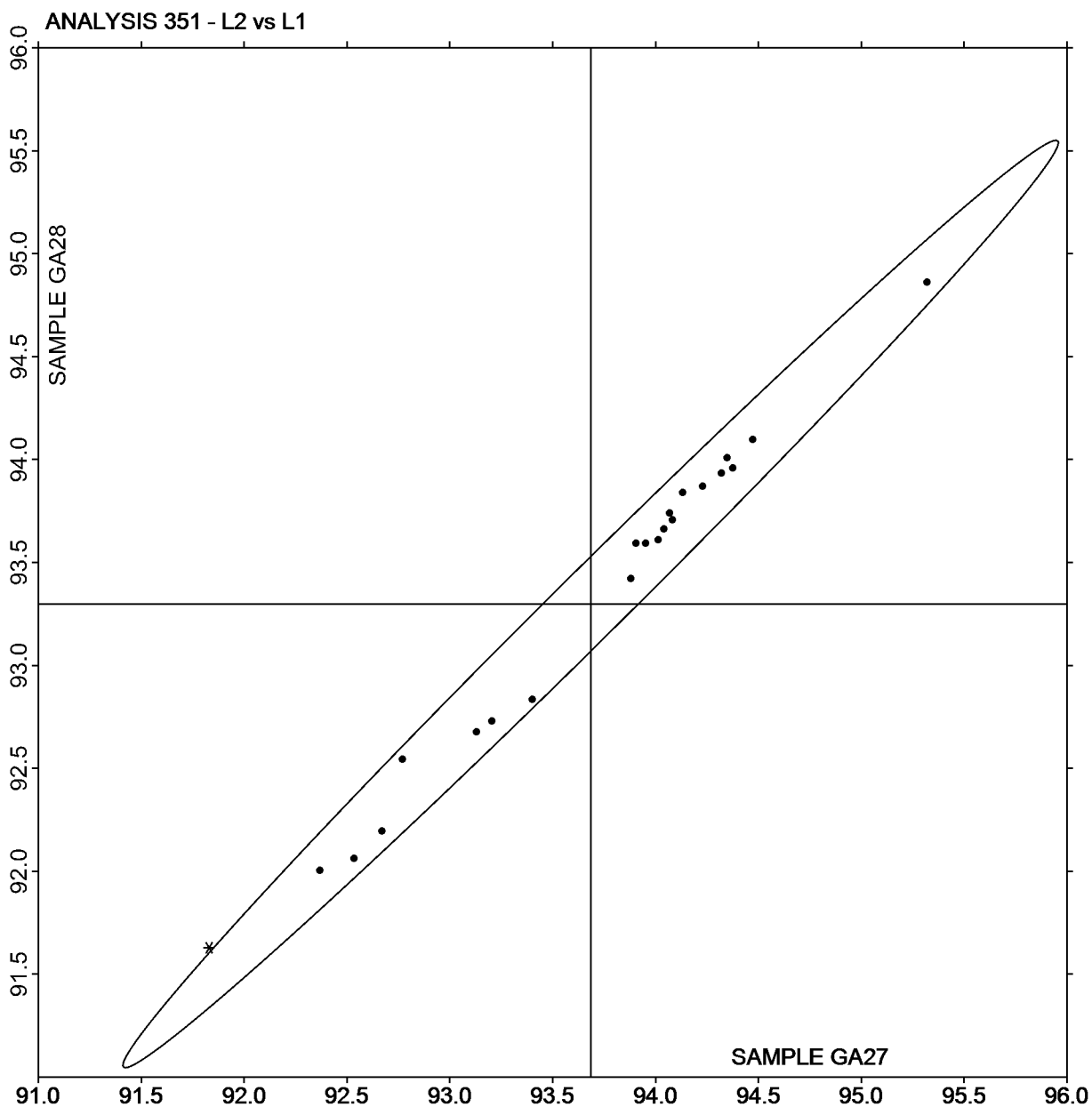


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 351**  
**Color & Color Difference - Near White Papers - D65/10deg obs**  
**Hunter L,a,b - Illuminant D65 - 10 Degree Observer**

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Web Code	F	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	$\Delta L$	$\Delta a$	$\Delta b$	$\Delta E$	

Plot of L values GA28 v L values GA27

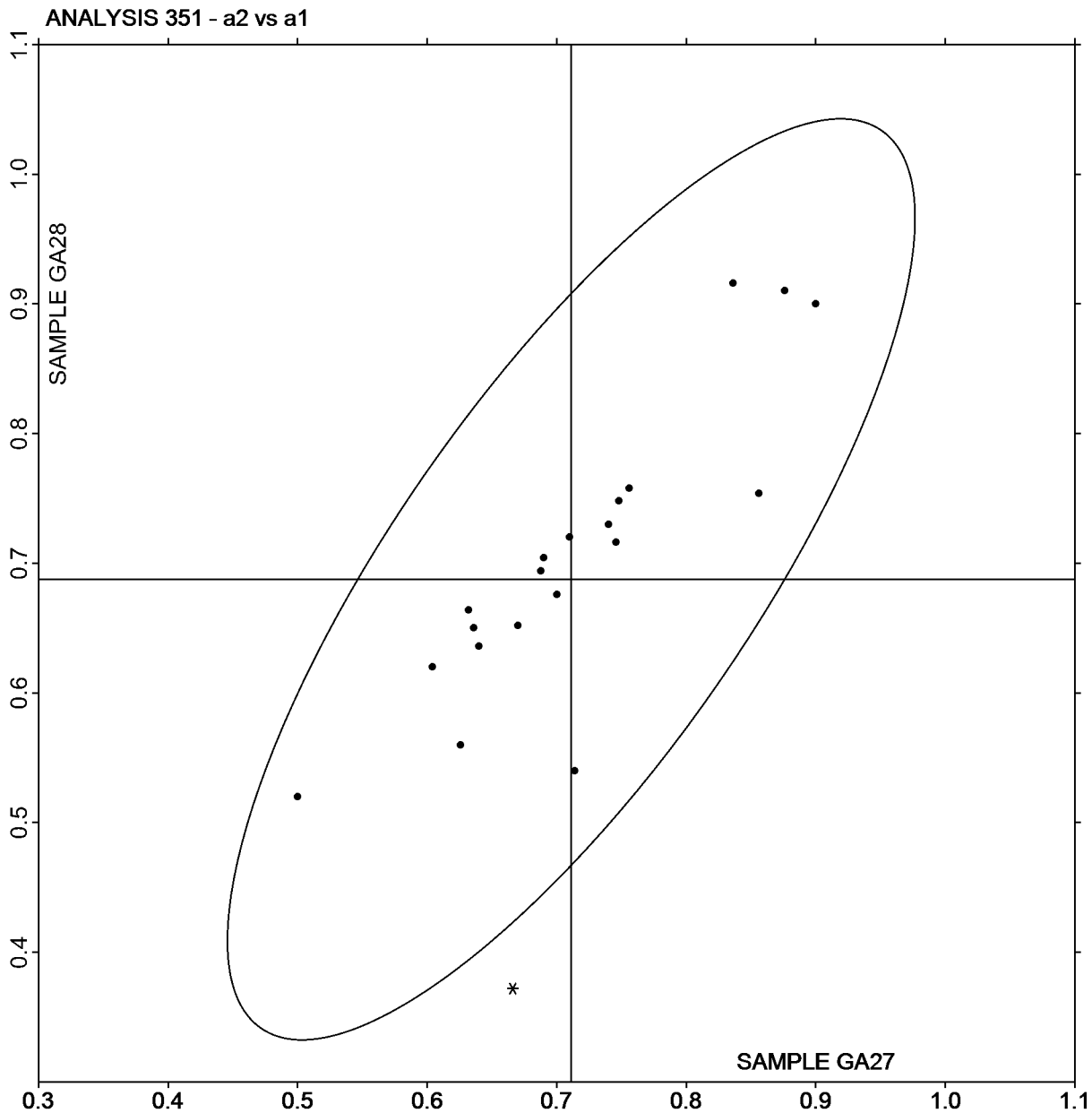




**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 351**  
**Color & Color Difference - Near White Papers - D65/10deg obs**  
**Hunter L,a,b - Illuminant D65 - 10 Degree Observer**

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Plot of a values GA28 v a values GA27







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

Report #280G  
February 2016

WebCode	Data Flag	Sample GV27			Sample GV28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2D8F9C		3.805	0.015	0.22	4.628	0.047	0.61	LW
36CZWD		3.817	0.027	0.39	4.595	0.014	0.18	LA
3YNAC3		3.804	0.014	0.20	4.583	0.002	0.03	EM
467328		3.808	0.018	0.26	4.553	-0.028	-0.36	TM
4F44DC		3.872	0.082	1.18	4.657	0.076	0.98	LW
4J686Y		3.864	0.074	1.07	4.620	0.039	0.50	XX
6WQJG9		3.792	0.002	0.02	4.650	0.069	0.89	LW
6Z8B7F		3.772	-0.018	-0.27	4.535	-0.045	-0.58	LW
789M2C		3.732	-0.058	-0.84	4.609	0.029	0.37	EM
7ACHKF		3.839	0.049	0.71	4.623	0.042	0.54	LW
7FX98B		3.915	0.125	1.79	4.674	0.093	1.20	TM
8JTL6K		3.796	0.006	0.09	4.606	0.025	0.33	LW
92A862		3.856	0.066	0.95	4.683	0.102	1.31	LW
A2PQPY		3.760	-0.030	-0.44	4.524	-0.057	-0.73	TA
ACBVWX		3.840	0.050	0.72	4.670	0.089	1.15	XX
AFA7TX		3.697	-0.093	-1.34	4.589	0.008	0.11	TA
BLQ29R		3.728	-0.062	-0.89	4.510	-0.071	-0.91	XX
CCWFFY		3.713	-0.077	-1.10	4.537	-0.044	-0.56	LW
CJWZFA		3.763	-0.027	-0.39	4.580	-0.001	-0.01	TA
CJYPK7		3.773	-0.017	-0.25	4.630	0.049	0.63	EM
CX2YNF		3.729	-0.061	-0.88	4.472	-0.109	-1.39	TA
D3PXH2		3.723	-0.067	-0.97	4.460	-0.120	-1.54	TM
DN9336	X	144.000	140.210	2,020.00	135.100	130.519	1,674.57	TM
EJBZDV		3.864	0.074	1.07	4.678	0.097	1.25	PP
EK4W3P		3.800	0.010	0.14	4.537	-0.044	-0.56	EM
FEUZUA		3.831	0.041	0.59	4.693	0.112	1.44	EM
GCYWFT		3.774	-0.016	-0.23	4.502	-0.079	-1.01	LA
HEKZDQ		3.858	0.068	0.98	4.602	0.022	0.28	MS
HPQHLN		3.740	-0.050	-0.72	4.530	-0.051	-0.65	XX
HUY7W4		3.878	0.088	1.27	4.645	0.064	0.82	LW
HXYGT4		3.781	-0.009	-0.13	4.586	0.005	0.07	PP
J43F4U		3.630	-0.160	-2.31	4.390	-0.191	-2.45	TM
J8GFZK		3.833	0.043	0.62	4.636	0.055	0.71	EM
J8KXYJ		3.826	0.036	0.52	4.554	-0.027	-0.34	XX
JFWWTU		3.830	0.040	0.58	4.649	0.068	0.87	LW
JK4PK6	X	3.453	-0.337	-4.86	4.206	-0.375	-4.81	TM
KQ9L7Q		3.791	0.001	0.02	4.627	0.046	0.59	LW
LBBUYU		3.781	-0.009	-0.13	4.491	-0.090	-1.15	EM
LK43JK		3.771	-0.019	-0.27	4.601	0.020	0.26	TA
LU8G3X		3.739	-0.052	-0.74	4.600	0.020	0.25	LW
MHRMPK	*	3.745	-0.045	-0.65	4.670	0.089	1.15	TM





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

**Report #280G  
February 2016**

WebCode	Data Flag	Sample GV27			Sample GV28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
N2HK6G		3.780	-0.010	-0.14	4.607	0.026	0.34	TA
PBK3DY		3.898	0.108	1.56	4.607	0.026	0.34	TA
PDQKCU		3.751	-0.039	-0.56	4.539	-0.042	-0.53	TA
PQWD7R		3.847	0.057	0.82	4.629	0.048	0.62	TM
PXYP2P		3.700	-0.090	-1.30	4.560	-0.021	-0.27	TM
Q6QKED		3.808	0.018	0.26	4.572	-0.009	-0.11	XX
QG2XUT		3.783	-0.007	-0.10	4.554	-0.027	-0.34	LA
QWXA3X		3.643	-0.147	-2.12	4.468	-0.113	-1.45	EM
RBAACT		3.768	-0.022	-0.32	4.565	-0.016	-0.20	LW
RNZY9D		3.867	0.077	1.11	4.609	0.028	0.36	EM
RQ9W3U		3.760	-0.030	-0.43	4.600	0.019	0.25	LW
RQAPYG		3.750	-0.040	-0.58	4.470	-0.111	-1.42	TM
U88NYG	*	3.983	0.193	2.79	4.784	0.203	2.61	LW
UGA9ZN		3.743	-0.047	-0.68	4.461	-0.120	-1.54	LA
UQZU6L		3.649	-0.141	-2.03	4.405	-0.176	-2.25	EM
URVC8M		3.743	-0.047	-0.68	4.525	-0.056	-0.72	TM
VG4DTM		3.839	0.049	0.71	4.651	0.070	0.90	EM
VHL8UW		3.707	-0.083	-1.20	4.488	-0.093	-1.19	TA
VHZU7J		3.822	0.032	0.46	4.604	0.023	0.30	EM
WEY63G	X	3.484	-0.306	-4.41	4.488	-0.092	-1.19	TM
WNL7HR		3.760	-0.030	-0.44	4.592	0.011	0.14	LW
WV3F99		3.748	-0.042	-0.61	4.514	-0.067	-0.86	PP
XJ7V6M		3.884	0.094	1.36	4.635	0.054	0.69	LW
XKZGXE	*	3.973	0.183	2.64	4.743	0.162	2.08	PP
Y88HKG		3.722	-0.068	-0.99	4.455	-0.126	-1.62	TM
Y93ZLH		3.746	-0.044	-0.63	4.480	-0.100	-1.29	LW
ZYB29H		3.810	0.020	0.29	4.648	0.067	0.86	TM

	Sample GV27	Summary Statistics	Sample GV28
Grand Means	3.7901 mils		4.5807 mils
SD Btwn Labs	0.0694 mils		0.0779 mils
Statistics based on 65 of 68 reporting participants			

**Comments on Assigned Data Flags for Test #360**

- JK4PK6 (X) - Data for both samples are low. Possible Systematic Error.
- DN9336 (X) - Extreme Data.
- WEY63G (X) - Inconsistent in testing between samples. Data for sample GV27 are low.



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

**Report #280G**  
**February 2016**

**Key to Instrument Codes Reported by Participants**

EM	Emveco	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

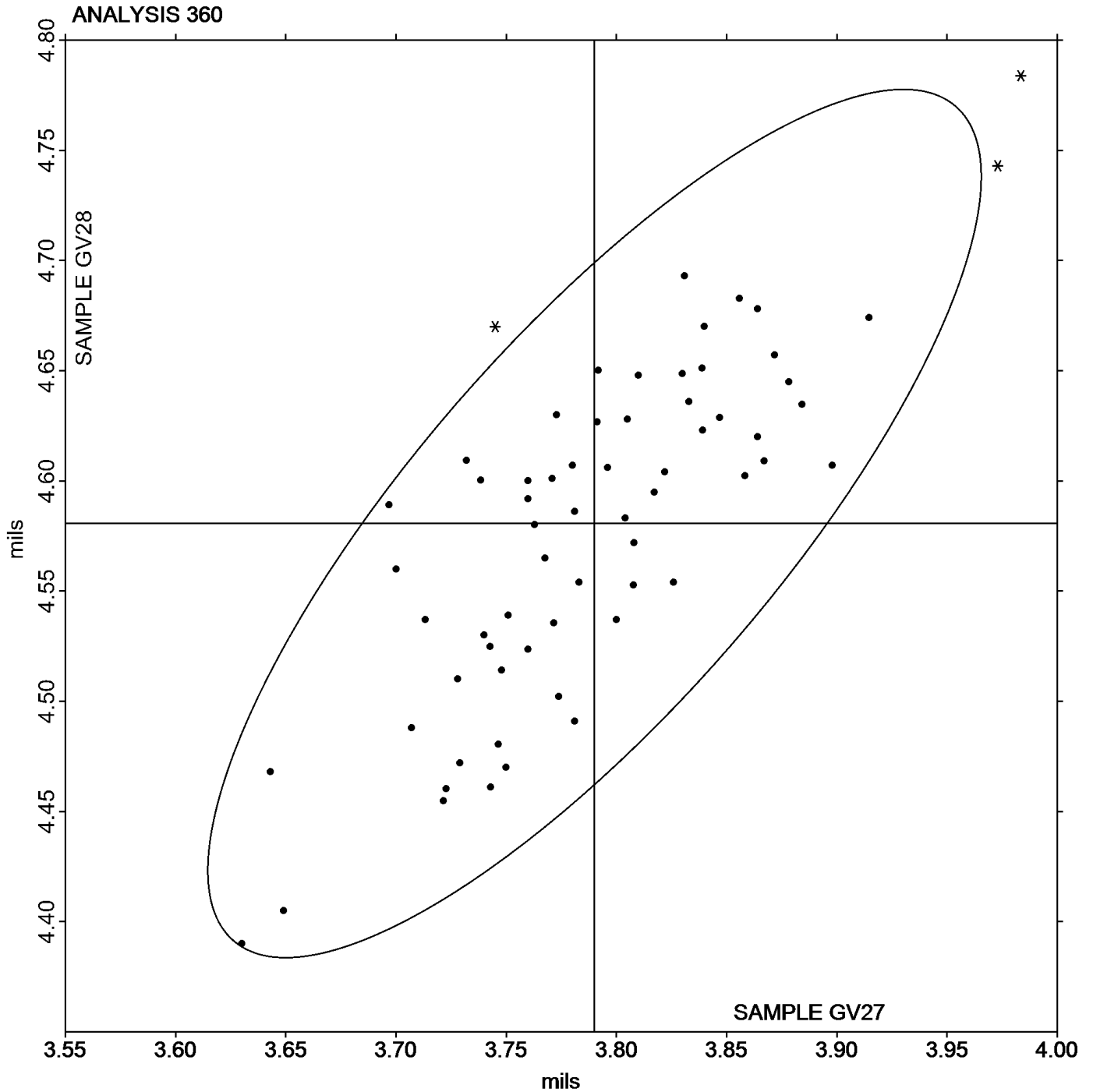


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 360**  
**Thickness (Caliper), Printing papers**

Report #280G  
February 2016

Grand Mean Sample **GV27** = 3.7901 mils

Grand Mean Sample **GV28** = 4.5807 mils





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

**Report #280G  
February 2016**

WebCode	Data Flag	Sample GY27			Sample GY28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
36CZWD		14.20	0.13	0.79	9.238	0.104	0.76	LA
4VK2HC		14.31	0.24	1.40	9.288	0.154	1.12	LA
66Z8U7		14.17	0.10	0.57	9.312	0.178	1.29	TM
7J27H4		14.13	0.06	0.37	9.137	0.003	0.02	EM
88Z3QE		14.24	0.17	1.01	9.138	0.004	0.03	XX
8Y8M4V		13.93	-0.14	-0.84	8.996	-0.138	-1.00	LW
9BZTBY		14.00	-0.07	-0.40	8.900	-0.234	-1.70	XX
AFA7TX		14.11	0.04	0.25	9.112	-0.022	-0.16	TA
C7APT4		13.85	-0.22	-1.29	9.000	-0.134	-0.97	TM
C869V6		14.25	0.19	1.09	9.208	0.074	0.54	EM
D4ZZ4Z		13.89	-0.18	-1.05	9.040	-0.094	-0.68	TA
D83XET		14.04	-0.03	-0.20	9.069	-0.065	-0.47	PP
DFQUE9		13.94	-0.13	-0.74	9.032	-0.102	-0.74	EM
DR8GPU		13.97	-0.10	-0.58	9.170	0.036	0.26	TA
EM8PU3		14.28	0.21	1.26	9.402	0.268	1.95	TM
FRG64Q		14.09	0.03	0.15	9.179	0.045	0.33	PP
HAQ4YY		14.29	0.22	1.32	9.206	0.072	0.52	EM
HEJ9R4		14.11	0.04	0.25	9.232	0.099	0.72	XX
HUY7W4		14.40	0.33	1.94	9.377	0.244	1.77	XX
J43F4U		13.77	-0.30	-1.76	8.850	-0.284	-2.06	TM
JZ43HP		13.88	-0.19	-1.12	8.927	-0.207	-1.50	TM
JZZHT2		14.01	-0.06	-0.34	9.110	-0.024	-0.17	LA
K72GGV		14.31	0.24	1.42	9.302	0.168	1.22	EM
KQ9L7Q		14.13	0.06	0.35	9.331	0.197	1.43	LW
LPW7DP		14.02	-0.04	-0.26	9.110	-0.024	-0.17	TM
MFZQ2Q		13.75	-0.32	-1.90	8.915	-0.219	-1.59	TA
NLMZNU		13.97	-0.10	-0.56	9.113	-0.021	-0.15	EM
NXEPLA		13.95	-0.12	-0.70	9.051	-0.083	-0.60	LA
P7NB8M		14.21	0.14	0.83	9.134	0.000	0.00	LA
QG6HJH		13.90	-0.17	-0.99	8.960	-0.174	-1.26	XX
RGMQ9C		13.87	-0.20	-1.17	9.060	-0.074	-0.54	TM
VHL8UW		13.97	-0.10	-0.56	9.070	-0.064	-0.46	TA
WHHZ6A		14.29	0.22	1.31	9.224	0.091	0.66	TM
WNL7HR		13.98	-0.09	-0.54	9.130	-0.004	-0.03	LW
XM6AQR		13.91	-0.16	-0.96	9.142	0.008	0.06	LA
XUQ34C		14.16	0.09	0.53	9.122	-0.012	-0.09	TM
ZYB29H		14.26	0.19	1.14	9.360	0.226	1.64	TM



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

**Report #280G  
February 2016**

	<b>Sample GY27</b>	<b>Summary Statistics</b>	<b>Sample GY28</b>
Grand Means	14.068 mils		9.1337 mils
SD Btwn Labs	0.170 mils		0.1377 mils
Statistics based on 37 of 37 reporting participants			

**Analysis Notes:**

XM6AQR - Data appear to be reported in micrometers and not mils, as reported on datasheet.

**Key to Instrument Codes Reported by Participants**

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



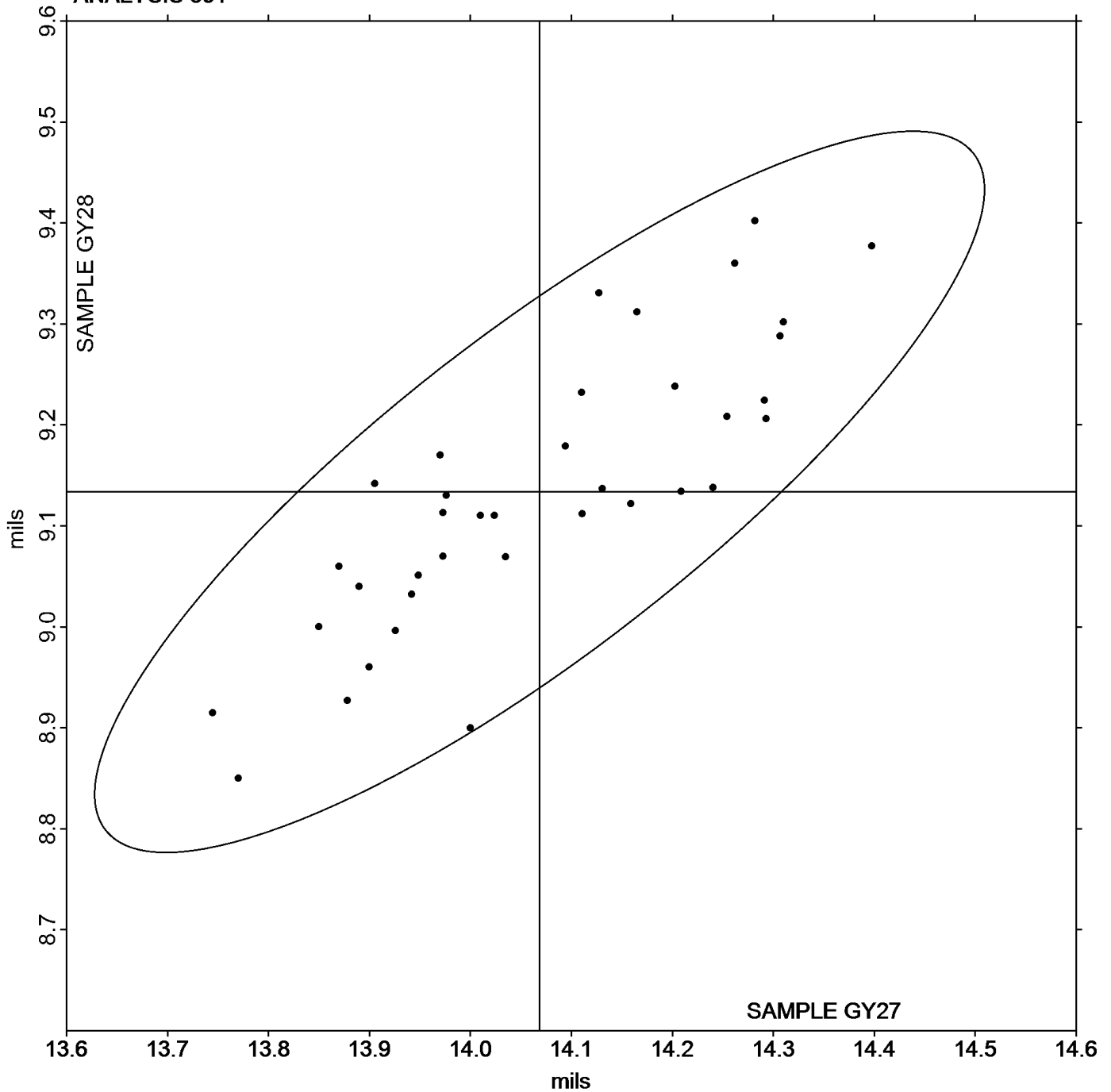
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 361**  
**Thickness (Caliper), Packaging papers**

Report #280G  
February 2016

Grand Mean Sample **GY27** = 14.068 mils

Grand Mean Sample **GY28** = 9.1337 mils

**ANALYSIS 361**





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

Report #280G  
February 2016

**Coefficient of Static Friction - Horizontal Plane Method - Printing Papers**

WebCode	Data Flag	Sample GD27			Sample GD28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
34FGUB		0.5596	0.0326	0.51	0.5816	0.0648	1.11	TA
3YNAC3		0.4444	-0.0826	-1.29	0.4686	-0.0483	-0.82	XX
4F44DC		0.4652	-0.0618	-0.96	0.4868	-0.0301	-0.51	TM
CJYPK7		0.5788	0.0518	0.81	0.5302	0.0134	0.23	XX
FEUZUA		0.5950	0.0680	1.06	0.5012	-0.0157	-0.27	TM
HUY7W4		0.5980	0.0710	1.10	0.5760	0.0592	1.01	TL
NXEPL		0.4578	-0.0692	-1.08	0.4186	-0.0983	-1.68	TA
PXYP2P	X	0.2658	-0.2612	-4.06	0.2298	-0.2871	-4.90	XX
XLAQNP		0.5174	-0.0096	-0.15	0.5718	0.0550	0.94	IT

Sample GD27		Summary Statistics		Sample GD28	
Grand Means	0.52703 COF			0.51685 COF	
SD Btwn Labs	0.06429 COF			0.05858 COF	
Statistics based on 8 of 9 reporting participants					

**Comments on Assigned Data Flags for Test #364**

PXYP2P (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		



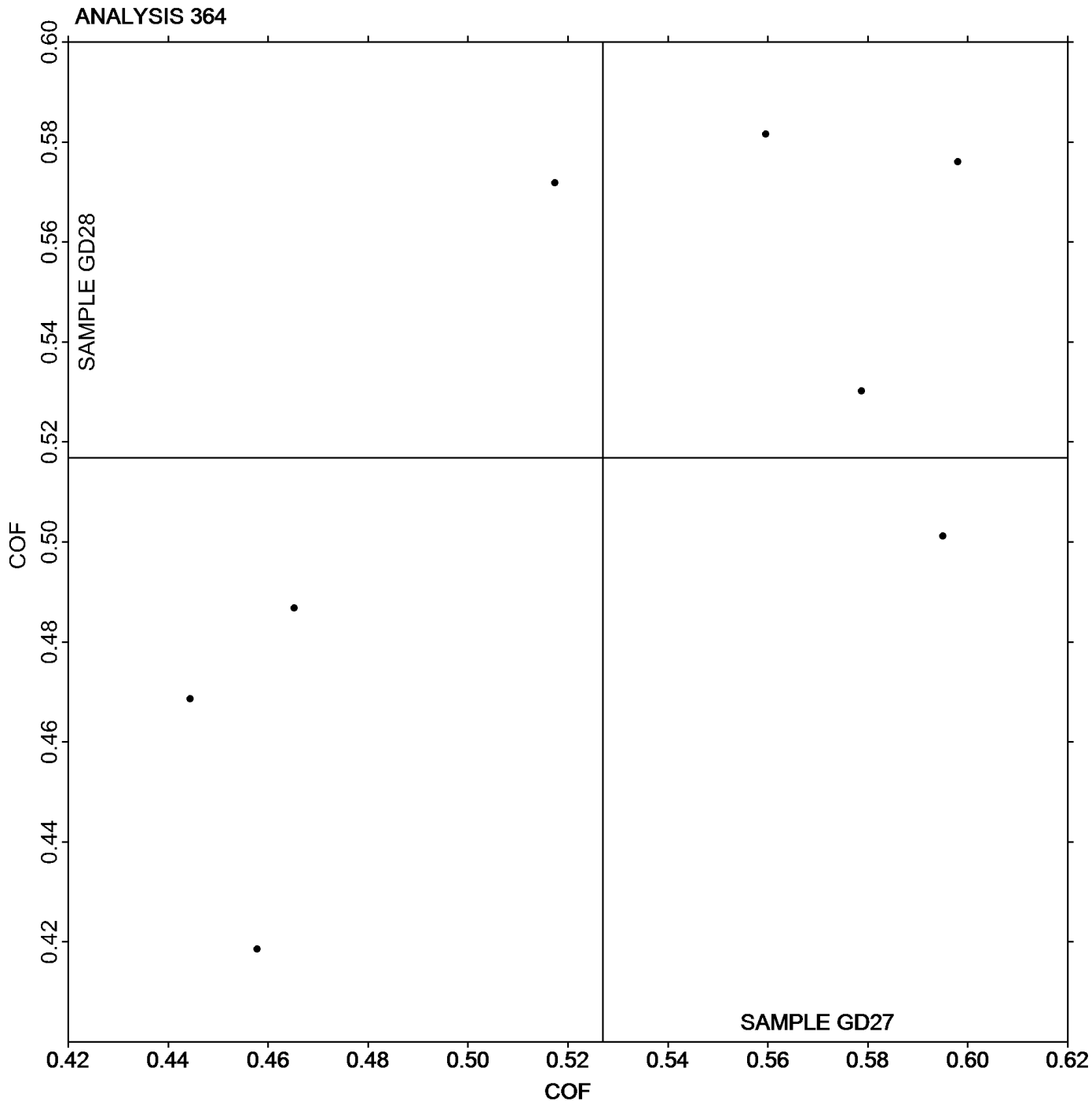
# Paper & Paperboard Interlaboratory Testing Program Analysis 364

Report #280G  
February 2016

## Coefficient of Static Friction - Horizontal Plane Method - Printing Papers

Grand Mean Sample **GD27** = 0.52703 COF

Grand Mean Sample **GD28** = 0.51685 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 #280G  
February 2016

**Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers**

WebCode	Data Flag	Sample GD27			Sample GD28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
34FGUB		0.4218	0.0040	0.06	0.4402	0.0183	0.29	TA
36CZWD		0.5142	0.0964	1.54	0.5312	0.1093	1.72	TM
3YNAC3		0.3460	-0.0718	-1.15	0.3252	-0.0967	-1.52	TA
4F44DC		0.4122	-0.0056	-0.09	0.4194	-0.0025	-0.04	TM
CNBBTD		0.3490	-0.0688	-1.10	0.3884	-0.0335	-0.53	TA
CX2YNF		0.4172	-0.0006	-0.01	0.4196	-0.0023	-0.04	TM
HUY7W4		0.5440	0.1262	2.02	0.5260	0.1041	1.64	TL
MQ6Z8F		0.4174	-0.0004	-0.01	0.4300	0.0081	0.13	TM
MVGLGM		0.3913	-0.0265	-0.43	0.3366	-0.0853	-1.34	TA
NXEPL		0.4246	0.0068	0.11	0.4054	-0.0165	-0.26	TA
PDQKCU		0.3656	-0.0522	-0.84	0.3756	-0.0463	-0.73	TA
PXYP2P	X	0.1720	-0.2458	-3.94	0.1474	-0.2745	-4.33	XX
QWXA3X		0.4778	0.0600	0.96	0.4880	0.0661	1.04	TA
XLAQNG		0.3506	-0.0672	-1.08	0.3990	-0.0229	-0.36	IR

		Summary Statistics	
	Sample GD27		Sample GD28
Grand Means	0.41782	COF	0.42189
SD Btwn Labs	0.06241	COF	0.06341
Statistics based on 13 of 14 reporting participants			

**Comments on Assigned Data Flags for Test #365**

PXYP2P (X) - Data for both samples are low.

**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		



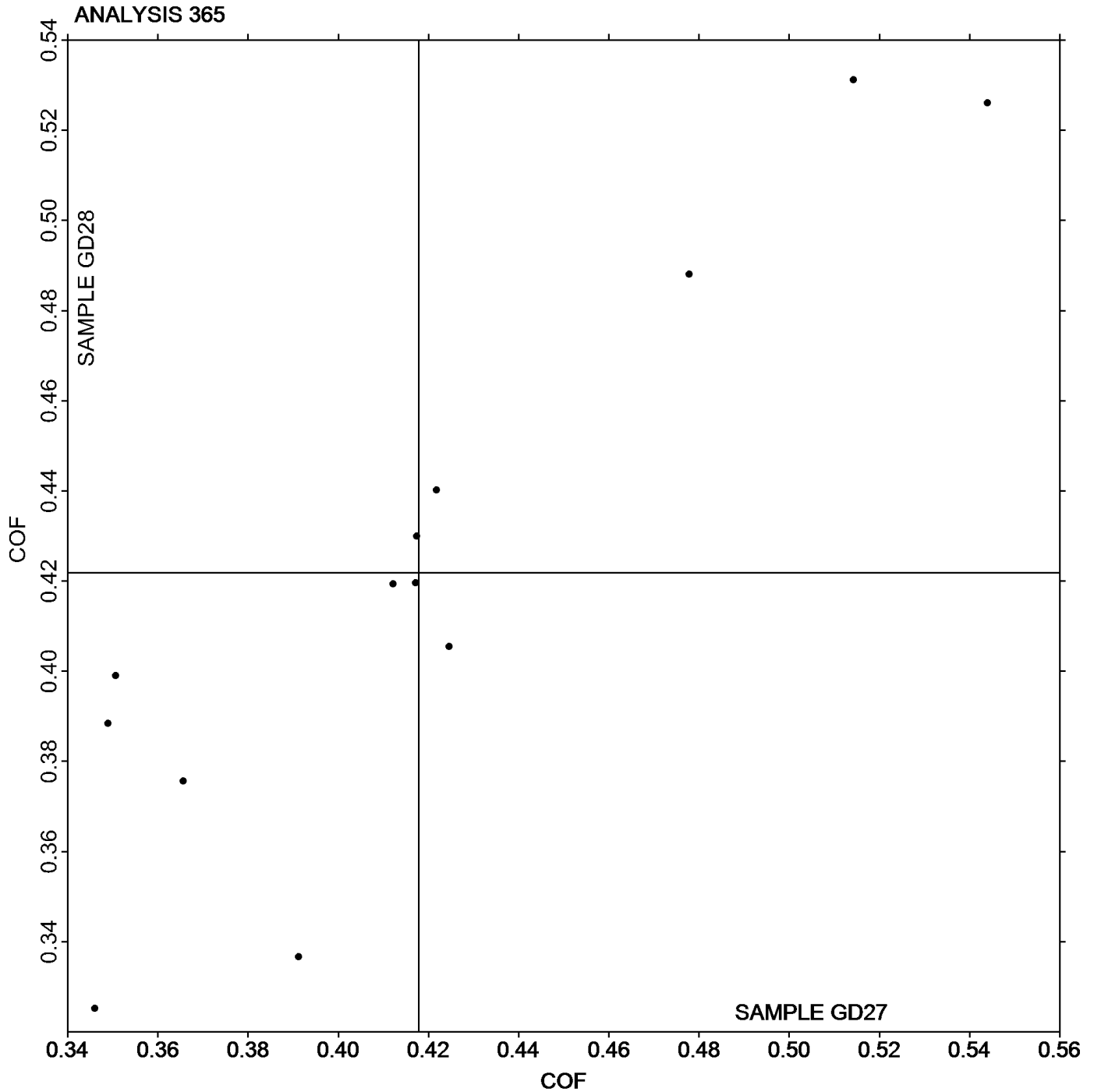
# Paper & Paperboard Interlaboratory Testing Program Analysis 365

Report #280G  
February 2016

## Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers

Grand Mean Sample **GD27** = 0.41782 COF

Grand Mean Sample **GD28** = 0.42189 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 #280G  
February 2016

WebCode	Data Flag	Sample GE27			Sample GE28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2D8F9C		30.97	-3.33	-1.34	25.53	0.42	0.29	LP
34FGUB		35.16	0.86	0.34	24.83	-0.28	-0.19	WG
3YNAC3		35.42	1.12	0.45	26.14	1.03	0.72	HG
6WQJG9		30.45	-3.85	-1.55	24.17	-0.94	-0.66	LP
6Z8B7F		33.50	-0.80	-0.32	25.20	0.09	0.06	LW
7J27H4		35.50	1.20	0.48	25.33	0.22	0.15	PP
88Z3QE		32.26	-2.04	-0.82	22.58	-2.53	-1.77	XX
8Y8M4V		34.99	0.69	0.28	24.85	-0.26	-0.18	TL
92A862		30.65	-3.65	-1.47	22.34	-2.77	-1.93	LP
ACBVWX		35.38	1.08	0.43	24.89	-0.22	-0.15	XX
BRH9RZ		34.36	0.06	0.02	25.87	0.76	0.53	HG
BXLCEE		33.34	-0.96	-0.39	25.41	0.30	0.21	XX
C7APT4		36.76	2.46	0.99	28.17	3.06	2.14	TL
CJWZFA		33.94	-0.37	-0.15	25.02	-0.09	-0.06	PP
D3PXH2		35.45	1.15	0.46	24.33	-0.78	-0.54	LW
D83XET		33.62	-0.68	-0.27	24.92	-0.19	-0.13	PP
DFQUE9		32.91	-1.39	-0.56	22.77	-2.34	-1.63	PP
EJBZDV		33.28	-1.02	-0.41	25.05	-0.06	-0.04	HG
FEUZUA		30.63	-3.67	-1.47	24.62	-0.49	-0.34	PP
FRG64Q		34.79	0.49	0.20	25.17	0.06	0.04	PP
HEJ9R4		33.94	-0.36	-0.15	24.74	-0.37	-0.26	LW
HPQHLN		37.42	3.12	1.25	26.93	1.82	1.27	WG
HUY7W4		35.06	0.76	0.30	25.19	0.08	0.06	LP
HXYGT4		35.82	1.52	0.61	25.36	0.25	0.17	PP
J8GFZK	*	35.22	0.92	0.37	28.05	2.94	2.05	HG
JZZHT2		37.30	3.00	1.20	26.40	1.29	0.90	LA
N2HK6G		32.07	-2.24	-0.90	25.13	0.02	0.01	PP
NFJWZG	*	39.29	4.98	2.00	25.13	0.03	0.02	TN
NU2MWX		35.51	1.21	0.48	26.05	0.94	0.66	LP
NXEPL		37.46	3.16	1.27	26.99	1.88	1.31	LA
PBK3DY		38.96	4.66	1.87	27.22	2.11	1.47	HG
PXYP2P		36.40	2.10	0.84	25.10	-0.01	-0.01	GS
QG2XUT		37.25	2.95	1.18	27.48	2.37	1.65	LA
QLZ9PT		30.99	-3.31	-1.33	23.01	-2.10	-1.47	LP
QXTVVN		30.23	-4.07	-1.63	22.72	-2.39	-1.67	RE
RGMQ9C		37.72	3.42	1.37	26.17	1.06	0.74	TL
RNZY9D		37.93	3.63	1.46	26.76	1.65	1.15	HG
RQAPYG		29.28	-5.02	-2.02	22.40	-2.71	-1.89	HG
T4R2MW		32.91	-1.39	-0.56	25.18	0.07	0.05	LP
U88NYG		31.45	-2.85	-1.15	22.47	-2.64	-1.84	LP
UGA9ZN		34.83	0.53	0.21	26.22	1.11	0.78	LA



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

**Report #280G  
February 2016**

WebCode	Data Flag	Sample GE27			Sample GE28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
VG4DTM		33.13	-1.17	-0.47	24.20	-0.91	-0.63	GL
VHZU7J		30.49	-3.81	-1.53	24.75	-0.36	-0.25	PP
WNL7HR		34.39	0.09	0.03	24.61	-0.50	-0.35	PP
WV3F99		36.48	2.18	0.87	25.28	0.17	0.12	HG
Y88HKG		32.53	-1.77	-0.71	23.67	-1.44	-1.00	LP
Z38QPP		34.82	0.52	0.21	25.70	0.59	0.41	LA
ZNTKFB	X	21.51	-12.79	-5.14	19.77	-5.34	-3.73	TN
ZYB29H	X	85.84	51.54	20.69	108.19	83.08	58.02	GA

Sample GE27		Summary Statistics		Sample GE28	
Grand Means	34.303 sec/100 cc			25.108 sec/100 cc	
SD Btwn Labs	2.491 sec/100 cc			1.432 sec/100 cc	
Statistics based on 47 of 49 reporting participants					

**Comments on Assigned Data Flags for Test #370**

- ZYB29H (X) - Extreme data.
- ZNTKFB (X) - Data for both samples are low.

**Analysis Notes:**

NFJWZG - Two determinations removed from the Lab Mean for Sample GE27 (TAPPI T1205 using Grubbs test at 1% risk level).

**Key to Instrument Codes Reported by Participants**

<b>GA</b> Gurley Precision #4340 Automatic Densometer	<b>GL</b> Gurley #4110
<b>GS</b> Gurley-Hill S-P-S Tester #4190	<b>HG</b> Technidyne - Hagerty Model #1
<b>LA</b> L & W Autoline	<b>LP</b> L & W Densometer, Air Permeance
<b>LW</b> L & W Type Gurley Densometer, Oil Flotation	<b>PP</b> Technidyne Profile/Plus
<b>RE</b> Regmed Gurley Densometer PGH-T	<b>TL</b> Gurley Densometer #4110, Oil Flotation
<b>TN</b> Gurley S-P-S Tester #4190	<b>WG</b> W & LE Gurley Tester
<b>XX</b> Instrument make/model not specified by lab	



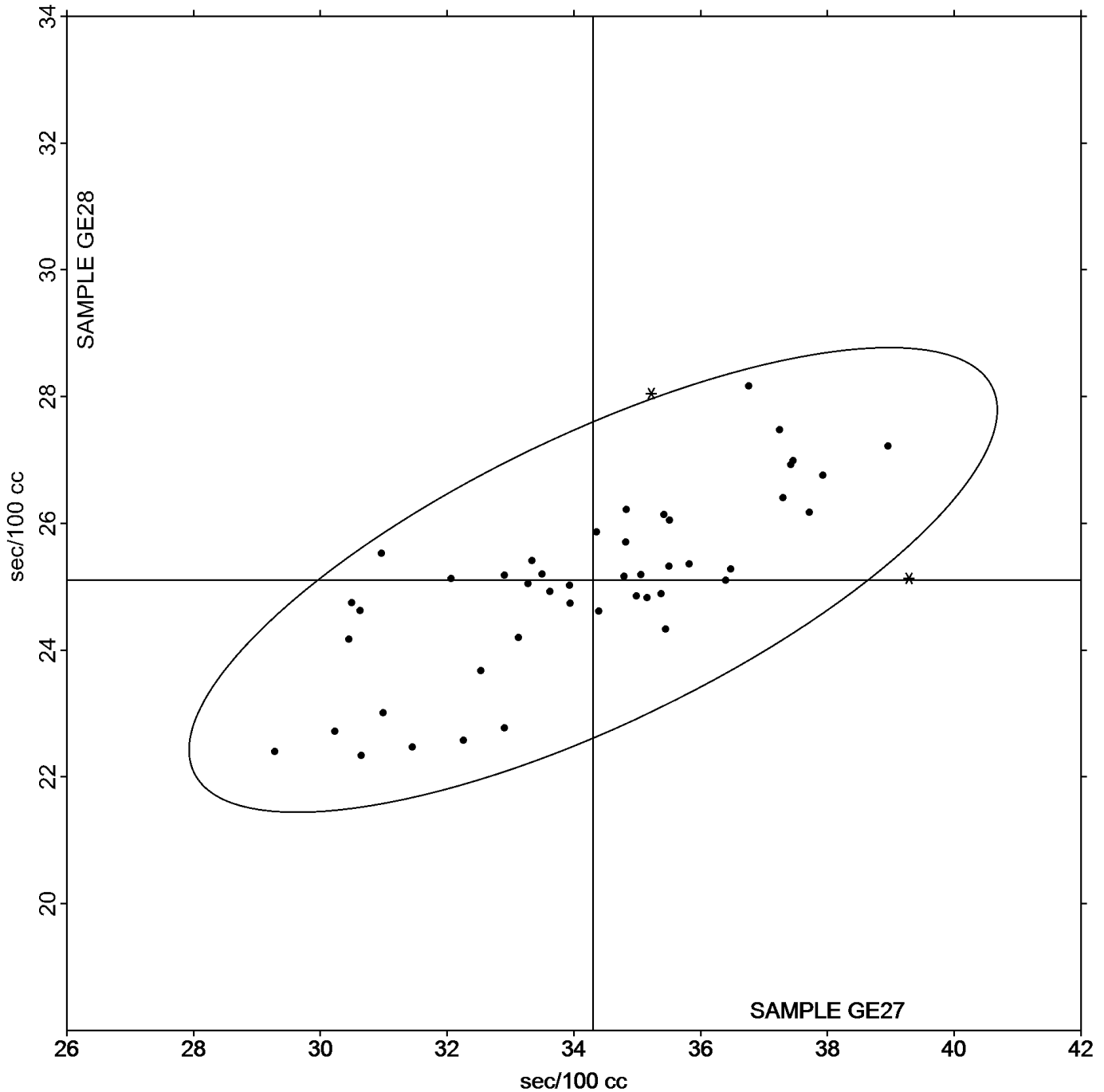
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 370**  
**Air Resistance - Gurley Oil Type**

Report #280G  
February 2016

Grand Mean Sample **GE27** = 34.303 sec/100 cc

Grand Mean Sample **GE28** = 25.108 sec/100 cc

**ANALYSIS 370**





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

Report #280G  
February 2016

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

WebCode	Data Flag	Sample GE27			Sample GE28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
467328		86.20	-2.22	-0.36	110.4	-0.7	-0.10	TT
4PQ6UL		93.60	5.18	0.83	120.6	9.5	1.28	TT
ACBVWX		80.22	-8.20	-1.32	107.3	-3.8	-0.51	XX
CJWZFA		89.10	0.68	0.11	113.4	2.3	0.31	HM
DFQUE9		101.20	12.78	2.05	113.4	2.3	0.31	SH
DN9336		88.00	-0.42	-0.07	114.4	3.3	0.44	SH
FWAAUA		79.15	-9.27	-1.49	103.7	-7.4	-1.00	GA
GX2K8N		97.20	8.78	1.41	127.9	16.8	2.26	VM
KN32G6		84.77	-3.65	-0.59	106.6	-4.5	-0.61	LP
LU8G3X		91.40	2.98	0.48	111.6	0.5	0.06	HM
MHRMPK		79.90	-8.52	-1.37	96.3	-14.8	-2.00	TT
PBK3DY		85.00	-3.42	-0.55	109.3	-1.8	-0.25	TT
PXYP2P	X	130.60	42.18	6.77	143.8	32.7	4.40	SH
R4YNPJ		90.10	1.68	0.27	110.3	-0.8	-0.11	HM
VHL8UW		91.03	2.61	0.42	116.5	5.4	0.72	XX
WAPRKJ		89.50	1.08	0.17	105.1	-6.0	-0.81	LP

Sample GE27		Summary Statistics		Sample GE28	
Grand Means	88.425 Sheffield Units			111.12 Sheffield Units	
SD Btwn Labs	6.229 Sheffield Units			7.43 Sheffield Units	
Statistics based on 15 of 16 reporting participants					

**Comments on Assigned Data Flags for Test #372**

PXYP2P (X) - Extreme data.

**Key to Instrument Codes Reported by Participants**

<b>GA</b>	Gurley Precision #4340 Automatic Densometer	<b>HM</b>	Technidyne - Hagerty Model #538
<b>LP</b>	L & W Densometer, Air Permeance	<b>SH</b>	Sheffield
<b>TT</b>	TMI Monitor/Smoothness II, Model 58-24	<b>VM</b>	Valmet PaperLab (was Kajaani/Robotest)
<b>XX</b>	Instrument make/model not specified by lab		



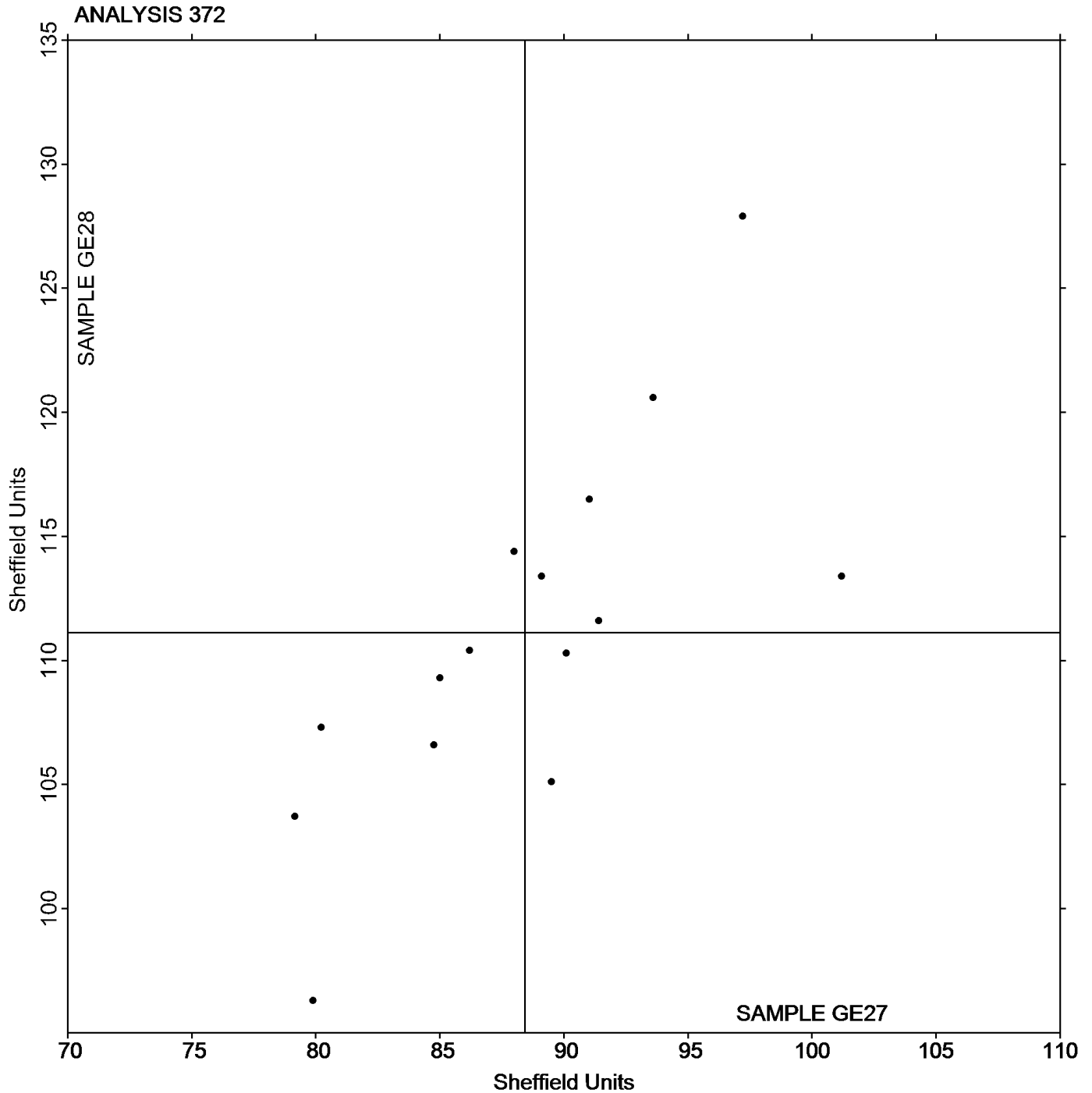
**Paper & Paperboard Interlaboratory Testing Program  
Analysis 372**

**Report #280G  
February 2016**

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

Grand Mean Sample **GE27** = 88.425 Sheffield Units

Grand Mean Sample **GE28** = 111.12 Sheffield Units



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



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

Report #280G  
February 2016

WebCode	Data Flag	Sample GJ27			Sample GJ28		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
34FGUB		0.984	-0.139	-1.93	0.973	-0.153	-2.03
3YNAC3		1.062	-0.061	-0.85	1.072	-0.054	-0.72
4VK2HC		1.081	-0.042	-0.58	1.082	-0.044	-0.59
789M2C		1.151	0.028	0.39	1.150	0.023	0.31
7ACHKF	X	1.306	0.183	2.55	1.230	0.104	1.37
8VA9G7		1.080	-0.043	-0.60	1.095	-0.031	-0.42
9BZTBY		1.060	-0.063	-0.87	1.039	-0.087	-1.16
B7EQGY		1.247	0.124	1.73	1.247	0.121	1.60
C869V6		1.163	0.040	0.56	1.144	0.018	0.23
CCWFFY	*	1.235	0.112	1.56	1.276	0.150	1.98
CNBBTD		1.122	-0.001	-0.01	1.117	-0.009	-0.12
D83XET		1.070	-0.053	-0.73	1.097	-0.029	-0.39
DFQUE9		1.130	0.007	0.10	1.125	-0.001	-0.02
EK4W3P		1.175	0.052	0.73	1.168	0.042	0.55
FRG64Q		1.102	-0.021	-0.29	1.088	-0.038	-0.51
HAQ4YY		1.077	-0.046	-0.64	1.088	-0.038	-0.51
J8GFZK	X	1.872	0.749	10.42	1.875	0.749	9.92
K72GGV		1.169	0.046	0.64	1.183	0.057	0.75
KQ9L7Q		1.137	0.014	0.20	1.131	0.005	0.06
LBBUYU		1.183	0.060	0.84	1.177	0.051	0.67
MHRMPK		1.188	0.065	0.91	1.195	0.069	0.91
N2HK6G		1.181	0.058	0.81	1.171	0.045	0.59
NLMZNU		1.174	0.051	0.71	1.180	0.054	0.71
PBK3DY		1.149	0.026	0.36	1.152	0.026	0.34
PDQKCU		1.276	0.153	2.13	1.301	0.175	2.32
QG6HJH		1.085	-0.038	-0.53	1.081	-0.045	-0.60
R4YNPJ		1.014	-0.109	-1.51	1.011	-0.115	-1.53
TWU43E		1.131	0.008	0.11	1.138	0.012	0.15
WHHZ6A		0.958	-0.165	-2.29	0.964	-0.162	-2.15
WV3F99		1.159	0.036	0.50	1.146	0.020	0.26
XKZGXE	X	1.479	0.356	4.95	1.452	0.326	4.32
XM6AQR		1.089	-0.034	-0.47	1.105	-0.021	-0.28
Y88HKG		1.076	-0.047	-0.65	1.094	-0.032	-0.43
YJZ2YM		1.099	-0.024	-0.33	1.127	0.001	0.01

Sample GJ27		Summary Statistics	Sample GJ28	
Grand Means	1.1228 Microns		1.1263 Microns	
SD Btwn Labs	0.0719 Microns		0.0754 Microns	
Statistics based on 31 of 34 reporting participants				





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

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**Report #280G**  
**February 2016**

**Comments on Assigned Data Flags for Test #376**

7ACHKF (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample GJ27.

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

J8GFZK (X) - Extreme data.

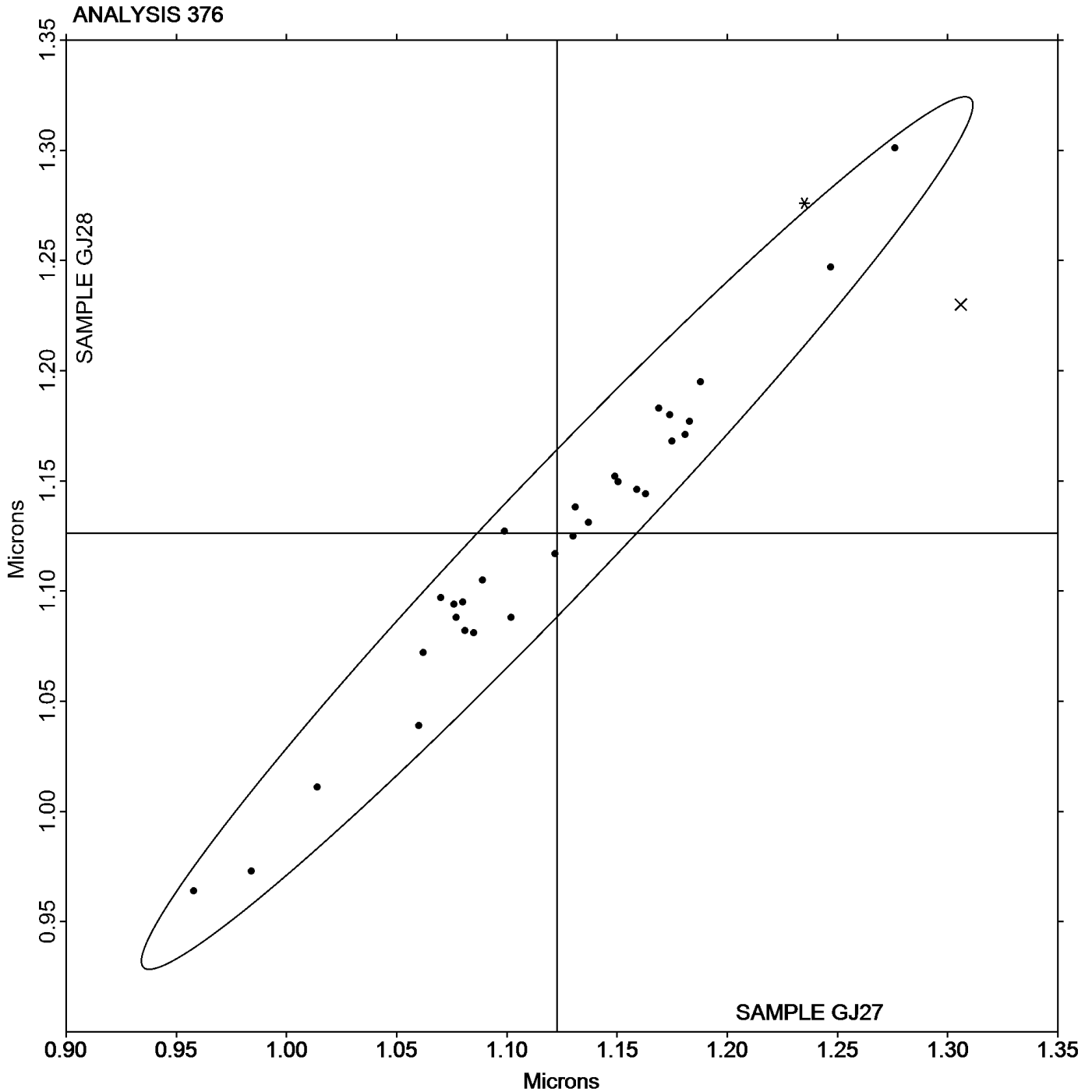


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 376**  
**Roughness - Print Surf Method - 0.5 to 4.0 Microns**

Report #280G  
February 2016

Grand Mean Sample **GJ27** = 1.1228 Microns

Grand Mean Sample **GJ28** = 1.1263 Microns





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

**Report #280G  
February 2016**

WebCode	Data Flag	Sample GK27			Sample GK28		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
34FGUB		4.132	-0.096	-0.27	2.843	-0.207	-0.97
3YNAC3		4.089	-0.139	-0.40	2.918	-0.132	-0.62
7J27H4		4.161	-0.067	-0.19	3.037	-0.013	-0.06
B7EQGY		4.994	0.766	2.19	3.449	0.399	1.86
CJYPK7		4.391	0.163	0.47	3.087	0.037	0.17
FEUZUA		4.313	0.085	0.24	3.031	-0.019	-0.09
GX2K8N		4.543	0.315	0.90	3.142	0.092	0.43
HUY7W4		4.133	-0.095	-0.27	3.005	-0.045	-0.21
UGA9ZN		3.983	-0.245	-0.70	2.727	-0.323	-1.51
WNL7HR		4.164	-0.064	-0.18	2.931	-0.119	-0.56
XUQ34C		3.600	-0.628	-1.80	3.380	0.330	1.54

		<b>Summary Statistics</b>	
	<b>Sample GK27</b>		<b>Sample GK28</b>
Grand Means	4.2275 Microns		3.0500 Microns
SD Btwn Labs	0.3493 Microns		0.2143 Microns
Statistics based on 11 of 11 reporting participants			



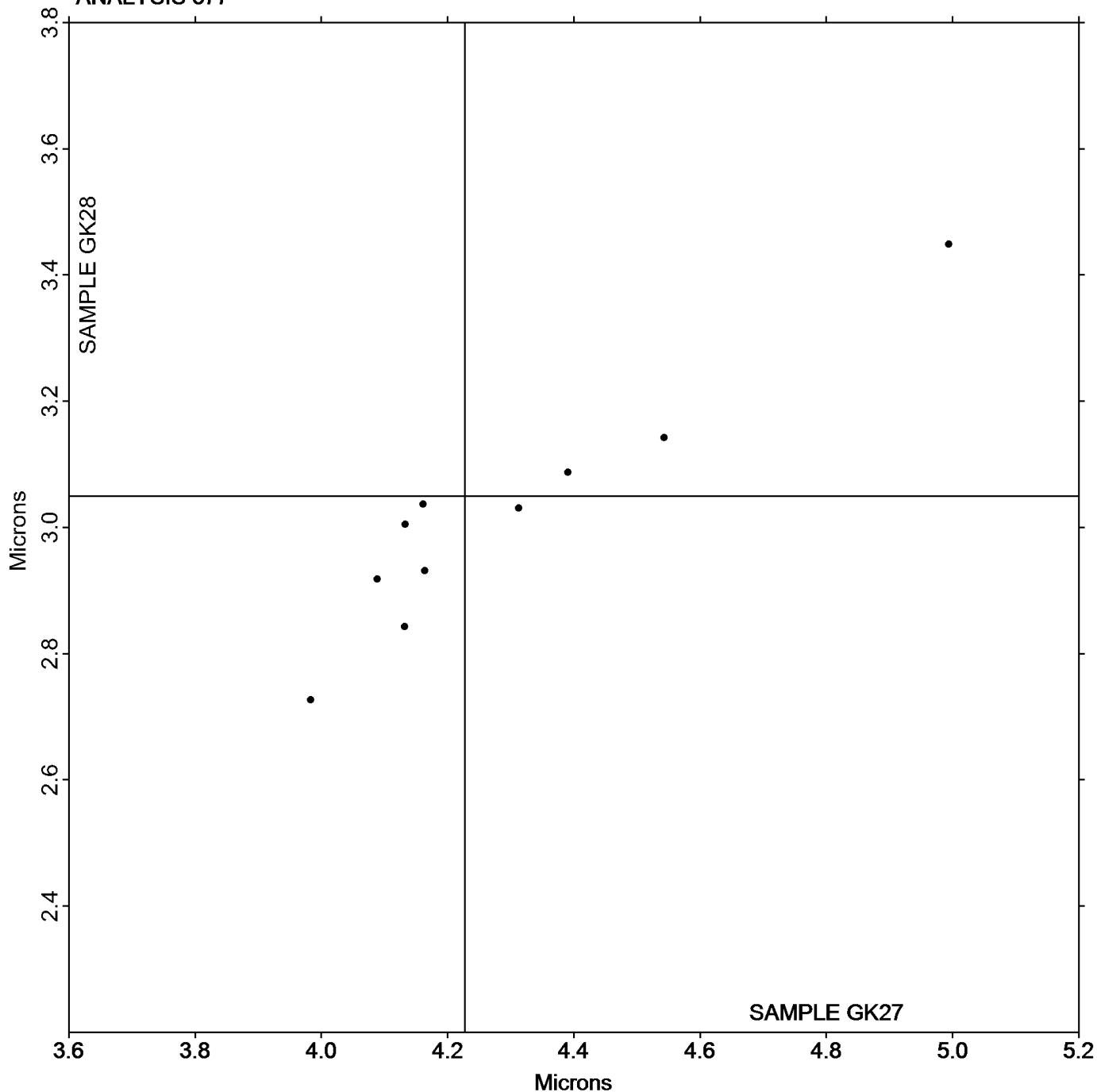
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 377**  
**Roughness - Print Surf Method - 2.5 to 6.0 Microns**

Report #280G  
February 2016

Grand Mean Sample **GK27** = 4.2275 Microns

Grand Mean Sample **GK28** = 3.0500 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 #280G  
February 2016

WebCode	Data Flag	Sample GL27			Sample GL28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
34FGUB		170.1	9.2	0.91	142.2	12.2	1.32	XX
467328	X	190.3	29.4	2.89	168.6	38.6	4.17	TT
472L39		178.0	17.1	1.68	131.0	1.0	0.11	GA
4F44DC		169.1	8.2	0.80	147.9	17.9	1.94	PP
4J686Y		150.1	-10.8	-1.06	131.0	1.0	0.11	LA
4VK2HC		163.7	2.8	0.28	148.4	18.4	1.99	LA
622WY8		159.0	-1.9	-0.19	119.0	-11.0	-1.19	MP
6Z8B7F		157.3	-3.6	-0.35	127.4	-2.6	-0.28	TS
789M2C		167.7	6.8	0.67	122.1	-7.9	-0.86	XX
7J27H4		159.4	-1.5	-0.14	130.6	0.6	0.07	PP
9BVCCZ	X	198.1	37.2	3.66	162.7	32.7	3.53	TT
9BZTBY		165.7	4.8	0.47	125.7	-4.3	-0.46	XX
ACBVWX		143.3	-17.6	-1.73	114.9	-15.1	-1.63	XX
BLQ29R		156.9	-4.0	-0.39	114.9	-15.1	-1.63	PP
BRH9RZ		164.1	3.2	0.32	128.3	-1.7	-0.18	PP
C47UA2		169.2	8.3	0.82	143.8	13.8	1.49	TS
C869V6		166.7	5.8	0.57	133.0	3.0	0.33	PP
CJWZFA		157.0	-3.9	-0.38	130.4	0.4	0.04	PP
CJYPK7		167.9	7.0	0.69	128.9	-1.1	-0.12	HM
CNBBTD		162.6	1.7	0.17	132.8	2.8	0.30	HM
D3PXH2		136.0	-24.9	-2.44	116.2	-13.8	-1.49	SH
D4ZZ4Z		166.5	5.7	0.56	123.4	-6.6	-0.71	PP
D83XET		162.4	1.6	0.15	118.3	-11.7	-1.26	PP
DFQUE9		159.7	-1.2	-0.11	121.4	-8.6	-0.93	PP
DN9336	X	3.8	-157.0	-15.42	4.6	-125.4	-13.55	SH
EJBZDV		158.1	-2.8	-0.27	123.2	-6.8	-0.73	HM
EM8PU3		157.0	-3.9	-0.38	144.4	14.4	1.56	GA
FEUZUA		167.1	6.2	0.61	135.9	5.9	0.64	PP
FRG64Q		155.2	-5.7	-0.56	117.5	-12.5	-1.35	PP
FWAAUA		151.0	-9.9	-0.97	125.1	-4.9	-0.53	GA
HAQ4YY		165.6	4.8	0.47	134.0	4.0	0.44	PP
HPQHLN		168.4	7.5	0.74	137.5	7.5	0.81	PG
HUY7W4		161.9	1.0	0.10	130.6	0.6	0.06	LW
HXYGT4		176.0	15.1	1.48	138.1	8.1	0.87	PP
J43F4U	*	188.0	27.1	2.66	145.0	15.0	1.62	GL
J8GFZK		165.3	4.4	0.44	138.7	8.7	0.94	HM
J8KXYJ		159.7	-1.2	-0.11	120.4	-9.6	-1.04	XX
K72GGV		167.0	6.1	0.60	139.1	9.1	0.98	LW
L4TLBX		156.7	-4.2	-0.41	139.3	9.3	1.00	XX
LU8G3X		164.2	3.3	0.33	127.2	-2.8	-0.30	HM
MFZQ2Q		154.5	-6.4	-0.63	122.3	-7.7	-0.84	PP



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

Report #280G  
February 2016

WebCode	Data Flag	Sample GL27			Sample GL28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
MHRMPK		150.7	-10.2	-1.00	125.1	-4.9	-0.53	TT
MQ6Z8F		139.7	-21.2	-2.08	113.3	-16.7	-1.80	TS
MYF3TG	X	111.1	-49.8	-4.89	96.8	-33.2	-3.59	TS
N2HK6G		163.2	2.3	0.22	141.9	11.9	1.29	PP
NLMZNU	*	136.8	-24.1	-2.36	130.1	0.1	0.01	PP
NU2MWX		155.5	-5.4	-0.53	119.4	-10.6	-1.14	LW
PBK3DY		164.4	3.5	0.35	130.7	0.7	0.08	SH
PDQKCU		166.3	5.4	0.53	119.8	-10.2	-1.10	HM
PXYP2P		167.4	6.5	0.64	141.7	11.7	1.26	XX
Q6QKED		181.0	20.1	1.98	151.0	21.0	2.27	XX
QG2XUT		154.5	-6.4	-0.62	128.3	-1.7	-0.18	LA
QG6HJH		176.7	15.8	1.55	139.4	9.4	1.02	TT
RNZY9D		164.8	3.9	0.39	122.0	-8.0	-0.86	HM
RQAPYG		154.4	-6.5	-0.64	126.3	-3.7	-0.40	TS
UGA9ZN		154.9	-6.0	-0.59	129.9	-0.1	-0.01	LA
VG4DTM		162.9	2.1	0.20	122.4	-7.6	-0.82	PP
VHL8UW		169.4	8.5	0.84	127.6	-2.4	-0.26	HM
VHZU7J		148.0	-12.9	-1.26	129.5	-0.5	-0.05	SH
WAPRKJ		152.4	-8.5	-0.83	125.7	-4.3	-0.46	PP
WHHZ6A		173.3	12.4	1.22	144.8	14.8	1.60	TT
WNL7HR		160.7	-0.2	-0.02	125.0	-5.0	-0.54	PP
WV3F99		162.5	1.6	0.16	127.9	-2.1	-0.23	HM
XM6AQR		159.8	-1.1	-0.10	126.4	-3.6	-0.39	LW
Y88HKG		140.7	-20.2	-1.98	123.8	-6.2	-0.67	TS
ZYB29H		145.9	-15.0	-1.47	138.1	8.1	0.88	HM

Sample GL27		Summary Statistics	Sample GL28	
Grand Means	160.87 Sheffield		130.00 Sheffield	
SD Btwn Labs	10.18 Sheffield		9.26 Sheffield	
Statistics based on 62 of 66 reporting participants				

**Comments on Assigned Data Flags for Test #378**

- DN9336 (X) - Extreme data.
- 467328 (X) - Data for both samples are high.
- 9BVCCZ (X) - Data for both samples are high. Inconsistent within the determinations of both samples.
- MYF3TG (X) - Data for both samples are low.



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

**Report #280G**  
**February 2016**

**Key to Instrument Codes Reported by Participants**

<b>GA</b>	Gurley Precision #4340 Automatic Densometer	<b>GL</b>	Giddings and Lewis Sheffield
<b>HM</b>	Technidyne - Hagerty Model #538	<b>LA</b>	L & W Roughness Sheffield - Autoline
<b>LW</b>	L & W Roughness Tester	<b>MP</b>	Metso Paperlab
<b>PG</b>	Precision Gage Smoothcheck	<b>PP</b>	Technidyne Profile/Plus
<b>SH</b>	Sheffield (Bendix Precisionaire)	<b>TS</b>	TMI Monitor/Smoothness, Model 58-02
<b>TT</b>	TMI Monitor/Smoothness II, Model 58-24	<b>XX</b>	Instrument make/model not specified by lab



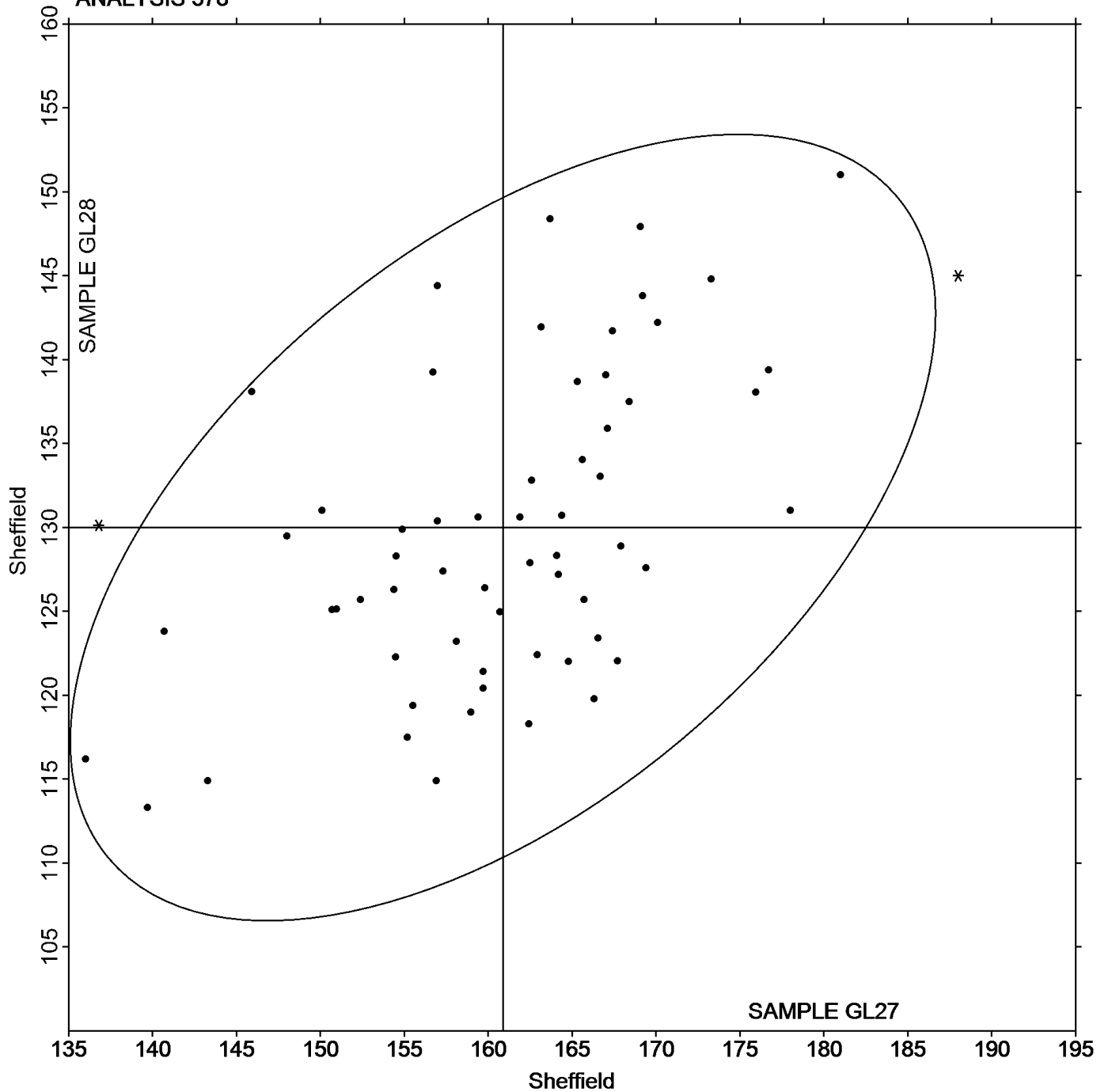
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 378**  
**Roughness - Sheffield Type**

Report #280G  
February 2016

Grand Mean Sample **GL27** = 160.87 Sheffield

Grand Mean Sample **GL28** = 130.00 Sheffield

**ANALYSIS 378**







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

**Report #280G  
February 2016**

WebCode	Data Flag	Sample GM27			Sample GM28		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
2UAFW7		4.675	0.318	0.78	4.453	0.232	0.60
6WQJG9		4.156	-0.201	-0.49	3.923	-0.298	-0.78
CCWFFY		4.027	-0.330	-0.81	4.009	-0.213	-0.55
CJYPK7		3.960	-0.397	-0.97	3.700	-0.521	-1.36
HEKZLNQ		4.295	-0.062	-0.15	4.210	-0.011	-0.03
R8928H		4.590	0.233	0.57	4.500	0.279	0.72
U7UELA		4.026	-0.331	-0.81	4.067	-0.154	-0.40
WHHZ6A		5.130	0.773	1.89	4.910	0.689	1.79

		<b>Summary Statistics</b>	
	<b>Sample GM27</b>		<b>Sample GM28</b>
Grand Means	4.3574 Percent		4.2215 Percent
SD Btwn Labs	0.4094 Percent		0.3846 Percent
Statistics based on 8 of 8 reporting participants			



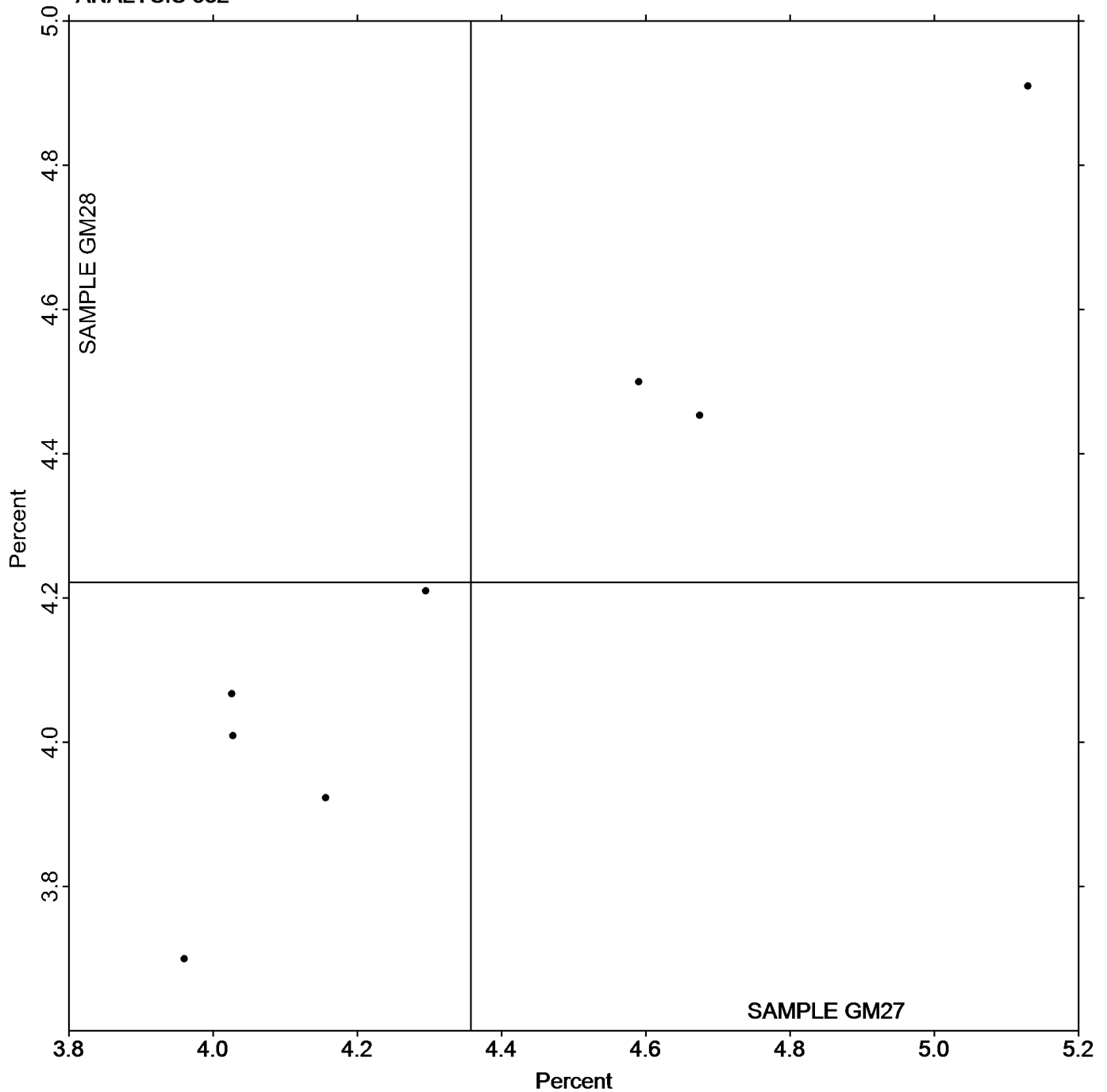
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 382**  
**Moisture in Paper**

**Report #280G**  
**February 2016**

Grand Mean Sample **GM27** = 4.3574 Percent

Grand Mean Sample **GM28** = 4.2215 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 #280G  
February 2016

WebCode	Data Flag	Sample GN27			Sample GN28		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3YNAC3		86.73	-0.21	-0.35	92.88	-0.10	-0.19
467328	X	89.24	2.30	3.92	93.93	0.95	1.88
4F44DC		87.53	0.59	1.01	93.15	0.17	0.33
6Z8B7F		87.26	0.32	0.55	92.75	-0.23	-0.45
789M2C		86.24	-0.70	-1.19	92.15	-0.83	-1.63
7FX98B		86.78	-0.16	-0.27	92.87	-0.11	-0.21
8JTL6K		87.83	0.89	1.52	93.60	0.62	1.23
ACBVWX	*	85.32	-1.62	-2.75	91.94	-1.04	-2.05
BLQ29R		86.92	-0.02	-0.03	93.05	0.07	0.14
CJYPK7	*	88.57	1.63	2.78	93.69	0.71	1.41
CNBBTD		87.09	0.15	0.26	93.57	0.59	1.17
DN9336		86.90	-0.04	-0.07	92.71	-0.27	-0.53
EK4W3P		87.24	0.30	0.51	93.04	0.06	0.12
FEUZUA		87.21	0.27	0.46	92.90	-0.08	-0.16
GCYWFT		86.64	-0.29	-0.50	93.11	0.14	0.27
HPQHNL		86.56	-0.38	-0.65	92.42	-0.56	-1.10
HXYGT4		86.80	-0.14	-0.24	93.06	0.08	0.17
J43F4U		87.28	0.34	0.58	93.37	0.39	0.77
J8KXYJ		87.47	0.53	0.91	93.49	0.51	1.01
KK8ABT		86.51	-0.43	-0.73	92.76	-0.22	-0.43
MHRMPK		87.87	0.93	1.59	93.49	0.51	1.01
N2HK6G		86.29	-0.65	-1.10	93.21	0.23	0.46
PBK3DY		87.57	0.63	1.08	93.14	0.16	0.31
PDQKCU		87.11	0.17	0.30	92.91	-0.07	-0.13
PQWD7R		86.64	-0.30	-0.51	93.63	0.65	1.29
PXYP2P		86.21	-0.73	-1.24	92.53	-0.45	-0.88
Q6QKED		87.95	1.01	1.72	93.71	0.73	1.44
QG2XUT		86.62	-0.32	-0.54	92.88	-0.10	-0.19
RAZXWC	X	91.15	4.21	7.16	95.33	2.35	4.64
RGMQ9C		86.61	-0.33	-0.56	92.05	-0.93	-1.83
RNZY9D		86.91	-0.03	-0.05	93.22	0.24	0.48
RQAPYG	*	87.01	0.07	0.12	91.95	-1.03	-2.03
UGA9ZN		86.93	-0.01	-0.01	93.01	0.03	0.06
VG4DTM		86.11	-0.83	-1.41	92.91	-0.07	-0.13
VHL8UW		87.38	0.45	0.76	93.93	0.95	1.88
VHZU7J		86.95	0.01	0.02	93.38	0.40	0.79
WNL7HR		86.54	-0.39	-0.67	92.76	-0.22	-0.44
WV3F99		86.50	-0.44	-0.74	93.11	0.13	0.26
XKZGXE		87.16	0.22	0.38	93.10	0.12	0.24
YJZ2YM		86.58	-0.36	-0.61	92.78	-0.20	-0.39
ZYB29H		86.74	-0.20	-0.34	91.94	-1.04	-2.05



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

**Report #280G  
February 2016**

**Opacity (89% Reflectance Backing) - Fine Papers**

	<b>Sample GN27</b>	<b>Summary Statistics</b>	<b>Sample GN28</b>
Grand Means	86.937 Percent		92.978 Percent
SD Btwn Labs	0.588 Percent		0.507 Percent
Statistics based on 39 of 41 reporting participants			

**Comments on Assigned Data Flags for Test #384**

467328 (X) - Data for sample GN27 are high.

RAZXWC (X) - Extreme data.

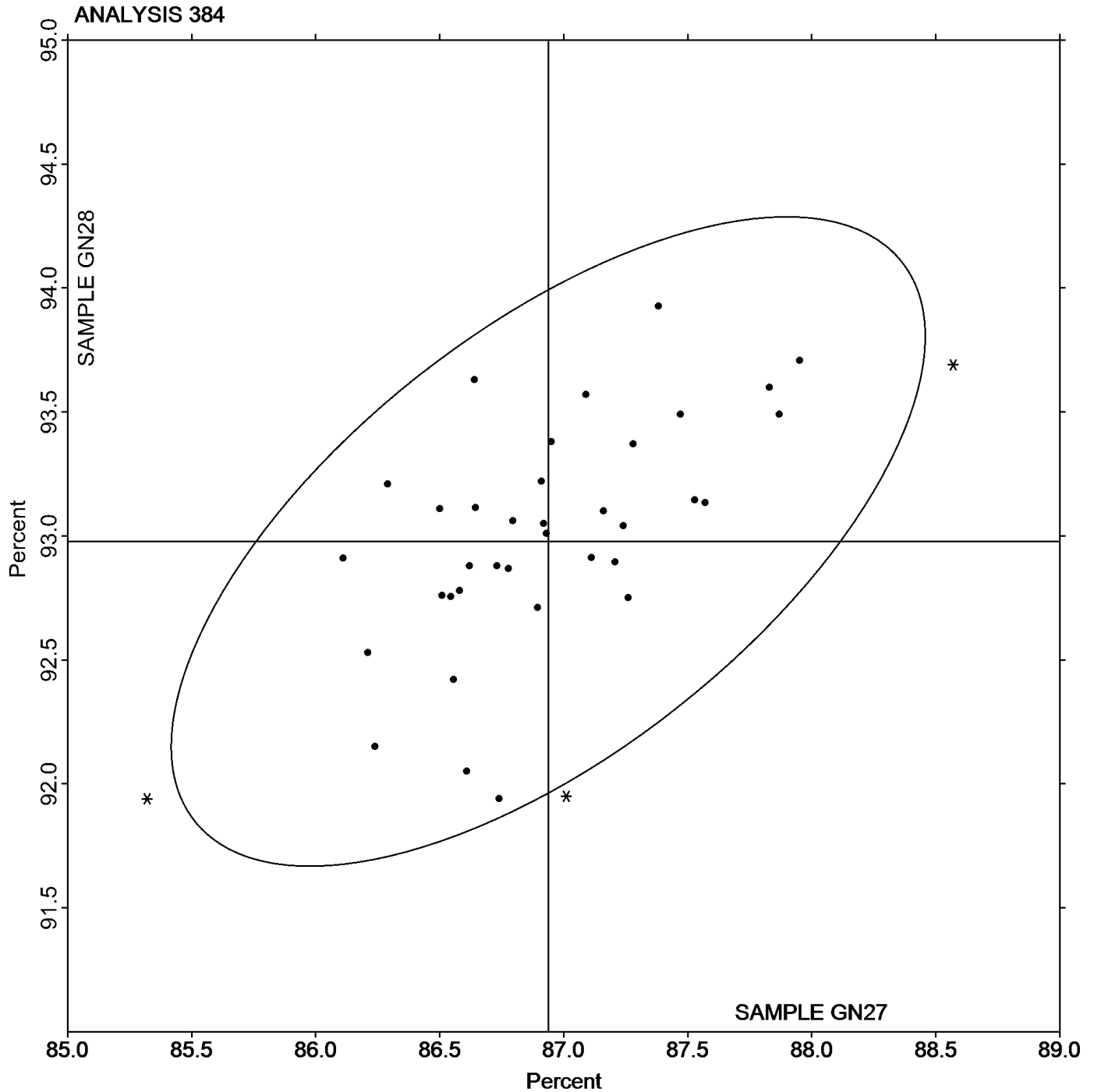


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 384**  
**Opacity (89% Reflectance Backing) - Fine Papers**

Report #280G  
February 2016

Grand Mean Sample **GN27** = 86.937 Percent

Grand Mean Sample **GN28** = 92.978 Percent





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

Report #280G  
February 2016

WebCode	Data Flag	Sample GP27			Sample GP28		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
36CZWD		88.88	-0.11	-0.43	93.65	-0.02	-0.20
6WQJG9		88.74	-0.24	-0.95	93.79	0.11	0.90
88Z3QE		89.02	0.03	0.11	93.49	-0.19	-1.54
92A862		88.71	-0.28	-1.09	93.58	-0.10	-0.82
BLNC3A		89.36	0.37	1.44	93.73	0.05	0.39
C7APT4		88.97	-0.02	-0.07	93.83	0.15	1.25
CJWZFA		89.34	0.35	1.37	93.73	0.05	0.39
HEJ9R4		89.03	0.04	0.16	93.49	-0.19	-1.54
KQ9L7Q		88.60	-0.39	-1.52	93.91	0.24	1.93
LU8G3X		88.98	-0.01	-0.05	93.54	-0.14	-1.12
PDQKCU	X	86.75	-2.24	-8.68	92.72	-0.96	-7.89
QXTVVN		88.90	-0.09	-0.36	93.74	0.06	0.51
RBAACT		89.09	0.10	0.38	93.68	0.00	0.01
RQ9W3U		88.89	-0.10	-0.39	93.68	0.00	0.00
U88NYG		88.77	-0.22	-0.84	93.71	0.03	0.22
WEY63G		89.59	0.60	2.33	93.82	0.14	1.17
XJ7V6M		88.81	-0.18	-0.70	93.58	-0.10	-0.84
Y93ZLH		89.14	0.15	0.58	93.59	-0.09	-0.71

		<b>Summary Statistics</b>	
	<b>Sample GP27</b>		<b>Sample GP28</b>
Grand Means	88.988 Percent		93.678 Percent
SD Btwn Labs	0.258 Percent		0.122 Percent
Statistics based on 17 of 18 reporting participants			

**Comments on Assigned Data Flags for Test #386**

PDQKCU (X) - Extreme data.

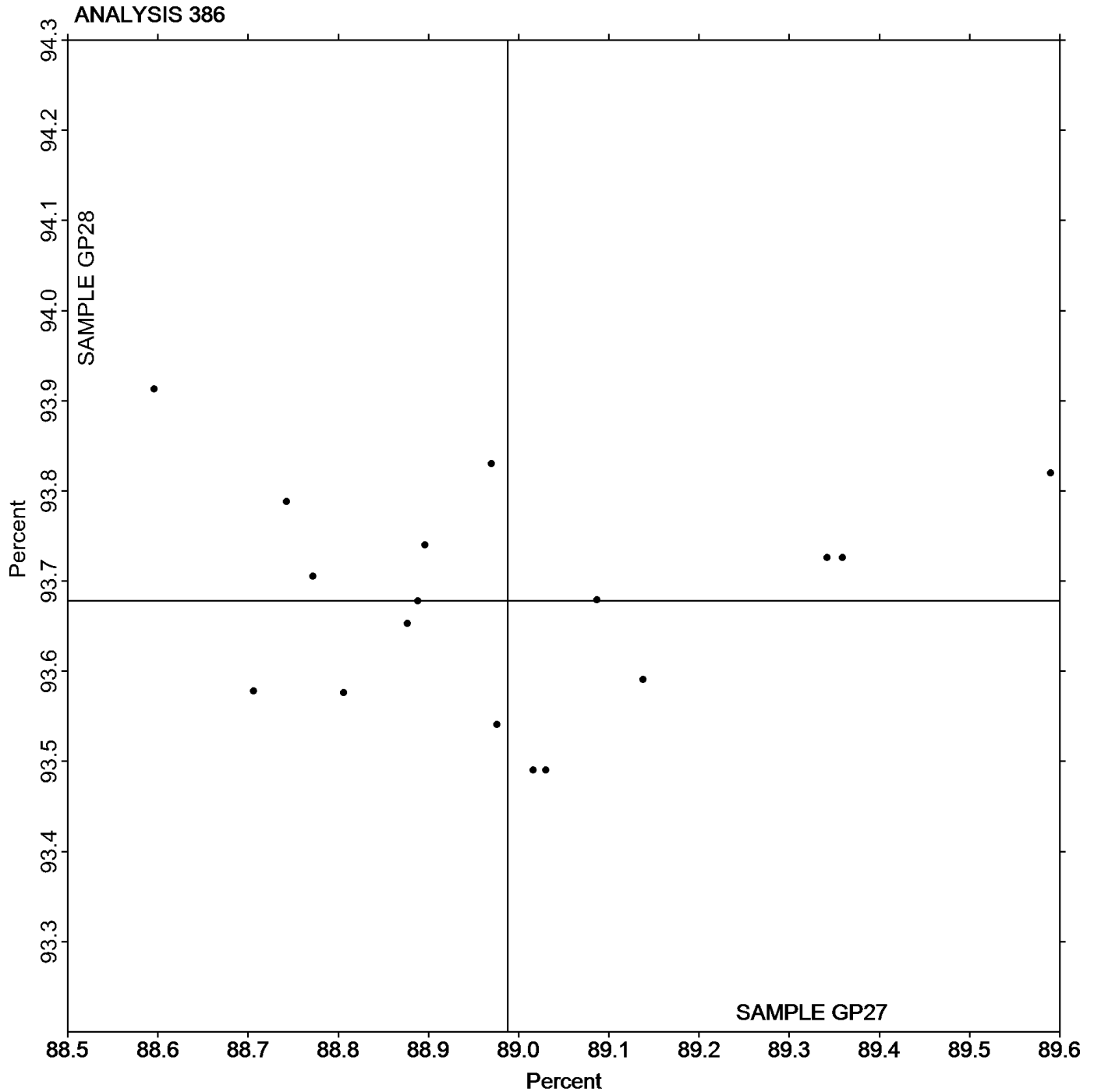


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 386**  
**Opacity (Paper Backing) - Fine Papers and Newsprint**

Report #280G  
February 2016

Grand Mean Sample **GP27** = 88.988 Percent

Grand Mean Sample **GP28** = 93.678 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 #280G  
February 2016**

WebCode	Data Flag	Sample GR27			Sample GR28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3YNAC3		81.05	-1.20	-0.70	81.10	-1.13	-0.69	TT
467328		84.23	1.97	1.15	84.58	2.35	1.42	TT
789M2C		80.14	-2.12	-1.24	80.08	-2.15	-1.30	TT
7J27H4	X	75.08	-7.18	-4.19	74.90	-7.33	-4.45	XX
8JTL6K		86.03	3.77	2.20	85.66	3.43	2.08	TA
ACBVWX		85.10	2.85	1.66	84.95	2.72	1.65	XX
BLQ29R		82.21	-0.04	-0.02	82.46	0.23	0.14	XX
C869V6		83.47	1.22	0.71	83.26	1.03	0.63	HD
CNBBTD		80.61	-1.64	-0.96	80.38	-1.85	-1.12	TS
D4ZZ4Z		81.74	-0.51	-0.30	81.37	-0.86	-0.52	TS
HAQ4YY		83.59	1.34	0.78	83.50	1.27	0.77	HD
HEKZNP		81.98	-0.28	-0.16	81.93	-0.30	-0.18	XX
HPQHLN		83.59	1.34	0.78	83.85	1.62	0.98	TS
HXYGT4		80.65	-1.60	-0.94	81.20	-1.03	-0.62	TT
J8KXYJ		81.11	-1.14	-0.67	80.93	-1.30	-0.79	XX
JK4PK6		83.36	1.11	0.65	83.25	1.02	0.62	HG
K72GGV		80.19	-2.07	-1.21	80.36	-1.87	-1.13	TT
MFZQ2Q		81.40	-0.85	-0.50	80.64	-1.59	-0.96	TS
MHRMPK	X	89.33	7.07	4.13	95.49	13.26	8.04	XX
N2HK6G		80.53	-1.73	-1.01	80.38	-1.85	-1.12	TT
NLMZNU		82.68	0.42	0.25	82.86	0.63	0.38	TT
PDQKCU		80.89	-1.37	-0.80	80.19	-2.04	-1.24	TS
PXYP2P	*	85.94	3.68	2.15	84.83	2.60	1.57	PE
Q6QKED		83.76	1.50	0.88	84.04	1.81	1.10	XX
QG6HJH		83.09	0.83	0.49	83.45	1.22	0.74	TT
RAZXWC	X	68.11	-14.15	-8.25	68.64	-13.59	-8.25	TS
RGMQ9C		82.84	0.58	0.34	82.65	0.42	0.26	TS
RQAPYG		81.99	-0.27	-0.16	82.00	-0.23	-0.14	TS
UGA9ZN		80.40	-1.85	-1.08	79.97	-2.26	-1.37	TS
VHL8UW		80.41	-1.85	-1.08	81.45	-0.78	-0.48	GM
XKZGXE		81.89	-0.37	-0.21	81.80	-0.43	-0.26	MK
XUQ34C	X	65.13	-17.13	-9.99	61.79	-20.44	-12.40	TS
ZYB29H		80.53	-1.73	-1.01	81.56	-0.67	-0.41	XS

Sample GR27		Summary Statistics		Sample GR28	
Grand Means	82.254 Percent			82.229 Percent	
SD Btwn Labs	1.714 Percent			1.649 Percent	
Statistics based on 29 of 33 reporting participants					





**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 390**  
**Directional Brightness**

**Report #280G**  
**February 2016**

**Comments on Assigned Data Flags for Test #390**

XUQ34C (X) - Extreme Data.

7J27H4 (X) - Data for both samples are low. Possible systematic error. Inconsistent in testing within the determinations for Sample GR28.

MHRMPK (X) - Extreme data.

RAZXWC (X) - Extreme data.

**Key to Instrument Codes Reported by Participants**

<b>GM</b>	Gretag Macbeth Color i5	<b>HD</b>	Hunter D25DP - 9000
<b>HG</b>	Hunter Labscan / XE	<b>MK</b>	Macbeth Color-Eye 7000 Spectrophotometer
<b>PE</b>	Photovolt 577	<b>TA</b>	Technidyne, Diano, M.S. S-4
<b>TS</b>	Technidyne Brightimeter Micro S-5	<b>TT</b>	Technidyne Brightimeter Micro S4-M
<b>XS</b>	X-Rite 938 Spectrodensitometer	<b>XX</b>	Instrument make/model not specified by lab



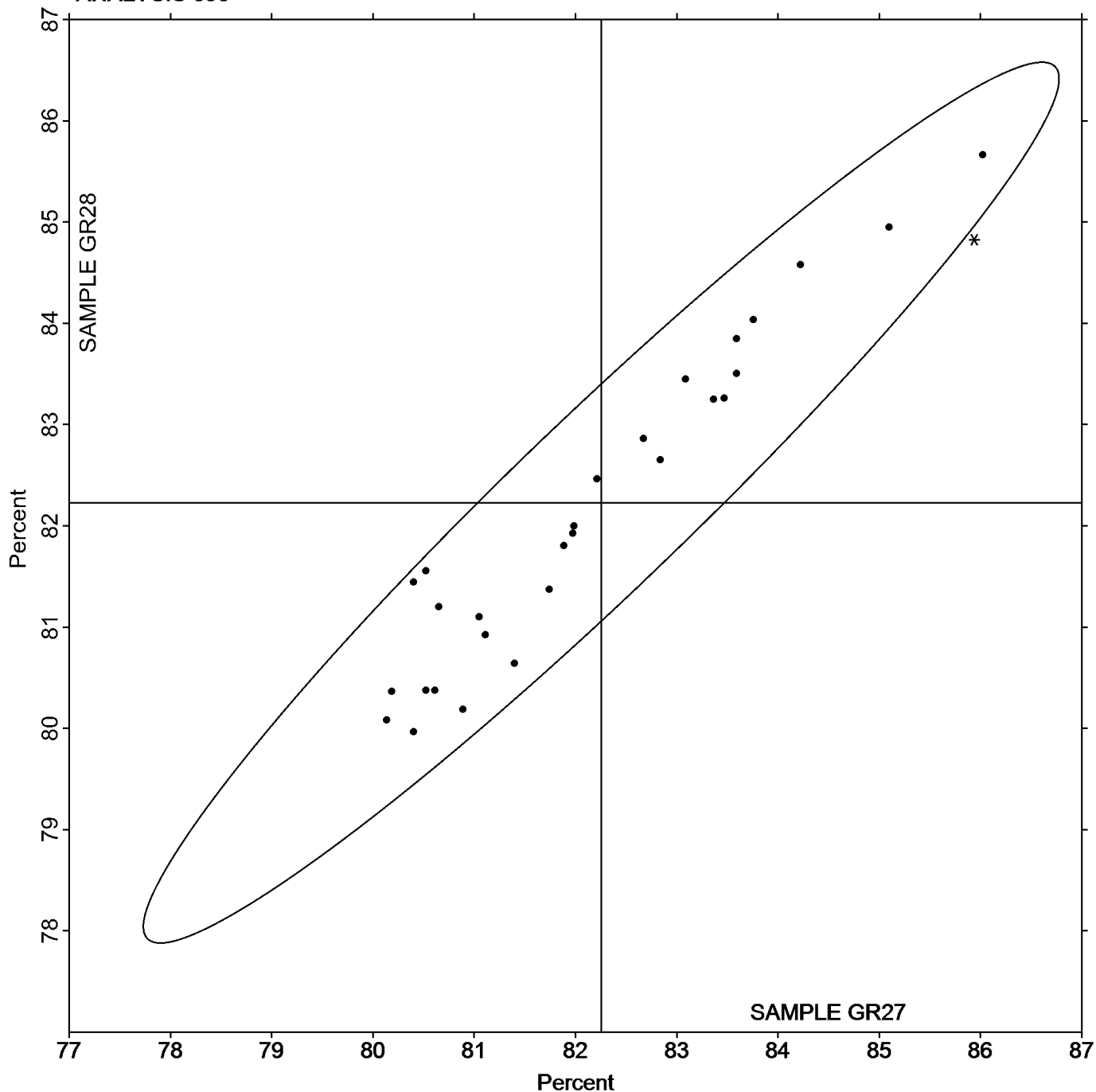
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 390**  
**Directional Brightness**

Report #280G  
February 2016

Grand Mean Sample **GR27** = 82.254 Percent

Grand Mean Sample **GR28** = 82.229 Percent

**ANALYSIS 390**





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

Report #280G  
February 2016

WebCode	Data Flag	Sample GZ27			Sample GZ28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4F44DC		89.73	-0.41	-0.38	93.41	-0.28	-0.24	TS
6Z8B7F		89.42	-0.72	-0.67	93.36	-0.33	-0.28	TS
7FX98B		90.71	0.57	0.53	94.42	0.73	0.63	TS
CNBBTD		89.77	-0.37	-0.34	93.57	-0.12	-0.10	TS
EK4W3P		90.20	0.06	0.05	94.28	0.59	0.51	TT
FEUZUA		89.62	-0.53	-0.49	92.93	-0.76	-0.65	TS
GCYWFT		90.08	-0.07	-0.06	93.70	0.01	0.01	TS
MVGLGM		90.32	0.18	0.17	93.93	0.25	0.21	TS
Q6QKED		90.92	0.78	0.73	94.84	1.15	0.99	XX
QG2XUT		89.76	-0.38	-0.36	93.64	-0.05	-0.04	TT
RNZY9D		89.35	-0.80	-0.74	92.42	-1.26	-1.08	HT
RQAPYG		91.00	0.86	0.80	94.76	1.07	0.92	TS
TQGN7V		91.56	1.42	1.33	95.09	1.40	1.20	TS
VHL8UW		88.13	-2.01	-1.87	91.16	-2.53	-2.16	GM
VHZU7J		88.51	-1.63	-1.52	91.70	-1.99	-1.71	HT
WHHZ6A	*	92.99	2.85	2.65	96.18	2.50	2.14	EF
WNL7HR		90.46	0.31	0.29	93.85	0.16	0.14	TS
WV3F99		90.38	0.24	0.22	93.30	-0.39	-0.33	TT
YJZ2YM		89.78	-0.36	-0.34	93.54	-0.15	-0.13	PP

Sample GZ27		Summary Statistics	Sample GZ28	
Grand Means	90.142 Percent		93.688 Percent	
SD Btwn Labs	1.072 Percent		1.168 Percent	
Statistics based on 19 of 19 reporting participants				

**Key to Instrument Codes Reported by Participants**

<b>EF</b>	L & W Datacolor Elrepho	<b>GM</b>	Gretag Macbeth Color i5
<b>HT</b>	Hunter UltraScan Vis	<b>PP</b>	Technidyne Profile/Plus
<b>TS</b>	Technidyne Brightimeter Micro S-5	<b>TT</b>	Technidyne Brightimeter Micro S4-M
<b>XX</b>	Instrument make/model not specified by lab		

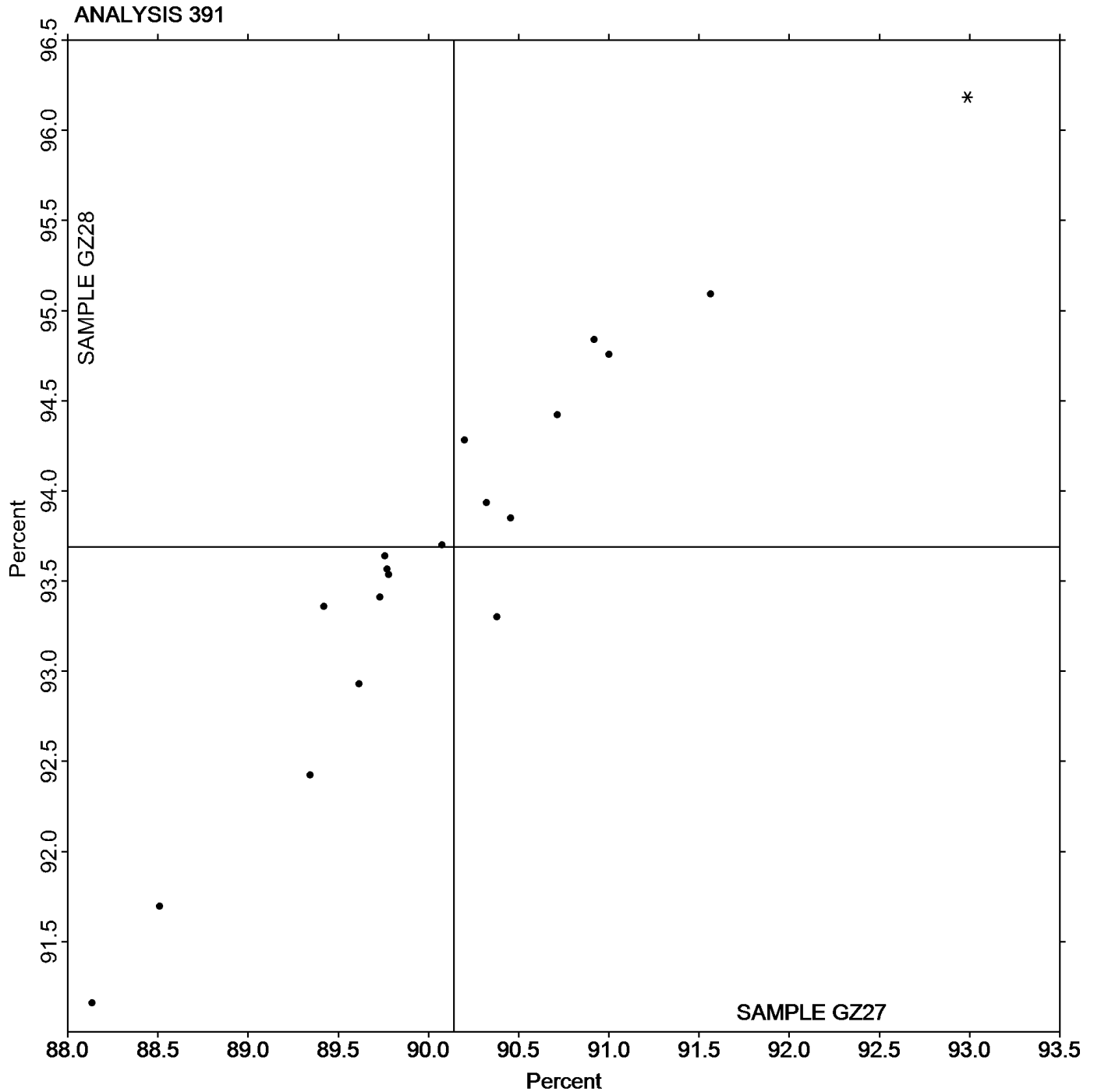


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 391**  
**Directional Brightness of Fluorescent Samples**

Report #280G  
February 2016

Grand Mean Sample **GZ27** = 90.142 Percent

Grand Mean Sample **GZ28** = 93.688 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 #280G  
February 2016**

WebCode	Data Flag	Sample GR27			Sample GR28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
36CZWD		81.42	0.07	0.27	81.46	0.08	0.26	LA
6WQJG9		81.23	-0.11	-0.43	81.23	-0.15	-0.52	LS
7ACHKF		81.42	0.08	0.29	81.44	0.06	0.22	TC
7J27H4	X	79.51	-1.84	-6.94	79.55	-1.83	-6.39	TC
A2PQPY		81.42	0.07	0.27	81.44	0.06	0.21	TC
B7EQGY	X	80.75	-0.59	-2.25	81.21	-0.17	-0.58	TC
BDYQWC		81.88	0.54	2.03	81.94	0.56	1.95	TC
BLNC3A		81.33	-0.02	-0.06	81.21	-0.17	-0.59	TC
C7APT4		81.15	-0.20	-0.74	81.14	-0.24	-0.85	TM
CJWZFA		81.72	0.37	1.40	81.86	0.48	1.67	TC
CNBBTD		81.52	0.17	0.66	81.55	0.17	0.59	LT
D83XET		81.47	0.13	0.48	81.40	0.02	0.08	TC
FRG64Q		81.33	-0.02	-0.07	81.36	-0.02	-0.08	PP
HEKZSQ		81.48	0.13	0.49	81.43	0.05	0.17	EE
K72GGV		81.36	0.01	0.03	81.42	0.04	0.13	EG
KQ9L7Q		81.42	0.07	0.26	81.39	0.01	0.04	LS
LBBUYU		81.21	-0.14	-0.51	81.22	-0.16	-0.56	TC
LU8G3X		81.22	-0.13	-0.49	81.30	-0.08	-0.28	TC
NLMZNU		81.19	-0.16	-0.60	81.34	-0.04	-0.15	TL
NU2MWX	*	80.69	-0.66	-2.49	80.58	-0.81	-2.81	EF
PBK3DY		81.59	0.24	0.92	81.69	0.31	1.08	EG
PDQKCU	X	82.18	0.83	3.14	80.91	-0.47	-1.63	TM
QG6HJH		81.06	-0.28	-1.07	81.15	-0.23	-0.80	EG
QWXA3X		81.41	0.06	0.22	81.30	-0.08	-0.29	TC
QXTVVN		80.83	-0.52	-1.97	80.89	-0.50	-1.73	EG
RQ9W3U		81.74	0.39	1.49	81.98	0.60	2.08	TC
T4R2MW		81.58	0.24	0.90	81.62	0.24	0.82	TC
UGA9ZN		81.39	0.05	0.17	81.32	-0.06	-0.20	TC
UQZU6L		81.15	-0.20	-0.74	81.27	-0.11	-0.39	TC
V8HALM		81.64	0.30	1.13	81.59	0.21	0.72	LA
WHHZ6A		80.98	-0.37	-1.39	81.17	-0.22	-0.75	LA
Y93ZLH		81.23	-0.11	-0.43	81.38	0.00	-0.01	TM

Sample GR27		Summary Statistics	Sample GR28	
Grand Means	81.346 Percent		81.380 Percent	
SD Btwn Labs	0.264 Percent		0.286 Percent	
Statistics based on 29 of 32 reporting participants				



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 392**  
**Diffuse Brightness**

**Report #280G**  
**February 2016**

**Comments on Assigned Data Flags for Test #392**

PDQKCU (X) - Inconsistent in testing between samples. Data for sample GR27 are high. Inconsistent within the determinations of both samples.

B7EQGY (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample GR27.

7J27H4 (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

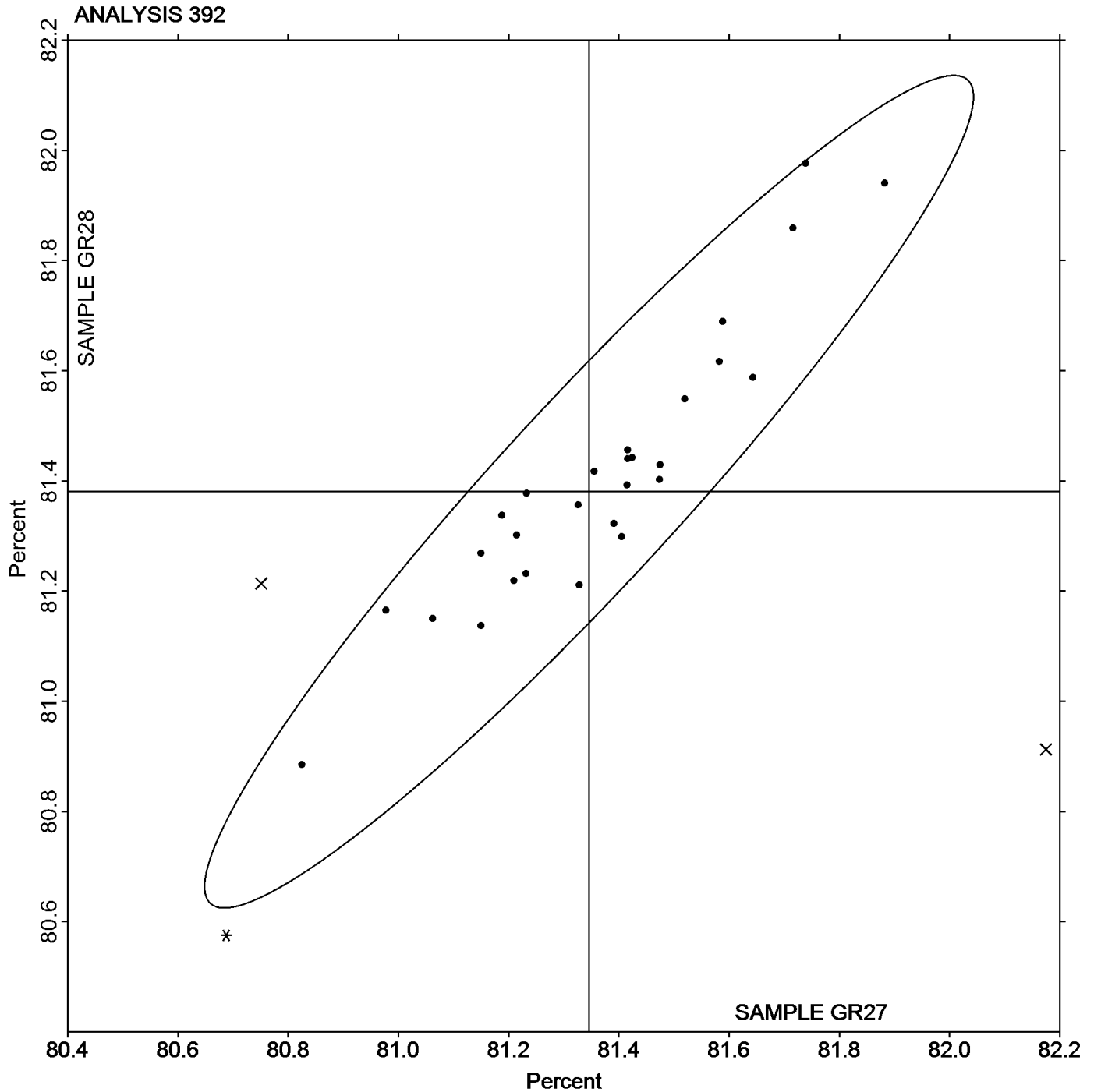


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 392**  
**Diffuse Brightness**

Report #280G  
February 2016

Grand Mean Sample **GR27** = 81.346 Percent

Grand Mean Sample **GR28** = 81.380 Percent





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

**Report #280G  
February 2016**

WebCode	Data Flag	Sample GZ27			Sample GZ28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4F44DC		7.092	-0.148	-0.50	6.040	-0.058	-0.22	TS
7FX98B		7.150	-0.090	-0.30	6.064	-0.034	-0.13	TS
CNBBTD		7.566	0.326	1.11	6.496	0.398	1.55	TS
FEUZUA		7.180	-0.060	-0.20	6.112	0.014	0.06	TS
GCYWFT		7.394	0.154	0.52	6.150	0.052	0.20	TS
MVGLGM		7.280	0.040	0.14	6.236	0.138	0.54	TS
Q6QKED		6.580	-0.660	-2.24	5.704	-0.394	-1.53	XX
QG2XUT		7.420	0.180	0.61	6.320	0.222	0.86	TT
RQAPYG		7.008	-0.232	-0.79	5.748	-0.350	-1.36	TS
TQGN7V		7.112	-0.128	-0.43	5.768	-0.330	-1.28	TS
VHL8UW	X	9.640	2.400	8.15	8.438	2.340	9.11	GM
WHHZ6A	X	10.338	3.098	10.52	8.978	2.880	11.21	EF
WNL7HR		7.580	0.340	1.16	6.316	0.218	0.85	TS
WV3F99		7.680	0.440	1.50	6.400	0.302	1.18	TT
YJZ2YM		7.072	-0.168	-0.57	5.916	-0.182	-0.71	PP

Sample GZ27		Summary Statistics		Sample GZ28	
Grand Means	7.2395 Percent			6.0977 Percent	
SD Btwn Labs	0.2945 Percent			0.2570 Percent	
Statistics based on 13 of 15 reporting participants					

**Comments on Assigned Data Flags for Test #394**

- VHL8UW (X) - Extreme data.
- WHHZ6A (X) - Extreme data.

**Key to Instrument Codes Reported by Participants**

<b>EF</b>	Datacolor Elrepho 3000	<b>GM</b>	Gretag Macbeth Color i5
<b>PP</b>	Technidyne Profile/Plus	<b>TS</b>	Technidyne Brightimeter Micro S-5
<b>TT</b>	Technidyne Brightimeter Micro S4-M	<b>XX</b>	Instrument make/model not specified by lab



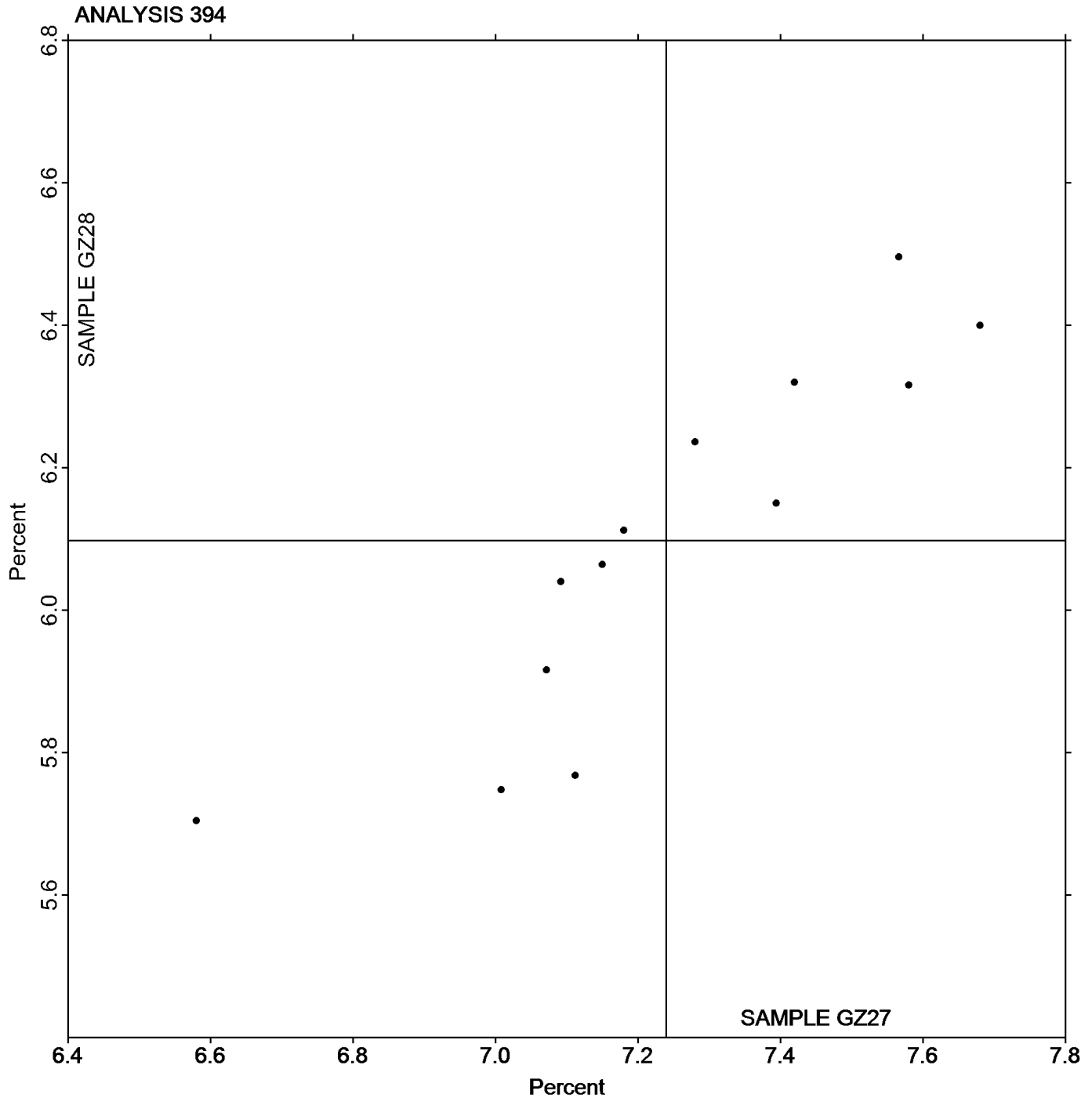


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 394**  
**Fluorescent Component of Directional Brightness**

Report #280G  
February 2016

Grand Mean Sample **GZ27** = 7.2395 Percent

Grand Mean Sample **GZ28** = 6.0977 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 395  
Specular Gloss at 75 Degrees - High Range**

**Report #280G  
February 2016**

WebCode	Data Flag	Sample GT27			Sample GT28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3YNAC3		74.65	1.14	0.64	69.73	0.44	0.28	TH
4VK2HC		73.95	0.44	0.25	69.69	0.40	0.25	LA
789M2C		75.91	2.39	1.34	71.60	2.31	1.45	TG
9BZTBY		72.05	-1.46	-0.82	69.11	-0.18	-0.11	XX
B7EQGY		74.60	1.09	0.61	67.10	-2.19	-1.37	ZH
C869V6		74.23	0.72	0.40	71.91	2.62	1.64	TH
DFQUE9		74.50	0.99	0.55	71.28	1.99	1.25	GM
EK4W3P		73.84	0.33	0.18	71.09	1.80	1.13	TG
GCYWFT		71.00	-2.51	-1.40	68.24	-1.05	-0.66	LA
HAQ4YY		70.22	-3.29	-1.84	70.22	0.93	0.58	TH
K72GGV		74.19	0.68	0.38	69.43	0.14	0.09	TH
KQ9L7Q		74.12	0.61	0.34	69.55	0.26	0.16	LB
NLMZNU		75.05	1.54	0.86	69.02	-0.27	-0.17	GS
PDQKCU		74.68	1.17	0.65	69.82	0.53	0.33	TH
QG6HJH		74.39	0.88	0.49	67.88	-1.41	-0.88	GM
RAZXWC	*	68.70	-4.81	-2.68	66.42	-2.87	-1.80	LA
WEY63G		75.60	2.09	1.17	66.60	-2.69	-1.68	GA
WV3F99		73.90	0.38	0.21	67.06	-2.23	-1.40	PP
XKZGXE		72.70	-0.81	-0.45	70.48	1.19	0.75	PP
Y88HKG		72.92	-0.59	-0.33	69.23	-0.06	-0.04	XX
YJZ2YM		72.54	-0.97	-0.54	69.58	0.29	0.18	PP

Sample GT27		Summary Statistics	Sample GT28	
Grand Means	73.511 Gloss Units		69.287 Gloss Units	
SD Btwn Labs	1.792 Gloss Units		1.596 Gloss Units	
Statistics based on 21 of 21 reporting participants				

**Key to Instrument Codes Reported by Participants**

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



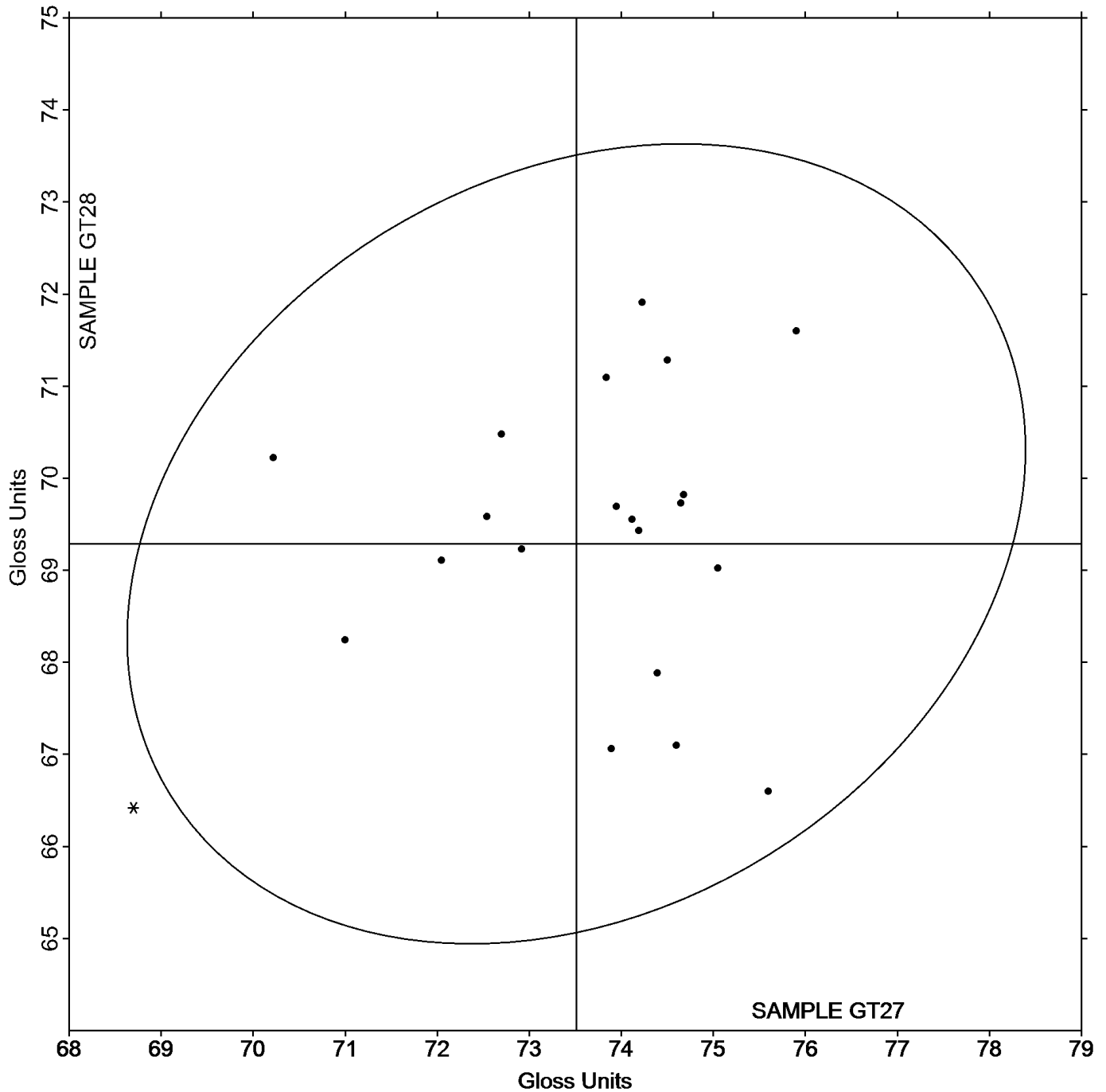
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 395**  
**Specular Gloss at 75 Degrees - High Range**

Report #280G  
February 2016

Grand Mean Sample **GT27** = 73.511 Gloss Units

Grand Mean Sample **GT28** = 69.287 Gloss Units

**ANALYSIS 395**





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

**Report #280G  
February 2016**

WebCode	Data Flag	Sample GU27			Sample GU28			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
789M2C		26.99	0.22	0.43	46.19	1.10	0.91	TG
7J27H4		27.39	0.62	1.20	45.54	0.44	0.37	TH
8JTL6K		26.10	-0.68	-1.31	44.44	-0.66	-0.54	TH
CCWFFY		26.42	-0.35	-0.68	44.25	-0.85	-0.70	XX
CJYPK7		26.55	-0.22	-0.43	44.59	-0.51	-0.42	PP
KQ9L7Q		26.01	-0.76	-1.48	44.28	-0.82	-0.68	LA
PBK3DY		27.09	0.32	0.62	46.41	1.31	1.09	TH
RQAPYG		26.61	-0.16	-0.31	42.83	-2.27	-1.88	GN
WHHZ6A		27.05	0.28	0.54	46.56	1.46	1.21	TG
ZYB29H		27.51	0.74	1.43	45.87	0.77	0.64	TH

		<b>Summary Statistics</b>	
		<b>Sample GU27</b>	<b>Sample GU28</b>
Grand Means		26.772 Gloss Units	45.096 Gloss Units
SD Btwn Labs		0.515 Gloss Units	1.205 Gloss Units
Statistics based on 10 of 10 reporting participants			

**Key to Instrument Codes Reported by Participants**

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

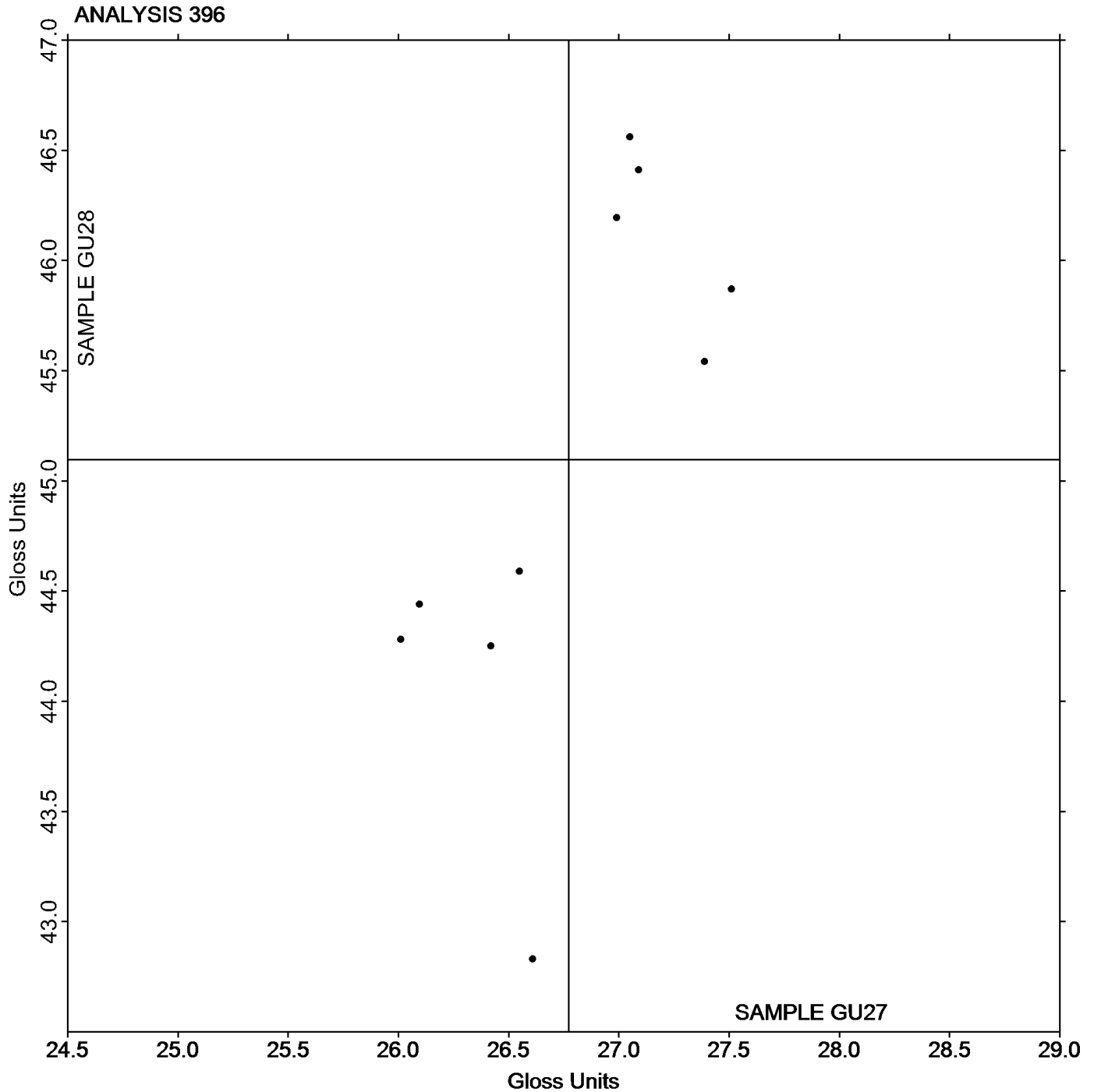


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 396**  
**Specular Gloss at 75 Degrees - Low Range**

Report #280G  
February 2016

Grand Mean Sample **GU27** = 26.772 Gloss Units

Grand Mean Sample **GU28** = 45.096 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 #280G  
February 2016

WebCode	Data Flag	Sample GW27			Sample GW28		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
4J686Y		86.85	0.84	1.65	101.1	0.8	1.59
66Z8U7		85.80	-0.21	-0.41	100.0	-0.3	-0.62
6WQJG9		85.67	-0.34	-0.66	100.8	0.4	0.86
6Z8B7F		84.92	-1.09	-2.14	99.7	-0.6	-1.21
7FX98B		85.27	-0.74	-1.45	100.1	-0.2	-0.43
88Z3QE		86.18	0.17	0.34	100.3	0.0	-0.06
8JTL6K		85.55	-0.45	-0.89	99.5	-0.9	-1.69
BLQ29R	X	85.29	-0.72	-1.42	99.5	-0.9	-1.70
CCWFFY		85.73	-0.28	-0.55	100.5	0.2	0.41
GYCMTM		85.95	-0.06	-0.12	100.2	-0.1	-0.25
HEJ9R4		86.18	0.17	0.34	100.7	0.4	0.74
HEKZNQ		86.68	0.67	1.32	101.0	0.7	1.29
J8KXYJ		86.26	0.25	0.50	100.3	0.0	-0.03
JK4PK6		86.07	0.06	0.12	99.6	-0.7	-1.45
JTKYBM		86.42	0.41	0.81	100.7	0.4	0.76
JZ43HP	X	85.74	-0.27	-0.54	98.1	-2.3	-4.46
KQ9L7Q		85.79	-0.22	-0.43	100.5	0.1	0.26
LU8G3X		86.37	0.36	0.72	100.6	0.3	0.51
NXEPL		86.00	-0.01	-0.02	100.5	0.2	0.34
P7NB8M		86.51	0.50	0.98	100.5	0.2	0.33
PBK3DY		85.54	-0.46	-0.91	100.3	0.0	-0.08
PQWD7R	*	87.21	1.20	2.36	101.7	1.3	2.61
RNZY9D		86.33	0.32	0.63	99.8	-0.5	-1.04
VHL8UW		85.27	-0.74	-1.46	99.5	-0.8	-1.61
VHZU7J		85.81	-0.20	-0.40	100.1	-0.2	-0.46
WHHZ6A		85.80	-0.21	-0.41	100.4	0.1	0.15
XJ7V6M		85.93	-0.08	-0.15	100.1	-0.2	-0.35
ZYB29H		86.13	0.12	0.23	100.0	-0.3	-0.58

Sample GW27		Summary Statistics	Sample GW28	
Grand Means	86.009 g/sq m		100.33 g/sq m	
SD Btwn Labs	0.509 g/sq m		0.51 g/sq m	
Statistics based on 26 of 28 reporting participants				

**Comments on Assigned Data Flags for Test #398**

JZ43HP (X) - Data for sample GW28 are low. Inconsistent within the determinations of sample GW28.

BLQ29R (X) - Data appear to be off by a factor of 0.01. Corrected by CTS (x100).

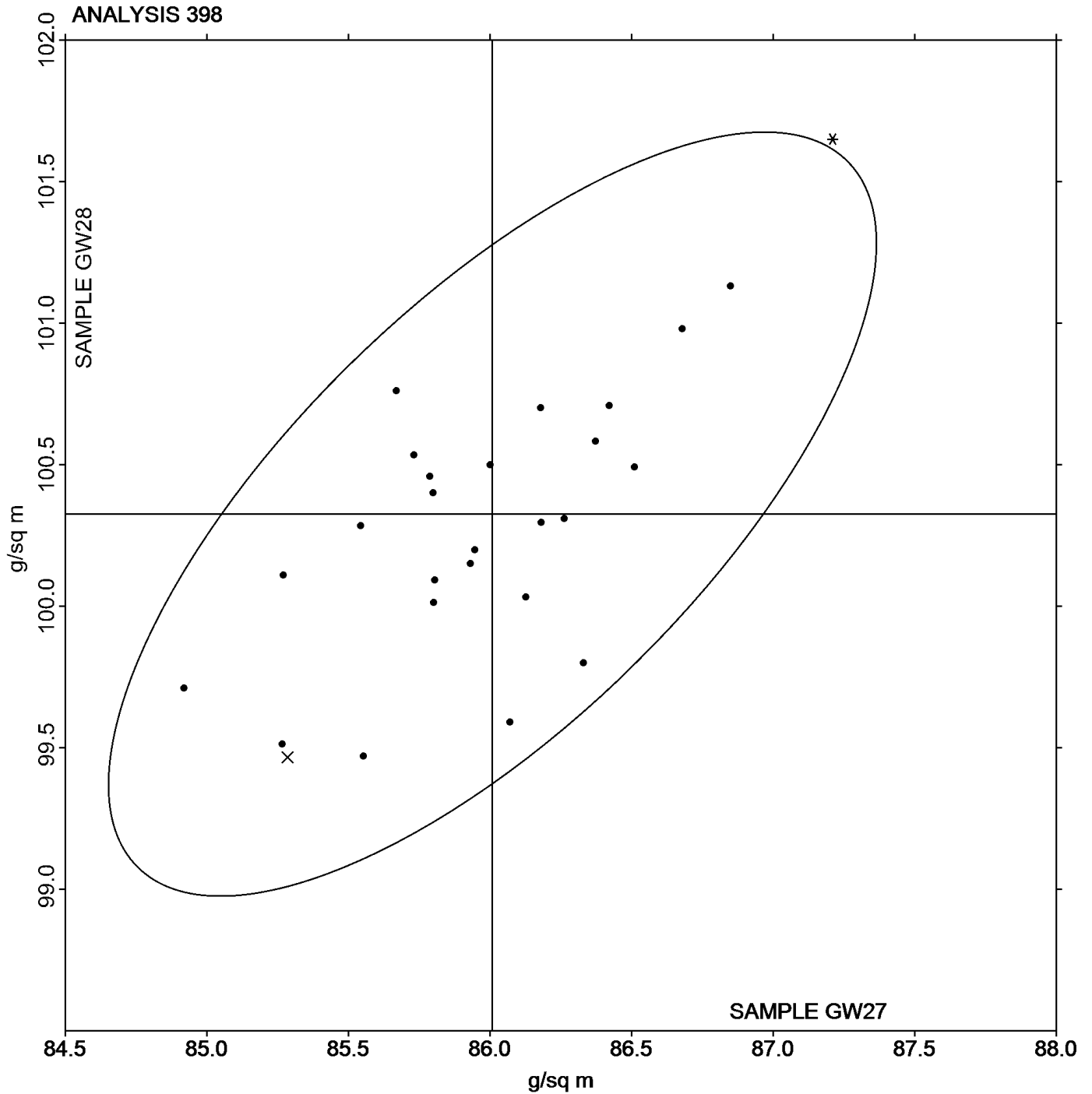


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 398**  
**Grammage (Mass per Unit Area)**

Report #280G  
February 2016

Grand Mean Sample **GW27** = 86.009 g/sq m

Grand Mean Sample **GW28** = 100.33 g/sq m





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

Report #280G  
February 2016

WebCode	Data Flag	Sample GX27			Sample GX28		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
3YNAC3		9.60	-2.82	-0.81	12.99	-2.52	-0.53
467328	*	22.90	10.48	3.02	24.00	8.49	1.79
4F44DC		12.99	0.57	0.16	11.35	-4.16	-0.88
6Z8B7F		9.40	-3.02	-0.87	14.70	-0.81	-0.17
ACBVWX		10.53	-1.89	-0.55	12.09	-3.42	-0.72
AFA7TX	X	29.10	16.68	4.81	25.30	9.79	2.06
BLQ29R		11.93	-0.49	-0.14	16.48	0.97	0.21
BRH9RZ		10.83	-1.59	-0.46	13.90	-1.61	-0.34
CJYPK7		9.65	-2.77	-0.80	13.19	-2.32	-0.49
CNBBTD		10.04	-2.38	-0.69	13.80	-1.71	-0.36
CX2YNF		10.83	-1.59	-0.46	10.53	-4.98	-1.05
D4ZZ4Z		10.38	-2.04	-0.59	11.73	-3.78	-0.80
DFQUE9		11.10	-1.32	-0.38	13.60	-1.91	-0.40
DN9336		12.19	-0.23	-0.07	18.30	2.79	0.59
GCYWFT		10.50	-1.92	-0.55	11.30	-4.21	-0.89
HUY7W4		11.63	-0.79	-0.23	17.89	2.38	0.50
HXYGT4		17.37	4.95	1.43	25.43	9.92	2.09
J43F4U	X	11.28	-1.14	-0.33	38.68	23.17	4.89
J8KXYJ	*	12.00	-0.42	-0.12	25.80	10.29	2.17
MFZQ2Q		10.55	-1.87	-0.54	9.02	-6.49	-1.37
MHRMPK		10.50	-1.92	-0.55	16.50	0.99	0.21
N2HK6G		11.73	-0.69	-0.20	16.46	0.95	0.20
PBK3DY		13.73	1.31	0.38	20.34	4.83	1.02
PXYP2P	X	21.40	8.98	2.59	50.74	35.23	7.43
R4YNPJ		18.78	6.36	1.83	15.87	0.36	0.08
RAZXWC		9.47	-2.95	-0.85	8.26	-7.25	-1.53
RQAPYG		11.95	-0.47	-0.14	12.26	-3.25	-0.68
UGA9ZN	*	21.64	9.22	2.66	22.99	7.48	1.58
VG4DTM		11.32	-1.10	-0.32	18.94	3.43	0.72
VHL8UW		11.30	-1.12	-0.32	10.20	-5.31	-1.12
WNL7HR		11.01	-1.41	-0.41	14.35	-1.16	-0.24
XKZGXE		14.43	2.01	0.58	17.44	1.93	0.41

	Sample GX27	Summary Statistics	Sample GX28
Grand Means	12.424 Seconds		15.507 Seconds
SD Btwn Labs	3.467 Seconds		4.742 Seconds
Statistics based on 29 of 32 reporting participants			





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

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**Report #280G**  
**February 2016**

**Comments on Assigned Data Flags for Test #399**

PXYP2P (X) - Extreme data for Sample GX28.

J43F4U (X) - Data for sample GX28 are high.

AFA7TX (X) - Data for sample GX27 are high. Inconsistent within the determinations of both samples.



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

Report #280G  
February 2016

Grand Mean Sample **GX27** = 12.424 Seconds

Grand Mean Sample **GX28** = 15.507 Seconds

**ANALYSIS 399**

