



## Paper & Paperboard Testing Program

### Summary Report #2942 G - June 2018

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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 #2942 G,  
June 2018**

**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	$\Delta L$	$\Delta a$	$\Delta b$	$\Delta E$	
2XA7TB		GA55	95.01	-0.66	3.58	-0.34	-0.04	0.06	0.34	HE
		GA56	94.68	-0.69	3.63					
62YMXZ		GA55	95.53	-0.53	3.83	-0.76	-0.04	0.01	0.76 X	NE
		GA56	94.77	-0.57	3.84					
8HXGKP		GA55	92.38	-0.22	2.54	0.14	0.00	0.42	0.44	TS
		GA56	92.52	-0.22	2.96					
8VLQXH		GA55	94.13	-0.85	3.88	-0.40	0.02	-0.08	0.41	XX
		GA56	93.73	-0.83	3.80					
9M9UZ4		GA55	94.85	-0.76	3.40	-0.34	-0.02	-0.06	0.35	HE
		GA56	94.51	-0.78	3.34					
AYUQCL		GA55	92.36	-0.78	3.48	-0.43	-0.01	0.02	0.43	HH
		GA56	91.94	-0.79	3.50					
BB84DL		GA55	94.15	-0.81	3.78	-0.38	-0.01	0.04	0.38	TC
		GA56	93.76	-0.82	3.82					
DUCPKX	X	GA55	92.52	-0.47	3.21	1.60	0.05	0.68	1.74 X	TS
		GA56	94.12	-0.42	3.88					
HMTZ6K		GA55	95.41	-0.84	3.73	-0.40	0.13	0.18	0.46	EH
		GA56	95.01	-0.71	3.91					
HXYYFY		GA55	93.39	-0.31	3.32	-0.56	0.08	0.02	0.56	TS
		GA56	92.83	-0.23	3.34					
JB2Q2B		GA55	93.46	-0.55	3.54	-0.34	0.07	0.09	0.36	TS
		GA56	93.11	-0.48	3.63					
JV4RXF		GA55	93.03	-0.21	3.56	-0.33	0.00	0.08	0.34	TS
		GA56	92.69	-0.21	3.64					
LMNRG9		GA55	95.44	-0.70	3.59	-0.35	0.02	0.04	0.35	TC
		GA56	95.09	-0.68	3.63					
NLH2HP	X	GA55	93.48	0.12	3.38	-0.43	0.00	0.09	0.44	TS
		GA56	93.05	0.12	3.47					
PD6E29		GA55	95.41	-0.78	3.88	-0.32	0.02	-0.09	0.33	TC
		GA56	95.09	-0.77	3.80					
X7WXR D		GA55	94.56	-0.70	3.25	-0.36	-0.02	0.04	0.36	HE
		GA56	94.20	-0.73	3.29					



**Paper & Paperboard Interlaboratory Testing Program  
Analysis 350**

**Report #2942 G,  
June 2018**

**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	$\Delta L$	$\Delta a$	$\Delta b$	$\Delta E$	
XH946Z		GA55	95.46	-0.77	3.82	-0.32	-0.01	0.05	0.32	EH
		GA56	95.15	-0.78	3.88					
Y2FQ6Y		GA55	96.14	-0.79	3.09	-0.43	0.04	-0.01	0.43	XS
		GA56	95.71	-0.74	3.08					
ZB38DY		GA55	94.80	-0.92	2.98	0.08	-0.02	0.43	0.44	LA
		GA56	94.89	-0.94	3.41					
ZH3QA4		GA55	95.35	-0.83	3.76	-0.32	-0.01	0.04	0.33	LS
		GA56	95.03	-0.84	3.80					

Grand Means		Summary Statistics							
GA55	94.439	-0.656	3.494						
GA56	94.092	-0.643	3.567	-0.342	0.011	0.072	0.411		
Std Dev Btwn Labs									
GA55	1.136	0.217	0.349						
GA56	1.105	0.226	0.274	0.197	0.043	0.142	0.107		

Statistics based on 18 of 20 reporting participants

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

NLH2HP (X) - High a values. Inconsistent within a values of Sample GA56.

DUCPKX (X) - Inconsistent within values for L and b for Samples GA55. Large delta L, delta b, and delta E values.

**Key to Instrument Codes Reported by Participants**

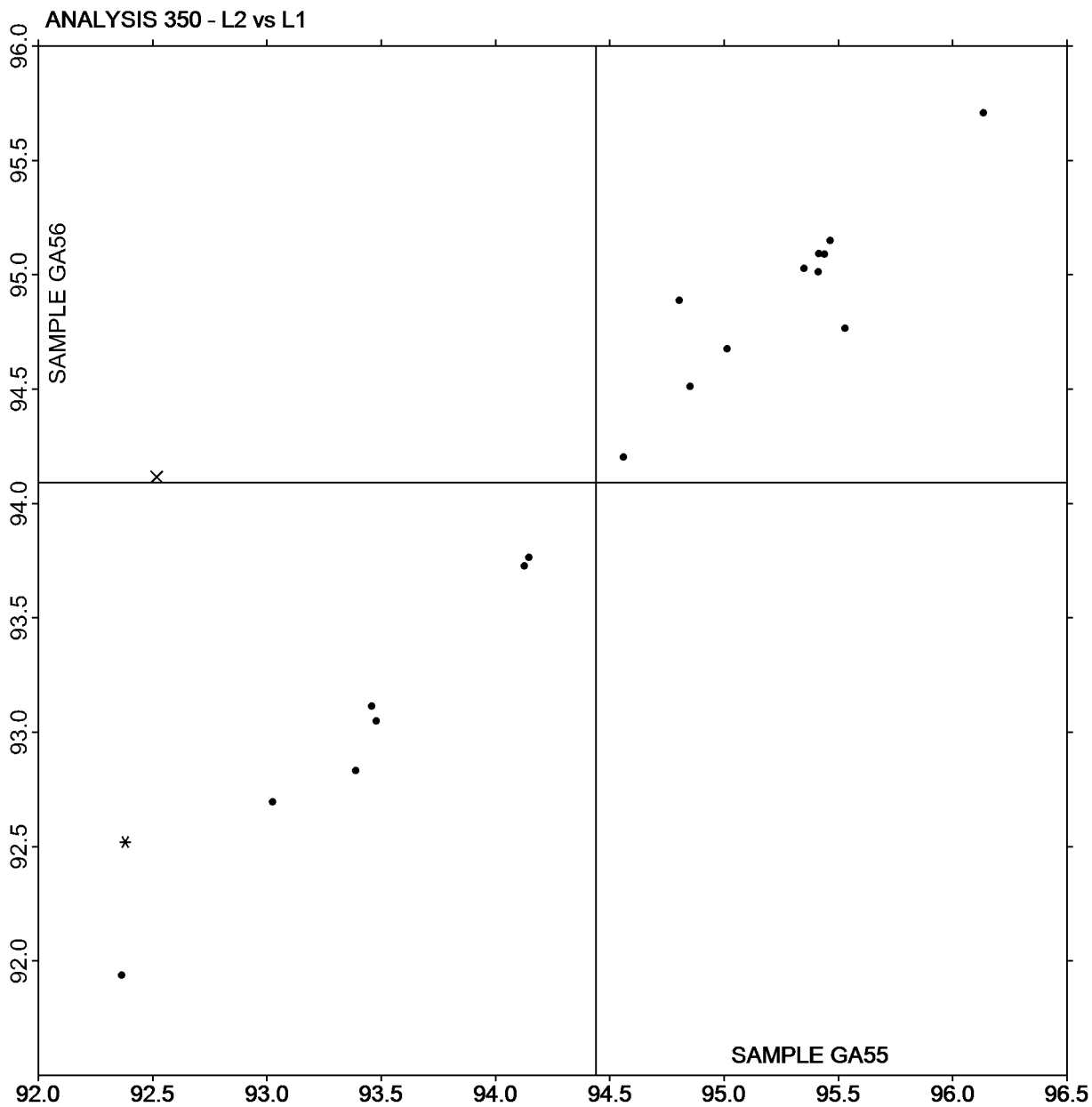
EH	Datacolor Elrepho SF450	HE	Hunter LabScan
HH	Hunter D25DP - 9000	LA	L & W Elrepho AL300
LS	L & W Elrepho SE 070	NE	Minolta CM-3500d Spectrophotometer
TC	Technidyne Color Touch Series	TS	Technidyne Brightimeter Micro S-5
XS	X-Rite 938 Spectrodensitometer	XX	Instrument make/model not specified by lab



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

Report #2942 G,  
June 2018

Plot of L values GA56 v L values GA55



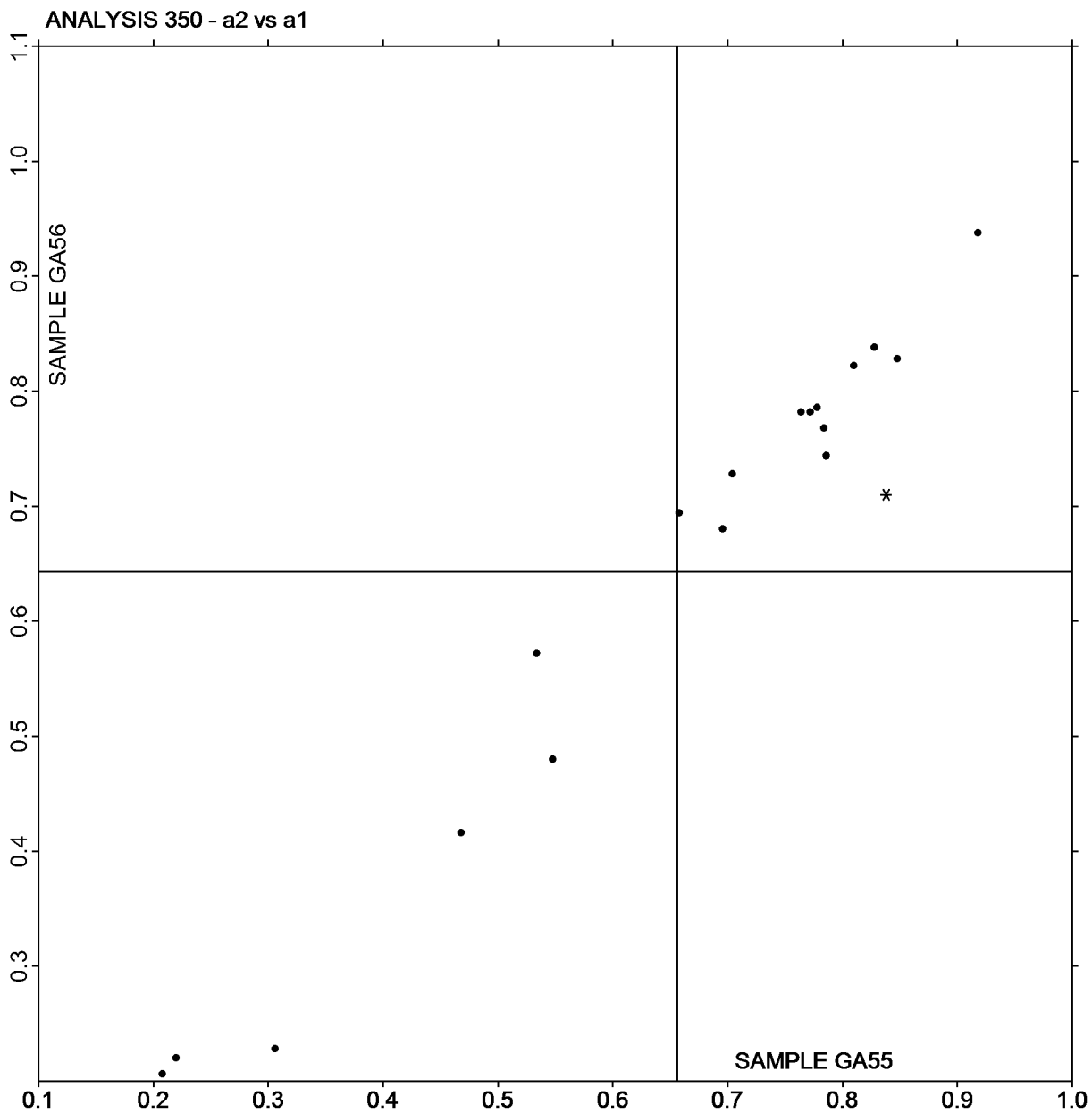
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.



**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 #2942 G,  
June 2018

Plot of a values GA56 v a values GA55



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

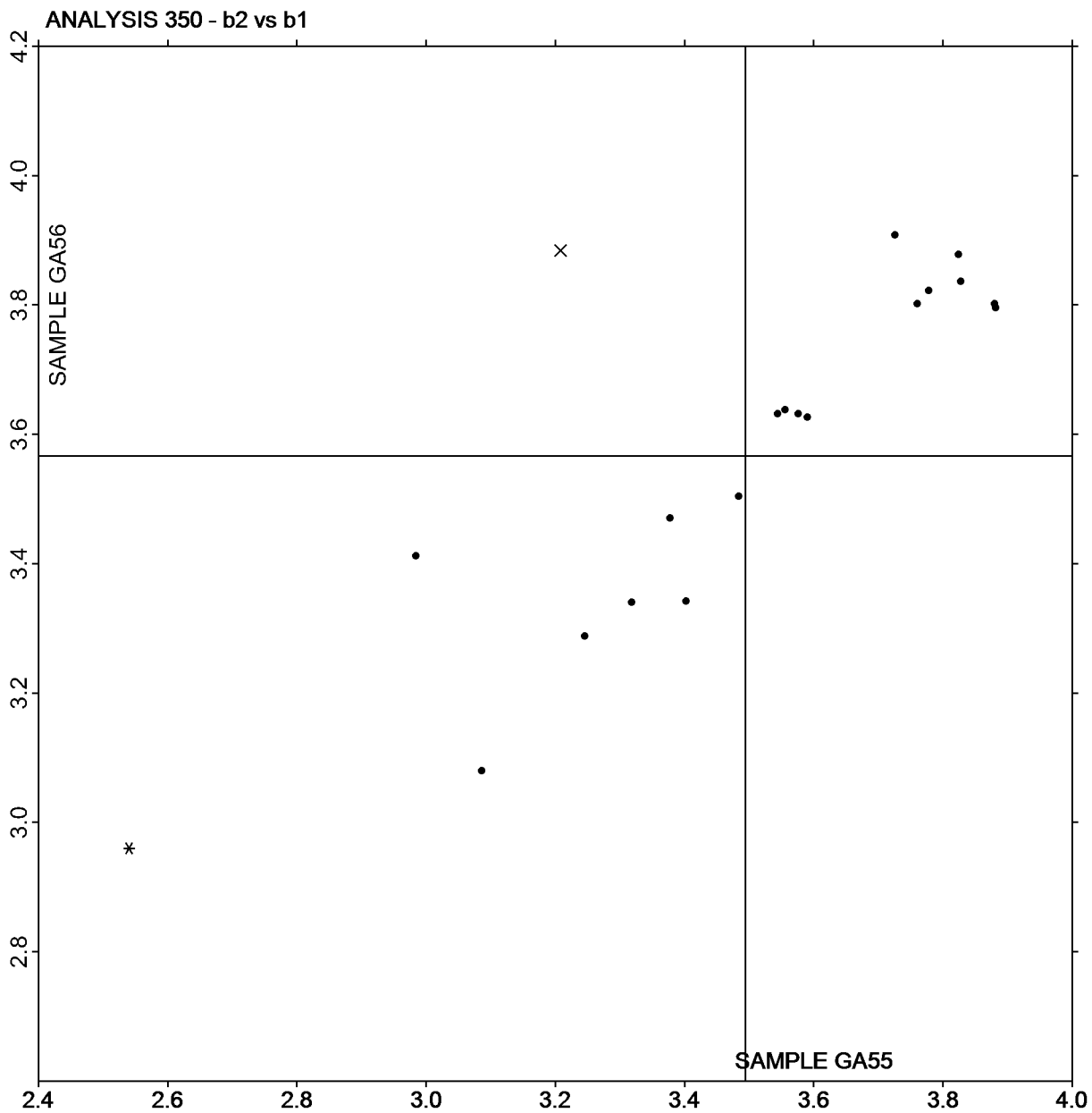




**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 350**  
**Color & Color Difference - Near White Papers - C/2deg obs**  
**Hunter L,a,b - Illuminant C - 2 Degree Observer**

Report #2942 G,  
June 2018

Plot of b values GA56 v b values GA55



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 #2942 G,  
June 2018**

**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*	$\Delta L^*$	$\Delta a^*$	$\Delta b^*$	$\Delta E^*$	
2XA7TB		GA55	94.98	-0.66	3.71	-0.45	-0.03	-0.11	0.47	HE
		GA56	94.52	-0.70	3.61					
72GVK9		GA55	95.56	-0.54	3.84	-0.28	-0.03	0.04	0.29	NF
		GA56	95.28	-0.57	3.88					
72R66T		GA55	95.28	-0.60	3.96	-0.31	-0.03	0.09	0.32	LS
		GA56	94.97	-0.63	4.05					
8CW6NT		GA55	94.61	-0.66	3.58	-0.32	-0.01	-0.01	0.32	HE
		GA56	94.29	-0.67	3.57					
97KNJW		GA55	95.45	-0.61	3.94	-0.30	-0.05	0.06	0.31	HT
		GA56	95.15	-0.66	3.99					
9QPJY7		GA55	95.33	-0.65	3.94	-0.33	-0.03	0.09	0.35	EH
		GA56	94.99	-0.68	4.03					
BZHLAD	X	GA55	97.14	-0.53	2.62	-0.11	0.03	0.43	0.44	XP
		GA56	97.02	-0.50	3.04					
CMBZKT		GA55	93.99	-0.60	3.66	-0.39	-0.03	0.05	0.40	TC
		GA56	93.60	-0.63	3.70					
J8XW2L		GA55	94.25	-0.73	3.04	-0.13	0.02	0.26	0.29	HV
		GA56	94.12	-0.71	3.31					
MAA23Y		GA55	95.48	-0.55	4.30	-0.28	-0.03	-0.14	0.31	NG
		GA56	95.20	-0.58	4.16					
TMF2M6		GA55	95.53	-0.61	3.86	-0.28	-0.04	0.02	0.29	HT
		GA56	95.25	-0.65	3.88					
UEM662		GA55	95.40	-0.70	3.88	-0.36	0.00	0.06	0.36	EF
		GA56	95.04	-0.70	3.94					
XWDH6X		GA55	95.64	-0.57	3.79	-0.36	-0.02	0.12	0.38	XM
		GA56	95.28	-0.59	3.91					
YPRM4U		GA55	94.19	-0.61	3.36	-0.36	-0.03	0.05	0.37	XA
		GA56	93.83	-0.64	3.41					



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

**Report #2942 G,  
June 2018**

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

Grand Means			Summary Statistics				
<b>GA55</b>	95.052	-0.622	3.760	-0.320	-0.024	0.044	0.342
<b>GA56</b>	94.733	-0.646	3.804				
Std Dev Btwn Labs							
<b>GA55</b>	0.587	0.057	0.309	0.077	0.020	0.099	0.052
<b>GA56</b>	0.592	0.046	0.262				

Statistics based on 13 of 14 reporting participants

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

BZHLAD (X) - High L values for both samples and a values for GA56. Low b values for both. Inconsistent within a values for both samples and within L, b values for GA56. Large delta L, delta a and delta b values.

**Key to Instrument Codes Reported by Participants**

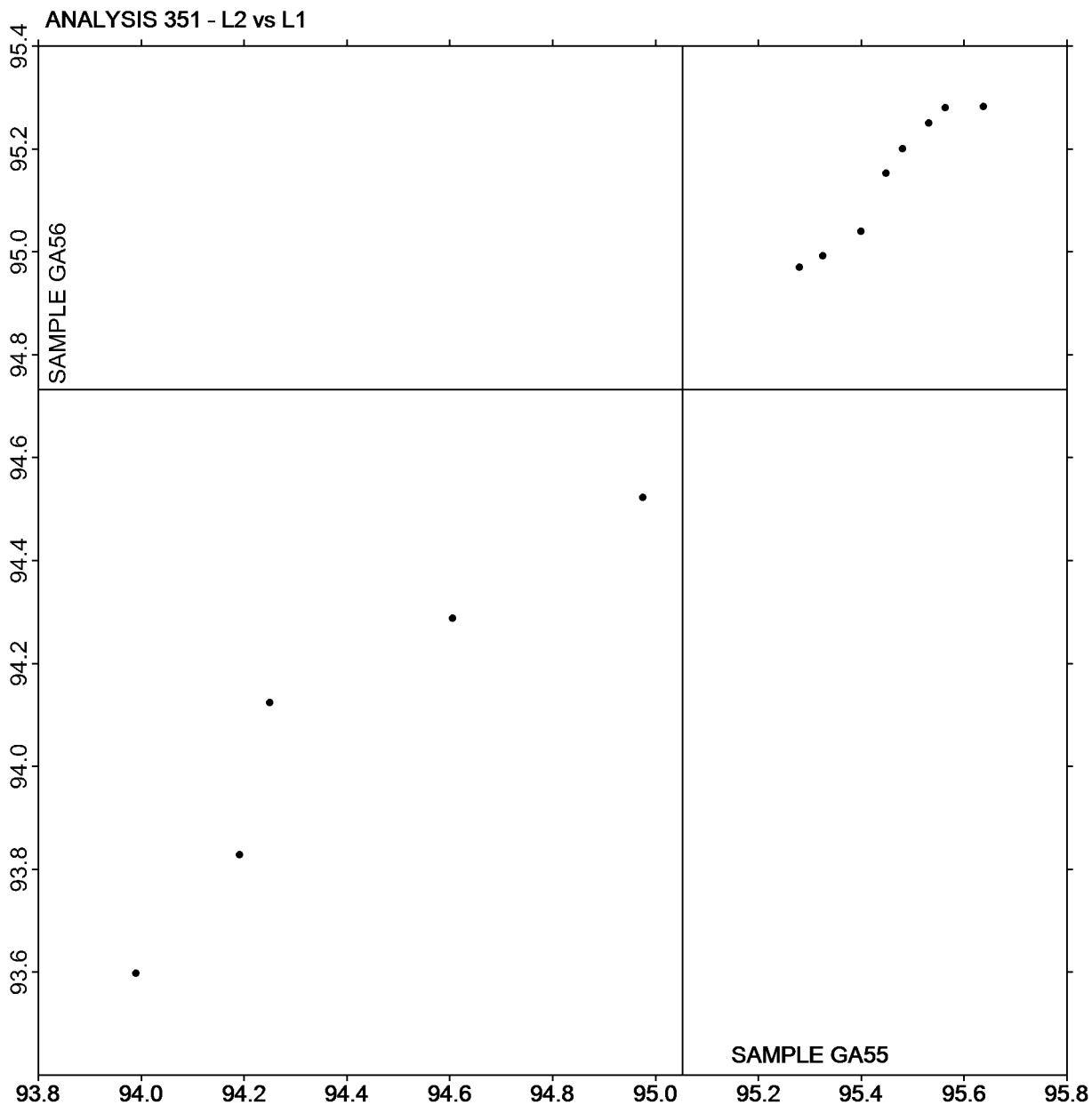
EF	Datacolor Elrepho 3000	EH	Datacolor Elrepho SF450
HE	Hunter LabScan	HT	Hunter UltraScan Vis
HV	Hunter Ultrascan XE	LS	L & W Elrepho SE 070
NF	Minolta CM-3600d Spectrophotometer	NG	Minolta CM-3700d Spectrophotometer
TC	Technidyne Color Touch Series	XA	X-Rite (model not specified)
XM	X-Rite CA-22	XP	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 #2942 G,  
June 2018

Plot of L values GA56 v L values GA55



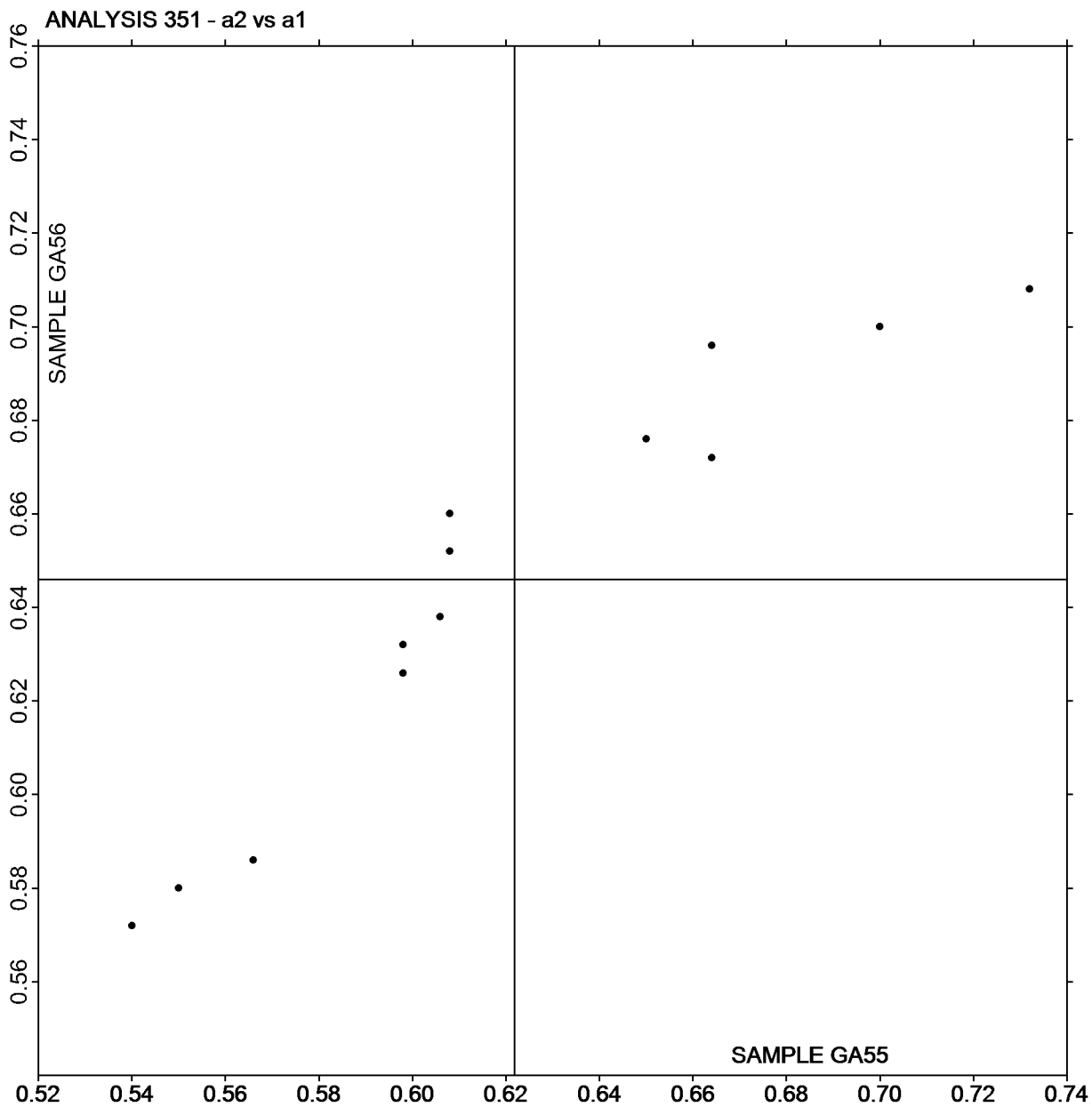
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.



**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 #2942 G,  
June 2018

Plot of a values GA56 v a values GA55



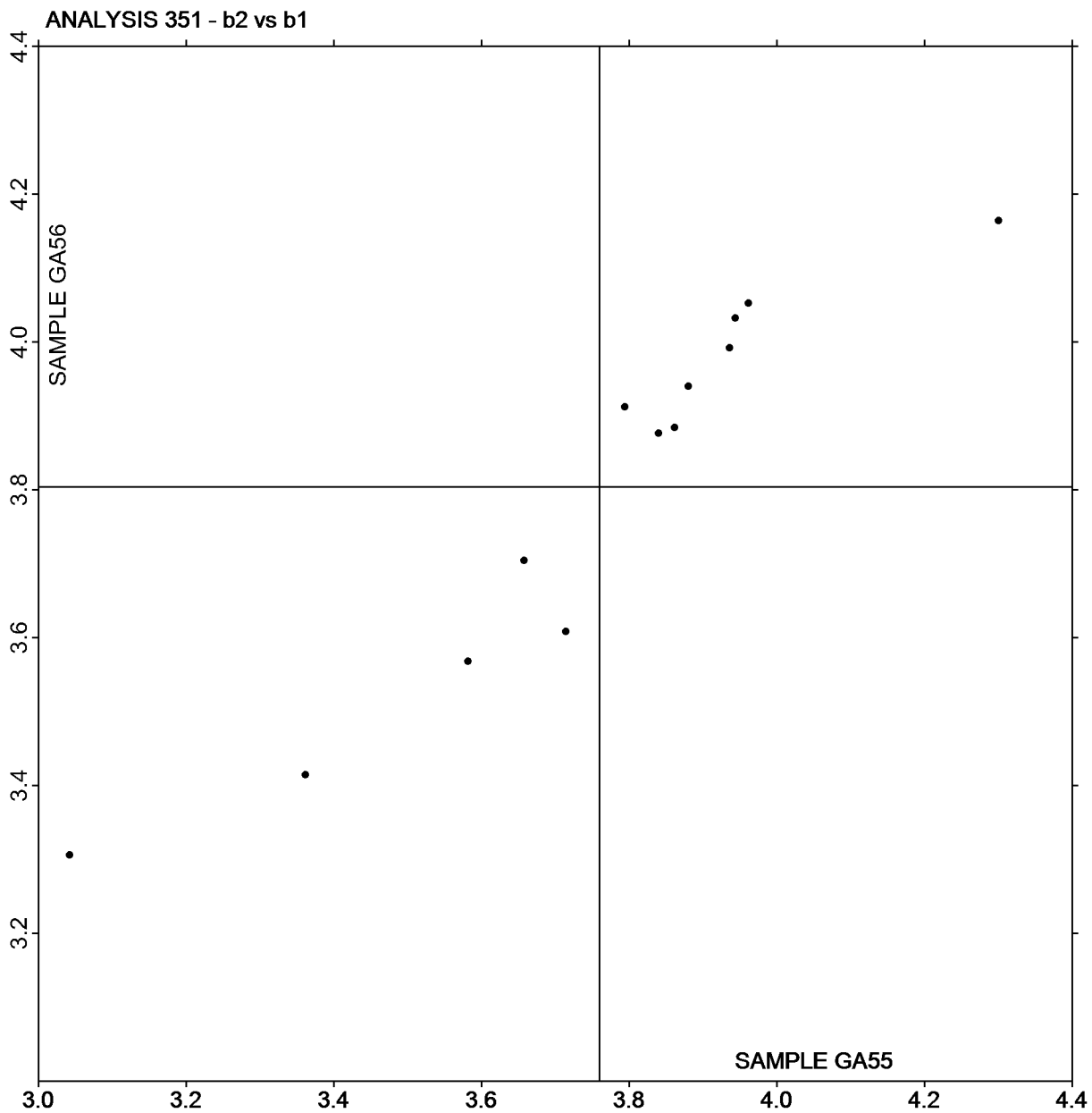
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.



**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 #2942 G,  
June 2018

Plot of b values GA56 v b values GA55



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 #2942G,  
June 2018**

**Analysis 360  
Thickness (Caliper), Printing papers  
TAPPI Official Test Method T411**

WebCode	Data Flag	Sample GV55			Sample GV56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
228QXU		4.629	0.020	0.19	6.102	0.022	0.21	LW
6DQJRK		4.368	-0.241	-2.34	5.821	-0.259	-2.39	TA
72GVK9		4.710	0.100	0.97	6.215	0.135	1.25	TM
76WNB2		4.691	0.081	0.79	6.176	0.097	0.90	LW
7KN99P		4.591	-0.019	-0.18	6.059	-0.021	-0.19	XX
8CW6NT		4.667	0.058	0.56	6.088	0.009	0.08	TM
8VLQXH		4.650	0.041	0.39	6.170	0.090	0.84	XX
97KNJW		4.629	0.020	0.19	6.107	0.027	0.25	EM
9PT2YQ		4.633	0.023	0.22	6.192	0.112	1.04	LW
BRCMYQ		4.595	-0.014	-0.14	6.060	-0.020	-0.18	PP
BZHLAD		4.622	0.013	0.12	6.139	0.059	0.55	TM
DUCPKX		4.632	0.023	0.22	6.103	0.023	0.22	LA
E69TPR		4.606	-0.003	-0.03	6.022	-0.058	-0.53	LA
FZEBUD		4.503	-0.106	-1.03	6.016	-0.064	-0.59	PP
GACKNF		4.680	0.071	0.69	6.115	0.035	0.33	FR
HMTZ6K		4.751	0.142	1.37	6.171	0.091	0.85	EM
HXYXYF		4.491	-0.118	-1.14	5.971	-0.109	-1.01	TM
HZY73P	*	4.420	-0.189	-1.83	5.800	-0.280	-2.59	TA
J8XW2L		4.630	0.021	0.20	6.096	0.016	0.15	TA
JB2Q2B		4.582	-0.027	-0.27	6.086	0.006	0.06	EM
JGZCN6		4.641	0.032	0.31	6.111	0.031	0.29	TA
JLHDBC		4.706	0.097	0.94	6.178	0.099	0.92	LW
K9TTAF		4.603	-0.006	-0.06	6.103	0.023	0.22	LW
KFMX3G		4.807	0.198	1.92	6.252	0.172	1.60	MS
KPDGJB		4.662	0.052	0.51	6.065	-0.015	-0.13	LW
KZTHUA		4.647	0.038	0.36	6.162	0.082	0.76	EM
L9L2YB		4.567	-0.042	-0.41	5.980	-0.099	-0.92	LW
LGHWW9	*	4.920	0.311	3.01	6.410	0.330	3.06	LW
LMNRG9		4.649	0.040	0.38	6.119	0.039	0.37	TA
MAA23Y		4.630	0.021	0.20	6.076	-0.004	-0.03	PP
MZQHX8		4.557	-0.052	-0.51	5.966	-0.114	-1.05	PP
N8276E	*	4.340	-0.269	-2.61	5.850	-0.230	-2.13	TM
NLH2HP		4.497	-0.112	-1.09	5.936	-0.143	-1.33	TM
PBWCYB		4.530	-0.079	-0.77	5.980	-0.100	-0.92	TM
PD6E29		4.586	-0.023	-0.23	6.100	0.020	0.19	LA
QLYTQZ		4.553	-0.057	-0.55	5.991	-0.089	-0.82	PP
QZULNM		4.528	-0.082	-0.79	6.012	-0.068	-0.63	XX
RB9VWD		4.649	0.040	0.38	6.111	0.031	0.29	PP
T3CD22		4.844	0.235	2.27	6.308	0.228	2.12	TM
TB7F6X		4.513	-0.096	-0.93	6.025	-0.055	-0.50	EM



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

Report #2942G,  
June 2018

WebCode	Data Flag	Sample GV55			Sample GV56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
TLLD4A		4.709	0.099	0.96	6.183	0.104	0.96	LW
TMF2M6		4.587	-0.022	-0.22	6.030	-0.050	-0.46	EM
UHJTG3		4.685	0.075	0.73	6.129	0.049	0.46	TM
V76YYG		4.539	-0.070	-0.68	6.013	-0.067	-0.62	PP
VG44K3		4.556	-0.053	-0.52	6.037	-0.043	-0.39	LW
VPXX82		4.468	-0.142	-1.37	5.958	-0.121	-1.12	LW
XGVEVW		4.612	0.003	0.03	6.042	-0.038	-0.35	EM
XWDH6X		4.516	-0.094	-0.91	6.059	-0.020	-0.19	LW
XZBYHR		4.669	0.060	0.58	6.158	0.078	0.73	EM
Y2FQ6Y		4.610	0.001	0.01	6.060	-0.020	-0.18	TM
YKXRZ2		4.550	-0.059	-0.57	6.021	-0.059	-0.54	TM
YPRM4U		4.677	0.068	0.65	6.101	0.021	0.20	LW
ZH3QA4		4.667	0.058	0.56	6.158	0.079	0.73	LW
ZTHPVY		4.555	-0.054	-0.53	6.101	0.022	0.20	LW

Summary Statistics	Sample GV55	Sample GV56
<b>Grand Means</b>	4.61 mils	6.08 mils
<b>Stnd Dev Btwn Labs</b>	0.10 mils	0.11 mils
Statistics based on 54 of 54 reporting participants.		

**Key to Instrument Codes Reported by Participants**

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





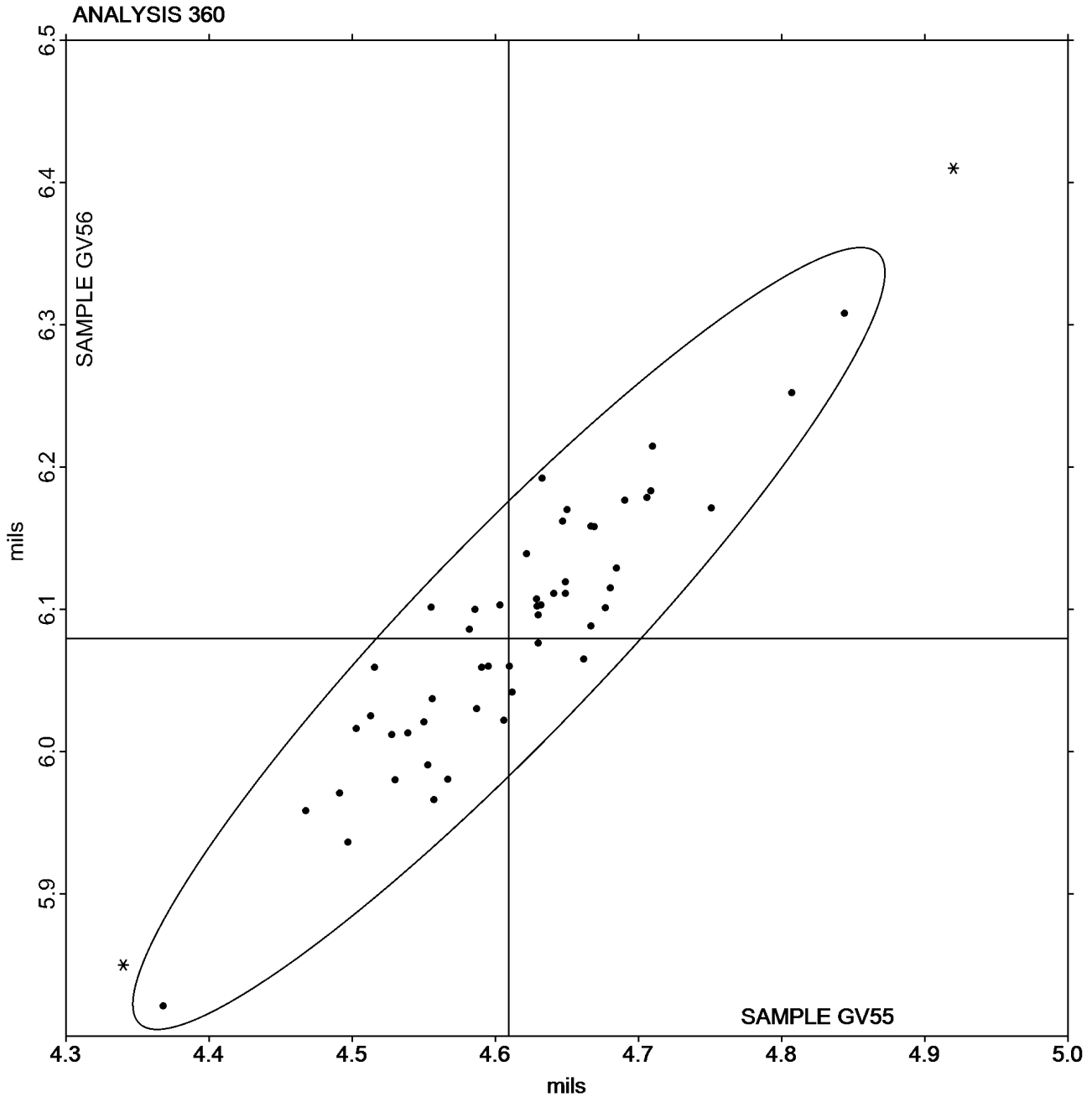
# Paper & Paperboard Interlaboratory Testing Program

Report #2942G,  
June 2018

## Analysis 360 Thickness (Caliper), Printing papers TAPPI Official Test Method T411

Grand Mean Sample GV55 = 4.6094  
mils

Grand Mean Sample GV56 = 6.0795  
mils





# Paper & Paperboard Interlaboratory Testing Program

Report #2942G,  
June 2018

## Analysis 361

### Thickness (Caliper), Packaging papers

#### TAPPI Official Test Method T411

WebCode	Data Flag	Sample GY55			Sample GY56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2XA7TB		9.554	-0.034	-0.22	14.08	-0.09	-0.48	EM
6DQJRK		9.331	-0.257	-1.67	13.95	-0.22	-1.12	TA
72R66T		9.600	0.012	0.07	14.22	0.05	0.26	LW
76WNB2		9.732	0.143	0.93	14.33	0.16	0.81	LW
77PCZP		9.567	-0.021	-0.14	14.04	-0.13	-0.69	LW
7MEP74		9.724	0.136	0.88	14.38	0.21	1.09	TM
82MQVQ		9.697	0.108	0.70	14.47	0.30	1.57	LW
8GLPLG		9.670	0.082	0.53	14.14	-0.03	-0.15	TM
8HXGKP		9.534	-0.054	-0.35	13.93	-0.23	-1.21	EM
9M9UZ4		9.734	0.146	0.94	14.29	0.12	0.61	EM
9QPJY7		9.945	0.357	2.31	14.57	0.40	2.05	EM
AYUQCL		9.632	0.044	0.28	14.26	0.09	0.48	VP
CMBZKT		9.709	0.121	0.78	14.36	0.19	0.99	EM
CUD843		9.638	0.049	0.32	14.15	-0.02	-0.08	XX
ENKL9L	*	9.480	-0.108	-0.70	14.27	0.10	0.52	LW
G4NVCH		9.565	-0.023	-0.15	14.10	-0.07	-0.36	TA
GDTAMJ		9.510	-0.078	-0.51	14.09	-0.08	-0.41	TA
HZY73P		9.470	-0.118	-0.77	13.96	-0.21	-1.08	TA
JLHDBC		9.746	0.158	1.02	14.39	0.22	1.15	XX
KPDGJB		9.648	0.059	0.38	14.09	-0.08	-0.41	LW
L3T9CA		9.236	-0.352	-2.28	13.80	-0.37	-1.91	LA
LL9BGA		9.561	-0.027	-0.18	14.14	-0.03	-0.14	TM
M8AQFC		9.485	-0.103	-0.67	14.12	-0.05	-0.25	TA
MRDFLE		9.590	0.002	0.01	14.09	-0.08	-0.42	TM
N8276E		9.420	-0.168	-1.09	13.93	-0.24	-1.23	TM
QLYTQZ		9.555	-0.033	-0.22	14.09	-0.08	-0.43	LW
QPWDCC		9.570	-0.018	-0.12	14.15	-0.02	-0.11	TM
R7EY8L		9.340	-0.248	-1.61	13.88	-0.29	-1.49	TM
W69Z72		9.519	-0.069	-0.45	14.11	-0.06	-0.33	LA
X7WXR D		9.534	-0.054	-0.35	14.20	0.03	0.14	EM
XENEFG		9.972	0.384	2.48	14.65	0.48	2.49	LA
ZB38DY		9.562	-0.026	-0.17	14.19	0.02	0.12	LA

Summary Statistics	Sample GY55	Sample GY56
<b>Grand Means</b>	9.59 mils	14.17 mils
<b>Std Dev Btwn Labs</b>	0.15 mils	0.19 mils
Statistics based on 32 of 32 reporting participants.		



# Paper & Paperboard Interlaboratory Testing Program

Report #2942G,  
June 2018

## Analysis 361

Thickness (Caliper), Packaging papers

TAPPI Official Test Method T411

### 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
XX	Instrument make/model not specified by lab		



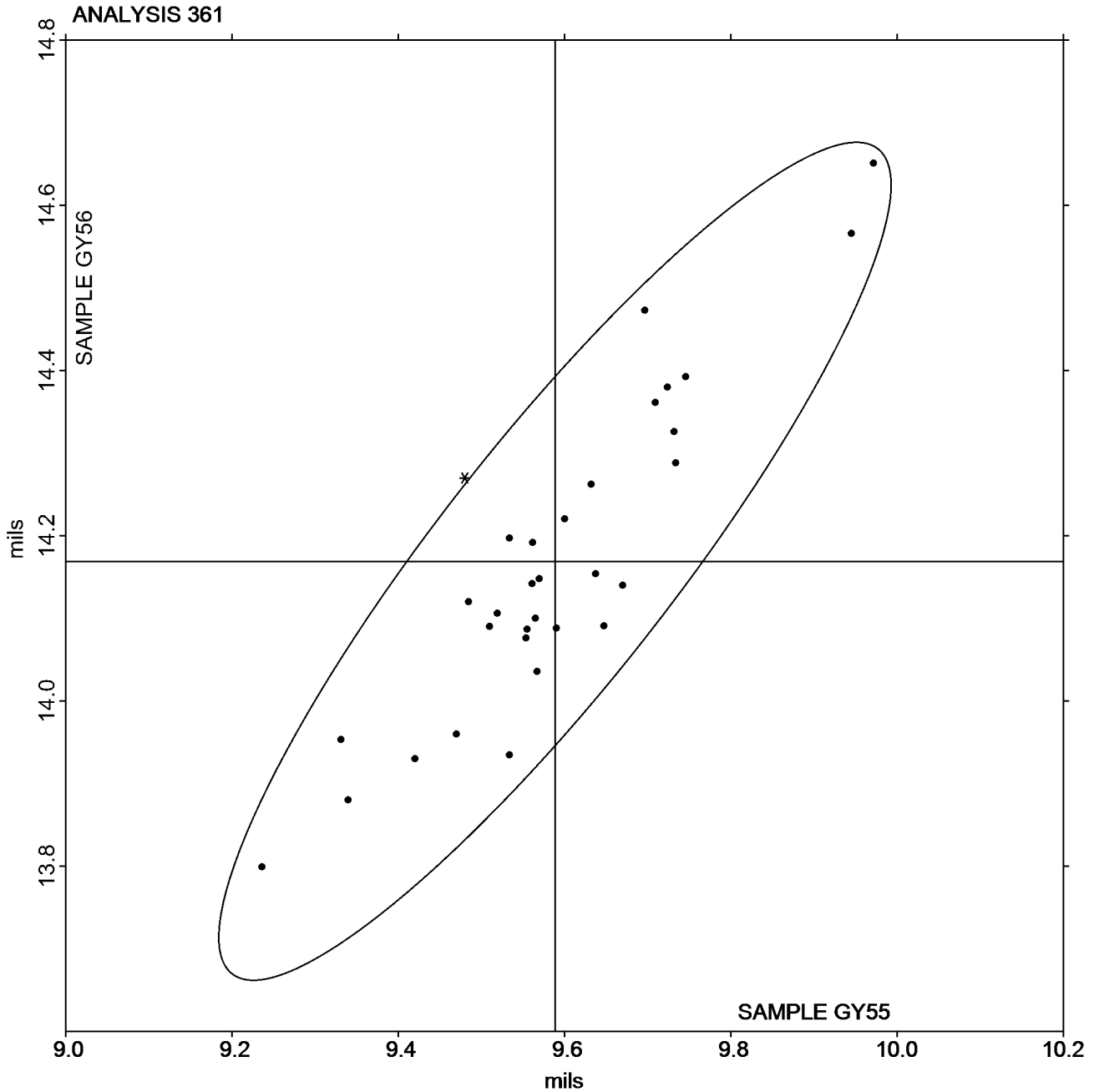
# Paper & Paperboard Interlaboratory Testing Program

Report #2942G,  
June 2018

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

Grand Mean Sample GY55 = 9.5884  
mils

Grand Mean Sample GY56 = 14.169  
mils





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

**Report #2942G,**  
**June 2018**

WebCode	Data Flag	<u>Sample GD55</u>			<u>Sample GD56</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
J8XW2L		0.4520	-0.0368	-0.50	0.5360	-0.0363	-0.47	TA
JB2Q2B		0.5190	0.0303	0.41	0.6006	0.0284	0.37	TA
JLHDBC		0.5864	0.0977	1.33	0.7018	0.1296	1.67	TL
L3T9CA		0.5208	0.0321	0.44	0.5898	0.0176	0.23	TA
NZLKVB		0.5498	0.0611	0.83	0.6098	0.0376	0.48	TA
VT3MCV		0.4574	-0.0314	-0.43	0.5274	-0.0449	-0.58	IT
XZBYHR		0.4780	-0.0108	-0.15	0.5800	0.0078	0.10	TA
Y2FQ6Y		0.3466	-0.1422	-1.93	0.4326	-0.1397	-1.80	XX

<b>Summary Statistics</b>	<u>Sample GD55</u>	<u>Sample GD56</u>
<b>Grand Means</b>	0.49 COF	0.57 COF
<b>Stnd Dev Btwn Labs</b>	0.07 COF	0.08 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

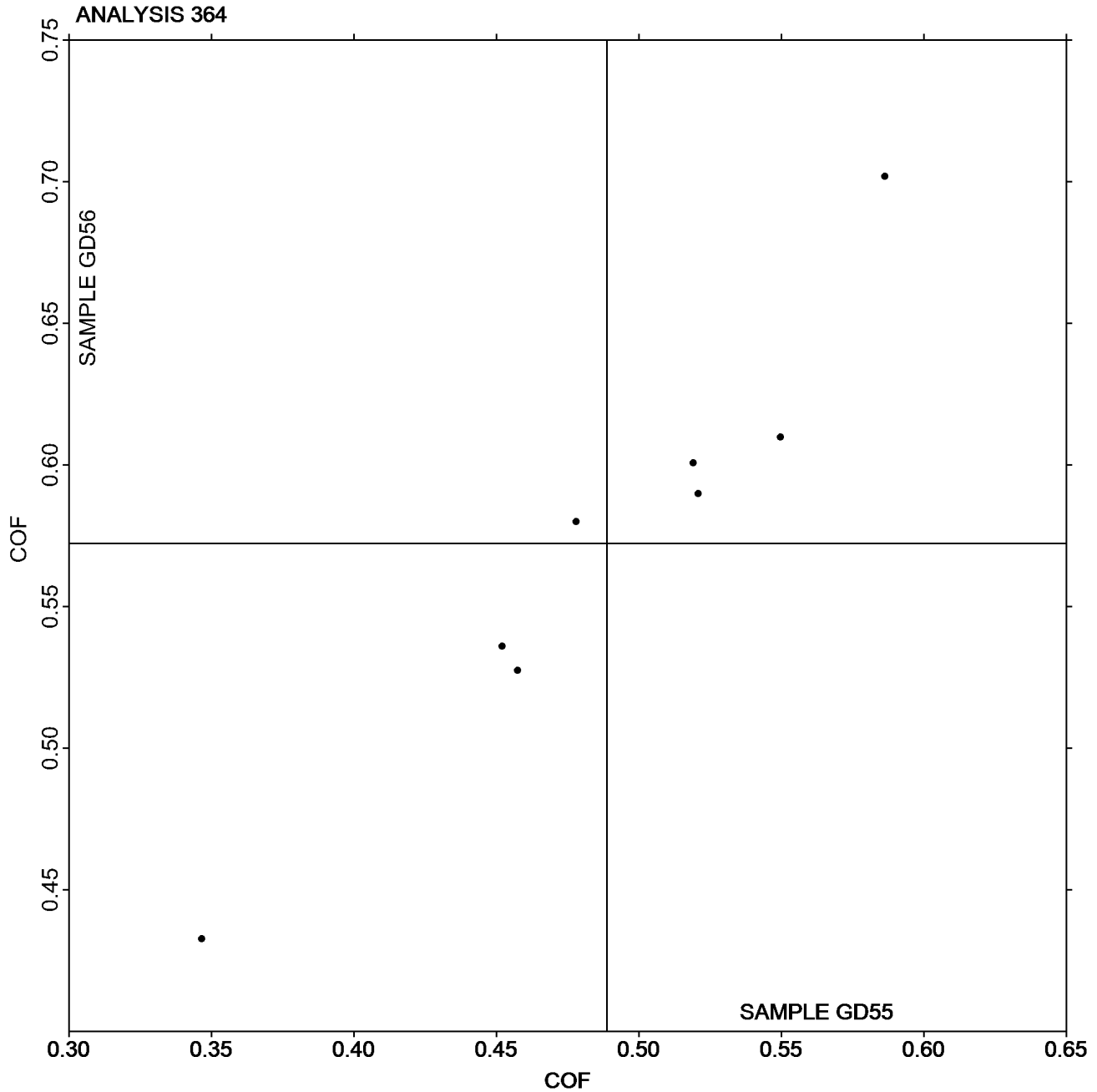


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 364**  
**Coefficient of Static Friction - Horizontal Plane Method - Printing Papers**  
**TAPPI Official Test Method T549**

Report #2942G,  
June 2018

Grand Mean Sample GD55 = 0.48875  
COF

Grand Mean Sample GD56 =  
0.57225 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 #2942G,  
June 2018

WebCode	Data Flag	Sample GD55			Sample GD56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
EZAL39		0.4630	0.0204	0.23	0.5674	0.0453	0.52	TM
FZEBUD		0.4674	0.0248	0.29	0.5806	0.0585	0.68	TA
JLHDBC		0.5300	0.0874	1.01	0.6118	0.0897	1.04	TL
JV4RXF		0.5066	0.0640	0.74	0.5956	0.0735	0.85	TA
L3T9CA		0.5036	0.0610	0.70	0.5548	0.0327	0.38	TA
NZLKVB		0.4332	-0.0094	-0.11	0.4970	-0.0251	-0.29	TA
TB7F6X		0.4782	0.0356	0.41	0.5244	0.0023	0.03	TA
VT3MCV		0.2684	-0.1742	-2.01	0.3618	-0.1603	-1.85	IR
Y2FQ6Y		0.3334	-0.1092	-1.26	0.4052	-0.1169	-1.35	XX

Summary Statistics	Sample GD55	Sample GD56
<b>Grand Means</b>	0.44 COF	0.52 COF
<b>Std Dev Btwn Labs</b>	0.09 COF	0.09 COF

Statistics based on 9 of 9 reporting participants.

**Key to Instrument Codes Reported by Participants**

IR	IMASS SP-2000	TA	Thwing-Albert Friction Tester
TL	TMI 32-90 Lab Master/Slip and Friction	TM	TMI 32-06 Monitor/Slip and Friction
XX	Instrument make/model not specified by lab		

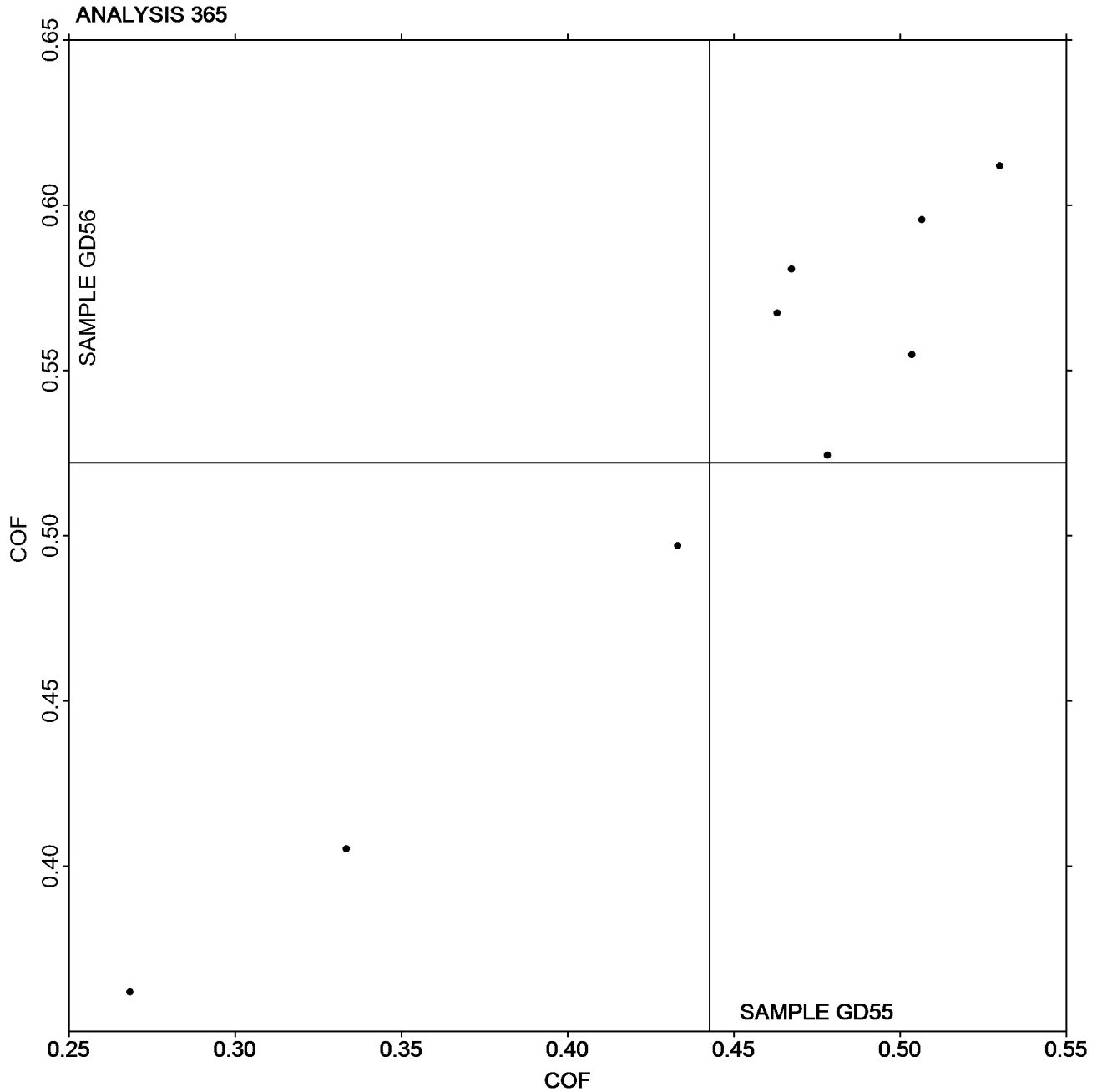


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 365**  
**Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers**  
**TAPPI Official Test Method T549**

Report #2942G,  
June 2018

Grand Mean Sample GD55 = 0.44264  
COF

Grand Mean Sample GD56 =  
0.52207 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 #2942G,  
June 2018

## Analysis 370

### Air Resistance - Gurley Oil Type

### TAPPI Official Test Method T460

WebCode	Data Flag	Sample GE55			Sample GE56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
72GVK9		24.38	-3.91	-2.25	26.20	-3.10	-2.11	PR
77PCZP		28.87	0.58	0.33	29.79	0.49	0.34	LW
8GLPLG		29.30	1.01	0.58	30.67	1.37	0.94	TL
8VLQXH		28.79	0.50	0.29	29.47	0.17	0.12	XX
94ZMTG		28.97	0.68	0.39	29.06	-0.24	-0.16	XX
97KNJW		29.34	1.05	0.60	29.07	-0.23	-0.16	HG
99TU6X		26.11	-2.18	-1.26	26.33	-2.97	-2.03	LP
9UBW7P		25.00	-3.29	-1.89	27.16	-2.14	-1.46	GA
AYUQCL	X	31.52	3.23	1.86	34.52	5.22	3.57	VM
BRCMYQ		28.18	-0.11	-0.07	29.97	0.67	0.46	HG
CKQZUD		30.55	2.26	1.30	30.31	1.01	0.69	LP
CMBZKT		28.94	0.65	0.37	29.21	-0.09	-0.06	PP
CUD843		25.64	-2.65	-1.53	28.73	-0.57	-0.39	LP
DUCPKX		28.19	-0.10	-0.06	28.41	-0.89	-0.61	LA
E69TPR		30.58	2.29	1.32	32.27	2.97	2.03	LA
HMTZ6K		27.99	-0.30	-0.17	29.30	0.00	0.00	HG
HXYXYF		27.72	-0.57	-0.33	30.19	0.89	0.61	LW
HZY73P		30.19	1.90	1.09	31.56	2.26	1.54	GA
J8XW2L		27.62	-0.68	-0.39	27.69	-1.61	-1.10	PP
JLHDBC		28.08	-0.21	-0.12	28.61	-0.69	-0.47	LP
KZTHUA		27.51	-0.79	-0.45	27.41	-1.89	-1.29	PP
L3T9CA		28.10	-0.19	-0.11	31.09	1.79	1.22	LA
LMNRG9		27.43	-0.86	-0.50	28.46	-0.84	-0.57	PP
MZQH8		31.17	2.87	1.65	29.88	0.58	0.40	PP
NLH2HP		28.91	0.62	0.35	30.27	0.97	0.66	LP
NZLKVB		29.63	1.34	0.77	29.17	-0.13	-0.09	WG
PBWCYB		25.43	-2.86	-1.65	28.01	-1.29	-0.88	HG
QLYTQZ		30.20	1.91	1.10	30.57	1.27	0.87	PP
R7EY8L		30.16	1.87	1.07	29.57	0.27	0.19	TL
RB9VWD		27.93	-0.36	-0.21	28.92	-0.38	-0.26	PP
TLLD4A		27.06	-1.23	-0.71	29.63	0.33	0.23	LP
TMF2M6		28.81	0.51	0.29	30.37	1.08	0.74	PP
UEM662		31.73	3.44	1.98	32.26	2.96	2.02	LP
VG44K3		26.80	-1.49	-0.86	27.11	-2.19	-1.49	LP
WCPCCK3		29.08	0.78	0.45	30.21	0.91	0.62	LA
XH946Z		26.28	-2.02	-1.16	27.06	-2.23	-1.53	RE
XTQP43		30.98	2.69	1.54	30.31	1.01	0.69	XX
XWDH6X		26.90	-1.39	-0.80	30.50	1.20	0.82	LW
XZBYHR		29.16	0.86	0.50	30.15	0.85	0.58	PP
Y2FQ6Y		27.60	-0.69	-0.40	29.00	-0.30	-0.20	GS



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

**Report #2942G,**  
**June 2018**

WebCode	Data Flag	<u>Sample GE55</u>			<u>Sample GE56</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
Z742AT	<b>X</b>	20.50	-7.79	-4.48	19.33	-9.97	-6.80	TN
ZH3QA4		26.45	-1.84	-1.06	27.95	-1.35	-0.92	LP

<b>Summary Statistics</b>	<u>Sample GE55</u>	<u>Sample GE56</u>
<b>Grand Means</b>	28.29 sec/100 cc	29.30 sec/100 cc
<b>Std Dev Btwn Labs</b>	1.74 sec/100 cc	1.46 sec/100 cc
Statistics based on 40 of 42 reporting participants.		

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

AYUQCL (X) - Data for sample GE56 are high. Inconsistent within the determinations of sample GE56.

Z742AT (X) - Extreme Data.

**Key to Instrument Codes Reported by Participants**

<b>GA</b> Gurley Precision #4340 Automatic Densometer	<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>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>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 #2942G,  
June 2018

WebCode	Data Flag	<u>Sample GE55</u>			<u>Sample GE56</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
8RQTYR		107.1	4.5	0.68	112.3	9.2	1.12	TT
8VLQXH		98.1	-4.5	-0.67	97.4	-5.7	-0.69	XX
AYUQCL		103.1	0.5	0.07	105.5	2.5	0.30	PP
BZHLAD		113.8	11.2	1.69	112.2	9.1	1.11	TT
HZY73P		92.2	-10.4	-1.56	89.8	-13.3	-1.62	GA
LMNRG9		100.8	-1.8	-0.27	101.3	-1.8	-0.22	HM
PNPNNG	X	72.6	-30.0	-4.52	78.2	-24.9	-3.02	TT
UHJTG3		107.5	4.9	0.74	112.0	8.9	1.08	TT
Y2FQ6Y		108.0	5.4	0.81	108.3	5.2	0.63	SH
Y7WBUY		94.7	-7.9	-1.19	93.1	-10.0	-1.21	GA
ZEGTYR		100.6	-2.0	-0.30	98.9	-4.2	-0.51	PP

<b>Summary Statistics</b>	<u>Sample GE55</u>	<u>Sample GE56</u>
<b>Grand Means</b>	102.59 Sheffield Units	103.08 Sheffield Units
<b>Std Dev Btwn Labs</b>	6.63 Sheffield Units	8.24 Sheffield Units
Statistics based on 10 of 11 reporting participants.		

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

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

**Key to Instrument Codes Reported by Participants**

<b>GA</b>	Gurley Precision #4340 Automatic Densometer	<b>HM</b>	Technidyne - Hagerty Model #538
<b>PP</b>	Technidyne Profile/Plus	<b>SH</b>	Sheffield
<b>TT</b>	TMI Monitor/Smoothness II, Model 58-24	<b>XX</b>	Instrument make/model not specified by lab

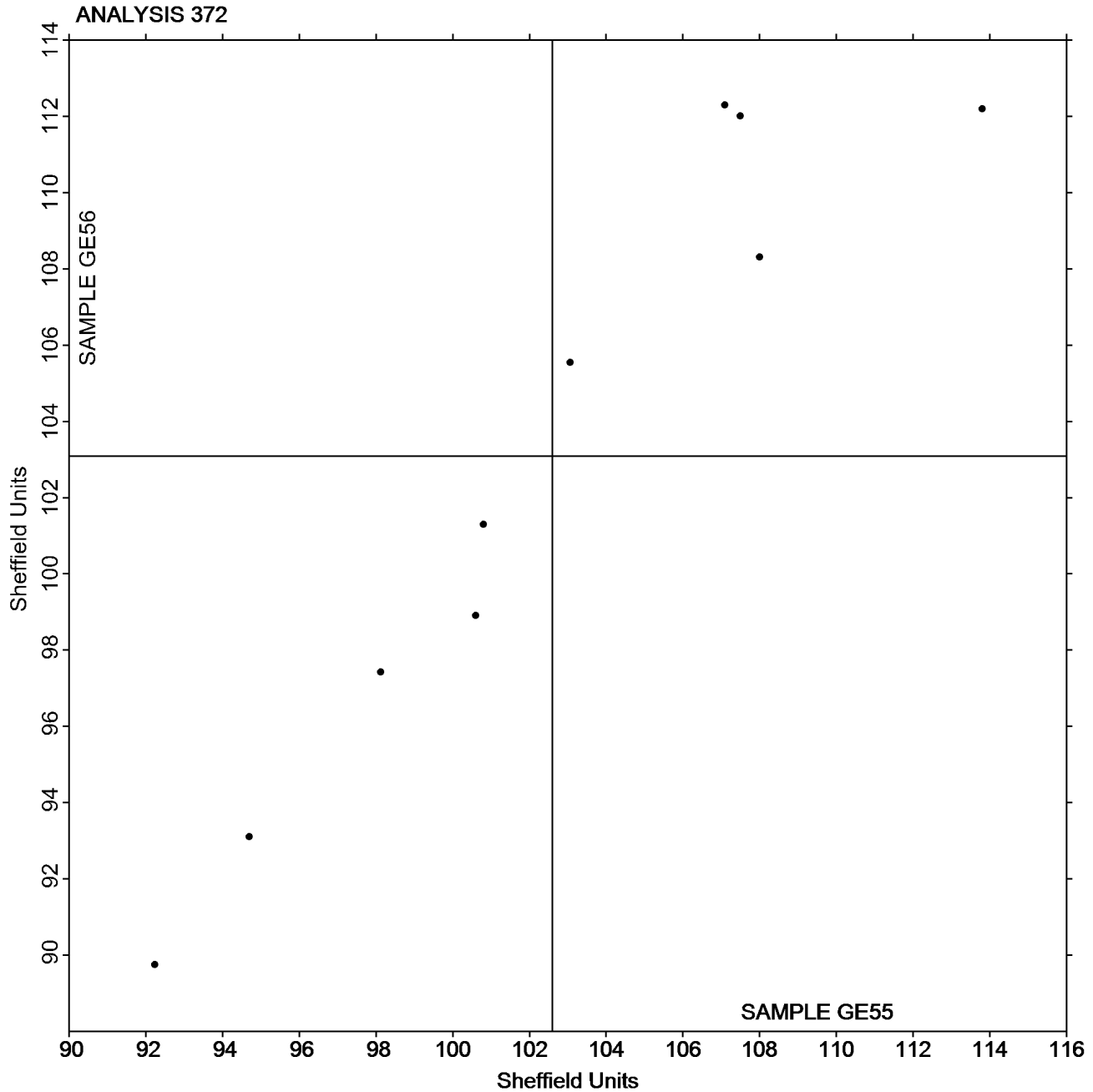


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 372**  
**Porosity - Sheffield Type - Sheffield Units for 3/4 inch Diameter Orifice**  
**TAPPI Official Test Method T547**

Report #2942G,  
June 2018

Grand Mean Sample GE55 = 102.59  
Sheffield Units

Grand Mean Sample GE56 = 103.08  
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 #2942G,  
June 2018**

**Analysis 376**

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

**TAPPI Official Test Method T555**

WebCode	Data Flag	Sample GJ55			Sample GJ56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
228QXU	*	1.1850	0.3650	2.90	1.1830	0.3651	3.03	ZZ
2XA7TB		0.7370	-0.0830	-0.66	0.7580	-0.0599	-0.50	ZZ
3D3YGW	*	1.1340	0.3140	2.49	1.0920	0.2741	2.27	ZZ
6V8KLM	X	2.0450	1.2250	9.72	2.0350	1.2171	10.09	ZZ
72R66T		0.8000	-0.0200	-0.16	0.8010	-0.0169	-0.14	ZZ
76WNB2		0.7270	-0.0930	-0.74	0.7150	-0.1029	-0.85	ZZ
8CVDR7		0.8020	-0.0180	-0.14	0.8210	0.0031	0.03	ZZ
8HXGKP		0.8730	0.0530	0.42	0.9040	0.0861	0.71	ZZ
8HXLT8		0.8680	0.0480	0.38	0.8610	0.0431	0.36	ZZ
9M9UZ4		0.7700	-0.0500	-0.40	0.7640	-0.0539	-0.45	ZZ
9QPIY7		0.8380	0.0180	0.14	0.8430	0.0251	0.21	ZZ
AYUQCL		0.8490	0.0290	0.23	0.8560	0.0381	0.32	ZZ
BB84DL		0.7620	-0.0580	-0.46	0.7480	-0.0699	-0.58	ZZ
BRCMYQ		0.8000	-0.0200	-0.16	0.7870	-0.0309	-0.26	ZZ
BZHLAD		1.0490	0.2290	1.82	1.0050	0.1871	1.55	ZZ
C3N7XD		0.8070	-0.0130	-0.10	0.8090	-0.0089	-0.07	ZZ
ENKL9L		0.8190	-0.0010	-0.01	0.7900	-0.0279	-0.23	ZZ
HMTZ6K		0.7650	-0.0550	-0.44	0.7640	-0.0539	-0.45	ZZ
J8XW2L		0.7600	-0.0600	-0.48	0.7490	-0.0689	-0.57	ZZ
JV4RXF		0.6890	-0.1310	-1.04	0.6940	-0.1239	-1.03	ZZ
KPDGJB		0.7300	-0.0900	-0.71	0.7210	-0.0969	-0.80	ZZ
KZTHUA		0.7690	-0.0510	-0.40	0.7470	-0.0709	-0.59	ZZ
NLH2HP		0.6700	-0.1500	-1.19	0.6810	-0.1369	-1.13	ZZ
NZLKVB		0.6980	-0.1220	-0.97	0.7140	-0.1039	-0.86	ZZ
PD6E29		0.7050	-0.1150	-0.91	0.7080	-0.1099	-0.91	ZZ
VPXX82	X	0.8690	0.0490	0.39	0.7810	-0.0369	-0.31	ZZ
WEPT8W		0.9980	0.1780	1.41	1.0130	0.1951	1.62	ZZ
X7WXR D		0.7620	-0.0580	-0.46	0.7850	-0.0329	-0.27	ZZ
XENEFG		0.7820	-0.0380	-0.30	0.7650	-0.0529	-0.44	ZZ
XGVEVW		0.7460	-0.0740	-0.59	0.7580	-0.0599	-0.50	ZZ
ZB38DY		0.8870	0.0670	0.53	0.8830	0.0651	0.54	ZZ

Summary Statistics	Sample GJ55	Sample GJ56
<b>Grand Means</b>	0.82 Microns	0.82 Microns
<b>Std Dev Btwn Labs</b>	0.13 Microns	0.12 Microns
Statistics based on 29 of 31 reporting participants.		



# Paper & Paperboard Interlaboratory Testing Program

Report #2942G,  
June 2018

## Analysis 376

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

#### TAPPI Official Test Method T555

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

VPXX82 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample GJ55.

6V8KLM (X) - Extreme Data.

#### **Key to Instrument Codes Reported by Participants**

ZZ Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

Report #2942G,  
June 2018

## Analysis 376

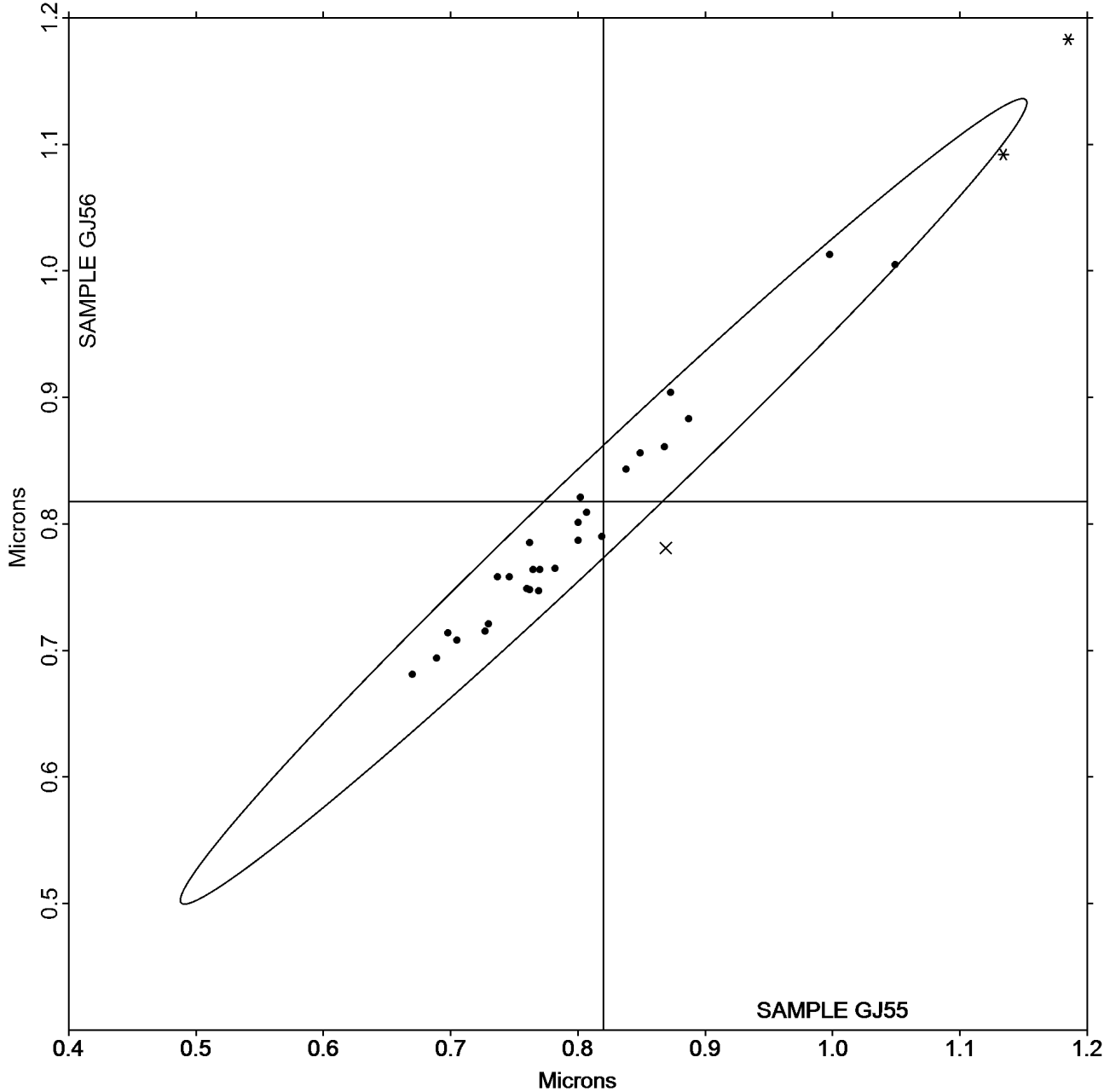
Roughness - Print Surf Method - 0.5 to 4.0 Microns

TAPPI Official Test Method T555

Grand Mean Sample GJ55 = 0.82003  
Microns

Grand Mean Sample GJ56 =  
0.81790 Microns

ANALYSIS 376







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

**Report #2942G,**  
**June 2018**

WebCode	Data Flag	<u>Sample GK55</u>			<u>Sample GK56</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
CMBZKT		4.217	0.228	1.40	6.308	0.076	0.43	ZZ
DUCPKX		3.716	-0.273	-1.68	5.908	-0.324	-1.84	ZZ
JB2Q2B		4.062	0.073	0.45	6.287	0.055	0.31	ZZ
JLHDBC		3.981	-0.008	-0.05	6.409	0.177	1.01	ZZ
NZLKVB		3.904	-0.085	-0.52	6.251	0.019	0.11	ZZ
QLYTQZ		3.927	-0.062	-0.38	6.373	0.141	0.80	ZZ
XZBYHR		4.115	0.126	0.78	6.087	-0.145	-0.82	ZZ

<b>Summary Statistics</b>	<u>Sample GK55</u>	<u>Sample GK56</u>
<b>Grand Means</b>	3.99 Microns	6.23 Microns
<b>Std Dev Btwn Labs</b>	0.16 Microns	0.18 Microns
Statistics based on 7 of 7 reporting participants.		

**Key to Instrument Codes Reported by Participants**

ZZ Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

Report #2942G,  
June 2018

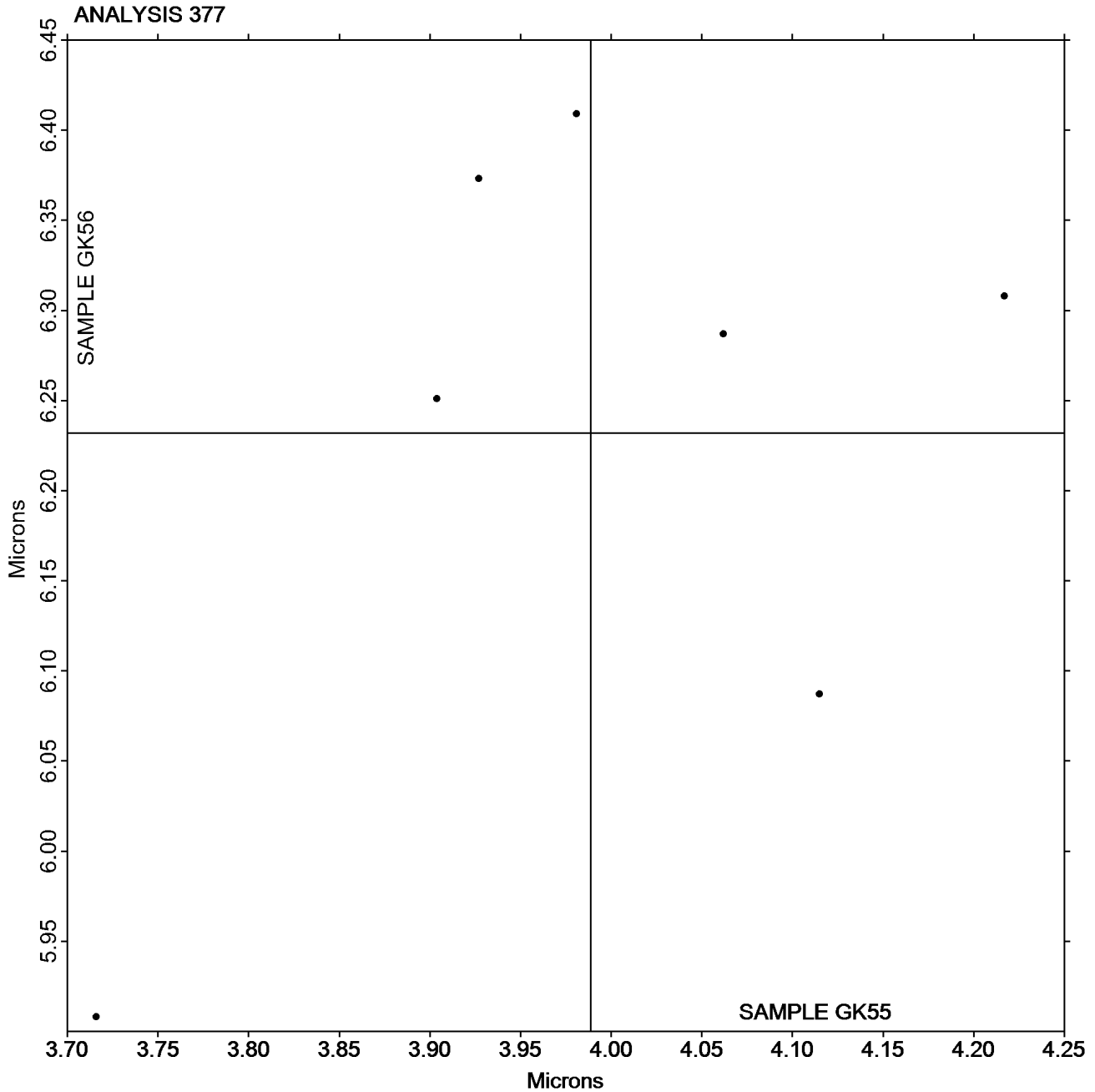
## Analysis 377

Roughness - Print Surf Method - 2.5 to 6.0 Microns

TAPPI Official Test Method T555

Grand Mean Sample GK55 = 3.9889  
Microns

Grand Mean Sample GK56 = 6.2319  
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 #2942G,  
June 2018**

**Analysis 378  
Roughness - Sheffield Type  
TAPPI Official Test Method T538**

WebCode	Data Flag	Sample GL55			Sample GL56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2XA7TB		135.1	-11.0	-1.63	113.0	-4.3	-0.61	PP
72R66T		148.0	1.9	0.28	120.7	3.4	0.48	PP
76WNB2		148.9	2.8	0.41	116.3	-1.0	-0.14	HM
7KN99P	X	194.5	48.4	7.18	153.0	35.7	5.03	XX
7MEP74	*	151.0	4.8	0.72	136.7	19.4	2.74	GA
8HXGKP		149.0	2.9	0.43	120.6	3.3	0.46	GL
8HXL78		150.3	4.2	0.62	120.5	3.2	0.45	LW
8VLQXH		139.1	-7.0	-1.04	114.0	-3.3	-0.47	XX
97KNJW		148.8	2.7	0.40	109.9	-7.4	-1.05	HM
9AGAE7		159.1	13.0	1.93	119.5	2.2	0.31	HM
9M9UZ4		147.8	1.7	0.25	112.5	-4.8	-0.68	PP
9QPJY7		149.8	3.7	0.55	131.5	14.2	2.00	LW
A4QD8U		151.0	4.9	0.72	113.4	-3.9	-0.55	GA
AYUQCL		138.2	-7.9	-1.17	101.1	-16.2	-2.29	VM
BRCMYQ		153.5	7.4	1.09	113.5	-3.8	-0.54	HM
BZHLAD		145.0	-1.1	-0.17	127.6	10.3	1.45	TT
CMBZKT		154.1	8.0	1.18	116.1	-1.2	-0.17	PP
DUCPKX		147.8	1.7	0.25	120.5	3.2	0.45	LA
E69TPR		143.2	-2.9	-0.43	110.3	-7.0	-0.98	LA
ENKL9L		135.3	-10.8	-1.61	108.8	-8.5	-1.20	LA
EZAL39	X	164.7	18.6	2.76	142.6	25.3	3.57	TS
F88X9P		145.8	-0.3	-0.05	119.1	1.8	0.25	TT
FRFQLQ		149.9	3.7	0.55	120.3	3.0	0.42	XX
G4NVCH		138.5	-7.6	-1.13	111.4	-6.0	-0.84	PP
HXYXYF		131.3	-14.8	-2.20	112.7	-4.6	-0.65	SH
HZY73P		145.1	-1.0	-0.15	118.0	0.7	0.10	PP
J8XW2L		146.5	0.3	0.05	115.4	-1.9	-0.27	PP
JB2Q2B		152.6	6.5	0.96	114.8	-2.5	-0.36	HM
JLHDBC		144.0	-2.1	-0.31	124.0	6.7	0.94	LW
JV4RFX		147.2	1.1	0.16	123.3	6.0	0.84	HM
KHTJQG		143.4	-2.7	-0.41	110.9	-6.5	-0.91	MP
KZTHUA		139.8	-6.3	-0.93	104.6	-12.7	-1.79	PP
M8AQFC		142.9	-3.2	-0.47	114.4	-2.9	-0.41	PP
MAA23Y		151.0	4.9	0.72	117.1	-0.3	-0.04	PP
MZQH8X		161.8	15.6	2.32	121.1	3.8	0.53	PP
N8276E	X	150.5	4.4	0.65	176.5	59.2	8.35	GL
NLH2HP		142.4	-3.7	-0.55	119.6	2.3	0.32	TS
NZLKVB		160.4	14.3	2.12	129.6	12.3	1.73	XX
PBWCYB		144.9	-1.2	-0.18	120.4	3.1	0.43	TS
PNPNNG	X	115.3	-30.8	-4.57	90.3	-27.0	-3.81	TT



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

Report #2942G,  
June 2018

WebCode	Data Flag	Sample GL55			Sample GL56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
QLYTQZ		149.7	3.5	0.52	123.8	6.5	0.91	PP
RB9VWD		143.7	-2.4	-0.36	120.4	3.1	0.43	PP
TMF2M6		135.5	-10.6	-1.58	113.5	-3.8	-0.54	SH
UEM662		141.3	-4.8	-0.72	105.8	-11.5	-1.63	LW
UHJTG3	X	119.0	-27.1	-4.02	86.0	-31.3	-4.42	TT
X7WXR		139.4	-6.7	-1.00	120.8	3.5	0.49	PP
XENEF		152.2	6.1	0.90	129.3	12.0	1.69	LA
XWDH6		143.1	-3.0	-0.45	118.5	1.2	0.17	TS
XZBYH		136.9	-9.2	-1.36	111.9	-5.5	-0.77	PP
Y2FQ6	X	161.3	15.2	2.25	148.4	31.1	4.39	XX
Y7WBU		147.0	0.9	0.13	122.9	5.6	0.79	GA
YPRM4		140.9	-5.2	-0.77	108.1	-9.2	-1.30	PP
ZB38D		155.6	9.5	1.41	115.9	-1.4	-0.20	LA
ZEGTY	X	106.7	-39.4	-5.84	329.9	212.5	29.99	PP

Summary Statistics	Sample GL55	Sample GL56
<b>Grand Means</b>	146.12 Sheffield	117.32 Sheffield
<b>Std Dev Btwn Labs</b>	6.74 Sheffield	7.09 Sheffield
Statistics based on 47 of 54 reporting participants.		

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

- Y2FQ6Y (X) - Data for sample GL56 are high.
- UHJTG3 (X) - Data for both samples are low.
- N8276E (X) - Extreme Data for Sample GL56.
- PNPNNG (X) - Data for both samples are low.
- EZAL39 (X) - Data for both samples are high.
- 7KN99P (X) - Extreme Data.
- ZEGTYR (X) - Extreme Data.

**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 #2942G,  
June 2018

## Analysis 378

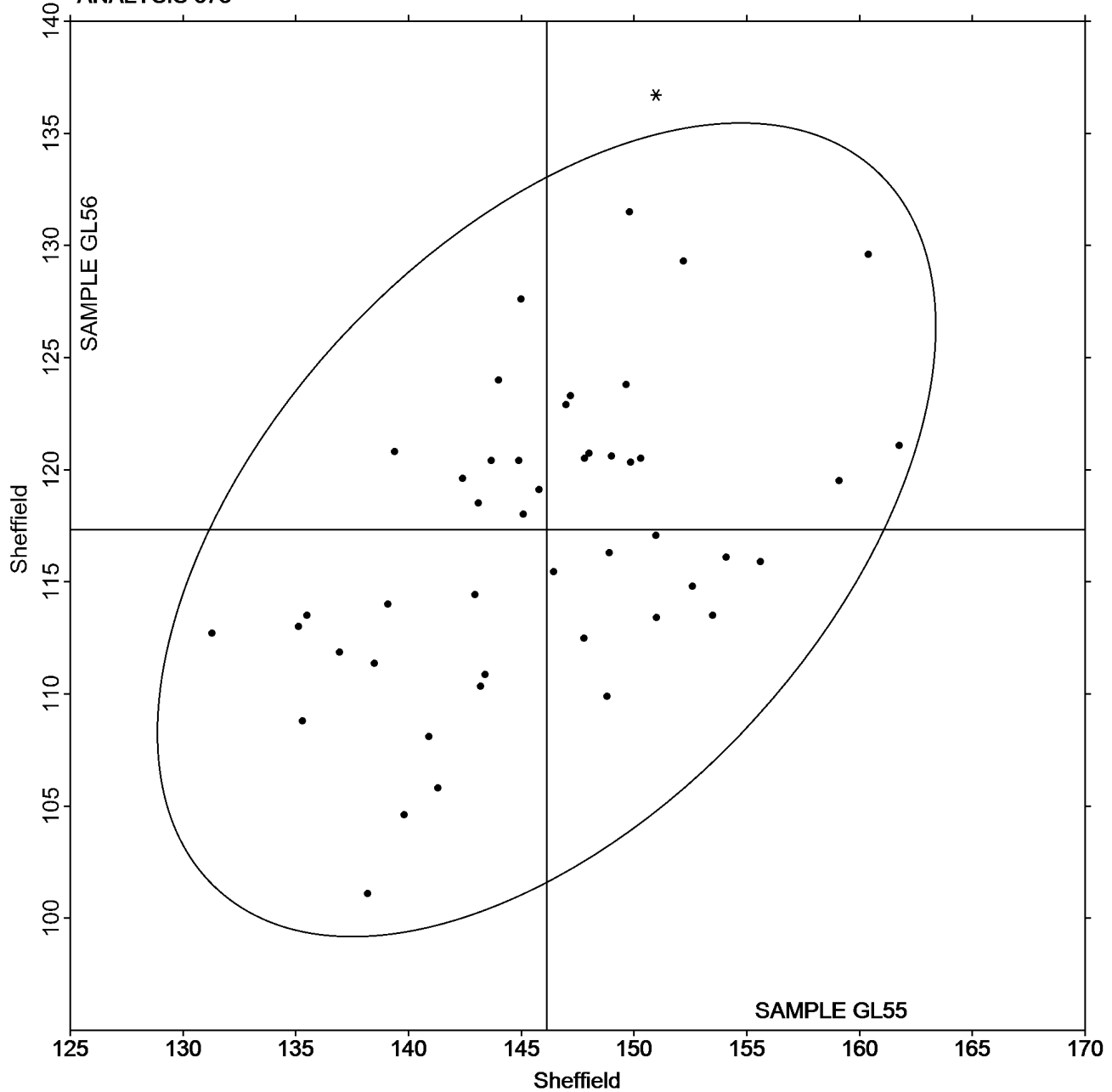
### Roughness - Sheffield Type

#### TAPPI Official Test Method T538

Grand Mean Sample GL55 = 146.12  
Sheffield

Grand Mean Sample GL56 = 117.32  
Sheffield

ANALYSIS 378





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

Report #2942G,  
June 2018

WebCode	Data Flag	Sample GM55			Sample GM56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
228QXU		4.453	-0.140	-0.30	4.465	-0.103	-0.21	ZZ
62YMXZ		5.030	0.437	0.95	4.780	0.212	0.42	ZZ
C37K2G		4.461	-0.132	-0.29	4.395	-0.173	-0.35	ZZ
C77T6R		4.857	0.263	0.57	4.934	0.366	0.73	ZZ
KFMX3G		4.650	0.057	0.12	4.675	0.107	0.21	ZZ
QPWDCC		4.285	-0.308	-0.67	4.399	-0.169	-0.34	ZZ
W29PB2		4.038	-0.555	-1.20	3.835	-0.733	-1.46	ZZ
XZBYHR		5.464	0.870	1.89	5.552	0.984	1.97	ZZ
ZH3QA4		4.103	-0.490	-1.06	4.078	-0.490	-0.98	ZZ

Summary Statistics	Sample GM55	Sample GM56
<b>Grand Means</b>	4.59 Percent	4.57 Percent
<b>Std Dev Btwn Labs</b>	0.46 Percent	0.50 Percent
Statistics based on 9 of 9 reporting participants.		

**Key to Instrument Codes Reported by Participants**

ZZ Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

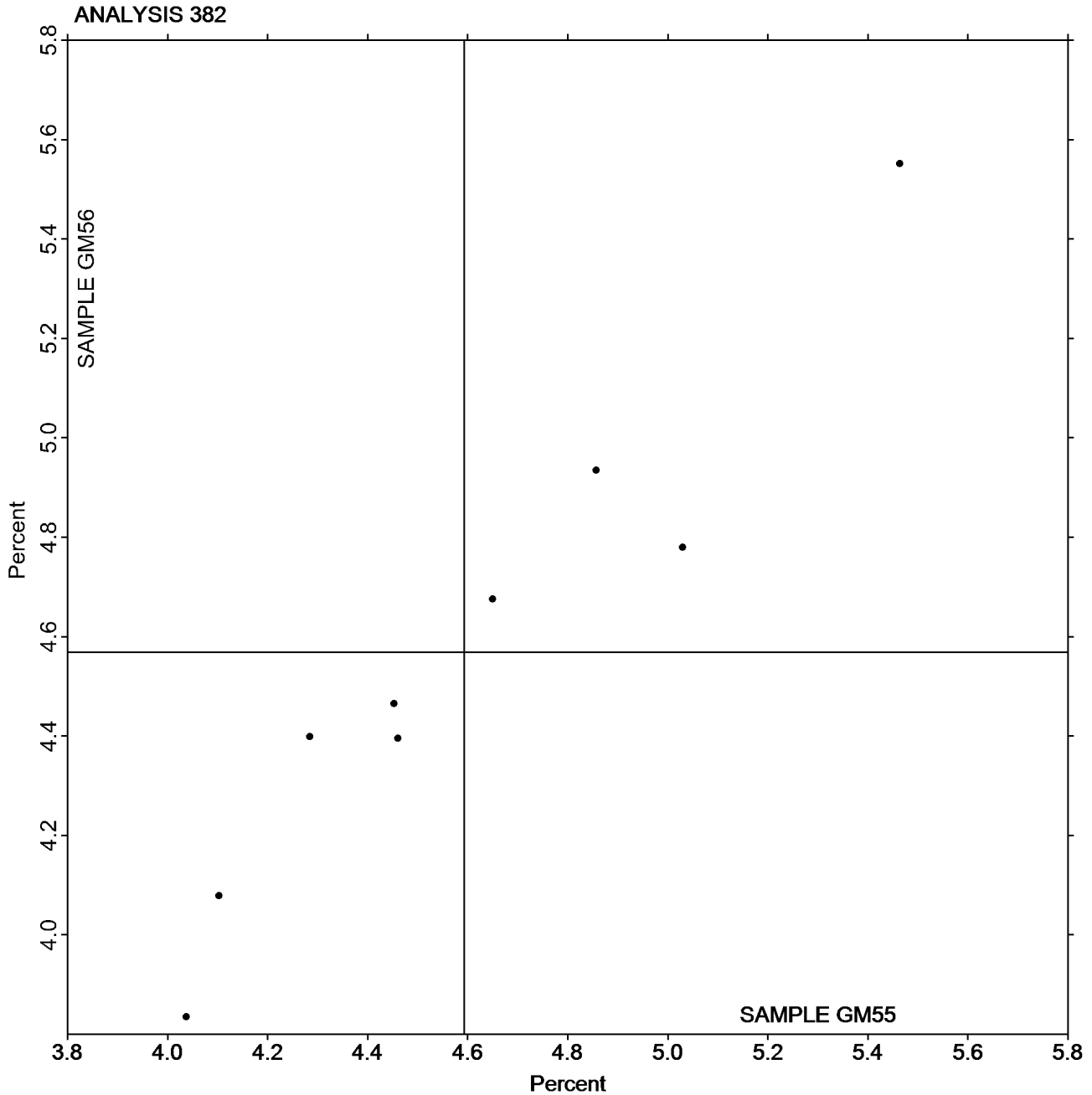
Report #2942G,  
June 2018

## Analysis 382 Moisture in Paper

### TAPPI Official Test Method T412

Grand Mean Sample GM55 = 4.5934  
Percent

Grand Mean Sample GM56 = 4.5681  
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 #2942G,  
June 2018

## Analysis 384

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

#### TAPPI Official Test Method T425

WebCode	Data Flag	Sample GN55			Sample GN56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6V8KLM		91.76	-1.48	-2.50	92.57	-1.48	-2.50	ZZ
76WNB2		92.43	-0.81	-1.37	93.25	-0.79	-1.35	ZZ
7KN99P		93.26	0.01	0.02	94.18	0.14	0.23	ZZ
8CW6NT	X	93.00	-0.24	-0.41	93.13	-0.91	-1.54	ZZ
8GLPLG		93.44	0.20	0.33	94.32	0.28	0.47	ZZ
8VLQXH	X	88.47	-4.77	-8.04	89.69	-4.35	-7.38	ZZ
97KNJW		92.93	-0.31	-0.53	93.67	-0.37	-0.63	ZZ
BB84DL		93.63	0.39	0.66	94.50	0.46	0.78	ZZ
BRCMYQ		93.46	0.22	0.36	94.26	0.22	0.37	ZZ
DUCPKX		93.35	0.11	0.18	94.11	0.07	0.12	ZZ
E69TPR		93.17	-0.07	-0.12	94.03	-0.01	-0.02	ZZ
HMTZ6K		93.29	0.05	0.08	94.06	0.02	0.03	ZZ
HZY73P		92.37	-0.87	-1.47	93.21	-0.83	-1.41	ZZ
J8XW2L		93.53	0.29	0.48	94.45	0.41	0.69	ZZ
JB2Q2B		93.42	0.18	0.30	94.21	0.17	0.28	ZZ
JV4RXF		93.54	0.30	0.50	94.31	0.27	0.46	ZZ
MAA23Y		93.88	0.63	1.07	94.68	0.64	1.09	ZZ
MZQH8		93.33	0.08	0.14	94.05	0.01	0.02	ZZ
N8276E	X	94.64	1.40	2.35	96.61	2.57	4.36	ZZ
PBWCYB		94.69	1.45	2.43	95.45	1.41	2.39	ZZ
PD6E29		93.36	0.11	0.19	94.06	0.02	0.04	ZZ
QLYTQZ	*	93.23	-0.01	-0.03	94.30	0.25	0.43	ZZ
TMF2M6		93.52	0.28	0.46	94.38	0.34	0.58	ZZ
TQECH6		92.12	-1.12	-1.89	92.94	-1.10	-1.87	ZZ
UHJTG3		93.44	0.20	0.33	94.22	0.18	0.30	ZZ
WEPT8W		93.20	-0.04	-0.08	93.98	-0.06	-0.11	ZZ
XGVEVW		93.35	0.11	0.18	94.07	0.03	0.05	ZZ
XWDH6X		93.08	-0.16	-0.28	93.70	-0.34	-0.58	ZZ
XZBYHR		93.93	0.68	1.15	94.66	0.61	1.04	ZZ
Y2FQ6Y		92.40	-0.84	-1.42	93.20	-0.84	-1.43	ZZ
YPRM4U		93.73	0.49	0.82	94.33	0.29	0.49	ZZ

Summary Statistics	Sample GN55	Sample GN56
<b>Grand Means</b>	93.24 Percent	94.04 Percent
<b>Std Dev Btwn Labs</b>	0.59 Percent	0.59 Percent
Statistics based on 28 of 31 reporting participants.		





# Paper & Paperboard Interlaboratory Testing Program

Report #2942G,  
June 2018

## Analysis 384

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

#### TAPPI Official Test Method T425

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

8CW6NT (X) - Inconsistent in testing between samples.

N8276E (X) - Data for sample GN56 are high.

8VLQXH (X) - Extreme Data.

#### **Key to Instrument Codes Reported by Participants**

**ZZ** Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

Report #2942G,  
June 2018

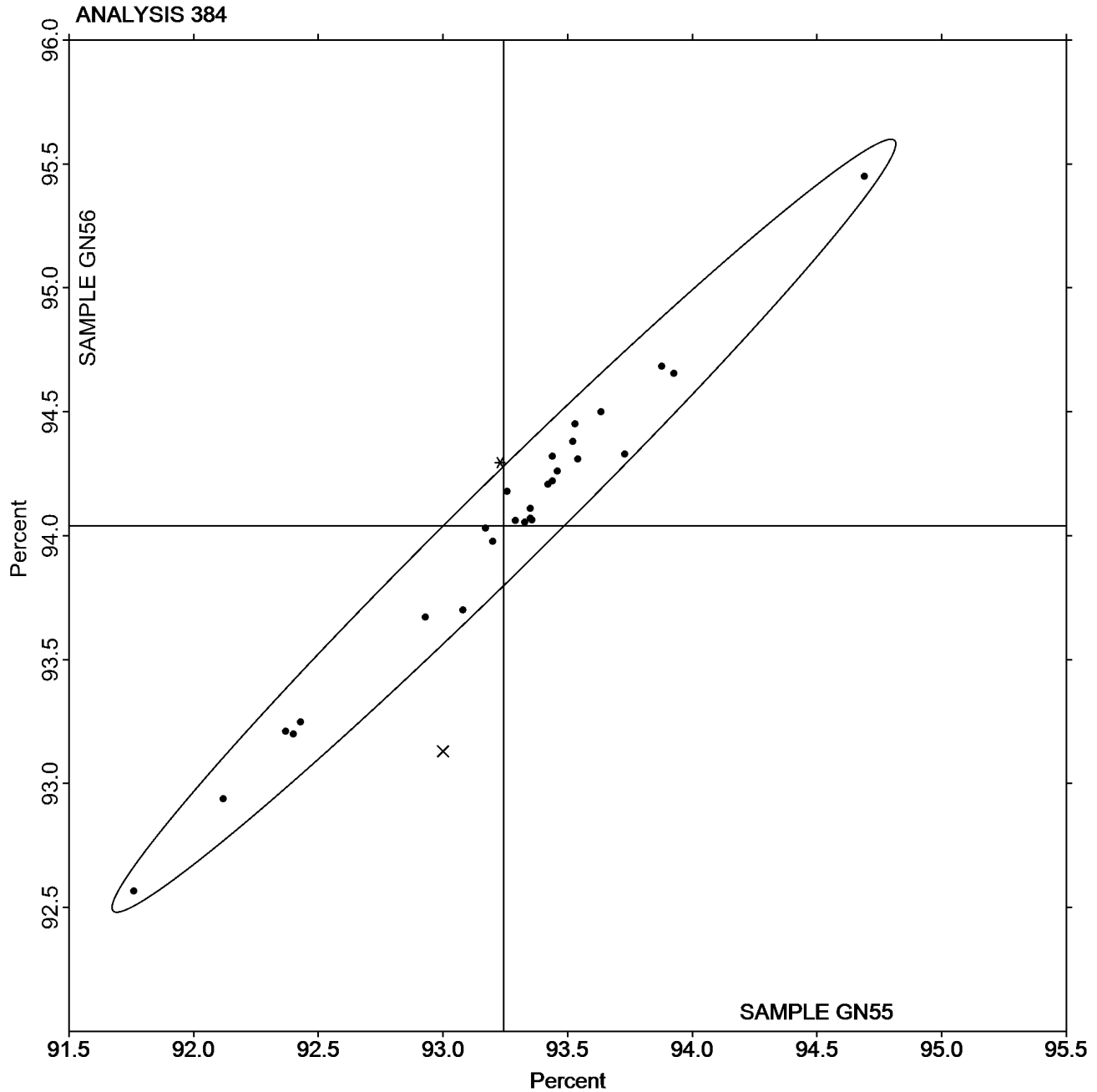
## Analysis 384

Opacity (89% Reflectance Backing) - Fine Papers

TAPPI Official Test Method T425

Grand Mean Sample GN55 = 93.244  
Percent

Grand Mean Sample GN56 = 94.041  
Percent





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

Report #2942G,  
June 2018

WebCode	Data Flag	Sample GP55			Sample GP56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
76WNB2		93.57	0.13	0.63	93.47	0.03	0.28	ZZ
77PCZP		93.34	-0.11	-0.54	93.35	-0.08	-0.70	ZZ
CKQZUD		93.30	-0.14	-0.72	93.41	-0.03	-0.25	ZZ
CUD843		93.57	0.13	0.65	93.57	0.14	1.14	ZZ
K9TTAF		93.24	-0.21	-1.06	93.23	-0.20	-1.69	ZZ
KPDGJB	X	98.87	5.43	27.42	98.82	5.39	44.80	ZZ
L9L2YB		93.37	-0.08	-0.38	93.36	-0.08	-0.67	ZZ
LGHWW9		93.48	0.03	0.16	93.40	-0.04	-0.32	ZZ
LMNRG9		93.45	0.00	0.01	93.31	-0.13	-1.04	ZZ
PNPNNG		93.89	0.45	2.26	93.74	0.30	2.49	ZZ
QZULNM		93.40	-0.05	-0.25	93.43	-0.01	-0.07	ZZ
R7EY8L		93.16	-0.28	-1.44	93.45	0.01	0.12	ZZ
TVTWJY		93.69	0.25	1.25	93.45	0.01	0.11	ZZ
VG44K3		93.17	-0.27	-1.37	93.36	-0.08	-0.65	ZZ
XH946Z		93.57	0.12	0.61	93.48	0.04	0.36	ZZ
ZH3QA4		93.48	0.03	0.17	93.54	0.11	0.89	ZZ

Summary Statistics	Sample GP55	Sample GP56
<b>Grand Means</b>	93.44 Percent	93.44 Percent
<b>Std Dev Btwn Labs</b>	0.20 Percent	0.12 Percent

Statistics based on 15 of 16 reporting participants.

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

KPDGJB (X) - Extreme Data.

**Key to Instrument Codes Reported by Participants**

ZZ Instruments No Longer Tracked





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

Report #2942G,  
June 2018

WebCode	Data Flag	Sample GR55			Sample GR56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2XA7TB		84.38	-0.12	-0.07	84.28	0.48	0.53	TT
3BBZ3X		85.16	0.67	0.39	84.80	1.00	1.10	TS
6V8KLM		85.67	1.17	0.69	84.15	0.36	0.40	VM
72R66T		84.84	0.34	0.20	84.41	0.62	0.68	PP
76WNB2		83.55	-0.95	-0.56	83.00	-0.79	-0.87	TS
7KN99P	*	89.04	4.54	2.65	84.94	1.15	1.26	XX
8GLPLG		84.23	-0.27	-0.16	84.81	1.02	1.12	TS
8HXGKP	X	65.19	-19.31	-11.28	84.24	0.45	0.49	TS
8HXLT8	X	83.03	-1.47	-0.86	87.94	4.15	4.55	HZ
8VLQXH		83.03	-1.47	-0.86	84.91	1.12	1.23	XX
9M9UZ4		88.15	3.66	2.14	84.64	0.84	0.93	HG
9QPJY7		83.18	-1.32	-0.77	82.78	-1.02	-1.11	TT
CMBZKT		82.75	-1.75	-1.02	82.63	-1.17	-1.28	TS
DUCPKX		84.85	0.35	0.20	84.12	0.33	0.36	TS
G4NVCH		83.91	-0.58	-0.34	83.57	-0.23	-0.25	TS
HMTZ6K		83.85	-0.65	-0.38	82.98	-0.82	-0.90	TT
HZY73P		86.13	1.63	0.95	83.56	-0.23	-0.25	XC
J8XW2L		83.48	-1.02	-0.60	82.95	-0.84	-0.92	TT
JV4RXF		82.85	-1.65	-0.96	82.43	-1.37	-1.50	TT
KFMX3G		82.28	-2.22	-1.30	83.64	-0.15	-0.17	XX
M8AQFC		83.66	-0.83	-0.49	83.01	-0.78	-0.86	TS
MAA23Y		85.40	0.90	0.53	85.30	1.51	1.65	XX
MZQH8		83.45	-1.05	-0.61	82.58	-1.22	-1.33	PP
PBWCYB		83.35	-1.15	-0.67	83.60	-0.19	-0.21	TS
UHJTG3	X	70.78	-13.72	-8.02	84.63	0.83	0.91	TS
WEPT8W		84.99	0.49	0.29	84.94	1.15	1.26	TS
X7WXR		87.28	2.78	1.63	84.24	0.45	0.49	HG
Y2FQ6Y	X	88.93	4.43	2.59	88.33	4.54	4.98	PE
YPRM4U		82.99	-1.51	-0.88	82.58	-1.22	-1.33	TT
ZB38DY	X	75.33	-9.17	-5.36	84.70	0.90	0.99	EA

Summary Statistics	Sample GR55	Sample GR56
<b>Grand Means</b>	84.50 Percent	83.79 Percent
<b>Std Dev Btwn Labs</b>	1.71 Percent	0.91 Percent
Statistics based on 25 of 30 reporting participants.		



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

**Report #2942G,**  
**June 2018**

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

- ZB38DY (X) - Data for sample GR55 are low.
- Y2FQ6Y (X) - Data for sample GR56 are high. Inconsistent within the determinations of sample GR55.
- 8HXGKP (X) - Extreme Data for Sample GR55.
- UHJTG3 (X) - Extreme Data for Sample GR55.
- 8HXLT8 (X) - Data for sample GR56 are high.

**Key to Instrument Codes Reported by Participants**

<b>EA</b>	L & W Autoline 400	<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



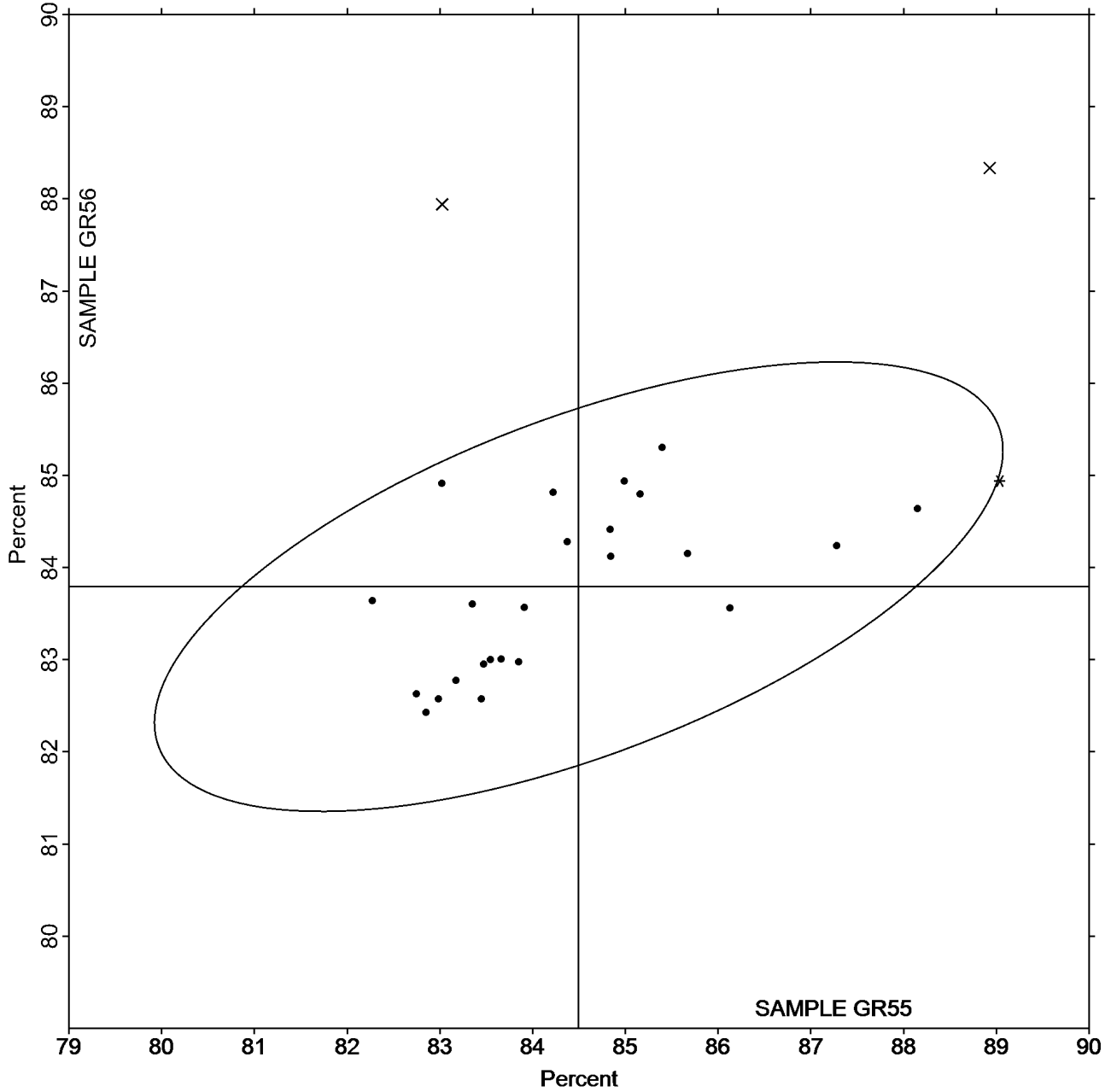
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 390**  
**Directional Brightness**  
**TAPPI Official Test Method T452**

**Report #2942G,**  
**June 2018**

**Grand Mean Sample GR55 = 84.497**  
**Percent**

**Grand Mean Sample GR56 = 83.792**  
**Percent**

**ANALYSIS 390**





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

Report #2942G,  
June 2018

WebCode	Data Flag	Sample GZ55			Sample GZ56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
7KN99P		97.76	0.81	1.21	97.68	0.76	1.11	XX
97KNJW		95.86	-1.09	-1.62	95.72	-1.20	-1.76	HT
BB84DL		97.08	0.13	0.20	97.09	0.17	0.25	PP
BRCMYQ		97.00	0.05	0.07	97.16	0.24	0.35	TT
BZHLAD		97.40	0.45	0.67	97.24	0.32	0.47	TT
E69TPR		96.78	-0.17	-0.25	96.92	0.00	0.00	TT
PBWCYB		96.62	-0.33	-0.49	96.42	-0.50	-0.73	TS
PD6E29		98.01	1.06	1.58	97.85	0.93	1.37	TS
QLYTQZ		96.77	-0.18	-0.26	96.86	-0.06	-0.09	TS
TMF2M6		95.76	-1.19	-1.78	95.73	-1.19	-1.75	HT
TVTJY		97.78	0.83	1.23	97.84	0.92	1.34	TS
XGVEVW		97.16	0.21	0.31	97.10	0.18	0.26	TT
XWDH6X		96.36	-0.59	-0.88	96.28	-0.64	-0.94	TS
XZBYHR		96.96	0.01	0.02	97.01	0.09	0.13	TS

Summary Statistics	Sample GZ55	Sample GZ56
<b>Grand Means</b>	96.95 Percent	96.92 Percent
<b>Stnd Dev Btwn Labs</b>	0.67 Percent	0.68 Percent
Statistics based on 14 of 14 reporting participants.		

**Key to Instrument Codes Reported by Participants**

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



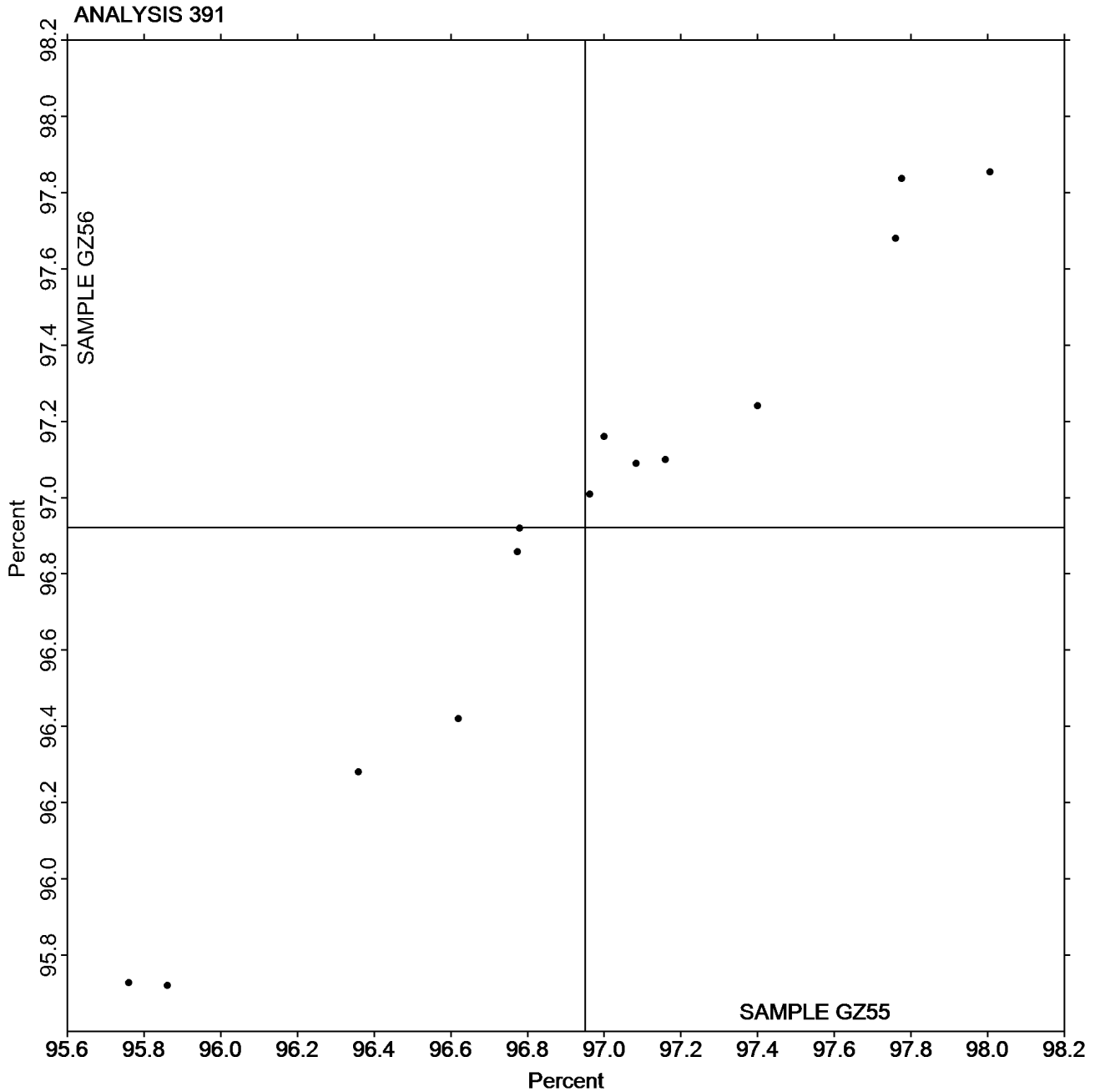


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 391**  
**Directional Brightness of Fluorescent Samples**  
**TAPPI Official Test Method T452**

**Report #2942G,**  
**June 2018**

**Grand Mean Sample GZ55 = 96.950**  
**Percent**

**Grand Mean Sample GZ56 = 96.921**  
**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**  
**TAPPI Official Test Method T525**

Report #2942G,  
June 2018

WebCode	Data Flag	Sample GR55			Sample GR56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2XA7TB	X	85.56	1.49	5.51	85.39	2.17	10.99	TL
3BBZ3X		84.08	0.00	0.01	83.33	0.11	0.55	TC
72R66T		84.21	0.13	0.48	83.18	-0.03	-0.16	EG
76WNB2		84.07	-0.01	-0.03	83.11	-0.11	-0.53	LS
8CVDR7		84.03	-0.05	-0.19	82.83	-0.38	-1.93	TC
9QPJY7		83.93	-0.15	-0.56	83.01	-0.21	-1.05	EG
CKQZUD		84.45	0.37	1.38	83.44	0.22	1.12	TC
CMBZKT		84.02	-0.06	-0.22	83.02	-0.20	-1.01	TC
DUCPKX		83.94	-0.14	-0.52	83.02	-0.19	-0.97	TC
JV4RXF	X	84.85	0.77	2.87	83.09	-0.12	-0.62	LT
K9TTAF	*	83.55	-0.53	-1.95	83.33	0.11	0.57	TM
KFMX3G	X	83.83	-0.25	-0.91	84.00	0.79	3.99	EE
KPDGJB		84.38	0.31	1.14	83.41	0.19	0.98	LS
LGHWW9		84.12	0.04	0.16	83.22	0.00	0.00	TC
LMNRG9		84.11	0.04	0.14	83.46	0.25	1.25	TC
PJT83Z	X	68.78	-15.30	-56.81	83.75	0.53	2.70	TZ
R7EY8L		83.85	-0.23	-0.84	83.44	0.22	1.12	TM
T3CD22		84.00	-0.08	-0.29	83.07	-0.14	-0.72	TC
TB7F6X		83.96	-0.11	-0.42	83.06	-0.16	-0.81	TC
TVTWJY		84.25	0.17	0.63	83.33	0.12	0.60	TC
UEM662		83.79	-0.29	-1.08	83.19	-0.03	-0.14	EF
VPXX82		84.25	0.17	0.64	83.18	-0.04	-0.18	TC
VVLQUZ		83.94	-0.13	-0.50	83.05	-0.17	-0.86	TC
XH946Z		83.86	-0.22	-0.82	83.22	0.00	0.00	EG
YLLBXR	*	84.83	0.75	2.79	83.66	0.45	2.26	XX
ZH3QA4		83.79	-0.29	-1.06	83.02	-0.20	-1.01	LS
ZTHPVY		84.38	0.30	1.11	83.39	0.18	0.90	TC

Summary Statistics	Sample GR55	Sample GR56
<b>Grand Means</b>	84.08 Percent	83.22 Percent
<b>Std Dev Btwn Labs</b>	0.27 Percent	0.20 Percent

Statistics based on 23 of 27 reporting participants.

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

PJT83Z (X) - Extreme Data.

JV4RXF (X) - Data for sample GR55 are high.

2XA7TB (X) - Extreme Data.

KFMX3G (X) - Data for sample GR56 are high. Inconsistent within the determinations of sample GR56.



**Analysis Notes:**

3BBZ3X - One determination removed from the Lab Mean of Sample GR55 per Grubb's Test at 1% risk (TAPPI 1205).

**Key to Instrument Codes Reported by Participants**

EE	Datacolor Elrepho 2000	EF	Datacolor Elrepho 3000
EG	Datacolor Elrepho 450X	LS	L & W Elrepho SE 070
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	XX	Instrument make/model not specified by lab



# Paper & Paperboard Interlaboratory Testing Program

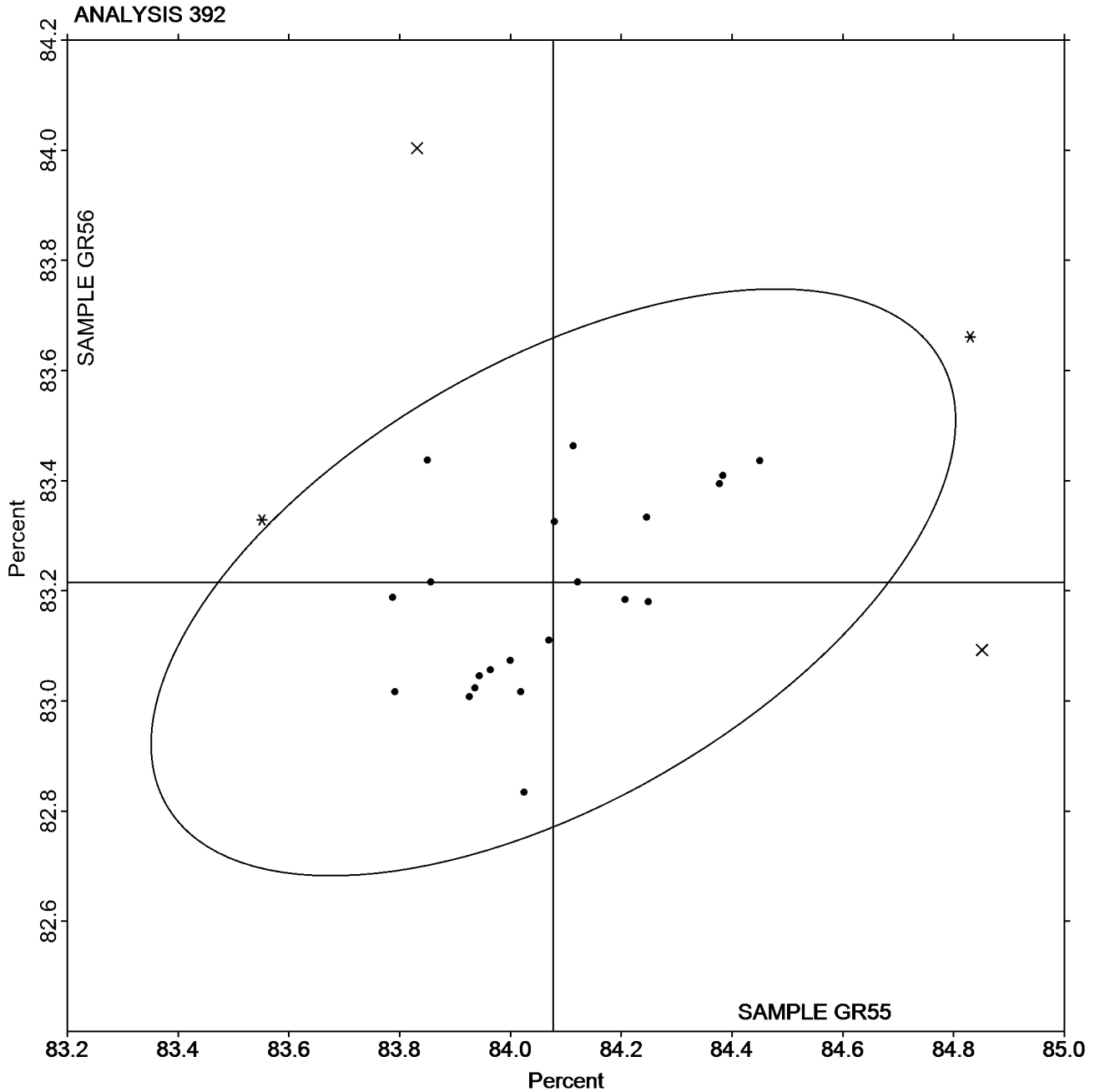
Report #2942G,  
June 2018

## Analysis 392 Diffuse Brightness

### TAPPI Official Test Method T525

Grand Mean Sample GR55 = 84.077  
Percent

Grand Mean Sample GR56 = 83.215  
Percent





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

Report #2942G,  
June 2018

WebCode	Data Flag	Sample GZ55			Sample GZ56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
7KN99P		7.910	-0.029	-0.08	8.154	0.159	0.44	XX
BB84DL		8.106	0.167	0.48	8.188	0.193	0.53	PP
BRCMYQ		8.240	0.301	0.87	8.220	0.225	0.62	TT
E69TPR		8.020	0.081	0.23	8.000	0.005	0.01	TT
PBWCYB		7.100	-0.839	-2.41	7.140	-0.855	-2.36	TS
PD6E29		8.032	0.093	0.27	8.040	0.045	0.12	TS
QLYTQZ		7.756	-0.183	-0.52	7.724	-0.271	-0.75	TS
TVTJWY		8.052	0.113	0.33	8.212	0.217	0.60	TS
XZBYHR		8.232	0.293	0.84	8.280	0.285	0.79	TS

Summary Statistics	Sample GZ55	Sample GZ56
<b>Grand Means</b>	7.94 Percent	8.00 Percent
<b>Std Dev Btwn Labs</b>	0.35 Percent	0.36 Percent
Statistics based on 9 of 9 reporting participants.		

**Key to Instrument Codes Reported by Participants**

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

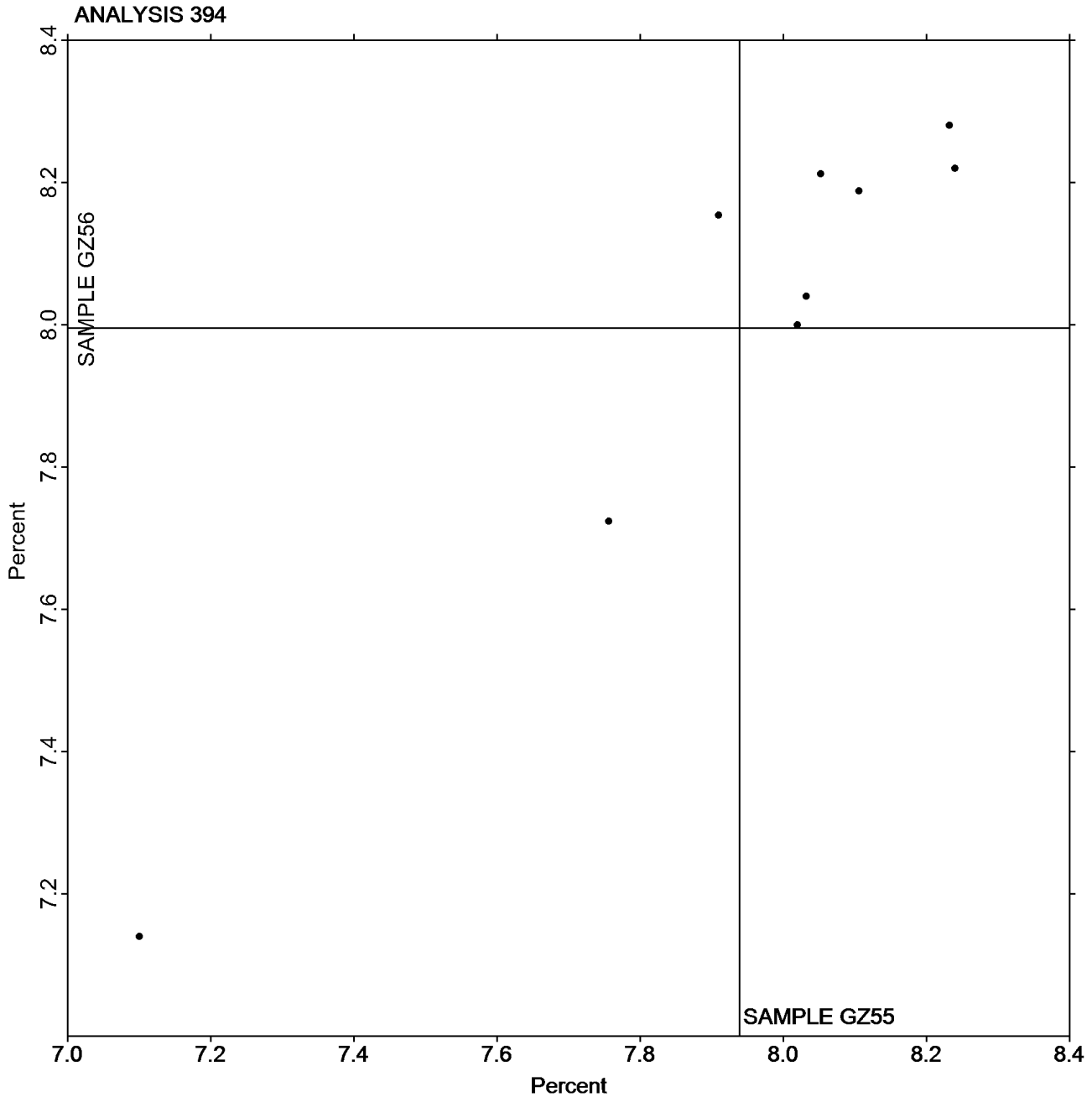


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 394**  
**Fluorescent Component of Directional Brightness**  
**TAPPI Official Test Method T452**

Report #2942G,  
June 2018

Grand Mean Sample GZ55 = 7.9387  
Percent

Grand Mean Sample GZ56 = 7.9953  
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 #2942G,  
June 2018

WebCode	Data Flag	Sample GT55			Sample GT56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2XA7TB		74.44	-1.32	-0.53	81.86	-1.57	-0.88	GS
6V8KLM		76.79	1.03	0.41	84.57	1.14	0.64	VM
72R66T	*	67.13	-8.63	-3.43	77.16	-6.27	-3.51	GA
9M9UZ4		77.82	2.06	0.82	84.01	0.58	0.33	TH
9QPJY7		77.48	1.72	0.68	85.25	1.82	1.02	TH
AYUQCL		77.70	1.94	0.77	83.60	0.17	0.10	GA
BB84DL		76.23	0.47	0.19	83.59	0.16	0.09	PP
BRCMYQ		76.36	0.60	0.24	83.79	0.36	0.20	PP
ENKL9L		75.61	-0.15	-0.06	83.39	-0.04	-0.02	GM
HMTZ6K		77.87	2.11	0.84	84.29	0.86	0.48	TH
KPDGJB		75.71	-0.05	-0.02	83.11	-0.32	-0.18	LB
NLH2HP		75.88	0.12	0.05	84.99	1.56	0.88	XX
PD6E29		76.49	0.73	0.29	84.04	0.61	0.34	LA
QZULNM		76.84	1.08	0.43	84.33	0.90	0.51	XX
TVTWJY		75.22	-0.54	-0.22	84.09	0.66	0.37	LA
VVLQUZ		71.71	-4.05	-1.61	80.92	-2.51	-1.40	ZH
WEPT8W		75.32	-0.44	-0.18	83.52	0.09	0.05	LA
X7WXR D		78.51	2.75	1.09	84.20	0.77	0.43	TH
XENEFG		75.56	-0.20	-0.08	83.10	-0.33	-0.18	LA
XGVEVW		76.59	0.83	0.33	84.73	1.30	0.73	TG

Summary Statistics	Sample GT55	Sample GT56
<b>Grand Means</b>	75.76 Gloss Units	83.43 Gloss Units
<b>Std Dev Btwn Labs</b>	2.52 Gloss Units	1.78 Gloss Units
Statistics based on 20 of 20 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>VM</b> Valmet PaperLab (was Kajaani/Robotest)	<b>XX</b> Instrument make/model not specified by lab
<b>ZH</b> Zehntner ZLR 1050	



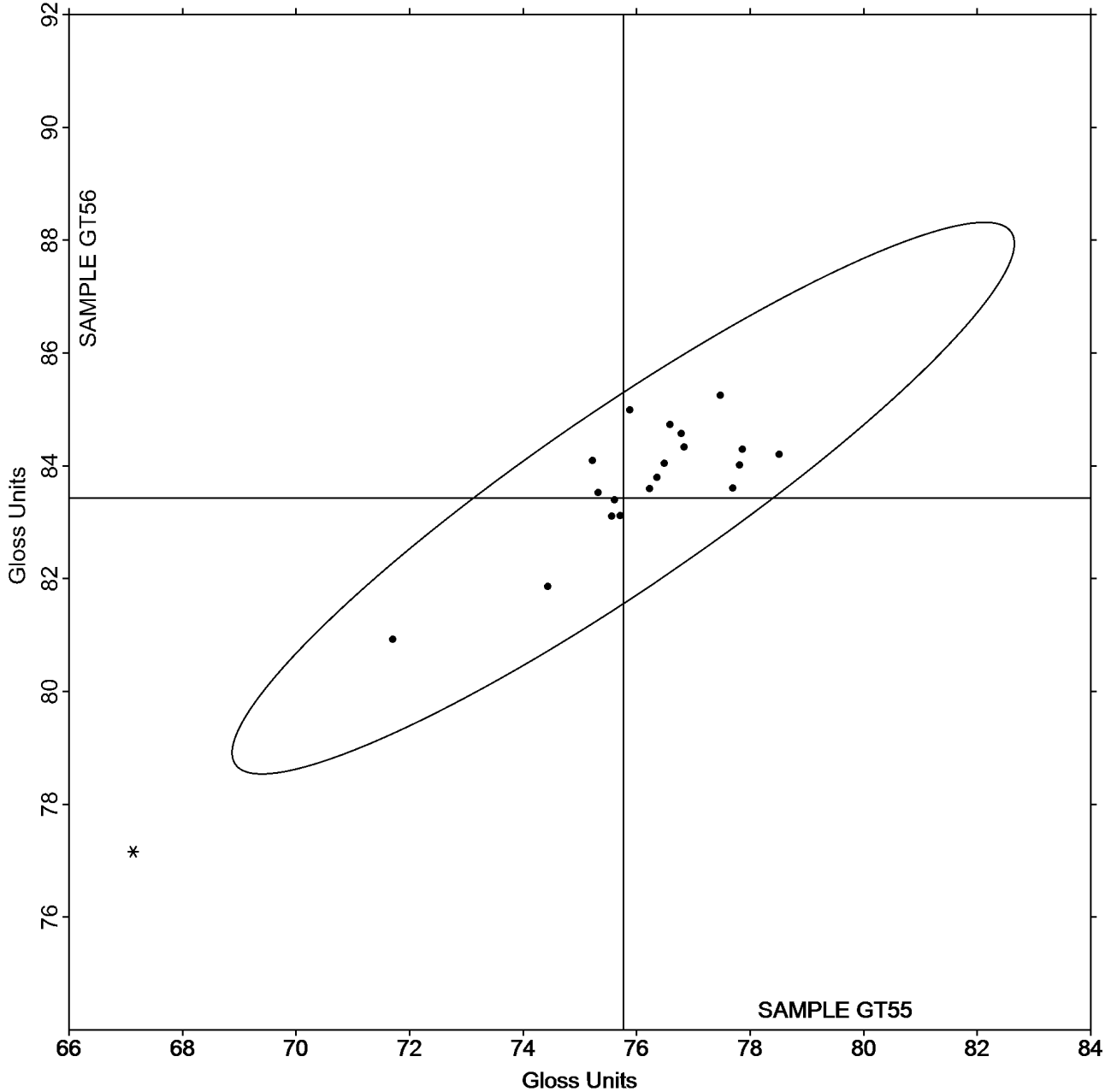
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 395**  
**Specular Gloss at 75 Degrees - High Range**  
**TAPPI Official Test Method T480**

**Report #2942G,**  
**June 2018**

**Grand Mean Sample GT55 = 75.763**  
**Gloss Units**

**Grand Mean Sample GT56 = 83.427**  
**Gloss Units**

**ANALYSIS 395**







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

Report #2942G,  
June 2018

WebCode	Data Flag	Sample GU55			Sample GU56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
228QXU		40.61	-0.90	-0.90	41.24	-0.82	-0.78	XX
76WNB2		42.35	0.84	0.84	43.30	1.24	1.17	LW
8HXLT8		39.67	-1.84	-1.84	40.93	-1.13	-1.07	GS
CMBZKT		41.88	0.37	0.37	42.59	0.53	0.50	TH
HZY73P		42.62	1.11	1.11	43.66	1.60	1.51	TH
JB2Q2B		42.08	0.57	0.57	42.54	0.48	0.45	PP
KPDGJB		41.03	-0.48	-0.48	40.61	-1.45	-1.38	LA
TVTJWY		42.44	0.93	0.93	42.12	0.06	0.06	LA
YPRM4U		40.94	-0.57	-0.57	41.57	-0.50	-0.47	TH

Summary Statistics	Sample GU55	Sample GU56
<b>Grand Means</b>	41.51 Gloss Units	42.06 Gloss Units
<b>Std Dev Btwn Labs</b>	1.00 Gloss Units	1.06 Gloss Units
Statistics based on 9 of 9 reporting participants.		

**Key to Instrument Codes Reported by Participants**

GS	BYK-Gardner Glossgard II	LA	L & W Gloss - Autoline 300
LW	L & W Gloss Tester	PP	Technidyne Profile/Plus
TH	Technidyne T480A	XX	Instrument make/model not specified by lab



# Paper & Paperboard Interlaboratory Testing Program

Report #2942G,  
June 2018

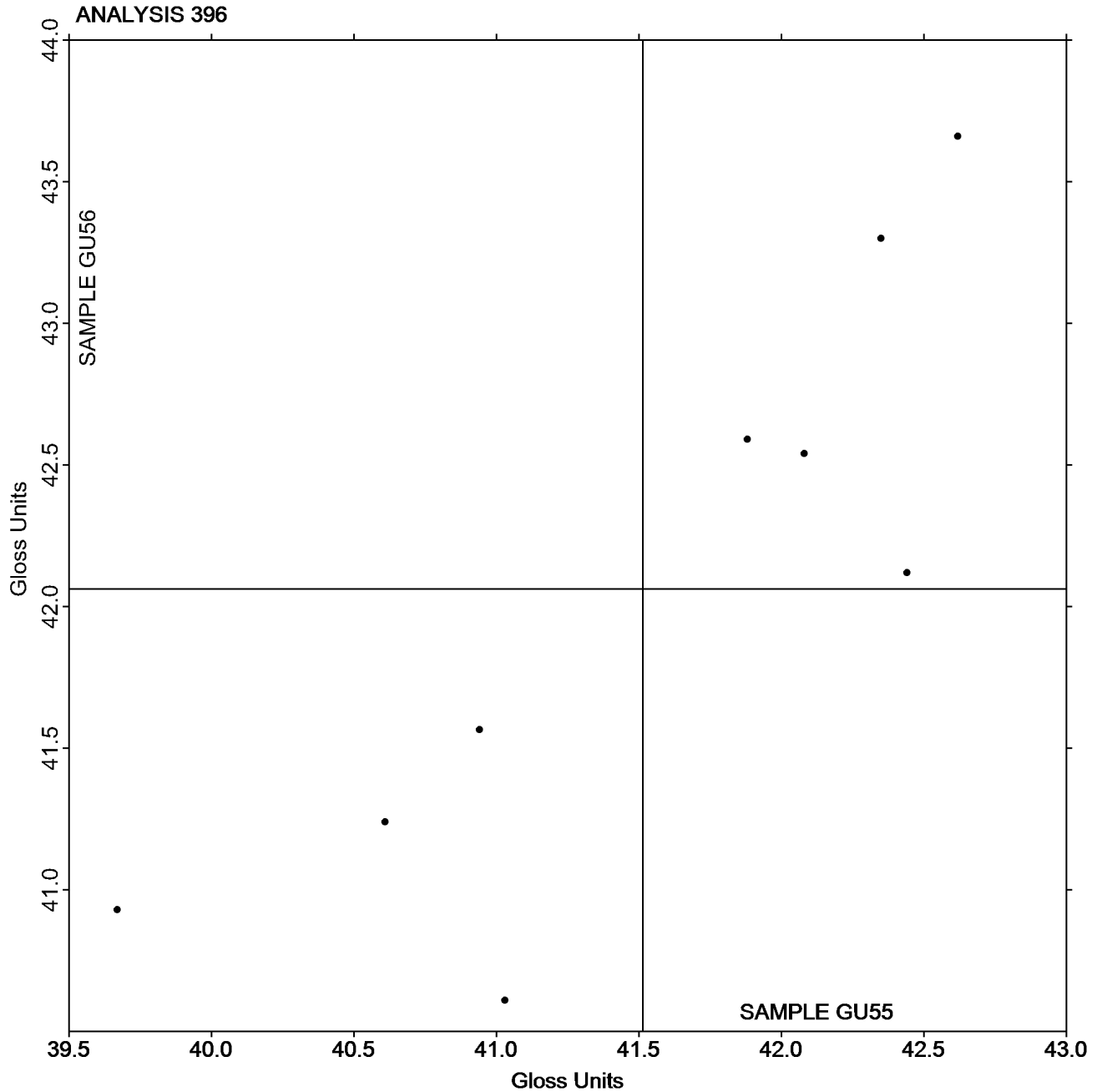
## Analysis 396

Specular Gloss at 75 Degrees - Low Range

TAPPI Official Test Method T480

Grand Mean Sample GU55 = 41.513  
Gloss Units

Grand Mean Sample GU56 = 42.062  
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 #2942G,  
June 2018

WebCode	Data Flag	Sample GW55			Sample GW56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
228QXU		73.08	-0.42	-1.22	88.86	-0.40	-0.89	ZZ
2U6NM2		73.40	-0.10	-0.30	89.55	0.29	0.63	ZZ
3BBZ3X		73.48	-0.02	-0.06	89.03	-0.24	-0.52	ZZ
4YWCKK		74.34	0.83	2.41	90.20	0.93	2.05	ZZ
72GVK9		73.26	-0.24	-0.70	89.43	0.16	0.36	ZZ
77PCZP		73.57	0.07	0.20	89.30	0.03	0.07	ZZ
82MQVQ		73.21	-0.30	-0.85	89.18	-0.09	-0.20	ZZ
8CW6NT	X	90.65	17.15	49.65	110.14	20.87	46.08	ZZ
97KNJW		73.82	0.32	0.92	88.90	-0.37	-0.81	ZZ
C77T6R		73.12	-0.38	-1.10	89.17	-0.10	-0.22	ZZ
CUD843		73.51	0.01	0.03	89.15	-0.11	-0.25	ZZ
FU48VX		73.40	-0.10	-0.30	89.44	0.17	0.38	ZZ
GACKNF		73.68	0.18	0.51	88.81	-0.46	-1.01	ZZ
HZY73P		73.78	0.28	0.80	89.23	-0.04	-0.09	ZZ
KFMX3G		74.08	0.58	1.68	90.22	0.95	2.10	ZZ
KPDGJB		73.30	-0.20	-0.58	89.21	-0.05	-0.12	ZZ
L3T9CA		73.80	0.30	0.87	89.60	0.33	0.74	ZZ
L9L2YB		73.17	-0.33	-0.95	88.83	-0.44	-0.96	ZZ
MAA23Y		73.80	0.30	0.88	88.43	-0.84	-1.84	ZZ
MRDFLE		73.30	-0.20	-0.59	89.00	-0.26	-0.58	ZZ
QPWDCC	X	78.91	5.41	15.67	88.22	-1.05	-2.31	ZZ
QZULNM		73.09	-0.41	-1.20	88.58	-0.69	-1.52	ZZ
TMF2M6		74.15	0.65	1.87	89.64	0.37	0.82	ZZ
W69Z72		73.23	-0.27	-0.78	89.83	0.57	1.25	ZZ
XWDH6X		73.35	-0.16	-0.45	89.85	0.59	1.29	ZZ
YPRM4U		73.36	-0.14	-0.42	89.21	-0.05	-0.12	ZZ
ZH3QA4		73.27	-0.23	-0.67	89.01	-0.26	-0.57	ZZ

Summary Statistics	Sample GW55	Sample GW56
<b>Grand Means</b>	73.50 g/sq m	89.27 g/sq m
<b>Std Dev Btwn Labs</b>	0.35 g/sq m	0.45 g/sq m
Statistics based on 25 of 27 reporting participants.		

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

8CW6NT (X) - Extreme Data.

QPWDCC (X) - Extreme Data for Sample GW55.

**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 #2942G,  
June 2018

WebCode	Data Flag	Sample GX55			Sample GX56			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
6DQJRK		10.00	-1.30	-0.32	15.70	0.96	0.24	HE
8VLQXH		6.33	-4.97	-1.24	10.16	-4.58	-1.14	XX
9AGAE7		7.30	-4.00	-1.00	9.30	-5.44	-1.36	HE
9UBW7P		6.87	-4.43	-1.11	12.60	-2.14	-0.53	HE
AYUQCL		11.48	0.18	0.05	15.25	0.51	0.13	HE
BZHLAD		17.50	6.20	1.55	21.40	6.66	1.66	HE
DUCPKX		14.14	2.84	0.71	13.60	-1.14	-0.28	XX
G4NVCH		7.33	-3.97	-0.99	11.40	-3.34	-0.83	HE
J8XW2L		9.48	-1.82	-0.45	11.29	-3.45	-0.86	HE
JB2Q2B	*	23.10	11.80	2.95	24.01	9.27	2.31	HE
JLHDBC		11.13	-0.17	-0.04	15.04	0.30	0.08	HE
JV4RXF		14.26	2.96	0.74	16.47	1.73	0.43	HE
M8AQFC		8.56	-2.74	-0.68	12.29	-2.45	-0.61	HE
MAA23Y		10.30	-1.00	-0.25	17.56	2.82	0.70	XX
MZQH8		19.16	7.86	1.96	24.30	9.56	2.39	HE
N8276E	X	14.83	3.53	0.88	32.40	17.66	4.41	HE
PBWCYB		11.82	0.52	0.13	15.13	0.39	0.10	HE
PD6E29		9.74	-1.56	-0.39	13.65	-1.09	-0.27	HE
QLYTQZ		8.70	-2.60	-0.65	14.19	-0.55	-0.14	HE
TENRVM		9.10	-2.20	-0.55	10.59	-4.15	-1.03	HE
UHJTG3		10.20	-1.10	-0.27	12.20	-2.54	-0.63	HE
WCPCCK3		10.52	-0.78	-0.19	11.67	-3.07	-0.76	HE
WEPT8W		9.78	-1.52	-0.38	13.34	-1.40	-0.35	HE
XWDH6X		9.00	-2.30	-0.57	14.36	-0.38	-0.09	HE
XZBYHR		12.51	1.21	0.30	14.77	0.03	0.01	HE
Y2FQ6Y		16.30	5.00	1.25	20.90	6.16	1.54	HE
ZEGTYR		9.10	-2.20	-0.55	11.97	-2.77	-0.69	HE

Summary Statistics	Sample GX55	Sample GX56
<b>Grand Means</b>	11.30 Seconds	14.74 Seconds
<b>Std Dev Btwn Labs</b>	4.00 Seconds	4.01 Seconds
Statistics based on 26 of 27 reporting participants.		

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

N8276E (X) - Data for sample GX56 are high.

**Key to Instrument Codes Reported by Participants**

HE Hercules Sizing Tester

XX Instrument make/model not specified by lab



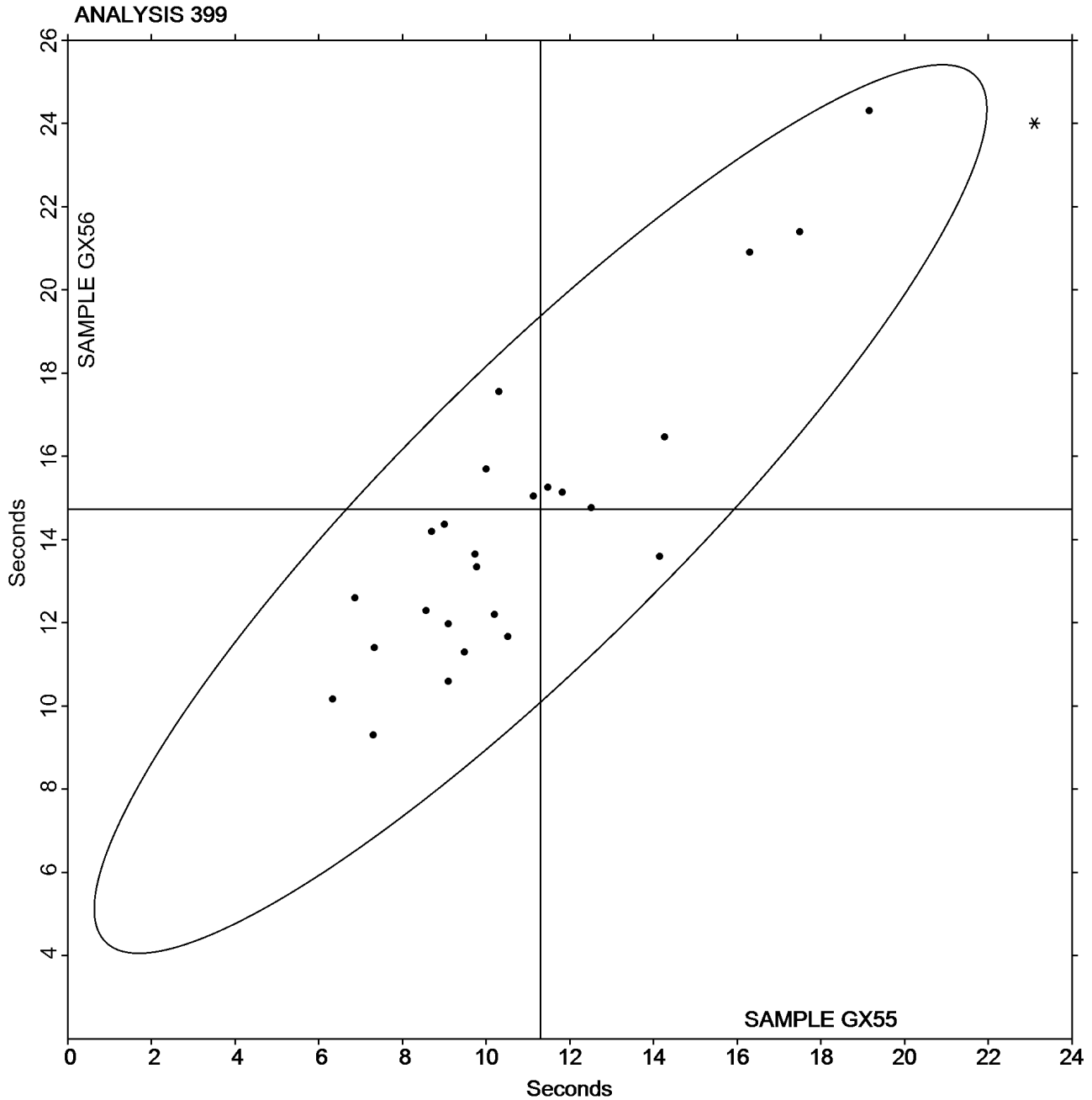
# Paper & Paperboard Interlaboratory Testing Program

Report #2942G,  
June 2018

## Analysis 399 Sizing Test (Hercules Type) TAPPI Official Test Method T530

Grand Mean Sample GX55 = 11.297  
Seconds

Grand Mean Sample GX56 = 14.736  
Seconds





**Paper & Paperboard Interlaboratory Testing Program**

**Report #2942G,  
June 2018**

**Analysis 399**

**Sizing Test (Hercules Type)**

**TAPPI Official Test Method T530**

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-End of Report-