

## Paper & Paperboard Testing Program

### Summary Report #3012 G - August 2019

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## **The CTS Paper & Paperboard Interlaboratory Program**

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

### **About CTS**

Founded in 1971, Collaborative Testing Services, Inc. (CTS) is a privately - owned company that specializes in interlaboratory tests for a variety of industrial sectors: rubber, plastics, fasteners and metals, CKPG, paper, color and wine, as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality assurance objectives. Labs from the U.S., as well as more than 80 countries, currently participate in CTS programs.

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>ΔE</b>	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*).
<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**

**Report #3012 G,  
August 2019**

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

Web Code	Data Flag	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	$\Delta L$	$\Delta a$	$\Delta b$	$\Delta E$	
2NHVGU		<b>GA69</b>	93.73	-0.78	4.24	0.53	0.02	-0.02	0.53	VM
		<b>GA70</b>	94.26	-0.76	4.22					
3AHQXH		<b>GA69</b>	95.04	-0.85	4.01	0.34	-0.01	-0.02	0.34	LS
		<b>GA70</b>	95.38	-0.85	3.99					
4FKAGT		<b>GA69</b>	94.37	-0.78	4.13	0.39	0.02	-0.07	0.40	HE
		<b>GA70</b>	94.76	-0.76	4.06					
7L6KTF		<b>GA69</b>	92.89	-0.34	3.78	0.34	-0.05	-0.10	0.36	TS
		<b>GA70</b>	93.22	-0.39	3.69					
8EGLTE		<b>GA69</b>	93.00	-0.20	3.79	0.32	-0.09	-0.14	0.36	TS
		<b>GA70</b>	93.32	-0.28	3.65					
AUGKJE		<b>GA69</b>	95.03	-0.82	4.02	0.30	0.00	-0.13	0.33	TC
		<b>GA70</b>	95.33	-0.82	3.90					
E4T4DL		<b>GA69</b>	93.59	-0.48	3.78	0.41	-0.01	-0.14	0.43	LA
		<b>GA70</b>	94.00	-0.49	3.64					
EZR6UG		<b>GA69</b>	94.85	-0.84	4.07	0.30	0.01	-0.14	0.33	LS
		<b>GA70</b>	95.15	-0.82	3.93					
KNZN83		<b>GA69</b>	92.73	-0.07	3.48	0.27	-0.12	-0.09	0.31	TS
		<b>GA70</b>	93.00	-0.19	3.39					
L3XKZ7		<b>GA69</b>	94.04	-1.06	4.05	0.09	0.18	-0.14	0.25	HG
		<b>GA70</b>	94.13	-0.87	3.91					
LUJ4JC		<b>GA69</b>	93.20	-0.60	3.85	0.46	-0.06	-0.01	0.46	TS
		<b>GA70</b>	93.66	-0.66	3.84					
MARKWR		<b>GA69</b>	95.49	-0.74	3.22	0.38	-0.03	-0.06	0.38	XS
		<b>GA70</b>	95.86	-0.76	3.16					
ME73EA		<b>GA69</b>	95.03	-0.79	3.98	0.33	-0.02	0.05	0.33	EH
		<b>GA70</b>	95.36	-0.81	4.02					
MGE9ZB		<b>GA69</b>	94.05	-0.75	4.11	0.47	0.01	0.00	0.47	HE
		<b>GA70</b>	94.51	-0.74	4.11					
RWARP2		<b>GA69</b>	93.72	-0.80	3.90	0.40	0.01	-0.04	0.40	TC
		<b>GA70</b>	94.11	-0.79	3.86					
ZNPV8T		<b>GA69</b>	93.69	-0.84	3.90	0.45	0.14	0.05	0.47	XX
		<b>GA70</b>	94.14	-0.70	3.95					



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August 2019**

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

Web Code	Data Flag	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	$\Delta L$	$\Delta a$	$\Delta b$	$\Delta E$	
ZNRHVX		GA69	94.52	-0.83	3.83	0.33	0.03	-0.07	0.34	HE
		GA70	94.85	-0.80	3.76					
ZTXGXB		GA69	95.11	-0.56	3.86	0.62	0.04	-0.01	0.62	ND
		GA70	95.72	-0.52	3.85					

Grand Means		Summary Statistics									
GA69	94.115	-0.673	3.888	0.373	0.004	-0.060	0.395	0.113	0.071	0.063	0.089
GA70	94.487	-0.669	3.828								
Std Dev Btw'n Labs											
GA69	0.855	0.254	0.241								
GA70	0.870	0.204	0.257								

Statistics based on 18 of 18 reporting participants

**Analysis Notes:**

- 2NHVGU - One determination removed from the Lab Mean of Sample GA69, b values, per Grubb's Test at 1% risk (TAPPI 1205).
- L3XKZ7 - One determination removed from the Lab Mean of Sample GA69, b values, per Grubb's Test at 1% risk (TAPPI 1205).

**Key to Instrument Codes Reported by Participants**

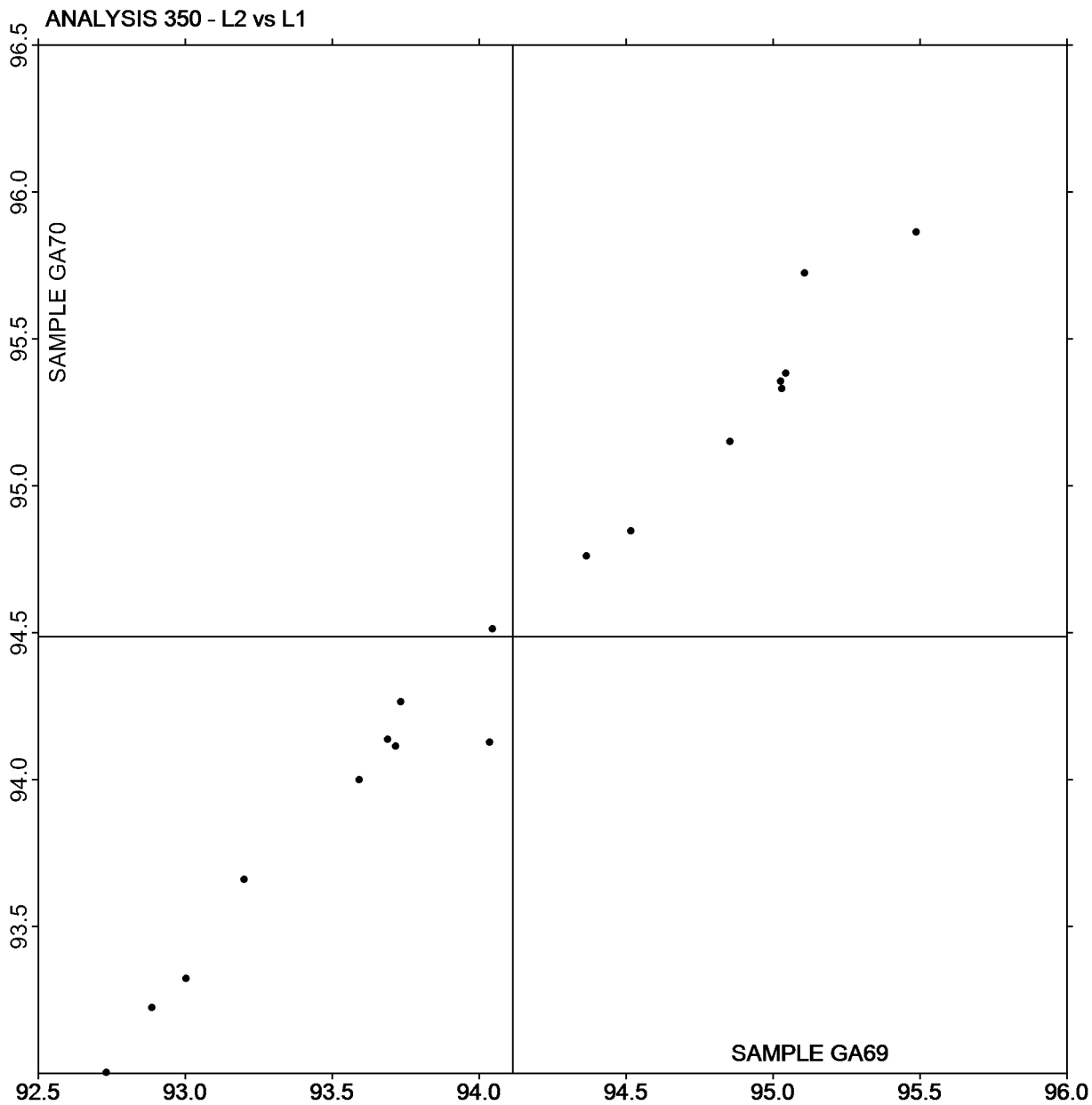
EH	Datacolor Elrepho SF450	HE	Hunter LabScan
HG	Hunter ColorQUEST	LA	L & W Elrepho AL300
LS	L & W Elrepho SE 070	ND	Minolta CM-2500d Spectrophotometer
TC	Technidyne Color Touch Series	TS	Technidyne Brightimeter Micro S-5
VM	Valmet PaperLab (was Kajaani/Robotest)	XS	X-Rite 938 Spectrodensitometer
XX	Instrument make/model not specified by lab		



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

Report #3012 G,  
August 2019

Plot of L values GA70 v L values GA69



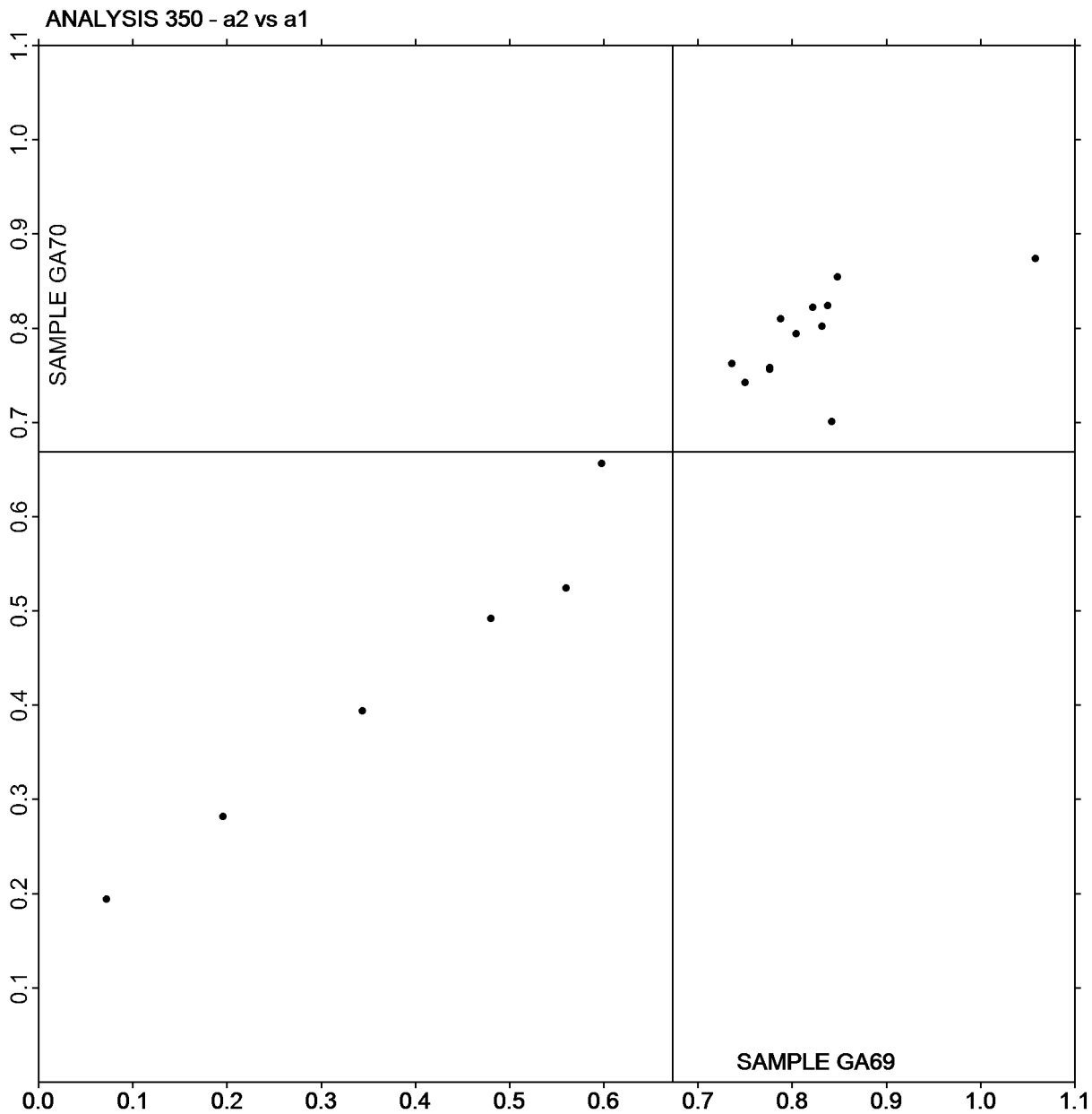
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.



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

Report #3012 G,  
August 2019

Plot of a values GA70 v a values GA69



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

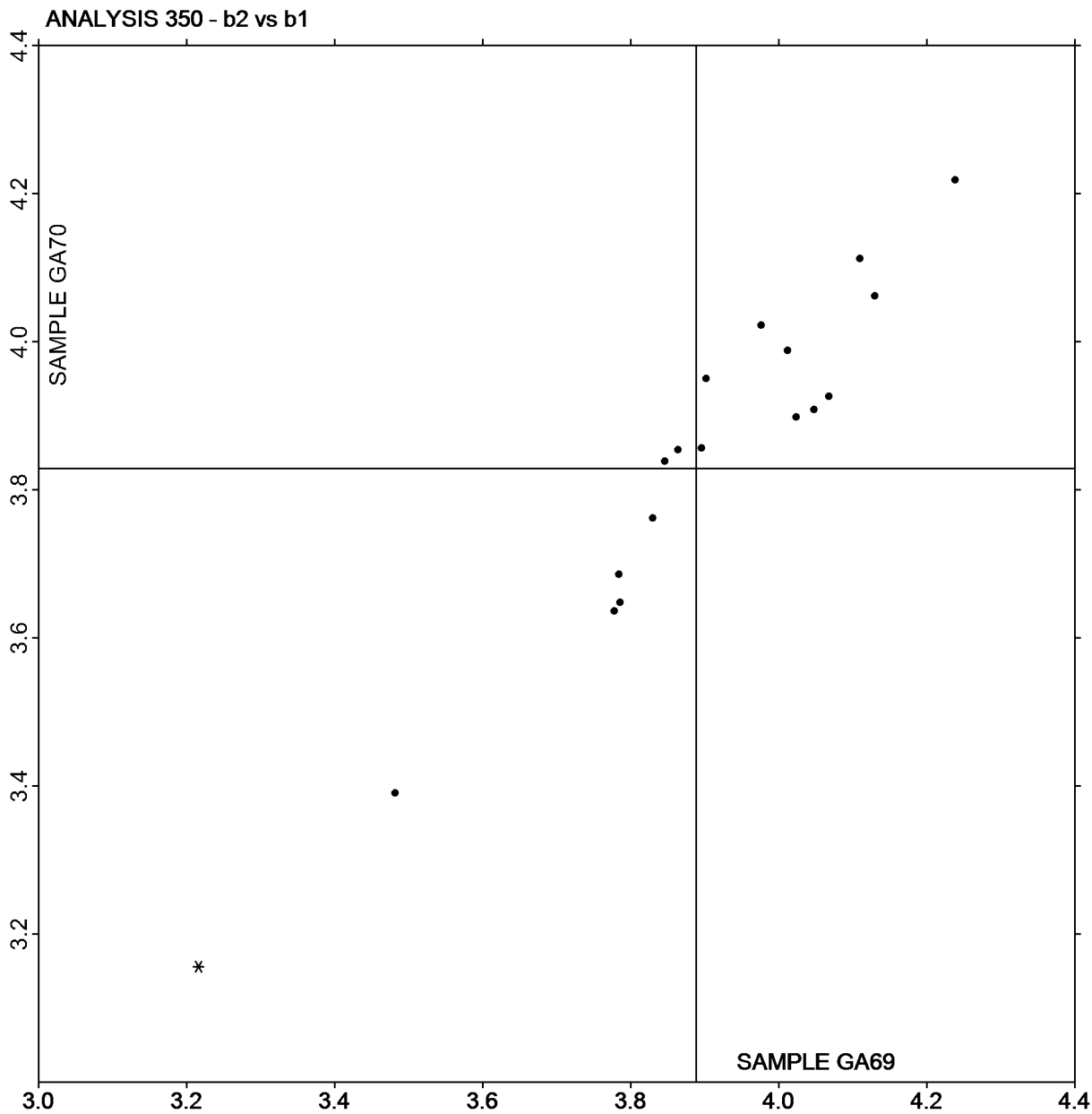




**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 350**  
**Color & Color Difference - Near White Papers - C/2deg obs**  
**Hunter L,a,b - Illuminant C - 2 Degree Observer**

Report #3012 G,  
August 2019

Plot of b values GA70 v b values GA69



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



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

**Report #3012 G,  
August 2019**

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

Web Code	Data Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	$\Delta L^*$	$\Delta a^*$	$\Delta b^*$	$\Delta E^*$	
2FRKGU		<b>GA69</b>	95.20	-0.65	4.28	0.33	0.05	-0.10	0.35	NG
		<b>GA70</b>	95.53	-0.60	4.18					
2ZXX9G		<b>GA69</b>	95.17	-0.64	3.93	0.32	-0.05	-0.19	0.38	LS
		<b>GA70</b>	95.49	-0.69	3.73					
9DY43D		<b>GA69</b>	94.64	-0.56	3.63	0.43	0.03	-0.05	0.43	HE
		<b>GA70</b>	95.07	-0.53	3.58					
9J7RFE		<b>GA69</b>	94.30	-0.63	4.04	0.35	0.01	-0.13	0.37	HE
		<b>GA70</b>	94.64	-0.62	3.91					
DKM97P		<b>GA69</b>	95.17	-0.62	4.07	0.29	0.01	-0.13	0.32	HT
		<b>GA70</b>	95.46	-0.61	3.94					
EZR6UG		<b>GA69</b>	94.81	-0.69	4.11	0.29	0.02	-0.15	0.32	LS
		<b>GA70</b>	95.10	-0.67	3.96					
GAEBWJ		<b>GA69</b>	95.34	-0.80	3.85	0.28	0.00	-0.21	0.35	XC
		<b>GA70</b>	95.61	-0.80	3.64					
HQCFRD		<b>GA69</b>	95.61	-0.62	3.89	0.14	0.00	-0.13	0.19	HE
		<b>GA70</b>	95.74	-0.62	3.76					
KC6BBC		<b>GA69</b>	94.97	-0.60	3.92	0.31	0.00	-0.13	0.33	TC
		<b>GA70</b>	95.28	-0.60	3.80					
RM4EMY		<b>GA69</b>	95.22	-0.55	4.08	0.32	0.00	-0.12	0.34	NF
		<b>GA70</b>	95.53	-0.55	3.96					
V2DBAW		<b>GA69</b>	95.94	-0.57	3.01	-0.11	-0.05	-0.45	0.47	XP
		<b>GA70</b>	95.83	-0.62	2.55					
X7XVX3		<b>GA69</b>	95.10	-0.68	4.04	0.26	-0.02	-0.14	0.30	EF
		<b>GA70</b>	95.36	-0.70	3.90					
XWB32R		<b>GA69</b>	94.34	-0.81	3.74	-0.07	-0.01	-0.45	0.46	EH
		<b>GA70</b>	94.28	-0.82	3.29					
Z2WALP		<b>GA69</b>	93.70	-0.49	3.52	0.32	0.02	-0.07	0.33	XA
		<b>GA70</b>	94.02	-0.47	3.44					
ZNRHVX		<b>GA69</b>	94.57	-0.82	3.84	0.44	0.01	-0.06	0.44	HE
		<b>GA70</b>	95.00	-0.81	3.78					



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

**Report #3012 G,  
August 2019**

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

<u>Grand Means</u>			<b>Summary Statistics</b>				
<b>GA69</b>	94.938	-0.648	3.863				
<b>GA70</b>	95.197	-0.647	3.695	0.259	0.001	-0.168	0.359
<u>Std Dev Btwn Labs</u>							
<b>GA69</b>	0.562	0.099	0.307				
<b>GA70</b>	0.526	0.102	0.388	0.158	0.026	0.124	0.072

Statistics based on 15 of 15 reporting participants

**Key to Instrument Codes Reported by Participants**

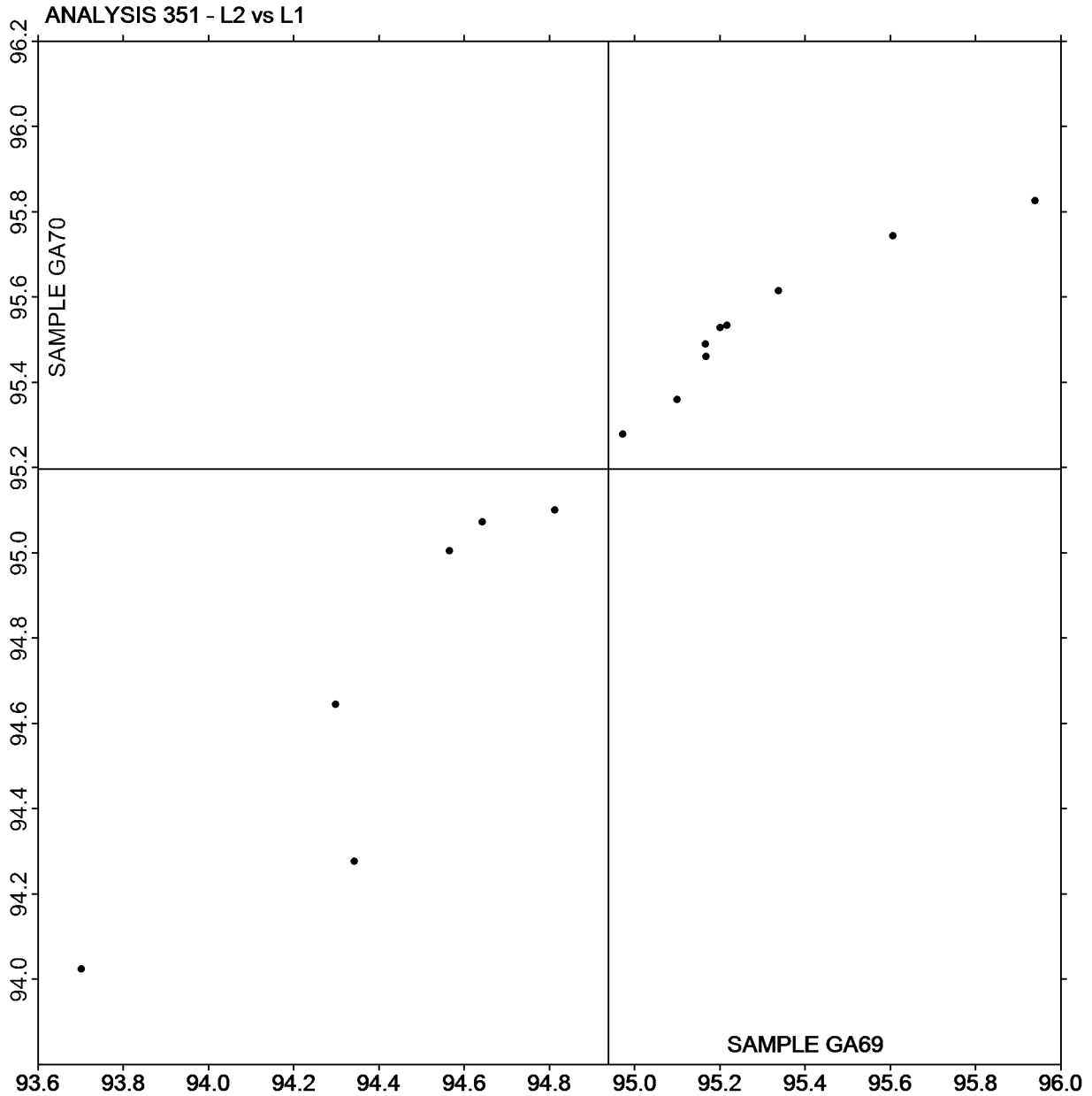
EF	Datacolor Elrepho 3000	EH	Datacolor Elrepho SF450
HE	Hunter LabScan	HT	Hunter UltraScan Vis
LS	L & W Elrepho SE 070	NF	Minolta CM-3600d Spectrophotometer
NG	Minolta CM-3700d Spectrophotometer	TC	Technidyne Color Touch Series
XA	X-Rite (model not specified)	XC	X-Rite eXact Series
XP	X-Rite Spectrophotometer DTP		



**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 #3012 G,  
August 2019

Plot of L values GA70 v L values GA69



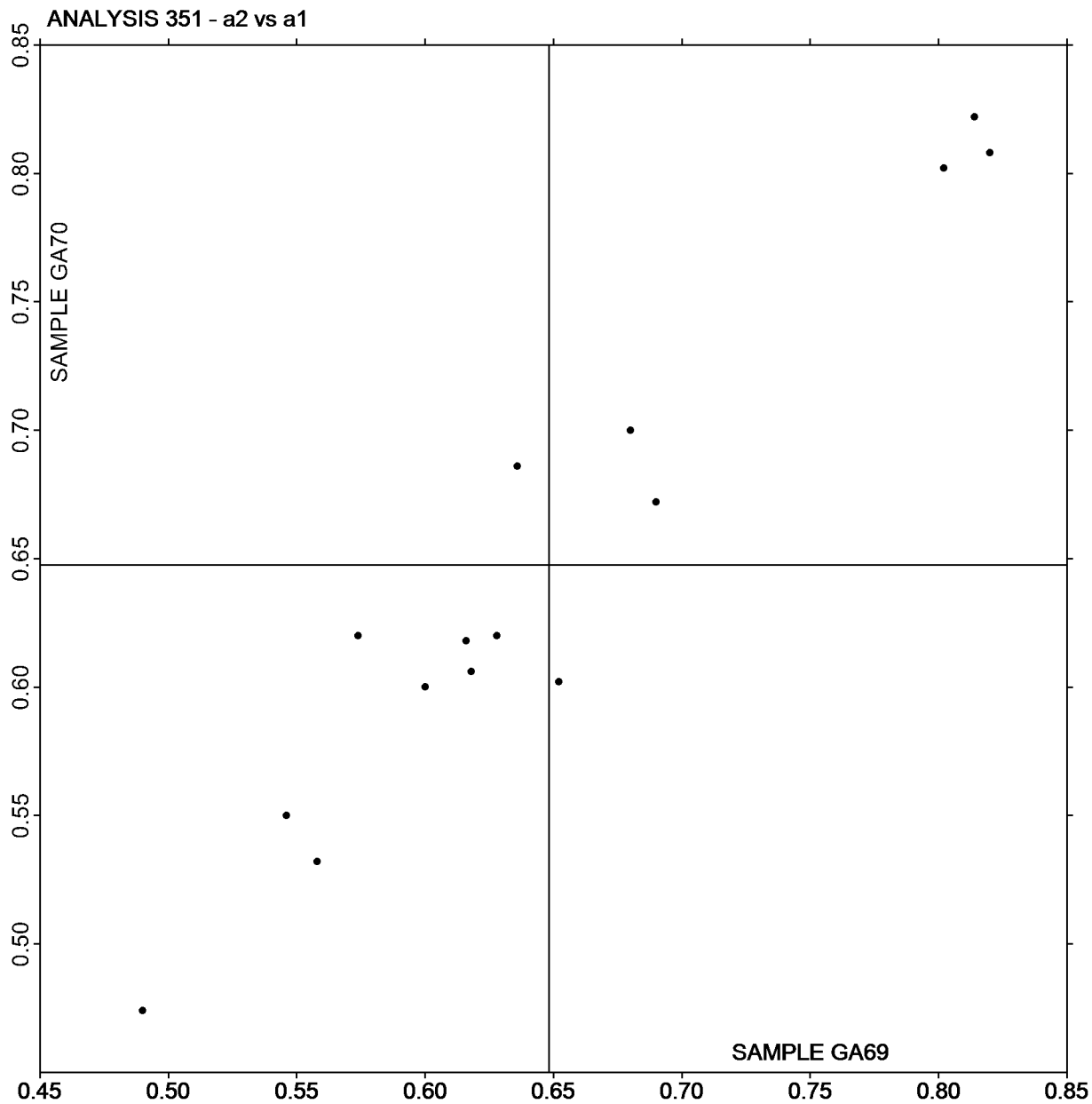
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.



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

Report #3012 G,  
August 2019

Plot of a values GA70 v a values GA69



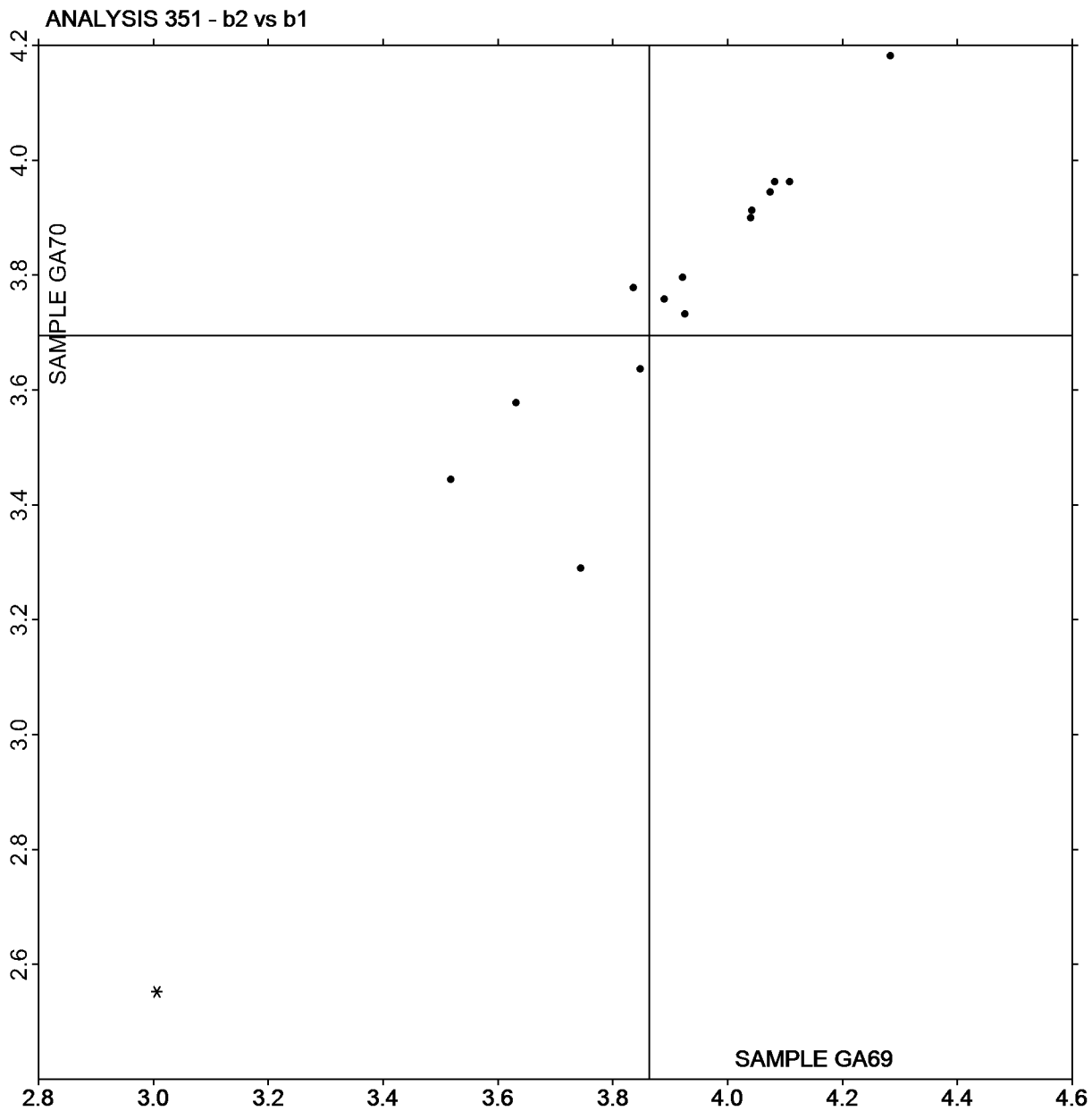
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**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 351**  
**Color & Color Difference - Near White Papers - D65/10deg obs**  
**Hunter L,a,b - Illuminant D65 - 10 Degree Observer**

Report #3012 G,  
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Plot of b values GA70 v b values GA69



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



# Paper & Paperboard Interlaboratory Testing Program

Report #3012G,  
August 2019

## Analysis 360

### Thickness (Caliper), Printing papers

#### TAPPI Official Test Method T411

WebCode	Data Flag	Sample GV69			Sample GV70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2FRKGU		3.821	-0.035	-0.65	3.802	-0.053	-0.91	PP
3AHQXH		3.921	0.065	1.20	3.899	0.044	0.74	LW
4ZM9WE		3.880	0.024	0.45	3.861	0.006	0.10	TM
78ZU2N		3.890	0.034	0.63	3.870	0.015	0.25	TA
7UEEYP		3.961	0.105	1.94	3.905	0.049	0.84	LW
7Y7V6M		3.767	-0.089	-1.64	3.789	-0.066	-1.13	PP
8BYNXW		3.812	-0.044	-0.81	3.775	-0.081	-1.38	TM
8EGLTE		3.884	0.028	0.52	3.863	0.008	0.13	EM
8LFFKK		3.897	0.041	0.76	3.869	0.014	0.23	EM
9DY43D		3.812	-0.044	-0.81	3.797	-0.058	-0.99	TA
9DZRQJ		3.886	0.030	0.56	3.900	0.045	0.76	LA
9F6M29		3.831	-0.025	-0.47	3.913	0.058	0.99	MS
AUGKJE		3.817	-0.039	-0.72	3.840	-0.015	-0.26	LA
B7B29F		3.733	-0.122	-2.26	3.778	-0.078	-1.33	LW
C78L6K		3.863	0.007	0.13	3.860	0.005	0.08	PP
DKM97P		3.849	-0.007	-0.13	3.858	0.003	0.05	EM
E4T4DL		3.893	0.037	0.68	3.954	0.099	1.69	LA
EQ8JGC		3.862	0.006	0.12	3.846	-0.009	-0.15	LW
G7WM8Y		3.900	0.044	0.81	3.877	0.022	0.37	TM
GAEBWJ		3.791	-0.065	-1.19	3.760	-0.095	-1.63	LW
GL8UDA		3.870	0.014	0.26	3.900	0.044	0.76	LW
GINUXWN		3.823	-0.033	-0.61	3.854	-0.001	-0.02	LW
GV9EDG		3.964	0.108	2.00	3.951	0.096	1.63	TA
HQCFRD		3.856	0.000	-0.01	3.879	0.024	0.41	TM
HZ367T		3.864	0.008	0.15	3.808	-0.047	-0.81	PP
JLFCWC		3.821	-0.035	-0.65	3.795	-0.060	-1.03	TA
KC6BBC		3.925	0.069	1.28	3.984	0.129	2.20	PP
L7DK9D		3.827	-0.029	-0.54	3.907	0.052	0.88	PP
LUJ4JC		3.789	-0.067	-1.24	3.757	-0.098	-1.68	LA
M9J8GC		3.883	0.027	0.50	3.881	0.026	0.44	TA
MARKWR		3.810	-0.046	-0.85	3.840	-0.015	-0.26	TM
ME73EA		3.935	0.079	1.46	3.900	0.045	0.76	EM
MQKK4C		3.804	-0.052	-0.96	3.826	-0.029	-0.50	TM
NCXVJZ		3.860	0.004	0.08	3.844	-0.012	-0.20	PP
P8EZG9		3.790	-0.066	-1.22	3.770	-0.085	-1.45	LW
PRK6T3		3.896	0.040	0.74	3.876	0.021	0.35	XX
Q3YLUWU		3.908	0.052	0.97	3.934	0.079	1.34	LW
RGWFX8		3.909	0.054	0.99	3.938	0.083	1.41	LW
RKFDRP		3.735	-0.121	-2.24	3.747	-0.108	-1.85	PP
RM4EMY		3.922	0.066	1.22	3.906	0.051	0.87	TM
TMYJ8L		3.880	0.024	0.45	3.904	0.049	0.84	LW



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 360**  
**Thickness (Caliper), Printing papers**  
**TAPPI Official Test Method T411**

**Report #3012G,**  
**August 2019**

WebCode	Data Flag	<u>Sample GV69</u>			<u>Sample GV70</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
U8XA2Q		3.760	-0.096	-1.77	3.750	-0.105	-1.80	TM
U9UMPJ		3.899	0.043	0.79	3.887	0.032	0.55	LW
UDPEVV		3.887	0.031	0.57	3.957	0.102	1.74	FR
URNL7W		3.831	-0.025	-0.46	3.790	-0.065	-1.11	EM
UUCUYR		3.899	0.043	0.80	3.884	0.029	0.49	EM
UWDZDX		3.873	0.017	0.32	3.859	0.004	0.06	MT
V2DBAW		3.800	-0.056	-1.03	3.800	-0.055	-0.94	TM
WB87KX		3.837	-0.019	-0.35	3.763	-0.092	-1.57	TA
XM2XN2		3.843	-0.013	-0.25	3.850	-0.005	-0.08	XX
Y8MJVN		3.922	0.066	1.22	3.862	0.007	0.11	EM
YNWHC2		3.888	0.032	0.59	3.848	-0.007	-0.12	LA
Z2WALP		3.860	0.004	0.08	3.828	-0.027	-0.47	LW
ZNPV8T	*	3.780	-0.076	-1.40	3.890	0.035	0.59	XX

<b>Summary Statistics</b>	<u>Sample GV69</u>	<u>Sample GV70</u>
<b>Grand Means</b>	3.86 mils	3.86 mils
<b>Std Dev Btwn Labs</b>	0.05 mils	0.06 mils

Statistics based on 54 of 54 reporting participants.

**Analysis Notes:**

8BYNXW - One determination removed from the Lab Mean of Sample GV69 per Grubb's Test at 1% risk (TAPPI 1205).

UWDZDX - Data appear to be reported as micrometers, not mils as indicated on data entry form. CTS will not correct the Units going forward.

**Key to Instrument Codes Reported by Participants**

<b>EM</b> Emveco	<b>FR</b> Frank Instruments
<b>LA</b> L & W Autoline	<b>LW</b> L & W
<b>MS</b> Messmer	<b>MT</b> Mitutoyo
<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**  
**TAPPI Official Test Method T411**

Report #3012G,  
August 2019

WebCode	Data Flag	Sample GY69			Sample GY70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2NHVGU		9.344	-0.275	-2.17	9.392	-0.202	-1.40	VP
2TGFUW		9.700	0.081	0.64	9.890	0.296	2.05	TM
2ZXX9G		9.490	-0.129	-1.02	9.520	-0.074	-0.51	LW
32Q9KV		9.547	-0.072	-0.57	9.626	0.032	0.22	LW
4FKAGT		9.595	-0.024	-0.19	9.657	0.063	0.44	EM
6LZFKD		9.494	-0.125	-0.98	9.291	-0.303	-2.10	TM
6MMJNL	X	10.247	0.628	4.95	10.326	0.732	5.07	LA
78ZU2N		9.610	-0.009	-0.07	9.700	0.106	0.74	TA
79VJ2B		9.360	-0.259	-2.04	9.370	-0.224	-1.55	TA
7UBYLN		9.660	0.041	0.32	9.740	0.146	1.01	TM
88DRQ7		9.647	0.028	0.22	9.667	0.073	0.51	TM
9J7RFE		9.563	-0.056	-0.44	9.411	-0.183	-1.27	EM
AFJYAJ		9.681	0.062	0.49	9.740	0.147	1.02	LA
D3788G		9.445	-0.174	-1.37	9.516	-0.078	-0.54	LA
E4T4DL		9.768	0.149	1.17	9.665	0.072	0.50	LA
EAHMAA		9.529	-0.090	-0.71	9.403	-0.191	-1.32	TM
ENGPVN		9.510	-0.109	-0.86	9.610	0.016	0.11	TA
EZR6UG		9.496	-0.123	-0.97	9.421	-0.172	-1.19	TM
GMJ2ND		9.551	-0.068	-0.54	9.562	-0.032	-0.22	LW
HDNHH3		9.693	0.074	0.58	9.717	0.123	0.85	LW
HXDRNB		9.630	0.011	0.09	9.590	-0.004	-0.03	LA
JLFCWC		9.790	0.171	1.35	9.823	0.229	1.59	TA
JTE89B		9.658	0.039	0.31	9.647	0.053	0.37	LA
KWDBNJ		9.650	0.031	0.24	9.515	-0.079	-0.55	TA
MGE9ZB		9.812	0.193	1.52	9.961	0.367	2.54	EM
NCXVJZ		9.709	0.090	0.71	9.551	-0.043	-0.29	LW
PF96AA		9.632	0.013	0.10	9.535	-0.059	-0.41	LW
T82WW4		9.852	0.233	1.83	9.645	0.052	0.36	LW
TAAHX7		9.520	-0.099	-0.78	9.470	-0.124	-0.86	TM
U8XA2Q		9.510	-0.109	-0.86	9.530	-0.064	-0.44	TM
U9UMPJ		9.763	0.144	1.14	9.615	0.021	0.14	LW
UDQ2HZ		9.870	0.251	1.98	9.689	0.095	0.66	TM
UY6YRV		9.649	0.030	0.24	9.588	-0.006	-0.04	LA
WB87KX		9.689	0.070	0.55	9.632	0.038	0.27	TA
XWB32R	X	10.218	0.599	4.72	10.187	0.593	4.11	EM
YATGAK		9.693	0.074	0.58	9.574	-0.020	-0.14	TM
ZNRHVX		9.553	-0.066	-0.52	9.518	-0.076	-0.52	EM



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 361**  
**Thickness (Caliper), Packaging papers**  
**TAPPI Official Test Method T411**

**Report #3012G,**  
**August 2019**

<b>Summary Statistics</b>	<u><b>Sample GY69</b></u>	<u><b>Sample GY70</b></u>
<b>Grand Means</b>	9.62 mils	9.59 mils
<b>Stnd Dev Btwn Labs</b>	0.13 mils	0.14 mils
Statistics based on 35 of 37 reporting participants.		

**Comments on Assigned Data Flags for Test #361**

XWB32R (X) - Data for both samples are high.

6MMJNL (X) - Data for both samples are high.

**Key to Instrument Codes Reported by Participants**

EM	Emveco	LA	L & W Autoline
LW	L & W	TA	Thwing-Albert
TM	TMI	VP	Valmet Paper Lab



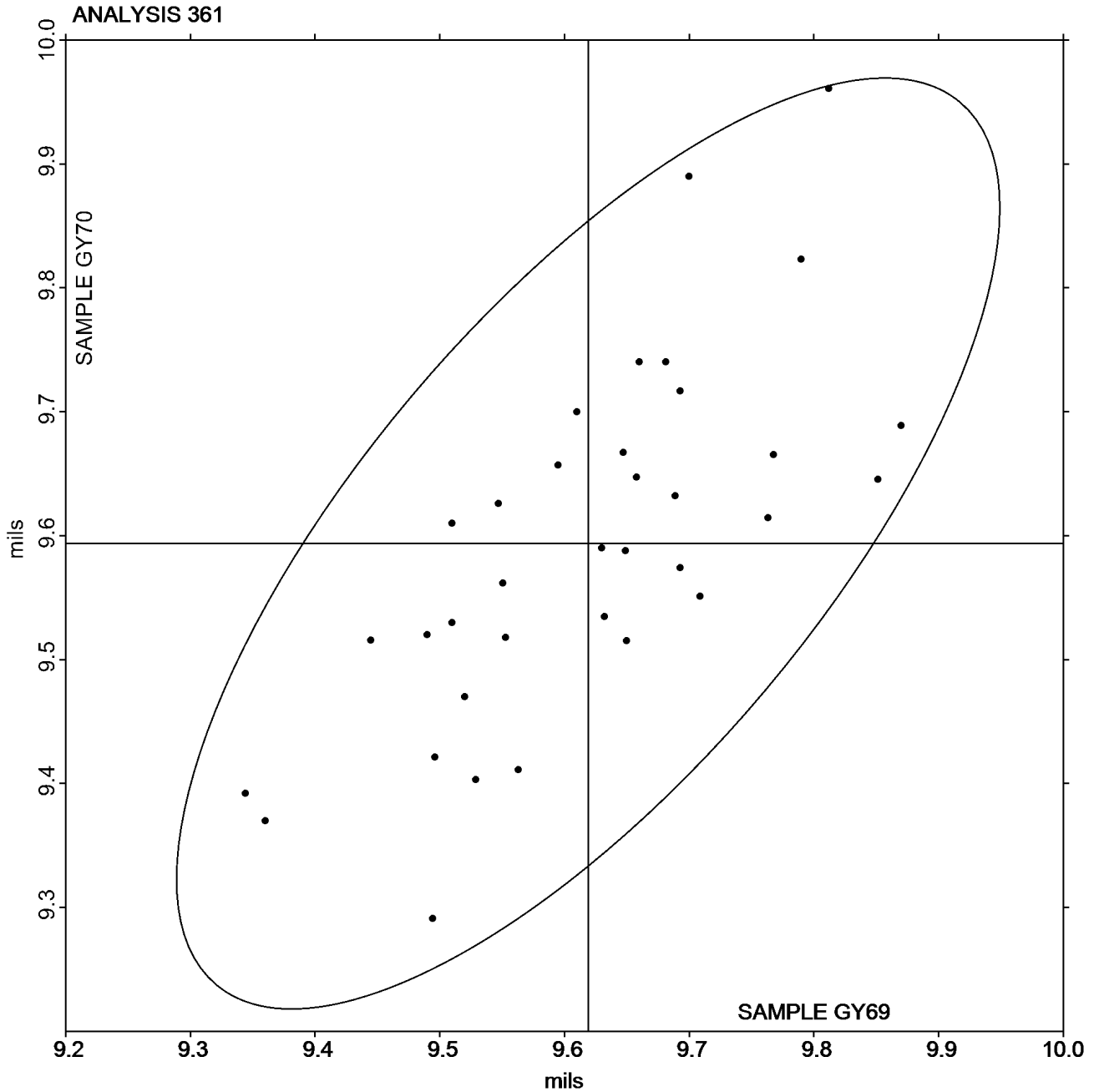
# Paper & Paperboard Interlaboratory Testing Program

Report #3012G,  
August 2019

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

Grand Mean Sample GY69 = 9.6189  
mils

Grand Mean Sample GY70 = 9.5937  
mils





**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 364**  
**Coefficient of Static Friction - Horizontal Plane Method - Printing Papers**  
**TAPPI Official Test Method T549**

**Report #3012G,**  
**August 2019**

WebCode	Data Flag	<u>Sample GD69</u>			<u>Sample GD70</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
8EGLTE		0.6154	0.0033	0.07	0.6356	0.0282	0.49	TA
9DY43D		0.5360	-0.0761	-1.55	0.5600	-0.0474	-0.83	TA
D3788G		0.5720	-0.0401	-0.82	0.6056	-0.0018	-0.03	TA
MARKWR		0.5656	-0.0465	-0.95	0.4962	-0.1112	-1.95	XX
ND7FJG		0.6484	0.0363	0.74	0.6076	0.0002	0.00	TA
T82WW4		0.6318	0.0197	0.40	0.6212	0.0138	0.24	TL
VFURAT		0.6756	0.0635	1.29	0.6572	0.0498	0.87	IT
Y8MJVN		0.6520	0.0399	0.81	0.6760	0.0686	1.20	TA

<b>Summary Statistics</b>	<u>Sample GD69</u>	<u>Sample GD70</u>
<b>Grand Means</b>	0.61 COF	0.61 COF
<b>Std Dev Btwn Labs</b>	0.05 COF	0.06 COF

Statistics based on 8 of 8 reporting participants.

**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	XX	Instrument make/model not specified by lab

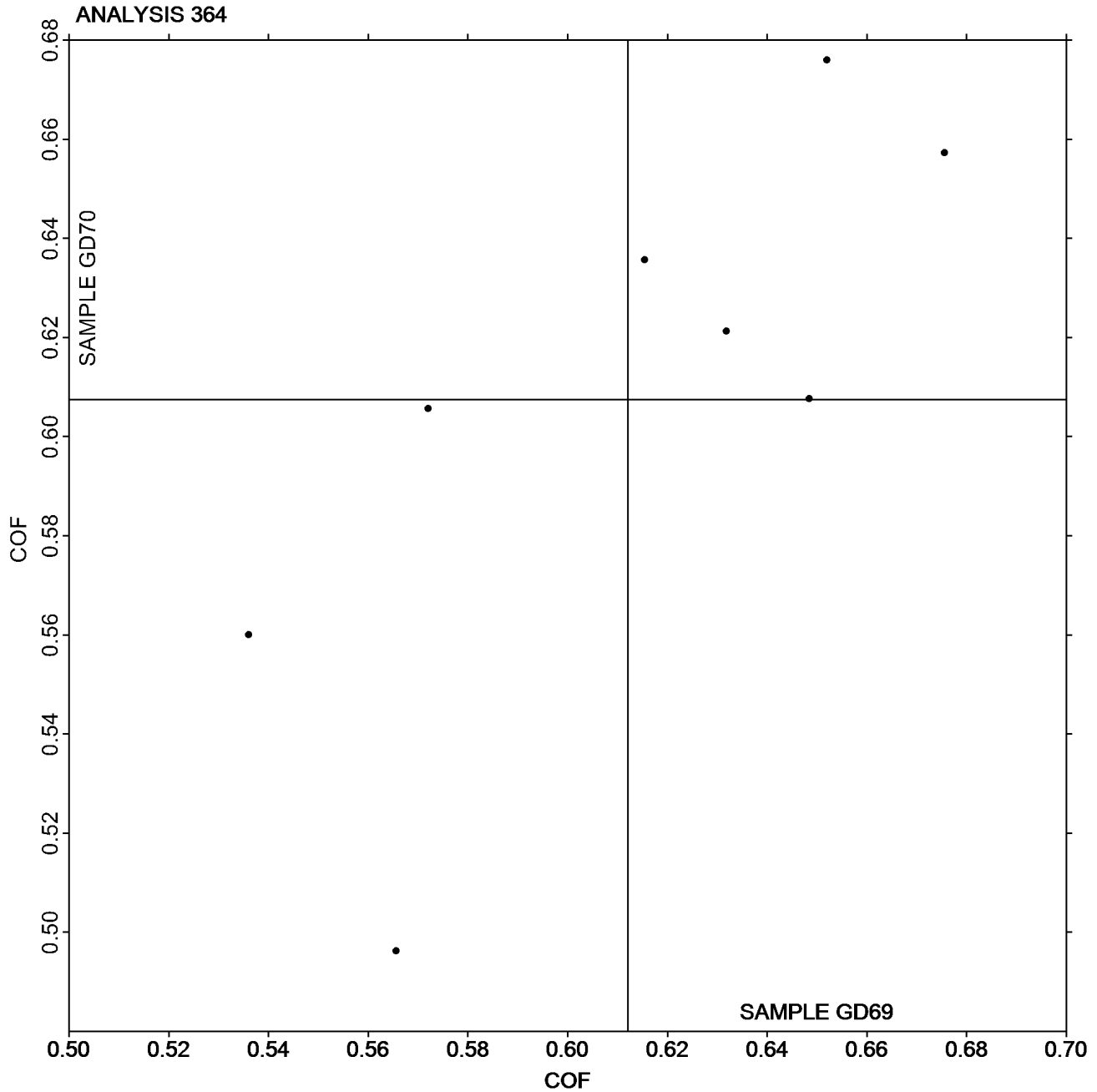


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 364**  
**Coefficient of Static Friction - Horizontal Plane Method - Printing Papers**  
**TAPPI Official Test Method T549**

**Report #3012G,**  
**August 2019**

**Grand Mean Sample GD69 = 0.61210**  
**COF**

**Grand Mean Sample GD70 =**  
**0.60743 COF**



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



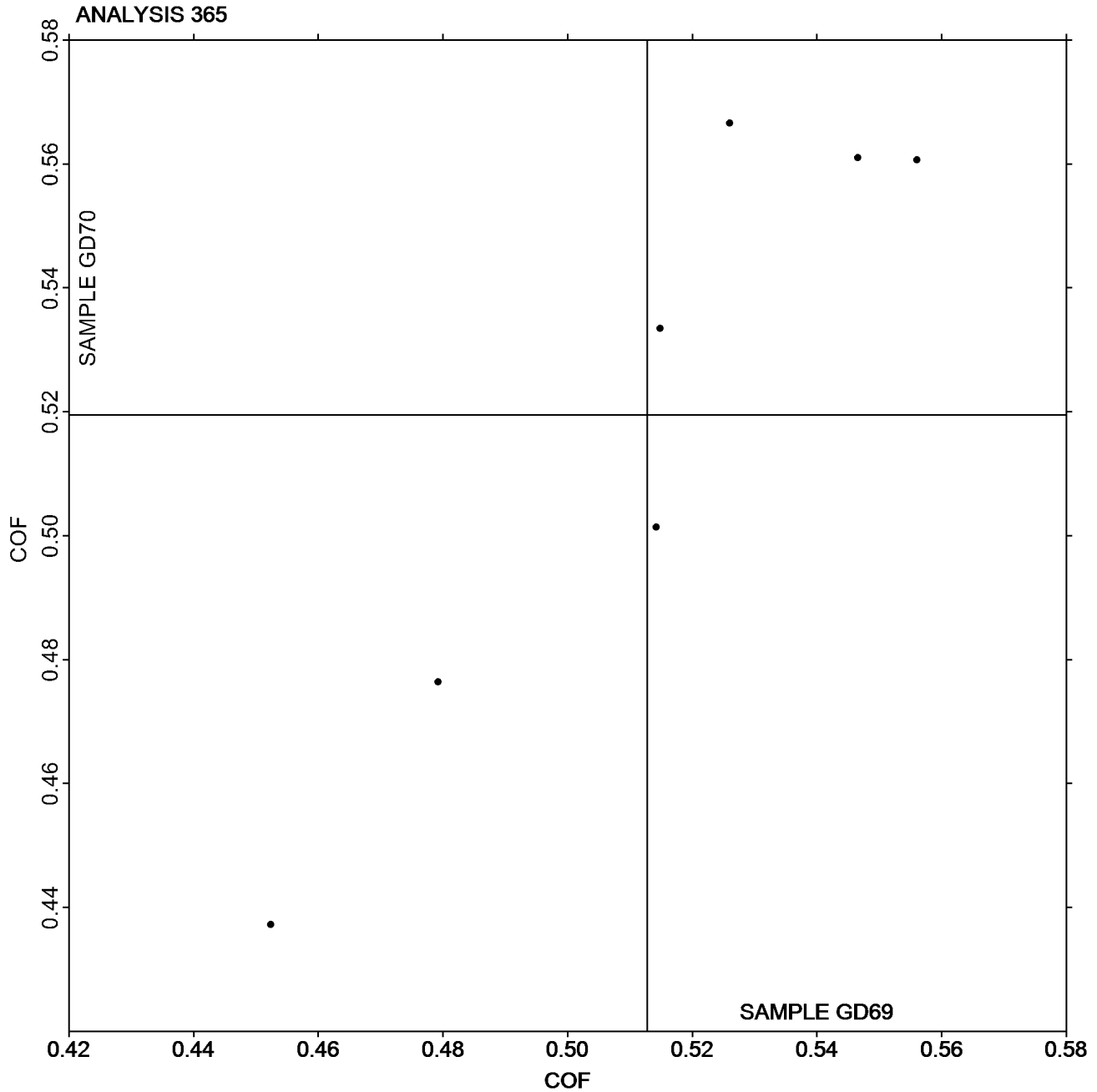


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 365**  
**Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers**  
**TAPPI Official Test Method T549**

Report #3012G,  
August 2019

Grand Mean Sample GD69 = 0.51274  
COF

Grand Mean Sample GD70 =  
0.51951 COF



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





# Paper & Paperboard Interlaboratory Testing Program

Report #3012G,  
August 2019

## Analysis 370

### Air Resistance - Gurley Oil Type

### TAPPI Official Test Method T460

WebCode	Data Flag	Sample GE69			Sample GE70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2NHVGU		19.14	0.36	0.44	19.63	0.80	1.03	VM
32Q9KV	X	17.00	-1.78	-2.16	15.44	-3.39	-4.36	LP
3AHQXH		18.76	-0.02	-0.02	18.78	-0.05	-0.07	LP
4ZM9WE		18.39	-0.39	-0.47	18.50	-0.33	-0.43	HG
78ZU2N		20.10	1.32	1.60	20.41	1.58	2.03	PP
7CQB8M		17.82	-0.96	-1.16	17.43	-1.40	-1.80	PP
7Y7V6M		18.52	-0.26	-0.31	18.82	-0.01	-0.01	HG
8LFFKK		18.44	-0.34	-0.41	19.37	0.54	0.69	PP
9DY43D		17.11	-1.67	-2.02	17.63	-1.20	-1.54	PP
9DZRQJ	*	20.88	2.10	2.55	20.83	2.00	2.57	LA
9J7RFE		19.31	0.53	0.65	18.79	-0.05	-0.06	PP
AFJYAJ		18.99	0.21	0.25	19.43	0.60	0.77	LA
C78L6K		20.18	1.40	1.70	20.46	1.63	2.09	PP
D3788G		18.96	0.18	0.22	18.77	-0.06	-0.08	LA
DK7E6F		18.14	-0.64	-0.77	17.80	-1.03	-1.32	LP
DKM97P		18.40	-0.37	-0.45	18.49	-0.34	-0.44	PP
FW9VD9		18.57	-0.21	-0.25	19.04	0.21	0.27	GL
GAEBWJ		17.30	-1.48	-1.79	17.40	-1.43	-1.84	LW
GMJ2ND		18.35	-0.42	-0.51	18.80	-0.03	-0.03	TL
HXDRNB		18.01	-0.77	-0.93	18.19	-0.64	-0.82	LA
HZ367T		18.68	-0.10	-0.12	19.08	0.25	0.32	HG
JLFCWC		18.67	-0.11	-0.14	18.99	0.16	0.21	PP
KC6BBC		19.14	0.36	0.44	18.56	-0.27	-0.35	PP
LUJ4JC		18.67	-0.11	-0.13	18.44	-0.39	-0.50	LA
MARKWR		17.80	-0.98	-1.19	18.10	-0.73	-0.94	GS
ME73EA		18.16	-0.62	-0.75	18.68	-0.15	-0.19	PP
NCXVJZ		18.97	0.19	0.23	18.83	0.00	0.00	PP
ND7FJG		19.16	0.38	0.46	19.31	0.48	0.62	WG
NTKBMW		18.98	0.20	0.25	18.69	-0.14	-0.18	XX
NZ4EUY		18.40	-0.38	-0.46	18.35	-0.48	-0.62	LP
P32UM3		18.98	0.20	0.25	19.27	0.44	0.56	PP
PF96AA		18.62	-0.16	-0.19	18.74	-0.09	-0.12	LW
Q3YLUWU		19.48	0.70	0.85	19.47	0.64	0.82	LP
RM4EMY		17.39	-1.39	-1.68	18.12	-0.71	-0.91	PR
TAAHX7		18.84	0.06	0.08	18.76	-0.07	-0.09	TL
TLJZNN	*	20.60	1.82	2.21	19.64	0.81	1.04	XX
UUCUYR		20.01	1.23	1.50	19.22	0.39	0.50	HG
WKH97X	X	21.70	2.92	3.55	22.38	3.55	4.56	XX
X7XVX3		19.60	0.82	1.00	19.73	0.90	1.15	LP
Y8MJVN		18.92	0.14	0.18	18.87	0.04	0.05	PP
Z2WALP		18.42	-0.36	-0.43	18.25	-0.58	-0.75	PP



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 370**  
**Air Resistance - Gurley Oil Type**  
**TAPPI Official Test Method T460**

**Report #3012G,**  
**August 2019**

WebCode	Data Flag	Sample GE69			Sample GE70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
ZNPV8T		18.23	-0.55	-0.66	17.58	-1.25	-1.61	XX

Summary Statistics	Sample GE69	Sample GE70
<b>Grand Means</b>	18.78 sec/100 cc	18.83 sec/100 cc
<b>Std Dev Btwn Labs</b>	0.82 sec/100 cc	0.78 sec/100 cc
Statistics based on 40 of 42 reporting participants.		

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

WKH97X (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample GE69.

32Q9KV (X) - Data for sample GE70 are low.

**Key to Instrument Codes Reported by Participants**

<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>PR</b> Parker Print-Surf (PPS) Model M590
<b>TL</b> Gurley Densometer #4110, Oil Flotation	<b>VM</b> Valmet PaperLab (was Kajaani/Robotest)
<b>WG</b> W & LE Gurley Tester	<b>XX</b> Instrument make/model not specified by lab





**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 372**  
**Porosity - Sheffield Type - Sheffield Units for 3/4 inch Diameter Orifice**  
**TAPPI Official Test Method T547**

**Report #3012G,**  
**August 2019**

WebCode	Data Flag	Sample GE69			Sample GE70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2NHVGU		151.6	5.3	0.31	149.1	3.7	0.25	PP
4X3LGR		131.1	-15.2	-0.88	131.9	-13.6	-0.91	GA
78ZU2N		142.9	-3.4	-0.20	147.9	2.5	0.17	PP
7CBC8P	X	19.7	-126.6	-7.34	19.7	-125.7	-8.48	TT
BYQZR4		146.9	0.6	0.03	144.9	-0.5	-0.03	HM
G7WM8Y		147.5	1.2	0.07	145.5	0.1	0.01	TT
GV9EDG		145.6	-0.7	-0.04	143.6	-1.8	-0.12	HM
HUCVYF		186.5	40.2	2.33	180.0	34.6	2.33	LP
MARKWR		139.3	-7.0	-0.41	137.7	-7.7	-0.52	SH
V2DBAW		125.3	-21.0	-1.22	128.2	-17.2	-1.16	TT

Summary Statistics	Sample GE69	Sample GE70
<b>Grand Means</b>	146.30 Sheffield Units	145.42 Sheffield Units
<b>Std Dev Btwn Labs</b>	17.24 Sheffield Units	14.83 Sheffield Units
Statistics based on 9 of 10 reporting participants.		

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

7CBC8P (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>PP</b> Technidyne Profile/Plus
<b>SH</b> Sheffield	<b>TT</b> TMI Monitor/Smoothness II, Model 58-24

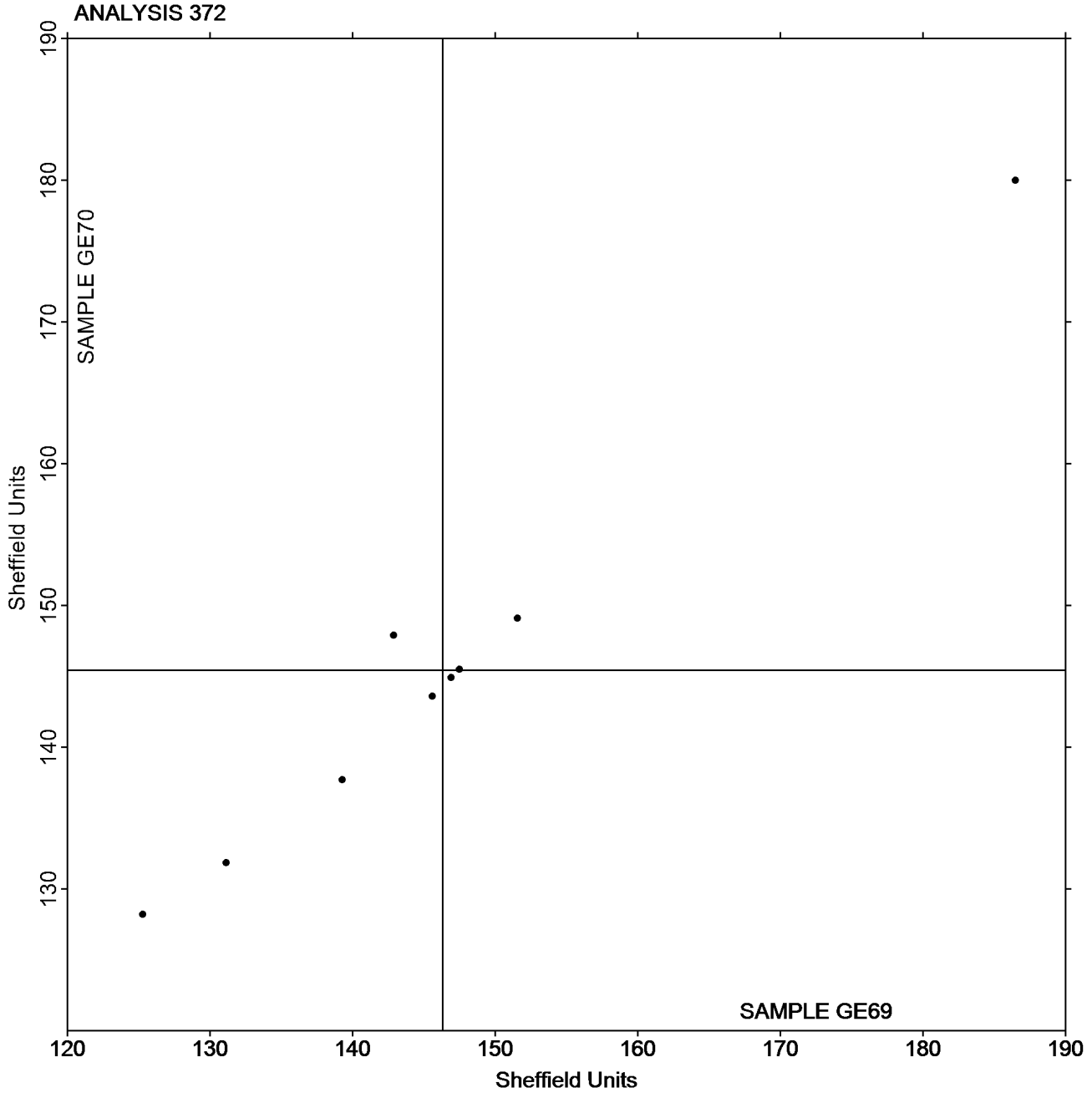


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 372**  
**Porosity - Sheffield Type - Sheffield Units for 3/4 inch Diameter Orifice**  
**TAPPI Official Test Method T547**

**Report #3012G,**  
**August 2019**

**Grand Mean Sample GE69 = 146.30**  
**Sheffield Units**

**Grand Mean Sample GE70 = 145.42**  
**Sheffield Units**



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



**Paper & Paperboard Interlaboratory Testing Program**

**Report #3012G,  
August 2019**

**Analysis 376**

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

**TAPPI Official Test Method T555**

WebCode	Data Flag	Sample GJ69			Sample GJ70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2NHVGU		2.018	0.370	2.43	1.934	0.365	2.32	ZZ
2ZXX9G		1.528	-0.120	-0.79	1.460	-0.109	-0.69	ZZ
4FKAGT		1.664	0.016	0.10	1.548	-0.021	-0.13	ZZ
6MMJNL		1.699	0.051	0.33	1.442	-0.127	-0.81	ZZ
7L6KTF		1.633	-0.015	-0.10	1.507	-0.062	-0.39	ZZ
7Y7V6M		1.664	0.016	0.10	1.591	0.022	0.14	ZZ
8LFFKK		1.751	0.103	0.68	1.678	0.109	0.69	ZZ
9DY43D		1.650	0.002	0.01	1.535	-0.034	-0.21	ZZ
AUGKJE		1.625	-0.023	-0.15	1.596	0.027	0.17	ZZ
BYQZR4	*	1.913	0.265	1.74	1.965	0.396	2.52	ZZ
CFC6BG		1.656	0.008	0.05	1.609	0.040	0.26	ZZ
EZR6UG		1.257	-0.391	-2.57	1.193	-0.376	-2.39	ZZ
GL8UDA		1.585	-0.063	-0.41	1.442	-0.127	-0.81	ZZ
JLFCWC		1.656	0.008	0.05	1.583	0.014	0.09	ZZ
L7DK9D		1.610	-0.038	-0.25	1.603	0.034	0.22	ZZ
ME73EA		1.497	-0.151	-0.99	1.422	-0.147	-0.93	ZZ
MGE9ZB		1.620	-0.028	-0.18	1.571	0.002	0.01	ZZ
ND7FJG		1.448	-0.200	-1.31	1.356	-0.213	-1.35	ZZ
P284J9		1.653	0.005	0.03	1.596	0.027	0.17	ZZ
PQPGEE		1.747	0.099	0.65	1.723	0.154	0.98	ZZ
RM3N84		1.738	0.090	0.59	1.695	0.126	0.80	ZZ
RWARP2		1.613	-0.035	-0.23	1.598	0.029	0.19	ZZ
U9UMPJ		1.708	0.060	0.39	1.561	-0.008	-0.05	ZZ
UY6YRV		1.535	-0.113	-0.74	1.477	-0.092	-0.58	ZZ
V2DBAW		1.743	0.095	0.62	1.688	0.119	0.76	ZZ
XWB32R	*	1.971	0.323	2.12	1.691	0.122	0.78	ZZ
YGBPZ2		1.495	-0.153	-1.01	1.358	-0.211	-1.34	ZZ
YNWHC2		1.525	-0.123	-0.81	1.485	-0.084	-0.53	ZZ
ZNRHVX		1.591	-0.057	-0.37	1.589	0.020	0.13	ZZ

Summary Statistics	Sample GJ69	Sample GJ70
<b>Grand Means</b>	1.65 Microns	1.57 Microns
<b>Std Dev Btwn Labs</b>	0.15 Microns	0.16 Microns
Statistics based on 29 of 29 reporting participants.		



**Paper & Paperboard Interlaboratory Testing Program**

**Report #3012G,  
August 2019**

**Analysis 376**

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

**TAPPI Official Test Method T555**

**Key to Instrument Codes Reported by Participants**

**ZZ** Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

Report #3012G,  
August 2019

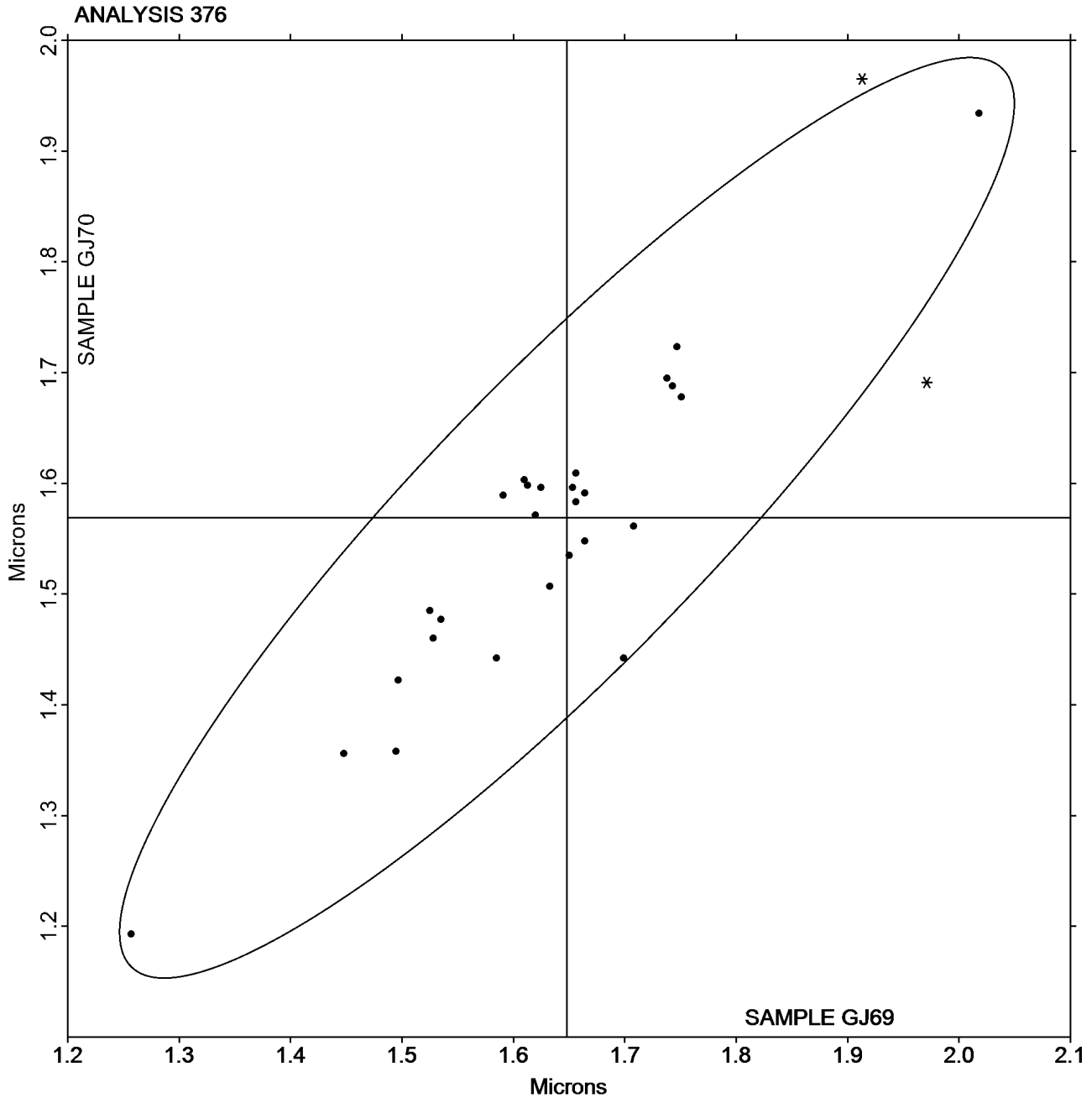
## Analysis 376

Roughness - Print Surf Method - 0.5 to 4.0 Microns

TAPPI Official Test Method T555

Grand Mean Sample GJ69 = 1.6480  
Microns

Grand Mean Sample GJ70 = 1.5688  
Microns







**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 377**  
**Roughness - Print Surf Method - 2.5 to 6.0 Microns**  
**TAPPI Official Test Method T555**

**Report #3012G,**  
**August 2019**

WebCode	Data Flag	<u>Sample GK69</u>			<u>Sample GK70</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
8EGLTE		3.976	0.006	0.03	4.049	0.072	0.30	ZZ
9J7RFE		4.467	0.497	2.09	4.423	0.446	1.85	ZZ
EAHMAA		3.793	-0.177	-0.74	3.736	-0.241	-1.00	ZZ
LUJ4JC		3.670	-0.300	-1.26	3.726	-0.251	-1.04	ZZ
NCXVJZ		3.845	-0.125	-0.52	3.844	-0.133	-0.55	ZZ
ND7FJG		3.941	-0.029	-0.12	3.845	-0.132	-0.55	ZZ
T82WW4		3.986	0.016	0.07	4.005	0.028	0.11	ZZ
Y8MJVN		4.081	0.111	0.47	4.191	0.214	0.89	ZZ

<b>Summary Statistics</b>	<u>Sample GK69</u>	<u>Sample GK70</u>
<b>Grand Means</b>	3.97 Microns	3.98 Microns
<b>Std Dev Btwn Labs</b>	0.24 Microns	0.24 Microns

Statistics based on 8 of 8 reporting participants.

**Key to Instrument Codes Reported by Participants**

ZZ Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

Report #3012G,  
August 2019

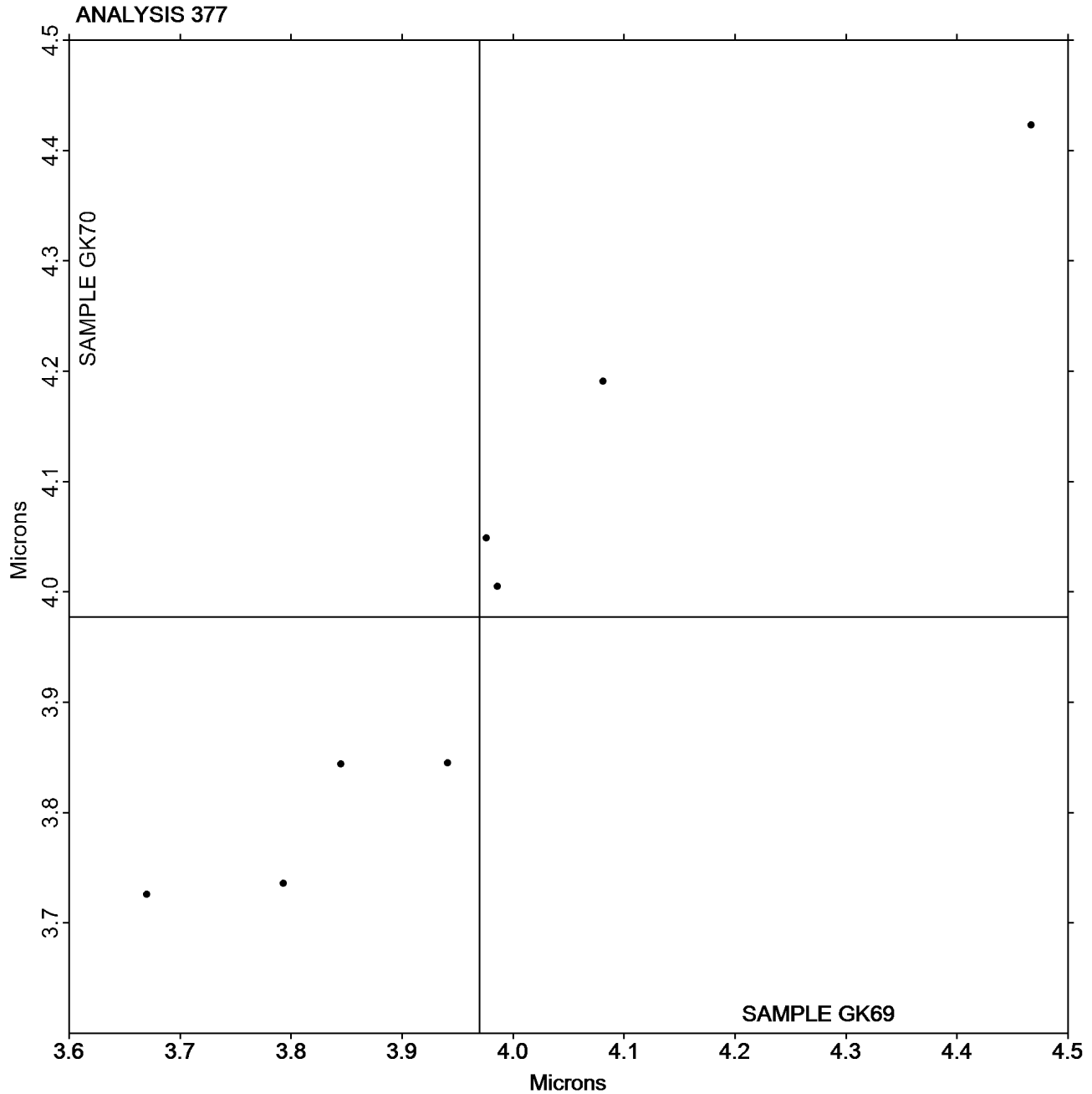
## Analysis 377

Roughness - Print Surf Method - 2.5 to 6.0 Microns

TAPPI Official Test Method T555

Grand Mean Sample GK69 = 3.9699  
Microns

Grand Mean Sample GK70 = 3.9774  
Microns



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



**Paper & Paperboard Interlaboratory Testing Program**

**Report #3012G,  
August 2019**

**Analysis 378**

**Roughness - Sheffield Type**

**TAPPI Official Test Method T538**

WebCode	Data Flag	Sample GL69			Sample GL70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2FRKGU		147.7	-5.1	-0.52	147.2	-4.7	-0.55	PP
2NHVGU		158.0	5.2	0.52	148.6	-3.2	-0.38	VM
2TGFUW		146.0	-6.8	-0.68	153.2	1.3	0.16	GA
2ZXX9G		160.6	7.8	0.79	158.7	6.9	0.81	PP
4FKAGT		158.0	5.2	0.52	157.9	6.1	0.71	PP
4NULQJ		143.4	-9.4	-0.95	135.9	-15.9	-1.86	TT
4X3LGR		139.4	-13.4	-1.35	138.1	-13.7	-1.61	GA
4ZM9WE		156.6	3.8	0.38	154.1	2.3	0.27	TS
6MMJNL		157.6	4.8	0.48	155.9	4.1	0.48	LA
78ZU2N		149.5	-3.3	-0.33	151.3	-0.5	-0.06	PP
7CQB8M		167.9	15.0	1.52	161.7	9.9	1.15	PP
7L6KTF		160.5	7.7	0.77	158.6	6.8	0.79	HM
7XB8ND		153.4	0.5	0.06	148.4	-3.4	-0.40	MP
7Y7V6M		148.3	-4.5	-0.46	152.2	0.4	0.04	HM
8EGLTE		151.2	-1.6	-0.16	152.3	0.5	0.05	PP
8LFFKK		148.3	-4.6	-0.46	151.8	0.0	0.00	PP
9DY43D		153.4	0.6	0.06	151.9	0.1	0.01	PP
9DZRQJ		128.5	-24.3	-2.45	130.5	-21.3	-2.49	LA
9J7RFE		160.3	7.5	0.75	155.1	3.3	0.38	LW
C78L6K		155.5	2.7	0.27	157.3	5.5	0.64	PP
DKM97P		141.0	-11.8	-1.19	148.0	-3.8	-0.45	SH
ENGPVN		147.9	-4.9	-0.50	142.8	-9.0	-1.05	PP
EZR6UG		169.9	17.1	1.72	168.1	16.3	1.90	TT
G7WM8Y	*	179.0	26.2	2.64	174.5	22.7	2.65	TT
GAEBWJ		149.5	-3.3	-0.33	148.8	-3.0	-0.35	TS
HUCVYF		152.2	-0.6	-0.06	152.1	0.3	0.03	LW
HZ367T		147.9	-4.9	-0.50	143.1	-8.7	-1.02	HM
KC6BBC		145.5	-7.3	-0.74	152.0	0.2	0.03	PP
KWDBNJ		152.3	-0.6	-0.06	152.9	1.0	0.12	PP
LUJ4JC		165.0	12.2	1.23	157.5	5.7	0.66	LA
MARKWR		138.1	-14.7	-1.48	137.9	-13.9	-1.63	XX
MGE9ZB		162.9	10.1	1.01	157.5	5.7	0.67	PP
NCXVJZ	X	453.1	300.2	30.25	452.5	300.7	35.13	PP
ND7FJG		168.7	15.9	1.60	163.3	11.5	1.34	XX
P284J9		153.4	0.6	0.06	156.7	4.9	0.57	LW
P32UM3		158.8	5.9	0.60	148.1	-3.7	-0.44	PP
PFV4G3		148.1	-4.7	-0.47	148.7	-3.2	-0.37	LA
PRK6T3		154.2	1.4	0.14	159.3	7.5	0.87	XX
RM3N84	*	133.3	-19.5	-1.97	144.3	-7.5	-0.88	LW
U8XA2Q		173.0	20.2	2.03	170.0	18.2	2.12	GL
UUCUYR		156.2	3.4	0.34	150.9	-0.9	-0.11	HM



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 378**  
**Roughness - Sheffield Type**  
**TAPPI Official Test Method T538**

**Report #3012G,**  
**August 2019**

WebCode	Data Flag	Sample GL69			Sample GL70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
UY6YRV		148.0	-4.8	-0.49	151.7	-0.1	-0.01	LA
V2DBAW		137.8	-15.0	-1.51	143.7	-8.1	-0.95	TT
X7XVX3		149.7	-3.1	-0.31	143.3	-8.5	-1.00	LW
XWB32R		155.4	2.6	0.26	155.3	3.5	0.41	LW
Y8MJVN		157.1	4.3	0.43	152.4	0.5	0.06	PP
YXX62D		149.7	-3.1	-0.31	157.9	6.1	0.71	GA
Z2WALP		147.2	-5.6	-0.57	139.5	-12.3	-1.44	PP
ZNPV8T	X	115.0	-37.8	-3.81	139.5	-12.3	-1.44	XX
ZNRHVX		149.5	-3.3	-0.33	146.4	-5.4	-0.63	PP

Summary Statistics	Sample GL69	Sample GL70
<b>Grand Means</b>	152.82 Sheffield	151.82 Sheffield
<b>Std Dev Btwn Labs</b>	9.92 Sheffield	8.56 Sheffield
Statistics based on 48 of 50 reporting participants.		

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

NCXVJZ (X) - Extreme Data.

ZNPV8T (X) - Data for sample GL69 are low.

**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>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>VM</b> Valmet PaperLab (was Kajaani\Robotest)	<b>XX</b> Instrument make/model not specified by lab



# Paper & Paperboard Interlaboratory Testing Program

Report #3012G,  
August 2019

## Analysis 378

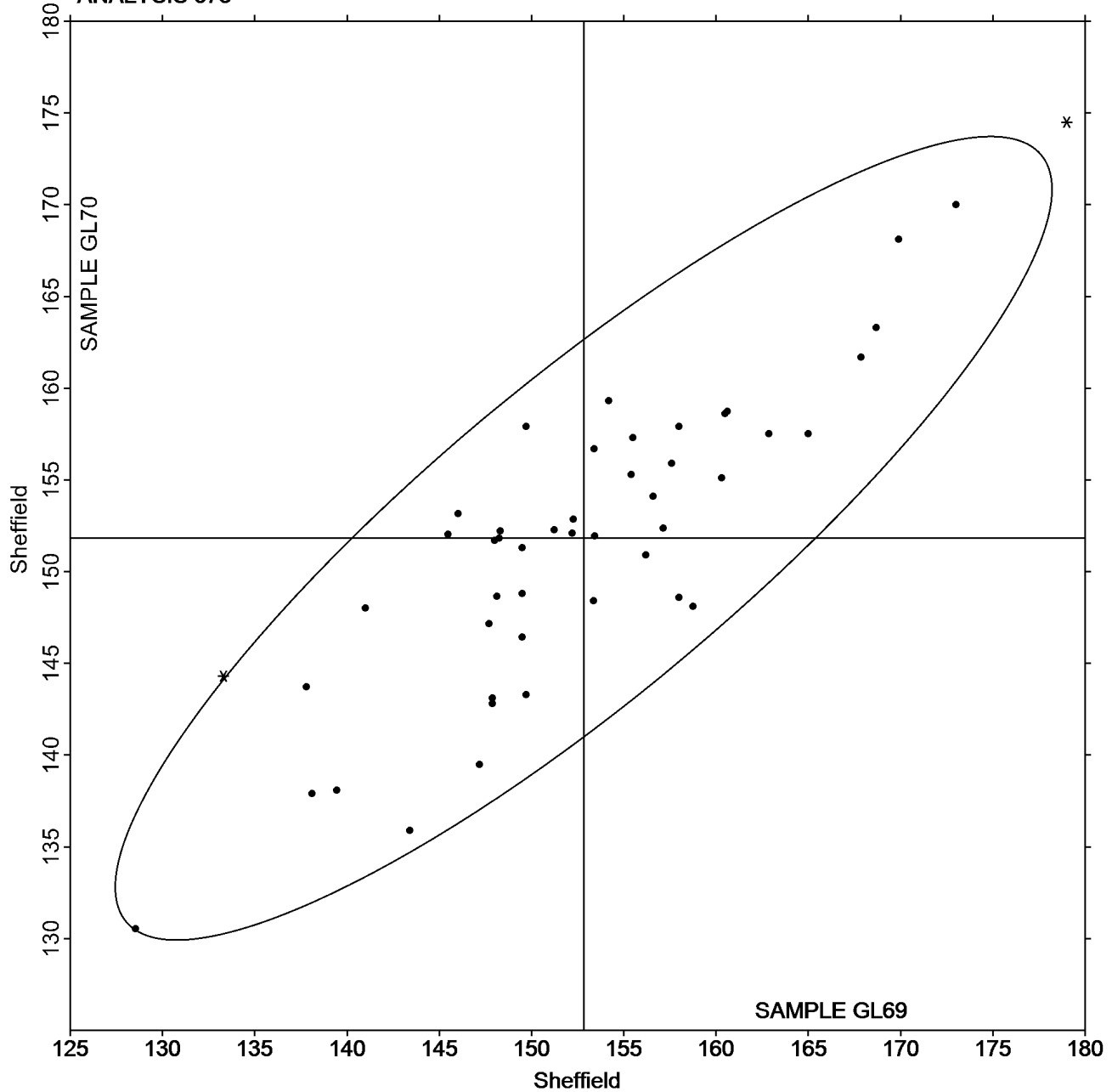
### Roughness - Sheffield Type

#### TAPPI Official Test Method T538

Grand Mean Sample GL69 = 152.82  
Sheffield

Grand Mean Sample GL70 = 151.82  
Sheffield

#### ANALYSIS 378





**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 382**  
**Moisture in Paper**  
**TAPPI Official Test Method T412**

Report #3012G,  
August 2019

WebCode	Data Flag	Sample GM69			Sample GM70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3AHQXH		4.024	-0.471	-1.35	3.963	-0.464	-1.22	ZZ
9F6M29		4.330	-0.165	-0.47	4.240	-0.187	-0.49	ZZ
EAHMAA	X	4.500	0.005	0.01	9.360	4.933	12.91	ZZ
EZR6UG		5.200	0.705	2.02	5.250	0.823	2.15	ZZ
FZM698		4.685	0.189	0.54	4.804	0.377	0.99	ZZ
MUYREC		5.050	0.555	1.59	4.460	0.033	0.09	ZZ
TMYJ8L		4.344	-0.152	-0.43	4.328	-0.100	-0.26	ZZ
VBEQY2		4.330	-0.165	-0.47	3.969	-0.458	-1.20	ZZ
WERGQV		4.320	-0.175	-0.50	4.370	-0.057	-0.15	ZZ
X3V8R8		4.441	-0.054	-0.16	4.449	0.022	0.06	ZZ
XM2XN2		4.307	-0.188	-0.54	4.316	-0.111	-0.29	ZZ
Y8MJVN		4.881	0.386	1.10	4.850	0.423	1.11	ZZ
YATGAK		4.287	-0.208	-0.60	3.945	-0.482	-1.26	ZZ
ZTXGXB		4.240	-0.255	-0.73	4.610	0.183	0.48	ZZ

Summary Statistics	Sample GM69	Sample GM70
<b>Grand Means</b>	4.50 Percent	4.43 Percent
<b>Std Dev Btwn Labs</b>	0.35 Percent	0.38 Percent

Statistics based on 13 of 14 reporting participants.

**Comments on Assigned Data Flags for Test #382**

EAHMAA (X) - Extreme Data for Sample GM70.

**Key to Instrument Codes Reported by Participants**

ZZ Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

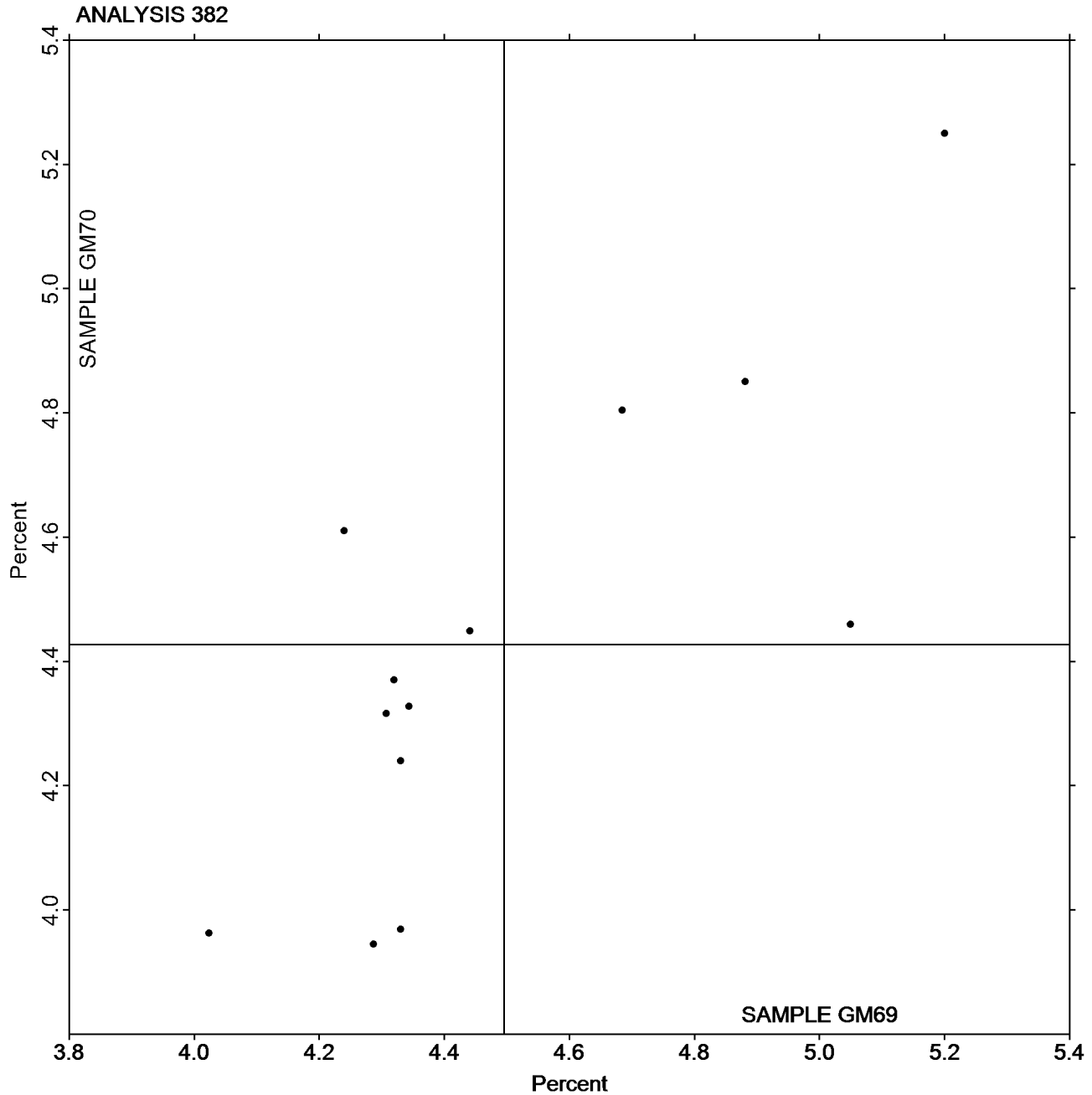
Report #3012G,  
August 2019

## Analysis 382 Moisture in Paper

### TAPPI Official Test Method T412

Grand Mean Sample GM69 = 4.4953  
Percent

Grand Mean Sample GM70 = 4.4272  
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**

**Report #3012G,  
August 2019**

**Analysis 384**

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

**TAPPI Official Test Method T425**

WebCode	Data Flag	Sample GN69			Sample GN70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2FRKGU		93.24	-0.20	-0.21	93.38	-0.09	-0.09	ZZ
4ZM9WE		92.48	-0.96	-1.01	92.57	-0.90	-0.94	ZZ
78ZU2N		93.09	-0.35	-0.36	93.24	-0.23	-0.24	ZZ
7L6KTF		93.61	0.17	0.18	93.61	0.14	0.15	ZZ
7Y7V6M		93.44	0.00	0.01	93.49	0.02	0.02	ZZ
8EGLTE		93.19	-0.25	-0.26	93.23	-0.23	-0.25	ZZ
9DY43D		94.20	0.76	0.80	94.52	1.05	1.10	ZZ
9DZRQJ	*	90.34	-3.10	-3.26	90.57	-2.90	-3.04	ZZ
AUGKJE		93.43	-0.01	-0.01	93.68	0.21	0.22	ZZ
C78L6K		93.01	-0.42	-0.44	93.11	-0.36	-0.37	ZZ
DKM97P		93.16	-0.28	-0.29	93.08	-0.39	-0.41	ZZ
EFMK3M		92.70	-0.73	-0.77	92.74	-0.73	-0.77	ZZ
G7WM8Y		93.23	-0.21	-0.22	92.90	-0.57	-0.60	ZZ
GAEBWJ		93.32	-0.12	-0.12	93.59	0.12	0.13	ZZ
HQCFRD		92.82	-0.62	-0.65	93.18	-0.29	-0.30	ZZ
JLFCWC		93.62	0.18	0.19	93.88	0.41	0.43	ZZ
KC6BBC		93.14	-0.29	-0.31	93.17	-0.30	-0.32	ZZ
LUJ4JC		93.82	0.39	0.41	93.75	0.28	0.29	ZZ
MARKWR	*	92.75	-0.69	-0.72	92.23	-1.24	-1.30	ZZ
ME73EA		93.95	0.51	0.54	94.10	0.63	0.66	ZZ
NCXVJZ		93.24	-0.19	-0.20	93.11	-0.36	-0.38	ZZ
PRK6T3		93.71	0.27	0.29	93.53	0.06	0.07	ZZ
RM4EMY		93.63	0.19	0.21	93.71	0.24	0.25	ZZ
RWARP2		93.86	0.42	0.44	93.48	0.01	0.02	ZZ
U8XA2Q	X	97.20	3.76	3.97	96.43	2.96	3.10	ZZ
UDQ2HZ		92.97	-0.46	-0.49	92.83	-0.64	-0.67	ZZ
V2DBAW	*	96.35	2.91	3.07	96.33	2.86	3.00	ZZ
Y8MJVN		93.79	0.35	0.37	93.79	0.32	0.34	ZZ
YGBPZ2		94.07	0.63	0.67	94.19	0.73	0.76	ZZ
Z2WALP		93.75	0.31	0.33	93.91	0.44	0.46	ZZ
ZNPV8T		95.14	1.71	1.80	95.15	1.68	1.76	ZZ

Summary Statistics	Sample GN69	Sample GN70
<b>Grand Means</b>	93.44 Percent	93.47 Percent
<b>Std Dev Btwn Labs</b>	0.95 Percent	0.95 Percent
Statistics based on 30 of 31 reporting participants.		

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

U8XA2Q (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample GN69.





**Paper & Paperboard Interlaboratory Testing Program**

**Report #3012G,  
August 2019**

**Analysis 384**

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

**TAPPI Official Test Method T425**

**Key to Instrument Codes Reported by Participants**

**ZZ** Instruments No Longer Tracked



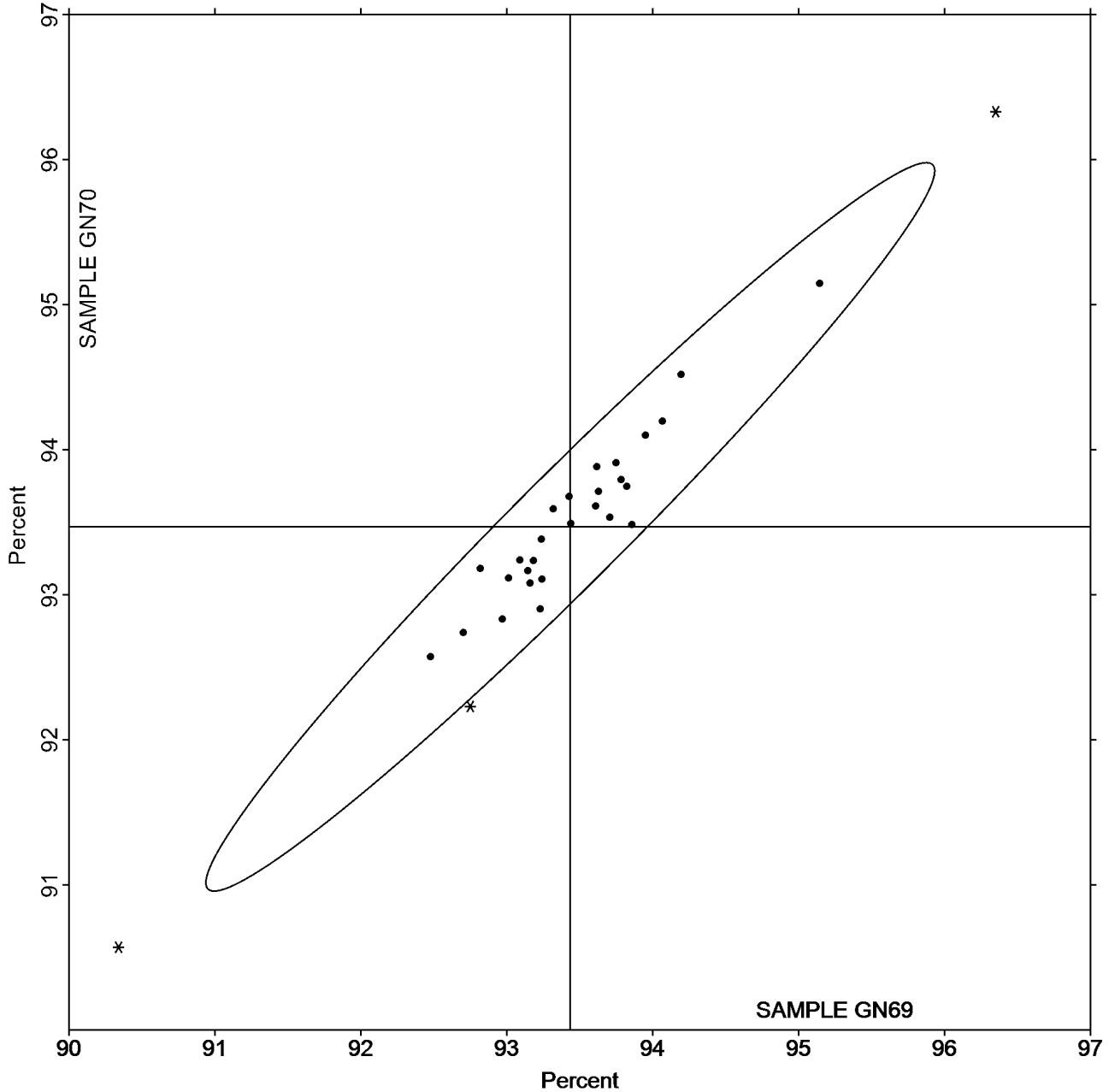
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 384**  
**Opacity (89% Reflectance Backing) - Fine Papers**  
**TAPPI Official Test Method T425**

**Report #3012G,**  
**August 2019**

**Grand Mean Sample GN69 = 93.435**  
**Percent**

**Grand Mean Sample GN70 = 93.468**  
**Percent**

**ANALYSIS 384**





**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 386**  
**Opacity (Paper Backing) - Fine Papers and Newsprint**  
**TAPPI Official Test Method T519**

**Report #3012G,**  
**August 2019**

WebCode	Data Flag	<u>Sample GP69</u>			<u>Sample GP70</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
32Q9KV		90.11	0.02	0.18	90.20	0.08	0.52	ZZ
3AHQXH		89.98	-0.11	-0.96	89.97	-0.15	-0.92	ZZ
7UEEYP		89.86	-0.23	-2.02	89.89	-0.23	-1.44	ZZ
E4T4DL		90.09	0.00	-0.03	90.04	-0.08	-0.48	ZZ
EQ8JGC		90.05	-0.04	-0.37	89.95	-0.17	-1.03	ZZ
FFGRGK		90.25	0.16	1.39	90.14	0.02	0.13	ZZ
MQKK4C		90.16	0.06	0.55	90.37	0.26	1.59	ZZ
NZ4EUY		90.05	-0.05	-0.40	90.13	0.01	0.09	ZZ
PF96AA		90.25	0.15	1.33	90.06	-0.05	-0.33	ZZ
RGWFX8		90.12	0.02	0.20	90.13	0.01	0.05	ZZ
TAAHX7		89.98	-0.11	-1.00	90.17	0.05	0.33	ZZ
U9UMPJ		90.27	0.17	1.50	90.29	0.17	1.05	ZZ
WKH97X		90.12	0.02	0.20	90.40	0.28	1.73	ZZ
XM2XN2		90.03	-0.07	-0.58	89.91	-0.21	-1.28	ZZ

<b>Summary Statistics</b>	<u>Sample GP69</u>	<u>Sample GP70</u>
<b>Grand Means</b>	90.09 Percent	90.12 Percent
<b>Std Dev Btwn Labs</b>	0.11 Percent	0.16 Percent

Statistics based on 14 of 14 reporting participants.

**Key to Instrument Codes Reported by Participants**

ZZ Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

Report #3012G,  
August 2019

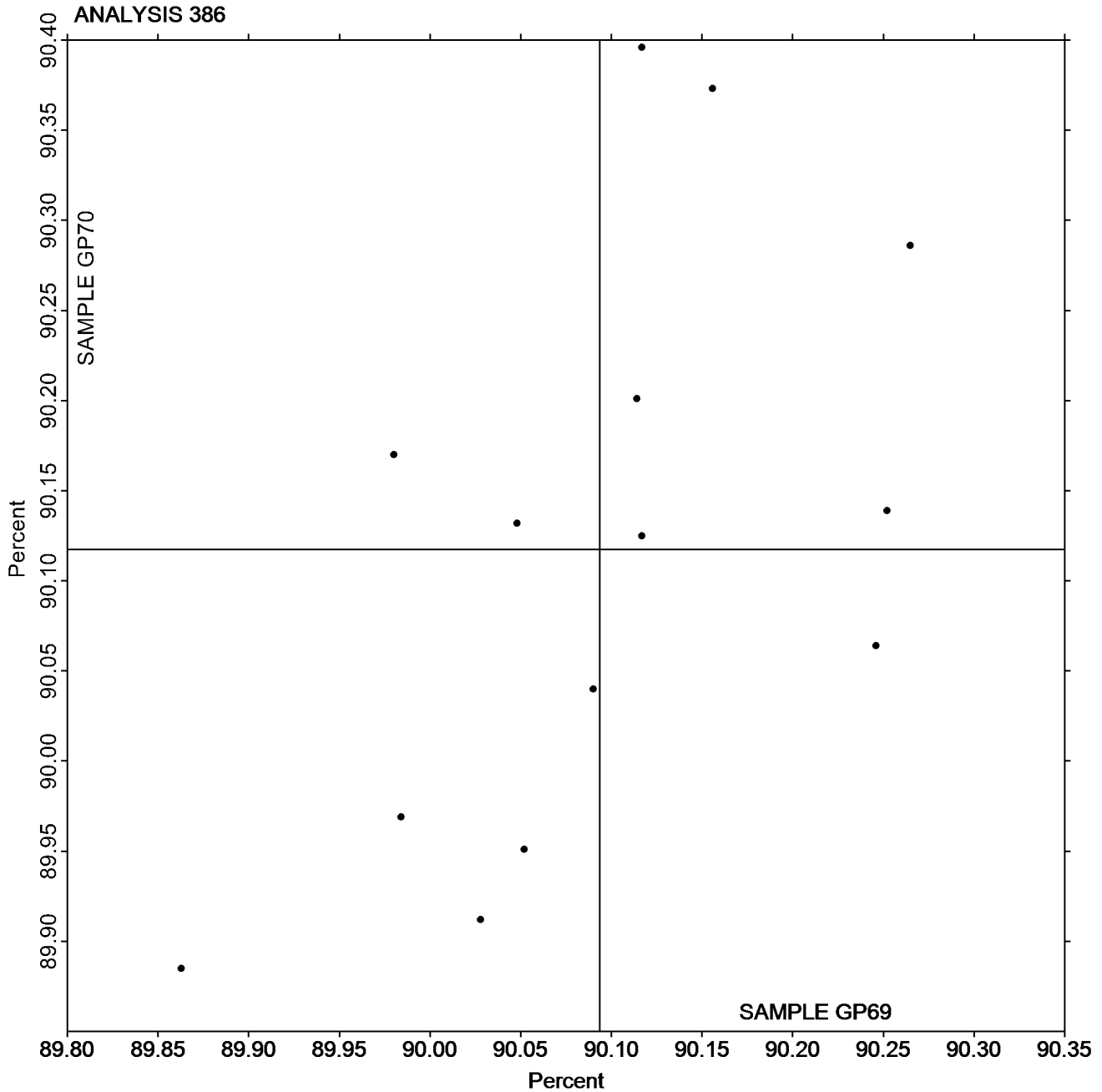
## Analysis 386

Opacity (Paper Backing) - Fine Papers and Newsprint

TAPPI Official Test Method T519

Grand Mean Sample GP69 = 90.094  
Percent

Grand Mean Sample GP70 = 90.117  
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**  
**TAPPI Official Test Method T452**

Report #3012G,  
August 2019

WebCode	Data Flag	<u>Sample GR69</u>			<u>Sample GR70</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2FRKGU		82.59	-1.37	-0.75	83.54	-1.08	-0.63	XX
2ZXX9G		82.35	-1.61	-0.88	83.13	-1.49	-0.87	PP
4FKAGT		83.98	0.03	0.01	84.72	0.10	0.06	HG
4ZM9WE		82.38	-1.58	-0.86	83.39	-1.23	-0.72	TS
78ZU2N		83.98	0.02	0.01	84.43	-0.19	-0.11	XC
7L6KTF		82.34	-1.61	-0.88	83.07	-1.55	-0.91	TS
9DY43D		84.61	0.66	0.36	85.33	0.71	0.41	TT
9F6M29		83.51	-0.44	-0.24	84.21	-0.41	-0.24	XX
9J7RFE		83.95	-0.01	0.00	84.77	0.16	0.09	HG
C78L6K		82.55	-1.41	-0.77	83.08	-1.54	-0.90	TT
EAHMAA	*	88.45	4.49	2.45	88.25	3.63	2.13	TS
ENGPVN		82.45	-1.51	-0.82	83.12	-1.49	-0.88	TS
EPBDAD		84.66	0.71	0.39	85.37	0.75	0.44	TS
G7WM8Y	*	85.28	1.32	0.72	85.15	0.53	0.31	TS
KWDBNJ		81.92	-2.04	-1.11	82.74	-1.88	-1.10	TS
LUJ4JC		82.51	-1.44	-0.79	83.38	-1.24	-0.72	TS
MARKWR	*	87.75	3.79	2.07	88.64	4.02	2.35	PE
ME73EA		82.14	-1.82	-0.99	82.91	-1.71	-1.00	TT
MGE9ZB		83.66	-0.29	-0.16	84.37	-0.25	-0.15	HG
P284J9		87.76	3.80	2.08	88.45	3.83	2.25	HZ
PRK6T3		83.98	0.02	0.01	84.66	0.04	0.02	XX
UDQ2HZ		84.26	0.30	0.17	85.00	0.38	0.22	TS
XWB32R		81.94	-2.02	-1.10	82.54	-2.08	-1.22	TT
YGBPZ2		84.05	0.09	0.05	84.95	0.34	0.20	VM
YNWHC2		84.74	0.78	0.43	85.43	0.81	0.48	TS
Z2WALP		82.25	-1.71	-0.93	82.90	-1.72	-1.01	TT
ZNPV8T		86.69	2.73	1.49	86.80	2.18	1.28	XX
ZNRHVX		84.08	0.12	0.06	84.99	0.37	0.22	TT

<b>Summary Statistics</b>	<u>Sample GR69</u>	<u>Sample GR70</u>
<b>Grand Means</b>	83.96 Percent	84.62 Percent
<b>Std Dev Btwn Labs</b>	1.83 Percent	1.71 Percent
Statistics based on 28 of 28 reporting participants.		



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 390**  
**Directional Brightness**  
**TAPPI Official Test Method T452**

**Report #3012G,**  
**August 2019**

**Key to Instrument Codes Reported by Participants**

<b>HG</b>	Hunter Labscan / XE	<b>HZ</b>	Hunter Lab ColorFlex EZ Series
<b>PE</b>	Photovolt 577	<b>PP</b>	Technidyne Profile/Plus
<b>TS</b>	Technidyne Brightimeter Micro S-5	<b>TT</b>	Technidyne Brightimeter Micro S4-M
<b>VM</b>	Valmet PaperLab (was Kajaani/Robotest)	<b>XC</b>	X-Rite Color i5
<b>XX</b>	Instrument make/model not specified by lab		



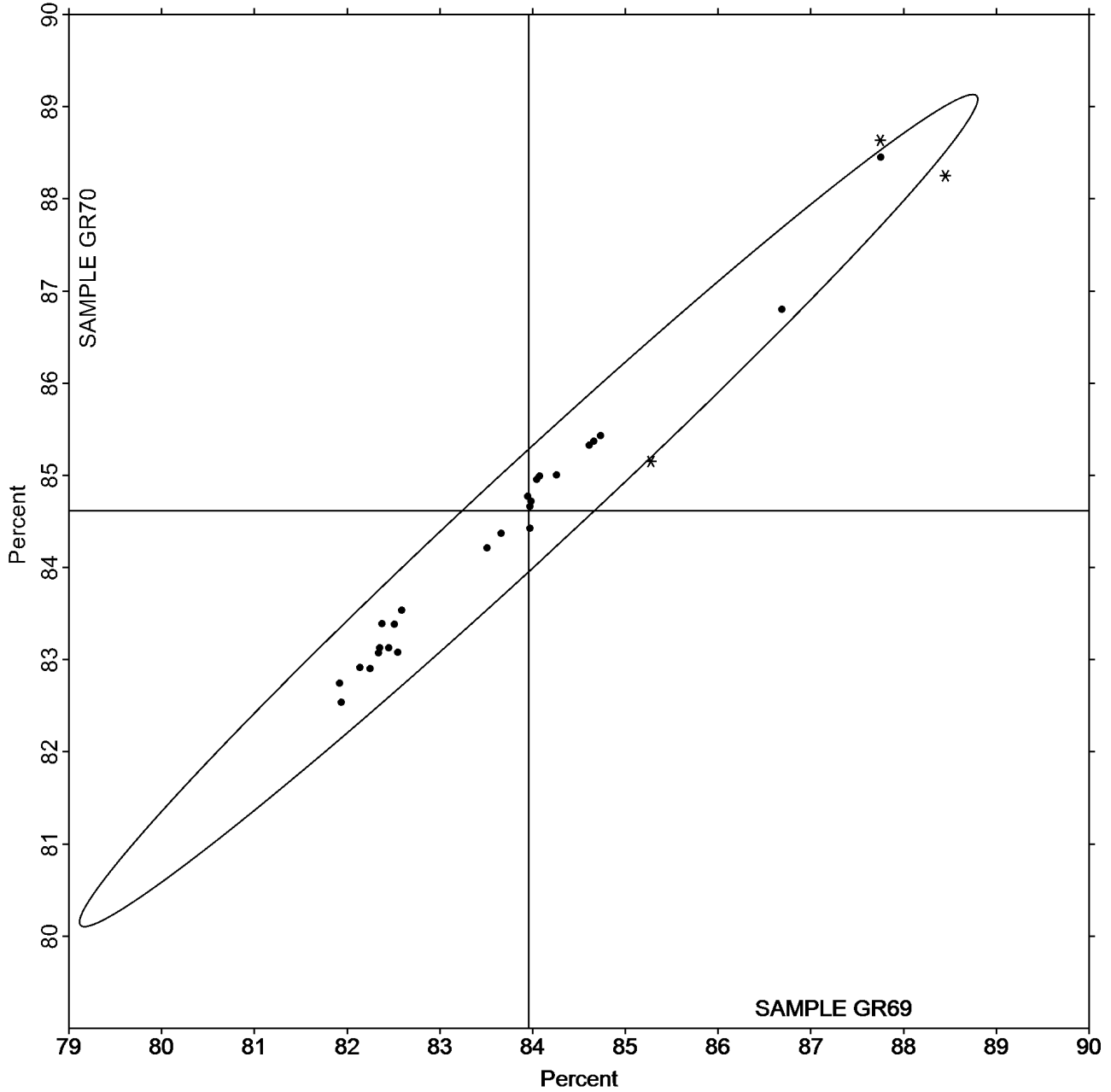
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 390**  
**Directional Brightness**  
**TAPPI Official Test Method T452**

**Report #3012G,**  
**August 2019**

**Grand Mean Sample GR69 = 83.957**  
**Percent**

**Grand Mean Sample GR70 = 84.618**  
**Percent**

**ANALYSIS 390**





**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 391**  
**Directional Brightness of Fluorescent Samples**  
**TAPPI Official Test Method T452**

**Report #3012G,**  
**August 2019**

WebCode	Data Flag	<u>Sample GZ69</u>			<u>Sample GZ70</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4ZM9WE		90.68	0.07	0.13	90.56	-0.04	-0.07	TS
7Y7V6M		90.60	-0.01	-0.01	90.32	-0.28	-0.49	TT
9DZRQJ		90.76	0.15	0.27	90.70	0.10	0.19	TT
AUGKJE		90.36	-0.24	-0.44	90.49	-0.10	-0.18	TS
DKM97P		89.36	-1.25	-2.22	89.40	-1.19	-2.13	HT
EZR6UG		91.58	0.97	1.73	91.70	1.10	1.97	LE
FFGRGK		90.32	-0.29	-0.52	90.33	-0.27	-0.48	TS
GAEBWJ		90.86	0.25	0.45	90.86	0.26	0.47	TS
JLFCWC		90.12	-0.49	-0.87	90.28	-0.32	-0.57	PP
KC6BBC		90.68	0.07	0.13	90.68	0.08	0.15	PP
NCXVJZ		90.48	-0.13	-0.22	90.33	-0.27	-0.48	TS
PRK6T3		91.72	1.11	1.98	91.72	1.12	2.00	XX
RM4EMY		90.38	-0.23	-0.40	90.20	-0.40	-0.70	TS
RWARP2		90.14	-0.46	-0.82	90.26	-0.34	-0.60	PP
V2DBAW		91.08	0.47	0.84	90.90	0.30	0.54	TT
Y8MJVN		90.59	-0.02	-0.04	90.80	0.21	0.37	TS

<b>Summary Statistics</b>	<u>Sample GZ69</u>	<u>Sample GZ70</u>
<b>Grand Means</b>	90.61 Percent	90.60 Percent
<b>Stnd Dev Btwn Labs</b>	0.56 Percent	0.56 Percent
Statistics based on 16 of 16 reporting participants.		

**Key to Instrument Codes Reported by Participants**

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



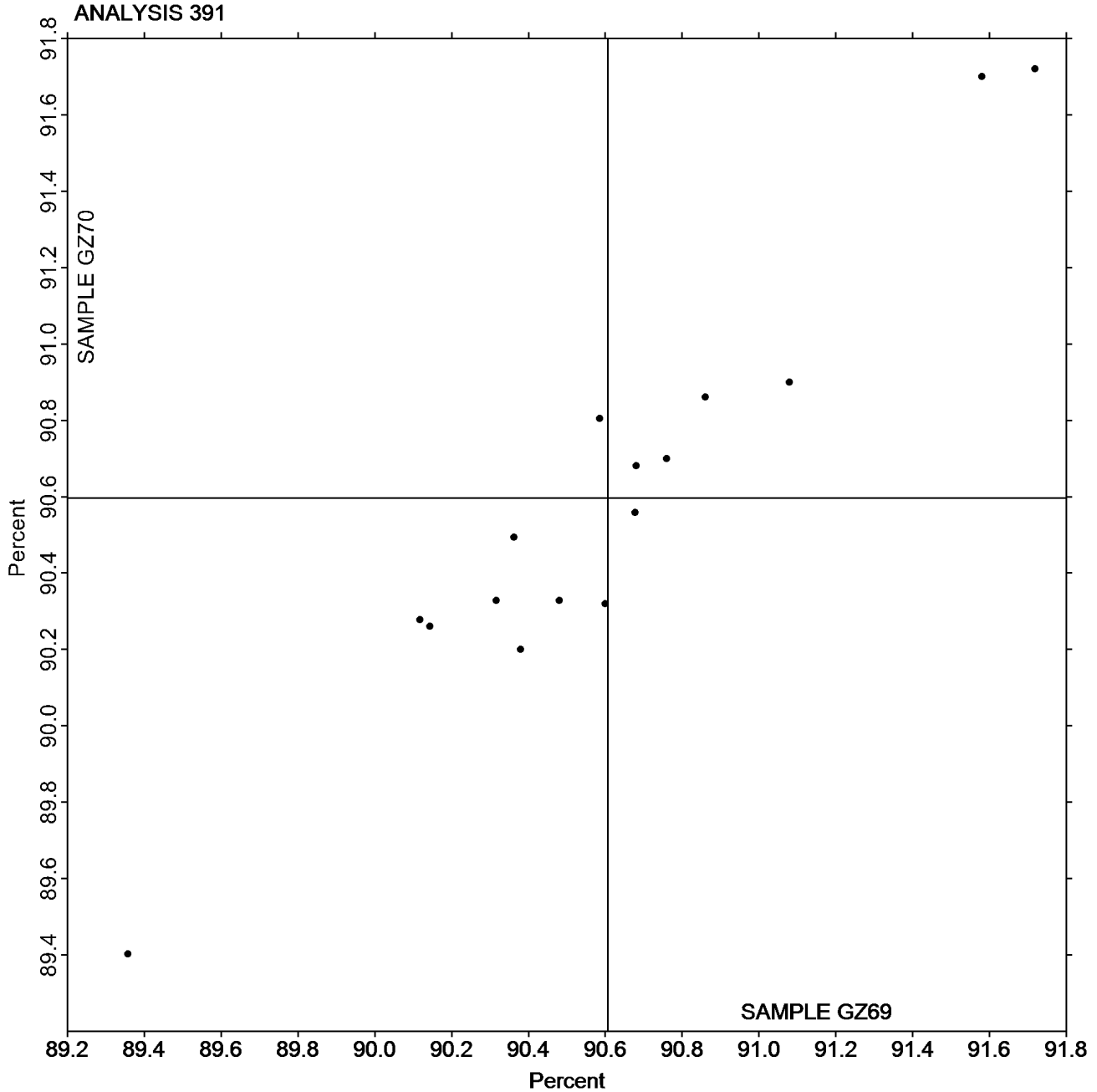


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 391**  
**Directional Brightness of Fluorescent Samples**  
**TAPPI Official Test Method T452**

**Report #3012G,**  
**August 2019**

**Grand Mean Sample GZ69 = 90.606**  
**Percent**

**Grand Mean Sample GZ70 = 90.596**  
**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**

**Report #3012G,  
August 2019**

**Analysis 392  
Diffuse Brightness**

**TAPPI Official Test Method T525**

WebCode	Data Flag	Sample GR69			Sample GR70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2ZXX9G		82.50	-0.40	-2.05	83.28	-0.43	-2.25	LT
3AHQXH		82.70	-0.19	-0.99	83.56	-0.14	-0.75	LE
7CQB8M		83.13	0.24	1.24	83.89	0.18	0.95	TC
7L6KTF		82.98	0.09	0.46	83.87	0.16	0.82	LT
7UEEYP	X	81.69	-1.21	-6.25	82.48	-1.23	-6.37	LE
9F6M29		83.11	0.22	1.12	83.77	0.06	0.30	EE
9J7RFE		82.98	0.08	0.44	83.76	0.05	0.25	TC
B7B29F		82.98	0.08	0.44	83.74	0.03	0.17	TC
E4T4DL		82.77	-0.13	-0.66	83.60	-0.11	-0.58	LA
EPBDAD		82.76	-0.14	-0.71	83.58	-0.12	-0.65	TC
EZR6UG	X	82.48	-0.42	-2.16	82.86	-0.85	-4.40	LE
FFGRGK		83.01	0.12	0.60	83.80	0.09	0.49	TC
GL8UDA		83.17	0.28	1.45	83.92	0.21	1.10	TC
L7DK9D		82.74	-0.15	-0.80	83.77	0.06	0.31	TC
LUJ4JC		82.76	-0.14	-0.70	83.71	0.00	-0.02	TC
MQKK4C		82.70	-0.19	-0.99	83.42	-0.29	-1.49	TC
NZ4EUY		82.86	-0.03	-0.17	83.81	0.11	0.55	TC
P8EZG9		82.75	-0.15	-0.76	83.42	-0.29	-1.51	TC
TAAHX7		83.19	0.29	1.52	84.00	0.29	1.52	TM
U9UMPJ		83.11	0.22	1.12	83.78	0.07	0.37	AC
URNL7W		82.78	-0.11	-0.58	83.61	-0.10	-0.51	TC
UT6BJ4		82.77	-0.12	-0.64	83.65	-0.05	-0.28	TC
VXPKUQ	X	82.80	-0.09	-0.48	82.96	-0.75	-3.88	TZ
X7VX3		83.06	0.17	0.88	83.89	0.18	0.93	EF
XM2XN2		82.67	-0.22	-1.15	83.47	-0.24	-1.25	EG
XWB32R	X	69.55	-13.34	-69.07	72.13	-11.58	-60.23	EG
ZNRHVX		83.08	0.18	0.94	84.00	0.29	1.52	TL

Summary Statistics	Sample GR69	Sample GR70
<b>Grand Means</b>	82.89 Percent	83.71 Percent
<b>Std Dev Btwn Labs</b>	0.19 Percent	0.19 Percent

Statistics based on 23 of 27 reporting participants.

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

VXPKUQ (X) - Data for sample GR70 are low. Inconsistent within the determinations of sample GR70.

XWB32R (X) - Extreme Data.

7UEEYP (X) - Extreme Data.

EZR6UG (X) - Data for sample GR70 are low. Inconsistent within the determinations of sample GR70.



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 392**  
**Diffuse Brightness**  
**TAPPI Official Test Method T525**

**Report #3012G,**  
**August 2019**

**Analysis Notes:**

URNL7W - One determination removed from the Lab Mean of Sample GR69 per Grubb's Test at 1% risk (TAPPI 1205).

**Key to Instrument Codes Reported by Participants**

AC	ACS Spectro-Sensor II	EE	Datacolor Elrepho 2000
EF	Datacolor Elrepho 3000	EG	Datacolor Elrepho 450X
LA	L & W Elrepho - Autoline	LE	L & W Elrepho
LT	L & W Elrepho SE 071	TC	Technidyne Color Touch Series
TL	Technidyne Technibrite TB-1	TM	Technidyne Technibrite Micro TB-1C
TZ	Technibrite Model TB-1		



# Paper & Paperboard Interlaboratory Testing Program

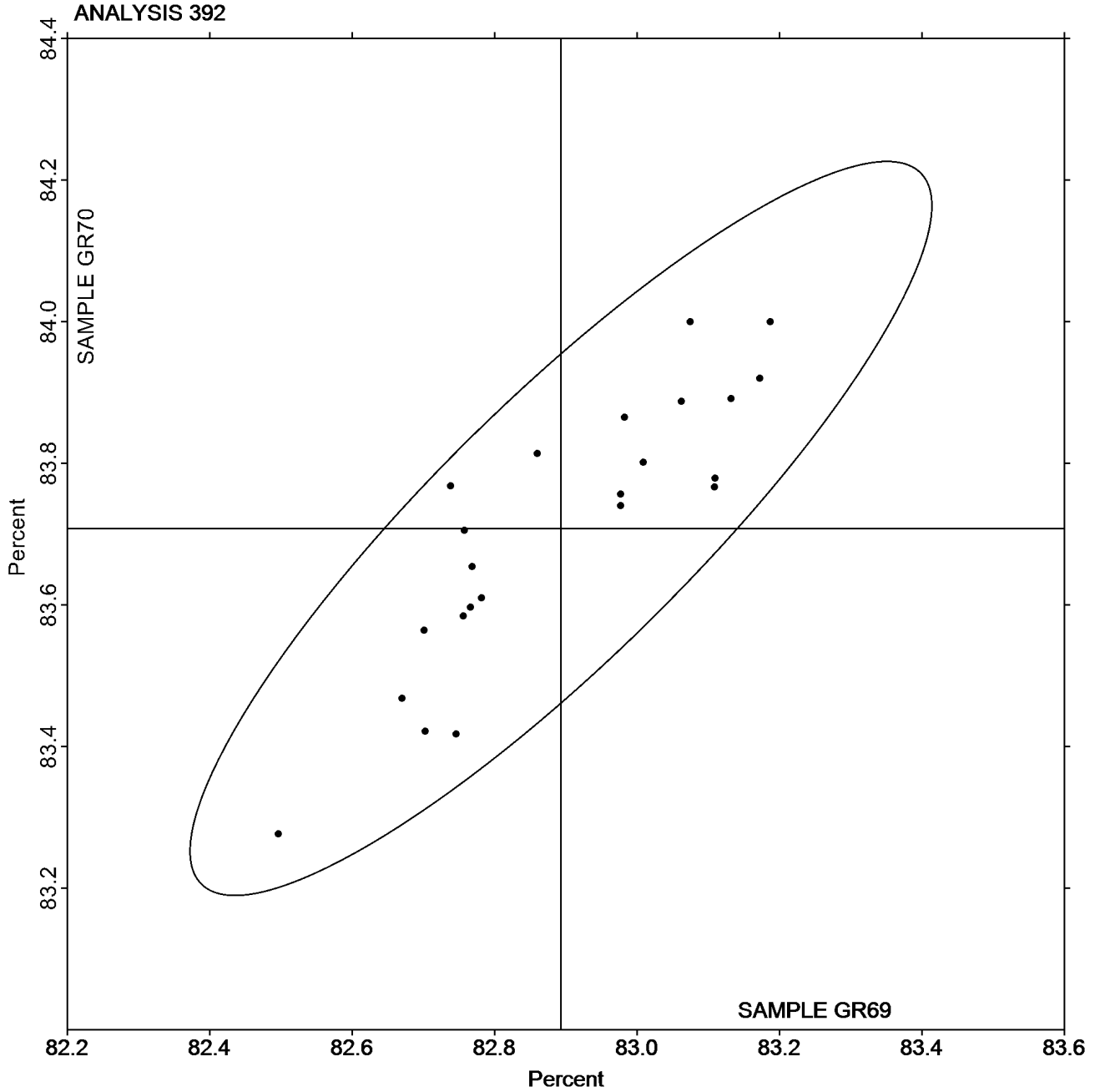
Report #3012G,  
August 2019

## Analysis 392 Diffuse Brightness

TAPPI Official Test Method T525

Grand Mean Sample GR69 = 82.893  
Percent

Grand Mean Sample GR70 = 83.708  
Percent





**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 394**  
**Fluorescent Component of Directional Brightness**  
**TAPPI Official Test Method T452**

**Report #3012G,**  
**August 2019**

WebCode	Data Flag	<u>Sample GZ69</u>			<u>Sample GZ70</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
4ZM9WE		3.996	0.255	0.58	3.886	0.147	0.32	TS
7Y7V6M		3.620	-0.121	-0.28	3.580	-0.159	-0.35	TT
9DZRQJ		3.520	-0.221	-0.51	3.580	-0.159	-0.35	TT
AUGKJE		3.642	-0.099	-0.23	3.728	-0.011	-0.02	TS
EZR6UG	*	5.056	1.315	3.00	5.124	1.385	3.06	LE
FFGRGK		3.376	-0.365	-0.83	3.402	-0.337	-0.74	TS
JLFCWC		3.544	-0.197	-0.45	3.556	-0.183	-0.40	PP
KC6BBC		3.580	-0.161	-0.37	3.660	-0.079	-0.17	PP
NCXVJZ		3.922	0.181	0.41	3.894	0.155	0.34	TS
PRK6T3		3.393	-0.349	-0.80	3.316	-0.423	-0.93	XX
RM4EMY		3.480	-0.261	-0.60	3.440	-0.299	-0.66	TS
RWARP2		3.682	-0.059	-0.14	3.610	-0.129	-0.28	PP
Y8MJVN		3.826	0.085	0.19	3.830	0.091	0.20	TS

<b>Summary Statistics</b>	<u>Sample GZ69</u>	<u>Sample GZ70</u>
<b>Grand Means</b>	3.74 Percent	3.74 Percent
<b>Std Dev Btwn Labs</b>	0.44 Percent	0.45 Percent

Statistics based on 13 of 13 reporting participants.

**Analysis Notes:**

PRK6T3 - One determination removed from the Lab Mean of Sample GZ69 per Grubb's Test at 1% risk (TAPPI 1205).

**Key to Instrument Codes Reported by Participants**

LE	L & W Elrepho	PP	Technidyne Profile/Plus
TS	Technidyne Brightimeter Micro S-5	TT	Technidyne Brightimeter Micro S4-M
XX	Instrument make/model not specified by lab		

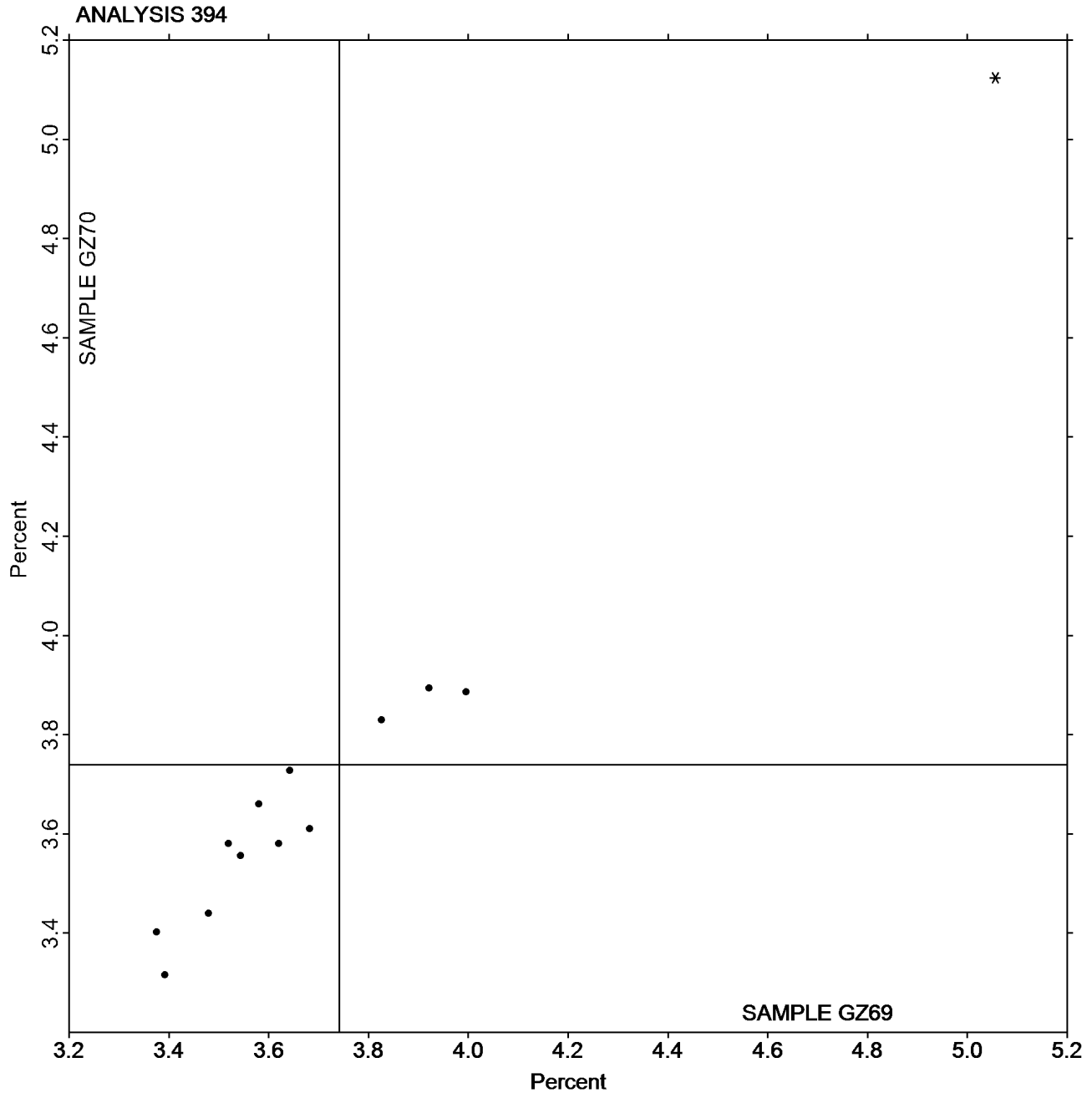


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 394**  
**Fluorescent Component of Directional Brightness**  
**TAPPI Official Test Method T452**

**Report #3012G,**  
**August 2019**

**Grand Mean Sample GZ69 = 3.7413**  
**Percent**

**Grand Mean Sample GZ70 = 3.7389**  
**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**  
**TAPPI Official Test Method T480**

**Report #3012G,**  
**August 2019**

WebCode	Data Flag	Sample GT69			Sample GT70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2NHVGU		73.67	1.41	1.04	73.88	2.54	0.88	VM
2ZXX9G		71.74	-0.52	-0.38	72.97	1.63	0.57	GA
4FKAGT		72.70	0.44	0.33	73.70	2.36	0.82	TH
6MMJNL		72.82	0.56	0.41	73.32	1.98	0.69	LA
7Y7V6M		71.87	-0.39	-0.28	71.68	0.34	0.12	PP
AUGKJE		71.74	-0.52	-0.38	69.95	-1.39	-0.48	LA
FFGRGK		71.40	-0.86	-0.63	72.00	0.66	0.23	LA
JLFCWC		73.36	1.10	0.81	73.72	2.38	0.83	PP
ME73EA		72.05	-0.21	-0.15	71.84	0.51	0.18	TH
MGE9ZB		73.32	1.06	0.78	73.38	2.04	0.71	TH
RWARP2		72.01	-0.25	-0.18	69.89	-1.45	-0.50	PP
U9UMPJ		72.70	0.44	0.33	72.36	1.02	0.35	LB
UY6YRV	*	71.77	-0.49	-0.36	62.64	-8.70	-3.02	LF
XWB32R		74.79	2.53	1.86	73.56	2.22	0.77	TH
YGBPZ2		72.67	0.41	0.30	71.13	-0.21	-0.07	VM
YNWHC2	*	68.28	-3.98	-2.91	68.07	-3.27	-1.13	LA
ZNRHVX		71.45	-0.81	-0.59	68.65	-2.69	-0.93	GM

Summary Statistics	Sample GT69	Sample GT70
<b>Grand Means</b>	72.26 Gloss Units	71.34 Gloss Units
<b>Std Dev Btwn Labs</b>	1.37 Gloss Units	2.88 Gloss Units
Statistics based on 17 of 17 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>LA</b> L & W Gloss - Autoline 300	<b>LB</b> L & W Gloss Tester Code 224
<b>LF</b> L & W Autoline 400	<b>PP</b> Technidyne Profile/Plus
<b>TH</b> Technidyne T480A	<b>VM</b> Valmet PaperLab (was Kajaani/Robotest)



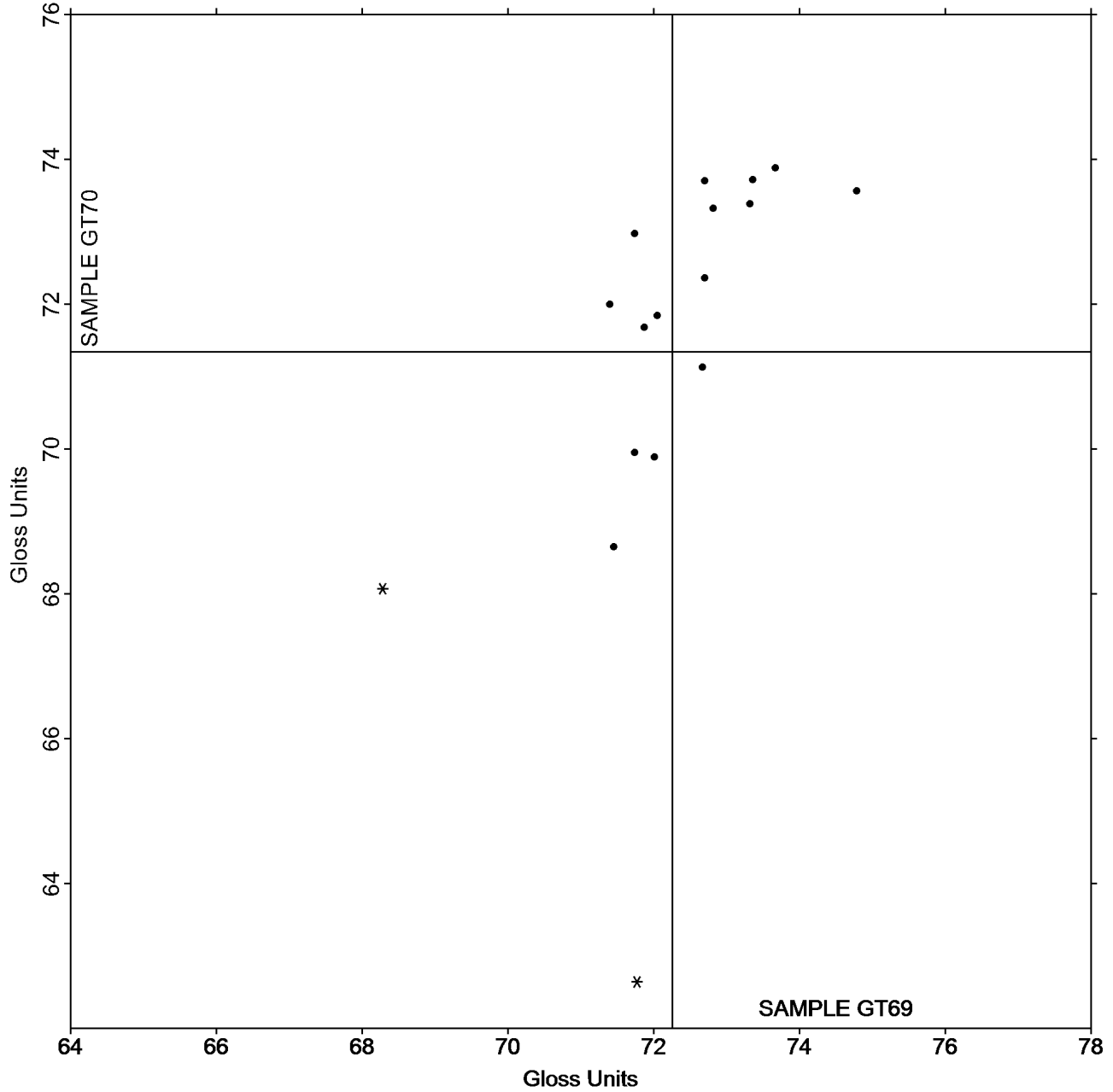
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 395**  
**Specular Gloss at 75 Degrees - High Range**  
**TAPPI Official Test Method T480**

**Report #3012G,**  
**August 2019**

**Grand Mean Sample GT69 = 72.255**  
**Gloss Units**

**Grand Mean Sample GT70 = 71.338**  
**Gloss Units**

**ANALYSIS 395**



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





**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 396**  
**Specular Gloss at 75 Degrees - Low Range**  
**TAPPI Official Test Method T480**

**Report #3012G,**  
**August 2019**

WebCode	Data Flag	Sample GU69			Sample GU70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
78ZU2N		47.56	3.20	1.11	34.55	1.15	0.87	TH
8EGLTE		43.76	-0.60	-0.21	33.43	0.03	0.02	PP
9J7RFE		48.86	4.50	1.56	35.15	1.75	1.33	PP
EZR6UG		45.26	0.90	0.31	34.00	0.60	0.45	TH
FFGRGK		39.64	-4.72	-1.63	30.63	-2.77	-2.10	LA
JLFCWC		40.75	-3.61	-1.25	31.84	-1.56	-1.19	PP
P284J9		46.74	2.38	0.83	34.22	0.82	0.62	GS
TMYJ8L		43.11	-1.25	-0.43	33.17	-0.23	-0.18	ZT
U9UMPJ		44.49	0.13	0.05	33.56	0.16	0.12	LA
Z2WALP		43.39	-0.97	-0.34	33.47	0.07	0.05	TH

Summary Statistics	Sample GU69	Sample GU70
<b>Grand Means</b>	44.36 Gloss Units	33.40 Gloss Units
<b>Std Dev Btwn Labs</b>	2.89 Gloss Units	1.32 Gloss Units
Statistics based on 10 of 10 reporting participants.		

**Key to Instrument Codes Reported by Participants**

GS	BYK-Gardner Glossgard II	LA	L & W Gloss - Autoline 300
PP	Technidyne Profile/Plus	TH	Technidyne T480A
ZT	Zehntner ZLR 1020		



# Paper & Paperboard Interlaboratory Testing Program

Report #3012G,  
August 2019

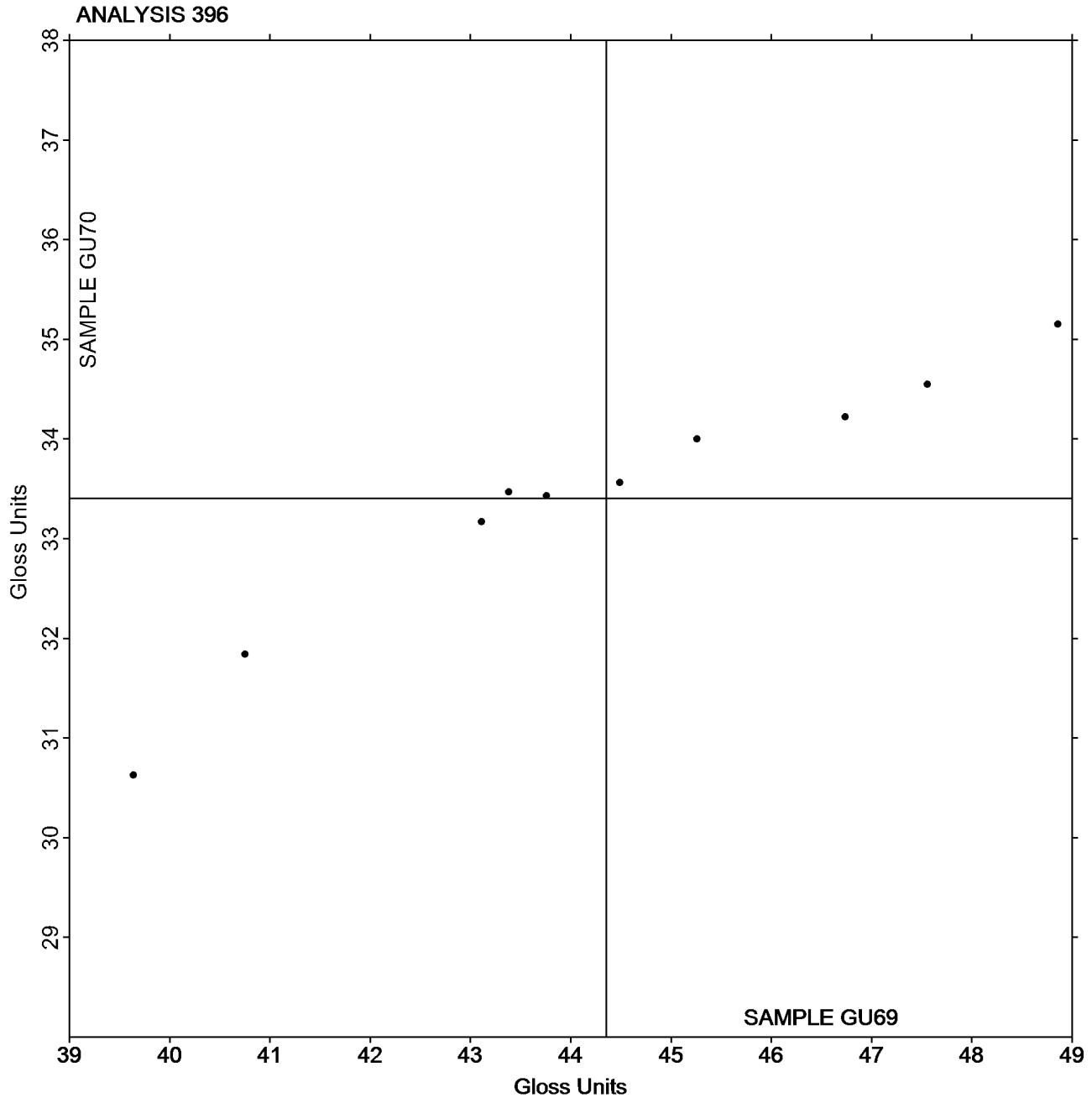
## Analysis 396

Specular Gloss at 75 Degrees - Low Range

TAPPI Official Test Method T480

Grand Mean Sample GU69 = 44.356  
Gloss Units

Grand Mean Sample GU70 = 33.402  
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)**  
**TAPPI Official Test Method T410**

Report #3012G,  
August 2019

WebCode	Data Flag	Sample GW69			Sample GW70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2FRKGU		73.85	0.38	0.96	88.65	-0.47	-1.05	ZZ
32Q9KV		73.39	-0.08	-0.21	88.88	-0.24	-0.54	ZZ
3AHQXH		73.21	-0.26	-0.66	89.69	0.57	1.28	ZZ
4EABGR		73.21	-0.26	-0.67	88.87	-0.25	-0.57	ZZ
6LZFKD		73.99	0.52	1.32	89.46	0.34	0.75	ZZ
78ZU2N		73.34	-0.13	-0.33	89.41	0.30	0.66	ZZ
8BGM8M		72.81	-0.66	-1.69	88.66	-0.46	-1.02	ZZ
9F6M29		73.53	0.06	0.15	89.24	0.12	0.26	ZZ
D3788G	*	74.10	0.63	1.60	90.22	1.10	2.47	ZZ
DKM97P		74.26	0.79	2.01	88.86	-0.26	-0.58	ZZ
EQ8JGC		73.84	0.36	0.93	89.19	0.08	0.17	ZZ
EZR6UG	X	71.70	-1.77	-4.51	85.70	-3.42	-7.66	ZZ
FZM698		73.39	-0.08	-0.22	88.55	-0.57	-1.29	ZZ
GAEBWJ		73.29	-0.18	-0.46	89.74	0.62	1.39	ZZ
HDNHH3		73.02	-0.45	-1.14	89.13	0.01	0.02	ZZ
HQCFRD		73.23	-0.24	-0.61	88.83	-0.29	-0.65	ZZ
JTE89B		73.28	-0.19	-0.49	87.99	-1.13	-2.53	ZZ
JUBHQD		73.34	-0.13	-0.33	89.38	0.26	0.59	ZZ
PF96AA		73.56	0.09	0.23	89.21	0.09	0.21	ZZ
RM4EMY		73.28	-0.19	-0.49	89.31	0.19	0.43	ZZ
TMYJ8L		73.29	-0.18	-0.46	89.09	-0.03	-0.07	ZZ
U9UMPJ		73.40	-0.07	-0.18	89.31	0.19	0.43	ZZ
UDPEVV		73.36	-0.11	-0.29	89.65	0.53	1.19	ZZ
UUCUYR		74.42	0.95	2.42	89.12	0.00	0.00	ZZ
X3V8R8		73.37	-0.10	-0.26	89.05	-0.07	-0.16	ZZ
XM2XN2		72.97	-0.51	-1.29	88.61	-0.51	-1.15	ZZ
YATGAK		73.84	0.37	0.94	89.15	0.03	0.07	ZZ
Z2WALP		73.16	-0.31	-0.79	88.97	-0.15	-0.33	ZZ

Summary Statistics	Sample GW69	Sample GW70
<b>Grand Means</b>	73.47 g/sq m	89.12 g/sq m
<b>Std Dev Btwn Labs</b>	0.39 g/sq m	0.45 g/sq m

Statistics based on 27 of 28 reporting participants.

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

EZR6UG (X) - Extreme Data.



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 398**  
**Grammage (Mass per Unit Area)**  
**TAPPI Official Test Method T410**

**Report #3012G,**  
**August 2019**

**Key to Instrument Codes Reported by Participants**

**ZZ** Instruments No Longer Tracked





**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 399**  
**Sizing Test (Hercules Type)**  
**TAPPI Official Test Method T530**

Report #3012G,  
August 2019

WebCode	Data Flag	Sample GX69			Sample GX70			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2FRKGU	X	32.49	18.22	3.82	34.05	21.01	5.19	XX
2NHVGU		14.17	-0.10	-0.02	12.43	-0.61	-0.15	HE
4ZM9WE		11.30	-2.97	-0.62	12.12	-0.92	-0.23	HE
7L6KTF		10.90	-3.37	-0.71	10.25	-2.79	-0.69	HE
8EGLTE	*	27.91	13.64	2.86	25.04	12.00	2.96	HE
9DY43D		16.14	1.87	0.39	15.73	2.69	0.66	HE
AFJYAJ		12.26	-2.01	-0.42	12.06	-0.98	-0.24	HE
AUGKJE		13.79	-0.48	-0.10	11.16	-1.88	-0.47	HE
C78L6K	*	23.42	9.15	1.92	17.49	4.45	1.10	HE
ENGPVN		11.02	-3.25	-0.68	11.41	-1.63	-0.40	HE
G7WM8Y		17.67	3.40	0.71	17.22	4.17	1.03	HE
GAEBWJ		11.20	-3.07	-0.64	11.20	-1.84	-0.46	HE
HUCVYF		10.87	-3.40	-0.71	10.56	-2.48	-0.61	HE
JLFCWC		9.39	-4.88	-1.02	7.83	-5.21	-1.29	HE
KC6BBC	*	17.61	3.34	0.70	11.78	-1.26	-0.31	HE
KNZN83		15.90	1.63	0.34	14.59	1.55	0.38	HE
KWDBNJ		11.80	-2.47	-0.52	12.21	-0.83	-0.21	HE
LUJ4JC		22.29	8.02	1.68	21.15	8.11	2.00	XX
MARKWR		19.14	4.87	1.02	16.63	3.59	0.89	HE
NCXVJZ		11.59	-2.68	-0.56	11.78	-1.26	-0.31	HE
T82WW4		15.31	1.04	0.22	15.95	2.91	0.72	HE
U8XA2Q		14.35	0.08	0.02	11.13	-1.91	-0.47	HE
UR9WR6		11.18	-3.09	-0.65	9.69	-3.35	-0.83	HE
V2DBAW		7.25	-7.02	-1.47	7.18	-5.86	-1.45	HE
WB87KX		12.35	-1.92	-0.40	11.66	-1.38	-0.34	HE
Y8MJVN		12.41	-1.86	-0.39	12.64	-0.40	-0.10	HE
ZNPV8T		9.70	-4.57	-0.96	8.20	-4.84	-1.20	XX

Summary Statistics	Sample GX69	Sample GX70
<b>Grand Means</b>	14.27 Seconds	13.04 Seconds
<b>Std Dev Btwn Labs</b>	4.77 Seconds	4.05 Seconds

Statistics based on 26 of 27 reporting participants.

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

2FRKGU (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.



**Paper & Paperboard Interlaboratory Testing Program**

**Report #3012G,  
August 2019**

**Analysis 399**

**Sizing Test (Hercules Type)**

**TAPPI Official Test Method T530**

**Key to Instrument Codes Reported by Participants**

HE Hercules Sizing Tester

XX Instrument make/model not specified by lab



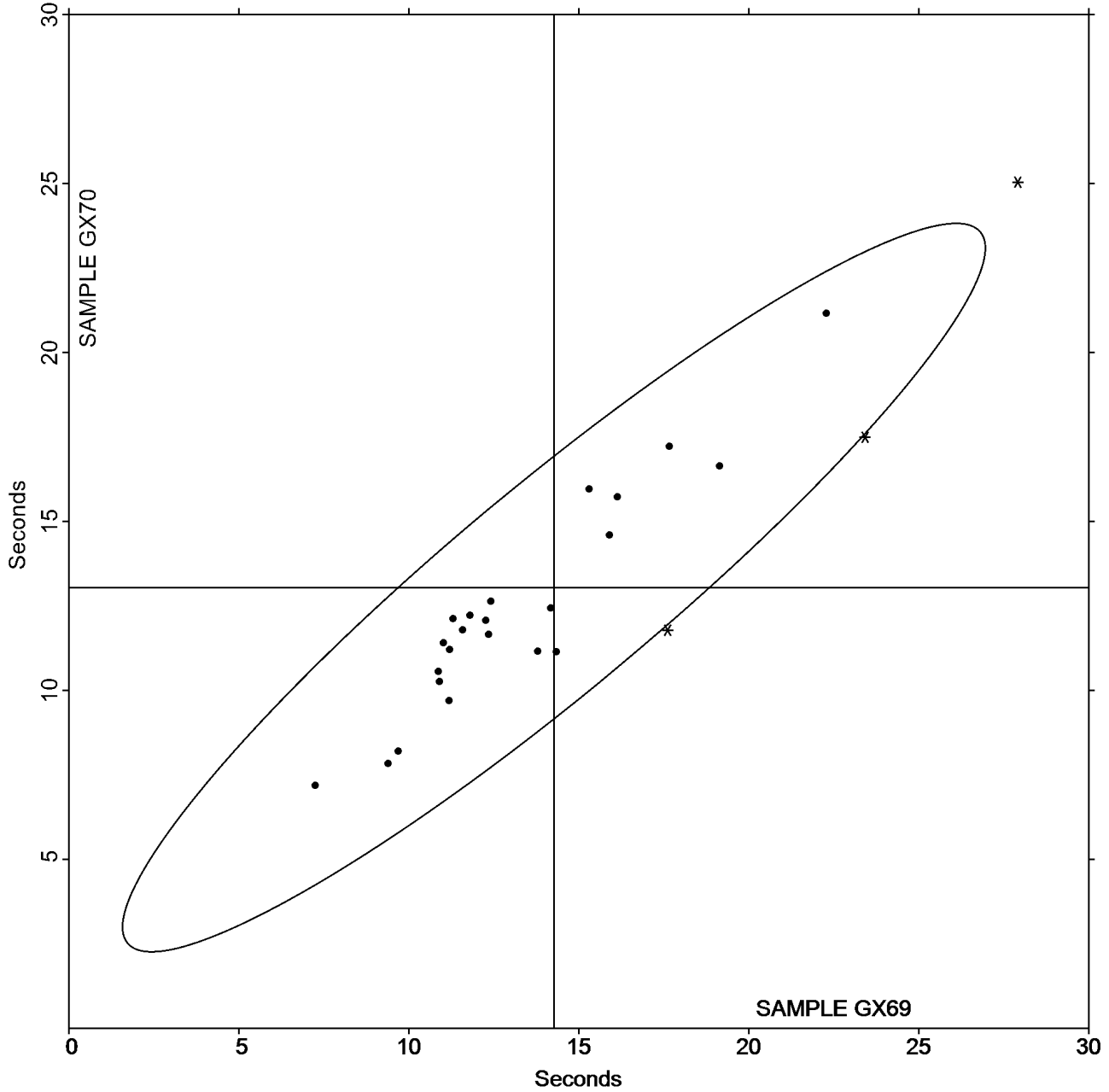
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 399**  
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**TAPPI Official Test Method T530**

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**Grand Mean Sample GX69 = 14.266**  
**Seconds**

**Grand Mean Sample GX70 = 13.042**  
**Seconds**

**ANALYSIS 399**







**Paper & Paperboard Interlaboratory Testing Program**

**Report #3012G,  
August 2019**

**Analysis 399**

**Sizing Test (Hercules Type)**

**TAPPI Official Test Method T530**

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-End of Report-