

Color & Appearance Testing Program

Summary Report #214 - 4th Qtr 2025

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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-45-0, D65/10° Observer
409	Color & Color Difference Sphere, D65/10°Observer
411	Spectrophotometric - Sphere
440	Gloss 60 Degree

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, Collaborative Testing Services, Inc. (CTS) is a privately - owned company that specializes in interlaboratory tests for a variety of industries including color, rubber, plastics, fasteners and metals, containerboard, paper, agriculture, hemp, 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 100 countries, currently participate in the CTS programs.

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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

Analysis 408

Report #214

4th Qtr 2025

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^*	
2K9EJT		D251	59.10	-19.50	7.60	0.95	-0.20	-0.50	1.09	HW
		D252	60.05	-19.70	7.10					
2UUHQ7		D251	58.92	-19.39	8.17	0.96	-0.15	-0.55	1.11	XU
		D252	59.88	-19.54	7.63					
399BR6		D251	58.76	-19.42	8.04	0.96	-0.18	-0.51	1.10	MT
		D252	59.72	-19.59	7.53					
3WZ63C		D251	58.91	-19.19	8.15	1.01	-0.16	-0.52	1.14	XU
		D252	59.92	-19.35	7.64					
46TZE2		D251	58.78	-19.10	7.56	0.94	-0.18	-0.48	1.07	HW
		D252	59.72	-19.28	7.08					
4JQ89W		D251	58.19	-18.97	8.06	0.96	-0.22	-0.47	1.09	GA
		D252	59.15	-19.19	7.59					
6AECR9		D251	58.82	-19.26	8.05	1.00	-0.17	-0.53	1.14	XP
		D252	59.82	-19.43	7.53					
6HVN8U		D251	59.28	-19.13	7.94	1.02	-0.20	-0.48	1.14	XG
		D252	60.30	-19.33	7.46					
7DALCU		D251	59.24	-19.15	8.15	0.97	-0.16	-0.51	1.10	HL
		D252	60.20	-19.31	7.64					
7Z4DTQ		D251	57.88	-19.14	8.04	0.93	-0.20	-0.50	1.08	HX
		D252	58.82	-19.34	7.54					
89UBYQ		D251	58.70	-19.11	8.21	1.07	-0.16	-0.54	1.21	XS
		D252	59.78	-19.28	7.67					
8CWBYM		D251	58.77	-19.54	8.52	1.02	-0.16	-0.54	1.16	BG
		D252	59.78	-19.70	7.98					
A9B7FH		D251	58.79	-19.78	8.54	0.93	-0.19	-0.49	1.07	BG
		D252	59.72	-19.96	8.04					
B48UXN	X	D251	58.99	-21.97	7.69	0.95	-0.09	-0.54	1.10	XG
		D252	59.94	-22.06	7.15					
BR2LDK		D251	59.33	-19.08	7.84	1.01	-0.17	-0.51	1.15	AB
		D252	60.34	-19.25	7.33					
C6XF4J		D251	58.53	-19.16	8.01	0.97	-0.17	-0.50	1.11	XY
		D252	59.51	-19.33	7.51					



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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^*	
CRURBQ		D251	59.05	-19.27	8.03	0.97	-0.12	-0.51	1.10	XM
		D252	60.02	-19.39	7.53					
CW8UXL		D251	58.33	-19.19	8.19	1.01	-0.17	-0.52	1.15	GG
		D252	59.34	-19.36	7.67					
ENMDHG	X	D251	59.30	-22.20	7.30	0.90	0.00	-0.60	1.08	HW
		D252	60.20	-22.20	6.70					
EWFQFV		D251	58.87	-19.47	7.95	1.45	-0.22	-0.47	1.54	XW
		D252	60.32	-19.69	7.48					
EZE2CV		D251	58.85	-19.31	8.09	0.99	-0.05	-0.55	1.13	XU
		D252	59.84	-19.36	7.54					
GN2JUC		D251	58.38	-19.21	8.20	1.02	-0.10	-0.55	1.17	GG
		D252	59.40	-19.31	7.64					
HH877T		D251	59.51	-18.83	8.06	0.93	-0.18	-0.45	1.05	XE
		D252	60.44	-19.01	7.61					
J37UBU		D251	58.87	-19.48	7.41	1.00	-0.17	-0.51	1.14	HW
		D252	59.87	-19.65	6.90					
JT4AAM		D251	58.89	-19.20	7.83	0.91	-0.18	-0.54	1.07	XO
		D252	59.80	-19.38	7.30					
K8WJ9D		D251	58.32	-19.25	8.13	0.94	-0.15	-0.50	1.07	GG
		D252	59.25	-19.40	7.63					
K9DFZD		D251	58.69	-19.14	8.07	0.99	-0.18	-0.47	1.11	HY
		D252	59.68	-19.33	7.60					
KK8TYN		D251	59.10	-19.42	8.25	0.93	-0.16	-0.55	1.09	GH
		D252	60.03	-19.58	7.71					
L6LZMM		D251	58.72	-19.29	7.40	1.03	-0.13	-0.53	1.17	MG
		D252	59.76	-19.42	6.87					
LK4NY7		D251	58.92	-19.35	7.99	0.88	-0.20	-0.50	1.03	XO
		D252	59.81	-19.55	7.50					
MY23WE		D251	59.14	-19.44	8.49	0.97	-0.18	-0.47	1.10	GE
		D252	60.12	-19.62	8.01					
NM4JVD		D251	58.90	-19.23	8.22	0.48	-0.18	-0.49	0.71	XU
		D252	59.38	-19.41	7.73					



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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^*	
NVWU69		D251	59.24	-18.74	7.28	0.92	-0.17	-0.43	1.03	XD
		D252	60.17	-18.91	6.85					
P79GUZ		D251	59.17	-18.99	7.60	0.95	-0.18	-0.49	1.09	XJ
		D252	60.12	-19.16	7.11					
PB3BR2		D251	58.65	-19.18	7.56	0.99	-0.18	-0.52	1.13	XF
		D252	59.64	-19.36	7.04					
T3UAHA		D251	57.81	-19.23	8.02	1.08	-0.21	-0.45	1.18	PR
		D252	58.89	-19.44	7.57					
T3YRF9		D251	58.23	-19.30	7.51	0.91	-0.11	-0.51	1.05	HW
		D252	59.14	-19.41	7.00					
UJZWKW		D251	58.90	-19.26	8.19	0.99	-0.18	-0.49	1.12	XU
		D252	59.89	-19.44	7.70					
V434CZ		D251	59.30	-19.40	7.70	0.95	-0.20	-0.50	1.09	HW
		D252	60.25	-19.60	7.20					
VHMFJZ		D251	59.05	-19.60	7.50	1.00	-0.10	-0.50	1.12	HW
		D252	60.05	-19.70	7.00					
YDKP99		D251	59.09	-19.10	7.53	0.95	-0.15	-0.51	1.09	XQ
		D252	60.04	-19.25	7.02					
Z4QY3R		D251	58.79	-19.36	7.63	1.02	-0.17	-0.53	1.16	HW
		D252	59.81	-19.53	7.11					

Summary Statistics

Samples	<u>L*</u>	<u>a*</u>	<u>b*</u>	<u>ΔL*</u>	<u>Δa*</u>	<u>Δb*</u>	<u>ΔE*</u>
Grand Means							
D251	58.83	-19.25	7.93	0.97	-0.17	-0.50	1.11
D252	59.80	-19.42	7.43				
Std Dev Btwn Labs							
D251	0.39	0.20	0.32	0.12	0.03	0.03	0.10
D252	0.38	0.20	0.31				

Statistics based on 40 of 42 reporting participants

Comments Assigned on Data Flags for Test #408

B48UXN(X) - Extreme data for both a* values.

ENMDHG(X) - Extreme data for both a* values. Inconsistent in determinations of b* values. Large Delta a and small Delta b.



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Color and Color Difference - Paint Chips - 45-0 Geometry Instruments
CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

Key to Instrument Codes Reported by Participants

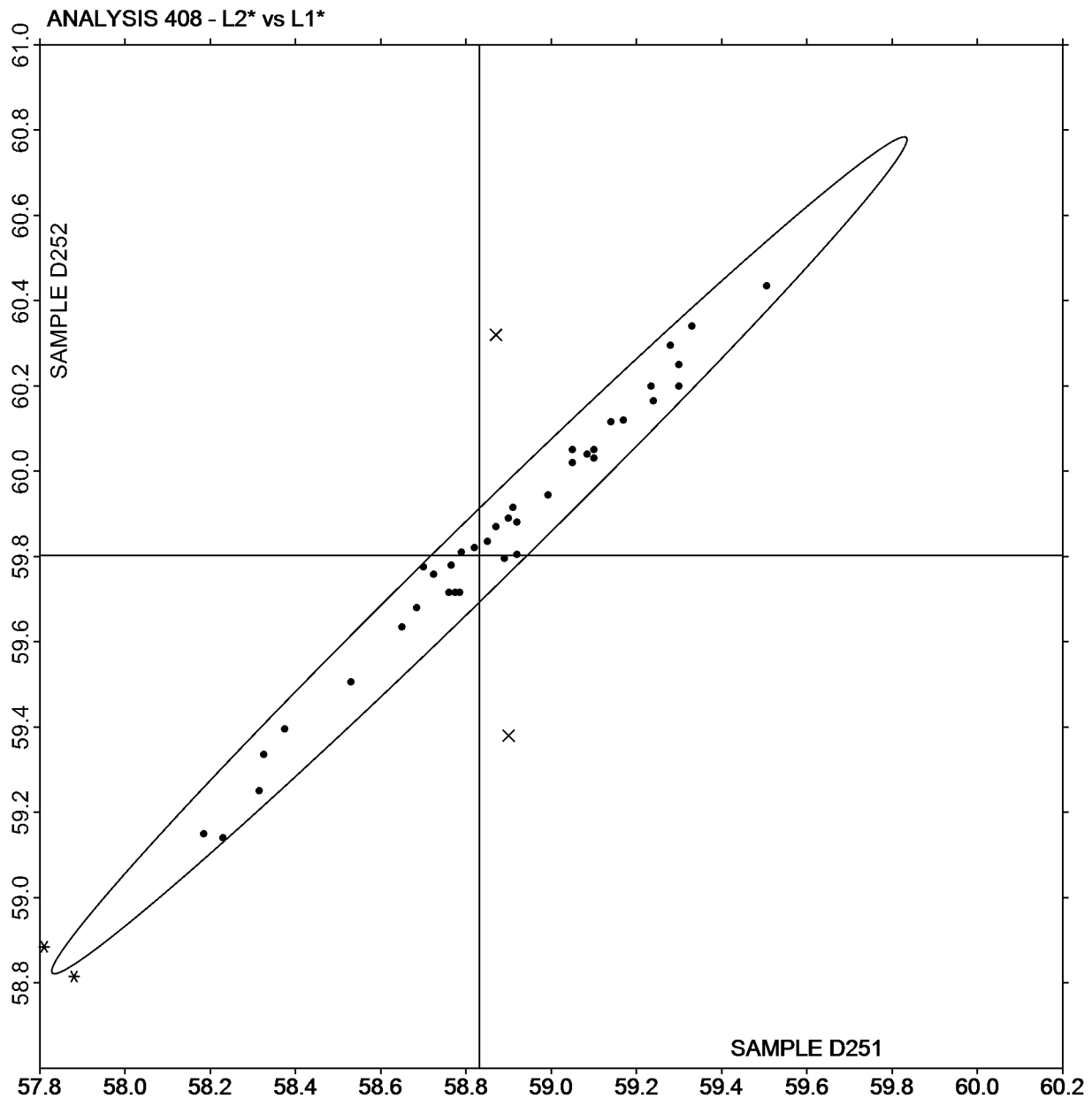
AB	Data Color	BG	BYK Mac i
GA	BYK-Gardner	GE	BYK-Gardner spectro-guide (45/0)
GG	BYK-Gardner spectro2-guide (45/0) gloss	GH	BYK-Gardner Color-View
HL	Hunter Agera	HW	Hunter LabScan XE
HX	Hunter Color FlexEZ 45/0	HY	Hunter Color Flex 45/0
MG	Macbeth 1500/PLUS or 2025+ Color Eye	MT	Minolta CM-25cG Spectrophotometer
PR	PhotoResearch PR730	XD	X-Rite 500 Series SpectroDensitometer
XE	X-Rite eXact Portable Spectrophotometer	XF	X-Rite i1 iSis
XG	X-Rite i1 Pro 2	XJ	X-Rite Ci7XX0
XM	X-Rite MA58 Multi-Angle Spectrophotometer	XO	X-Rite MA68 II Multi-Angle Spectrophotometer
XP	X-Rite MA9 Multi-Angle Spectrophotometer	XQ	X-Rite Ci6x
XS	X-Rite 962 Portable Spectrophotometer	XU	X-Rite 964 Portable Spectrophotometer
XW	X-Rite	XY	X-Rite MA T6 Multi-Angle Spectrophotometer



L2* vs L1*

SAMPLE D251 = 58.83

SAMPLE D252 = 59.80

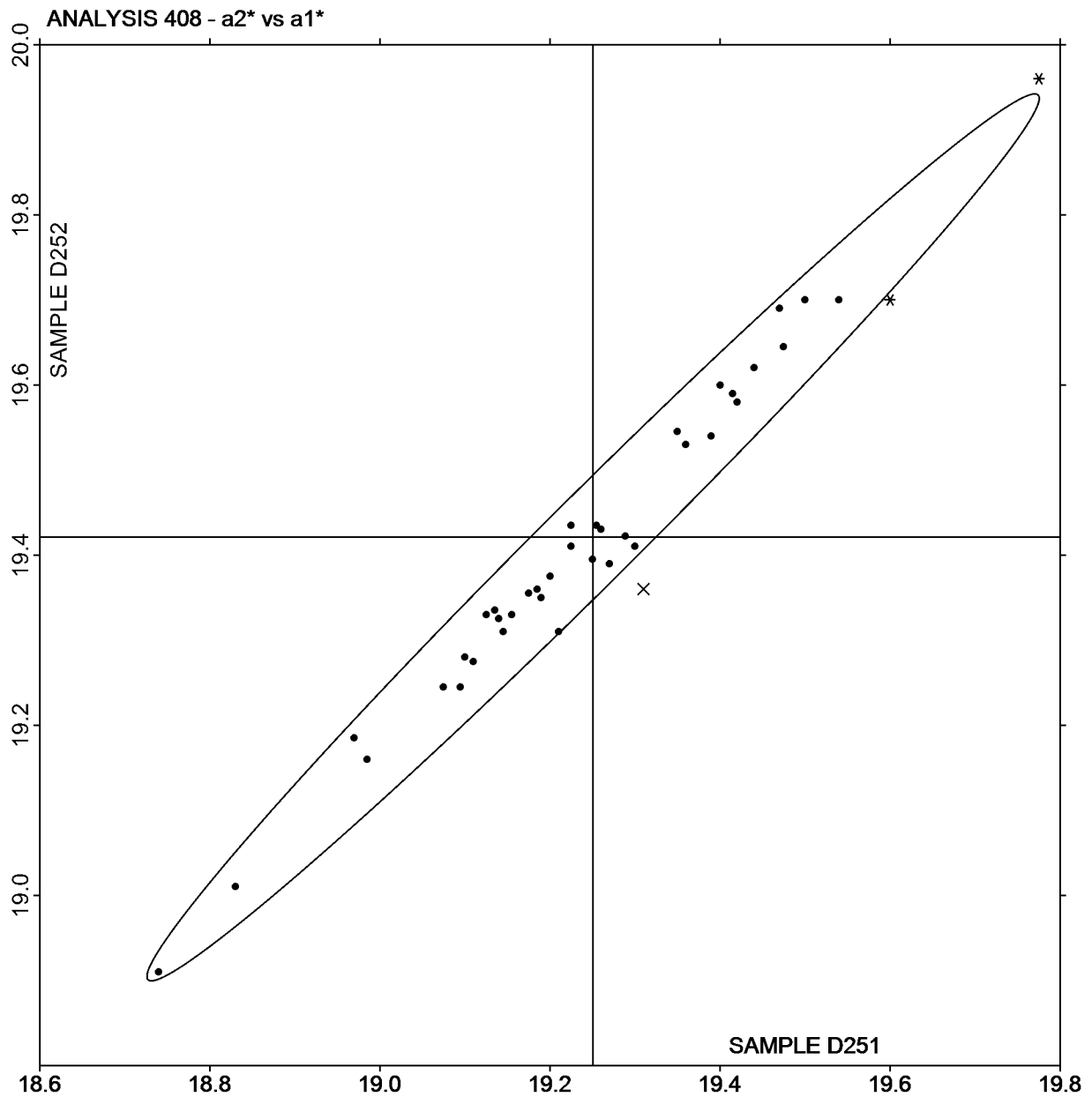




a2* vs a1*

SAMPLE D251 = -19.25

SAMPLE D252 = -19.42



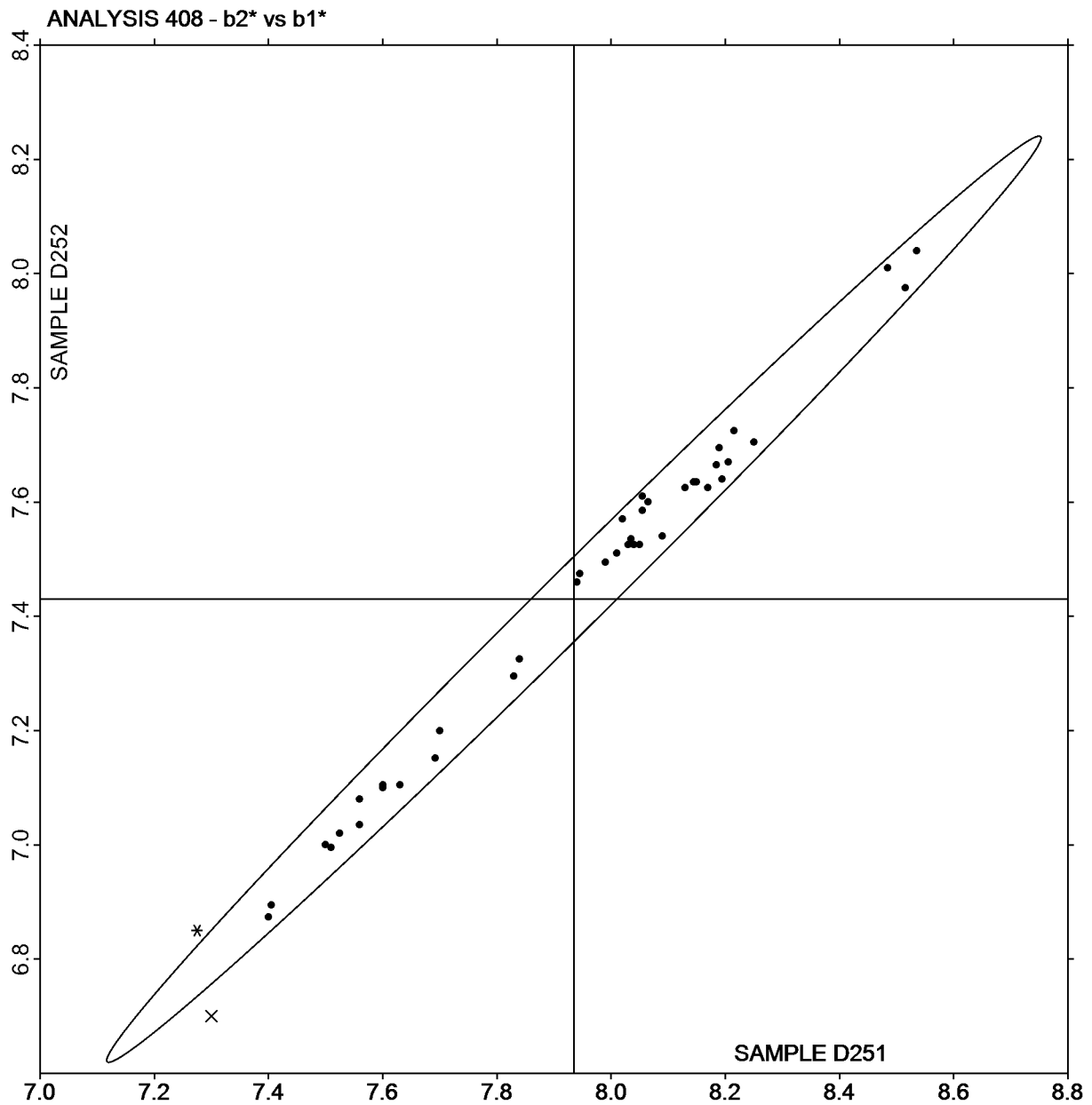
Plot created using absolute values.



b2* vs b1*

SAMPLE D251 = 7.93

SAMPLE D252 = 7.43





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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^*	
2PNPWX		D251	59.28	-18.94	7.81	0.98	-0.14	-0.51	1.11	AP
		D252	60.26	-19.08	7.30					
2UUHQT		D251	59.08	-19.01	7.49	1.01	-0.15	-0.52	1.15	XB
		D252	60.09	-19.16	6.97					
38ZXB3		D251	59.14	-18.98	7.68	0.98	-0.17	-0.52	1.12	XB
		D252	60.12	-19.15	7.15					
399BR6		D251	59.25	-19.21	7.71	0.98	-0.16	-0.51	1.12	XB
		D252	60.24	-19.37	7.20					
3EJYT2		D251	59.08	-18.86	7.70	0.98	-0.17	-0.49	1.11	XD
		D252	60.07	-19.03	7.21					
3LKDD3		D251	58.95	-19.06	7.51	0.94	-0.18	-0.50	1.08	XI
		D252	59.90	-19.24	7.01					
3WZ63C		D251	59.16	-19.07	7.63	1.00	-0.15	-0.54	1.14	XE
		D252	60.16	-19.21	7.09					
44URBM		D251	59.09	-18.98	7.53	0.99	-0.15	-0.52	1.13	XD
		D252	60.08	-19.13	7.02					
4JQ89W		D251	59.23	-18.91	7.90	0.98	-0.19	-0.51	1.12	AU
		D252	60.21	-19.10	7.39					
69KLLU		D251	59.26	-19.10	7.69	0.96	-0.20	-0.46	1.09	MV
		D252	60.22	-19.31	7.23					
6AECR9		D251	58.91	-18.99	7.48	1.02	-0.14	-0.54	1.16	XF
		D252	59.93	-19.13	6.94					
6PBRQ3		D251	58.83	-18.96	7.54	0.97	-0.15	-0.52	1.12	XI
		D252	59.80	-19.11	7.02					
7CE3BT		D251	59.15	-19.08	7.85	0.99	-0.16	-0.50	1.12	MU
		D252	60.14	-19.24	7.35					
86VY4Q		D251	59.01	-18.93	7.61	1.03	-0.15	-0.53	1.16	XI
		D252	60.03	-19.08	7.08					
89UBYQ		D251	59.12	-18.96	7.86	1.05	-0.14	-0.54	1.19	AJ
		D252	60.17	-19.09	7.32					
9HGTQ4		D251	59.16	-19.01	7.49	0.99	-0.16	-0.50	1.12	XD
		D252	60.15	-19.18	6.99					



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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^*	
ACT7VY	X	D251	52.24	-16.72	5.64	0.95	-0.19	-0.36	1.03	XD
		D252	53.18	-16.91	5.28					
AEBPFT		D251	59.22	-19.04	7.94	0.96	-0.17	-0.50	1.10	MW
		D252	60.18	-19.21	7.44					
AEW2E2	X	D251	59.13	-19.42	7.43	0.92	-0.13	-0.55	1.08	XC
		D252	60.05	-19.56	6.88					
C6XF4J		D251	58.93	-18.97	7.92	0.98	-0.16	-0.51	1.12	MP
		D252	59.92	-19.12	7.41					
C7R7AY		D251	59.07	-18.94	7.56	1.01	-0.13	-0.51	1.14	XU
		D252	60.08	-19.07	7.04					
C7VM8X		D251	58.99	-19.01	7.67	1.07	-0.14	-0.53	1.20	XH
		D252	60.06	-19.15	7.14					
CEAC9Q		D251	59.12	-18.94	7.53	0.99	-0.16	-0.53	1.14	XD
		D252	60.12	-19.10	7.00					
CKBN4N		D251	59.08	-19.02	7.73	0.99	-0.16	-0.52	1.14	MM
		D252	60.07	-19.18	7.20					
DW3W3G		D251	59.30	-18.86	7.50	0.96	-0.15	-0.51	1.09	XD
		D252	60.26	-19.01	6.99					
DXG4NX		D251	59.28	-19.14	7.98	1.03	-0.13	-0.54	1.17	AE
		D252	60.31	-19.27	7.44					
DXXF4H		D251	59.11	-19.09	7.80	0.97	-0.13	-0.54	1.12	MW
		D252	60.08	-19.22	7.26					
E2AKDW		D251	59.27	-19.04	7.97	1.03	-0.16	-0.55	1.18	AJ
		D252	60.30	-19.20	7.42					
EZE2CV		D251	59.08	-19.00	7.67	1.00	-0.16	-0.55	1.15	XD
		D252	60.08	-19.15	7.11					
FJ836D		D251	59.41	-18.95	7.79	0.91	-0.17	-0.48	1.04	MT
		D252	60.32	-19.12	7.31					
FWVAZT	X	D251	58.92	-19.35	7.36	0.99	-0.14	-0.54	1.13	XF
		D252	59.90	-19.50	6.83					
FY2RYN		D251	59.27	-18.86	7.59	0.95	-0.17	-0.50	1.08	XG
		D252	60.22	-19.03	7.09					



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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^*	
GM64HF		D251	59.12	-19.04	7.68	1.00	-0.13	-0.53	1.13	AQ
		D252	60.11	-19.16	7.15					
GN2JUC		D251	58.91	-19.00	8.02	1.01	-0.13	-0.55	1.15	GE
		D252	59.92	-19.13	7.47					
GP82T8		D251	59.25	-19.07	7.83	0.98	-0.16	-0.54	1.13	AU
		D252	60.23	-19.22	7.29					
H3DGCH		D251	58.99	-19.12	7.46	1.00	-0.16	-0.49	1.12	XF
		D252	59.99	-19.29	6.97					
HUFMEJ		D251	59.20	-19.17	7.81	1.01	-0.15	-0.45	1.11	MW
		D252	60.21	-19.31	7.37					
JMC6DC		D251	58.96	-18.79	7.56	1.00	-0.16	-0.51	1.13	XD
		D252	59.96	-18.95	7.05					
JR8TXQ		D251	59.16	-18.95	7.69	1.01	-0.14	-0.53	1.15	XB
		D252	60.17	-19.10	7.16					
K6RVTN		D251	59.22	-19.08	7.75	1.00	-0.15	-0.55	1.15	AS
		D252	60.22	-19.23	7.19					
K8VQCQ		D251	59.16	-18.84	7.84	0.97	-0.16	-0.51	1.11	MK
		D252	60.13	-19.00	7.33					
KA877R	X	D251	58.87	-18.49	7.64	1.01	-0.16	-0.51	1.14	AJ
		D252	59.88	-18.65	7.13					
KDLZMP		D251	59.33	-19.04	7.77	0.95	-0.15	-0.51	1.09	AT
		D252	60.28	-19.19	7.26					
KK8TYN		D251	59.23	-19.26	7.73	0.96	-0.16	-0.50	1.10	MV
		D252	60.20	-19.41	7.23					
KTXE4M		D251	59.00	-18.92	7.67	0.97	-0.17	-0.50	1.10	XI
		D252	59.97	-19.09	7.17					
LK4NY7	X	D251	59.40	-21.11	7.34	0.97	-0.05	-0.56	1.12	HP
		D252	60.36	-21.16	6.78					
M4RAG9		D251	59.39	-18.95	7.72	0.95	-0.17	-0.49	1.08	HP
		D252	60.34	-19.12	7.24					
MCKRRA		D251	59.25	-18.85	7.80	0.97	-0.16	-0.54	1.12	AU
		D252	60.22	-19.01	7.26					



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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^*	
MF38YG		D251	59.33	-19.04	7.78	0.94	-0.16	-0.48	1.07	HP
		D252	60.27	-19.21	7.30					
NM4JVD		D251	59.02	-18.97	7.55	0.97	-0.16	-0.52	1.11	XH
		D252	59.99	-19.13	7.03					
P87QMH		D251	59.27	-19.14	7.85	0.99	-0.15	-0.54	1.14	AU
		D252	60.27	-19.29	7.31					
PA8UE6		D251	59.10	-18.96	7.57	0.97	-0.15	-0.54	1.12	XB
		D252	60.07	-19.11	7.04					
PB73JH		D251	59.24	-19.02	7.57	1.00	-0.15	-0.49	1.12	HP
		D252	60.24	-19.17	7.07					
PE4JVC		D251	59.22	-18.96	7.85	0.98	-0.13	-0.52	1.12	AT
		D252	60.21	-19.09	7.32					
Q2CCD2	X	D251	59.62	-19.51	7.65	1.00	-0.19	-0.52	1.14	CA
		D252	60.62	-19.70	7.13					
QD29DE		D251	59.07	-19.07	7.46	0.98	-0.17	-0.49	1.10	XF
		D252	60.05	-19.23	6.97					
T22JCV		D251	59.15	-19.05	7.92	0.95	-0.18	-0.51	1.09	MW
		D252	60.10	-19.23	7.41					
T2MXZ9		D251	59.06	-18.88	7.55	0.99	-0.17	-0.51	1.13	XG
		D252	60.05	-19.05	7.04					
T3UAHA		D251	59.02	-19.07	7.77	1.00	-0.12	-0.55	1.14	CA
		D252	60.02	-19.19	7.22					
TLRBUF		D251	59.08	-19.06	7.54	0.97	-0.19	-0.50	1.10	XE
		D252	60.05	-19.24	7.05					
TU23WJ		D251	59.38	-19.02	7.91	0.98	-0.14	-0.52	1.12	AS
		D252	60.36	-19.16	7.39					
TVXHAF		D251	59.35	-19.15	7.81	1.00	-0.17	-0.52	1.14	AT
		D252	60.34	-19.32	7.29					
U86MY9		D251	59.26	-19.08	7.91	0.99	-0.18	-0.52	1.13	HP
		D252	60.26	-19.25	7.40					
U9Z72A		D251	59.37	-19.02	7.92	0.99	-0.16	-0.50	1.12	AW
		D252	60.36	-19.18	7.42					



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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^*	
UC34C3		D251	59.28	-18.94	7.71	0.96	-0.18	-0.51	1.11	AJ
		D252	60.24	-19.12	7.20					
UDWUHG		D251	59.28	-19.01	7.80	1.03	-0.14	-0.53	1.17	AP
		D252	60.32	-19.15	7.27					
UDYKNY		D251	59.24	-19.05	7.90	1.03	-0.11	-0.54	1.17	AS
		D252	60.27	-19.16	7.36					
VL8BR3		D251	59.04	-18.99	7.72	1.02	-0.13	-0.54	1.16	XD
		D252	60.06	-19.12	7.18					
VN9G79		D251	59.40	-19.20	7.84	0.98	-0.15	-0.51	1.12	CA
		D252	60.38	-19.36	7.34					
VT64ZW		D251	59.13	-18.85	7.75	0.99	-0.16	-0.52	1.13	XG
		D252	60.12	-19.01	7.23					
VYULD8		D251	59.13	-19.05	7.55	0.97	-0.17	-0.51	1.11	XD
		D252	60.10	-19.22	7.04					
WPX639		D251	59.27	-19.04	7.83	0.96	-0.16	-0.55	1.12	AP
		D252	60.24	-19.20	7.29					
WUVP7R		D251	59.33	-19.06	7.81	0.99	-0.18	-0.52	1.13	AT
		D252	60.32	-19.24	7.29					
WY3CG9		D251	59.11	-18.87	7.66	0.94	-0.18	-0.49	1.07	XD
		D252	60.05	-19.05	7.17					
X7JBPT		D251	58.99	-18.95	7.94	0.95	-0.18	-0.51	1.09	MP
		D252	59.94	-19.13	7.43					
YDKP99		D251	59.12	-18.87	7.66	0.94	-0.18	-0.50	1.08	XD
		D252	60.06	-19.05	7.16					
YHT882		D251	59.11	-19.04	7.86	1.00	-0.16	-0.52	1.14	MV
		D252	60.11	-19.20	7.34					
YM9HK6	X	D251	58.38	-19.11	7.38	1.97	-0.32	-0.38	2.03	XC
		D252	60.35	-19.43	7.00					
YNUJ3X		D251	59.04	-18.81	7.58	1.02	-0.16	-0.51	1.15	XH
		D252	60.06	-18.96	7.07					
YPD4AQ		D251	59.10	-18.88	7.59	0.98	-0.16	-0.51	1.12	XD
		D252	60.09	-19.03	7.08					



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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^*	
YQ8UF6		D251	58.91	-19.14	7.89	0.99	-0.13	-0.53	1.13	MP
		D252	59.90	-19.27	7.36					
Z4N9WA		D251	58.99	-19.04	7.71	1.00	-0.11	-0.54	1.14	XD
		D252	59.99	-19.15	7.18					
Z6KP97		D251	59.27	-19.01	7.86	0.97	-0.16	-0.53	1.12	AU
		D252	60.24	-19.17	7.33					

Summary Statistics

Samples	<u>L*</u>	<u>a*</u>	<u>b*</u>	<u>ΔL*</u>	<u>Δa*</u>	<u>Δb*</u>	<u>ΔE*</u>
Grand Means							
D251	59.15	-19.00	7.71	0.99	-0.16	-0.52	1.12
D252	60.13	-19.16	7.19				
Std Dev Btwn Labs							
D251	0.14	0.10	0.15	0.03	0.02	0.02	0.03
D252	0.14	0.09	0.15				

Statistics based on 76 of 83 reporting participants

Comments Assigned on Data Flags for Test #409

- ACT7VY(X) - Extreme Data. Large Delta b, small Delta E.
- AEW2E2(X) - Low a* values for both samples.
- FWVAZT(X) - Low a* values for both samples.
- KA877R(X) - High a* values for both samples.
- LK4NY7(X) - Extreme data for both a* values. Inconsistent in determinations of b* values. Large Delta a.
- Q2CCD2(X) - High L* values for both samples. Large replication difference for L* Sample D251. Low a* values for both samples. Large replication difference for a* values for both samples.
- YM9HK6(X) - Low data for L* values for Sample D251 and a* values for Sample D252. Large replication difference for L* & a* Sample D251. Inconsistent in determinations of b* values. Large Delta L, b & E, small Delta a.



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

Key to Instrument Codes Reported by Participants

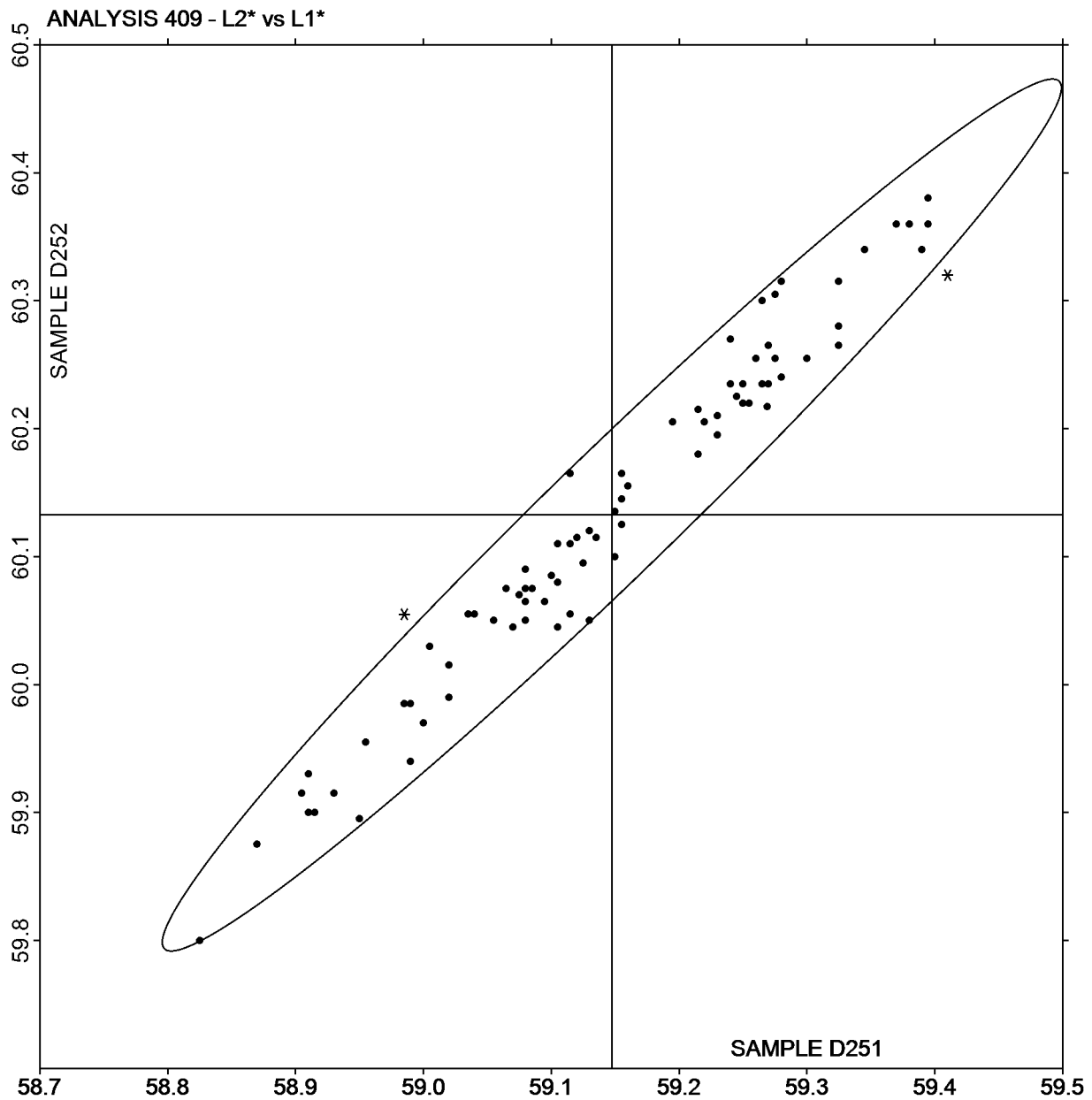
AE	Datacolor 110	AJ	Datacolor 600
AP	Datacolor 750	AQ	Datacolor 600x
AS	Datacolor 800	AT	Datacolor 850
AU	Datacolor 1000	AW	Datacolor 1050
CA	Cary 5000	GE	BYK-Gardner Spectro2-Guide Sphere Gloss
HP	Hunter UltraScan PRO	MK	Macbeth Color-Eye 7000
MM	Macbeth Color-Eye 7000a	MP	Minolta CM-36dG
MT	Minolta CM-2600d	MU	Minolta
MV	Minolta CM-3000d Spectrophotometer	MW	Minolta CM 3700a Spectrophotometer
XB	X-Rite Ci7000 Series Benchtop Spectrophotometer	XC	X-Rite Ci4200 Benchtop Spectrophotometer
XD	X-Rite Ci7800 Benchtop Spectrophotometer	XE	X-Rite Ci7600 Benchtop Spectrophotometer
XF	X-Rite Ci6x Portable Spectrophotometer	XG	X-Rite Ci7860 Benchtop Spectrophotometer
XH	X-Rite Color i5 Benchtop Spectrophotometer	XI	X-Rite Color i7 Benchtop Spectrophotometer
XU	X-Rite Color Premier 8200 Spectrophotometer		



L2* vs L1*

SAMPLE D251 = 59.15

SAMPLE D252 = 60.13

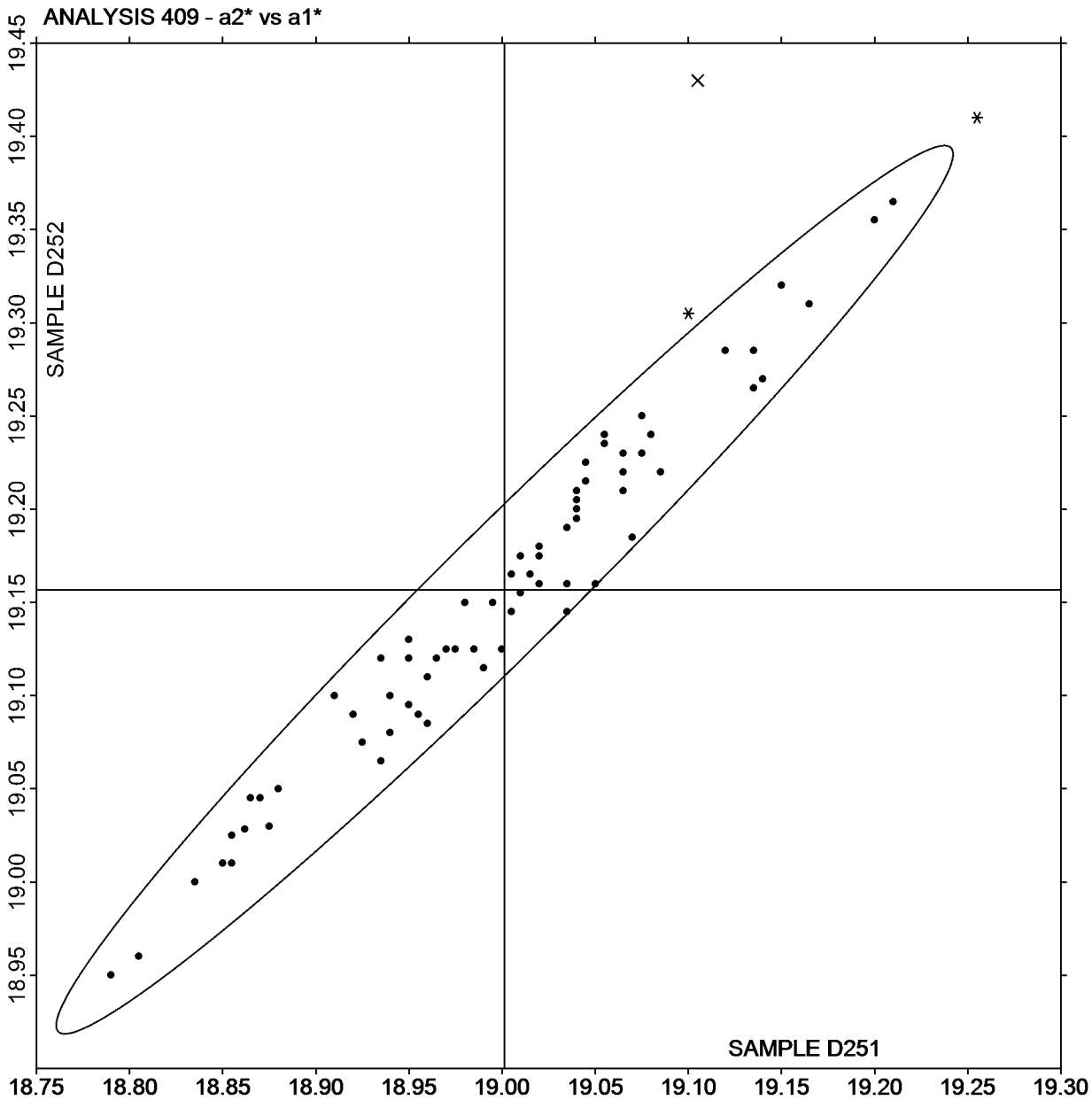




a2* vs a1*

SAMPLE D251 = -19.00

SAMPLE D252 = -19.16



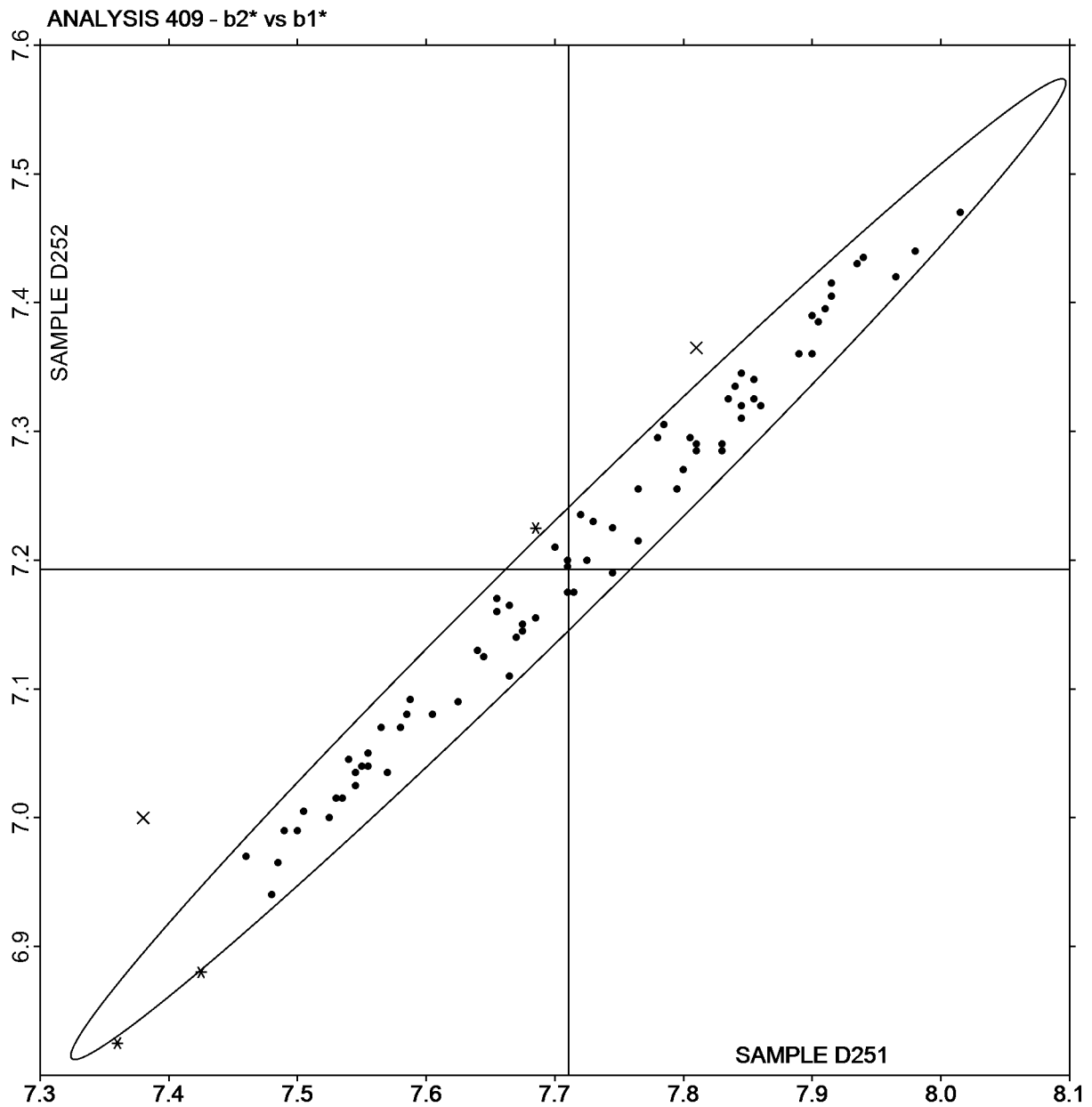
Plot created using absolute values.



b2* vs b1*

SAMPLE D251 = 7.71

SAMPLE D252 = 7.19





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4th Qtr 2025

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 D251																		
2PNPWX		15.31	17.97	21.54	24.01	24.83	27.66	32.95	35.79	29.72	22.77	19.30	17.44	17.19	18.06	17.90	16.01	AP
2UUHQT		15.50	18.03	21.58	23.97	24.81	27.68	32.94	35.62	29.15	22.50	19.07	17.33	17.05	17.96	17.61	15.80	XB
38ZXB3		16.07X	17.99	21.46	23.93	24.82	27.66	32.89	35.61	29.39	22.66	19.14	17.33	17.05	17.88	17.56	15.89	XB
399BR6		15.38	17.99	21.56	24.03	24.92	27.76	33.05	35.98	29.48	22.63	19.16	17.35	16.95	17.91	17.60	15.74	XB
3EJYT2		15.23	17.92	21.44	23.84	24.77	27.64	32.82	35.56	29.32	22.65	19.13	17.35	17.02	17.90	17.53	15.86	XD
3LKDD3		15.36	17.90	21.42	23.85	24.68	27.59	32.79	35.37	29.06	22.37	18.90	17.20	17.00	17.74	17.43	15.69	XI
3WZ63C		15.43	17.95	21.56	24.01	24.80	27.66	32.98	35.78	29.34	22.64	19.16	17.29	16.96	17.87	17.61	15.74	XE
44URBM		15.45	18.00	21.56	23.95	24.80	27.65	32.92	35.63	29.15	22.55	19.11	17.35	17.05	17.95	17.56	15.89	XD
69KLLU		15.27	18.12	21.59	24.11	24.88	27.65	33.10	36.15	29.57	22.61	19.13	17.36	17.10	18.13	17.91	16.24	MV
6AECR9		15.15	17.82	21.52	23.80	24.68	27.53	32.82	35.32	29.02	22.33	18.90	17.13	16.93	17.81	17.59	15.93	XF
7CE3BT		15.14	17.85	21.35	23.99	24.71	27.48	33.06	35.83	29.56	22.52	19.10	17.31	17.02	17.98	17.87	16.12	MV
86VY4Q		15.35	17.96	21.41	23.84	24.70	27.49	32.76	35.44	29.22	22.52	19.07	17.24	16.97	17.83	17.53	15.87	XI
ACT7VY		15.27	17.87	21.36	23.86	24.74	27.54	32.75	35.52	29.31	22.59	19.13	17.37	17.07	17.95	17.61	15.89	XD
AEBPFT		15.10	17.80	21.30	24.00	24.75	27.50	33.05	35.95	29.65	22.65	19.15	17.35	17.05	18.00	17.90	16.20	MW
C6XF4J		15.05	17.55*	21.16*	23.70	24.43*	27.26*	32.57	35.69	29.26	22.38	18.97	17.15	16.87	17.85	17.76	16.24	MP
C7R7AY		15.48	17.96	21.51	23.94	24.74	27.58	32.83	35.72	29.18	22.32	19.09	17.34	17.06	17.99	17.89	15.86	XU
C7VM8X		15.33	17.89	21.33	23.81	24.64	27.48	32.74	35.47	29.19	22.48	18.99	17.22	16.97	17.84	17.59	15.90	XH
CEAC9Q		15.49	18.05	21.58	23.99	24.85	27.70	32.95	35.61	29.22	22.61	19.16	17.37	17.08	17.96	17.62	15.92	XD
CKBN4N		15.22	17.86	21.36	23.86	24.76	27.60	32.82	35.56	29.30	22.55	19.08	17.30	17.03	17.96	17.60	15.89	MM
DW3W3G		15.65	18.26*	21.73	24.18	25.08	27.89	33.06	35.74	29.54	22.86	19.34	17.49	17.21	18.04	17.74	16.04	XD
DXG4NX		15.39	17.91	21.34	23.98	24.87	27.69	33.04	35.78	29.64	22.70	19.33	17.47	17.20	18.13	17.76	15.35X	AE
E2AKDW		15.26	17.87	21.26	23.98	24.86	27.59	32.90	35.86	29.75	22.74	19.31	17.42	17.14	18.04	17.71	16.11	AJ



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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 D251																		
EZE2CV		15.28	17.93	21.47	23.89	24.75	27.59	32.89	35.70	29.34	22.51	19.07	17.28	16.94	17.84	17.60	15.82	XD
FJ836D		15.25	18.00	21.67	24.27*	25.07	27.84	33.29	36.04	29.88	22.87	19.38	17.54	17.23	18.20	17.98	16.32	MT
FY2RYN		15.49	18.12	21.67	24.15	25.00	27.80	33.07	35.82	29.57	22.81	19.27	17.46	17.17	17.99	17.67	15.94	XD
GM64HF		15.14	17.84	21.45	23.90	24.84	27.57	32.88	35.62	29.40	22.59	19.11	17.28	17.05	17.83	17.61	15.96	AQ
GN2JUC		14.82*	17.39X	21.15*	23.51X	24.49*	27.38	32.65	35.35	29.23	22.43	18.95	17.19	16.92	17.79	17.60	16.01	GE
GP82T8		15.23	17.90	21.50	23.97	24.83	27.68	32.98	35.75	29.68	22.70	19.25	17.35	17.12	18.04	17.80	15.89	AU
H3DGCH	X	15.91*	18.43X	22.06X	24.49X	25.38X	28.42X	32.29X	35.99	31.65X	24.21X	20.05X	17.81*	17.18	18.28*	18.05	16.35*	XF
HUFMEJ		15.58	17.80	21.43	24.09	24.78	27.56	33.15	36.00	29.72	22.58	19.15	17.35	17.24	18.01	17.92	16.17	MY
JMC6DC		15.36	17.94	21.43	23.82	24.65	27.47	32.71	35.44	29.15	22.43	19.01	17.28	17.00	17.92	17.58	15.87	XD
JR8TXQ		15.23	17.98	21.47	23.94	24.86	27.69	32.88	35.58	29.41	22.71	19.16	17.37	17.10	17.92	17.53	15.85	XB
K6RVTN		15.30	17.91	21.54	23.96	24.88	27.68	32.98	35.79	29.57	22.65	19.23	17.33	17.11	18.04	17.65	15.93	AS
K8VQCQ		15.17	17.86	21.35	23.93	24.73	27.54	32.68	35.61	29.61	22.78	19.18	17.37	17.07	17.93	17.76	16.11	MK
KA877R		14.64X	17.83	21.24	23.70	24.69	27.48	32.50*	34.77X	29.24	22.63	19.07	17.35	17.12	17.66*	17.42	15.72	AJ
KDLZMP		15.45	18.02	21.59	24.10	24.95	27.77	33.12	35.90	29.72	22.76	19.31	17.44	17.20	18.24*	18.11*	15.91	AT
KK8TYN		15.30	17.89	21.59	24.05	24.84	27.79	33.38*	35.92	29.45	22.51	19.11	17.32	17.12	18.07	17.88	16.13	MV
KTXE4M		15.30	17.84	21.35	23.82	24.71	27.55	32.76	35.50	29.20	22.49	19.02	17.25	16.98	17.89	17.58	15.88	XI
LK4NY7		15.64	18.06	21.61	24.16	25.00	27.80	33.16	36.06	29.79	22.95*	19.37	17.46	17.09	18.01	17.88	16.29	HP
M4RAG9		15.83	18.05	21.76	24.11	25.01	27.87	33.09	36.07	29.78	22.95*	19.39	17.43	16.90	18.22	17.87	16.03	HP
P87QMH		15.36	17.91	21.48	23.99	24.89	27.81	33.05	35.87	29.63	22.70	19.24	17.39	17.13	18.02	18.00	15.88	AU
PA8UE6		15.42	17.99	21.52	23.97	24.82	27.69	32.92	35.66	29.27	22.56	19.07	17.30	17.02	17.94	17.62	15.91	XB
PB73JH		15.82	18.07	21.64	24.12	24.91	27.80	33.01	35.93	29.47	22.76	19.17	15.93X	16.62X	18.17	17.83	16.13	HP
PE4JVC		15.39	17.94	21.45	23.93	24.86	27.67	32.96	35.82	29.63	22.71	19.26	17.35	17.13	18.00	17.64	15.95	AT



CTS Interlaboratory Testing Program for Color & Appearance

Analysis 411

Report #214
4th Qtr 2025

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 D251																		
Q2CCD2		15.82	18.27*	22.03X	24.55X	25.31X	28.23X	33.71X	36.76X	29.97*	22.92	19.39	17.54	17.21	18.23	18.01	16.30	CA
QD29DE		15.52	17.96	21.57	23.95	24.81	27.76	33.10	35.61	29.16	22.44	18.99	17.24	16.99	17.92	17.73	16.04	XF
T22JCV		15.04	17.82	21.28	23.97	24.68	27.44	32.97	35.83	29.65	22.56	19.12	17.29	17.01	17.94	17.85	16.14	MW
T2MXZ9		15.45	17.98	21.53	23.90	24.74	27.57	32.83	35.55	29.17	22.54	19.12	17.36	17.07	17.97	17.66	15.94	XG
T3UAHA		15.17	17.62	21.27	23.87	24.60	27.41	32.71	35.83	29.33	22.43	19.01	17.18	16.87	17.84	17.65	15.96	CA
TLRBUF		15.49	17.99	21.56	23.91	24.83	27.74	32.96	35.59	29.13	22.49	19.05	17.34	17.07	18.00	17.63	15.94	XE
TU23WJ		15.40	17.90	21.47	24.09	24.97	27.76	33.10	35.97	29.81	22.89	19.37	17.52	17.25	18.09	18.14*	15.96	AS
TVXHAF		15.29	17.95	21.59	24.06	24.98	27.81	33.13	36.04	29.73	22.74	19.29	17.44	17.17	18.12	17.77	16.07	AT
U86MY9		15.62	17.93	21.41	24.00	24.89	27.71	32.94	35.93	29.73	22.83	19.27	17.31	16.88	17.78	17.70	16.31	HP
U9Z72A		15.44	17.92	21.47	24.06	24.97	27.80	33.11	35.91	29.83	22.86	19.38	17.51	17.25	18.21	17.81	15.90	AW
UC34C3		15.42	17.99	21.59	24.07	24.94	27.75	33.02	35.70	29.69	22.78	19.33	17.46	17.17	18.05	17.80	16.05	AJ
UDWUHG		15.38	17.95	21.57	24.05	24.92	27.70	33.00	35.73	29.74	22.75	19.30	17.40	17.16	18.05	17.99	16.00	AP
UDYKNY		15.22	17.71	21.44	23.92	24.85	27.67	32.96	35.78	29.66	22.73	19.25	17.39	17.14	18.06	17.70	15.94	AS
VL8BR3		15.23	17.87	21.33	23.84	24.70	27.57	32.74	35.51	29.27	22.56	19.06	17.26	16.99	17.83	17.62	16.00	XD
VN9G79		15.43	17.88	21.63	24.15	24.95	27.85	33.27	36.37*	29.68	22.72	19.27	17.44	17.10	18.11	17.90	16.18	CA
VYULD8		15.41	17.99	21.55	23.99	24.87	27.73	32.94	35.64	29.30	22.57	19.08	17.32	17.05	17.99	17.70	15.99	XD
WUVP7R		15.61	17.95	21.58	24.08	24.92	27.82	33.13	35.76	29.71	22.76	19.35	17.46	17.21	18.28*	18.25X	16.27	AT
WY3CG9		15.37	17.97	21.46	23.90	24.81	27.61	32.82	35.54	29.33	22.65	19.16	17.39	17.14	17.96	17.52	15.87	XD
X7JBPT		15.08	17.57*	21.22	23.76	24.51*	27.31*	32.65	35.76	29.30	22.42	19.03	17.21	16.95	17.93	17.84	16.32	MP
YDKP99		15.35	17.95	21.44	23.97	24.85	27.69	32.91	35.61	29.32	22.61	19.14	17.39	17.15	18.07	17.67	15.97	XD
YHT882		15.05	17.80	21.30	24.00	24.60	27.40	32.80	35.95	29.50	22.55	19.05	17.20	16.90	17.90	17.75	16.10	MV
YM9HK6	X	14.87*	17.44X	20.97X	23.29X	24.16X	27.11X	32.26X	34.59X	28.29X	21.77X	18.41X	16.74X	16.57X	17.45X	17.20X	15.58*	XC



CTS Interlaboratory Testing Program for Color & Appearance

Analysis 411

Report #214
4th Qtr 2025

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 D251																		
YNUJ3X		15.36	17.96	21.47	23.90	24.74	27.56	32.77	35.56	29.25	22.55	19.08	17.33	17.08	17.96	17.54	15.83	XH
YPD4AQ		16.11X	18.00	21.54	23.95	24.80	27.65	32.89	35.64	29.31	22.57	19.10	17.35	17.05	17.99	17.66	15.94	XD
YQ8UF6		15.05	17.50X	21.17*	23.70	24.49*	27.32*	32.69	35.74	29.08	22.27*	18.90	17.12	16.85	17.84	17.70	16.20	MP
Z4N9WA		15.18	17.80	21.33	23.75	24.65	27.52	32.74	35.44	29.18	22.49	19.01	17.22	16.93	17.79	17.60	15.96	XD
Z6KP97		15.59	17.87	21.55	23.95	24.88	27.70	32.99	35.80	29.67	22.74	19.30	17.40	17.17	18.07	18.23*	16.23	AU
Summary Statistics																		
		400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	
Grand Means		15.36	17.91	21.47	23.96	24.81	27.64	32.94	35.73	29.45	22.62	19.16	17.32	17.06	17.98	17.73	15.99	
SD Btwn Labs		0.24	0.15	0.15	0.15	0.15	0.16	0.19	0.27	0.24	0.16	0.13	0.20	0.12	0.13	0.18	0.17	

H3DGCH (X) - High % reflectance data for most wavelengths. Large replication difference for all wavelengths.

YM9HK6 (X) - Low % reflectance data for almost all wavelengths. Large replication difference for most wavelengths.



CTS Interlaboratory Testing Program for Color & Appearance

Analysis 411

Report #214
4th Qtr 2025

Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

Key to Instrument Codes Reported by Participants

AE Datacolor 110	AJ Datacolor 600	AP Datacolor 750
AQ Datacolor 600x	AS Datacolor 800	AT Datacolor 850
AU Datacolor 1000	AW Datacolor 1050	CA Cary 5000
GE BYK-Gardner Spectro2-Guide Sphere Gloss	HP Hunter UltraScan PRO	MK Macbeth Color-Eye 7000
MM Macbeth Color-Eye 7000a	MP Minolta CM-36dG	MT Minolta CM-2600d
MV Minolta CM-3000d Spectrophotometer	MW Minolta CM 3700a Spectrophotometer	MY Minolta Benchtop Spectrophotometer CM-3600a
XB X-Rite Ci7000 Series Benchtop Spectrophotometer	XC X-Rite Ci4200 Benchtop Spectrophotometer	XD X-Rite Ci7800 Benchtop Spectrophotometer
XE X-Rite Ci7600 Benchtop Spectrophotometer	XF X-Rite Ci6x Portable Spectrophotometer	XG X-Rite Ci7860 Benchtop Spectrophotometer
XH X-Rite Color i5 Benchtop Spectrophotometer	XI X-Rite Color i7 Benchtop Spectrophotometer	XU X-Rite Color Premier 8200 Spectrophotometer



Interlaboratory Testing Program for Color & Appearance

Analysis 440

60 Degree Gloss - Paint Chips

ASTM Method D 523

Report #214

4th Qtr 2025

WebCode	Data Flag	Sample H251			Sample H252			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
2UUHQ7		54.03	-0.18	-0.17	66.78	-0.20	-0.20	GL
399BR6		55.45	1.25	1.21	68.28	1.30	1.28	ZA
3EJYT2		54.35	0.15	0.14	67.00	0.02	0.02	GL
3LKDD3	*	53.23	-0.98	-0.95	67.73	0.75	0.74	GL
3WZ63C		52.25	-1.95	-1.89	65.53	-1.45	-1.43	GL
4JQ89W		54.48	0.27	0.26	67.40	0.42	0.42	GK
6AECR9		54.98	0.77	0.75	67.93	0.95	0.93	GL
6PBRQ3		54.80	0.60	0.58	67.60	0.62	0.61	GL
6VYAAK		55.13	0.92	0.89	68.03	1.05	1.03	MW
6WURBL		52.68	-1.53	-1.48	65.03	-1.95	-1.92	EN
7CE3BT		54.60	0.40	0.39	67.28	0.30	0.29	GL
7UJCEY	*	52.25	-1.95	-1.89	64.03	-2.95	-2.90	RA
86VY4Q		53.93	-0.28	-0.27	67.28	0.30	0.29	GL
89UBYQ		55.13	0.92	0.89	67.45	0.47	0.47	GL
8FEBF4	*	54.15	-0.05	-0.05	65.58	-1.40	-1.38	XX
9HGTQ4		54.45	0.25	0.24	66.40	-0.58	-0.57	GL
A9B7FH		55.43	1.22	1.19	67.55	0.57	0.56	GL
AEBPFT	X	53.38	-0.83	-0.80	63.93	-3.05	-3.00	GK
AN2BHK		54.90	0.70	0.68	67.35	0.37	0.37	GL
B62K33		54.00	-0.20	-0.20	67.03	0.05	0.05	GL
B64AAK		53.78	-0.43	-0.41	67.20	0.22	0.22	GL
BFMLLX		54.08	-0.13	-0.12	66.20	-0.78	-0.76	GL
C6XF4J		53.90	-0.30	-0.29	67.15	0.17	0.17	RQ
C7R7AY	*	56.98	2.77	2.69	69.40	2.42	2.38	RC
CKBN4N		55.40	1.20	1.16	67.58	0.60	0.59	GL
CRURBQ		53.83	-0.38	-0.37	66.35	-0.63	-0.61	GL
CVCBVK		53.08	-1.13	-1.09	65.98	-1.00	-0.98	GL
CW8UXL		54.75	0.55	0.53	68.10	1.12	1.10	GD
DXG4NX		54.30	0.10	0.09	67.30	0.32	0.32	GL
DXF4H		53.85	-0.35	-0.34	67.03	0.05	0.05	GN
E2AKDW		55.53	1.32	1.28	68.43	1.45	1.42	NH
EWFQFV		54.48	0.27	0.26	67.05	0.07	0.07	GN
EZE2CV		52.43	-1.78	-1.72	65.78	-1.20	-1.18	GL



Interlaboratory Testing Program for Color & Appearance

Analysis 440

60 Degree Gloss - Paint Chips

ASTM Method D 523

Report #214

4th Qtr 2025

WebCode	Data Flag	Sample H251			Sample H252			Instr Code
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV	
GN2JUC		52.28	-1.93	-1.87	65.48	-1.50	-1.47	GL
GP82T8		52.25	-1.95	-1.89	65.83	-1.15	-1.13	GL
H3DGCH		53.15	-1.05	-1.02	66.33	-0.65	-0.64	GN
HH877T		53.70	-0.50	-0.49	67.33	0.35	0.34	DE
HUFMEJ		55.70	1.50	1.45	68.13	1.15	1.13	GL
JMC6DC		53.20	-1.00	-0.97	66.28	-0.70	-0.69	GK
JT4AAM		55.68	1.47	1.43	68.13	1.15	1.13	GL
K8WJ9D		53.55	-0.65	-0.63	66.73	-0.25	-0.25	GK
KA877R		54.18	-0.03	-0.03	66.68	-0.30	-0.30	GL
KJE3TA	X	60.68	6.47	6.28	66.73	-0.25	-0.25	GK
KTXE4M		53.15	-1.05	-1.02	65.53	-1.45	-1.43	GL
LK4NY7	*	52.72	-1.48	-1.44	64.36	-2.62	-2.57	EN
M6PKBP		53.43	-0.78	-0.75	65.78	-1.20	-1.18	RA
MCKRRA		55.13	0.92	0.89	68.08	1.10	1.08	GL
MF38YG		55.68	1.47	1.43	68.28	1.30	1.28	GL
MY23WE		55.63	1.42	1.38	67.98	1.00	0.98	GL
NM4JVD		54.08	-0.13	-0.12	66.38	-0.60	-0.59	GL
PB73JH		54.03	-0.18	-0.17	67.18	0.20	0.20	GL
PJC4GN		54.50	0.30	0.29	67.20	0.22	0.22	GK
T22JCV		54.50	0.30	0.29	66.93	-0.05	-0.05	GN
T2MXZ9		52.38	-1.83	-1.77	66.00	-0.98	-0.96	GL
T3UAHA	X	51.10	-3.10	-3.01	61.33	-5.65	-5.55	GL
T3YRF9		54.40	0.20	0.19	67.23	0.25	0.25	GL
U9Z72A		53.55	-0.65	-0.63	67.05	0.07	0.07	GL
UDYKNY		55.38	1.17	1.14	68.48	1.50	1.47	GL
UJZWKW		54.63	0.42	0.41	67.08	0.10	0.10	EN
VT64ZW		54.89	0.69	0.67	67.15	0.17	0.17	GL
WEJBNU		53.93	-0.28	-0.27	67.08	0.10	0.10	GK
X7JBPT		55.05	0.85	0.82	67.65	0.67	0.66	MX
YDKP99		54.80	0.60	0.58	68.00	1.02	1.01	GN
YNUJ3X		53.98	-0.23	-0.22	67.10	0.12	0.12	GL
YPD4AQ		54.58	0.37	0.36	66.43	-0.55	-0.54	RA



Interlaboratory Testing Program for Color & Appearance

Report #214

Analysis 440

4th Qtr 2025

60 Degree Gloss - Paint Chips

ASTM Method D 523

Summary Statistics

Grand Means

54.20 Gloss Units

66.98 Gloss Units

Std Dev Btwn Labs

1.03 Gloss Units

1.02 Gloss Units

Statistics based on 62 of 65 reporting participants

Comments on Assigned Data Flags for Test #440

AEBPFT(X) - Low data for Sample H252. Inconsistent within the determinations for both samples.

KJE3TA(X) - Extreme data for Sample H251. Inconsistent within the determinations for Sample H251.

T3UAHA(X) - Data for both samples are low. Possible systematic error. Inconsistent within the determinations for both samples.

Key to Instrument Codes Reported by Participants

DE	DeFelsko PosiTector GLS 60	EN	Elcometer 480
GD	BYK Gardner Spectro2Guide 45/0	GK	BYK-Gardner micro-gloss (60)
GL	BYK-Gardner micro-TRI-gloss	GN	BYK-Gardner new micro-TRI-gloss
MW	Minolta Multi-Gloss 268	MX	Minolta Multi-Gloss 268 Plus
NH	3nh NHG268 Multi-angle Precise Gloss Meter	RA	Rhopoint Novo-Gloss Glossmeter
RC	Novo-Gloss Trio 20/60/85 Glossmeter	RQ	Rhopoint IQ Goniophotometer 20/60/85°
XX	Instrument make/model not specified by lab	ZA	Zehntner ZGM Series



Interlaboratory Testing Program for Color & Appearance

Analysis 440

60 Degree Gloss - Paint Chips

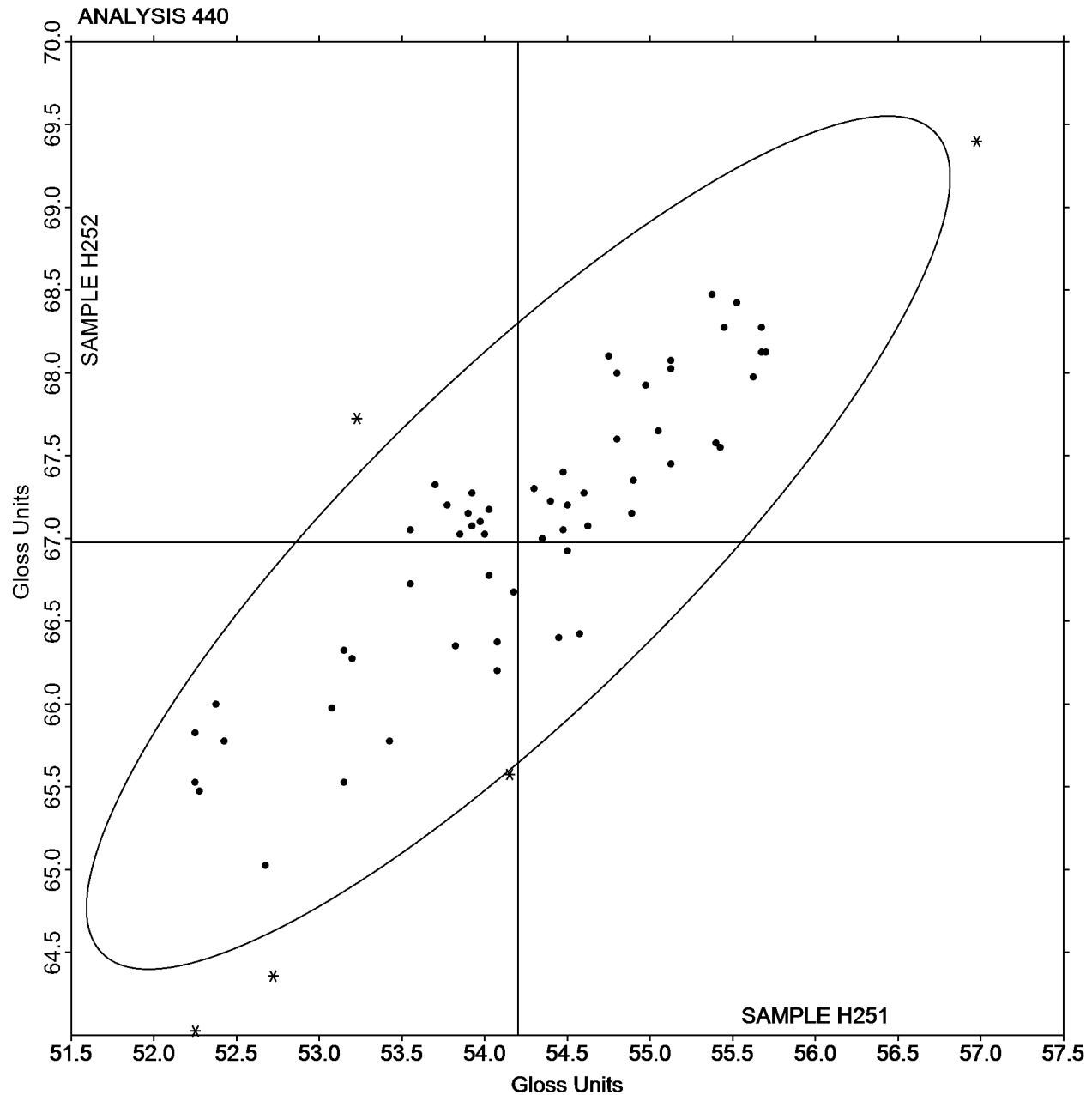
ASTM Method D 523

Report #214

4th Qtr 2025

SAMPLE H251 = 54.20 Gloss Units

SAMPLE H252 = 66.98 Gloss Units



-End of Report-