

Color & Appearance Testing Program

Summary Report #193 - 3rd Qtr 2020

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[Key to Tables and Graphs \(Color Tests\)](#)

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<u>Analysis</u>	<u>Analysis Name</u>
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408	Color & Color Difference (Paint Chips) - 45-0
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409	Color & Color Difference (Paint Chips) Sphere
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411	Spectrophotometric (Paint Chips) - Sphere
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440	Gloss 60 Degree (Paint Chips)
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About The Color & Appearance Program

The Collaborative Reference Program for Color & Appearance is operated and maintained by Collaborative Testing Services, Inc. (CTS), with technical guidance and advice provided by representatives from various instrument manufacturers. The program allows laboratories to compare periodically the performance of their testing with that of other laboratories.

Paint chip samples, which have been custom-made specifically for Collaborative Testing Services by Munsell Color, X-Rite Inc., Grand Rapids, MI, are distributed four times per year to participating laboratories. Gloss participants test two pairs of paint chip samples at different gloss levels, approximately 5-10 units apart. Color & Color Difference participants measure a set of two opaque color paint chips, selected from throughout the full color spectrum, consisting of a nonmetameric match with small color differences. These data are analyzed in two separate tables based on the conditions of measurement used. Laboratories that also participate in the Spectrophotometric analyses measure one of the opaque color chips for % reflectance at 16 wavelengths.

Please refer to each test's 'Key' for definitions of terms used in the tables and graphs and guidelines to interpreting the results. Also shown are notes concerning specific laboratory results, as well as significant findings related to instrument types or other testing variations.

ABOUT CTS

Founded in 1971, CTS is a privately-owned company that specializes in interlaboratory tests for a wide variety of industries, including rubber, plastics, fasteners and metals, containerboard, 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 control objectives. Labs from the U.S., as well as more than 80 countries, currently participate in the CTS programs.

For further information concerning this report contact:

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Key for Color Program Web Summary Report

WebCode	Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Color Report published on the CTS web site. The Web Code for each analysis can be found in the Performance Analysis Report emailed to each participant.
Lab Mean	The average of the 2 test results obtained by the participant for CIE L*,a*,b* color space values.
Grand Mean	The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.
Between-Lab Standard Deviation	An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).
Comparative Performance Value	An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa). The critical value for each CPV will vary depending on the number of labs participating in a test.
Graphs	For each laboratory, the LAB MEAN for the first sample is plotted against the LAB MEAN for the second sample with each point representing a laboratory. The horizontal and vertical axes are the GRAND MEANS for each sample. For each test there are three plots: L*2 vs L*1, a*2 vs a*1 and b*2 vs b*1. The a* and b* plots are created using absolute values.
Inst Code	A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section).
Data Flag	DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

<u>DATA FLAG</u>	<u>STATISTICALLY INCLUDED/EXCLUDED</u>	<u>ACTION REQUIRED</u>
*	INCLUDED	CAUTION - review testing procedure and monitor future results. Results fall outside 95% ellipse but within a 99% ellipse that is calculated but not drawn.
X	EXCLUDED	STOP - immediate review of data and/or testing procedure is required. Results fall outside the 99% ellipse and one or more CPV are greater than critical value. See specific notes following each table for more information on why the data is excluded. It is also possible to have an "X" for individual color coordinate (L*, a* or b*) without overall "X" flag. It means that results fall outside the 99% ellipse for particular coordinate but have no CPV flags. Those results will not require any action.
M	EXCLUDED	PROCEED - lab was unable to report data for at least one sample. However, a lab receiving two of more M flags for a test may need to stop and review its testing procedures.

Key for Spectrophotometric Web Summary Report

WebCode	Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Color Report published on the CTS web site. The Web Code for each analysis can be found in the Performance Analysis Report emailed to each participant.
Grand Mean	The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.
Between-Lab Standard Deviation	An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).
Inst Code	A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section).
Data Flag	DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

<u>DATA FLAG</u>	<u>STATISTICALLY INCLUDED/EXCLUDED</u>	<u>ACTION REQUIRED</u>
X	EXCLUDED	STOP - immediate review of data and/or testing procedure is required. See specific notes following each table for more information on why the data is excluded.

In addition to the DATA FLAG column, it is also possible to have a flag on individual wavelength values as follows:

*	The laboratory's mean for that wavelength deviates from the GRAND MEAN by more than two BETWEEN-LAB STANDARD DEVIATIONS.
X	The laboratory's mean for that wavelength deviates from the GRAND MEAN by more than the critical limit determined by a 99.5% confidence interval.

Key for Gloss Web Summary Report

WebCode Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Color Report published on the CTS web site. The Web Code for each analysis can be found in the Performance Analysis Report emailed to each participant.

Lab Mean The average of the test results obtained by the participant.

Grand Mean The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.

Difference from Grand Mean The difference of the LAB MEAN from the GRAND MEAN.

Between-Lab Standard Deviation An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).

Comparative Performance Value An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa). The critical value for each CPV will vary depending on the number of labs participating in a test.

Inst Code A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section).

Graphs 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 above.

Data Flag DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

<u>DATA FLAG</u>	<u>STATISTICALLY INCLUDED/EXCLUDED</u>	<u>ACTION REQUIRED</u>
*	INCLUDED	CAUTION - review testing procedure and monitor future results. Results fall outside 95% ellipse but within a 99% ellipse that is calculated but not drawn.
X	EXCLUDED	STOP - immediate review of data and/or testing procedure is required. Results fall outside the 99% ellipse. See specific notes following each table for more information on why the data is excluded.
M	EXCLUDED	PROCEED - lab was unable to report data for at least one sample. However, a lab receiving two of more M flags for a test may need to stop and review its testing procedures.



CTS Interlaboratory Testing Program for Color & Appearance

Report #193

Analysis 408

3rd Qtr 2020

Color and Color Difference - Paint Chips - 45-0 Geometry Instruments

CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
2ZJP6J		C201	37.20	-7.95	-12.20	0.70	-0.45	-0.40	0.92	HW
		C202	37.90	-8.40	-12.60					
39V4PZ		C201	37.13	-8.46	-11.93	0.66	-0.49	-0.45	0.94	MF
		C202	37.78	-8.96	-12.38					
3V7YMV		C201	37.18	-8.32	-12.06	0.73	-0.48	-0.40	0.96	XM
		C202	37.91	-8.80	-12.46					
6E9XFD		C201	37.34	-8.28	-12.10	0.61	-0.53	-0.42	0.91	XO
		C202	37.95	-8.81	-12.52					
7P9GYU	X	C201	36.37	-6.04	-13.06	0.76	-0.35	-0.35	0.90	XU
		C202	37.12	-6.39	-13.41					
8J2BWW		C201	37.02	-8.24	-11.93	0.78	-0.44	-0.40	0.98	XU
		C202	37.80	-8.68	-12.33					
ACRZER		C201	37.22	-8.28	-11.95	0.76	-0.48	-0.38	0.98	XC
		C202	37.98	-8.75	-12.33					
AKL2WQ		C201	36.59	-8.41	-12.16	0.74	-0.46	-0.35	0.94	HY
		C202	37.33	-8.88	-12.51					
AU8AFT		C201	37.42	-8.25	-12.07	0.79	-0.48	-0.34	0.98	GB
		C202	38.20	-8.73	-12.41					
AXBZNT		C201	37.11	-8.62	-12.15	0.84	-0.46	-0.35	1.02	XZ
		C202	37.95	-9.08	-12.50					
BWAMFR		C201	36.74	-8.06	-12.28	0.81	-0.42	-0.36	0.98	HW
		C202	37.55	-8.49	-12.64					
CGFGMN		C201	36.89	-8.21	-12.08	0.74	-0.39	-0.37	0.92	HK
		C202	37.63	-8.60	-12.45					
CT6EPL		C201	37.01	-8.27	-12.09	0.81	-0.41	-0.36	0.97	XO
		C202	37.81	-8.68	-12.45					
DGVZ8L		C201	36.84	-7.92	-12.38	0.76	-0.44	-0.38	0.95	HW
		C202	37.59	-8.36	-12.76					
EFE4FL		C201	37.33	-8.31	-11.87	0.76	-0.44	-0.39	0.95	XD
		C202	38.09	-8.74	-12.26					
F982L6		C201	36.82	-8.38	-12.09	0.79	-0.45	-0.39	0.99	HX
		C202	37.61	-8.82	-12.48					



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CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
FC8DG6		C201	36.97	-8.05	-12.30	0.78	-0.48	-0.43	1.02	XX
		C202	37.76	-8.53	-12.73					
G4BUF2		C201	36.32	-9.21	-12.33	0.84	-0.44	-0.38	1.03	BG
		C202	37.16	-9.65	-12.71					
GL98WF	X	C201	36.40	-5.60	-13.48	0.73	-0.37	-0.42	0.92	HW
		C202	37.13	-5.97	-13.90					
H7WXQK		C201	37.74	-8.36	-11.85	0.65	-0.41	-0.37	0.85	XE
		C202	38.39	-8.77	-12.22					
HCM4PF		C201	36.91	-8.53	-11.98	0.81	-0.43	-0.38	1.00	PR
		C202	37.72	-8.97	-12.35					
JUYD4L		C201	37.27	-8.46	-12.05	0.69	-0.43	-0.35	0.88	XE
		C202	37.96	-8.89	-12.40					
JWQBHK		C201	36.97	-8.26	-11.90	0.79	-0.44	-0.39	0.99	XU
		C202	37.76	-8.70	-12.29					
KQXNZJ		C201	37.09	-8.50	-11.78	0.76	-0.38	-0.38	0.93	GE
		C202	37.85	-8.88	-12.16					
L4WWED		C201	37.08	-8.41	-11.74	0.74	-0.43	-0.38	0.94	GE
		C202	37.82	-8.84	-12.12					
MK3K3X		C201	37.00	-8.33	-11.84	0.77	-0.53	-0.43	1.03	GE
		C202	37.78	-8.86	-12.28					
N2YLCA		C201	36.31	-9.16	-12.32	0.73	-0.47	-0.39	0.96	BG
		C202	37.04	-9.63	-12.71					
PH7Y7C		C201	36.71	-8.28	-11.84	0.74	-0.46	-0.38	0.95	GG
		C202	37.45	-8.73	-12.22					
PNUL2H		C201	36.99	-8.36	-11.86	0.72	-0.48	-0.38	0.94	XU
		C202	37.71	-8.84	-12.24					
PXHHXC		C201	36.10	-9.22	-12.27	0.77	-0.43	-0.36	0.95	BG
		C202	36.87	-9.64	-12.63					
QBYR4E		C201	36.98	-7.89	-12.29	0.78	-0.43	-0.39	0.97	MG
		C202	37.76	-8.33	-12.67					
QYRUDT		C201	37.10	-8.20	-12.30	0.80	-0.40	-0.40	0.98	HW
		C202	37.90	-8.60	-12.70					



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WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
RQBTDA		C201	36.86	-7.44	-12.49	0.80	-0.42	-0.41	0.99	HW
		C202	37.66	-7.86	-12.90					
TCPHJR		C201	37.15	-8.49	-12.01	0.77	-0.44	-0.37	0.96	XS
		C202	37.92	-8.94	-12.37					
UGUWL9		C201	37.26	-8.54	-12.07	0.61	-0.24	-0.46	0.80	XN
		C202	37.87	-8.78	-12.53					
VBMQ3M		C201	36.90	-7.45	-12.60	0.80	-0.40	-0.40	0.98	HW
		C202	37.70	-7.85	-13.00					
VH6X88		C201	37.10	-8.50	-11.82	0.76	-0.44	-0.34	0.94	GE
		C202	37.86	-8.94	-12.16					
VWQ8UC	X	C201	36.53	-8.12	-11.50	0.81	-0.40	-0.30	0.95	MP
		C202	37.34	-8.53	-11.80					
WAAF74		C201	37.00	-8.51	-11.96	0.80	-0.44	-0.38	0.98	XU
		C202	37.80	-8.95	-12.34					
WBGUDA		C201	37.91	-8.28	-12.17	0.76	-0.43	-0.35	0.94	MU
		C202	38.67	-8.71	-12.52					
XDZBZM		C201	37.15	-8.13	-12.29	0.80	-0.48	-0.43	1.02	HW
		C202	37.95	-8.61	-12.72					
YBFG78		C201	37.01	-8.14	-12.32	0.72	-0.43	-0.34	0.90	HW
		C202	37.73	-8.57	-12.66					
YGKKRY		C201	36.69	-8.08	-12.12	0.88	-0.49	-0.43	1.09	HW
		C202	37.57	-8.56	-12.55					
YZCLM3		C201	37.11	-8.33	-11.84	0.74	-0.42	-0.35	0.93	GE
		C202	37.85	-8.75	-12.19					
ZT6EK6		C201	37.15	-8.61	-11.91	0.74	-0.44	-0.37	0.93	GH
		C202	37.89	-9.05	-12.28					



Summary Statistics							
<u>Samples</u>	<u>L*</u>	<u>a*</u>	<u>b*</u>	<u>ΔL*</u>	<u>Δa*</u>	<u>Δb*</u>	<u>ΔE*</u>
Grand Means							
C201	36.97	-8.31	-12.08				
C202	37.73	-8.76	-12.47	0.76	-0.44	-0.39	0.96
Std Dev Btwn Labs							
C201	0.35	0.35	0.21				
C202	0.34	0.36	0.21	0.06	0.05	0.03	0.05

Statistics based on 42 of 45 reporting participants

Comments Assigned on Data Flags for Test #408

7P9GYU(X) - Extreme data for "a*" values. Low data for "b*" values.

GL98WF(X) - Extreme Data. Very high data for "a*" values. Very low data for "b*" values.

VWQ8UC(X) - High data for "b*" values. Large Delta b.

Key to Instrument Codes Reported by Participants

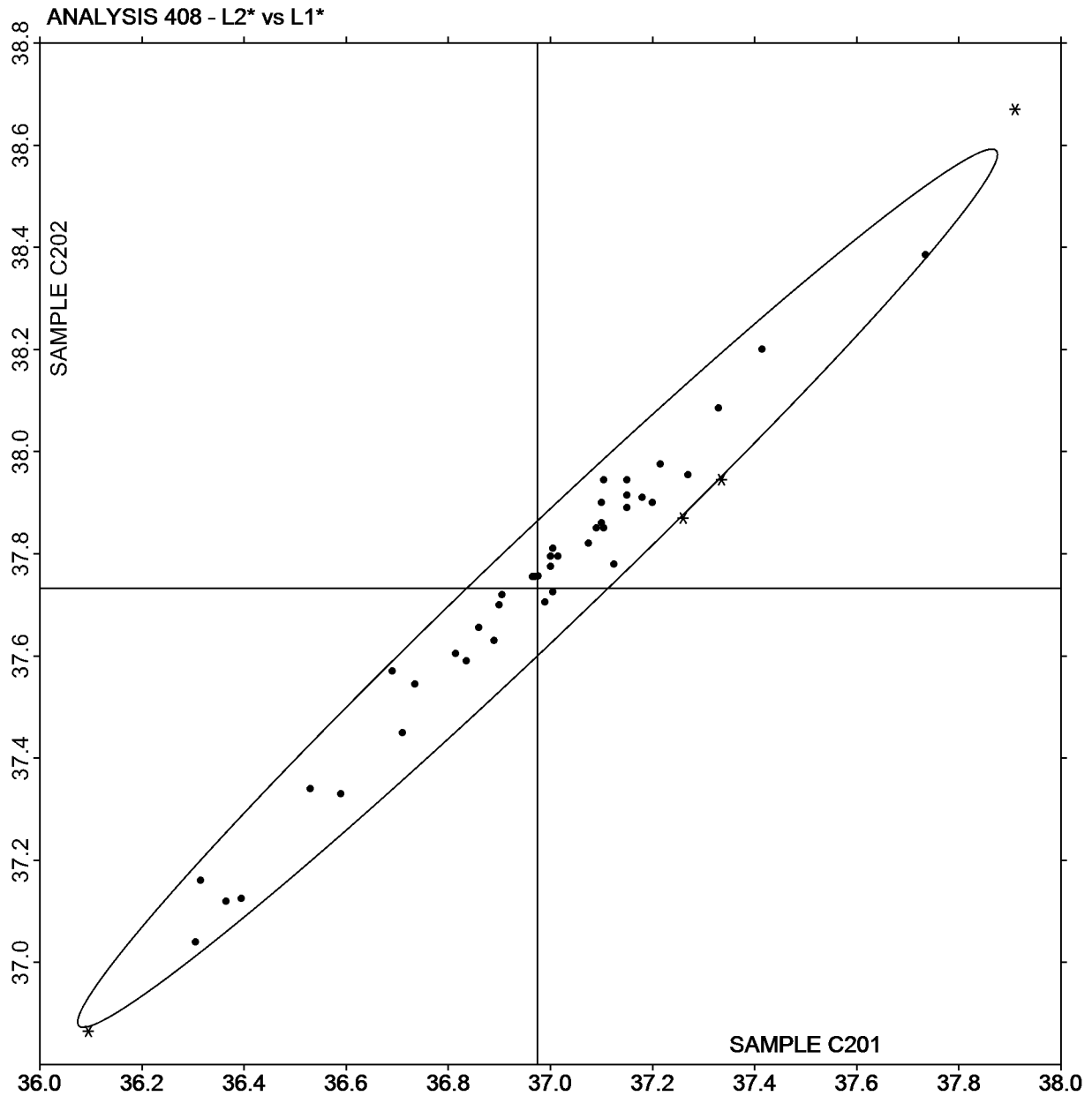
BG BYK Mac i	GB BYK-Gardner spectro-guide sphere gloss
GE BYK-Gardner spectro-guide (45/0)	GG BYK-Gardner spectro2-guide (45/0) gloss
GH BYK-Gardner Color-View	HK Hunter MiniScan XE (45/0)
HW Hunter LabScan XE	HX Hunter Color FlexEZ 45/0
HY Hunter Color Flex 45/0	MF Minolta FD Series
MG Macbeth 1500/PLUS or 2025+ Color Eye	MP Minolta CM-2500c Spectrophotometer
MU Minolta	PR PhotoResearch PR730
XC X-Rite i1Basic Pro	XD X-Rite 500 Series SpectroDensitometer
XE X-Rite eXact Portable Spectrophotometer	XM X-Rite MA58 Multi-Angle Spectrophotometer
XN X-Rite MA68 Multi-Angle Spectrophotometer	XO X-Rite MA68 II Multi-Angle Spectrophotometer
XS X-Rite 962 Portable Spectrophotometer	XU X-Rite 964 Portable Spectrophotometer
XX Instrument make/model not specified by lab	XZ X-Rite



L2* vs L1*

SAMPLE C201 = 36.97

SAMPLE C202 = 37.73

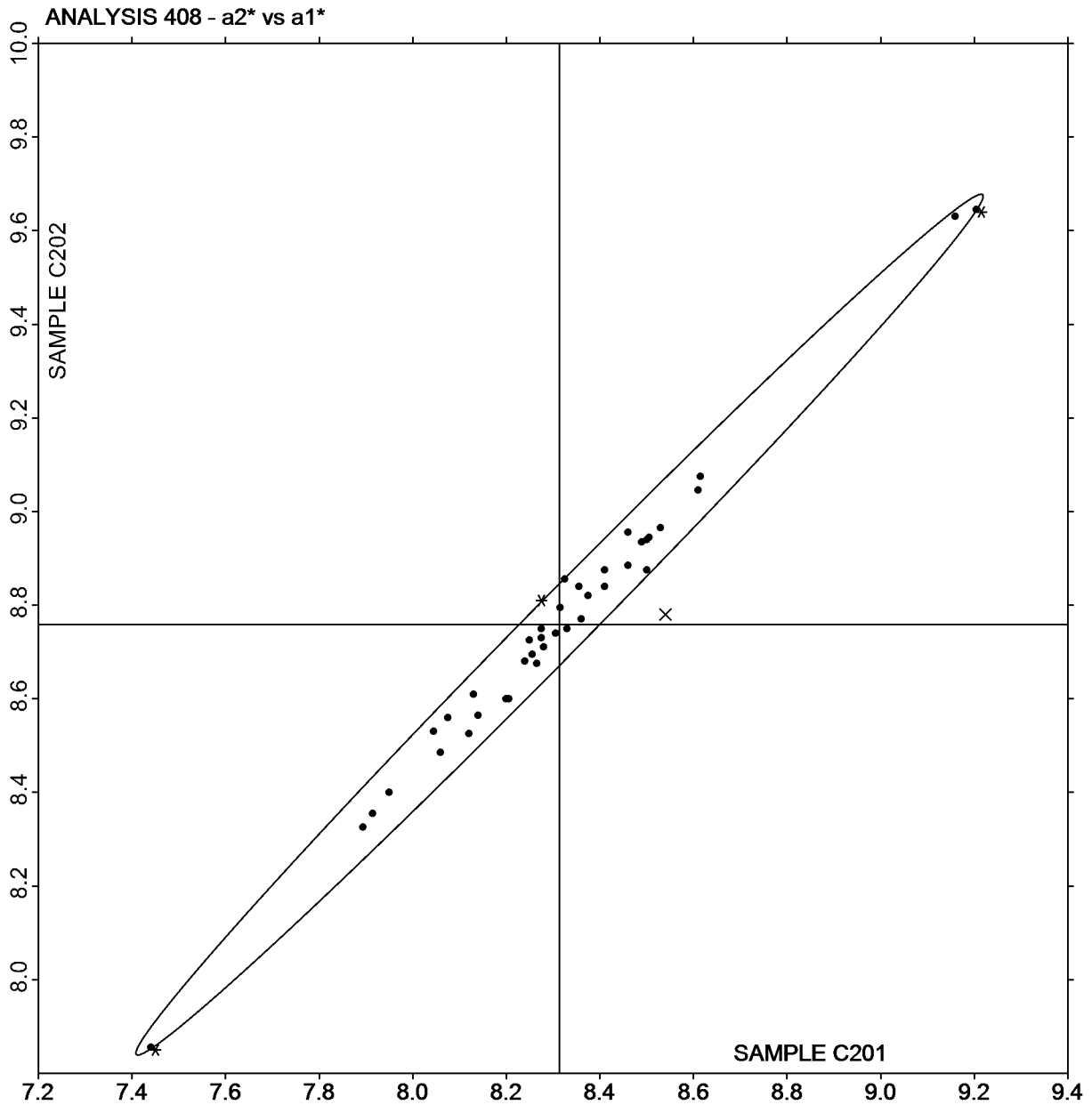




a2* vs a1*

SAMPLE C201 = -8.31

SAMPLE C202 = -8.76



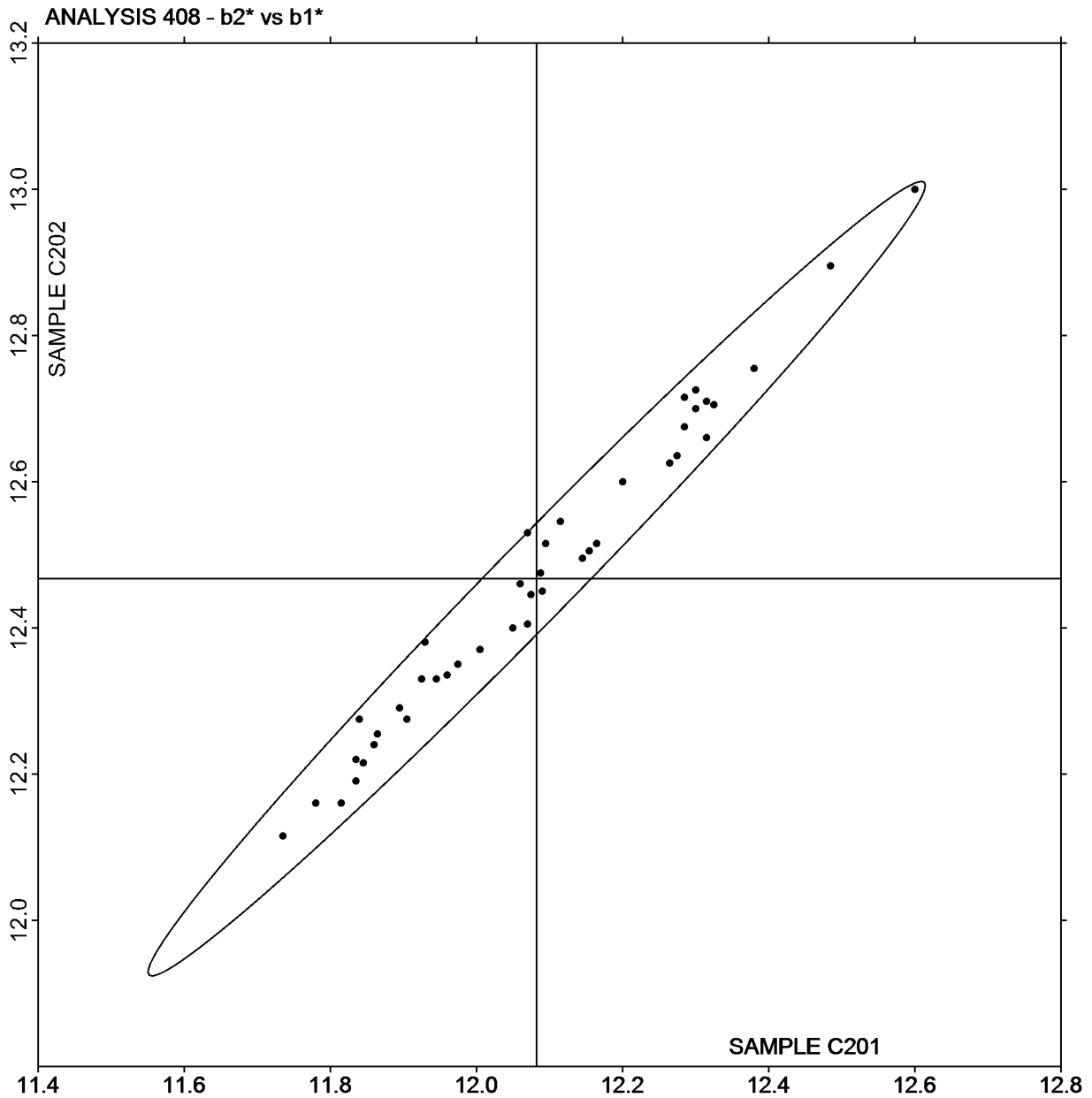
Plot created using absolute values.



b2* vs b1*

SAMPLE C201 = -12.08

SAMPLE C202 = -12.47



Plot created using absolute values.



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**Color and Color Difference - Paint Chips - Sphere Geometry Instruments
CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer**

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
2QG3LY	X	C201	40.30	-7.11	-12.30	0.72	-0.49	-0.44	0.98	MY
		C202	41.02	-7.60	-12.74					
2RRAHZ		C201	37.63	-8.22	-12.21	0.80	-0.45	-0.38	0.99	XB
	C202	38.42	-8.67	-12.60						
3B2LMV		C201	37.68	-8.29	-12.01	0.78	-0.44	-0.40	0.98	MM
	C202	38.46	-8.73	-12.41						
3KPF4Y		C201	37.96	-8.43	-12.22	0.78	-0.41	-0.33	0.94	CA
	C202	38.74	-8.84	-12.55						
3V7YMV		C201	37.62	-8.19	-12.11	0.80	-0.41	-0.34	0.96	XQ
	C202	38.43	-8.59	-12.45						
3VLLWW		C201	37.61	-8.26	-11.95	0.77	-0.40	-0.39	0.95	XI
	C202	38.38	-8.66	-12.34						
3XYVA4		C201	37.60	-8.34	-12.18	0.84	-0.43	-0.38	1.02	XR
	C202	38.44	-8.77	-12.56						
696MRU		C201	37.69	-8.32	-11.99	0.78	-0.43	-0.32	0.95	XI
	C202	38.47	-8.75	-12.31						
69L4K2		C201	37.69	-8.26	-12.08	0.81	-0.42	-0.34	0.97	XI
	C202	38.50	-8.67	-12.42						
77V3DT		C201	37.69	-8.25	-12.04	0.77	-0.39	-0.37	0.94	XI
	C202	38.46	-8.64	-12.41						
7ERXFW		C201	37.56	-8.09	-12.00	0.75	-0.40	-0.39	0.94	XH
	C202	38.31	-8.49	-12.40						
8AVRYX		C201	37.74	-8.23	-12.12	0.77	-0.43	-0.38	0.96	XB
	C202	38.50	-8.67	-12.50						
8J2BWV		C201	37.57	-8.17	-12.23	0.79	-0.28	-0.39	0.92	XI
	C202	38.36	-8.45	-12.62						
93Q9CT		C201	37.65	-8.28	-12.12	0.79	-0.46	-0.39	0.99	AM
	C202	38.44	-8.73	-12.52						
98L3AU		C201	37.79	-8.29	-12.13	0.81	-0.42	-0.34	0.97	AJ
	C202	38.60	-8.71	-12.46						
9MADWW		C201	37.44	-8.01	-11.99	0.78	-0.42	-0.31	0.94	XH
	C202	38.22	-8.43	-12.30						



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 CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
9NUW4P		C201	37.54	-8.08	-11.84	0.84	-0.43	-0.36	1.01	MU
		C202	38.38	-8.51	-12.19					
A4XQBN		C201	37.80	-8.32	-12.07	0.80	-0.45	-0.35	0.98	AO
		C202	38.60	-8.77	-12.42					
AU8AFT		C201	37.42	-8.31	-12.08	0.81	-0.45	-0.33	0.98	GD
		C202	38.23	-8.75	-12.41					
AZEXQA		C201	37.48	-8.62	-12.31	0.81	-0.44	-0.36	0.99	CA
		C202	38.29	-9.06	-12.67					
B2PV4Q		C201	37.85	-8.19	-12.06	0.78	-0.40	-0.35	0.95	MM
		C202	38.63	-8.59	-12.41					
BFG4R		C201	37.76	-8.36	-12.07	0.79	-0.44	-0.41	1.00	MM
		C202	38.56	-8.80	-12.49					
BQ6V69		C201	37.90	-8.36	-11.95	0.76	-0.43	-0.38	0.95	AS
		C202	38.66	-8.79	-12.32					
BQ7KBQ		C201	37.75	-8.31	-11.92	0.82	-0.43	-0.37	0.99	AS
		C202	38.57	-8.73	-12.29					
CCKMPM		C201	37.61	-8.21	-12.03	0.77	-0.44	-0.38	0.96	XB
		C202	38.37	-8.65	-12.40					
CE9YPT		C201	37.42	-7.95	-11.80	0.83	-0.42	-0.42	1.02	XH
		C202	38.26	-8.37	-12.22					
CT6EPL		C201	37.85	-7.92	-12.18	0.77	-0.42	-0.37	0.95	MI
		C202	38.63	-8.33	-12.55					
CZBRQQ		C201	37.77	-8.29	-12.27	0.79	-0.40	-0.36	0.96	AJ
		C202	38.56	-8.69	-12.63					
D3P6NJ		C201	37.72	-8.36	-12.06	0.76	-0.44	-0.37	0.96	MW
		C202	38.48	-8.80	-12.42					
D83U78		C201	37.71	-8.36	-12.26	0.76	-0.42	-0.35	0.93	HP
		C202	38.47	-8.78	-12.61					
D8KYLK		C201	37.76	-8.18	-12.08	0.77	-0.38	-0.31	0.91	MM
		C202	38.53	-8.56	-12.39					
DE7W9M		C201	37.58	-8.25	-12.03	0.76	-0.41	-0.37	0.93	XI
		C202	38.34	-8.66	-12.40					



CTS Interlaboratory Testing Program for Color & Appearance

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**Color and Color Difference - Paint Chips - Sphere Geometry Instruments
CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer**

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
DH73TK		C201	37.51	-8.14	-12.03	0.81	-0.41	-0.35	0.97	XM
		C202	38.31	-8.55	-12.38					
DL6EPK		C201	37.59	-8.33	-12.11	0.80	-0.43	-0.37	0.97	MV
		C202	38.39	-8.76	-12.47					
DZ8MTT		C201	37.73	-8.28	-12.14	0.80	-0.40	-0.33	0.95	XB
		C202	38.53	-8.69	-12.47					
EGP72K		C201	37.72	-8.35	-12.00	0.82	-0.41	-0.35	0.98	AS
		C202	38.54	-8.76	-12.35					
EXYUEK		C201	37.79	-8.18	-12.09	0.79	-0.43	-0.35	0.97	XI
		C202	38.57	-8.62	-12.44					
FM8VZK		C201	37.74	-8.27	-12.12	0.77	-0.44	-0.35	0.95	MM
		C202	38.50	-8.71	-12.47					
FQAW2H		C201	37.69	-8.16	-12.09	0.78	-0.43	-0.36	0.95	XI
		C202	38.47	-8.59	-12.45					
G89DKL		C201	37.60	-8.27	-12.24	0.78	-0.39	-0.33	0.93	XD
		C202	38.38	-8.66	-12.56					
GC9K6J		C201	37.53	-8.15	-11.96	0.74	-0.39	-0.37	0.92	XO
		C202	38.27	-8.54	-12.33					
GLTTMK		C201	37.81	-8.37	-12.01	0.72	-0.38	-0.39	0.90	MT
		C202	38.52	-8.76	-12.39					
GQLXE4		C201	37.42	-8.48	-12.19	0.79	-0.44	-0.38	0.98	CA
		C202	38.21	-8.93	-12.58					
HCM4PF	X	C201	37.59	6.97	-6.88	0.85	0.16	-0.72	1.13	CA
		C202	38.44	7.14	-7.59					
JWQBHK		C201	37.76	-8.29	-11.95	0.78	-0.46	-0.39	0.99	XI
		C202	38.54	-8.75	-12.35					
K7MYML		C201	37.87	-8.45	-12.21	0.93	-0.43	-0.32	1.08	CA
		C202	38.80	-8.88	-12.53					
KMACZE		C201	37.80	-8.21	-12.17	0.73	-0.47	-0.37	0.94	XI
		C202	38.53	-8.68	-12.54					
KPLRUE		C201	37.83	-8.35	-12.01	0.77	-0.40	-0.39	0.95	AJ
		C202	38.60	-8.75	-12.40					



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**Color and Color Difference - Paint Chips - Sphere Geometry Instruments
CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer**

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
KYNDY		C201	37.83	-8.30	-12.17	0.77	-0.42	-0.36	0.94	AH
		C202	38.60	-8.71	-12.52					
L4WWED		C201	37.67	-8.09	-12.26	0.77	-0.41	-0.36	0.95	MM
		C202	38.44	-8.50	-12.62					
LFVTGE		C201	37.67	-8.33	-12.17	0.80	-0.43	-0.34	0.97	AQ
		C202	38.47	-8.76	-12.51					
LXCW2L		C201	37.89	-8.47	-11.77	0.86	-0.39	-0.41	1.03	AO
		C202	38.75	-8.86	-12.18					
M4TWPW		C201	37.76	-8.35	-12.15	0.78	-0.42	-0.38	0.96	AS
		C202	38.54	-8.77	-12.54					
MC9FAW		C201	37.70	-8.30	-12.10	0.80	-0.40	-0.30	0.94	MS
		C202	38.50	-8.70	-12.40					
MGHR9H		C201	37.65	-8.22	-12.04	0.84	-0.42	-0.32	0.99	XI
		C202	38.49	-8.64	-12.36					
NAD8KD		C201	37.71	-8.34	-12.14	0.79	-0.43	-0.32	0.96	MV
		C202	38.51	-8.77	-12.46					
NFZ3HB		C201	37.51	-8.21	-12.13	0.78	-0.45	-0.43	1.00	XM
		C202	38.30	-8.66	-12.55					
PH7Y7C	X	C201	37.26	-8.42	-11.92	0.88	-0.33	-0.34	1.00	GE
		C202	38.14	-8.76	-12.26					
PUFEDG		C201	37.77	-8.36	-12.21	0.73	-0.42	-0.38	0.93	AO
		C202	38.50	-8.78	-12.59					
Q7NPDC	X	C201	-10.92	-8.18	-13.23	0.81	-0.45	-0.34	0.99	AJ
		C202	-10.10	-8.63	-13.57					
QDQQHC		C201	37.84	-8.29	-12.06	0.82	-0.44	-0.38	1.01	AJ
		C202	38.67	-8.72	-12.45					
QL6KT9		C201	37.56	-8.27	-12.07	0.76	-0.45	-0.35	0.95	MY
		C202	38.32	-8.71	-12.42					
QXEDZE		C201	37.79	-8.36	-12.02	0.81	-0.43	-0.39	0.99	AS
		C202	38.59	-8.79	-12.41					
R7KLYR		C201	37.74	-8.37	-12.06	0.80	-0.41	-0.35	0.96	AS
		C202	38.53	-8.78	-12.41					



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3rd Qtr 2020

Color and Color Difference - Paint Chips - Sphere Geometry Instruments
 CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
T3JVCC		C201	37.66	-8.21	-12.10	0.80	-0.40	-0.32	0.96	XI
		C202	38.46	-8.62	-12.42					
TCPHJR		C201	37.67	-8.24	-11.97	0.74	-0.44	-0.37	0.94	AJ
		C202	38.41	-8.67	-12.34					
TEWV97	X	C201	30.93	-4.14	-10.92	0.67	-0.29	-0.38	0.82	HP
		C202	31.60	-4.42	-11.30					
TN23N7		C201	37.67	-7.99	-12.38	0.81	-0.41	-0.38	0.98	XO
		C202	38.48	-8.39	-12.75					
TVK7V9		C201	37.80	-8.39	-12.06	0.82	-0.43	-0.38	1.00	AS
		C202	38.62	-8.81	-12.43					
TWW9G8		C201	37.76	-8.36	-12.18	0.81	-0.46	-0.34	1.00	AJ
		C202	38.58	-8.82	-12.52					
TX9HUE		C201	37.92	-8.29	-12.08	0.72	-0.41	-0.40	0.92	AJ
		C202	38.63	-8.70	-12.48					
TZVJD8		C201	37.78	-8.34	-12.08	0.83	-0.40	-0.34	0.98	AJ
		C202	38.61	-8.74	-12.42					
U89RE9		C201	37.56	-8.20	-12.07	0.78	-0.43	-0.36	0.97	XB
		C202	38.35	-8.63	-12.44					
UAD3PQ		C201	37.94	-8.14	-12.00	0.78	-0.40	-0.37	0.95	XH
		C202	38.72	-8.54	-12.37					
UGUWL9		C201	37.44	-8.18	-12.31	0.81	-0.40	-0.38	0.99	XO
		C202	38.26	-8.58	-12.69					
ULA4A8		C201	37.75	-8.31	-12.07	0.77	-0.42	-0.34	0.94	MU
		C202	38.52	-8.73	-12.41					
VCXR79		C201	37.85	-8.37	-11.95	0.79	-0.40	-0.40	0.97	AS
		C202	38.64	-8.78	-12.35					
VU27M3		C201	37.78	-8.28	-12.03	0.91	-0.45	-0.39	1.09	MM
		C202	38.69	-8.73	-12.42					
VWQ8UC		C201	37.66	-8.37	-12.20	0.81	-0.44	-0.35	0.98	XB
		C202	38.47	-8.81	-12.55					
VXXU2P		C201	37.71	-8.36	-12.08	0.79	-0.42	-0.33	0.96	MV
		C202	38.51	-8.78	-12.41					



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**Color and Color Difference - Paint Chips - Sphere Geometry Instruments
CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer**

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
VZ4C27		C201	37.83	-8.31	-12.32	0.81	-0.42	-0.34	0.98	AQ
		C202	38.65	-8.72	-12.66					
WEG7AA		C201	37.69	-8.30	-12.04	0.79	-0.47	-0.38	1.00	MK
		C202	38.48	-8.77	-12.42					
WK8FJ8		C201	37.82	-8.17	-12.01	0.82	-0.45	-0.43	1.03	XI
		C202	38.64	-8.62	-12.44					
WTK6J2		C201	37.62	-7.99	-12.18	0.80	-0.42	-0.37	0.98	XH
		C202	38.43	-8.42	-12.55					
WZYDK3		C201	37.78	-8.28	-11.96	0.75	-0.44	-0.37	0.94	XB
		C202	38.53	-8.71	-12.33					
Y2PYRY		C201	37.67	-8.23	-12.14	0.77	-0.38	-0.31	0.91	XI
		C202	38.43	-8.61	-12.45					
YJALY9		C201	37.66	-8.36	-12.04	0.80	-0.46	-0.42	1.01	AB
		C202	38.46	-8.83	-12.46					
YNZW97		C201	37.87	-8.33	-12.03	0.80	-0.43	-0.34	0.96	AO
		C202	38.67	-8.76	-12.36					
YZCLM3		C201	37.39	-8.13	-12.04	0.80	-0.44	-0.35	0.98	GD
		C202	38.19	-8.57	-12.39					
Z8QUN4		C201	37.76	-8.23	-12.01	0.85	-0.43	-0.41	1.04	AJ
		C202	38.61	-8.66	-12.42					
ZT6EK6		C201	37.83	-8.25	-12.13	0.80	-0.40	-0.34	0.96	MV
		C202	38.63	-8.65	-12.47					
ZTQXJJ		C201	37.60	-8.02	-11.98	0.79	-0.44	-0.35	0.97	XH
		C202	38.39	-8.46	-12.33					

Summary Statistics								
Samples	L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
Grand Means								
C201	37.69	-8.26	-12.08	0.79	-0.42	-0.36	0.97	
C202	38.48	-8.68	-12.44					
Std Dev Btwn Labs								
C201	0.13	0.12	0.11	0.03	0.03	0.03	0.03	
C202	0.13	0.12	0.11					

Statistics based on 87 of 92 reporting participants



Comments Assigned on Data Flags for Test #409

- 2QG3LY(X) - Extreme data for "L*" and "a*" values. Inconsistent in determinations of "b*" values.
- HCM4PF(X) - Extreme data for "a*" and "b*" values. Large Delta a and Delta E values. Small Delta b values.
- PH7Y7C(X) - Low "L*" values for Sample C201. Large replication difference for both "L*" values. Large replication difference for "a*" values for Sample C201. Large Delta a.
- Q7NPDC(X) - Extreme data for "L*" and "b*" values.
- TEWV97(X) - Extreme data for "L*", "a*" and "b*" values. Small Delta L and Delta E values. Large Delta a values.

Key to Instrument Codes Reported by Participants

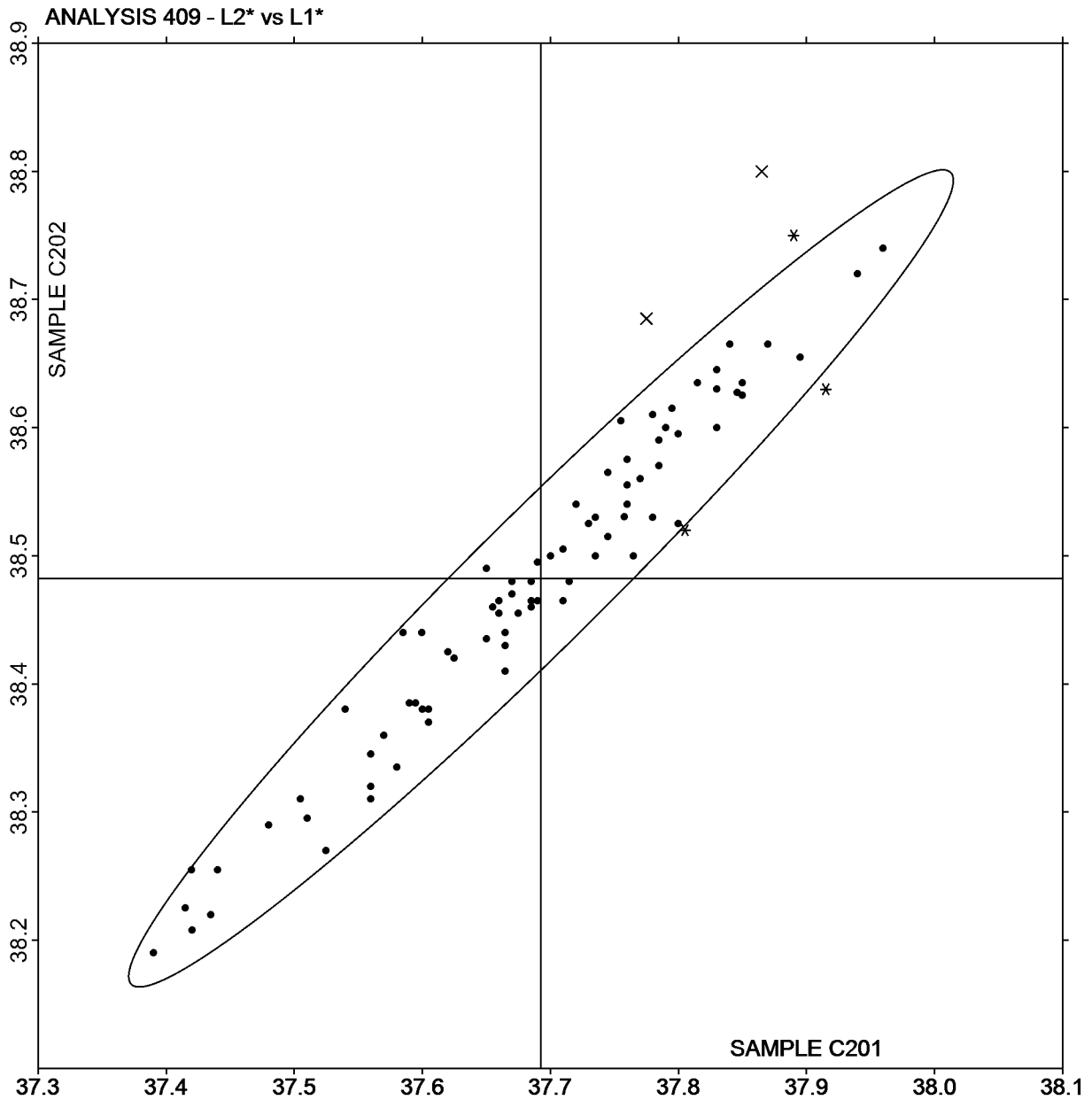
AB Datacolor 100	AH DataColor 550
AJ Datacolor 600	AM Datacolor 600 Plus
AO Datacolor 650x	AQ Datacolor 600x
AS Datacolor 800	CA Cary 5000
GD BYK-Gardner Spectro-Guide Sphere	GE BYK-Gardner Spectro2-Guide Sphere Gloss
HP Hunter UltraScan PRO	MI Macbeth Color i5
MK Macbeth Color-Eye 7000	MM Macbeth Color-Eye 7000a
MS Minolta CM-600d	MT Minolta CM-2600d
MU Minolta	MV Minolta CM-3000d Spectrophotometer
MW Minolta CM 3700a Spectrophotometer	MY Minolta Benchtop Spectrophotometer CM-3600a
XB X-Rite Ci7000 Series Benchtop Spectrophotometer	XD X-Rite Ci7800 Benchtop Spectrophotometer
XH X-Rite Color i5 Benchtop Spectrophotometer	XI X-Rite Color i7 Benchtop Spectrophotometer
XM X-Rite SP62 Portable Sphere Spectrophotometer	XO X-Rite SP64 Portable Sphere Spectrophotometer
XQ X-Rite SP68 Portable Sphere Spectrophotometer	XR X-Rite



L2* vs L1*

SAMPLE C201 = 37.69

SAMPLE C202 = 38.48



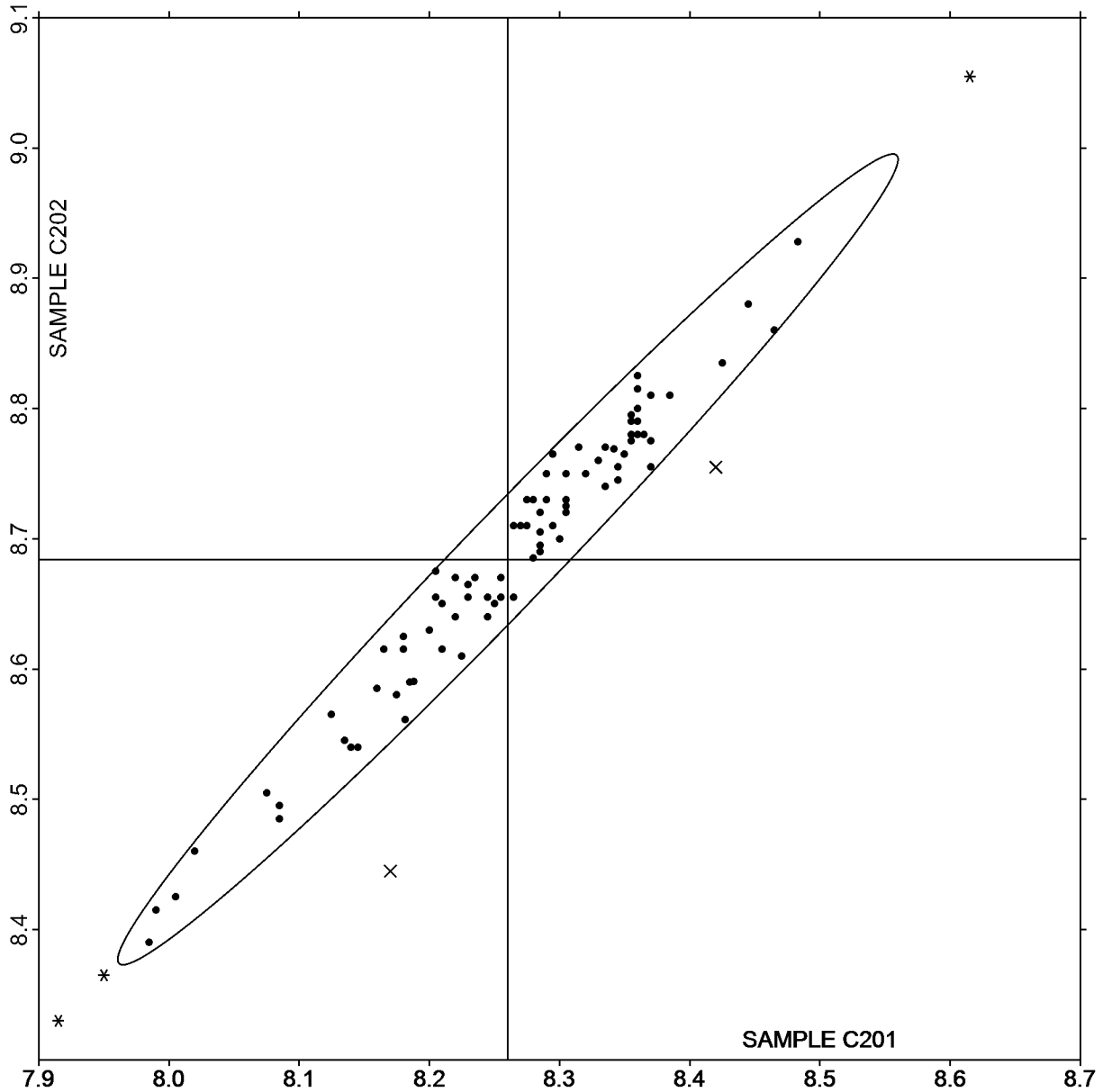


a2* vs a1*

SAMPLE C201 = -8.26

SAMPLE C202 = -8.68

ANALYSIS 409 - a2* vs a1*



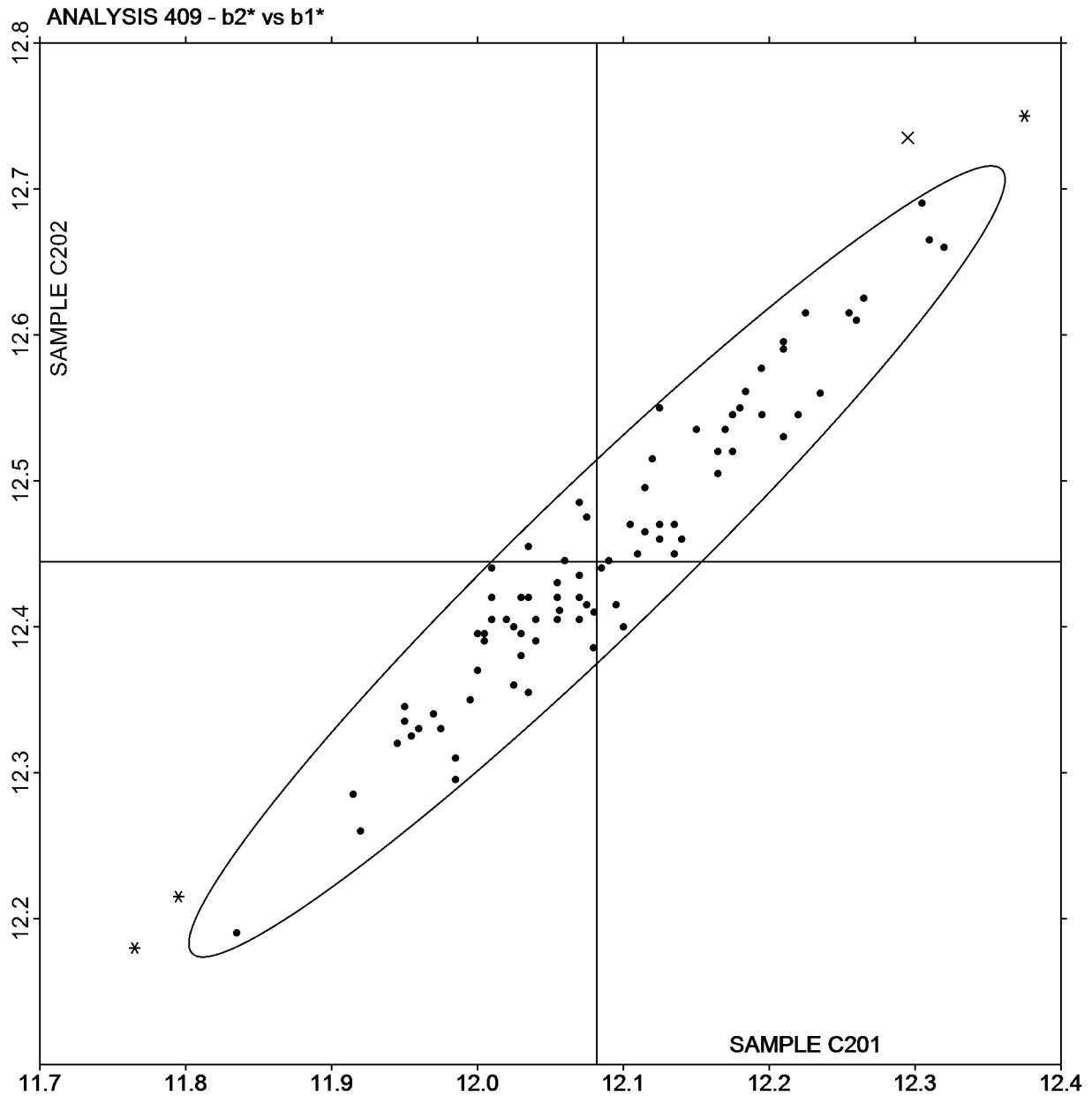
Plot created using absolute values.



b2* vs b1*

SAMPLE C201 = -12.08

SAMPLE C202 = -12.44



Plot created using absolute values.



CTS Interlaboratory Testing Program for Color & Appearance Analysis 411

Report #193
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Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

WebCode	Data Flag	Spectrophotometric Reflectance values (as %) at selected wavelengths																Instr Code
		400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	
Sample C201																		
2QG3LY	X	13.85X	15.71X	16.53X	16.70X	16.36X	15.93X	14.96X	13.16X	10.59X	8.74X	8.02X	7.78X	7.83X	8.07X	8.03X	7.79X	MY
2RRAHZ		12.85	14.08	14.59	14.50	14.04	13.47	12.51	10.87	8.70	7.23	6.61	6.41	6.41	6.57	6.45	6.25	XD
3B2LMV	X	19.29X	23.58X	25.33X	26.68X	27.00X	27.05X	25.89X	22.14X	17.34X	15.16X	14.56X	15.18X	18.62X	21.02X	18.92X	17.72X	MM
3KPF4Y		13.00	14.22	14.86*	14.76	14.30	13.75	12.80	11.11	8.86	7.33	6.70	6.50	6.50	6.68	6.58	6.36	CA
3VLLWW		12.51	13.99	14.44	14.39	13.92	13.42	12.48	10.86	8.73	7.25	6.63	6.40	6.45	6.54	6.40	6.22	XI
3XYVA4		12.74	14.09	14.57	14.48	14.03	13.47	12.52	10.87	8.70	7.21	6.58	6.35	6.31*	6.45*	6.33*	6.11*	XR
69L4K2		12.87	14.12	14.55	14.52	14.04	13.53	12.57	10.92	8.72	7.26	6.64	6.46	6.43	6.56	6.42	6.19	XI
7ERXFW		12.65	13.99	14.44	14.37	13.91	13.36	12.42	10.85	8.68	7.24	6.64	6.45	6.49	6.58	6.47	6.31	XH
8AVRYX		12.84	14.13	14.60	14.54	14.08	13.51	12.58	10.93	8.78	7.30	6.68	6.45	6.45	6.58	6.44	6.22	XB
8J2BWV		12.74	14.11	14.54	14.47	13.96	13.43	12.47	10.85	8.66	7.23	6.60	6.39	6.41	6.58	6.43	6.25	XI
93Q9CT		12.74	14.12	14.55	14.44	14.04	13.49	12.57	10.90	8.68	7.25	6.65	6.39	6.39	6.49	6.45	6.30	AM
98L3AU		12.81	14.25	14.64	15.09X	14.15	13.57	12.64	10.96	8.81	7.30	6.69	6.44	6.45	6.59	6.53	6.36	AJ
9MADWW		12.29	13.91	14.36	14.27*	13.83*	13.30*	12.34	10.72*	8.62	7.23	6.62	6.43	6.38	6.55	6.42	6.22	XH
9NUW4P		12.50	13.88	14.36	14.31	13.88	13.34	13.40X	10.80	8.71	7.26	6.64	6.44	6.48	6.65	6.60	6.41	MU
A4XQBN		12.90	14.18	14.63	14.57	14.15	13.57	12.65	10.99	8.82	7.30	6.69	6.46	6.48	6.61	6.58	6.45	AN
AU8AFT		13.75X	13.78X	14.27*	14.32	13.82*	13.19X	12.43	10.99	8.49X	7.19	6.56	6.24X	6.38	6.52	6.45	6.24	GD
AZEXQA		12.80	14.05	14.67	14.59	14.17	13.62	12.67	11.03	8.81	7.28	6.66	6.44	6.44	6.61	6.53	6.31	CA
B2PV4Q		12.83	14.21	14.69	14.60	14.16	13.59	12.64	10.98	8.85	7.36	6.73	6.51	6.50	6.63	6.59	6.39	MM
BFKG4R		12.68	14.09	14.62	14.54	14.12	13.54	12.61	10.98	8.80	7.30	6.65	6.44	6.44	6.61	6.51	6.32	MM
BQ6V69		12.96	14.19	14.61	14.57	14.17	13.62	12.68	11.07	8.91	7.35	6.76	6.51	6.51	6.62	6.48	6.39	AS
BQ7KBQ		12.67	14.08	14.51	14.48	14.05	13.51	12.59	10.96	8.81	7.30	6.70	6.47	6.48	6.62	6.54	6.41	AS
CCKMPM		12.63	14.01	14.48	14.42	13.96	13.41	12.48	10.86	8.72	7.25	6.65	6.42	6.42	6.56	6.45	6.23	XB



CTS Interlaboratory Testing Program for Color & Appearance Analysis 411

Report #193
3rd Qtr 2020

Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

WebCode	Data Flag	Spectrophotometric Reflectance values (as %) at selected wavelengths																Instr Code
		400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	
Sample C201																		
CT6EPL		12.83	14.30	14.70	14.66	14.18	13.59	12.59	10.99	8.84	7.36	6.76	6.64X	6.67X	6.79X	6.68*	6.53*	MI
CZBRQQ		14.14X	14.21	14.68	14.64	14.19	13.56	12.62	10.97	8.76	7.27	6.68	6.45	6.45	6.57	6.53	6.34	AJ
D3P6NJ		12.99	14.09	14.57	14.55	14.09	13.54	12.62	10.97	8.78	7.26	6.67	6.47	6.48	6.65	6.59	6.36	MW
D83U78		12.96	14.06	14.72	14.59	14.11	13.58	12.63	10.93	8.81	7.25	6.55	6.38	6.41	6.84X	6.57	6.26	HP
D8KYLK		12.74	14.17	14.64	14.56	14.07	13.51	12.58	10.95	8.83	7.32	6.67	6.45	6.47	6.62	6.52	6.29	MM
DE7W9M		12.75	14.17	14.67	14.53	14.15	13.59	12.63	10.93	8.78	7.30	6.66	6.41	6.44	6.57	6.47	6.24	XI
DH73TK		13.00	14.15	14.65	14.60	14.10	13.60	12.60	10.90	8.70	7.20	6.60	6.50	6.55	6.80X	6.40	6.30	HW
DL6EPK		12.62	14.05	14.48	14.45	13.98	13.45	12.51	10.86	8.67	7.18	6.59	6.37	6.38	6.55	6.49	6.26	MV
DZ8MTT		12.82	14.16	14.51	14.54	14.08	13.53	12.58	10.77	8.79	7.29	6.66	6.43	6.42	6.53	6.44	6.18	XB
EGP72K		12.92	14.06	14.51	14.51	14.09	13.53	12.60	10.94	8.76	7.30	6.68	6.44	6.46	6.56	6.49	6.33	AS
EXYUEK		12.78	14.20	14.65	14.53	14.09	13.54	12.61	10.96	8.79	7.34	6.72	6.48	6.47	6.64	6.50	6.32	XI
FM8VZK		12.71	14.11	14.63	14.55	14.10	13.55	12.58	10.92	8.77	7.30	6.66	6.45	6.47	6.63	6.53	6.32	MM
FQAW2H		12.80	14.15	14.60	14.50	14.05	13.50	12.50	10.90	8.75	7.30	6.70	6.40	6.45	6.60	6.45	6.30	XI
GC9K6J		12.51	13.90	14.40	14.38	13.95	13.37	12.46	10.83	8.67	7.23	6.63	6.42	6.46	6.59	6.53	6.31	XO
GLTTMK		12.57	14.07	14.62	14.60	14.14	13.58	12.65	11.01	8.81	7.30	6.68	6.46	6.47	6.64	6.55	6.35	MT
GQLXE4		12.59	13.79*	14.47	14.35	13.93	13.40	12.44	10.79	8.59*	7.07X	6.46X	6.25X	6.26X	6.43*	6.35*	6.13*	CA
HCM4PF	X	12.46	12.96X	12.59X	12.13X	11.40X	10.22X	9.06X	8.53X	8.75	9.78X	11.60X	11.12X	11.48X	13.46X	14.48X	14.72X	CA
JWQBHK		12.66	14.04	14.56	14.50	14.08	13.55	12.60	10.96	8.78	7.33	6.73	6.49	6.45	6.59	6.48	6.36	XI
K7MYML		12.92	14.14	14.79	14.70	14.25	13.70	12.74	11.05	8.80	7.28	6.67	6.45	6.46	6.63	6.51	6.21	CA
KMACZE		12.83	14.23	14.69	14.62	14.10	13.57	12.63	10.98	8.80	7.35	6.69	6.49	6.44	6.61	6.49	6.24	XI
KPLRUE		13.94X	14.17	14.61	14.57	14.13	13.58	12.66	11.03	8.84	7.30	6.71	6.48	6.50	6.61	6.54	6.38	AJ
KYNDYD		12.78	14.25	14.66	14.63	14.18	13.57	12.66	11.01	8.84	7.31	6.72	6.45	6.45	6.56	6.49	6.37	AH



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Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

WebCode	Data Flag	Spectrophotometric Reflectance values (as %) at selected wavelengths																Instr Code
		400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	
Sample C201																		
L4WWED		12.87	14.12	14.67	14.56	14.11	13.50	12.51	10.88	8.71	7.27	6.65	6.44	6.48	6.63	6.56	6.36	MM
LFVTGE		12.58	14.11	14.56	14.56	14.11	13.55	12.56	10.90	8.73	7.23	6.63	6.41	6.44	6.52	6.43	6.32	AQ
LXCW2L		12.80	14.10	14.50	14.50	14.20	13.60	12.65	11.10	8.90	7.40*	6.70	6.50	6.50	6.60	6.60	6.50*	AN
M4TWPW		12.83	14.15	14.63	14.61	14.16	13.56	12.62	10.97	8.78	7.30	6.67	6.44	6.44	6.55	6.52	6.40	AS
MC9FAW		12.60	14.10	14.55	14.50	14.05	13.50	12.55	10.90	8.75	7.30	6.65	6.40	6.40	6.55	6.50	6.30	MS
MGHR9H		12.60	14.05	14.51	14.44	14.01	13.50	12.54	10.87	8.71	7.26	6.65	6.46	6.47	6.64	6.45	6.32	XI
NAD8KD		12.62	14.13	14.63	14.52	14.05	13.57	12.61	10.92	8.73	7.21	6.66	6.38	6.42	6.61	6.53	6.29	MV
PH7Y7C		12.84	14.33	14.99X	14.93X	14.53X	13.74	12.95*	11.24X	8.96*	7.37	6.70	6.47	6.49	6.66	6.60	6.40	GE
PUFEDG		12.77	14.24	14.59	14.64	14.17	13.60	12.61	10.98	8.79	7.28	6.65	6.42	6.41	6.55	6.48	6.35	AN
Q7NPDC		12.81	14.13	14.56	14.54	14.12	13.59	12.65	10.99	8.79	7.28	6.71	6.45	6.46	6.62	6.62	6.43	AJ
QDQQHC		12.79	14.21	14.64	14.58	14.17	13.62	12.65	11.03	8.83	7.33	6.72	6.49	6.49	6.60	6.51	6.39	AJ
QL6KT9		12.38	13.82*	14.27*	14.24*	13.77*	13.26*	12.34	10.77	8.57*	7.12*	6.52*	6.33	6.34	6.51	6.43	6.22	MY
QXEDZE		12.93	14.13	14.58	14.53	14.16	13.60	12.64	10.99	8.80	7.29	6.72	6.47	6.47	6.58	6.47	6.37	AS
R7KLYR		12.85	14.09	14.58	14.52	14.10	13.54	12.60	10.97	8.77	7.27	6.68	6.42	6.44	6.56	6.51	6.39	AS
T3JVCC		12.76	14.08	14.54	14.48	14.01	13.49	12.53	10.86	8.72	7.28	6.64	6.44	6.46	6.57	6.43	6.23	XI
TN23N7		12.70	14.33	14.71	14.59	14.09	13.97X	12.50	10.89	8.72	7.24	6.67	6.45	6.50	6.61	6.54	6.31	XO
TVK7V9		12.79	14.13	14.62	14.56	14.17	13.60	12.65	11.02	8.81	7.29	6.71	6.46	6.45	6.61	6.53	6.41	AS
TWV9G8		12.69	14.23	14.63	14.59	14.13	13.55	12.62	11.00	8.79	7.24	6.66	6.42	6.44	6.54	6.43	6.30	AJ
TX9HUE		12.97	14.27	14.71	14.67	14.26	13.67	12.70	11.06	8.82	7.35	6.74	6.51	6.54	6.64	6.55	6.42	AJ
TZVJD8		12.81	14.16	14.60	14.55	14.15	13.60	12.64	10.99	8.79	7.28	6.71	6.46	6.47	6.58	6.46	6.38	AJ
U89RE9		12.69	14.00	14.47	14.41	13.96	13.39	12.45	10.82	8.70	7.24	6.62	6.38	6.38	6.51	6.41	6.24	XB
UAD3PQ		12.74	14.28	14.69	14.65	14.18	13.65	12.68	11.06	8.91	7.43*	6.79*	6.58*	6.57*	6.73	6.62	6.40	XH



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Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

WebCode	Data Flag	Spectrophotometric Reflectance values (as %) at selected wavelengths																Instr Code
		400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	
Sample C201																		
UGUWL9		12.80	14.02	14.49	14.43	13.92	13.36	12.41	10.77	8.59*	7.11X	6.54*	6.32*	6.35	6.50	6.42	6.21	XO
ULA4A8		12.64	14.15	14.58	14.57	14.11	13.55	12.63	10.96	8.77	7.26	6.67	6.45	6.48	6.65	6.58	6.35	MV
VCXR79	X	44.90X	46.10X	48.30X	53.10X	60.90X	70.90X	76.20X	74.10X	70.00X	65.80X	62.90X	60.90X	60.10X	60.50X	61.80X	63.70X	AS
VU27M3		12.68	14.10	14.62	14.56	14.11	13.54	12.60	10.95	8.82	7.32	6.68	6.47	6.48	6.64	6.55	6.34	MM
VWQ8UC		12.74	14.09	14.61	14.51	14.09	13.51	12.57	10.91	8.72	7.24	6.61	6.38	6.36	6.51	6.41	6.17	XB
VZ4C27		13.61X	14.32	14.74	14.69	14.23	13.65	12.68	11.01	8.81	7.29	6.70	6.46	6.48	6.60	6.47	6.32	AQ
WEG7AA		12.58	14.02	14.55	14.49	14.02	13.49	12.55	10.92	8.77	7.28	6.64	6.42	6.43	6.59	6.51	6.30	MK
WK8FJ8	X	13.28	14.87X	15.40X	15.35X	14.90X	14.28X	13.27X	11.55X	9.19X	7.60X	6.92X	6.72X	6.75X	6.87X	6.78X	6.55*	XI
WTK6J2		12.81	14.09	14.56	14.50	13.98	13.44	12.47	10.86	8.67	7.30	6.68	6.47	6.51	6.61	6.46	6.28	XH
WZYDK3		12.78	14.10	14.57	14.51	14.07	13.52	12.61	10.98	8.81	7.33	6.71	6.49	6.48	6.64	6.50	6.28	XB
Y2PYRY		12.72	14.16	14.57	14.50	14.03	13.49	12.54	10.90	8.73	7.25	6.63	6.45	6.46	6.60	6.44	6.24	XI
YJALY9		12.54	14.00	14.51	14.46	14.06	13.53	12.54	10.88	8.74	7.24	6.64	6.41	6.41	6.57	6.48	6.09*	AB
YNZW97		12.95	14.20	14.60	14.60	14.15	13.60	12.70	11.05	8.90	7.30	6.70	6.50	6.50	6.70	6.60	6.50*	AN
YZCLM3		13.21	13.78X	14.35*	14.33	13.97	13.37	12.18X	10.84	8.59*	7.21	6.49X	6.31*	6.35	6.48	6.39	6.11*	GD
Z8QUN4		12.83	14.12	14.59	14.51	14.07	13.49	12.59	10.96	8.81	7.31	6.69	6.47	6.47	6.60	6.55	6.36	AJ
ZT6EK6		12.86	14.20	14.69	14.64	14.19	13.63	12.67	10.99	8.79	7.30	6.72	6.51	6.55	6.71	6.63	6.41	MV
ZTQXJJ		12.62	14.00	14.45	14.43	13.92	13.37	12.45	10.84	8.72	7.27	6.65	6.47	6.54	6.60	6.50	6.29	XH



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Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

Summary Statistics

	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700
Grand Means	12.81	14.11	14.58	14.53	14.08	13.53	12.59	10.94	8.76	7.27	6.66	6.44	6.45	6.60	6.50	6.31
SD Btwn Labs	0.29	0.12	0.12	0.13	0.11	0.11	0.14	0.09	0.08	0.06	0.06	0.06	0.06	0.07	0.07	0.09

Comments Assigned on Data Flags for Test #411

- 2QG3LY (X) - High % reflectance data at all wavelengths.
- 3B2LMV (X) - Very high % reflectance data at all wavelengths.
- HCM4PF (X) - High and low % reflectance data at various wavelengths.
- VCXR79 (X) - Extremely high % reflectance data at all wavelengths.
- WK8FJ8 (X) - High % reflectance data for almost all wavelengths.

Key to Instrument Codes Reported by Participants

AB Datacolor 100	AH Datacolor 550	AJ Datacolor 600
AM Datacolor 600 Plus	AN Datacolor 650	AQ Datacolor 600x
AS Datacolor 800	CA Cary 5000	GD BYK-Gardner Spectro-Guide Sphere
GE BYK-Gardner Spectro2-Guide Sphere Gloss	HP Hunter UltraScan PRO	HW Hunter UltraScan XE
MI Macbeth Color i5	MK Macbeth Color-Eye 7000	MM Macbeth Color-Eye 7000a
MS Minolta CM-600d	MT Minolta CM-2600d	MU Minolta
MV Minolta CM-3000d Spectrophotometer	MW Minolta CM 3700a Spectrophotometer	MY Minolta Benchtop Spectrophotometer CM-3600a
XB X-Rite Ci7000 Series Benchtop Spectrophotometer	XD X-Rite Ci7800 Benchtop Spectrophotometer	XH X-Rite Color i5 Benchtop Spectrophotometer
XI X-Rite Color i7 Benchtop Spectrophotometer	XO X-Rite SP64 Sphere Spectrophotometer	XR X-Rite



Interlaboratory Testing Program for Color & Appearance

Report #193

Analysis 440

3rd Qtr 2020

60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample G201			Sample G202			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
3B2LMV		58.86	0.87	0.97	69.58	0.16	0.18	GL
3V7YMV		56.60	-1.39	-1.55	68.55	-0.87	-0.97	GL
3XYVA4		57.75	-0.24	-0.27	69.63	0.20	0.23	GK
696MRU	*	55.60	-2.39	-2.67	66.73	-2.70	-3.01	GL
6E9XFD		58.63	0.63	0.71	70.10	0.68	0.76	GL
77V3DT		58.28	0.28	0.32	69.63	0.20	0.23	GL
7ERXFW		58.73	0.73	0.82	70.20	0.78	0.87	GK
7RGW7Z		58.15	0.16	0.18	70.33	0.90	1.01	GK
7YDNET		57.75	-0.24	-0.27	69.25	-0.17	-0.19	GL
8J2BWV		57.63	-0.37	-0.41	69.60	0.18	0.20	GL
A9RPHR		57.53	-0.47	-0.52	68.65	-0.77	-0.86	GN
AU8AFT		58.20	0.21	0.23	69.35	-0.07	-0.08	GK
AXBZNT		59.48	1.48	1.66	70.95	1.53	1.71	GN
B2PV4Q		58.48	0.48	0.54	69.10	-0.32	-0.36	GL
BFKG4R		57.60	-0.39	-0.44	68.98	-0.45	-0.50	RA
BLCQEP		57.75	-0.24	-0.27	69.38	-0.05	-0.05	GL
BQ6V69		57.70	-0.29	-0.32	68.58	-0.85	-0.94	GK
CE9YPT		57.27	-0.72	-0.81	69.27	-0.15	-0.16	GL
CGFGMN		57.80	-0.19	-0.21	69.68	0.25	0.28	GL
CT6EPL		58.55	0.56	0.62	69.83	0.40	0.45	GL
D3P6NJ		59.63	1.63	1.83	70.53	1.10	1.23	GL
D7DGMF		57.63	-0.37	-0.41	68.98	-0.45	-0.50	GL
DE7W9M		57.05	-0.94	-1.05	69.30	-0.12	-0.13	GT
DH73TK		57.40	-0.59	-0.66	68.93	-0.50	-0.55	GK
E6VUML		55.90	-2.09	-2.33	67.55	-1.87	-2.09	RQ
G89DKL		57.45	-0.54	-0.60	68.93	-0.50	-0.55	GL
GC9K6J		59.25	1.26	1.41	71.15	1.73	1.93	GN
GLQ4G3		58.73	0.73	0.82	70.53	1.10	1.23	GN
H27J7J		57.30	-0.69	-0.77	69.25	-0.17	-0.19	GL
HCM4PF		58.08	0.08	0.09	69.43	0.00	0.01	GL



Interlaboratory Testing Program for Color & Appearance

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60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample G201			Sample G202			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
HML9B2		58.28	0.28	0.32	69.55	0.13	0.14	GK
HQ2GY2	X	59.55	1.56	1.74	67.43	-2.00	-2.23	GK
J388XE		58.65	0.66	0.74	69.58	0.15	0.17	GL
JUYD4L		59.90	1.91	2.13	71.28	1.85	2.07	RA
JWQBHK		57.75	-0.24	-0.27	69.18	-0.25	-0.27	GL
KQXNZJ	X	54.88	-3.12	-3.48	65.08	-4.35	-4.85	GB
L4WWED		56.57	-1.42	-1.59	68.33	-1.10	-1.22	GL
MC9FAW		57.73	-0.27	-0.30	69.55	0.13	0.14	GK
MGHR9H		57.55	-0.44	-0.49	68.50	-0.92	-1.03	MM
MK3K3X		56.38	-1.62	-1.80	67.65	-1.77	-1.97	GK
N2YLCA		57.13	-0.87	-0.97	68.63	-0.80	-0.89	GL
P7XYWD		58.05	0.06	0.07	70.25	0.83	0.93	GK
PHMVYC		59.28	1.28	1.43	70.30	0.88	0.98	GK
PNUL2H		59.08	1.08	1.21	70.55	1.13	1.26	GL
PXHHXC	X	56.00	-1.99	-2.22	66.18	-3.25	-3.62	GL
Q7NPDC		59.15	1.16	1.30	70.23	0.80	0.90	GL
T3JVCC		58.00	0.00	0.01	68.61	-0.82	-0.91	GL
TCPHJR		57.98	-0.02	-0.02	69.35	-0.07	-0.08	GL
TEWV97		59.25	1.26	1.41	70.35	0.93	1.04	GL
TN23N7		58.50	0.51	0.57	69.93	0.50	0.56	MW
TWV9G8		56.85	-1.14	-1.27	68.35	-1.07	-1.19	GK
TX9HUE		57.48	-0.52	-0.58	68.38	-1.05	-1.17	GL
TZVJD8		58.78	0.78	0.88	69.50	0.08	0.09	MW
UAD3PQ	*	58.13	0.13	0.15	68.38	-1.05	-1.17	GL
UGUWL9		58.10	0.11	0.12	69.85	0.43	0.48	GL
ULA4A8		57.70	-0.29	-0.32	69.00	-0.42	-0.47	GL
VH6X88		58.78	0.78	0.88	70.43	1.00	1.12	GN
VV9GJ7		57.33	-0.67	-0.74	68.10	-1.32	-1.47	GK
VWQ8UC		58.93	0.93	1.04	70.10	0.68	0.76	ZA
VXXU2P		57.80	-0.19	-0.21	69.95	0.53	0.59	GN



Interlaboratory Testing Program for Color & Appearance

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60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample G201			Sample G202			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
WAAF74		57.45	-0.54	-0.60	69.50	0.08	0.09	GK
WBGUDA		59.98	1.98	2.22	71.48	2.05	2.29	GK
WN3CZL		57.85	-0.14	-0.16	69.44	0.02	0.02	GK
WTK6J2		58.23	0.23	0.26	69.13	-0.30	-0.33	GL
YJALY9		57.50	-0.49	-0.55	68.93	-0.50	-0.55	GL
YZCLM3	*	57.20	-0.79	-0.88	69.80	0.38	0.42	GN
ZTQXJJ		57.45	-0.54	-0.60	68.95	-0.47	-0.52	GL

Summary Statistics

Grand Means

57.99 Gloss Units

69.42 Gloss Units

Std Dev Btwn Labs

0.90 Gloss Units

0.90 Gloss Units

Statistics based on 64 of 67 reporting participants

Comments on Assigned Data Flags for Test #440

HQ2GY2(X) - Inconsistent in testing between samples and inconsistent within the determinations for Sample G202.

KQXNZJ(X) - Data for both samples are low. Possible systematic error.

PXHHXC(X) - Low data for Sample G202.

Key to Instrument Codes Reported by Participants

GB BYK Gardner Spectro - Guide Sphere Gloss	GK BYK-Gardner micro-gloss (60)
GL BYK-Gardner micro-TRI-gloss	GN BYK-Gardner new micro-TRI-gloss
GT Gardco Novo-Gloss (20/60/85)	MM Macbeth Lab-Gloss
MW Minolta Multi-Gloss 268	RA Rhopoint Novo-Gloss Glossmeter
RQ Rhopoint IQ Goniophotometer 20/60/85°	ZA Zehntner ZGM Series



Interlaboratory Testing Program for Color & Appearance

Report #193

Analysis 440

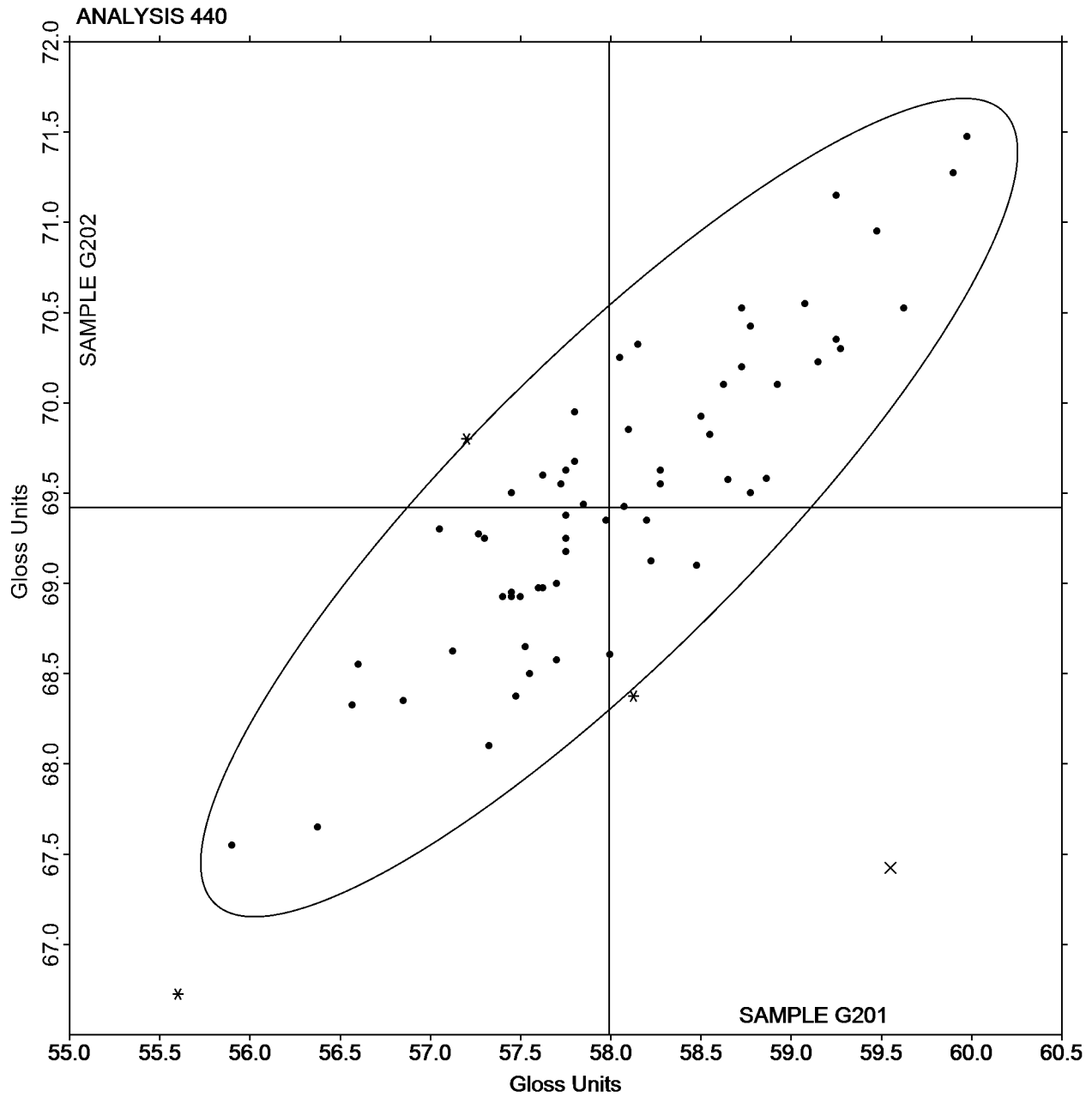
3rd Qtr 2020

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SAMPLE G201 = 57.99 Gloss Units

SAMPLE G202 = 69.42 Gloss Units



-End of Report-