



## Paper & Paperboard Testing Program

### Summary Report #3032 G - December 2019

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

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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 #3032 G,  
December 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	$\Delta L$	$\Delta a$	$\Delta b$	$\Delta E$	
2TZEUN		GA73	94.38	-0.64	3.85	0.00	0.00	-0.05	0.05	HE
		GA74	94.38	-0.64	3.80					
3PFARR		GA73	93.68	-0.85	4.00	0.04	0.00	-0.07	0.08	XX
		GA74	93.72	-0.85	3.93					
7E3W7K		GA73	94.36	-0.78	3.91	0.02	-0.01	0.02	0.03	HE
		GA74	94.38	-0.79	3.93					
7T4QJE		GA73	92.26	-0.36	3.34	0.06	0.02	0.04	0.07	TS
		GA74	92.32	-0.34	3.38					
ADJ37M		GA73	92.96	-0.53	3.96	0.02	-0.02	0.00	0.03	TS
		GA74	92.98	-0.55	3.95					
BQ7M7A		GA73	93.72	-0.80	3.99	0.03	0.00	0.03	0.04	TC
		GA74	93.74	-0.80	4.02					
BTRHHG		GA73	95.03	-0.88	4.04	-0.01	0.00	0.06	0.06	LS
		GA74	95.02	-0.87	4.10					
D6EDRD		GA73	93.36	-0.97	3.99	0.00	0.10	-0.01	0.10	TS
		GA74	93.37	-0.87	3.98					
D9U27J		GA73	95.07	-0.79	4.02	0.02	-0.02	0.04	0.05	TC
		GA74	95.09	-0.81	4.07					
EHXFMB		GA73	94.31	-0.78	4.16	-0.02	-0.01	0.00	0.02	HE
		GA74	94.29	-0.79	4.16					
H3U926	X	GA73	92.60	0.05	3.45	0.07	0.01	-0.01	0.07	TS
		GA74	92.66	0.06	3.43					
KPYD62		GA73	94.79	-0.62	3.88	0.07	-0.01	-0.14	0.16	XS
		GA74	94.86	-0.62	3.74					
MB9QKE		GA73	94.89	-0.68	4.13	-0.05	0.01	0.01	0.06	EH
		GA74	94.84	-0.67	4.13					
NYUQQ7		GA73	95.08	-0.56	4.02	-0.21	-0.01	-0.08	0.23	ND
		GA74	94.87	-0.57	3.94					
QUAK6F		GA73	93.00	-0.63	4.07	-0.13	-0.07	-0.01	0.15	TS
		GA74	92.87	-0.70	4.06					
REDZP4		GA73	93.70	-0.78	4.20	0.04	0.04	-0.08	0.10	VM
		GA74	93.75	-0.74	4.12					



**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 #3032 G,**  
**December 2019**

Web Code	Data Flag	Samples	Hunter L, a, b Color Values			Color Difference Values				Instr Code
			L	a	b	$\Delta L$	$\Delta a$	$\Delta b$	$\Delta E$	
YYZTXE		<b>GA73</b>	92.83	-0.22	3.72	-0.02	-0.01	0.04	0.04	TS
		<b>GA74</b>	92.81	-0.23	3.76					

Grand Means			Summary Statistics						
<b>GA73</b>	93.885	-0.679	3.925						
<b>GA74</b>	93.880	-0.677	3.912	-0.009	0.002	-0.013	0.080		
Std Dev Btwn Labs									
<b>GA73</b>	0.937	0.195	0.232						
<b>GA74</b>	0.918	0.185	0.228	0.073	0.035	0.056	0.056		

Statistics based on 16 of 17 reporting participants

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

H3U926 (X) - High "a" values.

**Key to Instrument Codes Reported by Participants**

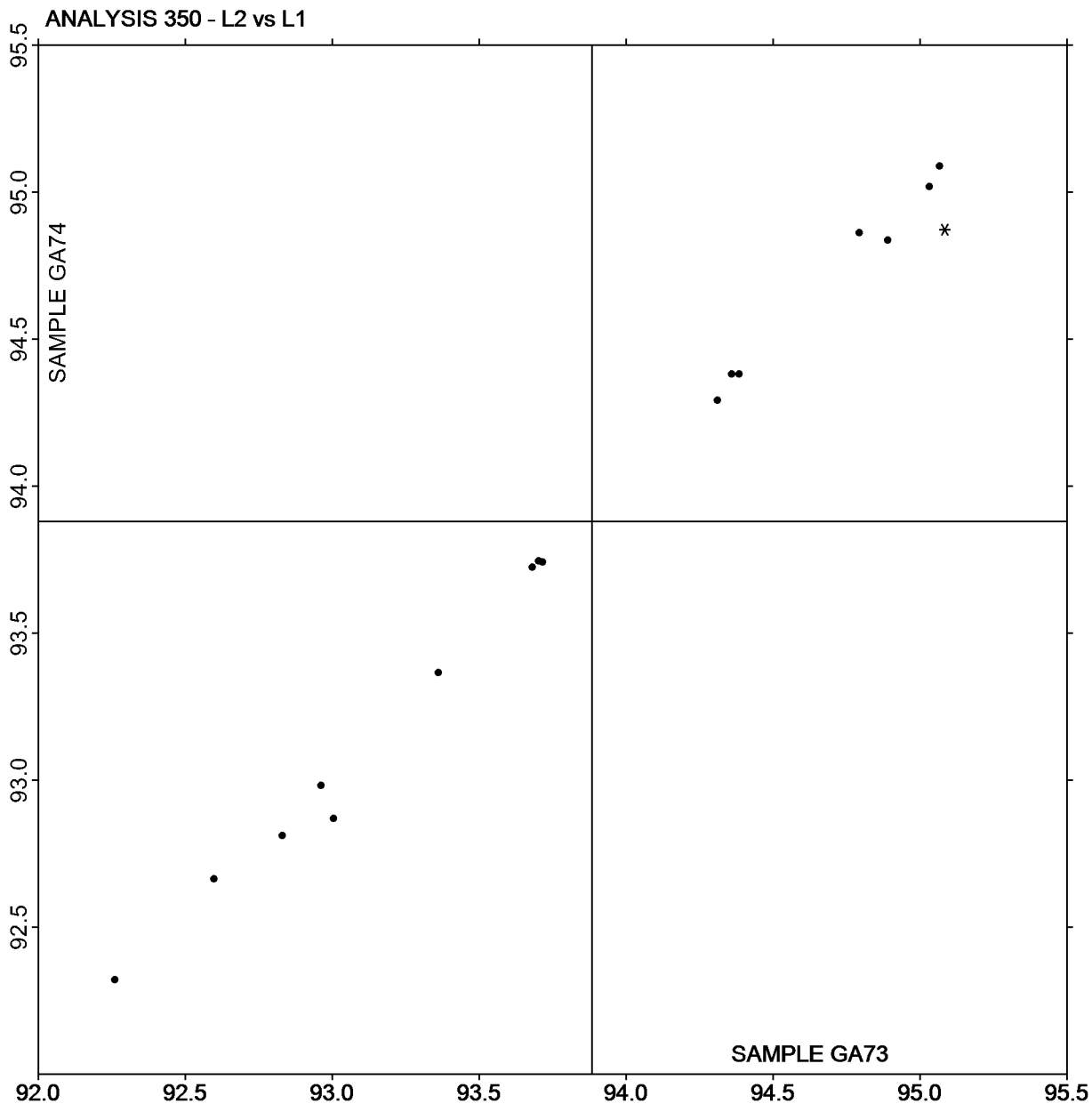
<b>EH</b> Datacolor Elrepho SF450	<b>HE</b> Hunter LabScan
<b>LS</b> L & W Elrepho SE 070	<b>ND</b> Minolta CM-2500d Spectrophotometer
<b>TC</b> Technidyne Color Touch Series	<b>TS</b> Technidyne Brightimeter Micro S-5
<b>VM</b> Valmet PaperLab (was Kajaani/Robotest)	<b>XS</b> X-Rite 938 Spectrodensitometer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



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

**Report #3032 G,**  
**December 2019**

Plot of L values GA74 vs L values GA73



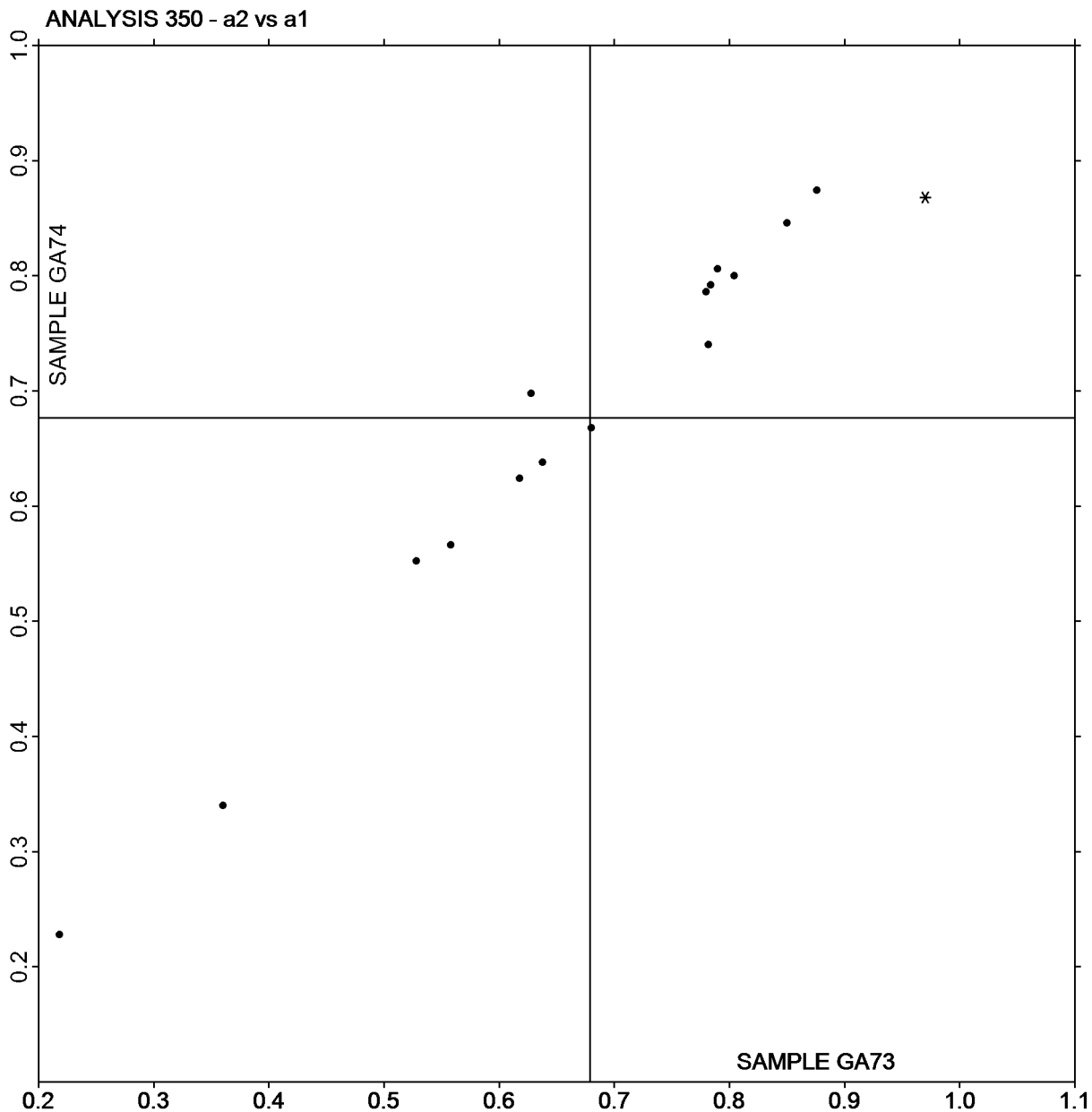
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.



**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 #3032 G,**  
**December 2019**

Plot of a values GA74 vs a values GA73



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

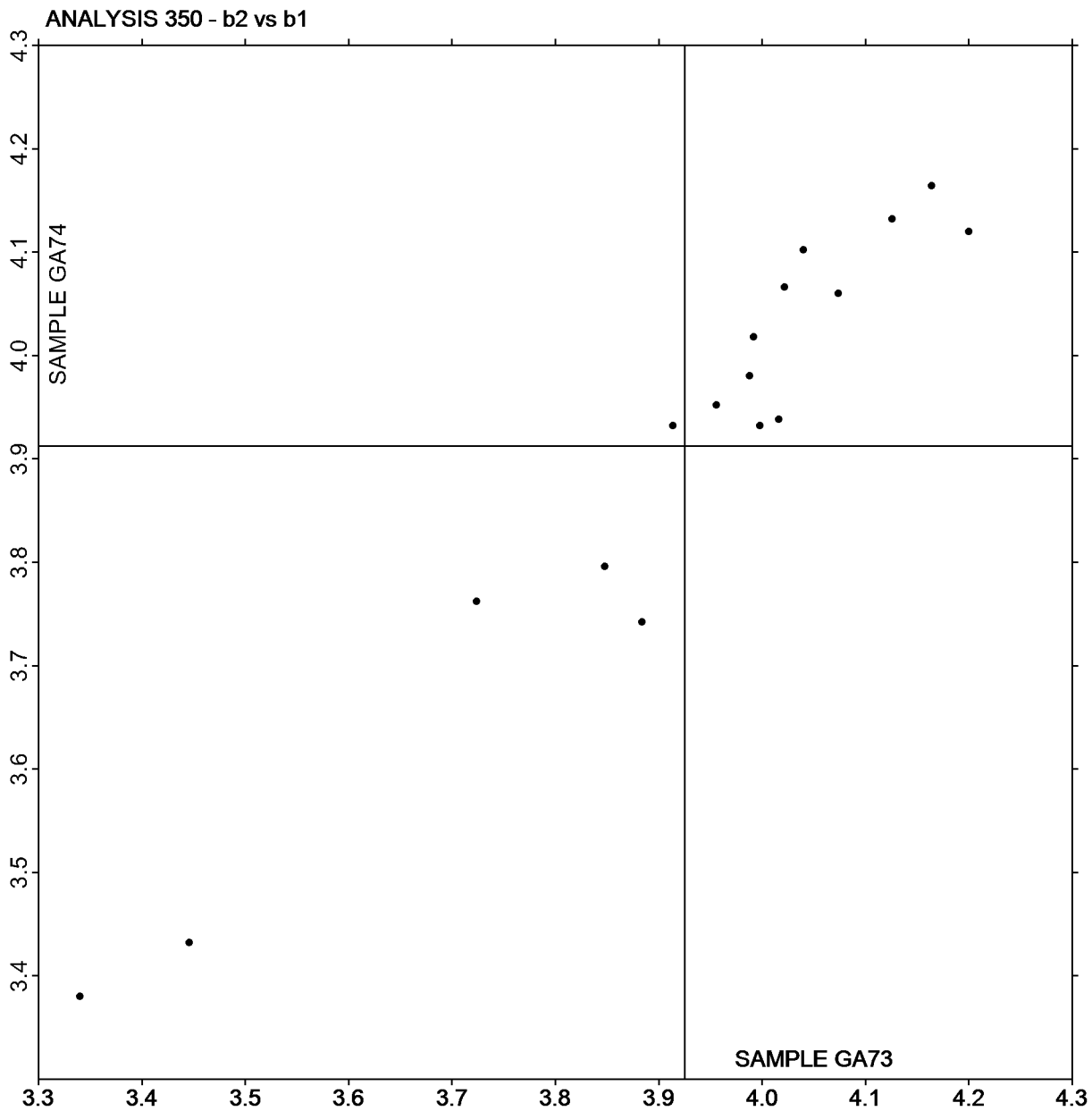




**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 350**  
**Color & Color Difference - Near White Papers - C/2deg obs**  
**Hunter L,a,b - Illuminant C - 2 Degree Observer**

**Report #3032 G,**  
**December 2019**

Plot of b values GA74 vs b values GA73



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 #3032 G,  
December 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*	$\Delta L^*$	$\Delta a^*$	$\Delta b^*$	$\Delta E^*$	
2W2H MV		GA73	95.07	-0.63	4.11	0.00	0.00	-0.02	0.02	LS
		GA74	95.07	-0.63	4.10					
3KNHQ3		GA73	95.14	-0.75	4.02	0.01	0.00	-0.03	0.03	HT
		GA74	95.15	-0.74	3.99					
4F6V FU		GA73	92.99	-0.84	3.66	1.10	0.01	0.14	1.11 X	XC
		GA74	94.09	-0.83	3.80					
6NDV3G		GA73	96.29	-0.66	3.97	-0.08	0.04	-0.14	0.16	HE
		GA74	96.22	-0.62	3.84					
7E3W7K		GA73	94.47	-0.82	3.90	-0.19	0.01	-0.09	0.21	HE
		GA74	94.28	-0.81	3.81					
DYZ3V		GA73	93.65	-0.52	3.59	0.01	0.00	0.02	0.02	XA
		GA74	93.66	-0.52	3.61					
FULWV9		GA73	95.11	-0.63	4.12	-0.01	0.01	-0.03	0.03	HT
		GA74	95.10	-0.62	4.09					
H3NX6Y		GA73	94.59	-0.80	3.73	0.01	-0.01	-0.02	0.03	EH
		GA74	94.60	-0.81	3.70					
KDHUHK		GA73	95.61	-0.55	3.79	-0.03	-0.01	0.06	0.07	HE
		GA74	95.59	-0.56	3.85					
NBL77D		GA73	95.01	-0.70	4.05	-0.04	-0.01	0.00	0.04	TC
		GA74	94.96	-0.71	4.05					
NXZ6VU		GA73	95.25	-0.55	4.04	0.01	-0.01	0.03	0.04	NF
		GA74	95.26	-0.56	4.07					
RHEQ8C		GA73	94.30	-0.83	3.93	0.03	0.02	-0.03	0.05	HE
		GA74	94.33	-0.81	3.90					
VDP8AX		GA73	96.71	-0.43	3.48	0.00	0.02	0.10	0.10	XP
		GA74	96.71	-0.40	3.58					
XJP7XR		GA73	95.15	-0.63	4.30	0.00	0.00	0.00	0.01	NG
		GA74	95.16	-0.64	4.30					



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

**Report #3032 G,  
December 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>GA73</b>	94.954	-0.667	3.907				
<b>GA74</b>	95.013	-0.663	3.906	0.059	0.004	-0.001	0.136
<u>Std Dev Btwn Labs</u>							
<b>GA73</b>	0.955	0.129	0.229				
<b>GA74</b>	0.814	0.129	0.205	0.304	0.015	0.070	0.286

Statistics based on 14 of 14 reporting participants

**Key to Instrument Codes Reported by Participants**

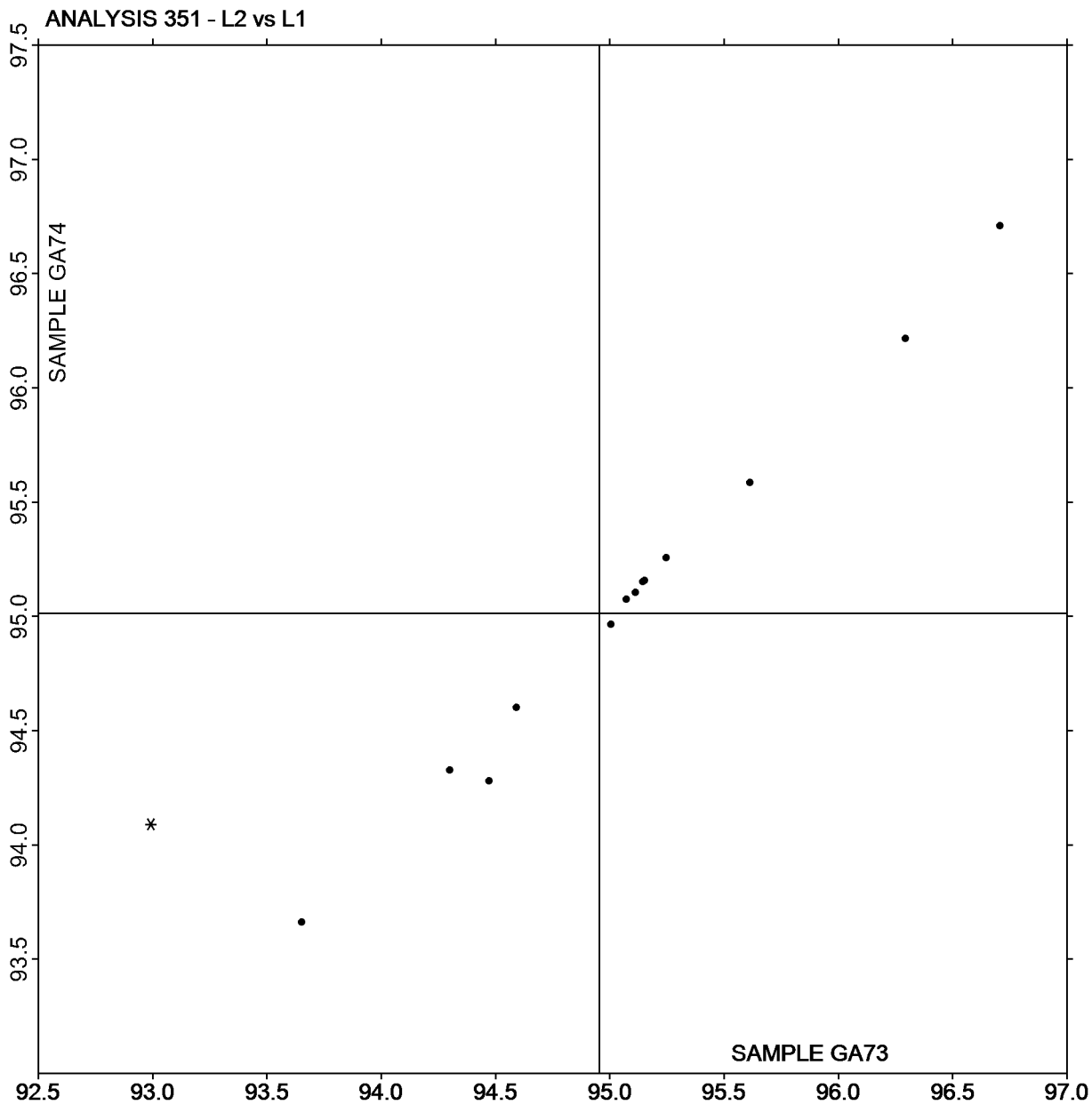
<b>EH</b>	Datacolor Elrepho SF450	<b>HE</b>	Hunter LabScan
<b>HT</b>	Hunter UltraScan Vis	<b>LS</b>	L & W Elrepho SE 070
<b>NF</b>	Minolta CM-3600d Spectrophotometer	<b>NG</b>	Minolta CM-3700d Spectrophotometer
<b>TC</b>	Technidyne Color Touch Series	<b>XA</b>	X-Rite (model not specified)
<b>XC</b>	X-Rite eXact Series	<b>XP</b>	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 #3032 G,  
December 2019

Plot of L values GA74 vs L values GA73



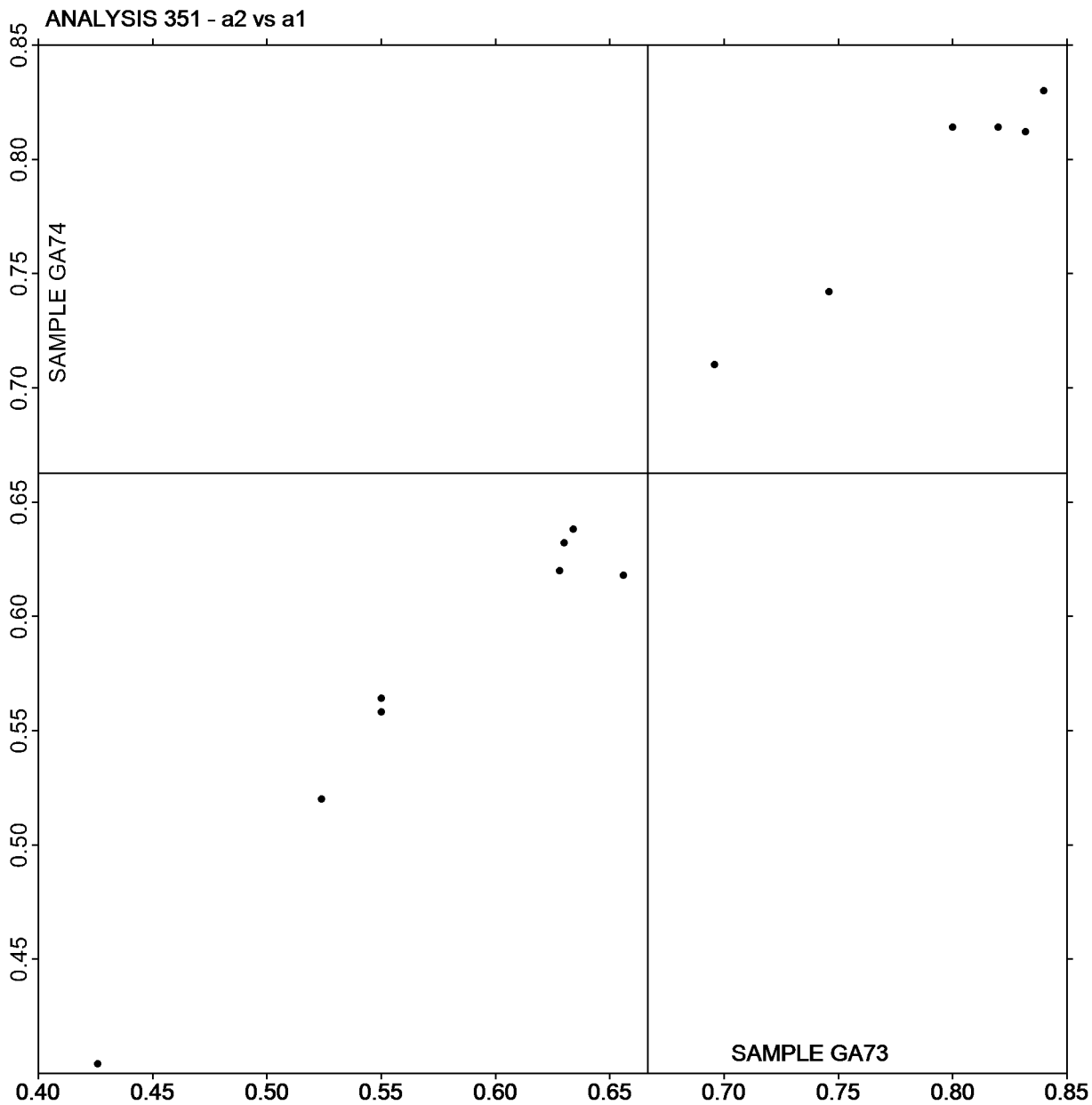
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.



**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 #3032 G,  
December 2019

Plot of a values GA74 vs a values GA73



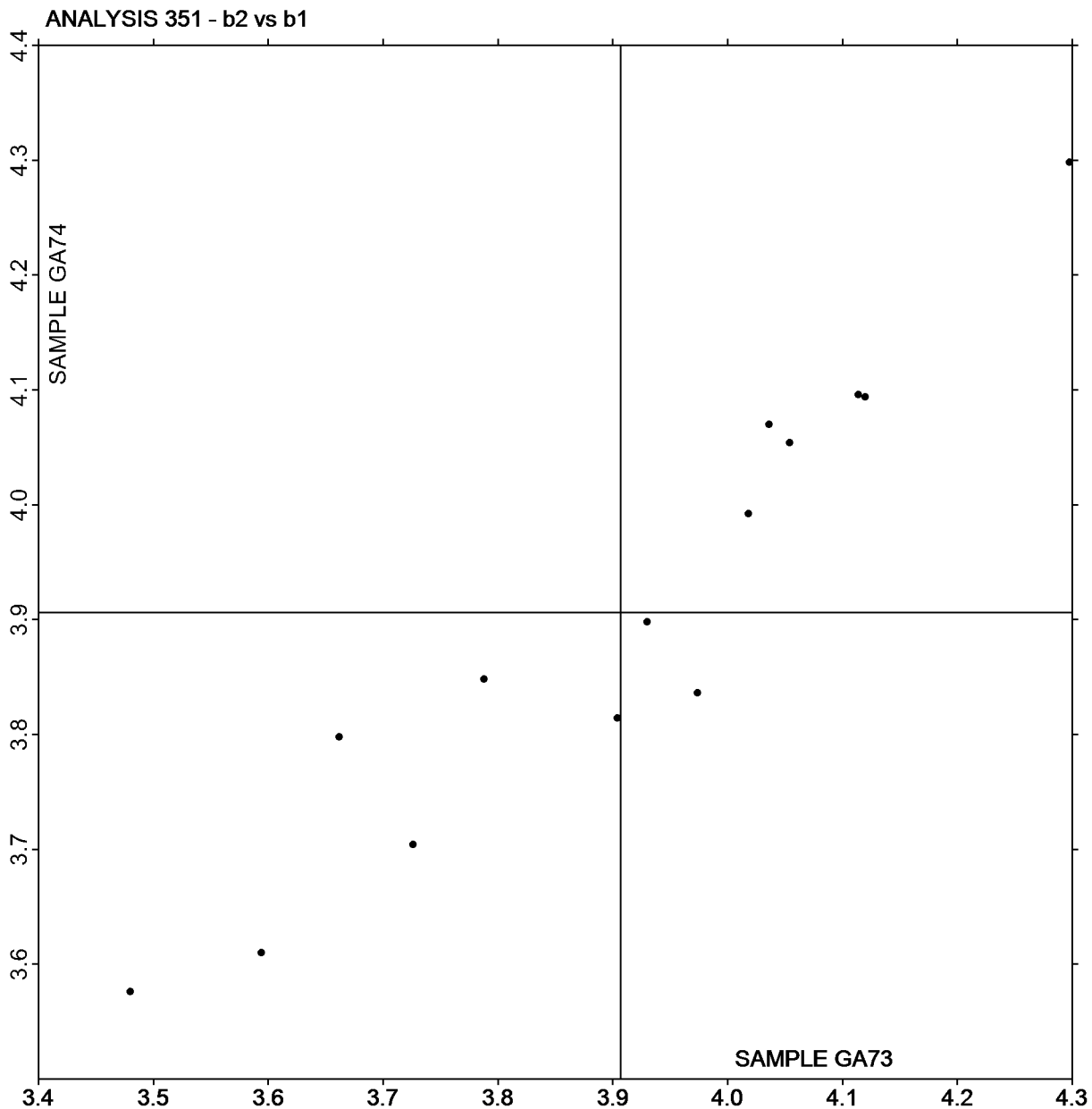
If fewer than 20 laboratories are included in an analysis, a control ellipse will not be drawn on the two-sample plot.



**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 #3032 G,  
December 2019

Plot of b values GA74 vs b values GA73



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



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

Report #3032G,  
December 2019

WebCode	Data Flag	Sample GV73			Sample GV74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3BV8EL		4.583	0.033	0.48	4.620	0.065	0.92	LW
3KNHQ3		4.609	0.059	0.87	4.598	0.042	0.60	EM
3PFARR		4.510	-0.040	-0.60	4.550	-0.006	-0.08	XX
3V77TG		4.592	0.042	0.62	4.593	0.037	0.53	LW
3Y22AU		4.440	-0.110	-1.64	4.470	-0.086	-1.22	LW
49P8ND		4.439	-0.111	-1.65	4.470	-0.086	-1.22	EM
4F6VFU	*	4.661	0.111	1.65	4.587	0.031	0.44	LW
6J39JT		4.546	-0.004	-0.06	4.621	0.065	0.93	EM
6NDV3G		4.571	0.021	0.31	4.626	0.070	1.00	TM
77P3VN		4.515	-0.035	-0.52	4.519	-0.037	-0.52	LW
8YTE4C		4.509	-0.041	-0.61	4.548	-0.008	-0.11	LW
97744R		4.503	-0.047	-0.70	4.473	-0.083	-1.18	XX
ADJ37M		4.565	0.015	0.22	4.580	0.024	0.34	EM
BTRHHG		4.589	0.039	0.58	4.611	0.056	0.79	LW
C2KKCK		4.474	-0.076	-1.13	4.502	-0.054	-0.76	LA
D6EDRD		4.442	-0.108	-1.61	4.416	-0.140	-1.99	LA
D9U27J		4.524	-0.026	-0.39	4.526	-0.030	-0.42	LA
D9XGMP		4.590	0.040	0.59	4.599	0.043	0.61	XX
DL4GE9		4.582	0.032	0.47	4.524	-0.032	-0.46	TM
DYDZ3V		4.588	0.038	0.56	4.590	0.034	0.49	TM
EDN37C		4.519	-0.031	-0.46	4.539	-0.017	-0.24	PP
FU6KD4		4.440	-0.110	-1.64	4.443	-0.113	-1.60	LA
FULWV9		4.582	0.032	0.47	4.612	0.056	0.80	EM
GFKKZA	X	132.500	127.950	1,901.49	130.000	125.444	1,783.09	TM
H3NX6Y		4.623	0.073	1.08	4.565	0.009	0.13	XX
H3U926		4.507	-0.043	-0.63	4.516	-0.040	-0.56	TM
JPMDQF		4.594	0.044	0.65	4.592	0.036	0.51	TA
JT6J4G		4.535	-0.015	-0.22	4.508	-0.048	-0.68	MS
JZ3HJX		4.579	0.029	0.43	4.643	0.087	1.24	EM
KDHUHK		4.596	0.046	0.68	4.568	0.012	0.17	EM
KPYD62		4.520	-0.030	-0.45	4.550	-0.006	-0.08	TM
LRKMM2	X	4.721	0.171	2.54	4.560	0.004	0.06	LW
MB9QKE		4.580	0.030	0.44	4.635	0.079	1.13	EM
MPBWYJ		4.624	0.074	1.10	4.619	0.063	0.90	FR
NBL77D		4.661	0.111	1.65	4.669	0.113	1.61	PP
NMY838		4.593	0.043	0.64	4.541	-0.015	-0.21	TA
NRCKRD		4.511	-0.039	-0.58	4.443	-0.113	-1.60	TA
NXZ6VU		4.610	0.060	0.89	4.645	0.089	1.27	TM
NZ97BY		4.515	-0.035	-0.52	4.498	-0.058	-0.82	TM
Q3HCA4		4.598	0.048	0.72	4.591	0.035	0.49	LW
QMNP2Q		4.691	0.141	2.09	4.673	0.117	1.67	XX



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

Report #3032G,  
December 2019

WebCode	Data Flag	Sample GV73			Sample GV74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
RYNNJP		4.476	-0.074	-1.10	4.506	-0.050	-0.70	PP
UEP88Q		4.586	0.036	0.53	4.565	0.009	0.12	LW
UGC3JX		4.597	0.047	0.70	4.637	0.081	1.15	LW
UGVQ2T		4.489	-0.061	-0.91	4.515	-0.041	-0.58	TM
UKEWL9		4.600	0.050	0.74	4.550	-0.006	-0.08	TA
V2DD3R		4.555	0.005	0.07	4.575	0.019	0.27	XX
V3UF3D		4.449	-0.101	-1.50	4.426	-0.130	-1.85	PP
VDP8AX	X	4.396	-0.154	-2.29	4.558	0.002	0.03	TM
VV9GG7	*	4.360	-0.190	-2.83	4.402	-0.154	-2.19	PP
WZVDCU		4.530	-0.020	-0.30	4.579	0.023	0.33	TA
XGZD8W		4.559	0.009	0.13	4.566	0.010	0.14	PP
XJP7XR		4.498	-0.052	-0.78	4.504	-0.052	-0.74	PP
XNKN6X		4.499	-0.051	-0.76	4.498	-0.058	-0.82	PP
YQ439X		4.568	0.018	0.26	4.520	-0.036	-0.51	TM
ZQZJY2	*	4.681	0.131	1.94	4.742	0.186	2.65	TM

Summary Statistics	Sample GV73	Sample GV74
<b>Grand Means</b>	4.55 mils	4.56 mils
<b>Std Dev Btwn Labs</b>	0.07 mils	0.07 mils
Statistics based on 53 of 56 reporting participants.		

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

- LRKMM2 (X) - Inconsistent in testing between samples.
- GFKKZA (X) - Extreme Data.
- VDP8AX (X) - Inconsistent in testing between samples.

**Analysis Notes:**

6NDV3G - One determination removed from the Lab Mean of Sample GV74 per Grubb's Test at 1% risk (TAPPI 1205).

**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		





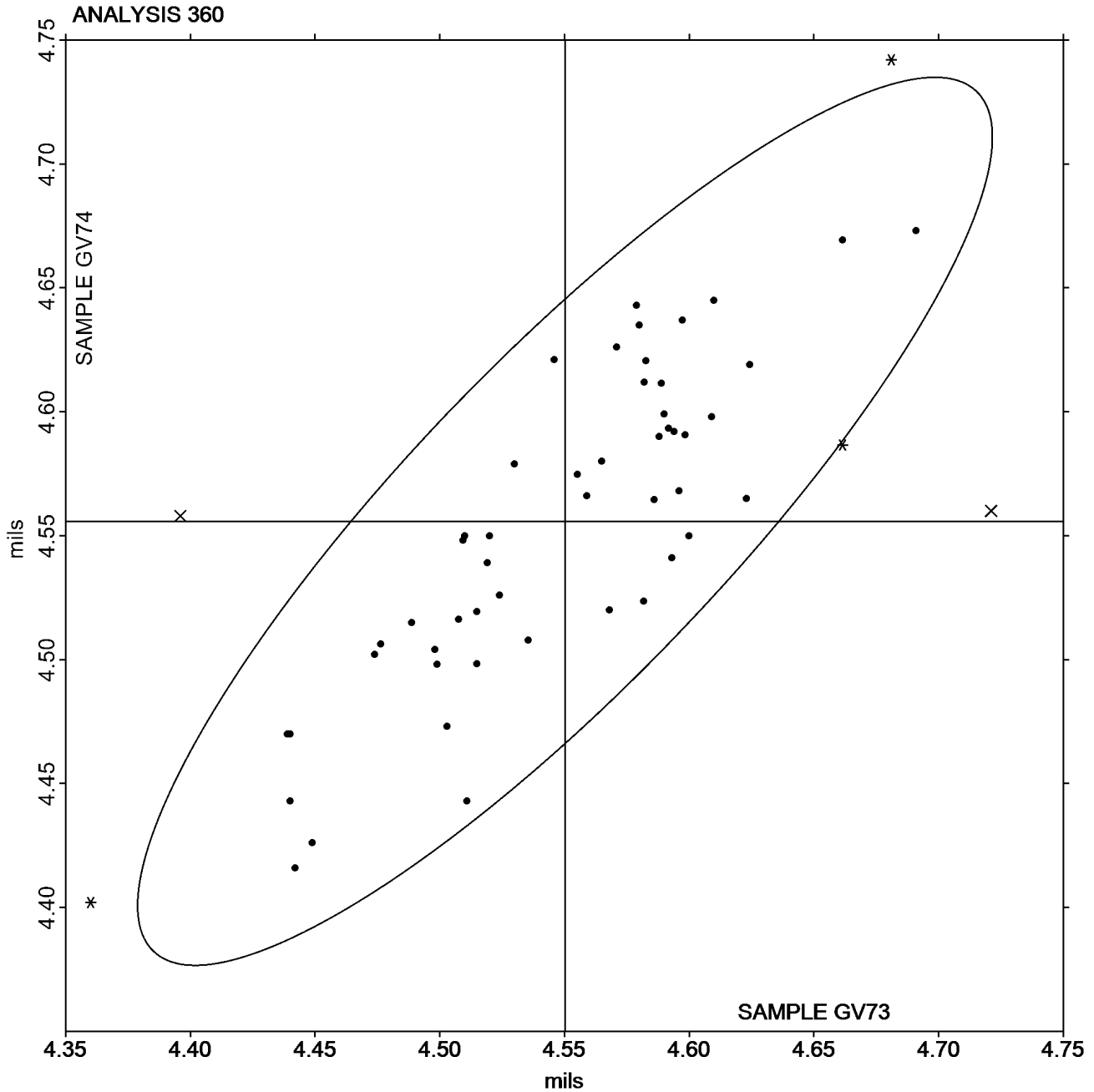
# Paper & Paperboard Interlaboratory Testing Program

Report #3032G,  
December 2019

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

Grand Mean Sample GV73 = 4.5502  
mils

Grand Mean Sample GV74 = 4.5558  
mils





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

Report #3032G,  
December 2019

WebCode	Data Flag	Sample GY73			Sample GY74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2TZEUN		14.10	0.00	-0.03	14.13	0.04	0.24	EM
2W2HMV		14.09	-0.01	-0.05	14.15	0.05	0.33	LW
48UHB		14.15	0.05	0.32	14.09	-0.01	-0.06	TM
4U8CHP		14.24	0.14	0.87	14.21	0.12	0.77	LW
6E8ZCH		14.15	0.05	0.31	14.08	-0.01	-0.09	LA
73QPAK		14.15	0.05	0.32	14.18	0.08	0.53	TM
77P3VN		14.11	0.01	0.07	14.04	-0.05	-0.35	LW
7E3W7K		14.13	0.03	0.19	14.06	-0.04	-0.25	EM
7T4QJE		13.88	-0.22	-1.35	13.93	-0.17	-1.11	EM
A6PWDL		14.42	0.31	1.94	14.42	0.32	2.14	TM
AC6K3G		13.83	-0.28	-1.71	13.83	-0.27	-1.80	TA
AG2AJN		14.09	-0.01	-0.07	14.12	0.03	0.18	LA
AMRJUL		14.03	-0.07	-0.44	14.08	-0.02	-0.11	TM
APRE7G	*	14.09	-0.01	-0.08	14.30	0.20	1.34	TM
C3T6AD		13.98	-0.13	-0.78	13.88	-0.22	-1.47	TA
EHXFMB		14.04	-0.06	-0.37	14.05	-0.05	-0.31	EM
FVY89F		14.07	-0.04	-0.22	14.10	0.00	0.02	TM
GFKKZA	*	13.67	-0.43	-2.66	13.75	-0.35	-2.29	TM
H3NX6Y		14.29	0.19	1.17	14.37	0.28	1.83	EM
H7QY8G		13.97	-0.13	-0.82	13.92	-0.18	-1.17	TA
M7WA6H		14.11	0.01	0.05	14.05	-0.05	-0.33	LW
MLTPLG		13.95	-0.15	-0.94	13.98	-0.12	-0.77	LA
NRCKRD		14.05	-0.06	-0.35	14.04	-0.06	-0.39	TA
PK6ZXZ	X	1.40	-12.71	-78.27	1.40	-12.69	-83.91	LW
QEVGGZ		13.95	-0.15	-0.94	13.99	-0.11	-0.71	TM
QMNP2Q	*	14.50	0.40	2.46	14.35	0.25	1.66	LA
REDZP4		14.35	0.24	1.50	14.32	0.22	1.45	VP
RHEQ8C		14.16	0.06	0.36	14.18	0.08	0.56	EM
RKYT24		14.23	0.13	0.81	14.12	0.02	0.12	LW
RYNNJP		14.06	-0.04	-0.24	14.07	-0.03	-0.20	LW
UKEWL9		14.14	0.04	0.23	14.08	-0.02	-0.11	TA
YCL69N		14.11	0.01	0.04	14.13	0.03	0.20	LA
YZE6TY		14.17	0.06	0.40	14.12	0.02	0.13	LW

Summary Statistics	Sample GY73	Sample GY74
<b>Grand Means</b>	14.10 mils	14.10 mils
<b>Std Dev Btwn Labs</b>	0.16 mils	0.15 mils
Statistics based on 32 of 33 reporting participants.		



# Paper & Paperboard Interlaboratory Testing Program

Report #3032G,  
December 2019

## Analysis 361

Thickness (Caliper), Packaging papers

TAPPI Official Test Method T411

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

PK6ZXZ (X) - Extreme Data.

### Analysis Notes:

PK6ZXZ - Possibly off by a factor of 10.

### 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

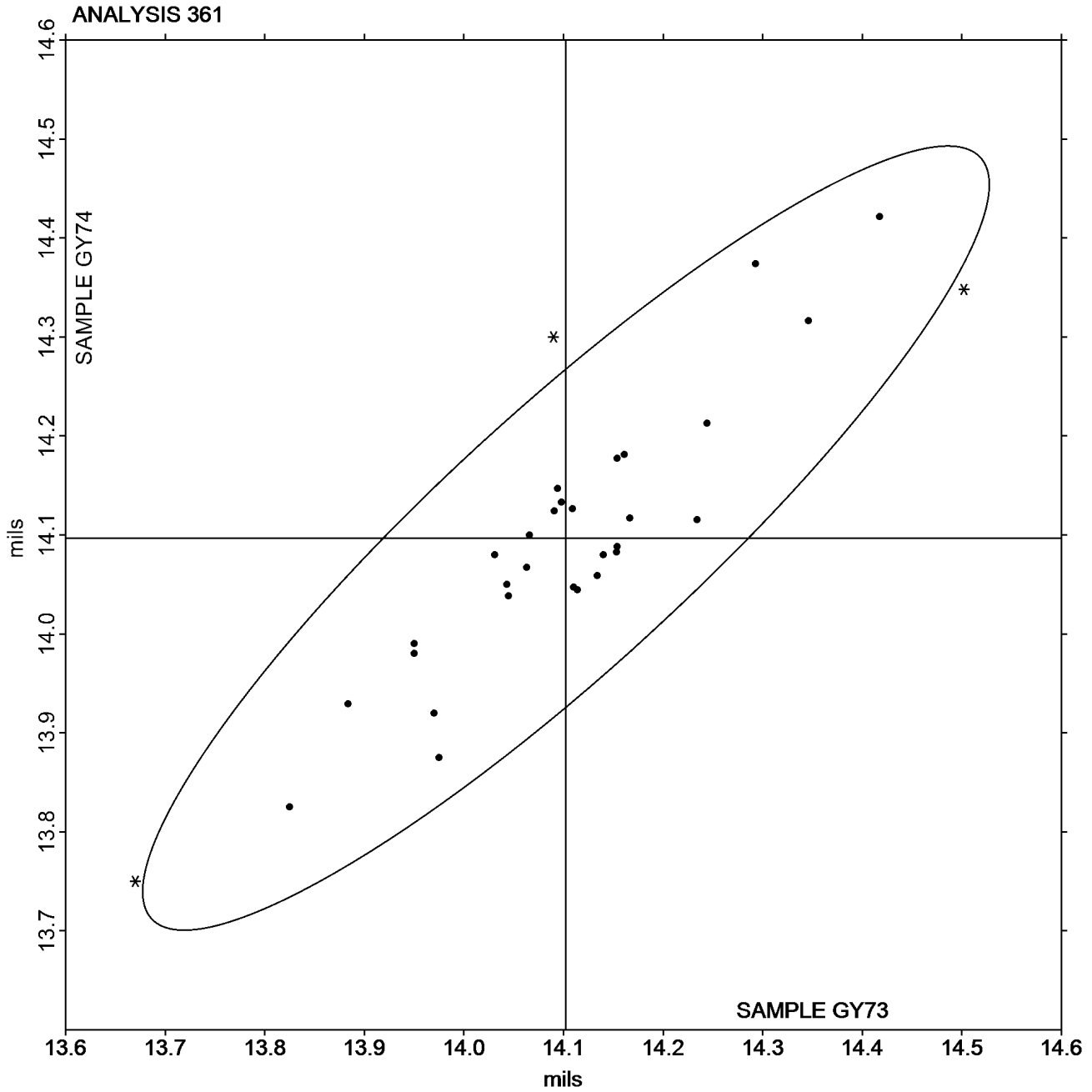


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 361**  
**Thickness (Caliper), Packaging papers**  
**TAPPI Official Test Method T411**

Report #3032G,  
December 2019

Grand Mean Sample GY73 = 14.102  
mils

Grand Mean Sample GY74 = 14.097  
mils





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

**Report #3032G,**  
**December 2019**

WebCode	Data Flag	<u>Sample GD73</u>			<u>Sample GD74</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2H2MGG		0.4458	-0.0661	-0.61	0.5222	-0.0067	-0.06	IT
ADJ37M		0.5770	0.0651	0.60	0.5736	0.0447	0.41	TA
JZ3HJX		0.6320	0.1201	1.11	0.6360	0.1071	0.98	TA
KDHUHK		0.3318	-0.1801	-1.67	0.3116	-0.2173	-1.99	TA
KPYD62		0.4378	-0.0741	-0.69	0.4750	-0.0539	-0.49	XX
RKYT24		0.5810	0.0691	0.64	0.5990	0.0701	0.64	TA
XLTE7P		0.5776	0.0657	0.61	0.5850	0.0561	0.51	TA

<b>Summary Statistics</b>	<u><b>Sample GD73</b></u>	<u><b>Sample GD74</b></u>
<b>Grand Means</b>	0.51 COF	0.53 COF
<b>Std Dev Btwn Labs</b>	0.11 COF	0.11 COF

Statistics based on 7 of 7 reporting participants.

**Key to Instrument Codes Reported by Participants**

- IT IMASS SP-2100
- TA Thwing-Albert Friction Tester
- XX Instrument make/model not specified by lab

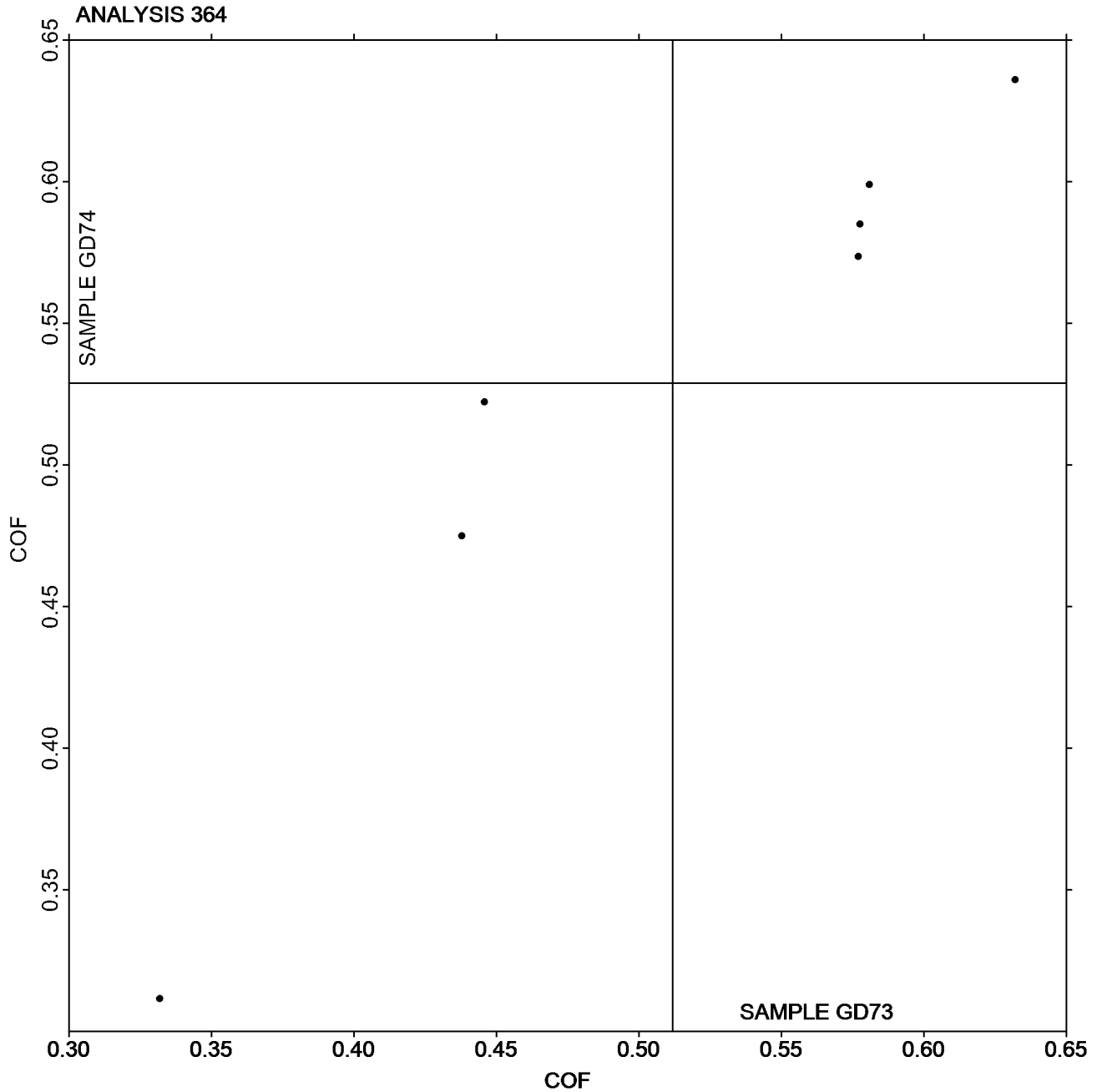


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 364**  
**Coefficient of Static Friction - Horizontal Plane Method - Printing Papers**  
**TAPPI Official Test Method T549**

Report #3032G,  
December 2019

Grand Mean Sample GD73 = 0.51186  
COF

Grand Mean Sample GD74 =  
0.52891 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 #3032G,**  
**December 2019**

WebCode	Data Flag	Sample GD73			Sample GD74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2H2MGG		0.3312	-0.1146	-1.75	0.3526	-0.0997	-1.70	IR
49P8ND		0.4886	0.0428	0.65	0.5194	0.0671	1.14	TA
KPYD62		0.4248	-0.0210	-0.32	0.4710	0.0187	0.32	XX
V3UF3D		0.4546	0.0088	0.13	0.4224	-0.0299	-0.51	TA
XLTE7P		0.4526	0.0068	0.10	0.4572	0.0049	0.08	TA
YYZTXE		0.5230	0.0772	1.18	0.4910	0.0387	0.66	TA

Summary Statistics	Sample GD73	Sample GD74
<b>Grand Means</b>	0.45 COF	0.45 COF
<b>Stnd Dev Btwn Labs</b>	0.07 COF	0.06 COF

Statistics based on 6 of 6 reporting participants.

**Key to Instrument Codes Reported by Participants**

- IR IMASS SP-2000
- TA Thwing-Albert Friction Tester
- XX Instrument make/model not specified by lab

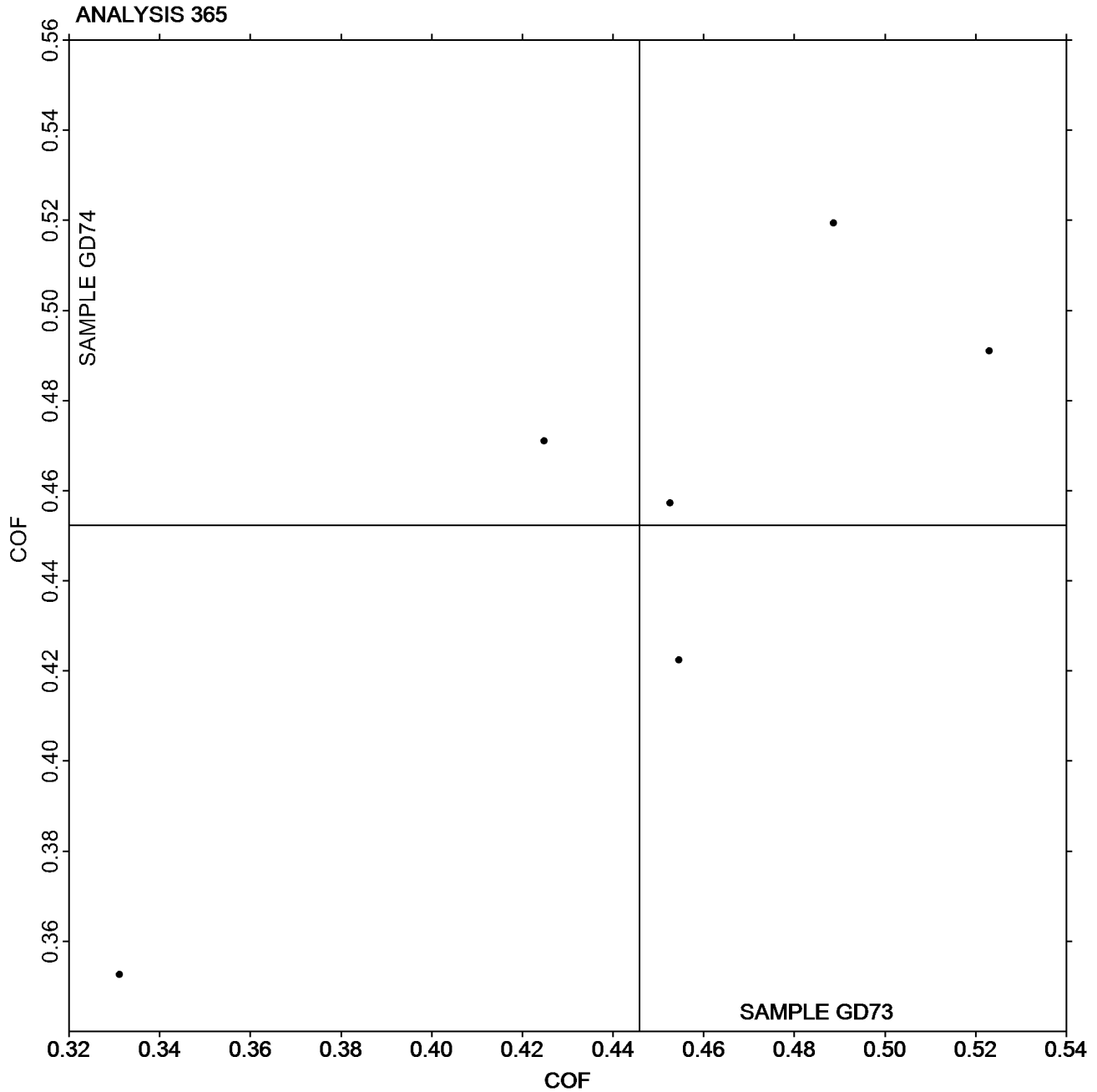


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 365**  
**Coefficient of Kinetic Friction - Horizontal Plane Method - Printing Papers**  
**TAPPI Official Test Method T549**

Report #3032G,  
December 2019

Grand Mean Sample GD73 = 0.44580  
COF

Grand Mean Sample GD74 =  
0.45227 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 #3032G,  
December 2019

## Analysis 370

### Air Resistance - Gurley Oil Type

### TAPPI Official Test Method T460

WebCode	Data Flag	Sample GE73			Sample GE74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2MXVNQ		17.76	-1.02	-1.10	17.62	-1.17	-1.35	PP
3KNHQ3		20.39	1.61	1.74	19.79	1.00	1.16	HG
3PFARR		17.03	-1.75	-1.89	17.44	-1.35	-1.56	XX
4F6VFU		19.10	0.32	0.34	19.90	1.11	1.29	LW
6E8ZCH		19.41	0.62	0.67	18.98	0.19	0.22	LA
6J39JT		18.62	-0.16	-0.17	18.88	0.09	0.11	PP
9C9DBK		19.29	0.51	0.55	18.69	-0.10	-0.12	PP
BTRHHG		18.64	-0.14	-0.15	18.79	0.00	0.00	LP
D6EDRD		18.44	-0.34	-0.37	18.64	-0.15	-0.17	LA
DYDZ3V		18.64	-0.14	-0.15	18.74	-0.05	-0.06	PP
FU6KD4	*	21.21	2.42	2.62	20.59	1.81	2.09	LA
FULWV9		18.77	-0.02	-0.02	18.27	-0.52	-0.60	PP
FWVTTY		19.66	0.88	0.95	19.38	0.59	0.69	XX
H3U926	X	14.99	-3.79	-4.09	15.26	-3.53	-4.08	LW
JZ3HJX		18.25	-0.54	-0.58	19.27	0.48	0.56	PP
KDHUHK		18.39	-0.39	-0.42	18.76	-0.02	-0.03	PP
KMXLZV		19.18	0.40	0.43	19.12	0.33	0.38	XX
KPYD62		18.30	-0.48	-0.52	17.80	-0.99	-1.14	GS
M7WA6H	*	15.94	-2.84	-3.06	16.39	-2.40	-2.77	LP
MB9QKE		18.23	-0.55	-0.60	17.79	-1.00	-1.16	PP
MLTPLG		19.60	0.82	0.88	19.70	0.91	1.06	LA
NBL77D		19.30	0.52	0.56	18.74	-0.04	-0.05	PP
NXZ6VU		18.03	-0.75	-0.81	17.78	-1.01	-1.17	PR
PK6ZXZ		17.87	-0.92	-0.99	18.36	-0.43	-0.50	TL
QEVGGZ		18.72	-0.06	-0.07	18.78	-0.01	-0.01	TL
REDZP4		19.16	0.38	0.41	19.42	0.63	0.73	VM
RHEQ8C		19.51	0.72	0.78	19.49	0.70	0.81	PP
RYNNJP		18.50	-0.28	-0.30	18.35	-0.44	-0.51	PP
T6KWBA		19.51	0.73	0.79	19.14	0.35	0.40	XX
TNDYPP		17.40	-1.38	-1.49	17.56	-1.23	-1.42	LP
UGC3JX		18.90	0.12	0.13	18.88	0.09	0.11	LP
UKEWL9		19.85	1.07	1.15	20.18	1.39	1.61	GA
VV9GG7		18.18	-0.60	-0.65	18.74	-0.05	-0.05	HG
X6TBYK		18.95	0.17	0.18	18.87	0.08	0.10	GL
XGZD8W		19.47	0.69	0.74	18.50	-0.28	-0.33	HG
XLFQ2H		18.11	-0.67	-0.72	18.31	-0.48	-0.55	LP
XLTE7P		19.93	1.15	1.24	19.85	1.06	1.23	WG
XNKN6X	*	19.27	0.49	0.53	20.58	1.80	2.08	PP
YNH6VZ		19.01	0.23	0.25	18.39	-0.40	-0.46	XX
YZE6TY		18.55	-0.23	-0.25	18.52	-0.27	-0.31	LW
ZQZJY2		18.20	-0.58	-0.63	18.51	-0.28	-0.32	HG



# Paper & Paperboard Interlaboratory Testing Program

Report #3032G,  
December 2019

## Analysis 370

### Air Resistance - Gurley Oil Type

### TAPPI Official Test Method T460

Summary Statistics	Sample GE73	Sample GE74
<b>Grand Means</b>	18.78 sec/100 cc	18.79 sec/100 cc
<b>Stnd Dev Btwn Labs</b>	0.93 sec/100 cc	0.86 sec/100 cc

Statistics based on 40 of 41 reporting participants.

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

H3U926 (X) - Data for both samples are low. Possible Systematic Error.

#### Key to Instrument Codes Reported by Participants

<b>GA</b> Gurley Precision #4340 Automatic Densometer	<b>GL</b> Gurley #4110
<b>GS</b> Gurley-Hill S-P-S Tester #4190	<b>HG</b> Technidyne - Hagerty Model #1
<b>LA</b> L & W Autoline	<b>LP</b> L & W Densometer, Air Permeance
<b>LW</b> L & W Type Gurley Densometer, Oil Flotation	<b>PP</b> Technidyne Profile/Plus
<b>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	

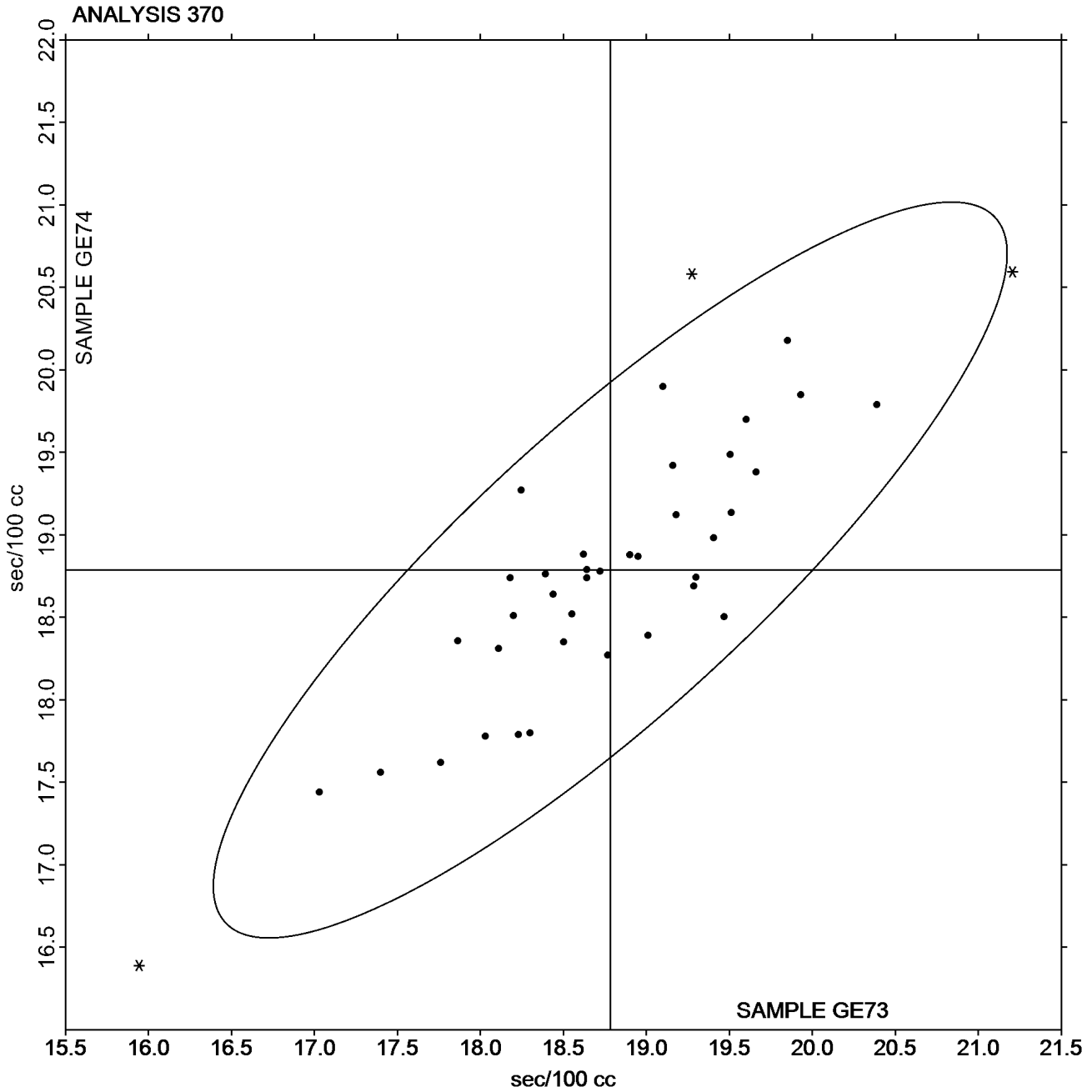


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 370**  
**Air Resistance - Gurley Oil Type**  
**TAPPI Official Test Method T460**

**Report #3032G,**  
**December 2019**

**Grand Mean Sample GE73 = 18.781**  
sec/100 cc

**Grand Mean Sample GE74 = 18.787**  
sec/100 cc





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

Report #3032G,  
December 2019

WebCode	Data Flag	Sample GE73			Sample GE74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
D9XGMP		156.0	13.0	1.87	155.1	10.9	1.65	LA
DCTET9		143.5	0.5	0.07	147.8	3.6	0.55	HM
DL4GE9		149.5	6.5	0.93	150.0	5.8	0.88	SH
GTV4NW		135.6	-7.4	-1.06	135.8	-8.4	-1.27	GA
HE3LAC	X	180.0	37.0	5.31	185.9	41.7	6.29	LP
JPMDQF		145.6	2.6	0.37	146.7	2.5	0.38	HM
KPYD62		135.1	-7.9	-1.13	137.7	-6.5	-0.97	SH
REDZP4		144.0	1.0	0.15	143.4	-0.8	-0.12	PP
UKEWL9		135.9	-7.1	-1.02	136.1	-8.1	-1.21	GA
VDP8AX		141.7	-1.3	-0.18	144.9	0.7	0.11	TT

Summary Statistics	Sample GE73	Sample GE74
<b>Grand Means</b>	142.99 Sheffield Units	144.16 Sheffield Units
<b>Std Dev Btwn Labs</b>	6.97 Sheffield Units	6.63 Sheffield Units
Statistics based on 9 of 10 reporting participants.		

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

HE3LAC (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>LA</b> L & W Roughness Sheffield - Autoline	<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	

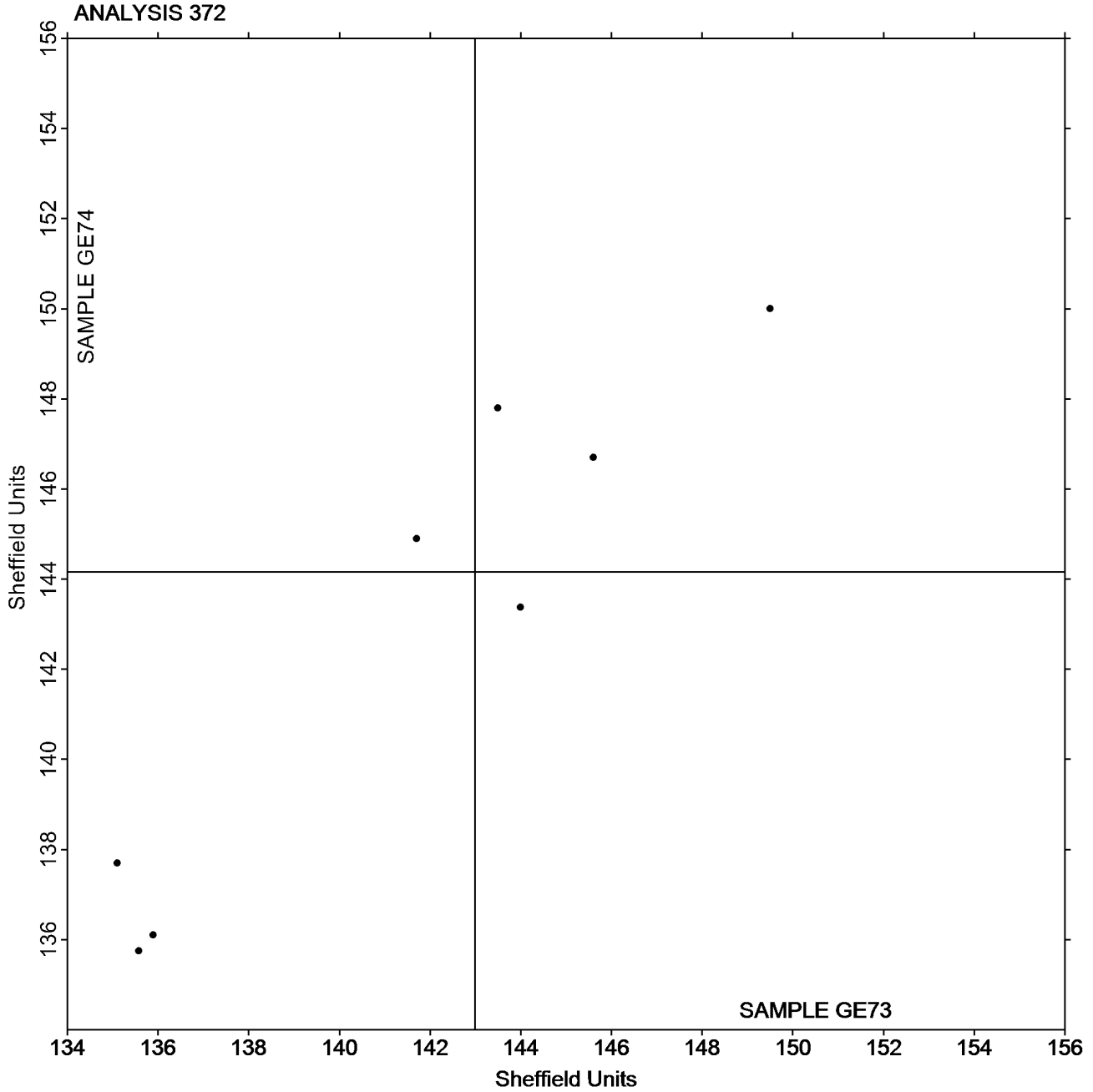


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 372**  
**Porosity - Sheffield Type - Sheffield Units for 3/4 inch Diameter Orifice**  
**TAPPI Official Test Method T547**

Report #3032G,  
December 2019

Grand Mean Sample GE73 = 142.99  
Sheffield Units

Grand Mean Sample GE74 = 144.16  
Sheffield Units



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



**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 376**  
**Roughness - Print Surf Method - 0.5 to 4.0 Microns**  
**TAPPI Official Test Method T555**

Report #3032G,  
December 2019

WebCode	Data Flag	Sample GJ73			Sample GJ74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2TZEUN		1.462	-0.047	-0.26	1.543	0.035	0.19	ZZ
2W2HMV		1.413	-0.096	-0.53	1.440	-0.068	-0.37	ZZ
4KX86Y		1.193	-0.316	-1.76	1.193	-0.315	-1.71	ZZ
6J39JT		1.570	0.061	0.34	1.690	0.182	0.99	ZZ
77P3VN		1.477	-0.032	-0.18	1.483	-0.025	-0.14	ZZ
7E3W7K		1.442	-0.067	-0.37	1.533	0.025	0.14	ZZ
9F9LEU		1.627	0.118	0.66	1.574	0.066	0.36	ZZ
AG2AJN		1.502	-0.007	-0.04	1.460	-0.048	-0.26	ZZ
BQ7M7A		1.514	0.005	0.03	1.490	-0.018	-0.10	ZZ
C2KKCK		1.445	-0.064	-0.35	1.451	-0.057	-0.31	ZZ
CUYZFC		1.418	-0.091	-0.50	1.356	-0.152	-0.83	ZZ
D9U27J		1.529	0.020	0.11	1.500	-0.008	-0.04	ZZ
DCTET9		1.543	0.034	0.19	1.473	-0.035	-0.19	ZZ
EDN37C		1.741	0.232	1.30	1.739	0.231	1.26	ZZ
EHXFMB		1.509	0.000	0.00	1.541	0.033	0.18	ZZ
H3NX6Y		1.328	-0.181	-1.01	1.307	-0.201	-1.09	ZZ
KDHUHK		1.500	-0.009	-0.05	1.455	-0.053	-0.29	ZZ
M263L9	*	2.070	0.561	3.13	2.062	0.554	3.01	ZZ
MB9QKE		1.392	-0.117	-0.65	1.415	-0.093	-0.51	ZZ
QMNP2Q		1.367	-0.142	-0.79	1.326	-0.182	-0.99	ZZ
REDZP4		1.860	0.351	1.96	1.868	0.360	1.96	ZZ
T6GW42	X	8.601	7.092	39.54	8.601	7.093	38.58	ZZ
T6KWBA		1.235	-0.274	-1.52	1.233	-0.275	-1.50	ZZ
UEP88Q		1.497	-0.012	-0.06	1.420	-0.088	-0.48	ZZ
VDP8AX		1.691	0.182	1.02	1.687	0.179	0.97	ZZ
VV9GG7		1.551	0.042	0.24	1.513	0.005	0.03	ZZ
XLTE7P		1.370	-0.139	-0.77	1.404	-0.104	-0.57	ZZ
YYZTXE		1.484	-0.025	-0.14	1.557	0.049	0.27	ZZ

Summary Statistics	Sample GJ73	Sample GJ74
<b>Grand Means</b>	1.51 Microns	1.51 Microns
<b>Std Dev Btwn Labs</b>	0.18 Microns	0.18 Microns

Statistics based on 27 of 28 reporting participants.

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

T6GW42 (X) - Extreme Data.



**Paper & Paperboard Interlaboratory Testing Program**

**Report #3032G,  
December 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 #3032G,  
December 2019

## Analysis 376

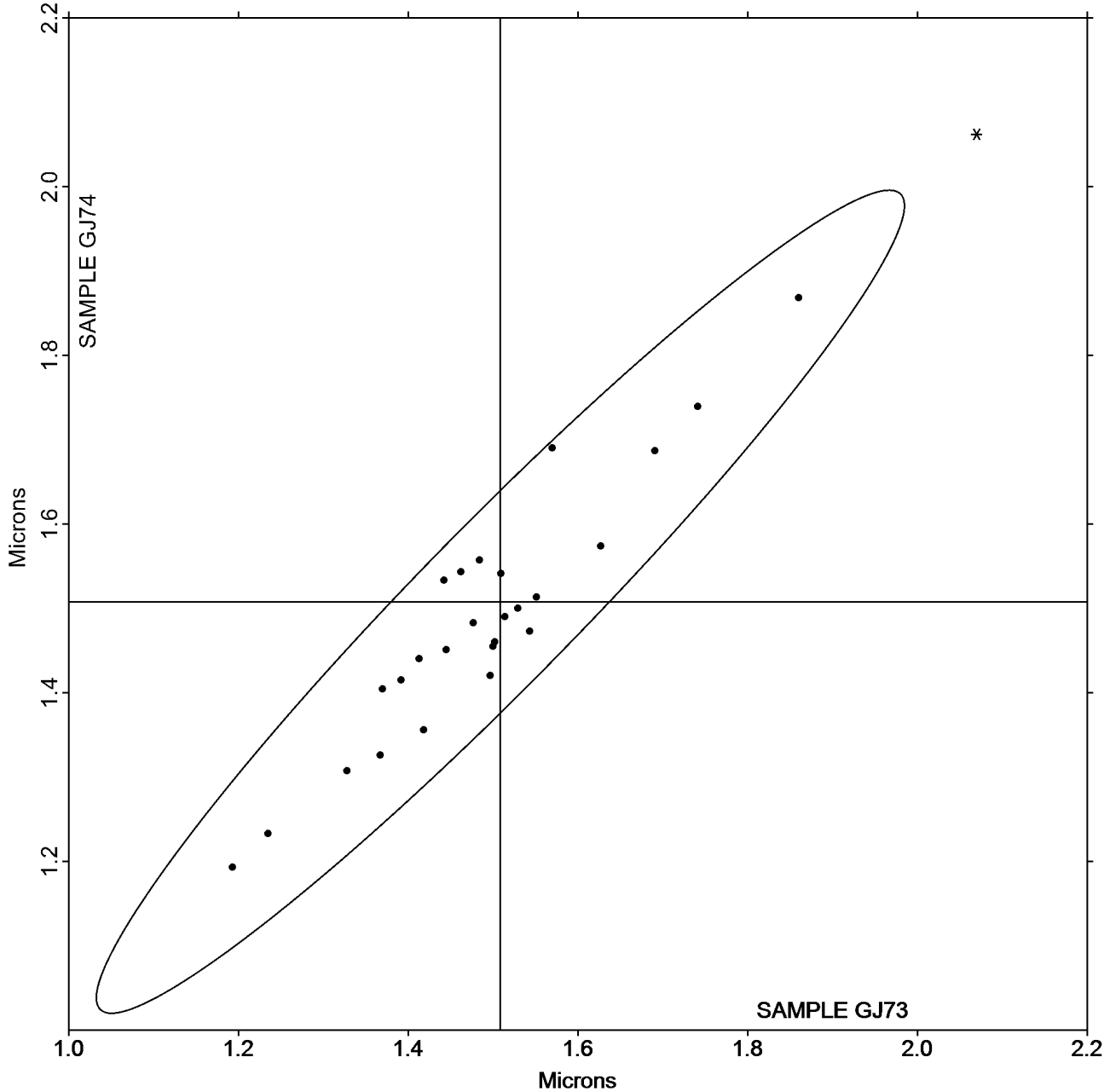
Roughness - Print Surf Method - 0.5 to 4.0 Microns

TAPPI Official Test Method T555

Grand Mean Sample GJ73 = 1.5085  
Microns

Grand Mean Sample GJ74 = 1.5079  
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 #3032G,**  
**December 2019**

WebCode	Data Flag	<u>Sample GK73</u>			<u>Sample GK74</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
ADJ37M		5.174	-0.300	-1.34	4.003	-0.006	-0.03	ZZ
D6EDRD		5.333	-0.141	-0.63	3.795	-0.214	-1.12	ZZ
H3NX6Y		5.280	-0.194	-0.87	4.077	0.068	0.35	ZZ
QMNP2Q		5.718	0.244	1.09	3.933	-0.076	-0.40	ZZ
RHEQ8C		5.746	0.272	1.21	4.435	0.426	2.23	ZZ
RKYT24		5.514	0.040	0.18	3.989	-0.020	-0.11	ZZ
RYNNJP		5.695	0.221	0.99	3.955	-0.054	-0.28	ZZ
XLTE7P		5.332	-0.142	-0.63	3.887	-0.122	-0.64	ZZ

<b>Summary Statistics</b>	<u><b>Sample GK73</b></u>	<u><b>Sample GK74</b></u>
<b>Grand Means</b>	5.47 Microns	4.01 Microns
<b>Std Dev Btwn Labs</b>	0.22 Microns	0.19 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 #3032G,  
December 2019

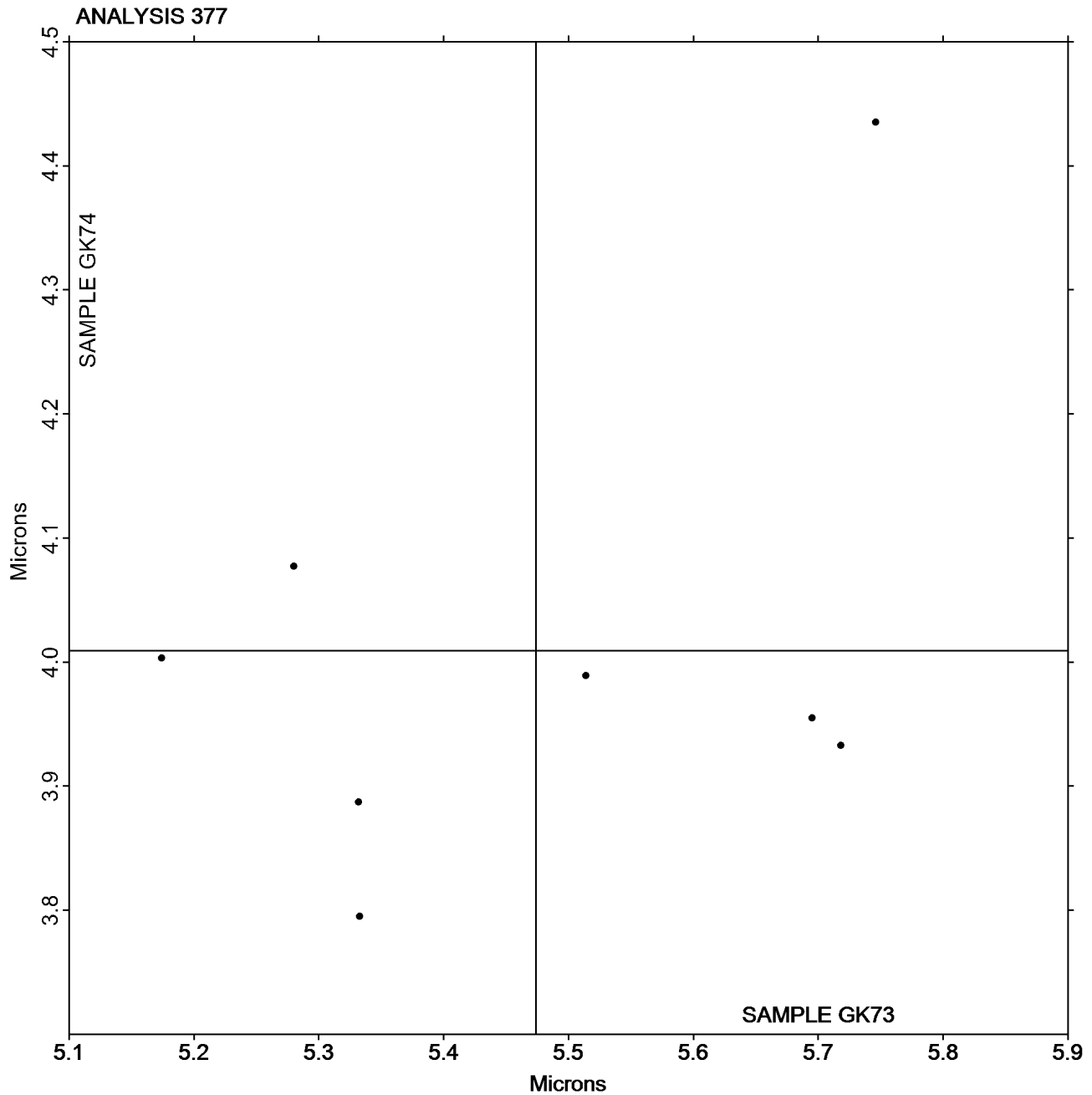
## Analysis 377

Roughness - Print Surf Method - 2.5 to 6.0 Microns

TAPPI Official Test Method T555

Grand Mean Sample GK73 = 5.4740  
Microns

Grand Mean Sample GK74 = 4.0093  
Microns



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



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

**Report #3032G,**  
**December 2019**

WebCode	Data Flag	Sample GL73			Sample GL74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2MXVNQ		119.4	0.7	0.09	118.7	0.0	0.00	PP
2TZEUN		117.6	-1.1	-0.13	115.6	-3.0	-0.35	PP
2W2HMY		115.4	-3.3	-0.42	120.8	2.1	0.25	PP
3KNHQ3		115.4	-3.3	-0.42	112.2	-6.4	-0.76	HM
3PFARR		114.3	-4.4	-0.55	113.2	-5.4	-0.64	XX
48UHBJ	X	150.9	32.2	4.08	136.5	17.9	2.11	GA
4F6VFU		119.3	0.6	0.08	120.1	1.5	0.17	TS
4KX86Y		110.4	-8.3	-1.05	107.1	-11.5	-1.36	LW
6J39JT		112.4	-6.2	-0.79	113.8	-4.8	-0.57	PP
7E3W7K		112.8	-5.9	-0.74	111.4	-7.3	-0.86	PP
7T4QJE		138.0	19.3	2.45	139.5	20.9	2.46	GL
97744R		135.5	16.8	2.13	134.5	15.9	1.87	XX
9C9DBK		120.6	1.9	0.24	119.2	0.6	0.07	PP
9F9LEU		127.0	8.3	1.05	124.4	5.8	0.68	LW
AC6K3G		111.1	-7.5	-0.95	109.2	-9.5	-1.12	PP
ADJ37M		111.8	-6.9	-0.87	114.9	-3.7	-0.44	PP
AG2AJN	X	136.0	17.3	2.19	113.2	-5.4	-0.64	LA
C3T6AD		119.9	1.3	0.16	120.4	1.8	0.21	PP
D6EDRD		124.5	5.8	0.74	121.0	2.4	0.28	LA
D9XGMP		120.7	2.0	0.26	118.3	-0.3	-0.04	LA
DL4GE9	X	149.6	30.9	3.92	145.3	26.7	3.14	TZ
DYDZ3V		107.8	-10.9	-1.38	109.4	-9.3	-1.10	PP
EHXFMB		117.0	-1.7	-0.21	123.5	4.8	0.57	PP
FU6KD4		104.9	-13.8	-1.74	101.7	-16.9	-1.99	LA
FULWV9		107.5	-11.2	-1.42	103.5	-15.1	-1.79	SH
GFKKZA		138.0	19.3	2.45	140.0	21.4	2.52	GL
GTV4NW		127.1	8.4	1.06	127.0	8.4	0.99	GA
H3NX6Y		122.1	3.4	0.43	119.5	0.9	0.10	LW
H3U926	X	54.3	-64.4	-8.15	53.1	-65.5	-7.73	SH
HE3LAC		121.2	2.5	0.32	117.5	-1.1	-0.13	LW
JZ3HJX		120.5	1.8	0.23	118.4	-0.3	-0.03	PP
KDHUHK		112.2	-6.5	-0.82	111.8	-6.9	-0.81	PP
KPYD62		126.7	8.0	1.02	127.7	9.1	1.07	XX
NBL77D		116.6	-2.1	-0.26	120.0	1.3	0.16	PP
QD4FG4		113.7	-5.0	-0.63	111.7	-6.9	-0.82	GA
QMNP2Q		119.8	1.1	0.14	120.9	2.3	0.27	LA
REDZP4		119.8	1.1	0.14	122.6	4.0	0.47	VM
RHEQ8C		122.0	3.3	0.42	125.3	6.7	0.79	LW
RYNNJP		124.6	5.9	0.75	120.9	2.3	0.27	PP
TEMELC		119.4	0.7	0.09	120.2	1.6	0.18	TT
UKEWL9		109.3	-9.4	-1.19	108.4	-10.2	-1.21	PP



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

Report #3032G,  
December 2019

WebCode	Data Flag	Sample GL73			Sample GL74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
VDP8AX		126.7	8.0	1.02	128.4	9.8	1.15	TT
VV9GG7		112.4	-6.3	-0.80	111.1	-7.5	-0.89	HM
XGZD8W		112.5	-6.2	-0.78	109.3	-9.4	-1.11	HM
XJP7XR		111.7	-7.0	-0.88	110.9	-7.7	-0.91	PP
XLTE7P		131.8	13.1	1.66	132.5	13.9	1.63	XX
XNKN6X		123.6	5.0	0.63	126.5	7.8	0.92	PP
Y96U7T	*	104.5	-14.1	-1.79	110.0	-8.7	-1.02	MP
YYZTXE		124.4	5.7	0.72	119.6	1.0	0.11	HM
ZDDEPJ		114.6	-4.1	-0.52	118.9	0.2	0.03	LA
ZQZJY2		119.2	0.5	0.07	124.8	6.2	0.73	TS

Summary Statistics	Sample GL73	Sample GL74
<b>Grand Means</b>	118.68 Sheffield	118.64 Sheffield
<b>Std Dev Btwn Labs</b>	7.90 Sheffield	8.48 Sheffield
Statistics based on 47 of 51 reporting participants.		

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

- 48UHBJ (X) - Data for sample GL73 are high.
- H3U926 (X) - Extreme Data.
- DL4GE9 (X) - Data for both samples are high. Possible Systematic Error.
- AG2AJN (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample GL73.

**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>TZ</b> TMI Sheffield Paper Tester, Model 58-25	<b>VM</b> Valmet PaperLab (was Kajaani\Robotest)
<b>XX</b> Instrument make/model not specified by lab	



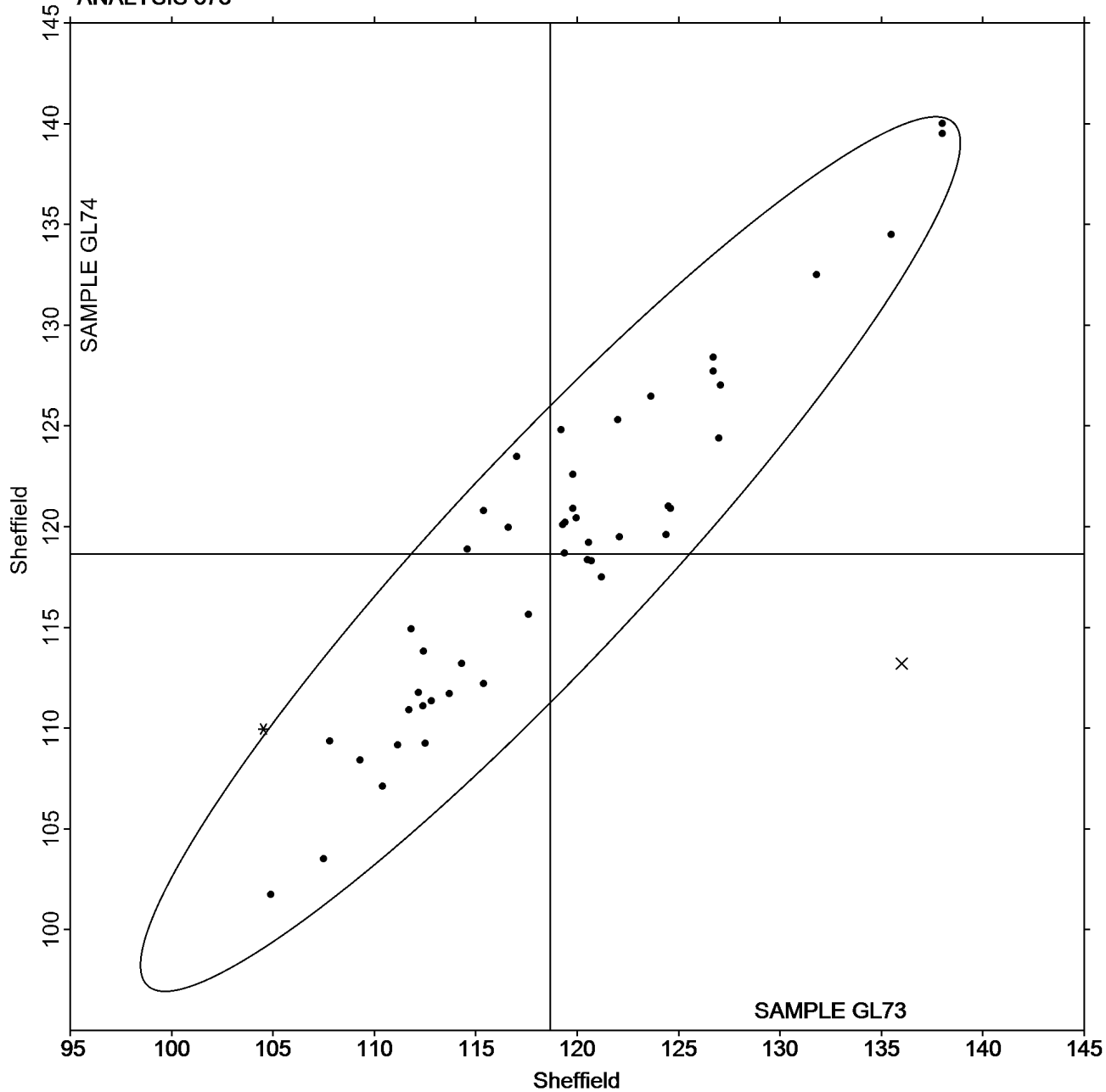
Paper & Paperboard Interlaboratory Testing Program  
Analysis 378  
Roughness - Sheffield Type  
TAPPI Official Test Method T538

Report #3032G,  
December 2019

Grand Mean Sample GL73 = 118.68  
Sheffield

Grand Mean Sample GL74 = 118.64  
Sheffield

ANALYSIS 378





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

Report #3032G,  
December 2019

WebCode	Data Flag	Sample GM73			Sample GM74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
73QPAK		4.184	-0.245	-0.89	4.217	-0.187	-0.73	ZZ
BTRHHG		3.776	-0.653	-2.38	3.825	-0.579	-2.25	ZZ
H3WNP4	X	1.740	-2.689	-9.79	2.302	-2.102	-8.18	ZZ
H79DNL		4.720	0.291	1.06	4.720	0.316	1.23	ZZ
JT6J4G		4.415	-0.014	-0.05	4.425	0.021	0.08	ZZ
JWXB4K		4.494	0.065	0.24	4.428	0.024	0.09	ZZ
JZ3HJX		4.708	0.279	1.02	4.750	0.346	1.35	ZZ
KXDUMH		4.662	0.233	0.85	4.627	0.223	0.87	ZZ
LG99EC		4.259	-0.170	-0.62	4.269	-0.135	-0.53	ZZ
NYUQQ7		4.530	0.101	0.37	4.370	-0.034	-0.13	ZZ
Q3HCA4		4.460	0.031	0.11	4.395	-0.010	-0.04	ZZ
V2DD3R		4.509	0.080	0.29	4.421	0.017	0.07	ZZ

Summary Statistics	Sample GM73	Sample GM74
<b>Grand Means</b>	4.43 Percent	4.40 Percent
<b>Std Dev Btwn Labs</b>	0.27 Percent	0.26 Percent

Statistics based on 11 of 12 reporting participants.

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

H3WNP4 (X) - Extreme Data.

**Key to Instrument Codes Reported by Participants**

ZZ Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

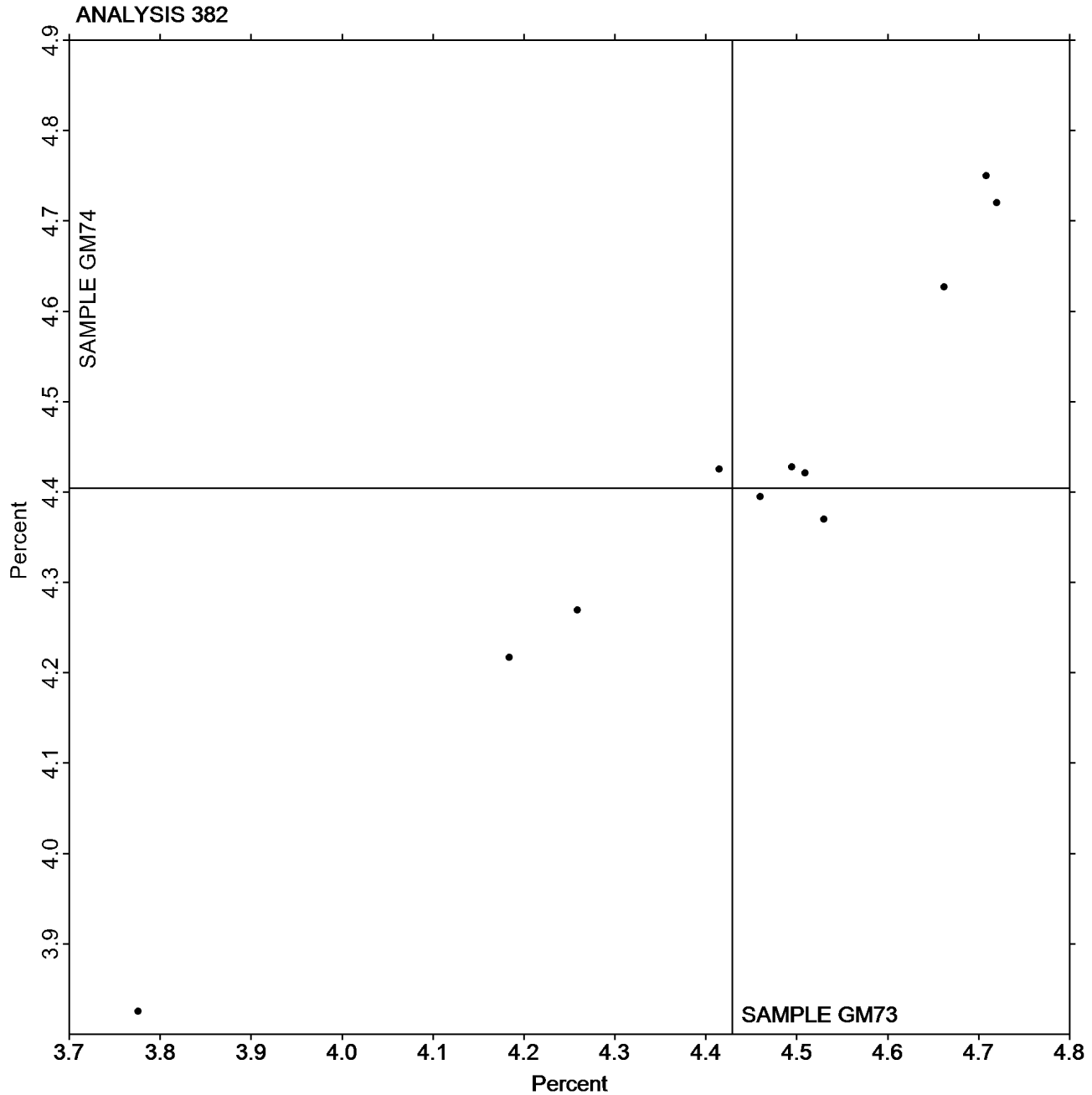
Report #3032G,  
December 2019

## Analysis 382 Moisture in Paper

### TAPPI Official Test Method T412

Grand Mean Sample GM73 = 4.4289  
Percent

Grand Mean Sample GM74 = 4.4042  
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 #3032G,  
December 2019**

**Analysis 384**

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

**TAPPI Official Test Method T425**

WebCode	Data Flag	Sample GN73			Sample GN74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3KNHQ3		93.42	-0.05	-0.08	96.22	0.07	0.14	ZZ
3PFARR	*	95.39	1.92	2.90	97.32	1.17	2.35	ZZ
4F6VFU		93.51	0.04	0.06	96.18	0.03	0.06	ZZ
6NDV3G	X	93.92	0.45	0.68	93.66	-2.49	-5.01	ZZ
97744R		93.51	0.04	0.06	96.39	0.24	0.49	ZZ
A6PWDL		93.00	-0.47	-0.71	95.90	-0.26	-0.51	ZZ
ADJ37M		93.41	-0.06	-0.09	96.05	-0.11	-0.21	ZZ
BQ7M7A		93.65	0.18	0.27	96.38	0.22	0.45	ZZ
C2KKCK		93.07	-0.40	-0.61	95.90	-0.25	-0.50	ZZ
D6EDRD		93.84	0.37	0.55	95.89	-0.26	-0.52	ZZ
D9U27J		93.54	0.07	0.10	96.13	-0.02	-0.04	ZZ
D9XGMP		93.50	0.03	0.04	96.08	-0.07	-0.14	ZZ
DL4GE9		93.25	-0.22	-0.34	96.03	-0.12	-0.24	ZZ
DYDZ3V	*	91.50	-1.97	-2.98	94.72	-1.43	-2.88	ZZ
FU6KD4	X	90.16	-3.31	-5.00	93.07	-3.08	-6.20	ZZ
FULWV9		93.31	-0.16	-0.25	95.91	-0.24	-0.48	ZZ
GFKKZA		94.74	1.27	1.91	97.21	1.06	2.13	ZZ
JZ3HJX		93.58	0.11	0.17	96.39	0.24	0.49	ZZ
KDHUHK		93.99	0.52	0.78	96.59	0.44	0.89	ZZ
KPYD62		92.25	-1.22	-1.85	95.60	-0.55	-1.11	ZZ
M263L9	*	94.21	0.73	1.11	97.27	1.12	2.26	ZZ
MB9QKE		93.16	-0.31	-0.47	95.97	-0.18	-0.36	ZZ
NBL77D		93.24	-0.24	-0.36	95.95	-0.20	-0.41	ZZ
NXZ6VU		93.47	0.00	0.00	96.23	0.07	0.15	ZZ
RYNNJP		93.37	-0.11	-0.16	95.76	-0.39	-0.78	ZZ
UKEWL9		93.05	-0.42	-0.64	95.98	-0.17	-0.34	ZZ
VDP8AX		93.97	0.50	0.75	96.39	0.24	0.48	ZZ
VV9GG7		93.53	0.06	0.09	96.04	-0.11	-0.22	ZZ
XJP7XR		93.34	-0.13	-0.20	96.06	-0.09	-0.18	ZZ
XNKN6X		93.48	0.01	0.01	96.19	0.04	0.07	ZZ
YTQL6P		92.98	-0.49	-0.74	95.73	-0.42	-0.85	ZZ
YYZTXE		93.51	0.04	0.06	96.39	0.24	0.48	ZZ
ZQZJY2	*	93.88	0.41	0.62	95.84	-0.31	-0.63	ZZ

Summary Statistics	Sample GN73	Sample GN74
<b>Grand Means</b>	93.47 Percent	96.15 Percent
<b>Std Dev Btwn Labs</b>	0.66 Percent	0.50 Percent
Statistics based on 31 of 33 reporting participants.		





# Paper & Paperboard Interlaboratory Testing Program

Report #3032G,  
December 2019

## 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**

FU6KD4 (X) - Extreme Data.

6NDV3G (X) - Data for sample GN74 are low.

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

ZZ Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

Report #3032G,  
December 2019

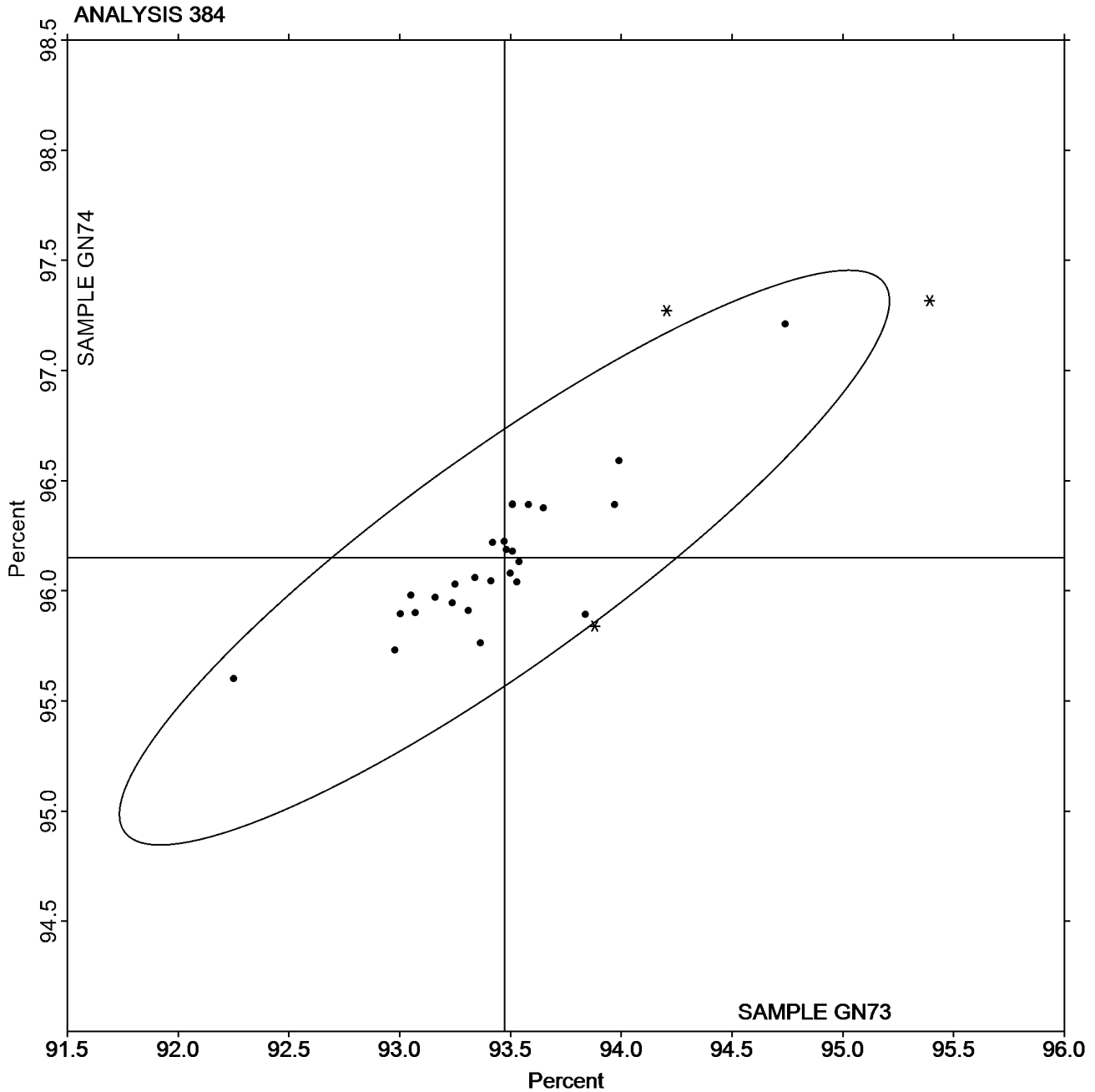
## Analysis 384

Opacity (89% Reflectance Backing) - Fine Papers

TAPPI Official Test Method T425

Grand Mean Sample GN73 = 93.473  
Percent

Grand Mean Sample GN74 = 96.151  
Percent





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

Report #3032G,  
December 2019

WebCode	Data Flag	Sample GP73			Sample GP74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3BV8EL		90.12	-0.03	-0.29	90.04	-0.18	-1.29	ZZ
3V77TG		90.17	0.01	0.13	90.07	-0.15	-1.09	ZZ
77P3VN		90.23	0.08	0.76	90.42	0.20	1.42	ZZ
8YTE4C		90.08	-0.08	-0.74	90.38	0.16	1.14	ZZ
BTRHHG		90.13	-0.03	-0.26	90.10	-0.12	-0.86	ZZ
M7WA6H		89.96	-0.19	-1.87	90.32	0.10	0.74	ZZ
QEVGGZ		90.18	0.03	0.28	90.32	0.10	0.72	ZZ
R4QBX6		90.37	0.22	2.15	90.26	0.04	0.31	ZZ
T6KWBA		90.25	0.10	0.95	90.32	0.10	0.74	ZZ
V2DD3R		90.10	-0.05	-0.52	90.05	-0.17	-1.27	ZZ
XLFQ2H		90.15	0.00	0.00	90.26	0.04	0.27	ZZ
YQ439X	X	94.88	4.73	46.40	94.93	4.71	34.31	ZZ
YZE6TY		90.09	-0.06	-0.58	90.11	-0.11	-0.83	ZZ

Summary Statistics	Sample GP73	Sample GP74
<b>Grand Means</b>	90.15 Percent	90.22 Percent
<b>Stnd Dev Btwn Labs</b>	0.10 Percent	0.14 Percent

Statistics based on 12 of 13 reporting participants.

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

YQ439X (X) - Extreme Data.

**Key to Instrument Codes Reported by Participants**

ZZ Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

Report #3032G,  
December 2019

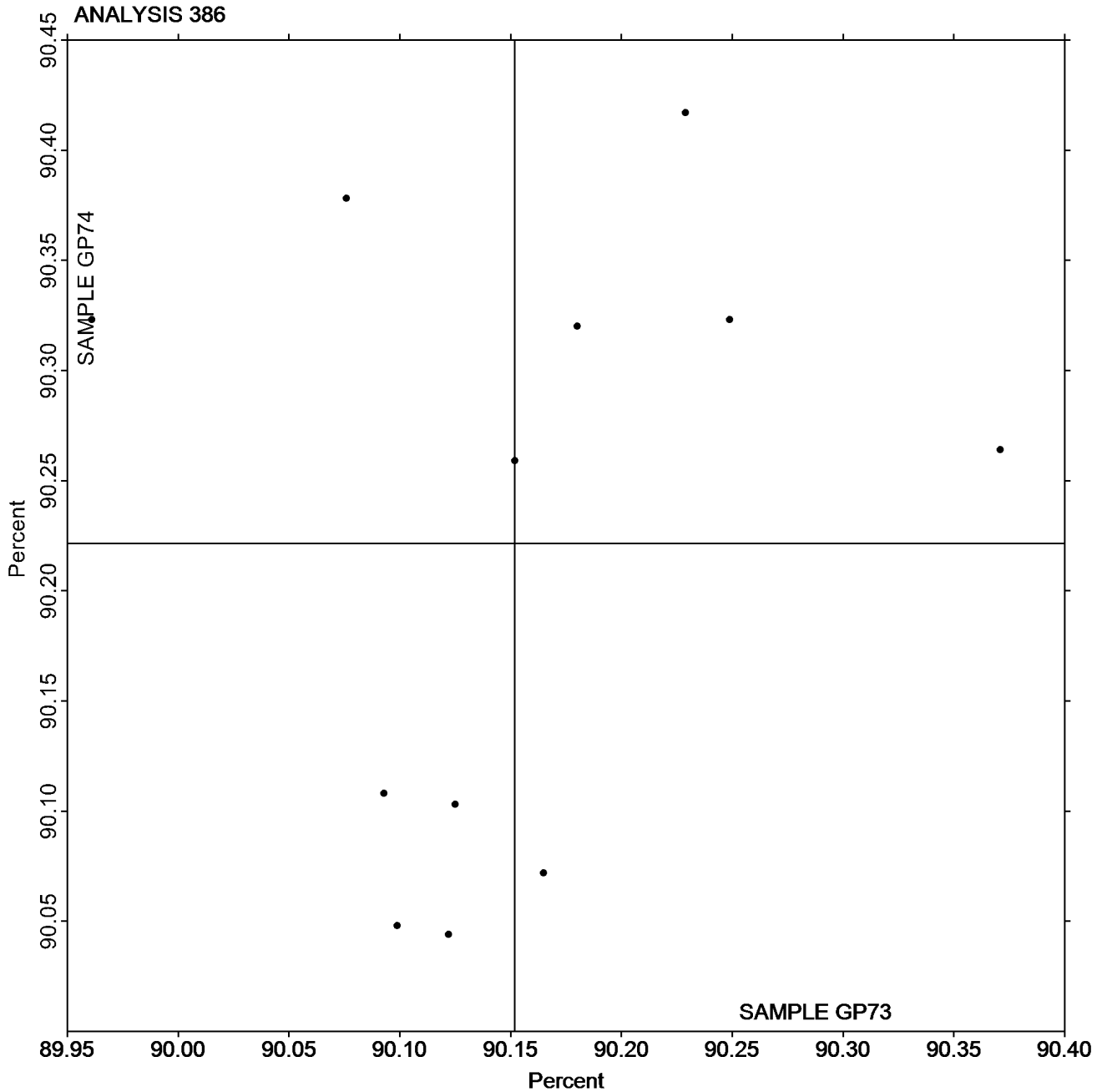
## Analysis 386

Opacity (Paper Backing) - Fine Papers and Newsprint

TAPPI Official Test Method T519

Grand Mean Sample GP73 = 90.152  
Percent

Grand Mean Sample GP74 = 90.222  
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 #3032G,  
December 2019

WebCode	Data Flag	<u>Sample GR73</u>			<u>Sample GR74</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2TZEUN		84.57	1.15	0.97	85.29	1.13	0.97	HG
2W2HMV		82.16	-1.26	-1.06	82.98	-1.18	-1.01	PP
3PFARR	X	70.25	-13.17	-11.15	72.39	-11.76	-10.10	XX
7E3W7K		84.48	1.06	0.89	85.13	0.97	0.83	TT
97744R		83.83	0.42	0.35	84.53	0.38	0.32	XX
9F9LEU	X	88.21	4.79	4.06	87.59	3.43	2.95	HZ
A6PWDL		82.49	-0.92	-0.78	83.42	-0.73	-0.63	TS
AC6K3G		82.94	-0.48	-0.41	83.64	-0.51	-0.44	TS
C2KKCK		84.55	1.14	0.96	85.20	1.04	0.89	TS
C3T6AD		82.27	-1.15	-0.97	83.03	-1.13	-0.97	TS
D6EDRD		83.32	-0.10	-0.08	83.91	-0.24	-0.21	TS
DL4GE9		85.84	2.42	2.05	86.43	2.27	1.95	TS
DYDZ3V		82.25	-1.17	-0.99	83.16	-0.99	-0.85	TT
EHXFMB		83.74	0.33	0.28	84.51	0.36	0.31	HG
H3NX6Y	*	82.43	-0.99	-0.84	82.70	-1.45	-1.25	TT
JT6J4G		83.43	0.01	0.01	84.08	-0.08	-0.07	XX
KDHUHK		82.19	-1.23	-1.04	83.01	-1.14	-0.98	TT
KPYD62	*	86.15	2.73	2.31	87.05	2.90	2.49	PE
M263L9		83.89	0.47	0.40	84.76	0.61	0.52	VM
MB9QKE		82.72	-0.70	-0.59	83.53	-0.62	-0.54	TP
NZ97BY		84.40	0.98	0.83	85.23	1.07	0.92	HG
RHEQ8C		84.42	1.00	0.85	84.92	0.77	0.66	HG
TTPBX7		84.58	1.16	0.99	85.27	1.11	0.95	TS
UKEWL9		83.21	-0.20	-0.17	84.08	-0.08	-0.07	XC
XJP7XR		82.06	-1.36	-1.15	83.14	-1.02	-0.87	XX
XNKN6X		81.99	-1.43	-1.21	82.71	-1.44	-1.24	TT
YYZTXE		82.43	-0.99	-0.84	83.04	-1.12	-0.96	TS
ZQZJY2		82.54	-0.88	-0.75	83.30	-0.85	-0.73	TS

<b>Summary Statistics</b>	<u>Sample GR73</u>	<u>Sample GR74</u>
<b>Grand Means</b>	83.42 Percent	84.15 Percent
<b>Std Dev Btwn Labs</b>	1.18 Percent	1.16 Percent

Statistics based on 26 of 28 reporting participants.

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

3PFARR (X) - Extreme Data.

9F9LEU (X) - Data for both samples are high. Possible Systematic Error.



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

**Report #3032G,**  
**December 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>TP</b>	Technidyne Test/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



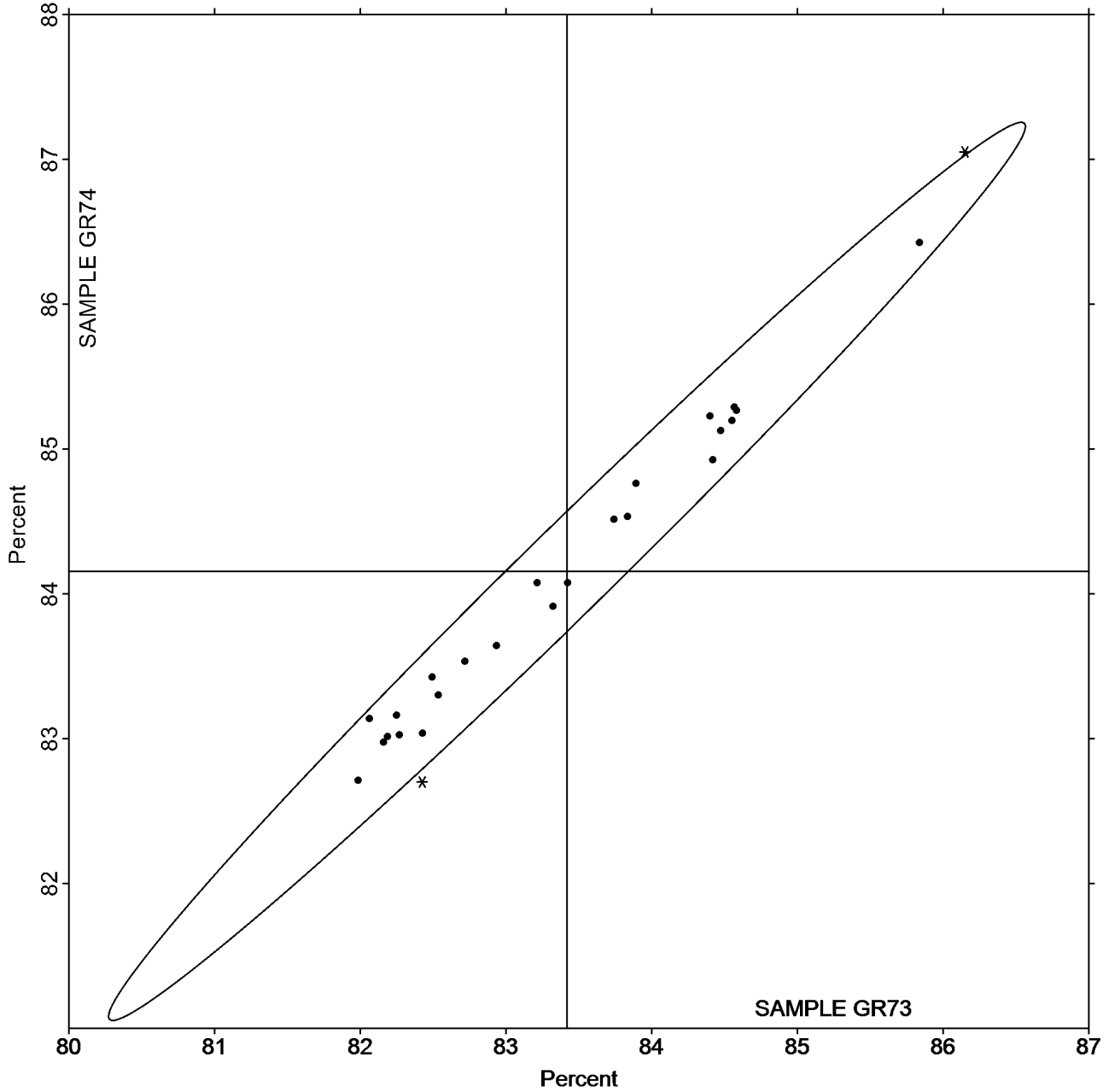
**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 390**  
**Directional Brightness**  
**TAPPI Official Test Method T452**

**Report #3032G,**  
**December 2019**

**Grand Mean Sample GR73 = 83.418**  
**Percent**

**Grand Mean Sample GR74 = 84.155**  
**Percent**

**ANALYSIS 390**





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

Report #3032G,  
December 2019

WebCode	Data Flag	Sample GZ73			Sample GZ74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3KNHQ3		94.83	-0.07	-0.07	98.62	0.53	0.55	HT
4F6VFU		95.14	0.24	0.26	98.22	0.13	0.14	TS
97744R		95.75	0.85	0.93	98.15	0.06	0.06	XX
BQ7M7A		94.81	-0.09	-0.10	98.22	0.13	0.14	PP
D9U27J		95.05	0.15	0.17	98.36	0.27	0.29	TS
FU6KD4		94.78	-0.12	-0.13	97.96	-0.13	-0.14	TT
FULWV9		93.58	-1.33	-1.45	97.26	-0.83	-0.86	HT
JZ3HJX		95.29	0.39	0.42	98.45	0.36	0.38	TS
NBL77D		95.32	0.42	0.46	98.74	0.65	0.68	PP
NXZ6VU		96.33	1.43	1.56	98.99	0.90	0.95	TS
R4QBX6		94.76	-0.15	-0.16	98.19	0.10	0.11	TS
RYNNJP		95.07	0.17	0.18	98.30	0.21	0.22	TS
VDP8AX	*	92.36	-2.54	-2.78	94.94	-3.15	-3.30	TT
VV9GG7		95.32	0.42	0.46	98.62	0.53	0.56	TT
ZQZJY2		95.14	0.24	0.26	98.31	0.22	0.23	TS

Summary Statistics	Sample GZ73	Sample GZ74
<b>Grand Means</b>	94.90 Percent	98.09 Percent
<b>Std Dev Btwn Labs</b>	0.91 Percent	0.95 Percent
Statistics based on 15 of 15 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		



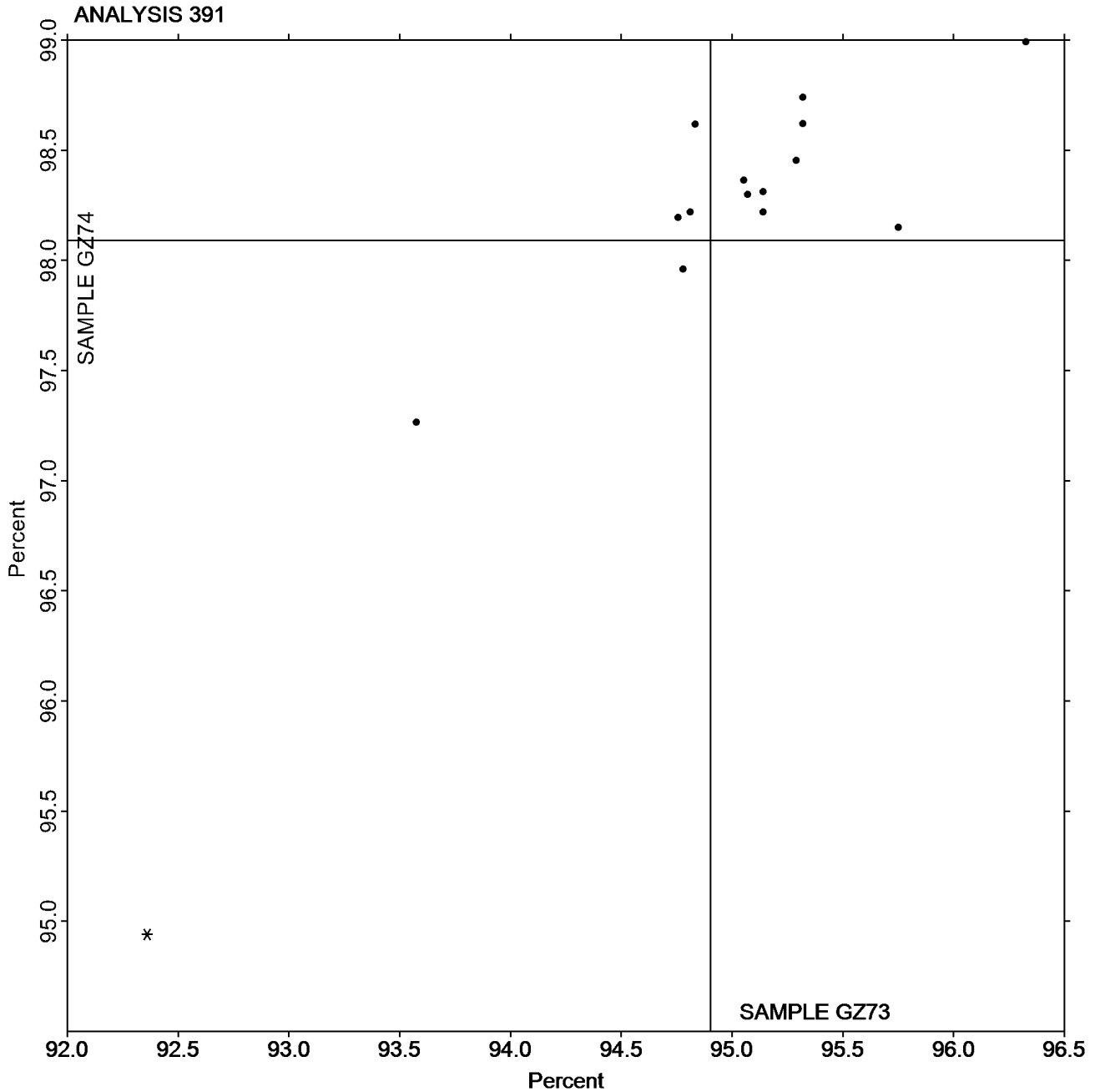


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 391**  
**Directional Brightness of Fluorescent Samples**  
**TAPPI Official Test Method T452**

**Report #3032G,**  
**December 2019**

**Grand Mean Sample GZ73 = 94.902**  
**Percent**

**Grand Mean Sample GZ74 = 98.089**  
**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 #3032G,  
December 2019**

**Analysis 392  
Diffuse Brightness**

**TAPPI Official Test Method T525**

WebCode	Data Flag	Sample GR73			Sample GR74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2MXVNQ		82.96	0.07	0.25	83.76	0.13	0.37	TC
2W2HMY		83.18	0.29	1.00	83.97	0.33	0.96	LT
3BV8EL		82.84	-0.05	-0.17	83.70	0.07	0.20	LE
3Y22AU		82.68	-0.21	-0.73	83.57	-0.06	-0.18	TC
49P8ND		82.73	-0.16	-0.57	83.71	0.08	0.23	TC
77P3VN		82.70	-0.20	-0.68	83.52	-0.11	-0.32	AC
7E3W7K		82.86	-0.03	-0.10	83.76	0.13	0.37	TL
BM89K7	X	81.33	-1.57	-5.46	81.53	-2.11	-6.11	TZ
BTRHHG	*	83.53	0.64	2.23	83.57	-0.06	-0.18	LE
D6EDRD		82.86	-0.03	-0.11	83.71	0.08	0.22	TC
EDN37C		82.56	-0.33	-1.14	83.69	0.06	0.17	TC
H3NX6Y	*	82.86	-0.03	-0.10	82.81	-0.82	-2.39	EG
JT6J4G		82.93	0.04	0.14	83.77	0.13	0.38	EE
QEVGGZ		83.13	0.23	0.82	84.05	0.42	1.20	TM
R4QBX6		82.90	0.01	0.03	83.75	0.12	0.33	TC
RHEQ8C		82.56	-0.33	-1.16	82.76	-0.88	-2.54	TC
T6KWBA	*	83.73	0.84	2.93	84.46	0.83	2.40	XX
TTPBX7		82.67	-0.22	-0.75	83.55	-0.08	-0.24	TC
UEP88Q		82.97	0.07	0.26	83.69	0.06	0.16	TC
V2DD3R		82.62	-0.27	-0.93	83.40	-0.24	-0.69	EG
X28M8T		82.77	-0.12	-0.43	83.63	-0.01	-0.03	TC
XLFQ2H		82.72	-0.17	-0.60	83.72	0.08	0.24	TC
YQ439X		82.70	-0.19	-0.66	83.53	-0.10	-0.30	TC
YYZTXE		83.02	0.13	0.47	83.51	-0.13	-0.37	LT

Summary Statistics	Sample GR73	Sample GR74
<b>Grand Means</b>	82.89 Percent	83.63 Percent
<b>Std Dev Btwn Labs</b>	0.29 Percent	0.34 Percent

Statistics based on 23 of 24 reporting participants.

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

BM89K7 (X) - Extreme Data.

**Key to Instrument Codes Reported by Participants**

AC	ACS Spectro-Sensor II	EE	Datacolor Elrepho 2000
EG	Datacolor Elrepho 450X	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	XX	Instrument make/model not specified by lab



# Paper & Paperboard Interlaboratory Testing Program

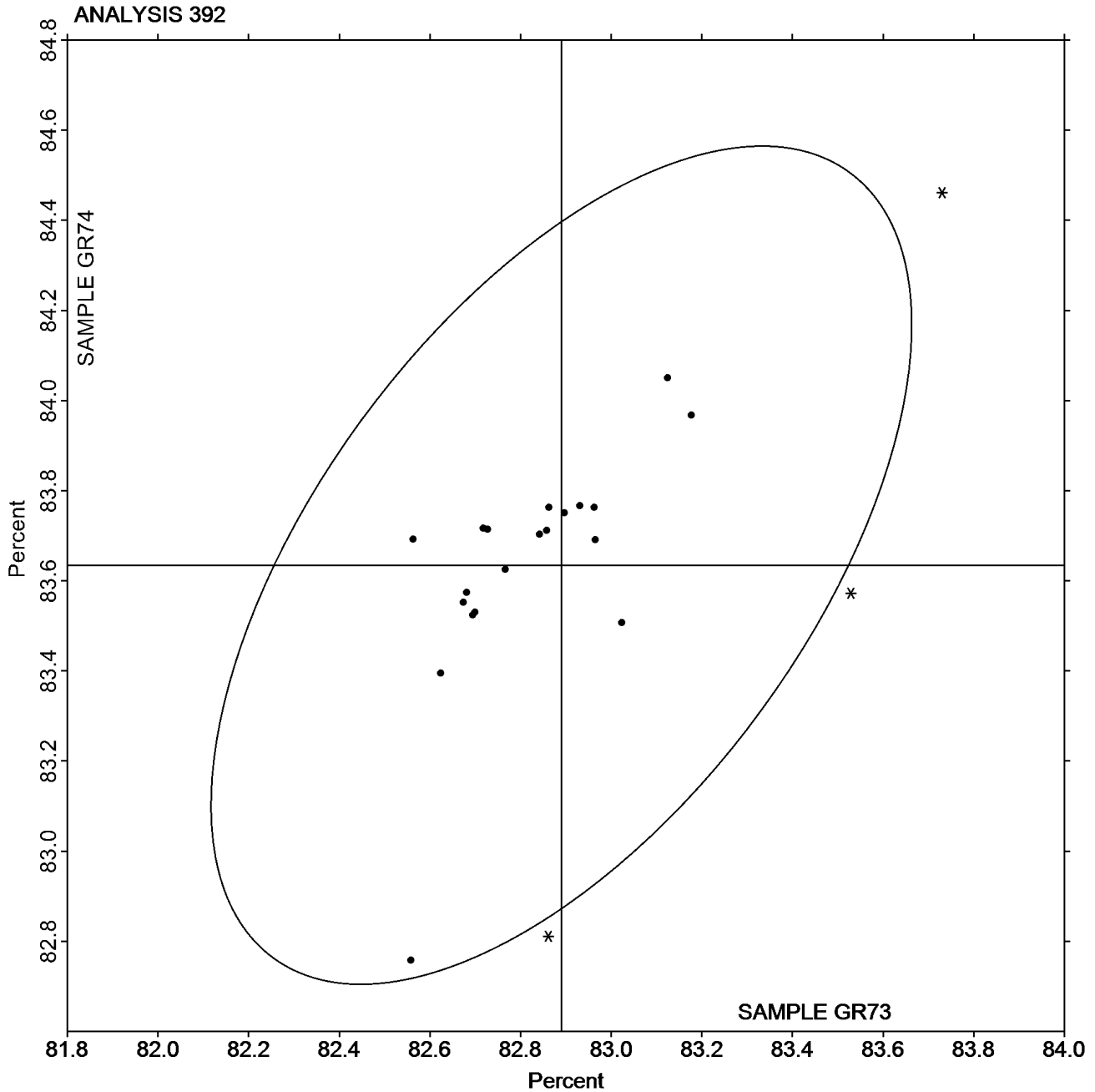
Report #3032G,  
December 2019

## Analysis 392 Diffuse Brightness

TAPPI Official Test Method T525

Grand Mean Sample GR73 = 82.890  
Percent

Grand Mean Sample GR74 = 83.635  
Percent





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

**Report #3032G,**  
**December 2019**

WebCode	Data Flag	<u>Sample GZ73</u>			<u>Sample GZ74</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
97744R		7.384	-0.415	-1.49	8.040	-0.723	-2.01	XX
BQ7M7A		7.874	0.075	0.27	8.696	-0.067	-0.19	PP
D9U27J		7.574	-0.225	-0.81	8.518	-0.245	-0.68	TS
FU6KD4		7.660	-0.139	-0.50	8.560	-0.203	-0.56	TT
JZ3HJX		8.070	0.271	0.98	9.070	0.307	0.85	TS
NBL77D		7.740	-0.059	-0.21	8.940	0.177	0.49	PP
NXZ6VU		7.640	-0.159	-0.57	8.660	-0.103	-0.29	TS
R4QBX6		7.500	-0.299	-1.07	8.498	-0.265	-0.74	TS
RYNNJP		7.956	0.157	0.57	9.048	0.285	0.79	TS
VV9GG7		8.200	0.401	1.44	9.300	0.537	1.49	TT
ZQZJY2		8.186	0.387	1.39	9.066	0.303	0.84	TS

<b>Summary Statistics</b>	<u><b>Sample GZ73</b></u>	<u><b>Sample GZ74</b></u>
<b>Grand Means</b>	7.80 Percent	8.76 Percent
<b>Std Dev Btwn Labs</b>	0.28 Percent	0.36 Percent
Statistics based on 11 of 11 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

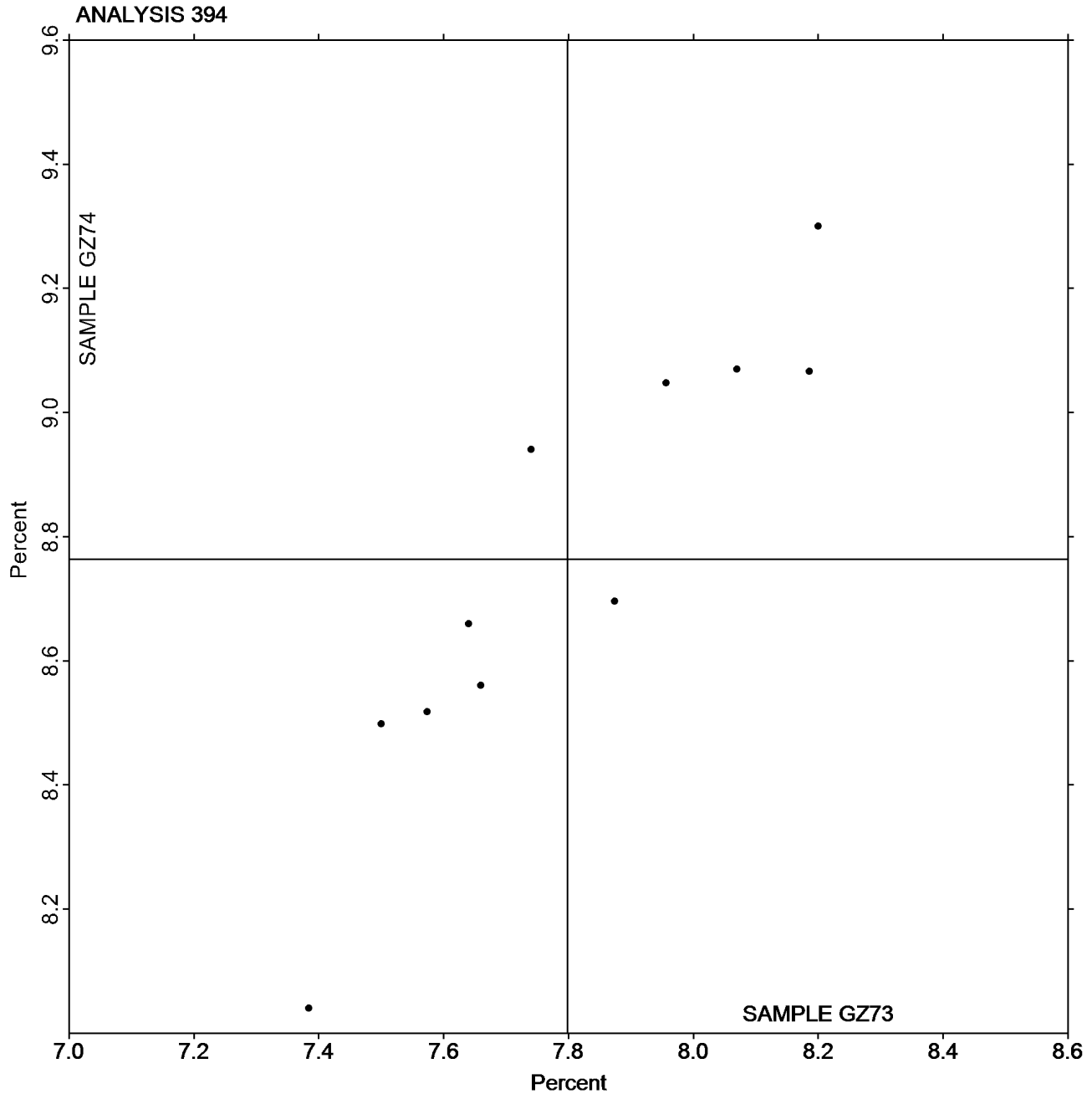


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 394**  
**Fluorescent Component of Directional Brightness**  
**TAPPI Official Test Method T452**

**Report #3032G,**  
**December 2019**

**Grand Mean Sample GZ73 = 7.7985**  
**Percent**

**Grand Mean Sample GZ74 = 8.7633**  
**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 #3032G,**  
**December 2019**

WebCode	Data Flag	Sample GT73			Sample GT74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2TZEUN		72.40	0.75	0.56	77.19	1.90	1.18	TH
2W2HMV		72.46	0.81	0.61	73.45	-1.84	-1.15	GA
77P3VN		72.28	0.63	0.47	77.11	1.82	1.13	LB
7E3W7K		71.90	0.25	0.19	75.71	0.42	0.26	GM
AG2AJN	X	48.75	-22.90	-17.03	38.91	-36.38	-22.73	LF
BQ7M7A		69.56	-2.09	-1.55	74.98	-0.31	-0.20	PP
C2KKCK		70.55	-1.10	-0.82	74.07	-1.22	-0.77	LA
D9U27J		69.54	-2.11	-1.57	75.74	0.45	0.28	LA
EHXFMB		74.18	2.53	1.89	77.58	2.29	1.43	TH
H3NX6Y		72.39	0.74	0.55	75.92	0.63	0.39	TH
M263L9		71.77	0.12	0.09	76.39	1.10	0.68	VM
MB9QKE		71.50	-0.15	-0.11	75.53	0.24	0.15	TH
QMNP2Q		71.93	0.28	0.21	75.38	0.09	0.05	LA
R4QBX6		71.88	0.23	0.17	73.24	-2.05	-1.28	LA
REDZP4		72.91	1.26	0.94	75.37	0.08	0.05	VM
VV9GG7		69.44	-2.21	-1.64	71.76	-3.53	-2.21	PP

Summary Statistics	Sample GT73	Sample GT74
<b>Grand Means</b>	71.65 Gloss Units	75.29 Gloss Units
<b>Std Dev Btwn Labs</b>	1.34 Gloss Units	1.60 Gloss Units
Statistics based on 15 of 16 reporting participants.		

**Comments on Assigned Data Flags for Test #395**

AG2AJN (X) - Extreme Data.

**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)

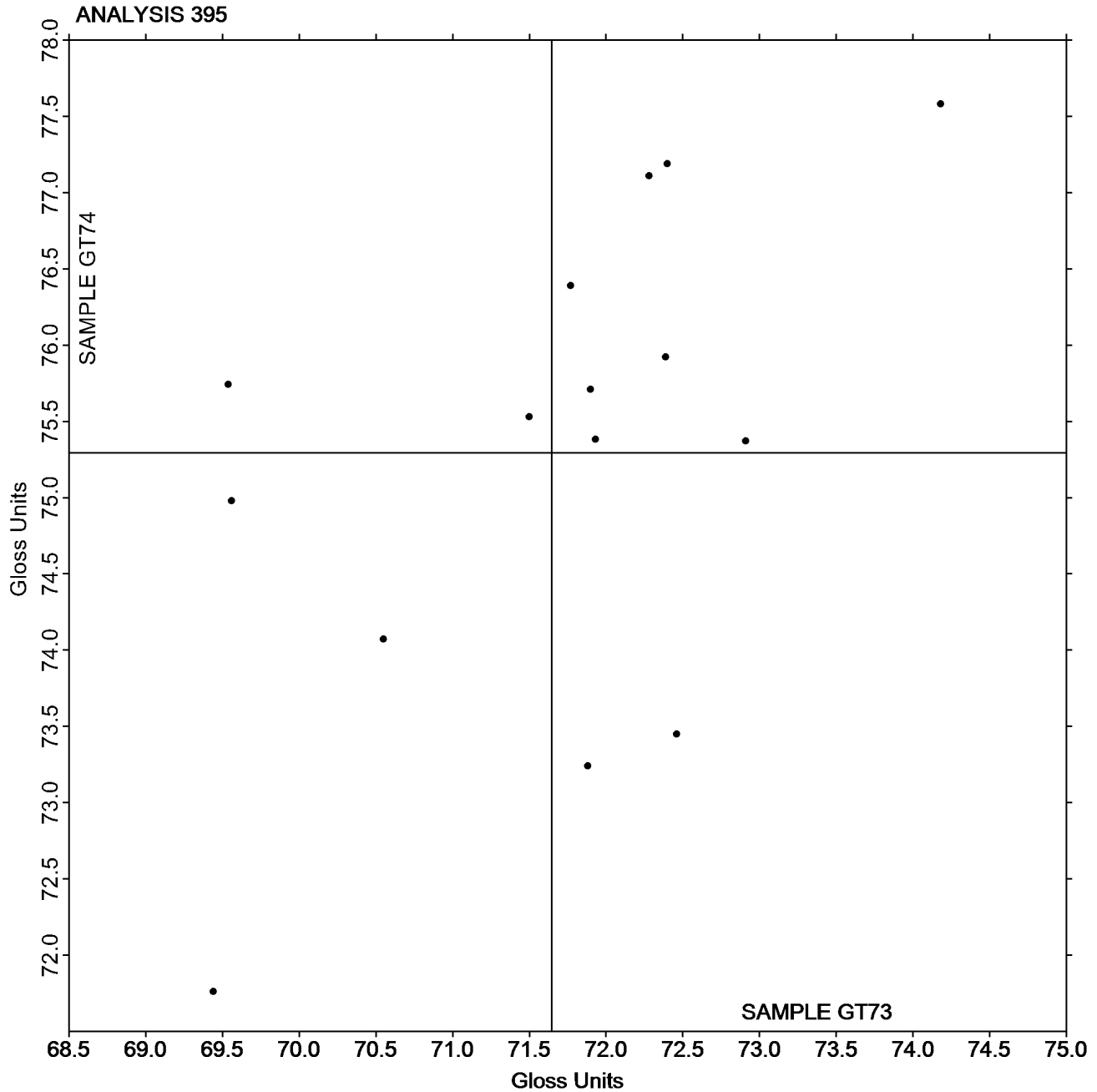


**Paper & Paperboard Interlaboratory Testing Program**  
**Analysis 395**  
**Specular Gloss at 75 Degrees - High Range**  
**TAPPI Official Test Method T480**

**Report #3032G,**  
**December 2019**

**Grand Mean Sample GT73 = 71.646**  
**Gloss Units**

**Grand Mean Sample GT74 = 75.295**  
**Gloss Units**



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



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

**Report #3032G,**  
**December 2019**

WebCode	Data Flag	<u>Sample GU73</u>			<u>Sample GU74</u>			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
77P3VN		47.00	2.34	0.87	46.60	1.27	0.45	LA
9F9LEU		45.98	1.32	0.49	46.72	1.39	0.49	GS
ADJ37M		43.75	-0.91	-0.34	44.49	-0.84	-0.30	PP
DYDZ3V		45.85	1.19	0.44	47.06	1.73	0.61	TH
Q3HCA4		42.37	-2.29	-0.85	42.49	-2.84	-1.00	ZT
R4QBX6		39.29	-5.37	-2.00	39.87	-5.46	-1.92	LA
RHEQ8C		46.51	1.85	0.69	47.77	2.44	0.86	PP
UKEWL9		46.55	1.89	0.70	47.62	2.29	0.81	TH

<b>Summary Statistics</b>	<u><b>Sample GU73</b></u>	<u><b>Sample GU74</b></u>
<b>Grand Means</b>	44.66 Gloss Units	45.33 Gloss Units
<b>Stnd Dev Btwn Labs</b>	2.69 Gloss Units	2.84 Gloss Units
Statistics based on 8 of 8 reporting participants.		

**Key to Instrument Codes Reported by Participants**

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





# Paper & Paperboard Interlaboratory Testing Program

Report #3032G,  
December 2019

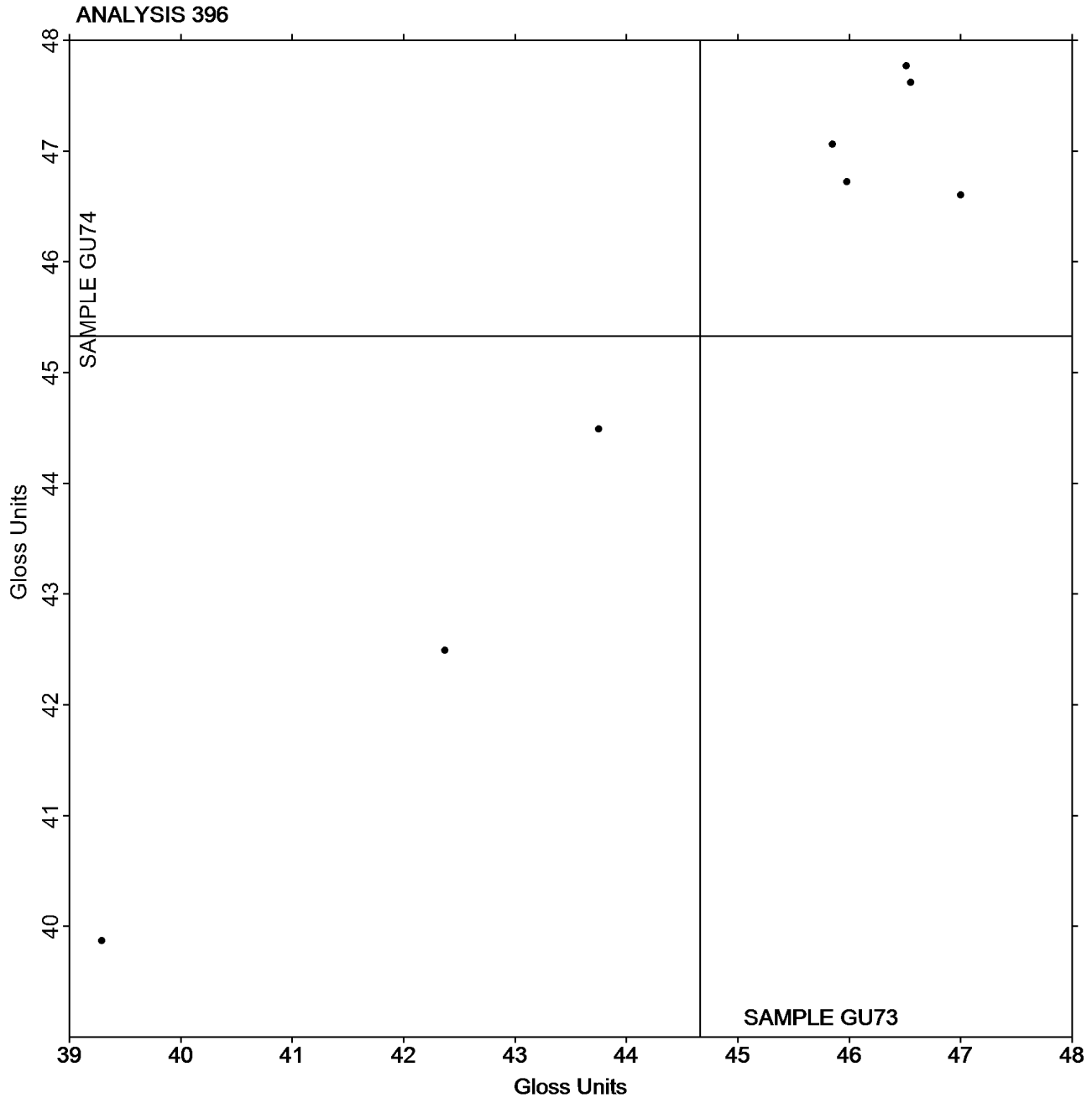
## Analysis 396

Specular Gloss at 75 Degrees - Low Range

TAPPI Official Test Method T480

Grand Mean Sample GU73 = 44.663  
Gloss Units

Grand Mean Sample GU74 = 45.328  
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 #3032G,  
December 2019

WebCode	Data Flag	Sample GW73			Sample GW74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3DMQBZ		73.73	0.44	1.32	89.66	0.44	1.16	ZZ
3KNHQ3		73.88	0.59	1.77	89.70	0.48	1.27	ZZ
3V77TG		73.24	-0.04	-0.13	88.87	-0.35	-0.91	ZZ
4F6VFU		73.17	-0.12	-0.35	89.28	0.06	0.16	ZZ
4U8CHP		73.49	0.20	0.60	89.88	0.66	1.73	ZZ
6NDV3G	X	0.95	-72.34	-215.12	1.13	-88.08	-231.76	ZZ
73QPAK		73.46	0.17	0.52	89.39	0.17	0.45	ZZ
77P3VN		72.77	-0.52	-1.55	89.01	-0.21	-0.56	ZZ
BTRHHG		73.08	-0.21	-0.61	89.58	0.36	0.95	ZZ
CK89KR		72.71	-0.58	-1.71	88.94	-0.28	-0.73	ZZ
D9XGMP		73.47	0.18	0.55	89.40	0.18	0.48	ZZ
DYDZ3V		73.33	0.05	0.14	89.21	-0.01	-0.04	ZZ
FULWV9		72.98	-0.31	-0.91	89.56	0.34	0.90	ZZ
JT6J4G		73.44	0.15	0.44	89.31	0.09	0.23	ZZ
KXDUMH		73.70	0.41	1.22	89.89	0.67	1.77	ZZ
M7WA6H		73.13	-0.15	-0.46	89.24	0.03	0.07	ZZ
MPBWYJ	X	74.99	1.71	5.07	90.51	1.29	3.40	ZZ
NGQFKE		72.75	-0.54	-1.60	88.85	-0.37	-0.96	ZZ
NXZ6VU		73.54	0.26	0.77	88.85	-0.37	-0.98	ZZ
NZ97BY		73.52	0.23	0.70	89.11	-0.11	-0.29	ZZ
Q3HCA4		73.00	-0.28	-0.84	89.10	-0.12	-0.31	ZZ
UKEWL9		73.09	-0.20	-0.60	88.76	-0.46	-1.20	ZZ
V2DD3R		73.28	-0.01	-0.02	89.42	0.20	0.53	ZZ
XJP7XR		73.21	-0.08	-0.23	88.39	-0.83	-2.18	ZZ
YCL69N		73.89	0.60	1.80	89.07	-0.15	-0.39	ZZ
YZE6TY		73.01	-0.28	-0.82	88.78	-0.44	-1.15	ZZ

Summary Statistics	Sample GW73	Sample GW74
<b>Grand Means</b>	73.29 g/sq m	89.22 g/sq m
<b>Std Dev Btwn Labs</b>	0.34 g/sq m	0.38 g/sq m
Statistics based on 24 of 26 reporting participants.		

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

6NDV3G (X) - Extreme Data.

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



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

**Report #3032G,**  
**December 2019**

**Key to Instrument Codes Reported by Participants**

**ZZ** Instruments No Longer Tracked



# Paper & Paperboard Interlaboratory Testing Program

Report #3032G,  
December 2019

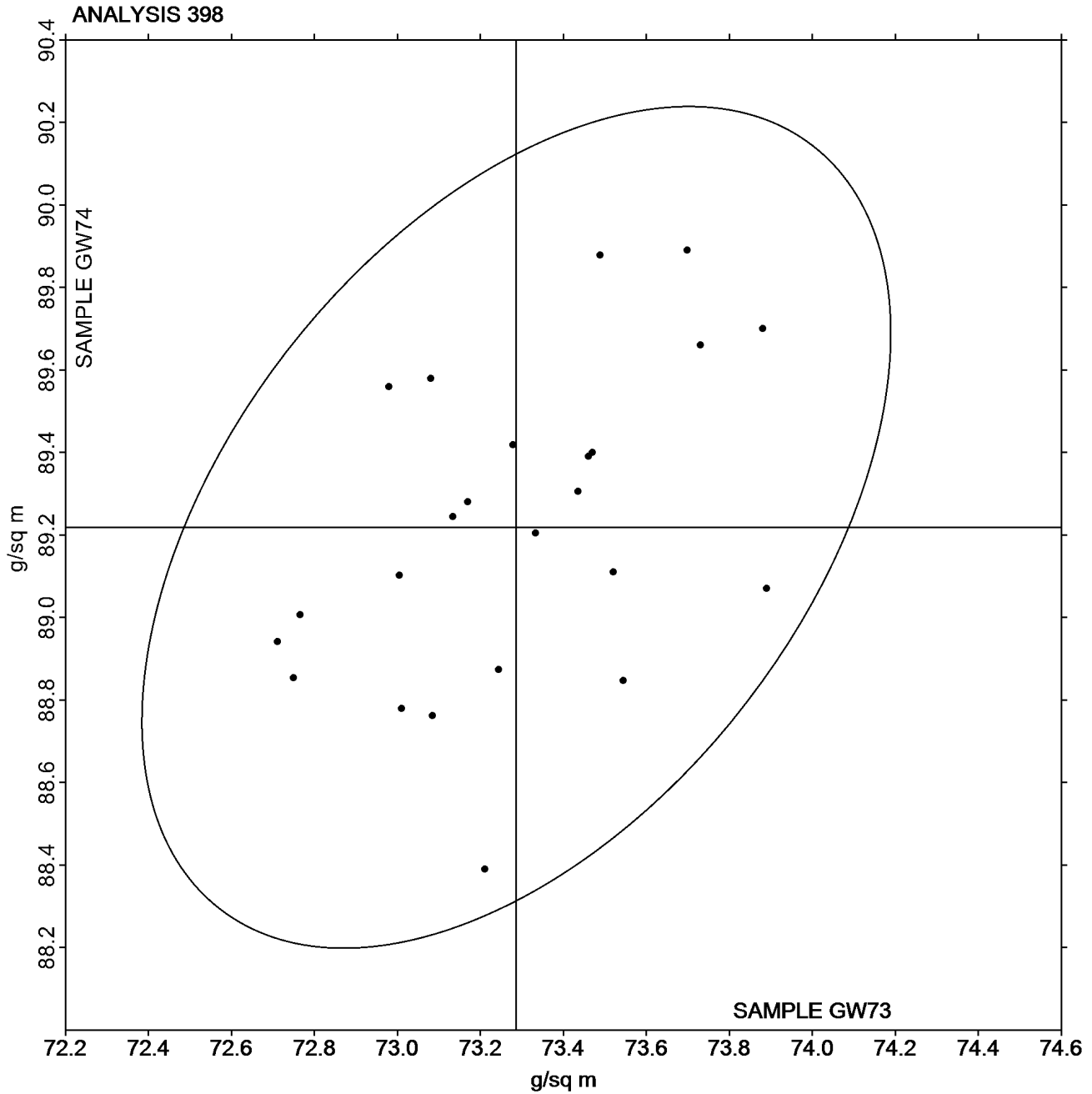
## Analysis 398

Grammage (Mass per Unit Area)

TAPPI Official Test Method T410

Grand Mean Sample GW73 = 73.286  
g/sq m

Grand Mean Sample GW74 =  
89.219 g/sq m





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

Report #3032G,  
December 2019

WebCode	Data Flag	Sample GX73			Sample GX74			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3PFARR		13.42	-1.55	-0.36	13.42	-0.71	-0.18	XX
4F6VFU		13.60	-1.37	-0.32	12.90	-1.23	-0.32	HE
6E8ZCH		12.22	-2.75	-0.64	11.55	-2.58	-0.67	HE
AC6K3G		9.79	-5.18	-1.20	8.72	-5.41	-1.41	HE
ADJ37M	*	26.73	11.76	2.72	23.04	8.91	2.32	HE
C3T6AD		10.78	-4.19	-0.97	10.39	-3.74	-0.97	HE
D6EDRD		22.41	7.44	1.72	22.03	7.90	2.06	XX
D9U27J		14.38	-0.59	-0.14	13.90	-0.23	-0.06	HE
D9XGMP		11.66	-3.31	-0.76	12.29	-1.84	-0.48	HE
DL4GE9		17.70	2.73	0.63	17.90	3.77	0.98	HE
GFKKZA	*	24.39	9.42	2.18	20.57	6.44	1.68	HE
H3U926		14.44	-0.53	-0.12	12.84	-1.29	-0.34	HE
HE3LAC		17.18	2.21	0.51	15.49	1.36	0.35	HE
JZ3HJX		12.55	-2.42	-0.56	11.95	-2.18	-0.57	HE
KDHUHK		17.31	2.34	0.54	15.62	1.49	0.39	HE
KPYD62	X	35.20	20.23	4.68	27.60	13.47	3.51	HE
NBL77D		14.08	-0.89	-0.20	11.83	-2.30	-0.60	HE
NRCKRD		13.87	-1.10	-0.25	11.02	-3.11	-0.81	HE
QUAK6F		13.67	-1.30	-0.30	13.20	-0.93	-0.24	HE
REDZP4		12.76	-2.21	-0.51	12.28	-1.85	-0.48	HE
RKYT24		13.15	-1.82	-0.42	12.92	-1.21	-0.32	HE
RYNNJP		9.66	-5.31	-1.23	9.86	-4.27	-1.11	HE
TGBDT3		13.24	-1.73	-0.40	11.57	-2.56	-0.67	HE
VDP8AX		12.82	-2.15	-0.50	12.92	-1.21	-0.32	HE
XJP7XR		17.14	2.17	0.50	16.38	2.25	0.59	XX
XNKN6X	*	20.94	5.97	1.38	21.66	7.53	1.96	HE
YYZTXE		10.19	-4.78	-1.10	10.81	-3.32	-0.86	HE
ZQZJY2		13.98	-0.99	-0.23	14.45	0.32	0.08	HE

Summary Statistics	Sample GX73	Sample GX74
<b>Grand Means</b>	14.97 Seconds	14.13 Seconds
<b>Std Dev Btwn Labs</b>	4.32 Seconds	3.84 Seconds

Statistics based on 27 of 28 reporting participants.

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

KPYD62 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.



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**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

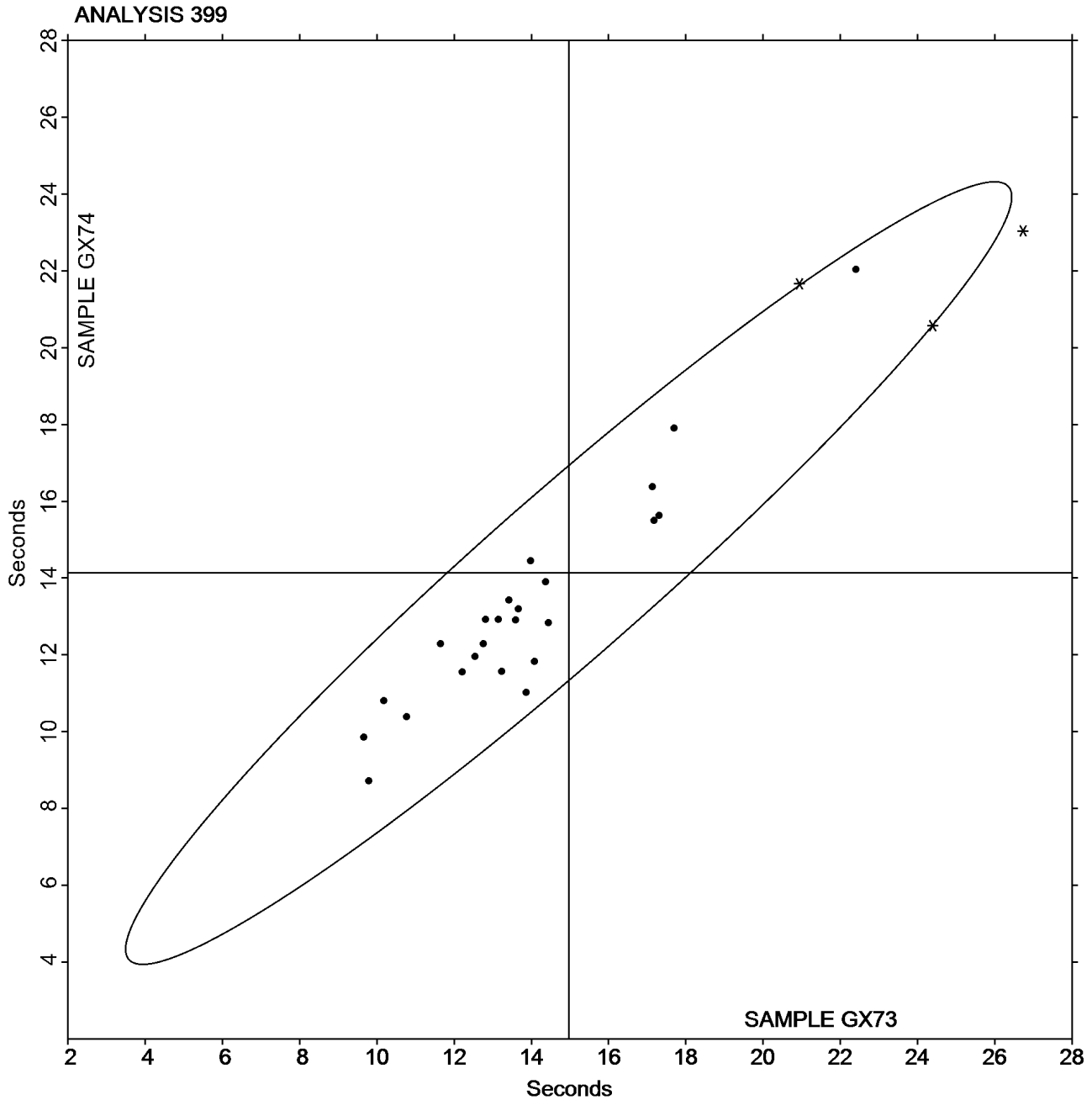
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### Sizing Test (Hercules Type) TAPPI Official Test Method T530

Grand Mean Sample GX73 = 14.965  
Seconds

Grand Mean Sample GX74 = 14.130  
Seconds





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**Sizing Test (Hercules Type)**

**TAPPI Official Test Method T530**

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-End of Report-