Collaborative Testing Services, Inc.

Color & Appearance Testing Program

Summary Report #209 - 3rd Qtr 2024

About the Color Program, About CTS

Key to Tables and Graphs (Color Tests)

Key to Tables and Graphs (Spectro Test)

Key to Tables and Graphs (Gloss Tests)

Analysis	Analysis Name
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:

DATA FLAG	STATISTICALLY INCLUDED/EXCLUDED	ACTION REQUIRED
*	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:

DATA FLAG	STATISTICALLY INCLUDED/EXCLUDED	ACTION REQUIRED
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:

DATA FLAG	STATISTICALLY INCLUDED/EXCLUDED	ACTION REQUIRED
*	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.

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
3FYTMY		C241	47.48	-14.23	-10.19	0.36	-0.42	-0.80	0.97	GG
		C242	47.84	-14.65	-11.00					
3NUYEF		C241	47.84	-14.21	-10.40	0.38	-0.40	-0.81	0.98	MT
		C242	48.22	-14.61	-11.21					
3PLU4A		C241	47.37	-14.25	-10.28	0.43	-0.39	-0.83	1.01	HY
		C242	47.80	-14.65	-11.11					
64WEDD		C241	47.90	-14.18	-10.15	0.40	-0.39	-0.78	0.95	XU
		C242	48.29	-14.57	-10.92					
6JBFA4		C241	48.05	-14.23	-10.20	0.39	-0.41	-0.80	0.99	XU
		C242	48.45	-14.64	-11.00					
6ZV7A3		C241	47.29	-14.20	-10.18	0.32	-0.39	-0.81	0.96	GA
		C242	47.61	-14.60	-10.99					
7QPNB6		C241	47.86	-14.17	-10.19	0.36	-0.40	-0.80	0.97	XU
		C242	48.22	-14.58	-11.00					
8X4UKG		C241	47.81	-13.96	-10.74	0.39	-0.37	-0.80	0.96	HW
		C242	48.20	-14.33	-11.54					
92XBBF		C241	48.02	-14.07	-10.35	0.40	-0.37	-0.78	0.95	XO
		C242	48.42	-14.44	-11.13					
9T6XFM	X	C241	47.87	-14.62	-10.64	0.35	-0.21	-0.44	0.60	XE
		C242	48.22	-14.83	-11.08					
A7QUR6		C241	48.10	-14.30	-10.60	0.30	-0.30	-0.65	0.78	HL
		C242	48.40	-14.60	-11.25					
A9TR3X		C241	48.14	-14.02	-10.60	0.34	-0.41	-0.84	0.99	HL
		C242	48.48	-14.43	-11.43					
ABKNRR		C241	47.76	-14.13	-10.51	0.32	-0.46	-0.85	1.02	XF
		C242	48.08	-14.59	-11.36					
AFXAXD		C241	47.62	-13.81	-10.80	0.44	-0.36	-0.78	0.97	MG
		C242	48.06	-14.17	-11.58					
AVTTEZ		C241	47.43	-14.24	-10.23	0.36	-0.41	-0.80	0.97	GG
		C242	47.79	-14.64	-11.04					
C8TC36		C241	47.93	-14.16	-10.33	0.35	-0.40	-0.77	0.94	XP
		C242	48.29	-14.56	-11.09					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
CKKX9Z		C241	48.30	-14.20	-10.30	0.40	-0.40	-0.80	0.98	HL
		C242	48.70	-14.60	-11.10					
D62V4G		C241	48.55	-14.12	-10.29	0.37	-0.36	-0.78	0.94	DD
		C242	48.92	-14.49	-11.07					
D8CEB7		C241	48.23	-13.96	-10.53	0.37	-0.38	-0.80	0.96	XQ
		C242	48.60	-14.34	-11.33					
DAEFB3		C241	48.13	-14.47	-10.42	0.30	-0.43	-0.81	0.96	XW
		C242	48.43	-14.89	-11.22					
DC7CZW		C241	48.00	-14.07	-9.99	0.31	-0.48	-0.85	1.03	GE
		C242	48.31	-14.56	-10.84					
EDBGQQ		C241	48.46	-14.35	-10.62	0.42	-0.38	-0.76	0.95	PR
		C242	48.88	-14.73	-11.38					
EVC78T		C241	48.03	-14.22	-10.03	0.32	-0.45	-0.82	0.99	GE
		C242	48.35	-14.66	-10.85					
F6VX7Q		C241	48.01	-14.34	-10.19	0.35	-0.42	-0.82	0.99	XU
		C242	48.35	-14.76	-11.01					
F9V93Q		C241	48.11	-14.13	-10.35	0.22	-0.41	-0.79	0.91	XM
		C242	48.33	-14.53	-11.14					
FDP6RH		C241	48.39	-14.02	-10.48	0.39	-0.38	-0.77	0.95	XJ
		C242	48.78	-14.40	-11.25					
H6L3DV		C241	48.42	-14.03	-10.37	0.34	-0.43	-0.84	1.00	MS
		C242	48.76	-14.46	-11.21					
HG3PPG		C241	48.91	-14.10	-9.92	0.32	-0.44	-0.75	0.92	XE
		C242	49.23	-14.54	-10.67					
J7W4YU		C241	48.35	-14.30	-10.40	0.35	-0.40	-0.90	1.05	HL
		C242	48.70	-14.70	-11.30					
JRR6P3		C241	48.37	-14.24	-10.14	0.30	-0.45	-0.85	1.00	GH
		C242	48.68	-14.69	-10.98					
JW9DD2		C241	47.84	-13.77	-10.67	0.39	-0.38	-0.77	0.95	HW
		C242	48.23	-14.15	-11.44					
KMEKHG		C241	47.87	-14.14	-10.16	0.38	-0.40	-0.81	0.98	XU
		C242	48.25	-14.55	-10.97					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
MEBG4U		C241	47.93	-14.08	-10.23	0.40	-0.40	-0.80	0.98	XU
		C242	48.33	-14.48	-11.03					
MXPWNA		C241	48.16	-14.17	-10.09	0.39	-0.41	-0.80	0.98	XE
		C242	48.55	-14.58	-10.90					
N33RAY		C241	49.00	-14.20	-10.10	0.35	-0.30	-0.75	0.88	XE
		C242	49.35	-14.50	-10.85					
NWAW4K		C241	48.64	-14.17	-9.99	0.35	-0.44	-0.90	1.06	XE
		C242	48.99	-14.61	-10.89					
PVXJZN	X	C241	47.77	-14.81	-10.29	0.38	-0.44	-0.81	1.00	BG
		C242	48.15	-15.24	-11.10					
Q489DM		C241	47.57	-14.19	-10.47	0.34	-0.43	-0.87	1.03	HX
		C242	47.91	-14.61	-11.35					
QQGCCN		C241	48.30	-14.10	-10.80	0.35	-0.40	-0.85	1.00	HW
		C242	48.65	-14.50	-11.65					
RXA4WN		C241	47.91	-14.08	-10.27	0.34	-0.46	-0.89	1.06	XU
		C242	48.25	-14.54	-11.16					
T27AT6	X	C241	47.63	-14.94	-10.28	0.35	-0.42	-0.79	0.96	BG
		C242	47.98	-15.37	-11.06					
TKJTMM	X	C241	48.18	-14.31	-11.66	-0.38	0.38	0.82	0.98	HW
		C242	47.80	-13.93	-10.84					
U4QL6F		C241	47.36	-14.19	-10.28	0.37	-0.40	-0.79	0.95	GE
		C242	47.73	-14.58	-11.06					
UF79G2		C241	47.81	-13.94	-10.54	0.29	-0.39	-0.79	0.93	HW
		C242	48.10	-14.33	-11.33					
VDAC6D		C241	47.91	-14.26	-10.31	0.34	-0.41	-0.80	0.96	XG
		C242	48.25	-14.67	-11.11					
WZPW2D		C241	47.59	-14.18	-10.17	0.35	-0.43	-0.82	0.99	GG
		C242	47.94	-14.61	-10.99					
XAN9BC		C241	47.88	-14.18	-10.10	0.41	-0.41	-0.78	0.96	XS
		C242	48.29	-14.59	-10.88					
XB3JNJ		C241	48.70	-13.95	-10.19	0.31	-0.48	-0.80	0.98	XE
		C242	49.01	-14.43	-10.99					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
XP68HY		C241	48.04	-14.36	-9.62	0.34	-0.45	-0.86	1.03	GE
		C242	48.38	-14.81	-10.48					
YNP8XA		C241	48.46	-13.89	-10.75	0.41	-0.42	-0.77	0.97	XD
		C242	48.87	-14.31	-11.52					
ZAMYUZ		C241	47.04	-14.10	-10.24	0.36	-0.40	-0.81	0.97	HX
		C242	47.39	-14.50	-11.05					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
C241	48.00	-14.13	-10.30	0.36	-0.41	-0.81	0.97
C242	48.36	-14.55	-11.11				
Stnd Dev Btwn Labs							
C241	0.41	0.14	0.24	0.04	0.04	0.04	0.05
C242	0.41	0.15	0.24				

Statistics based on 47 of 51 reporting participants

Comments Assigned on Data Flags for Test #408

9T6XFM(X) - Low a* value for Sample C241. Large replication difference for a* Sample C241. Inconsistent in testing between the b* values. Large replication difference for b* Sample C241. Large Delta a & b, small Delta E.

PVXJZN(X) - Low a* values for both samples.

T27AT6(X) - Very low a* values for both samples.

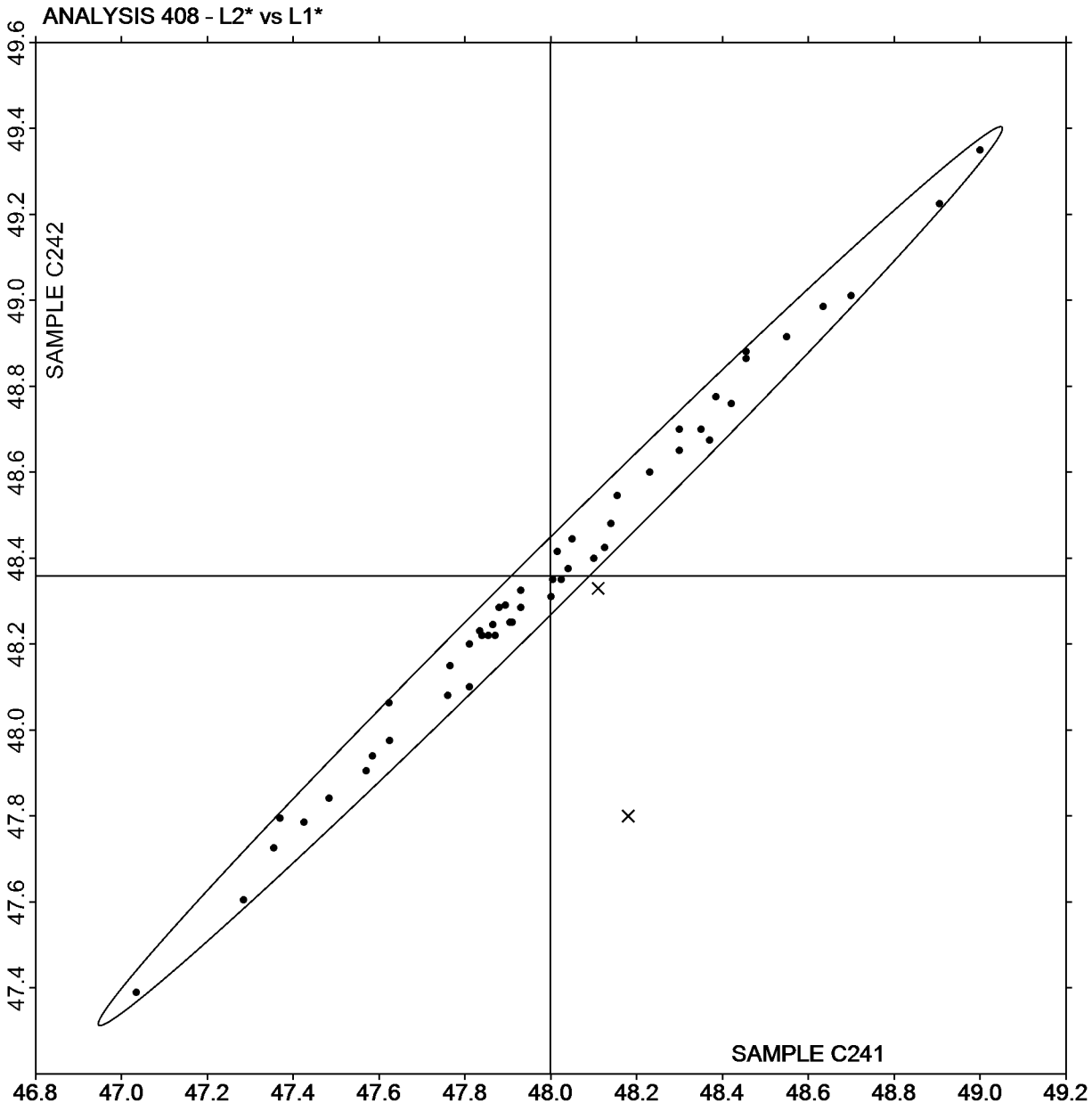
TKJTMM(X) - Inconsistent in testing between the L* values. High a* value for Sample C242. Very low b* value for Sample C241. Small Delta L, large Delta a & b.

Key to Instrument Codes Reported by Participants

BG	BYK Mac i	DD	Data Color 200
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	MS	Minolta CM-600d Spectrophotometer
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

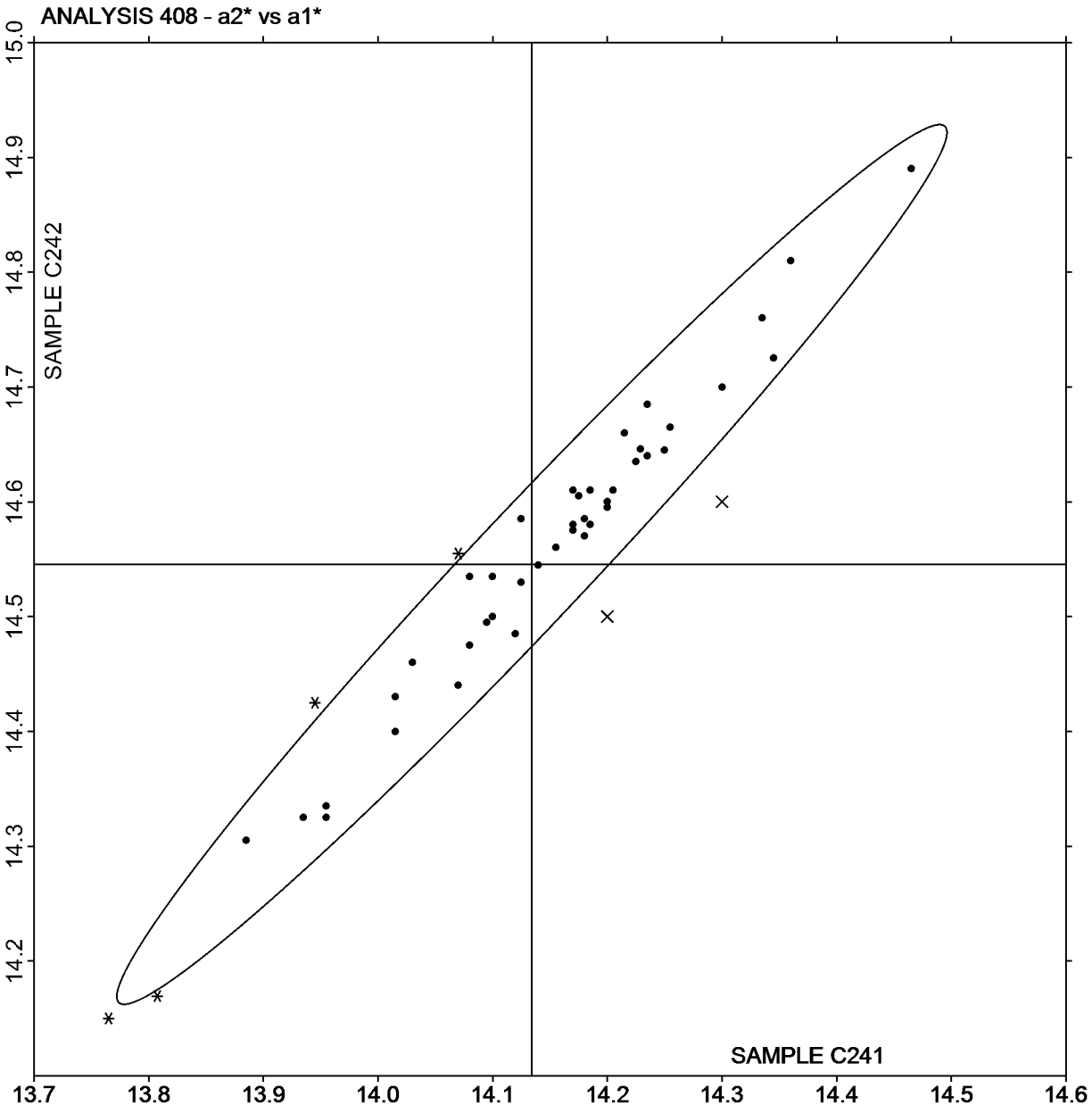
L2* vs L1*

SAMPLE C241 = 48.00 SAMPLE C242 = 48.36



a2* vs a1*

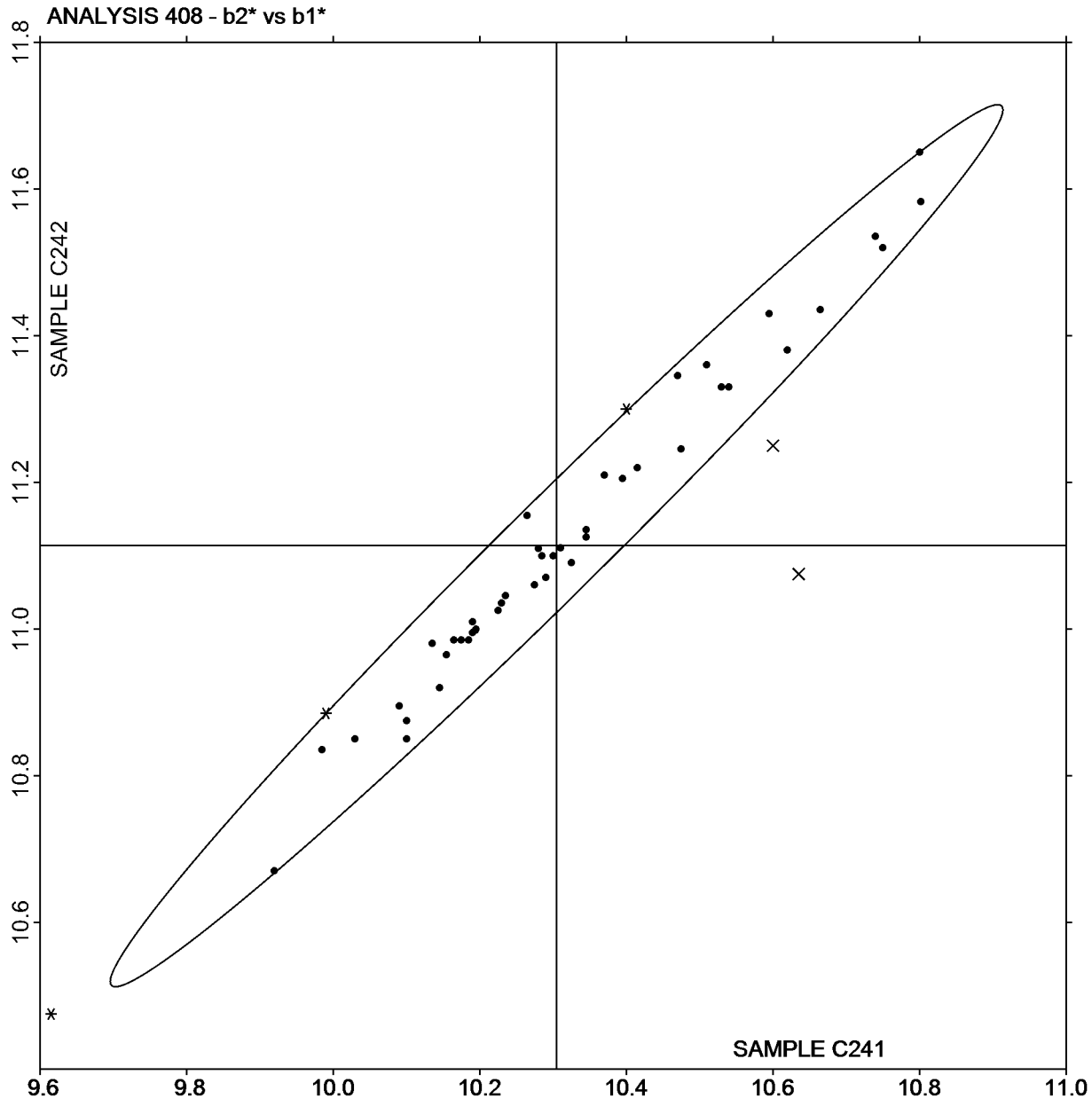
SAMPLE C241 = -14.13 SAMPLE C242 = -14.55



Plot created using absolute values.

b2* vs b1*

SAMPLE C241 = -10.30 SAMPLE C242 = -11.11



Plot created using absolute values.

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
2KCEUK		C241	48.58	-14.17	-10.38	0.40	-0.38	-0.78	0.96	AT
		C242	48.98	-14.55	-11.17					
2PRMHK		C241	48.55	-14.15	-10.49	0.42	-0.31	-0.77	0.93	AF
		C242	48.97	-14.47	-11.26					
2U23R9		C241	48.44	-13.91	-10.46	0.30	-0.45	-0.86	1.01	XH
		C242	48.74	-14.36	-11.31					
3N9KQ3		C241	48.39	-14.04	-10.34	0.33	-0.45	-0.86	1.02	MU
		C242	48.72	-14.49	-11.20					
3NUYEF		C241	48.44	-14.14	-10.51	0.18	-0.40	-0.78	0.89	XB
		C242	48.62	-14.55	-11.29					
3VD2LH		C241	48.34	-14.04	-10.49	0.38	-0.37	-0.78	0.94	XD
		C242	48.73	-14.41	-11.26					
4EZ6JU		C241	48.59	-14.07	-10.30	0.34	-0.41	-0.86	1.01	AU
		C242	48.92	-14.48	-11.15					
4JGD8U		C241	48.34	-13.90	-10.58	0.32	-0.44	-0.88	1.03	XD
		C242	48.66	-14.34	-11.45					
4TLKMU		C241	48.47	-14.01	-10.33	0.34	-0.47	-0.87	1.05	AS
		C242	48.81	-14.48	-11.20					
6XU78K	X	C241	48.62	-14.18	-10.79	0.37	-0.36	-0.76	0.92	HP
		C242	48.99	-14.54	-11.55					
6ZV7A3		C241	48.55	-14.10	-10.34	0.39	-0.38	-0.80	0.97	AJ
		C242	48.94	-14.49	-11.14					
7C8REG		C241	48.29	-13.95	-10.55	0.34	-0.44	-0.85	1.02	XD
		C242	48.63	-14.39	-11.40					
7QPNB6		C241	48.40	-13.96	-10.56	0.39	-0.36	-0.79	0.95	XB
		C242	48.79	-14.32	-11.34					
7WFYL4		C241	48.39	-14.12	-10.48	0.40	-0.44	-0.84	1.02	MV
		C242	48.79	-14.55	-11.32					
88AYBC		C241	48.62	-14.11	-10.38	0.38	-0.35	-0.78	0.94	AP
		C242	49.00	-14.46	-11.16					
8FK2WD		C241	48.65	-14.08	-10.27	0.33	-0.40	-0.74	0.91	AJ
		C242	48.98	-14.47	-11.01					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
9T8P83		C241	48.45	-14.10	-10.47	0.34	-0.45	-0.85	1.02	XD
		C242	48.79	-14.55	-11.33					
AV4TCV		C241	48.38	-13.99	-10.43	0.33	-0.46	-0.86	1.03	XD
		C242	48.70	-14.45	-11.29					
AZYKH7		C241	48.28	-13.91	-10.47	0.34	-0.43	-0.86	1.02	XG
		C242	48.62	-14.34	-11.33					
BG64VN		C241	48.55	-13.96	-10.36	0.37	-0.39	-0.80	0.96	AU
		C242	48.92	-14.35	-11.16					
BLHN2A		C241	48.19	-13.95	-10.54	0.42	-0.35	-0.75	0.93	XI
		C242	48.62	-14.30	-11.29					
BRNKNV		C241	48.16	-14.17	-10.49	0.42	-0.38	-0.79	0.97	MV
		C242	48.58	-14.55	-11.28					
BX9L49		C241	48.56	-13.92	-10.29	0.43	-0.37	-0.78	0.96	AO
		C242	48.99	-14.29	-11.06					
C326KW		C241	48.36	-14.19	-10.37	0.34	-0.45	-0.87	1.04	XX
		C242	48.71	-14.64	-11.24					
C8TC36		C241	48.24	-13.96	-10.57	0.42	-0.36	-0.74	0.92	XF
		C242	48.66	-14.33	-11.31					
D7UNYZ		C241	48.68	-14.04	-10.42	0.37	-0.38	-0.79	0.95	HP
		C242	49.05	-14.42	-11.21					
D8CEB7		C241	48.35	-13.98	-10.45	0.37	-0.37	-0.80	0.96	XD
		C242	48.73	-14.35	-11.25					
DC7CZW		C241	48.09	-13.93	-10.34	0.32	-0.47	-0.82	1.00	GD
		C242	48.41	-14.40	-11.16					
DJFXL7		C241	48.40	-14.04	-10.39	0.38	-0.37	-0.80	0.95	MK
		C242	48.78	-14.41	-11.18					
DP9VJA		C241	48.61	-14.05	-10.30	0.34	-0.42	-0.85	1.01	AS
		C242	48.96	-14.46	-11.15					
DX43VM		C241	48.34	-14.05	-10.38	0.32	-0.45	-0.89	1.04	MQ
		C242	48.67	-14.50	-11.27					
DZPPNB		C241	48.48	-14.03	-10.60	0.41	-0.35	-0.74	0.91	AO
		C242	48.88	-14.38	-11.34					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
EAAFN9		C241	48.52	-14.13	-10.45	0.40	-0.34	-0.79	0.94	AS
		C242	48.92	-14.47	-11.23					
EDBGQQ		C241	48.32	-14.04	-10.48	0.09	-0.40	-0.74	0.85	CA
		C242	48.41	-14.44	-11.23					
EH3N9Y	X	C241	48.62	-14.43	-10.71	0.34	-0.45	-0.89	1.05	CA
		C242	48.96	-14.88	-11.60					
EKUMMW		C241	48.36	-14.13	-10.49	0.39	-0.40	-0.84	1.01	AQ
		C242	48.75	-14.53	-11.33					
EVQPRQ		C241	48.49	-13.95	-10.44	0.37	-0.40	-0.79	0.96	MM
		C242	48.87	-14.34	-11.23					
EXJLFK		C241	48.52	-14.08	-10.35	0.32	-0.47	-0.85	1.02	AU
		C242	48.85	-14.55	-11.20					
F36YTT		C241	48.10	-13.88	-10.32	0.39	-0.39	-0.78	0.96	XO
		C242	48.49	-14.27	-11.10					
F6VX7Q		C241	48.16	-13.89	-10.55	0.34	-0.40	-0.83	0.98	XH
		C242	48.50	-14.29	-11.38					
FRBH4R		C241	48.19	-14.08	-10.63	0.38	-0.38	-0.78	0.94	XC
		C242	48.56	-14.46	-11.41					
FY7K63		C241	48.53	-13.93	-10.35	0.41	-0.38	-0.74	0.93	AO
		C242	48.94	-14.31	-11.10					
GCPPRP		C241	48.13	-14.00	-10.62	0.34	-0.37	-0.79	0.94	XF
		C242	48.47	-14.37	-11.41					
GPDRAH		C241	48.36	-13.91	-10.50	0.34	-0.42	-0.79	0.96	XE
		C242	48.70	-14.33	-11.29					
GUTYXG		C241	48.54	-13.96	-10.35	0.40	-0.41	-0.80	0.98	MW
		C242	48.94	-14.37	-11.15					
GXTARW		C241	48.37	-13.91	-10.37	0.36	-0.40	-0.79	0.96	XB
		C242	48.73	-14.31	-11.16					
H6L3DV		C241	48.44	-14.01	-10.37	0.35	-0.42	-0.85	1.01	MS
		C242	48.79	-14.43	-11.22					
JE7TDR		C241	48.43	-14.01	-10.47	0.41	-0.40	-0.80	0.99	AJ
		C242	48.83	-14.41	-11.28					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
JH749R		C241	48.73	-14.00	-10.38	0.13	-0.37	-0.80	0.89	AJ
		C242	48.86	-14.37	-11.17					
JRCL66		C241	48.39	-14.10	-10.35	0.37	-0.37	-0.79	0.95	MY
		C242	48.76	-14.46	-11.14					
JRDJFZ		C241	48.57	-14.08	-10.36	0.38	-0.37	-0.80	0.96	AT
		C242	48.94	-14.44	-11.16					
JRR6P3		C241	48.49	-14.06	-10.47	0.39	-0.37	-0.79	0.96	MV
		C242	48.88	-14.43	-11.26					
KL93JK		C241	48.39	-14.14	-10.30	0.38	-0.37	-0.76	0.93	MW
		C242	48.77	-14.51	-11.06					
KLMNTM		C241	48.50	-14.04	-10.32	0.34	-0.45	-0.84	1.01	AT
		C242	48.84	-14.49	-11.16					
LGL3GA		C241	48.31	-13.98	-10.61	0.45	-0.33	-0.74	0.92	XD
		C242	48.75	-14.31	-11.35					
M33GUV		C241	48.48	-13.97	-10.53	0.38	-0.39	-0.78	0.95	HP
		C242	48.85	-14.36	-11.31					
MEBG4U		C241	48.34	-13.92	-10.55	0.37	-0.37	-0.78	0.94	XE
		C242	48.71	-14.29	-11.33					
MG66NB		C241	48.42	-14.08	-10.21	0.43	-0.38	-0.79	0.97	MW
		C242	48.84	-14.46	-10.99					
N3Z7EJ		C241	48.61	-14.20	-10.30	0.39	-0.39	-0.79	0.97	AW
		C242	49.00	-14.59	-11.09					
PQ6F96		C241	48.41	-13.96	-10.39	0.37	-0.40	-0.79	0.96	MM
		C242	48.78	-14.36	-11.19					
QUW4ZW	X	C241	48.34	-13.96	-10.71	0.39	-0.36	-0.63	0.82	XD
		C242	48.73	-14.32	-11.34					
R39HKD	X	C241	49.06	-14.11	-10.49	0.33	-0.43	-0.82	0.98	CA
		C242	49.39	-14.54	-11.31					
R9W6DX		C241	48.38	-13.98	-10.41	0.41	-0.34	-0.75	0.92	XD
		C242	48.80	-14.32	-11.16					
RPGVCW	X	C241	60.97	-33.74	-10.13	-0.06	-0.06	10.14	10.14	XO
		C242	60.91	-33.80	0.00					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
RXA4WN		C241	48.33	-13.94	-10.51	0.29	-0.47	-0.86	1.02	XD
		C242	48.62	-14.41	-11.37					
T2RMGH		C241	48.42	-13.94	-10.47	0.37	-0.42	-0.84	1.00	XD
		C242	48.79	-14.35	-11.30					
T6RVLR		C241	48.48	-13.90	-10.48	0.37	-0.38	-0.75	0.92	XG
		C242	48.85	-14.28	-11.23					
T724Q7		C241	48.48	-13.99	-10.43	0.30	-0.44	-0.84	1.00	XE
		C242	48.78	-14.42	-11.28					
T7JRBL		C241	48.39	-14.13	-10.33	0.36	-0.42	-0.83	1.00	MW
		C242	48.75	-14.56	-11.17					
TJCEGG		C241	48.57	-14.04	-10.40	0.36	-0.43	-0.83	1.00	AP
		C242	48.93	-14.46	-11.23					
TPGA33		C241	48.53	-14.00	-10.37	0.42	-0.36	-0.76	0.94	HP
		C242	48.95	-14.36	-11.13					
TTWHQ3		C241	48.42	-14.04	-10.25	0.33	-0.45	-0.85	1.01	MB
		C242	48.75	-14.49	-11.10					
TUUV9N		C241	48.47	-14.04	-10.45	0.39	-0.38	-0.78	0.95	AT
		C242	48.86	-14.42	-11.22					
U68F7P		C241	48.47	-14.03	-10.64	0.36	-0.39	-0.77	0.94	XB
		C242	48.83	-14.41	-11.42					
UDG79T		C241	48.41	-14.11	-10.47	0.39	-0.36	-0.75	0.92	AS
		C242	48.80	-14.47	-11.22					
UHTUAP		C241	48.25	-14.03	-10.43	0.40	-0.37	-0.79	0.95	XI
		C242	48.65	-14.39	-11.22					
UMR9UT		C241	48.45	-14.06	-10.39	0.40	-0.36	-0.76	0.94	AU
		C242	48.85	-14.42	-11.15					
UZEBE7		C241	48.30	-13.84	-10.45	0.34	-0.44	-0.84	1.01	XD
		C242	48.64	-14.28	-11.29					
W46QFP		C241	48.29	-13.92	-10.56	0.40	-0.38	-0.77	0.94	XE
		C242	48.69	-14.30	-11.32					
W8KY4P		C241	48.33	-14.04	-10.43	0.39	-0.37	-0.73	0.91	XI
		C242	48.73	-14.41	-11.16					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
WB676X		C241	48.50	-14.07	-10.30	0.35	-0.45	-0.84	1.02	AS
		C242	48.85	-14.52	-11.14					
WGUQ7R		C241	48.27	-13.98	-10.56	0.40	-0.34	-0.76	0.93	XB
		C242	48.67	-14.32	-11.33					
WTKF7X		C241	48.51	-14.08	-10.37	0.44	-0.40	-0.90	1.08	MT
		C242	48.95	-14.49	-11.28					
WXXZCJ		C241	48.07	-13.79	-10.45	0.32	-0.43	-0.88	1.03	XH
		C242	48.40	-14.22	-11.33					
WZPW2D	X	C241	47.91	-14.19	-10.07	0.35	-0.40	-0.82	0.98	GE
		C242	48.26	-14.59	-10.89					
X7PXGX		C241	48.19	-13.88	-10.33	0.43	-0.42	-0.83	1.03	AS
		C242	48.62	-14.30	-11.17					
XAN9BC		C241	48.36	-14.05	-10.39	0.38	-0.41	-0.78	0.96	AJ
		C242	48.74	-14.46	-11.17					
XJC82H		C241	48.33	-14.00	-10.43	0.38	-0.38	-0.78	0.95	XD
		C242	48.71	-14.38	-11.21					
XUUPUP		C241	48.52	-14.09	-10.35	0.38	-0.38	-0.77	0.93	XX
		C242	48.90	-14.47	-11.11					
YPG4M4		C241	48.54	-13.93	-10.32	0.32	-0.43	-0.85	1.01	XD
		C242	48.86	-14.36	-11.17					
YRJ2VB		C241	48.35	-13.84	-10.52	0.33	-0.42	-0.82	0.98	XG
		C242	48.68	-14.26	-11.35					
ZLTBMK		C241	48.47	-14.02	-10.40	0.17	-0.38	-0.78	0.88	HP
		C242	48.64	-14.40	-11.17					
ZNKAZJ		C241	48.33	-13.77	-10.45	0.40	-0.35	-0.80	0.96	AJ
		C242	48.73	-14.12	-11.24					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
C241	48.41	-14.01	-10.43	0.36	-0.40	-0.80	0.97
C242	48.78	-14.41	-11.23				
Stnd Dev Btwn Labs							
C241	0.14	0.09	0.10	0.06	0.04	0.04	0.04
C242	0.14	0.09	0.10				

Statistics based on 87 of 93 reporting participants

Comments Assigned on Data Flags for Test #409

6XU78K(X) - Low b* values for both samples.

EH3N9Y(X) - Low a* values for both samples. Large replication difference for a* values for both samples. Low b* values for both samples. Large replication difference for b* Sample C241

QUW4ZW(X) - Low b* values for Sample C241. Large replication difference for b* Sample C241. Large Delta b & small Delta E.

R39HKD(X) - High L* values for both samples.

RPGVCW(X) - Extreme data for both samples for all values.

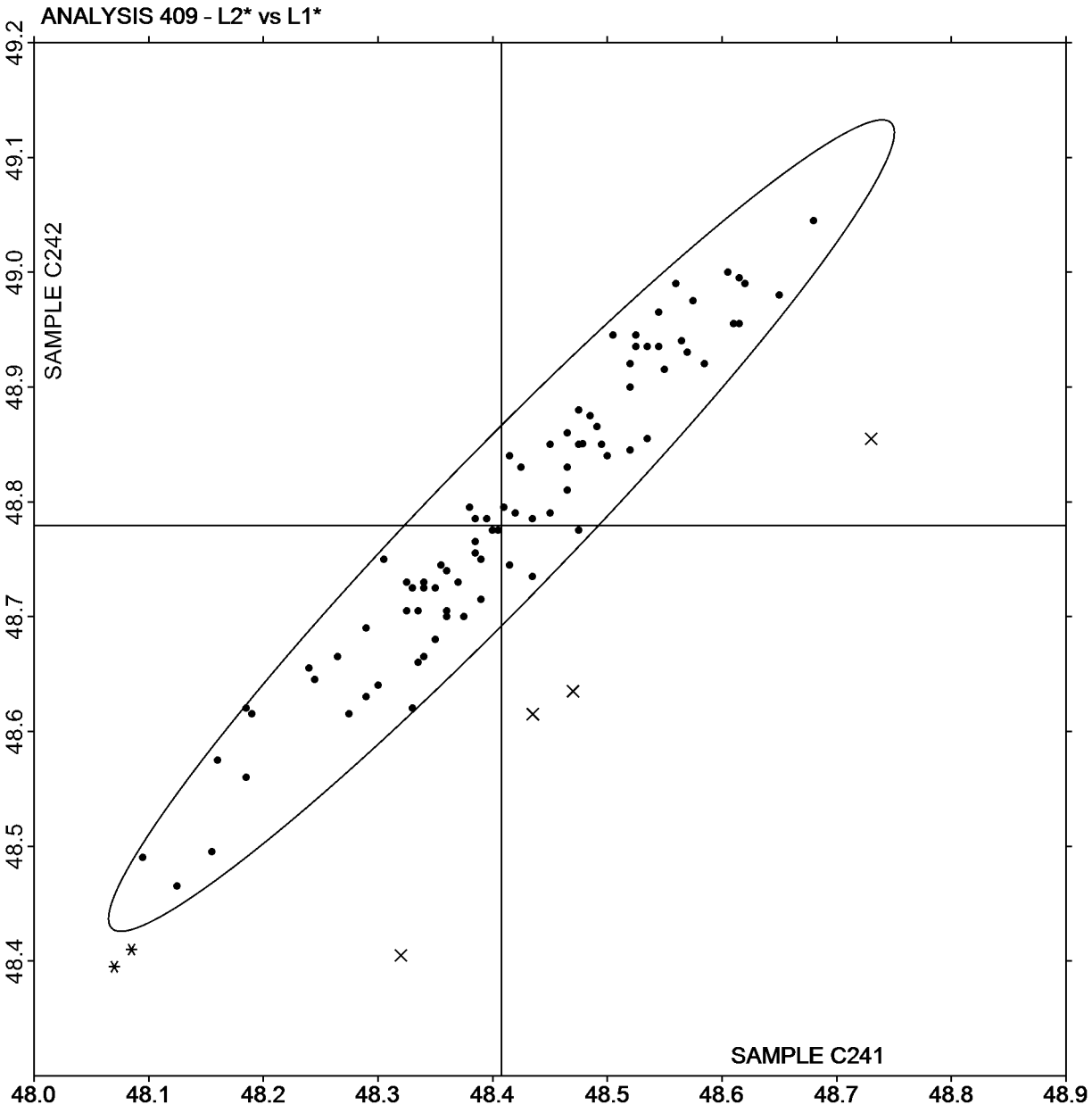
WZPW2D(X) - Low L* values for both samples. High b* values for both samples.

Key to Instrument Codes Reported by Participants

AF	Datacolor 500	AJ	Datacolor 600
AO	Datacolor 650x	AP	Datacolor 750
AQ	Datacolor 600x	AS	Datacolor 800
AT	Datacolor 850	AU	Datacolor 1000
AW	Datacolor 1050	CA	Cary 5000
GD	BYK-Gardner Spectro-Guide Sphere	GE	BYK-Gardner Spectro2-Guide Sphere Gloss
HP	Hunter UltraScan PRO	MB	Minolta CM 3700d Spectrophotometer
MK	Macbeth Color-Eye 7000	MM	Macbeth Color-Eye 7000a
MQ	Minolta CM-700d	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
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	XO	X-Rite SP64 Portable Sphere Spectrophotometer
XX	Instrument make/model not specified by lab		

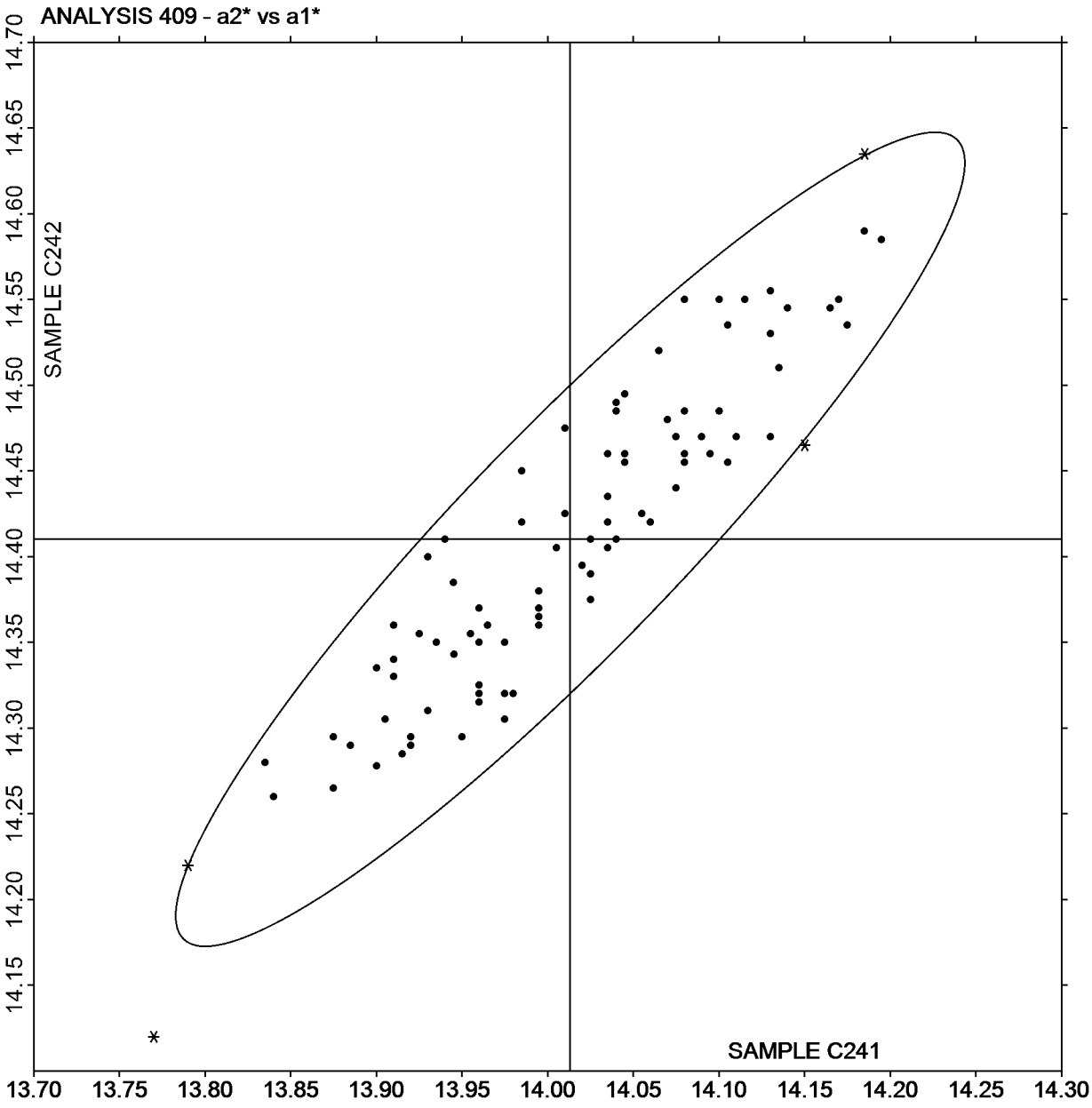
L2* vs L1*

SAMPLE C241 = 48.41 SAMPLE C242 = 48.78



a2* vs a1*

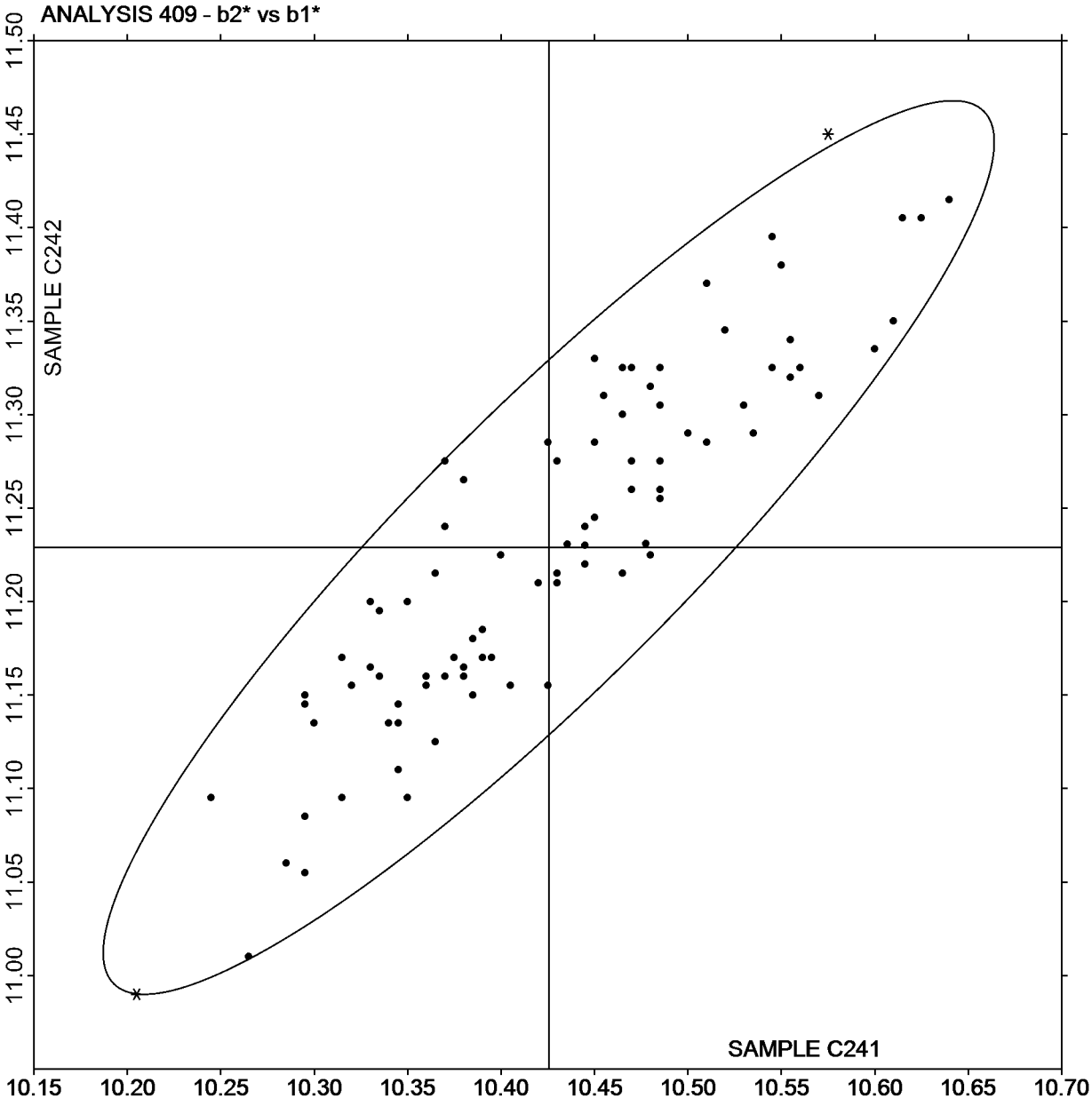
SAMPLE C241 = -14.01 SAMPLE C242 = -14.41



Plot created using absolute values.

b2* vs b1*

SAMPLE C241 = -10.43 SAMPLE C242 = -11.23



Plot created using absolute values.

Spectrophotometric Reflectance values (as %) at selected wavelengths

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
Sample C241																		
2KCEUK		17.21	20.55	22.50	23.23	23.14	23.01	22.38	20.06	15.99	12.60	10.97	10.07	9.85	10.10	9.98	9.28	AT
2PRMHK		17.21	20.57	22.57	23.26	23.14	23.03	22.39	20.00	15.95	12.61	10.97	10.02	9.84	10.09	10.01	9.15	AF
2U23R9		17.35	20.53	22.40	23.17	23.00	22.87	22.20	19.88	15.84	12.56	10.90	10.04	9.85	10.14	9.87	9.16	XH
3N9KQ3		16.96	20.46	22.23	23.12	22.93	22.80	22.22	19.87	15.82	12.52	10.89	9.98	9.78	10.11	10.00	9.24	MV
3NUYEF		17.29	20.50	22.45	23.16	23.04	22.94	22.26	19.91	15.83	12.52	10.87	9.98	9.69	10.01	9.80	9.01	XB
3VD2LH		17.40	20.44	22.29	23.08	22.92	22.81	22.13	19.78	15.74	12.50	10.83	9.96	9.75	10.06	9.83	9.11	XD
4EZ6JU		17.62	20.55	22.44	23.20	23.07	22.99	22.36	20.02	16.05	12.66	11.02	10.10	9.88	10.14	9.99	9.25	AU
4JGD8U		18.94X	20.53	22.39	23.13	22.93	22.82	22.13	19.79	15.75	12.50	10.83	9.97	9.77	10.06	9.86	9.07	XD
4TLKMU		17.59	20.48	22.34	23.08	22.99	22.86	22.19	19.92	15.93	12.59	10.96	10.04	9.85	10.09	10.02	9.29	AS
6XU78K		17.84	20.93X	22.70*	23.64X	23.47X	23.25X	22.44	20.03	15.55*	12.64	11.00	10.10	9.64*	10.17	9.56X	9.05	HP
7QPNB6		17.43	20.57	22.45	23.16	22.97	22.85	22.18	19.84	15.80	12.56	10.88	10.01	9.74	10.03	9.82	9.05	XB
7WFYL4		16.96	20.57	22.32	23.12	22.92	22.89	22.18	19.90	15.75	12.47	10.83	9.96	9.72	10.08	9.95	9.19	MV
88AYBC		17.40	20.60	22.55	23.28	23.15	23.05	22.40	20.05	16.02	12.67	11.02	10.12	9.88	10.11	10.13*	9.29	AP
8FK2WD		17.28	20.61	22.34	23.29	23.20	23.04	22.34	20.08	16.09*	12.72	11.06	10.16*	9.92	10.16	9.99	9.26	AJ
9T8P83		17.14	20.50	22.42	23.18	23.03	22.91	22.27	19.91	15.83	12.58	10.90	9.99	9.76	10.02	9.85	9.04	XD
AMBKQ4	X	17.90	21.35X	23.30X	24.10X	23.90X	23.70X	23.05X	20.60X	16.40X	12.95X	11.20X	10.30X	10.00X	10.35X	10.20X	9.45X	SI
AV4TCV		17.20	20.43	22.33	23.08	22.91	22.80	22.13	19.82	15.81	12.57	10.87	9.99	9.79	10.06	9.82	9.07	XD
AZYKH7		17.30	20.41	22.27	23.00	22.85	22.73	22.05	19.73	15.71	12.47	10.82	9.95	9.75	10.04	9.83	9.10	XG
BG64VN		17.22	20.56	22.45	23.19	23.05	22.95	22.34	19.95	15.97	12.64	11.03	10.08	9.87	10.08	9.94	9.21	AU
BLHN2A		17.14	20.33	22.19	22.98	22.75	22.70	21.99	19.64	15.59	12.42	10.77	9.92	9.71	9.97	9.75	9.04	XI
BRNKNV		17.29	20.72	22.54	23.40	23.12	23.06	22.35	19.94	15.65	12.32*	10.65X	9.80X	9.63*	10.02	9.85	9.10	MV
BX9L49		16.78	20.51	22.40	23.22	23.17	23.02	22.29	19.95	15.93	12.70	11.03	10.17*	9.97*	10.10	9.92	9.32	AN

Spectrophotometric Reflectance values (as %) at selected wavelengths

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
Sample C241																		
C326KW		17.07	20.35	22.26	23.03	22.90	22.80	22.17	19.86	15.83	12.51	10.83	9.92	9.67	9.95	9.74	8.96*	XX
C8TC36		17.21	20.46	22.37	23.05	22.87	22.80	22.12	19.71	15.67	12.45	10.79	9.93	9.74	10.03	9.90	9.19	XF
D7UNYZ		18.01*	20.41	22.67*	23.39	23.19	23.08	22.43	20.11	16.06	12.79*	11.06	9.95	9.77	10.18	10.08	9.06	HP
D8CEB7		17.26	20.42	22.31	23.10	22.94	22.84	22.15	19.79	15.75	12.51	10.85	9.98	9.79	10.10	9.86	9.12	XD
DC7CZW	X	18.43X	20.04X	21.96X	22.81*	22.54X	22.44X	21.80X	19.50X	15.63	12.48	10.59X	9.74X	9.68	10.00	9.91	9.13	GE
DJFXL7		17.10	20.40	22.31	23.09	22.92	22.84	22.16	19.83	15.84	12.58	10.87	9.98	9.77	10.08	9.92	9.20	MK
DP9VJA		17.39	20.59	22.36	23.24	23.09	22.97	22.34	20.06	16.03	12.70	11.01	10.15*	9.92	10.12	10.13*	9.25	AS
DX43VM		17.13	20.39	22.24	23.08	22.85	22.78	22.14	19.83	15.78	12.51	10.81	9.95	9.70	10.02	9.85	9.14	MQ
DZPPNB		17.45	20.63	22.54	23.28	23.10	22.88	22.29	19.95	15.89	12.59	10.92	9.98	9.76	9.97	9.85	9.26	AO
EAAFN9		17.27	20.55	22.50	23.20	23.12	23.02	22.35	19.97	15.90	12.59	10.95	10.03	9.82	10.08	9.87	9.22	AS
EDBGQQ		17.26	20.18*	22.32	23.06	22.84	22.78	22.14	19.84	15.75	12.47	10.82	9.95	9.70	10.03	9.89	9.19	CA
EH3N9Y		17.55	20.76*	22.73*	23.54X	23.33*	23.22*	22.62X	20.25X	16.08	12.70	11.00	10.08	9.85	10.16	10.02	9.27	CA
EKUMMW		16.97	20.40	22.36	23.12	23.00	22.85	22.18	19.81	15.77	12.48	10.81	9.95	9.74	9.95	9.78	9.12	AQ
EVQPRQ		17.30	20.61	22.45	23.22	23.06	22.94	22.24	19.90	15.92	12.64	10.92	10.05	9.82	10.10	9.98	9.25	MM
EXJLFK		17.15	20.50	22.44	23.16	23.04	22.93	22.29	19.93	15.97	12.62	10.98	10.05	9.84	10.08	9.90	9.22	AU
F36YTT		16.92	20.13X	21.95X	22.81*	22.46X	22.49X	21.91*	19.59*	15.55*	12.40	10.75	9.89	9.73	9.98	9.83	9.12	XO
F6VX7Q		17.24	20.37	22.19	22.94	22.75	22.59*	21.96	19.63	15.56*	12.42	10.74	9.92	9.73	10.00	9.77	9.01	XH
FRBH4R		17.08	20.35	22.26	22.98	22.80	22.73	22.04	19.66	15.57	12.35*	10.70*	9.85*	9.67	9.98	9.84	9.11	XC
FY7K63		16.85	20.43	22.41	23.22	23.15	22.99	22.27	19.92	15.89	12.70	10.98	10.13	9.94*	10.09	9.91	9.29	AN
GCPPRP		17.70	20.60	22.50	23.20	23.10	23.00	22.20	19.80	15.70	12.50	10.80	10.00	9.80	10.30X	9.90	9.30	HW
GUTYXG		17.09	20.66	22.41	23.24	22.99	22.93	22.29	20.04	15.94	12.64	10.97	10.10	9.85	10.17	10.06	9.30	MW
GXTARW		17.37	20.41	22.31	23.06	22.89	22.79	22.12	19.82	15.78	12.56	10.89	10.02	9.82	10.10	9.86	9.13	XB

Spectrophotometric Reflectance values (as %) at selected wavelengths

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
Sample C241																		
H6L3DV		17.09	20.49	22.31	23.12	22.94	22.84	22.19	19.90	15.84	12.58	10.91	9.98	9.76	10.07	9.90	9.19	MS
JE7TDR		17.28	20.54	22.40	23.13	22.97	22.84	22.20	19.88	15.85	12.56	10.90	10.02	9.79	9.99	9.81	9.17	AJ
JH749R		17.32	20.49	22.41	23.15	23.00	22.90	22.26	19.94	15.90	12.61	10.97	10.04	9.84	10.06	9.87	9.24	AJ
JRCL66		17.60	20.32	22.25	23.13	22.90	22.83	22.20	19.90	15.81	12.49	10.84	9.97	9.76	10.08	9.98	9.22	MY
JRDJFZ		17.41	20.58	22.45	23.20	23.08	22.98	22.34	20.02	15.98	12.64	10.98	10.09	9.87	10.15	10.15*	9.26	AT
JRR6P3		17.31	20.56	22.45	23.23	23.07	23.01	22.34	19.92	15.81	12.54	10.93	10.04	9.88	10.18	10.05	9.29	MV
KL93JK		16.80	20.40	22.20	23.10	22.90	22.80	22.20	19.90	15.85	12.50	10.85	9.95	9.75	10.05	10.00	9.25	MW
KLMNTM		17.46	20.54	22.39	23.10	23.02	22.93	22.31	19.98	15.90	12.60	10.97	10.03	9.83	10.00	9.82	9.25	AT
LGL3GA		17.49	20.57	22.44	23.14	22.96	22.85	22.14	19.77	15.71	12.48	10.81	9.95	9.74	10.03	9.80	9.07	XD
M33GUV	X	13.64X	20.35	21.77X	23.65X	23.57X	23.29X	23.11X	21.56X	18.13X	14.01X	11.70X	10.16*	9.80	10.06	10.24X	9.67X	HP
MEBG4U		17.46	20.49	22.38	23.08	22.89	22.79	22.09	19.76	15.77	12.55	10.86	9.95	9.74	10.00	9.78	8.97	XE
MG66NB		16.81	20.43	22.16	23.08	22.87	22.81	22.21	19.93	15.89	12.55	10.90	10.00	9.79	10.09	10.00	9.26	MW
N3Z7EJ		17.32	20.52	22.39	23.27	23.13	23.07	22.42	20.04	16.02	12.65	10.99	10.06	9.88	10.16	9.94	9.26	AW
PQ6F96		17.30	20.46	22.35	23.11	22.94	22.83	22.15	19.86	15.87	12.58	10.88	10.00	9.79	10.08	9.92	9.20	MM
QUW4ZW		17.32	20.50	22.37	23.13	22.94	22.84	22.13	19.77	15.74	12.48	10.83	9.98	9.79	10.09	9.89	9.20	XD
R39HKD	X	17.88	20.93X	23.06X	23.80X	23.61X	23.53X	22.88X	20.48X	16.30X	12.92X	11.24X	10.32X	10.08X	10.42X	10.26X	9.50X	CA
R9W6DX		17.14	20.38	22.30	23.10	22.92	22.86	22.15	19.80	15.79	12.56	10.89	10.04	9.80	10.09	9.88	9.21	XD
RPGVCW	X	24.31X	31.17X	33.53X	36.83X	43.19X	51.70X	47.02X	34.13X	22.57X	16.20X	13.49X	12.18X	12.02X	12.66X	12.53X	11.38X	XO
RXA4WN		17.25	20.48	22.38	23.09	22.91	22.80	22.14	19.77	15.78	12.50	10.86	9.95	9.71	10.00	9.77	8.99	XD
T2RMGH		17.23	20.54	22.38	23.13	22.95	22.83	22.17	19.85	15.84	12.60	10.92	10.01	9.82	10.08	9.87	9.15	XD
T6RVLR		17.49	20.62	22.47	23.21	23.05	22.93	22.24	19.90	15.87	12.63	10.94	10.05	9.85	10.14	9.95	9.20	XD
T724Q7		17.37	20.50	22.33	23.04	22.86	22.75	22.07	19.73	15.75	12.49	10.83	9.95	9.72	10.01	9.73	8.91*	XE

Spectrophotometric Reflectance values (as %) at selected wavelengths

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
								Sample C241										
TJCEGG		17.30	20.62	22.53	23.22	23.10	23.00	22.30	20.00	15.98	12.65	11.01	10.11	9.87	10.12	10.00	9.28	AP
TPGA33		17.49	20.47	22.42	23.23	23.07	22.95	22.29	19.88	15.99	12.70	10.99	10.03	9.80	10.08	9.94	9.20	HP
TUUV9N		17.37	20.49	22.45	23.16	23.02	22.92	22.29	19.90	15.87	12.57	10.95	10.04	9.84	10.11	9.82	9.25	AT
U68F7P		17.50	20.70	22.55	23.28	23.09	22.97	22.26	19.90	15.83	12.57	10.87	10.00	9.78	10.07	9.89	9.14	XB
UDG79T		17.79	20.45	22.40	23.13	23.02	22.89	22.25	19.88	15.82	12.52	10.89	9.96	9.77	10.00	9.85	9.16	AS
UHTUAP		17.24	20.32	22.18	22.98	22.84	22.73	22.04	19.71	15.67	12.43	10.78	9.90	9.69	9.99	9.81	9.08	XI
UMR9UT		17.56	20.45	22.38	23.11	22.98	22.88	22.26	19.90	15.89	12.56	10.92	10.01	9.82	10.05	10.10	9.23	AU
UZEBE7		17.32	20.46	22.29	23.03	22.84	22.73	22.06	19.73	15.76	12.52	10.86	9.98	9.76	10.07	9.85	9.05	XD
W46QFP		17.48	20.46	22.35	23.03	22.90	22.80	22.08	19.73	15.66	12.46	10.85	10.00	9.79	10.09	9.86	9.07	XE
WB676X		17.12	20.40	22.35	23.10	23.00	22.90	22.26	19.94	15.94	12.63	10.96	10.07	9.85	10.11	9.92	9.24	AS
WGUQ7R		18.82X	20.45	22.29	23.02	22.84	22.72	22.05	19.73	15.70	12.46	10.79	9.91	9.71	9.96	9.75	9.01	XB
WTKF7X		16.96	20.43	22.42	23.27	23.05	22.93	22.31	19.99	15.93	12.60	10.93	10.01	9.79	10.13	9.94	9.24	MT
WXXZCJ		17.13	20.26	22.02*	22.81*	22.61*	22.47X	21.82X	19.52*	15.55*	12.39	10.75	9.90	9.72	9.98	9.79	9.05	XH
WZPW2D	X	15.86X	19.47X	21.67X	22.59X	22.45X	22.38X	21.70X	19.46X	15.48*	12.21X	10.58X	9.75X	9.57X	9.82X	9.66*	8.95*	GE
X7PXGX		16.94	20.25	22.03*	22.88*	22.70	22.58*	21.97	19.62	15.63	12.47	10.83	9.95	9.77	10.04	9.88	9.17	AS
XJC82H		17.19	20.41	22.27	23.03	22.87	22.76	22.10	19.77	15.76	12.54	10.84	9.96	9.75	9.98	9.78	9.01	XD
YPG4M4		17.35	20.51	22.41	23.19	23.04	22.97	22.29	19.95	15.93	12.67	11.01	10.12	9.86	10.18	9.94	9.24	XD
YRJ2VB		17.46	20.51	22.38	23.09	22.89	22.80	22.11	19.76	15.76	12.56	10.90	10.03	9.81	10.12	9.87	9.13	XG
ZNKAZJ		16.96	20.52	22.32	23.01	22.89	22.71	22.03	19.78	15.76	12.58	10.88	10.02	9.83	9.88*	9.77	9.15	AJ

Summary Statistics

	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700
Grand Means	17.32	20.49	22.37	23.14	22.98	22.87	22.21	19.87	15.82	12.56	10.89	10.00	9.79	10.07	9.89	9.16
SD Btwn Labs	0.34	0.12	0.13	0.13	0.15	0.14	0.13	0.13	0.13	0.09	0.09	0.07	0.07	0.07	0.10	0.10

AMBKQ4 (X) - High % reflectance data for almost all wavelengths.

DC7CZW (X) - Low % reflectance data for most wavelengths.

M33GUV (X) - High % reflectance data for most wavelengths. Large replication difference for most wavelengths.

R39HKD (X) - High % reflectance data for almost all wavelengths.

RPGVCW (X) - High % reflectance data at all wavelengths.

WZPW2D (X) - Low % reflectance data for almost all wavelengths.

Key to Instrument Codes Reported by Participants

AF	Datacolor 500	AJ	Datacolor 600	AN	Datacolor 650
AO	Datacolor 650x	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	HW	Hunter UltraScan XE	MK	Macbeth Color-Eye 7000
MM	Macbeth Color-Eye 7000a	MQ	Minolta CM-700d	MS	Minolta CM-600d
MT	Minolta CM-2600d	MV	Minolta CM-3000d Spectrophotometer	MW	Minolta CM 3700a Spectrophotometer
MY	Minolta Benchtop Spectrophotometer CM-3600a	SI	SHIMADZU 3700i	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	XO	X-Rite SP64 Portable Sphere Spectrophotometer	XX	Instrument make/model not specified by lab

WebCode	Data Flag	Sample G241 Lab Mean	Sample G241 Diff from Grand Mean	Sample G241 CPV	Sample G242 Lab Mean	Sample G242 Diff from Grand Mean	Sample G242 CPV	Instr Code
2U23R9		46.53	0.42	0.63	59.23	1.04	1.13	GL
3N9KQ3		46.30	0.19	0.29	58.18	-0.01	-0.01	GL
3NUYEF		46.93	0.82	1.24	58.58	0.39	0.42	ZA
4JGD8U		46.10	-0.01	-0.01	57.45	-0.73	-0.80	RA
64WEDD		46.55	0.44	0.67	58.00	-0.18	-0.20	GL
6JBFA4		45.93	-0.18	-0.28	57.98	-0.21	-0.23	GK
6ZV7A3		46.85	0.74	1.13	58.68	0.49	0.53	GK
768GZC		46.38	0.27	0.41	58.85	0.67	0.72	GL
7C8REG		46.48	0.37	0.57	58.48	0.30	0.32	GL
7QPNB6		46.43	0.32	0.48	58.93	0.74	0.80	GL
7ZUWTQ		45.54	-0.57	-0.87	58.74	0.55	0.60	GL
8FK2WD		46.43	0.32	0.48	58.63	0.44	0.48	NH
8X4UKG		45.63	-0.48	-0.73	57.80	-0.38	-0.42	GL
92XBBF		47.68	1.57	2.38	59.78	1.59	1.72	GL
AV4TCV		46.43	0.32	0.48	58.93	0.74	0.80	GL
AVTTEZ		46.28	0.17	0.25	57.95	-0.23	-0.25	GD
BG64VN	*	45.48	-0.63	-0.96	59.15	0.97	1.05	EN
BLHN2A		46.36	0.25	0.39	58.46	0.27	0.30	GL
BVLYBK		45.98	-0.13	-0.20	58.60	0.42	0.45	GN
C8TC36		46.30	0.19	0.29	58.23	0.04	0.04	GL
D3W8M7	X	48.55	2.44	3.71	59.43	1.24	1.34	RB
D62V4G		44.98	-1.13	-1.72	56.28	-1.91	-2.07	GK
D8CEB7		46.50	0.39	0.60	58.20	0.02	0.02	GN
DAEFB3		46.50	0.39	0.60	58.38	0.19	0.21	GN
DC7CZW		46.33	0.22	0.33	58.25	0.07	0.07	GN
DF6PK2		46.53	0.42	0.63	58.90	0.72	0.77	GK
DX43VM		46.03	-0.08	-0.13	58.78	0.59	0.64	MX
EDBGQQ		46.18	0.07	0.10	57.83	-0.36	-0.39	GL
EVC78T		46.50	0.39	0.60	59.18	0.99	1.07	GL
EVQPRQ		46.60	0.49	0.75	59.60	1.42	1.53	GL
EXJLFK		47.35	1.24	1.89	59.08	0.89	0.96	GL
F2XGUW		45.70	-0.41	-0.62	56.80	-1.38	-1.50	GK
F36YTT		45.90	-0.21	-0.32	57.90	-0.28	-0.31	GN

Interlaboratory Testing Program for Color & Appearance

Analysis 440

60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample G241 Lab Mean	Sample G241 Diff from Grand Mean	Sample G241 CPV	Sample G242 Lab Mean	Sample G242 Diff from Grand Mean	Sample G242 CPV	Instr Code
F6VX7Q		46.93	0.82	1.24	59.43	1.24	1.34	GL
F9V93Q		45.88	-0.23	-0.35	57.33	-0.86	-0.93	GL
GCPPRP		45.13	-0.98	-1.49	57.80	-0.38	-0.42	GK
GCRAN7		45.73	-0.38	-0.58	57.28	-0.91	-0.99	RC
GPDRAH		47.10	0.99	1.51	59.85	1.67	1.80	GN
H6L3DV		45.45	-0.66	-1.00	57.05	-1.13	-1.23	GK
HG3PPG		45.60	-0.51	-0.77	58.18	-0.01	-0.01	GL
JE7TDR		44.53	-1.58	-2.41	57.03	-1.16	-1.26	GK
JRCL66		46.80	0.69	1.05	59.60	1.42	1.53	GL
KL93JK		46.78	0.67	1.01	58.45	0.27	0.29	GK
KMEKHG		44.83	-1.28	-1.95	57.40	-0.78	-0.85	EN
M33GUV		46.23	0.12	0.18	58.50	0.32	0.34	GL
MEBG4U		45.25	-0.86	-1.30	57.60	-0.58	-0.63	GL
MG66NB		46.08	-0.03	-0.05	58.93	0.74	0.80	GN
N33RAY	*	46.55	0.44	0.67	57.05	-1.13	-1.23	XX
N3Z7EJ		45.93	-0.18	-0.28	57.15	-1.03	-1.12	GL
NUANZB		45.03	-1.08	-1.65	56.93	-1.26	-1.37	GB
NVHZFQ		46.35	0.24	0.37	59.15	0.97	1.05	GK
PBAVRG		45.08	-1.03	-1.57	57.20	-0.98	-1.07	GN
PQ6F96		46.30	0.19	0.29	58.55	0.36	0.39	GL
RXA4WN		46.03	-0.08	-0.13	58.58	0.39	0.42	GL
T27AT6		46.83	0.72	1.09	58.98	0.79	0.86	GL
T7JRBL		47.40	1.29	1.96	59.80	1.62	1.75	GN
TPGA33		45.45	-0.66	-1.00	57.98	-0.21	-0.23	EN
U4QL6F		46.58	0.47	0.71	59.35	1.17	1.26	GK
UHTUAP		46.68	0.57	0.86	59.10	0.92	0.99	GL
UZEBE7		45.03	-1.08	-1.65	56.78	-1.41	-1.53	GK
W8KY4P		46.60	0.49	0.75	58.15	-0.03	-0.04	GL
WCHFFJ	*	45.63	-0.48	-0.73	55.90	-2.28	-2.48	XX
WFHQCJ		46.15	0.04	0.06	58.43	0.24	0.26	GK
X7PXGX	*	44.28	-1.83	-2.79	56.50	-1.68	-1.83	GK
XAN9BC		46.18	0.07	0.10	58.40	0.22	0.23	GL

Interlaboratory Testing Program for Color & Appearance

Report #209
3rd Qtr 2024

Analysis 440

60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample G241 Lab Mean	Sample G241 Diff from Grand Mean	Sample G241 CPV	Sample G242 Lab Mean	Sample G242 Diff from Grand Mean	Sample G242 CPV	Instr Code
XB3JNJ		46.23	0.12	0.18	58.05	-0.13	-0.15	DE
XP68HY		46.78	0.67	1.02	58.10	-0.08	-0.09	GL
XWZAJA		45.73	-0.38	-0.58	57.83	-0.36	-0.39	GL
XYR794		45.95	-0.16	-0.24	58.68	0.49	0.53	GL
YEZJ2L		46.18	0.07	0.10	57.60	-0.58	-0.63	GK
YFRFPF	*	45.30	-0.81	-1.23	55.65	-2.53	-2.75	GN
YRJ2VB		45.88	-0.23	-0.35	57.83	-0.36	-0.39	GL
ZLTBMK		45.90	-0.21	-0.32	58.60	0.42	0.45	GL
ZNKAZJ		46.05	-0.06	-0.09	57.10	-1.08	-1.18	GL

Summary Statistics

Grand Means

46.11 Gloss Units — 58.18 Gloss Units

Stnd Dev Btwn Labs

0.66 Gloss Units — 0.92 Gloss Units

Statistics based on 73 of 74 reporting participants

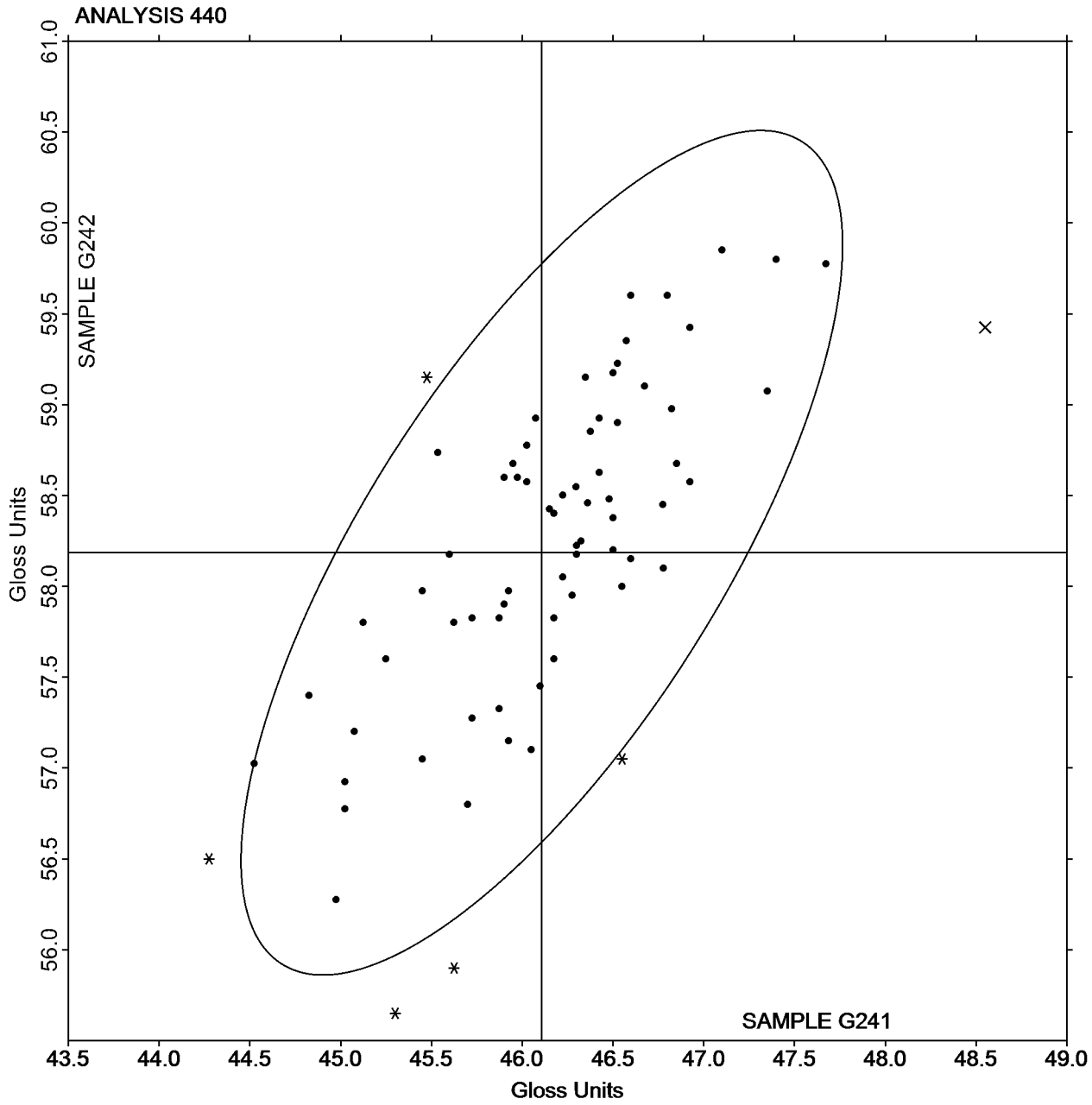
Comments on Assigned Data Flags for Test #440

D3W8M7(X) - Inconsistent in testing between samples. High data for Sample G241.

Key to Instrument Codes Reported by Participants

DE	DeFelsko PosiTector GLS 60	EN	Elcometer 480
GB	BYK Gardner Spectro - Guide Sphere Gloss	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	MX	Minolta Multi-Gloss 268 Plus
NH	3nh NHG268 Multi-angle Precise Gloss Meter	RA	Rhopoint Novo-Gloss Glossmeter
RB	Rhopoint Novo-Gloss LITE Glossmeter	RC	Novo-Gloss Trio 20/60/85 Glossmeter
XX	Instrument make/model not specified by lab	ZA	Zehntner ZGM Series

SAMPLE G241 = 46.11 Gloss Units SAMPLE G242 = 58.18 Gloss Units



-End of Report-