Collaborative Testing Services, Inc.

Color & Appearance Testing Program

Summary Report #213 - 3rd Qtr 2025

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
2PGVVP		C251	46.65	-13.19	-10.74	0.62	-0.55	-0.69	1.08	HW
		C252	47.27	-13.74	-11.42					
2ZGHP8		C251	46.70	-13.56	-10.26	0.63	-0.55	-0.68	1.07	MT
		C252	47.33	-14.12	-10.94					
333PMA		C251	46.73	-13.23	-10.63	0.62	-0.55	-0.69	1.07	HW
		C252	47.34	-13.78	-11.32					
34X8NB		C251	46.50	-13.79	-10.35	0.58	-0.55	-0.77	1.11	PR
		C252	47.08	-14.34	-11.12					
37JRUE		C251	46.33	-13.49	-10.15	0.63	-0.56	-0.68	1.08	GG
		C252	46.96	-14.05	-10.82					
4E9ZTW		C251	46.49	-13.53	-10.22	0.62	-0.57	-0.69	1.09	GG
		C252	47.11	-14.10	-10.91					
663E3N	X	C251	47.81	-13.71	-10.29	0.91	-0.59	-0.71	1.29	XW
		C252	48.71	-14.30	-10.99					
6Z7NXX		C251	47.46	-13.35	-10.27	0.62	-0.57	-0.66	1.07	AB
		C252	48.07	-13.91	-10.94					
83MWX9		C251	47.42	-13.09	-10.72	0.63	-0.56	-0.63	1.05	XD
		C252	48.04	-13.65	-11.35					
8EGDMA		C251	46.53	-13.36	-10.23	0.55	-0.58	-0.68	1.06	XY
		C252	47.08	-13.94	-10.91					
9FRCGJ		C251	46.85	-13.33	-10.16	0.63	-0.55	-0.67	1.07	XU
		C252	47.48	-13.87	-10.83					
AEQ227		C251	47.42	-13.36	-10.62	0.60	-0.59	-0.68	1.08	HL
		C252	48.02	-13.95	-11.31					
APPWY2		C251	46.93	-13.31	-10.32	0.58	-0.55	-0.70	1.06	XO
		C252	47.51	-13.86	-11.02					
BX37Z3		C251	47.56	-13.41	-9.91	0.63	-0.57	-0.69	1.10	XE
		C252	48.18	-13.99	-10.60					
D2XELP		C251	46.82	-13.42	-10.09	0.62	-0.56	-0.70	1.09	XU
		C252	47.44	-13.98	-10.79					
EPY3N2		C251	46.54	-13.46	-10.26	0.65	-0.54	-0.68	1.08	HY
		C252	47.19	-14.00	-10.93					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
EUR33W		C251	46.78	-13.05	-10.54	0.61	-0.55	-0.67	1.06	HW
		C252	47.39	-13.60	-11.21					
GMLANJ	X	C251	50.44	-12.28	-8.77	0.56	-0.57	-2.34	2.48	BG
		C252	51.00	-12.84	-11.11					
HCJANK		C251	45.97	-13.36	-10.15	0.75	-0.62	-0.72	1.21	HX
		C252	46.72	-13.98	-10.87					
HQFQCX	X	C251	46.19	-13.47	-10.11	0.03	-0.58	-0.68	0.89	GA
		C252	46.23	-14.05	-10.79					
HUE3AJ		C251	47.30	-13.32	-10.38	0.60	-0.55	-0.68	1.06	XJ
		C252	47.90	-13.88	-11.06					
JHJ8CF		C251	46.76	-13.41	-10.34	0.57	-0.56	-0.70	1.06	XO
		C252	47.34	-13.97	-11.04					
N9ERQQ		C251	46.94	-13.50	-9.97	0.63	-0.57	-0.65	1.08	GE
		C252	47.57	-14.08	-10.62					
PZJ9R9		C251	47.10	-13.30	-10.75	0.65	-0.60	-0.70	1.13	HW
		C252	47.75	-13.90	-11.45					
QBH8E9		C251	47.00	-13.30	-10.70	0.60	-0.40	-0.50	0.88	HW
		C252	47.60	-13.70	-11.20					
QQ9878	X	C251	46.66	-14.09	-10.17	0.55	-0.61	-0.69	1.07	BG
		C252	47.21	-14.70	-10.86					
TATPAP		C251	46.73	-13.46	-10.02	0.63	-0.55	-0.67	1.07	XS
		C252	47.35	-14.02	-10.69					
TGEMZX		C251	47.67	-13.27	-10.01	0.57	-0.57	-0.65	1.03	XE
		C252	48.23	-13.85	-10.65					
U9VYGF		C251	46.66	-13.14	-10.69	0.65	-0.53	-0.66	1.07	MG
		C252	47.31	-13.67	-11.35					
UXZLJ6		C251	47.20	-13.30	-10.60	0.55	-0.60	-0.70	1.07	HW
		C252	47.75	-13.90	-11.30					
V3MV4M		C251	46.29	-13.42	-10.22	0.58	-0.58	-0.69	1.07	GG
		C252	46.87	-13.99	-10.91					
VCBNFJ		C251	47.81	-13.32	-9.91	0.61	-0.60	-0.71	1.11	XG
		C252	48.42	-13.92	-10.62					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
W33EQ6		C251	47.26	-13.31	-10.33	0.64	-0.56	-0.64	1.07	MS
		C252	47.90	-13.88	-10.97					
WCTZW4		C251	46.17	-13.05	-10.46	0.56	-0.56	-0.69	1.05	HW
		C252	46.74	-13.61	-11.14					
WPGYM7		C251	47.07	-13.48	-10.63	0.65	-0.57	-0.67	1.09	XE
		C252	47.72	-14.05	-11.30					
WPVQBF		C251	46.85	-13.55	-10.11	0.70	-0.52	-0.66	1.09	XU
		C252	47.55	-14.07	-10.77					
WY7RWG		C251	47.07	-13.34	-10.29	0.59	-0.56	-0.70	1.07	XM
		C252	47.65	-13.90	-10.99					
X3XGQT		C251	46.75	-13.46	-10.27	0.66	-0.54	-0.67	1.09	XP
		C252	47.41	-13.99	-10.94					
XBV7C4		C251	46.39	-13.47	-10.24	0.57	-0.57	-0.69	1.06	GG
		C252	46.95	-14.04	-10.93					
XRHLFZ		C251	46.79	-13.51	-10.47	0.54	-0.60	-0.66	1.04	HW
		C252	47.32	-14.12	-11.12					
YM4BZB		C251	47.21	-13.53	-10.09	0.59	-0.57	-0.72	1.08	GH
		C252	47.79	-14.09	-10.80					
YQ3MVB	X	C251	47.15	-13.22	-10.41	0.35	-0.26	-0.34	0.56	XQ
		C252	47.51	-13.49	-10.75					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
C251	46.90	-13.38	-10.30	0.61	-0.56	-0.68	1.07
C252	47.51	-13.95	-10.98				
Stnd Dev Btwn Labs							
C251	0.40	0.16	0.24	0.04	0.03	0.04	0.04
C252	0.40	0.16	0.24				

Statistics based on 37 of 42 reporting participants

Comments Assigned on Data Flags for Test #408

663E3N(X) - High L* value for Sample C252. Large replication difference for both L* values. Large Delta L & E.

GMLANJ(X) - Extreme Data. Small Delta b, large Delta E.

HQFQCX(X) - Low L* value for Sample C252. Small Delta L & E.

QQ9878(X) - Low a* values for both samples.

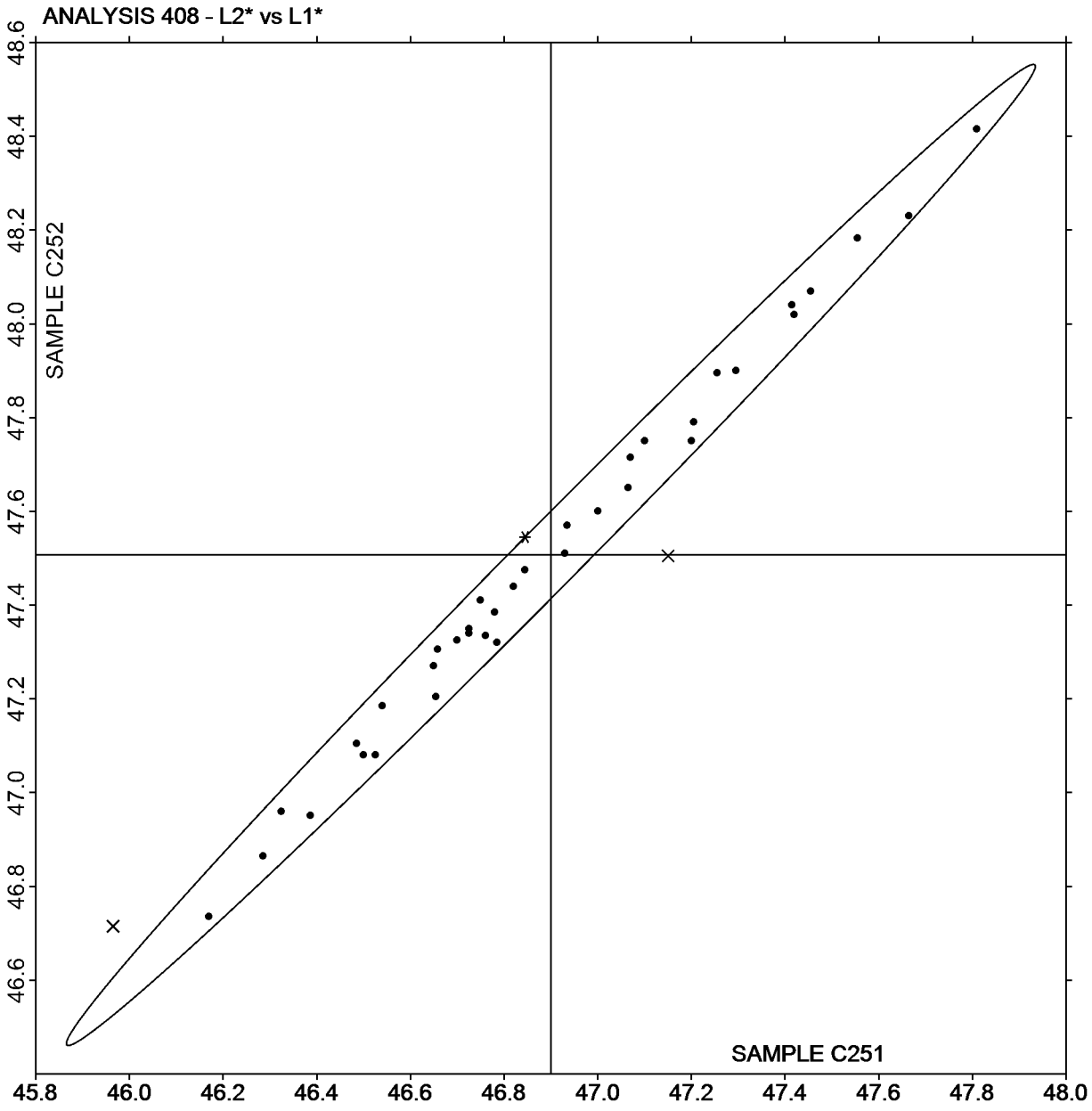
YQ3MVB(X) - High a* values for Sample C252. Large replication difference for L*, a* & b* Sample C252. Small Delta L & E, large Delta a & b.

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	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
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

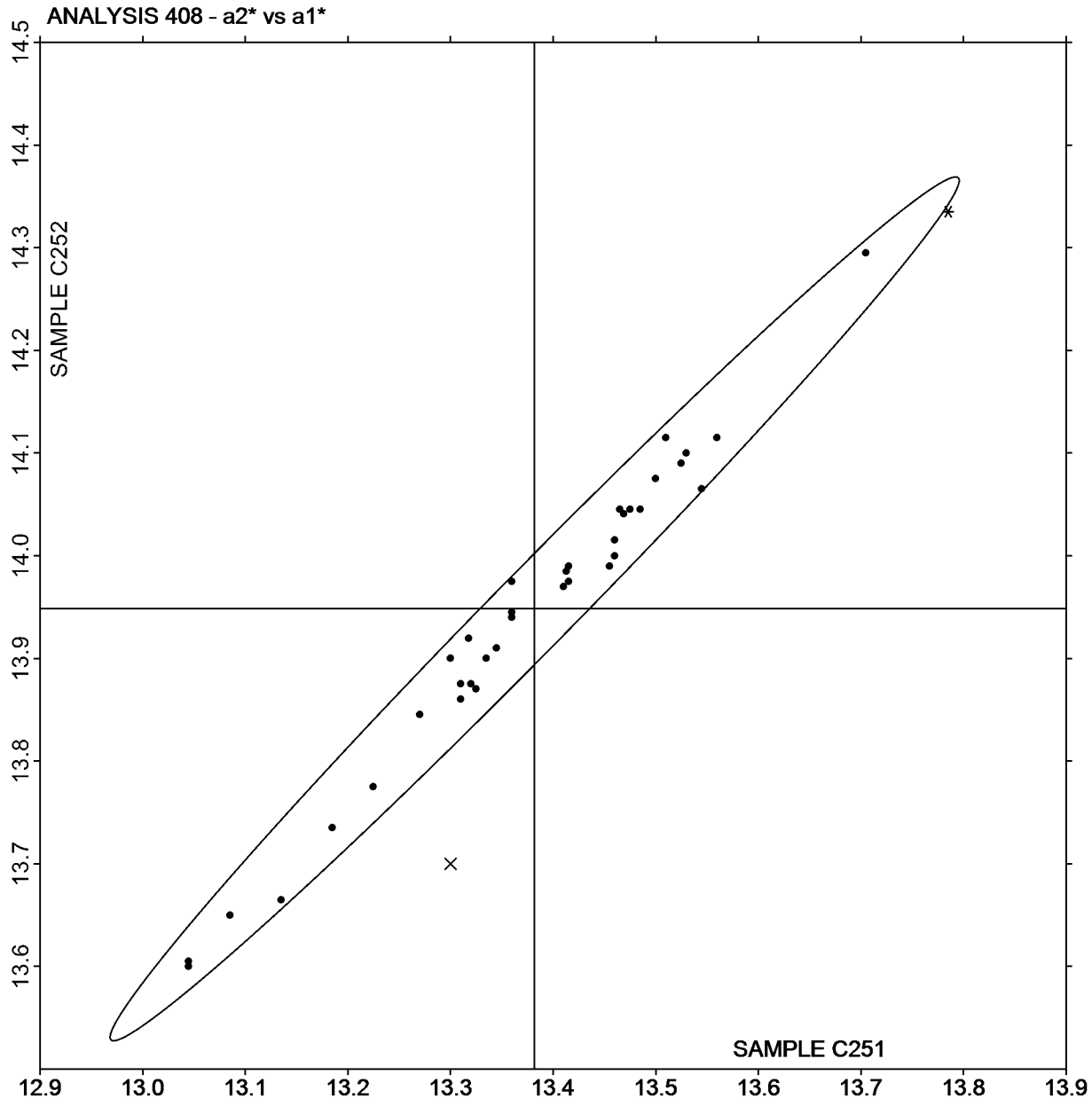
L2* vs L1*

SAMPLE C251 = 46.90 SAMPLE C252 = 47.51



a2* vs a1*

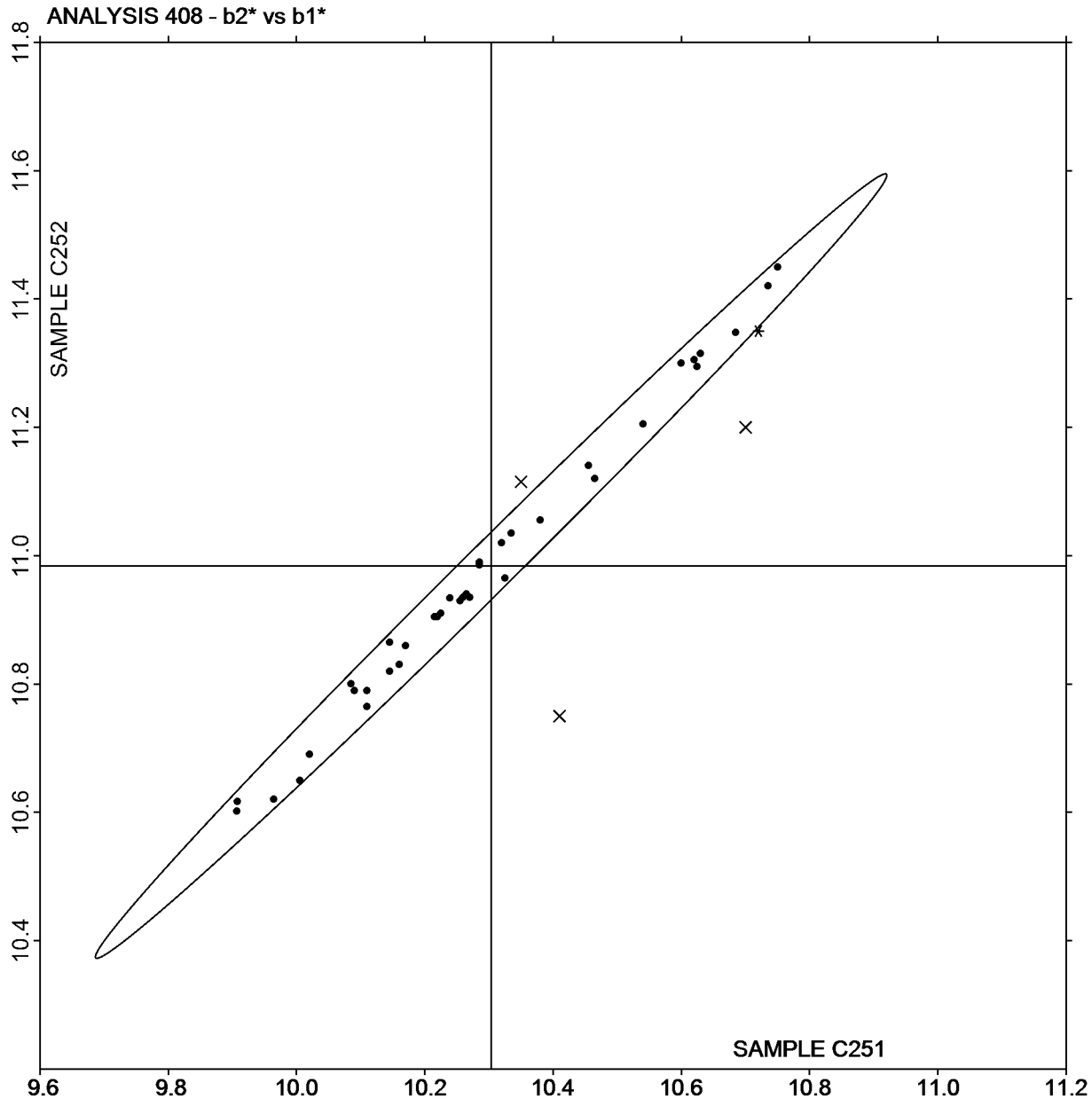
SAMPLE C251 = -13.38 SAMPLE C252 = -13.95



Plot created using absolute values.

b2* vs b1*

SAMPLE C251 = -10.30 SAMPLE C252 = -10.98



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
2MC36X		C251	47.35	-13.39	-10.24	0.63	-0.55	-0.69	1.08	MW
		C252	47.98	-13.94	-10.92					
2MTF7F		C251	47.33	-13.32	-10.38	0.61	-0.59	-0.67	1.09	AQ
		C252	47.94	-13.91	-11.06					
2ZGHP8		C251	47.34	-13.41	-10.42	0.63	-0.53	-0.67	1.06	XB
		C252	47.97	-13.94	-11.09					
34X8NB		C251	47.27	-13.30	-10.35	0.58	-0.55	-0.67	1.04	CA
		C252	47.84	-13.85	-11.02					
3KHXMA		C251	47.09	-13.28	-10.23	0.61	-0.55	-0.67	1.06	MP
		C252	47.71	-13.82	-10.90					
4E9ZTW	X	C251	47.02	-13.32	-9.96	0.66	-0.52	-0.70	1.09	GE
		C252	47.68	-13.84	-10.66					
4J4TPC		C251	47.47	-13.34	-10.19	0.61	-0.54	-0.72	1.08	AT
		C252	48.08	-13.88	-10.90					
4Q49BD		C251	47.59	-13.24	-10.21	0.56	-0.57	-0.67	1.05	HP
		C252	48.15	-13.81	-10.88					
4WTQTV		C251	47.35	-13.25	-10.33	0.62	-0.55	-0.67	1.07	XG
		C252	47.96	-13.80	-11.01					
68QNDA		C251	47.36	-13.51	-10.35	0.63	-0.55	-0.66	1.07	XX
		C252	47.99	-14.06	-11.01					
6JL2CL		C251	47.52	-13.36	-10.24	0.70	-0.55	-0.62	1.08	AS
		C252	48.22	-13.90	-10.86					
6VDQ97		C251	47.18	-13.21	-10.30	0.61	-0.58	-0.66	1.07	XI
		C252	47.79	-13.79	-10.96					
7CUC72		C251	47.51	-13.35	-10.27	0.60	-0.55	-0.67	1.05	AT
		C252	48.11	-13.90	-10.94					
7EKFY9		C251	47.31	-13.15	-10.46	0.63	-0.53	-0.65	1.05	XG
		C252	47.94	-13.68	-11.11					
7Y9W33		C251	47.55	-13.31	-10.13	0.61	-0.57	-0.68	1.08	AJ
		C252	48.16	-13.88	-10.81					
8EGDMA		C251	47.11	-13.32	-10.16	0.64	-0.54	-0.66	1.07	MP
		C252	47.75	-13.87	-10.82					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
8K8K84		C251	47.21	-13.16	-10.46	0.64	-0.55	-0.65	1.07	XE
		C252	47.84	-13.71	-11.12					
94DFEZ		C251	47.28	-13.33	-10.48	0.61	-0.54	-0.70	1.07	XC
		C252	47.89	-13.87	-11.18					
97KUNR		C251	47.50	-13.39	-10.30	0.61	-0.55	-0.70	1.08	MT
		C252	48.11	-13.95	-11.00					
9D6XT9		C251	47.41	-13.32	-10.32	0.63	-0.52	-0.68	1.06	AJ
		C252	48.03	-13.84	-11.00					
9FRCGJ		C251	47.26	-13.21	-10.44	0.63	-0.53	-0.66	1.05	XE
		C252	47.88	-13.73	-11.10					
9MTNF2		C251	47.08	-13.16	-10.47	0.66	-0.50	-0.65	1.05	XI
		C252	47.74	-13.65	-11.12					
9WUAHT		C251	47.49	-13.19	-10.22	0.61	-0.58	-0.69	1.09	AU
		C252	48.10	-13.77	-10.91					
AZTPQG		C251	47.26	-13.25	-10.46	0.59	-0.54	-0.66	1.04	XD
		C252	47.85	-13.79	-11.12					
B7UJ2N	X	C251	47.60	-13.67	-10.71	0.59	-0.58	-0.69	1.07	CA
		C252	48.19	-14.24	-11.39					
BB9YUZ		C251	47.37	-13.18	-10.29	0.61	-0.56	-0.67	1.07	XG
		C252	47.98	-13.74	-10.97					
BTN9U2		C251	47.39	-13.31	-10.28	0.63	-0.56	-0.66	1.07	AU
		C252	48.02	-13.87	-10.94					
BW8MX2		C251	47.61	-13.40	-10.14	0.59	-0.56	-0.70	1.07	AW
		C252	48.20	-13.96	-10.84					
BZNP68		C251	47.59	-13.20	-10.37	0.59	-0.54	-0.68	1.05	XD
		C252	48.19	-13.74	-11.05					
C7CUD2		C251	47.27	-13.36	-10.33	0.61	-0.56	-0.67	1.07	MM
		C252	47.88	-13.92	-11.01					
CDRB9W		C251	47.34	-13.30	-10.30	0.60	-0.54	-0.66	1.05	MK
		C252	47.95	-13.84	-10.97					
CFV7RZ		C251	47.30	-13.33	-10.37	0.63	-0.55	-0.66	1.06	XD
		C252	47.93	-13.88	-11.03					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
CRT87P		C251	47.50	-13.36	-10.31	0.61	-0.57	-0.66	1.06	AT
		C252	48.11	-13.93	-10.96					
CXHPKZ		C251	47.39	-13.30	-10.39	0.59	-0.56	-0.67	1.05	XD
		C252	47.98	-13.86	-11.06					
CYTQ7Y		C251	47.27	-13.32	-10.46	0.62	-0.53	-0.66	1.05	XB
		C252	47.89	-13.85	-11.12					
D434NX		C251	47.18	-13.26	-10.48	0.66	-0.53	-0.66	1.07	XF
		C252	47.83	-13.78	-11.14					
EBU4FV		C251	47.39	-13.37	-10.27	0.64	-0.54	-0.65	1.07	AU
		C252	48.03	-13.91	-10.92					
ECA28V		C251	47.47	-13.36	-10.05	0.61	-0.57	-0.69	1.08	AE
		C252	48.08	-13.93	-10.73					
EFRH3K		C251	47.40	-13.33	-10.23	0.63	-0.55	-0.67	1.07	AS
		C252	48.03	-13.88	-10.90					
FKYBVV		C251	47.46	-13.45	-10.30	0.63	-0.57	-0.65	1.07	AT
		C252	48.10	-14.02	-10.95					
FRZQGW		C251	47.32	-13.31	-10.21	0.61	-0.57	-0.66	1.06	MW
		C252	47.93	-13.87	-10.87					
FVGTM3		C251	47.44	-13.31	-10.27	0.67	-0.58	-0.68	1.11	AP
		C252	48.11	-13.89	-10.95					
FVZYMR		C251	47.38	-13.30	-10.41	0.64	-0.52	-0.65	1.06	XB
		C252	48.02	-13.83	-11.06					
G3AK92	X	C251	46.92	-13.02	-10.35	0.61	-0.53	-0.68	1.05	XH
		C252	47.53	-13.55	-11.02					
H3983K		C251	47.25	-13.13	-10.39	0.60	-0.53	-0.65	1.04	XD
		C252	47.85	-13.67	-11.05					
HQFQCX		C251	47.46	-13.41	-10.22	0.63	-0.52	-0.69	1.07	AU
		C252	48.09	-13.93	-10.91					
HYTFCQ		C251	47.55	-13.36	-10.27	0.59	-0.54	-0.68	1.05	AP
		C252	48.14	-13.89	-10.95					
J7L8XQ	X	C251	39.77	-9.07	-9.34	0.58	-0.38	-0.68	0.97	XD
		C252	40.35	-9.45	-10.02					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
JMT77U		C251	47.38	-13.33	-10.48	0.64	-0.53	-0.65	1.05	HP
		C252	48.02	-13.85	-11.13					
MTQW4F		C251	47.44	-13.20	-10.17	0.59	-0.57	-0.67	1.06	XD
		C252	48.03	-13.77	-10.84					
NL2YPD		C251	47.42	-13.37	-10.16	0.64	-0.53	-0.67	1.07	MW
		C252	48.07	-13.90	-10.83					
NQFEHP		C251	47.37	-13.38	-10.23	0.63	-0.55	-0.67	1.07	MW
		C252	48.00	-13.93	-10.90					
PT2LFR		C251	47.27	-13.36	-10.27	0.63	-0.54	-0.65	1.05	MV
		C252	47.90	-13.90	-10.92					
PXELCJ		C251	47.33	-13.09	-10.26	0.62	-0.52	-0.65	1.03	AJ
		C252	47.95	-13.61	-10.91					
R73VYJ		C251	47.18	-13.29	-10.35	0.65	-0.53	-0.65	1.06	XI
		C252	47.82	-13.82	-11.00					
RCMEU7		C251	47.33	-13.21	-10.39	0.59	-0.58	-0.67	1.07	XB
		C252	47.92	-13.79	-11.06					
RDYTML		C251	47.18	-13.31	-10.52	0.60	-0.55	-0.67	1.06	XC
		C252	47.78	-13.86	-11.19					
T24YPH		C251	47.43	-13.29	-10.28	0.65	-0.54	-0.65	1.06	HP
		C252	48.08	-13.82	-10.93					
TATPAP		C251	47.28	-13.36	-10.29	0.63	-0.54	-0.67	1.06	AJ
		C252	47.91	-13.89	-10.96					
TKRK8K		C251	47.69	-13.40	-10.24	0.61	-0.55	-0.68	1.06	CA
		C252	48.30	-13.95	-10.92					
UKNHVL		C251	47.12	-13.27	-10.47	0.68	-0.49	-0.65	1.06	XF
		C252	47.80	-13.76	-11.12					
V2FHMK		C251	47.35	-13.28	-10.42	0.59	-0.55	-0.70	1.07	XD
		C252	47.94	-13.83	-11.12					
VUVEFH		C251	47.33	-13.33	-10.25	0.63	-0.55	-0.67	1.07	MU
		C252	47.96	-13.88	-10.92					
W72PL6		C251	47.24	-13.30	-10.32	0.66	-0.55	-0.68	1.10	MQ
		C252	47.90	-13.86	-10.99					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
WEAJEC		C251	47.39	-13.29	-10.43	0.59	-0.56	-0.64	1.04	HP
		C252	47.99	-13.85	-11.08					
WNLFL6		C251	47.29	-13.21	-10.49	0.63	-0.55	-0.66	1.06	XD
		C252	47.92	-13.75	-11.15					
WPVQBF		C251	47.16	-13.15	-10.45	0.59	-0.57	-0.68	1.06	XH
		C252	47.75	-13.71	-11.13					
WTCTHL		C251	47.33	-13.22	-10.41	0.59	-0.54	-0.67	1.04	XH
		C252	47.92	-13.75	-11.08					
WTWU33		C251	47.33	-13.22	-10.45	0.61	-0.53	-0.69	1.07	XD
		C252	47.94	-13.76	-11.14					
X3XGQT		C251	47.15	-13.21	-10.45	0.64	-0.54	-0.66	1.06	XF
		C252	47.78	-13.75	-11.11					
XLPKAF		C251	47.30	-13.21	-10.20	0.63	-0.55	-0.68	1.07	XD
		C252	47.93	-13.76	-10.88					
Y2GJYU		C251	47.24	-13.17	-10.41	0.65	-0.56	-0.66	1.08	XH
		C252	47.89	-13.73	-11.07					
Y9HWWC		C251	47.22	-13.39	-10.37	0.64	-0.54	-0.66	1.07	AS
		C252	47.86	-13.93	-11.02					
YM4BZB		C251	47.47	-13.32	-10.33	0.59	-0.55	-0.70	1.07	MV
		C252	48.06	-13.88	-11.03					
YQ3MVB		C251	47.32	-13.25	-10.35	0.61	-0.55	-0.69	1.07	XD
		C252	47.92	-13.80	-11.03					
YRX6XC		C251	47.58	-13.40	-10.24	0.59	-0.48	-0.61	0.97	AP
		C252	48.17	-13.88	-10.84					
YVTW7A		C251	47.34	-13.32	-10.23	0.66	-0.54	-0.66	1.08	XD
		C252	47.99	-13.86	-10.89					
Z86JUZ		C251	47.40	-13.31	-10.28	0.60	-0.56	-0.67	1.06	AU
		C252	48.01	-13.88	-10.95					
ZCWVRH	X	C251	47.91	-13.45	-10.60	0.60	-0.59	-0.72	1.11	SI
		C252	48.51	-14.04	-11.32					
ZK9AAD		C251	47.40	-13.35	-10.40	0.63	-0.55	-0.64	1.05	MV
		C252	48.03	-13.89	-11.04					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
ZUW4LB		C251	47.00	-13.28	-10.59	0.60	-0.54	-0.67	1.05	XF
		C252	47.60	-13.82	-11.26					
ZYBEZY		C251	47.07	-13.17	-10.31	0.62	-0.56	-0.69	1.08	AS
		C252	47.69	-13.73	-11.00					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
C251	47.34	-13.29	-10.33	0.62	-0.55	-0.67	1.06
C252	47.96	-13.84	-11.00				
Stnd Dev Btwn Labs							
C251	0.14	0.09	0.11	0.02	0.02	0.02	0.02
C252	0.14	0.09	0.10				

Statistics based on 77 of 82 reporting participants

Comments Assigned on Data Flags for Test #409

4E9ZTW(X) - High b* values for both samples.

B7UJ2N(X) - Low values for both samples for both a* & b*. Large replication difference for a* & b* values for both samples.

G3AK92(X) - Low L* values for both samples.

J7L8XQ(X) - Extreme Data. Large Delta a, small Delta E.

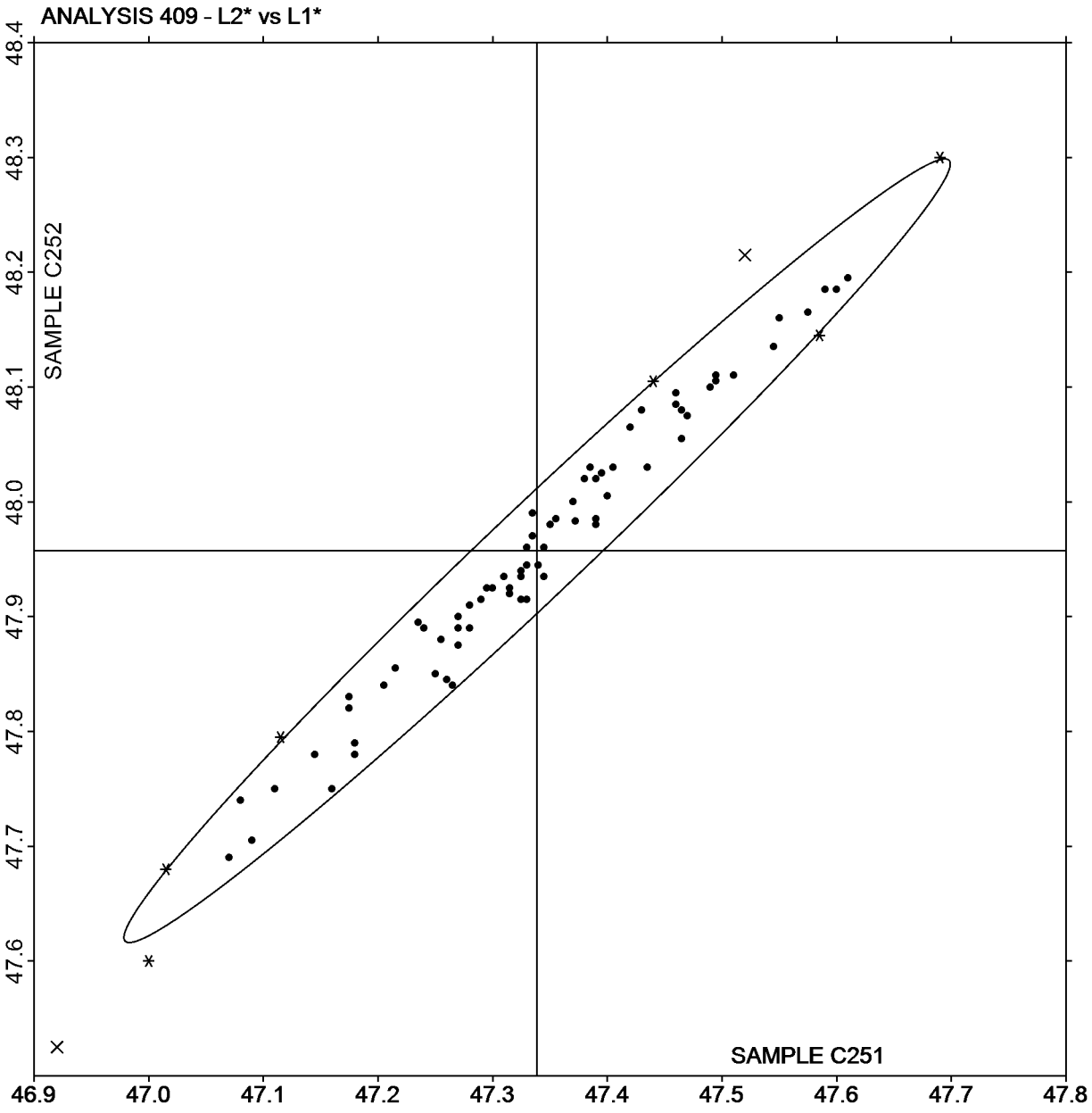
ZCWVRH(X) - High L* values for both samples. Low b* values for Sample C252. Large replication difference for b* Sample C251. Small Delta b.

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
MQ	Minolta CM-700d	MT	Minolta CM-2600d
MU	Minolta	MV	Minolta CM-3000d Spectrophotometer
MW	Minolta CM 3700a Spectrophotometer	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
XX	Instrument make/model not specified by lab		

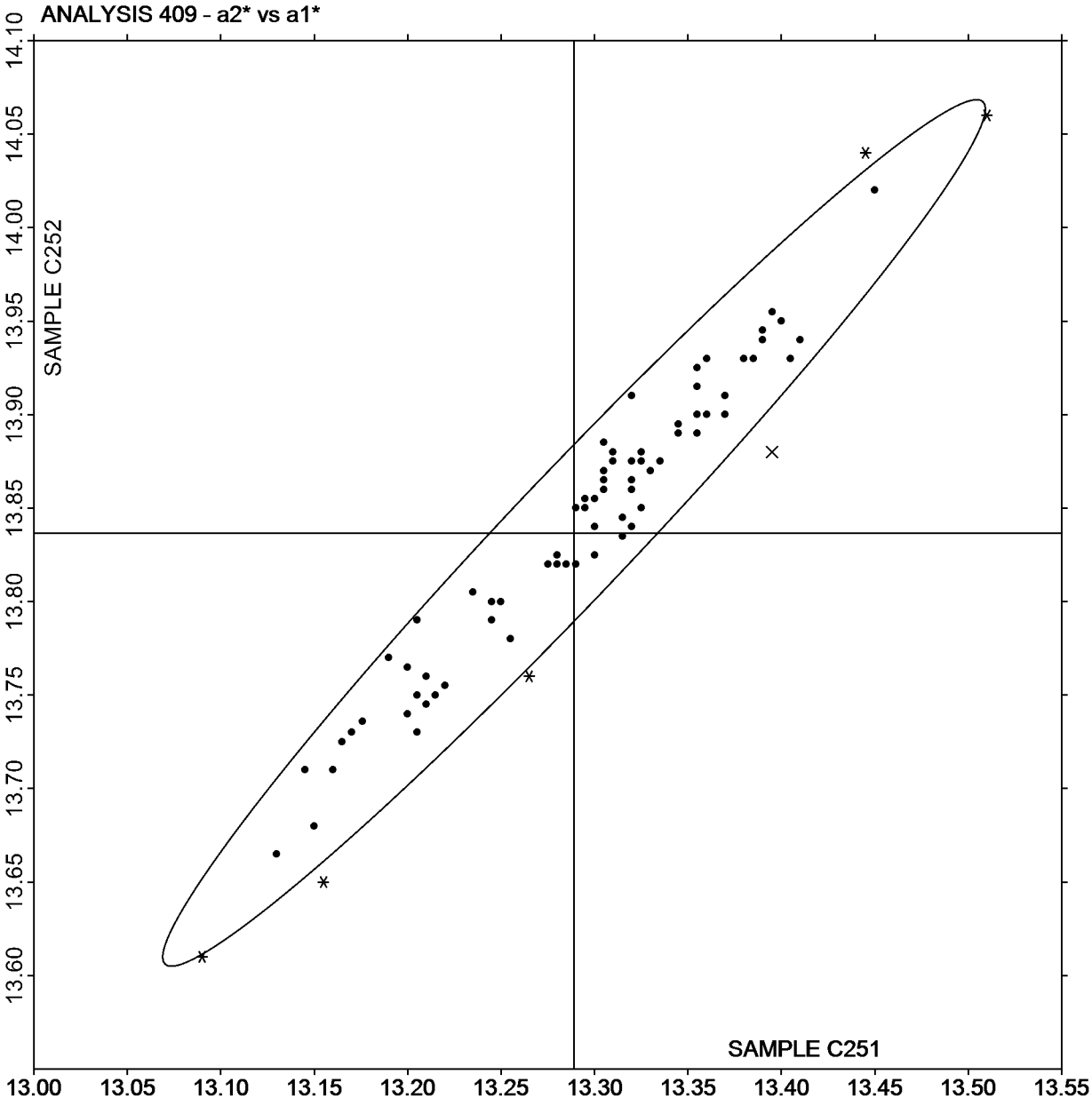
L2* vs L1*

SAMPLE C251 = 47.34 SAMPLE C252 = 47.96



a2* vs a1*

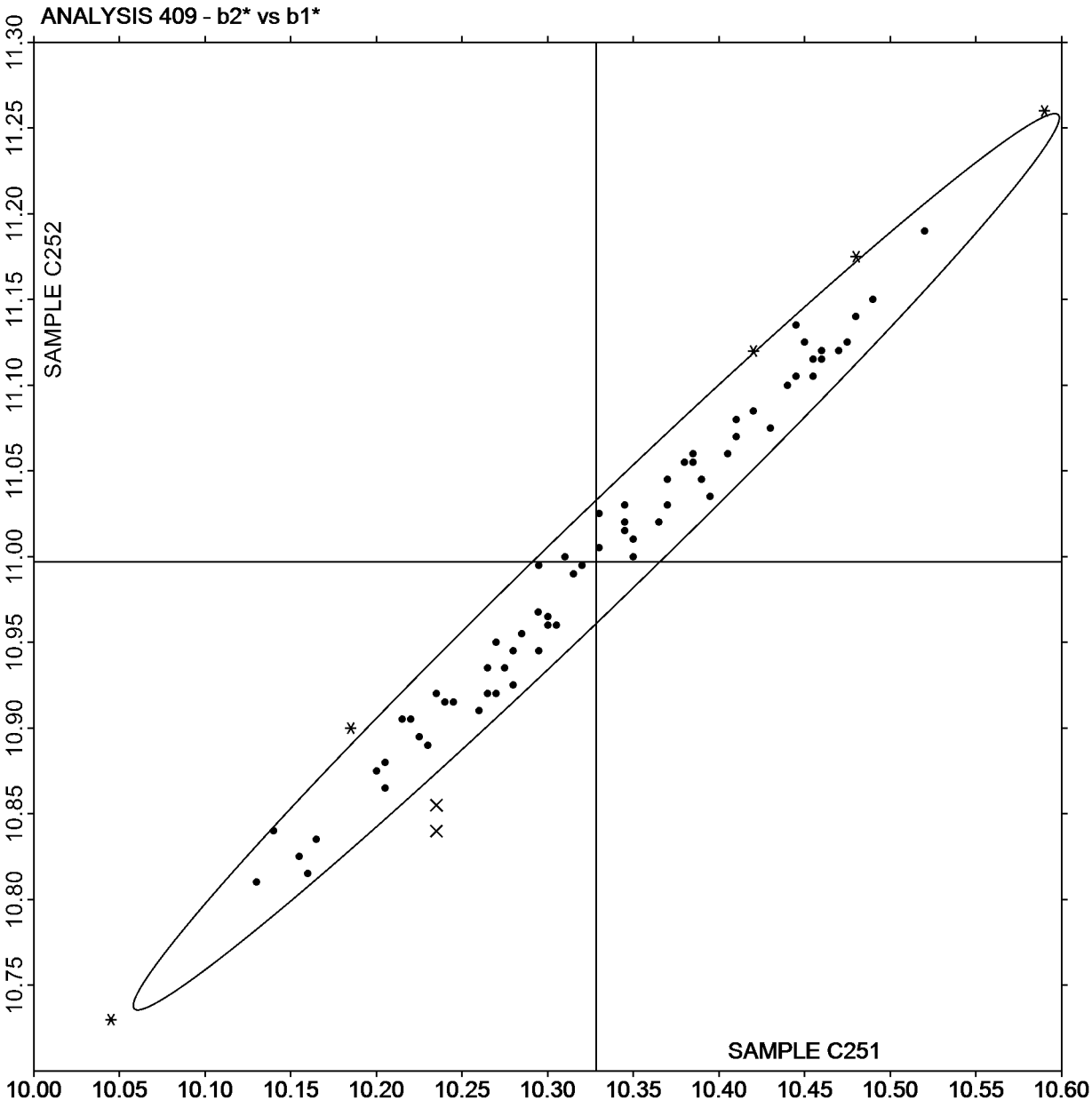
SAMPLE C251 = -13.29 SAMPLE C252 = -13.84



Plot created using absolute values.

b2* vs b1*

SAMPLE C251 = -10.33 SAMPLE C252 = -11.00



Plot created using absolute values.

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 C251										
2MTF7F		16.67	19.69	21.36	21.99	21.79	21.63	20.99	18.80	15.05	12.01	10.45	9.67	9.48	9.69	9.54	8.95	AQ
2ZGHP8		16.87	19.74	21.41	21.98	21.80	21.63	21.02	18.85	15.06	11.97	10.44	9.62	9.37	9.66	9.47	8.76	XB
34X8NB		16.78	19.42	21.27	21.92	21.64	21.53	20.96	18.79	15.01	11.95	10.43	9.63	9.43	9.76	9.61	9.43	CA
3KHXMA		16.56	19.42	21.06	21.71	21.48	21.35	20.77	18.66	14.83	11.84	10.35	9.55	9.38	9.74	9.61	9.01	MP
4E9ZTW		15.67X	18.94X	20.87X	21.58*	21.40*	21.31*	20.65*	18.51	14.87	11.85	10.32	9.56	9.41	9.65	9.48	8.85	GE
4J4TPC		17.06	19.82	21.39	21.92	21.84	21.72	21.13	18.95	15.22	12.09	10.55	9.71	9.55	9.70	9.54	9.04	AT
4Q49BD		17.25	19.78	21.57	22.08	21.90	21.75	21.16	19.04	15.32	12.25*	10.66*	9.78	9.43	10.03X	9.85	8.93	HP
68QNDA		16.73	19.67	21.35	21.99	21.79	21.66	21.03	18.89	15.08	11.99	10.42	9.59	9.39	9.68	9.44	8.71	XX
6JL2CL		16.98	19.87	21.35	22.08	21.88	21.74	21.10	19.02	15.26	12.14	10.57	9.77	9.57	9.78	9.79	8.99	AS
7CUC72		17.00	19.86	21.46	22.05	21.89	21.74	21.13	19.00	15.24	12.10	10.57	9.75	9.58	9.84	9.85	9.04	AT
7EKFY9		17.08	19.78	21.41	21.97	21.73	21.60	20.95	18.76	15.02	12.02	10.48	9.69	9.50	9.80	9.56	8.88	XG
7Y9W33		17.03	19.82	21.29	22.07	21.92	21.73	21.07	19.03	15.33	12.18	10.63	9.82*	9.60	9.85	9.72	9.07	AJ
8EGDMA		16.46	19.41	21.03*	21.68	21.44*	21.34	20.79	18.69	14.91	11.85	10.35	9.53	9.37	9.70	9.61	9.01	MP
8K8K84		17.06	19.71	21.32	21.87	21.67	21.52	20.87	18.67	14.90	11.92	10.43	9.66	9.48	9.79	9.57	8.84	XE
97KUNR		16.68	19.76	21.46	22.18	21.89	21.77	21.15	19.00	15.22	12.08	10.53	9.70	9.50	9.84	9.66	8.99	MT
9D6XT9		16.90	19.80	21.41	21.99	21.81	21.68	21.04	18.89	15.13	12.05	10.52	9.70	9.51	9.74	9.56	8.99	AJ
9FRCGJ		17.06	19.75	21.35	21.91	21.68	21.54	20.87	18.72	15.01	12.01	10.43	9.61	9.42	9.67	9.46	8.76	XE
B7UJ2N		17.29	20.05*	21.80X	22.43X	22.15X	21.98*	21.38X	19.17	15.32	12.16	10.58	9.76	9.54	9.87	9.72	9.03	CA
BB9YUZ		16.85	19.77	21.37	21.97	21.76	21.60	20.96	18.84	15.13	12.09	10.50	9.70	9.52	9.77	9.59	8.89	XD
BTN9U2		17.18	19.75	21.36	21.95	21.76	21.62	21.03	18.87	15.15	12.04	10.52	9.69	9.51	9.74	9.78	9.00	AU
BW8MX2	X	17.03	19.81	21.43	22.14	21.95	21.84	21.23	19.06	15.34	12.18	10.64	9.81*	9.64*	9.92	9.73	9.11	AW
BZNP68		17.15	20.01	21.59	22.22	21.97	21.81	21.16	19.03	15.28	12.22*	10.65*	9.81*	9.62*	9.87	9.69	9.01	XD

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
		Spectrophotometric Reflectance values (as %) at selected wavelengths																
		Sample C251																
C7CUD2		16.75	19.63	21.25	21.90	21.71	21.56	20.92	18.77	15.00	11.96	10.41	9.61	9.44	9.73	9.53	8.85	MM
CDRB9W		16.72	19.67	21.32	21.94	21.74	21.59	20.95	18.82	15.11	12.05	10.45	9.65	9.48	9.77	9.64	8.96	MK
CFV7RZ		16.81	19.68	21.30	21.95	21.74	21.61	20.94	18.78	15.02	11.98	10.43	9.63	9.46	9.76	9.57	8.89	XD
CRT87P		17.35	19.84	21.50	22.10	21.90	21.77	21.11	18.96	15.21	12.09	10.59	9.73	9.57	9.88	9.80	9.09	AT
CXHPKZ		16.86	19.75	21.41	22.03	21.83	21.72	21.05	18.84	15.07	12.06	10.50	9.69	9.52	9.81	9.58	8.93	XD
CYTQ7Y		18.34X	19.75	21.34	21.94	21.71	21.57	20.92	18.76	15.01	11.97	10.40	9.58	9.41	9.67	9.47	8.80	XB
D434NX		16.93	19.65	21.30	21.85	21.65	21.56	20.88	18.66	14.88	11.88	10.35	9.56	9.40	9.71	9.58	8.90	XF
EBU4FV		16.90	19.75	21.32	21.94	21.78	21.69	21.05	18.87	15.12	12.04	10.50	9.66	9.50	9.73	9.69	8.97	AU
ECA28V		17.01	19.62	21.18	21.98	21.83	21.64	21.05	19.00	15.20	12.09	10.60	9.78	9.60	9.87	9.68	8.20	AE
EFRH3K		16.73	19.71	21.32	21.93	21.76	21.62	21.01	18.88	15.15	12.06	10.52	9.70	9.53	9.79	9.61	8.99	AS
FKYBVV		16.75	19.81	21.44	22.03	21.87	21.73	21.09	19.50X	15.20	12.05	10.52	9.70	9.51	9.76	9.64	9.01	AT
FRZQGW		17.16	19.57	21.24	21.94	21.66	21.54	20.96	18.85	15.08	11.99	10.45	9.66	9.47	9.78	9.68	9.00	MY
FVGTM3		16.82	19.79	21.43	21.99	21.82	21.68	21.02	18.91	15.19	12.07	10.55	9.73	9.54	9.77	9.67	9.02	AP
FVZYMR		16.86	19.82	21.40	22.03	21.82	21.67	21.00	18.84	15.13	12.07	10.48	9.65	9.46	9.70	9.48	8.80	XB
G3AK92		16.40	19.44	20.97*	21.53X	21.33X	21.19X	20.54X	18.36*	14.80*	11.81*	10.29*	9.53	9.42	9.68	9.45	8.87	XH
H3983K		16.94	19.74	21.33	21.91	21.65	21.52	20.89	18.72	15.01	11.98	10.44	9.64	9.46	9.76	9.54	8.82	XD
HYTFCQ		17.01	19.89	21.53	22.10	21.92	21.78	21.17	19.01	15.27	12.12	10.59	9.77	9.58	9.80	9.81	9.08	AP
J7L8XQ		16.80	19.64	21.25	21.89	21.69	21.54	20.91	18.76	15.01	11.98	10.43	9.64	9.45	9.73	9.53	8.87	XD
JHJ8CF		17.07	19.82	21.49	22.14	21.88	21.76	21.13	18.97	15.28	12.21*	10.62	9.74	9.52	9.81	9.70	9.01	HP
JMT77U		16.96	19.82	21.50	22.09	21.85	21.74	21.05	18.81	15.14	12.04	10.50	9.62	9.33*	9.93*	9.69	8.95	HP
MTQW4F		16.90	19.75	21.35	21.96	21.76	21.64	21.01	18.90	15.19	12.14	10.57	9.73	9.53	9.78	9.69	9.07	XD
NL2YPD		16.53	19.77	21.25	22.01	21.75	21.65	21.07	18.95	15.18	12.04	10.51	9.68	9.51	9.82	9.73	9.04	MW

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
		Spectrophotometric Reflectance values (as %) at selected wavelengths																
		Sample C251																
NQFEHP		16.55	19.75	21.25	22.00	21.75	21.65	21.05	18.90	15.10	12.00	10.45	9.65	9.50	9.80	9.70	9.00	MW
PT2LFR		16.50	19.70	21.25	21.90	21.60	21.50	20.90	18.85	15.00	11.90	10.40	9.60	9.40	9.70	9.60	8.90	MV
PXELCJ		16.04*	19.78	21.31	21.93	21.74	21.53	20.90	18.81	15.07	12.10	10.50	9.72	9.56	9.64	9.51	8.98	AJ
R73VYJ		16.82	19.59	21.19	21.83	21.64	21.48	20.83	18.69	14.93	11.90	10.36	9.55	9.37	9.68	9.52	8.87	XI
RCMEU7		16.93	19.78	21.38	21.98	21.77	21.61	20.96	18.82	15.04	12.02	10.48	9.67	9.47	9.76	9.59	8.88	XB
RDYTML		16.77	19.67	21.32	21.86	21.65	21.55	20.89	18.69	14.87	11.88	10.34	9.56	9.42	9.71	9.59	8.92	XC
TKRK8K		17.08	19.79	21.64*	22.26*	22.04*	21.94*	21.34*	19.18	15.33	12.19	10.65*	9.82*	9.62*	9.95*	9.80	9.11	CA
UKNHVL		16.97	19.68	21.28	21.76	21.60	21.05X	20.89	17.77X	14.86	11.87	10.34	9.56	9.41	9.71	9.58	8.91	XF
V2FHMK		16.98	19.79	21.39	22.01	21.78	21.64	21.00	18.82	15.03	12.02	10.46	9.66	9.48	9.77	9.56	8.88	XD
VUVEFH		16.59	19.72	21.24	21.96	21.73	21.56	21.02	18.84	15.06	11.98	10.47	9.64	9.47	9.80	9.70	8.99	MV
W72PL6		16.72	19.63	21.22	21.89	21.63	21.50	20.91	18.75	15.00	11.94	10.39	9.58	9.38	9.70	9.54	8.89	MQ
WEAJEC		17.54	19.73	21.49	22.08	21.78	21.68	21.01	18.85	15.11	12.09	10.48	9.66	9.31*	9.90	9.64	8.86	HP
WNLFL6		18.44X	19.81	21.39	22.00	21.75	21.61	20.95	18.78	15.01	11.98	10.41	9.63	9.45	9.75	9.56	8.83	XD
WTCTHL		16.93	19.80	21.38	22.00	21.76	21.61	20.97	18.81	15.05	12.00	10.45	9.66	9.50	9.80	9.57	8.87	XH
WTWU33		17.06	19.81	21.42	21.99	21.76	21.62	20.97	18.80	15.03	12.02	10.47	9.67	9.50	9.79	9.59	8.90	XD
X3XGQT		16.70	19.59	21.29	21.80	21.60	21.52	20.84	18.62	14.89	11.89	10.35	9.55	9.42	9.70	8.06X	13.76X	XF
XLPKAF		16.72	19.65	21.24	21.84	21.68	21.52	20.89	18.79	15.06	12.04	10.46	9.66	9.50	9.79	9.57	8.84	XD
Y2GJYU		16.96	19.75	21.30	21.90	21.67	21.50	20.88	18.25*	14.96	11.99	10.43	9.67	9.49	9.76	9.59	8.91	XH
Y9HWWC		16.78	19.64	21.27	21.83	21.69	21.56	20.89	18.73	14.98	11.90	10.40	9.56	9.38	9.62	9.42	8.79	AS
YM4BZB		16.93	19.84	21.46	22.09	21.89	21.78	21.16	18.93	15.11	12.04	10.54	9.74	9.61	9.90	9.78	9.08	MV
YQ3MVB		16.88	19.71	21.31	21.97	21.76	21.61	20.96	18.79	15.03	12.00	10.45	9.65	9.50	9.79	9.58	8.91	XD
YVTW7A		16.75	19.61	21.26	21.91	21.71	21.60	20.98	18.82	15.07	12.03	10.47	9.68	9.48	9.77	9.56	8.90	XD

Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

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 C251																		
Z86JUZ		16.81	19.75	21.40	21.98	21.78	21.63	21.01	18.86	15.16	12.05	10.53	9.68	9.53	9.76	9.57	9.00	AU
ZCWVRH	X	17.33	20.35X	22.04X	22.71X	22.41X	22.19X	21.57X	19.36*	15.51X	12.29X	10.72X	9.84*	9.61	9.92	9.81	9.12	SI
ZK9AAD		16.75	19.96	21.40	22.14	21.81	21.62	21.09	18.97	15.10	11.98	10.47	9.68	9.45	9.84	9.67	9.01	MV
ZYBEZY		16.61	19.50	21.06	21.73	21.50	21.34	20.76	18.56	14.83	11.89	10.39	9.58	9.42	9.69	9.55	8.91	AS

Summary Statistics

	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700
Grand Means	16.89	19.72	21.34	21.96	21.75	21.60	20.98	18.82	15.08	12.02	10.47	9.66	9.48	9.77	9.59	9.00
SD Btwn Labs	0.38	0.16	0.15	0.14	0.14	0.15	0.14	0.22	0.13	0.10	0.08	0.07	0.07	0.08	0.21	0.60

BW8MX2 (X) - Large replication difference for half wavelengths.

ZCWVRH (X) - High % reflectance data for most 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	MQ	Minolta CM-700d
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	XX	Instrument make/model not specified by lab		

WebCode	Data Flag	Sample G251 Lab Mean	Sample G251 Diff from Grand Mean	Sample G251 CPV	Sample G252 Lab Mean	Sample G252 Diff from Grand Mean	Sample G252 CPV	Instr Code
2MC36X		43.53	-0.34	-0.41	53.83	-0.43	-0.46	GN
2ZGHP8		44.08	0.21	0.26	55.05	0.80	0.87	ZA
333PMA		44.08	0.21	0.26	54.33	0.07	0.08	GL
34X8NB		43.73	-0.14	-0.16	53.40	-0.85	-0.93	GL
37JRUE		43.10	-0.76	-0.92	53.88	-0.38	-0.41	GD
3Q7G48		42.80	-1.06	-1.28	53.48	-0.78	-0.84	GL
4E9ZTW		43.78	-0.09	-0.10	54.50	0.25	0.27	GL
4TTEWV		44.00	0.14	0.17	53.85	-0.40	-0.44	GK
4WTQTV		43.38	-0.48	-0.58	53.90	-0.35	-0.38	GL
663E3N		44.13	0.26	0.32	54.28	0.02	0.03	GN
6U4J7D		42.93	-0.94	-1.13	53.75	-0.50	-0.54	GK
6VDQ97		43.45	-0.41	-0.50	53.93	-0.33	-0.35	GL
7CGKF7	X	45.93	2.06	2.50	54.53	0.27	0.30	RA
7EKFY9	X	42.90	-0.96	-1.16	51.15	-3.10	-3.37	GL
7LJZ26		44.70	0.84	1.01	54.58	0.32	0.35	GL
7Y9W33		45.03	1.16	1.41	55.30	1.05	1.14	NH
8EGDMA		44.15	0.29	0.35	53.88	-0.38	-0.41	RQ
9FRCGJ	*	41.68	-2.19	-2.64	51.78	-2.48	-2.69	GL
9MTNF2		43.85	-0.01	-0.01	53.98	-0.28	-0.30	GL
9WUAHT		42.45	-1.41	-1.71	53.15	-1.10	-1.20	GL
APPWY2		44.13	0.26	0.32	54.68	0.42	0.46	GL
AWUEUG		43.38	-0.49	-0.59	53.48	-0.78	-0.84	RA
AZTPQG		43.85	-0.01	-0.01	54.05	-0.20	-0.22	GL
BFYBQH		44.93	1.06	1.29	55.53	1.27	1.39	XX
BW8MX2		43.98	0.11	0.14	53.75	-0.50	-0.54	GL
C7CUD2		44.68	0.81	0.98	55.45	1.20	1.31	GL
CFV7RZ		43.74	-0.13	-0.15	54.51	0.25	0.28	GL
D2XELP		43.03	-0.84	-1.01	53.75	-0.50	-0.54	EN
DCFX2E		44.80	0.94	1.14	55.65	1.40	1.52	GK
ECA28V		44.60	0.74	0.89	55.70	1.45	1.58	GL
EFRH3K		43.78	-0.09	-0.10	54.43	0.17	0.19	GL
FRZQGW		44.08	0.21	0.26	54.75	0.50	0.54	GL
G3AK92		44.46	0.60	0.72	54.61	0.36	0.39	XX

Interlaboratory Testing Program for Color & Appearance

Analysis 440

60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample G251 Lab Mean	Sample G251 Diff from Grand Mean	Sample G251 CPV	Sample G252 Lab Mean	Sample G252 Diff from Grand Mean	Sample G252 CPV	Instr Code
GMLANJ		43.75	-0.11	-0.13	54.00	-0.25	-0.27	GL
H3983K	X	41.83	-2.04	-2.46	51.03	-3.23	-3.51	GK
HQFQCX		43.65	-0.21	-0.26	54.75	0.50	0.54	GK
JHJ8CF	*	41.58	-2.29	-2.76	52.03	-2.23	-2.42	EN
K3KLLD		44.55	0.69	0.83	54.65	0.40	0.44	GL
LQ6X97		44.80	0.94	1.14	55.65	1.40	1.52	GK
N9ERQQ		44.48	0.61	0.74	55.63	1.37	1.50	GL
NL2YPD		44.90	1.04	1.26	55.50	1.25	1.36	GN
NQFEHP	*	46.23	2.36	2.86	57.18	2.92	3.18	GK
P36TWC		43.90	0.04	0.05	53.85	-0.40	-0.44	ST
PXELCJ	*	43.73	-0.14	-0.16	52.95	-1.30	-1.41	GL
R73VYJ		42.85	-1.01	-1.22	53.80	-0.45	-0.49	GL
T24YPH		44.83	0.96	1.17	55.03	0.77	0.84	GL
TATPAP		42.98	-0.89	-1.07	53.45	-0.80	-0.87	GL
TGEMZX		42.25	-1.61	-1.95	52.88	-1.38	-1.50	DE
UKNHVL		43.73	-0.14	-0.16	53.53	-0.73	-0.79	GN
UNCR88		44.10	0.24	0.29	54.30	0.05	0.05	GL
V3MV4M		44.05	0.19	0.23	54.25	0.00	0.00	GK
VUVEFH		43.60	-0.26	-0.32	54.30	0.05	0.05	GL
W72PL6		43.93	0.06	0.08	54.28	0.02	0.03	MW
WEAJEC		43.83	-0.04	-0.04	54.05	-0.20	-0.22	GL
WNLFL6		43.93	0.06	0.08	53.70	-0.55	-0.60	RA
WPVQBF		44.83	0.96	1.17	55.00	0.75	0.82	GL
WTCTHL		43.63	-0.24	-0.29	53.95	-0.30	-0.33	GL
WY7RWG		43.28	-0.59	-0.71	53.43	-0.83	-0.90	GL
X3XGQT		44.73	0.86	1.04	55.20	0.95	1.03	GL
XLPKAF		44.03	0.16	0.20	54.08	-0.18	-0.19	GL
YFFLF2		43.98	0.11	0.14	54.75	0.50	0.54	MW
YQ3MVB		44.40	0.54	0.65	54.35	0.10	0.11	GN
Z86JUZ		44.48	0.61	0.74	54.75	0.50	0.54	GL
ZYBEZY		42.40	-1.46	-1.77	52.93	-1.33	-1.44	GK

Summary Statistics

Grand Means			
	43.86 Gloss Units		54.25 Gloss Units
Stnd Dev Btwn Labs			
	0.83 Gloss Units		0.92 Gloss Units

Statistics based on 61 of 64 reporting participants

Comments on Assigned Data Flags for Test #440

7CGKF7(X) - Inconsistent in testing between samples.

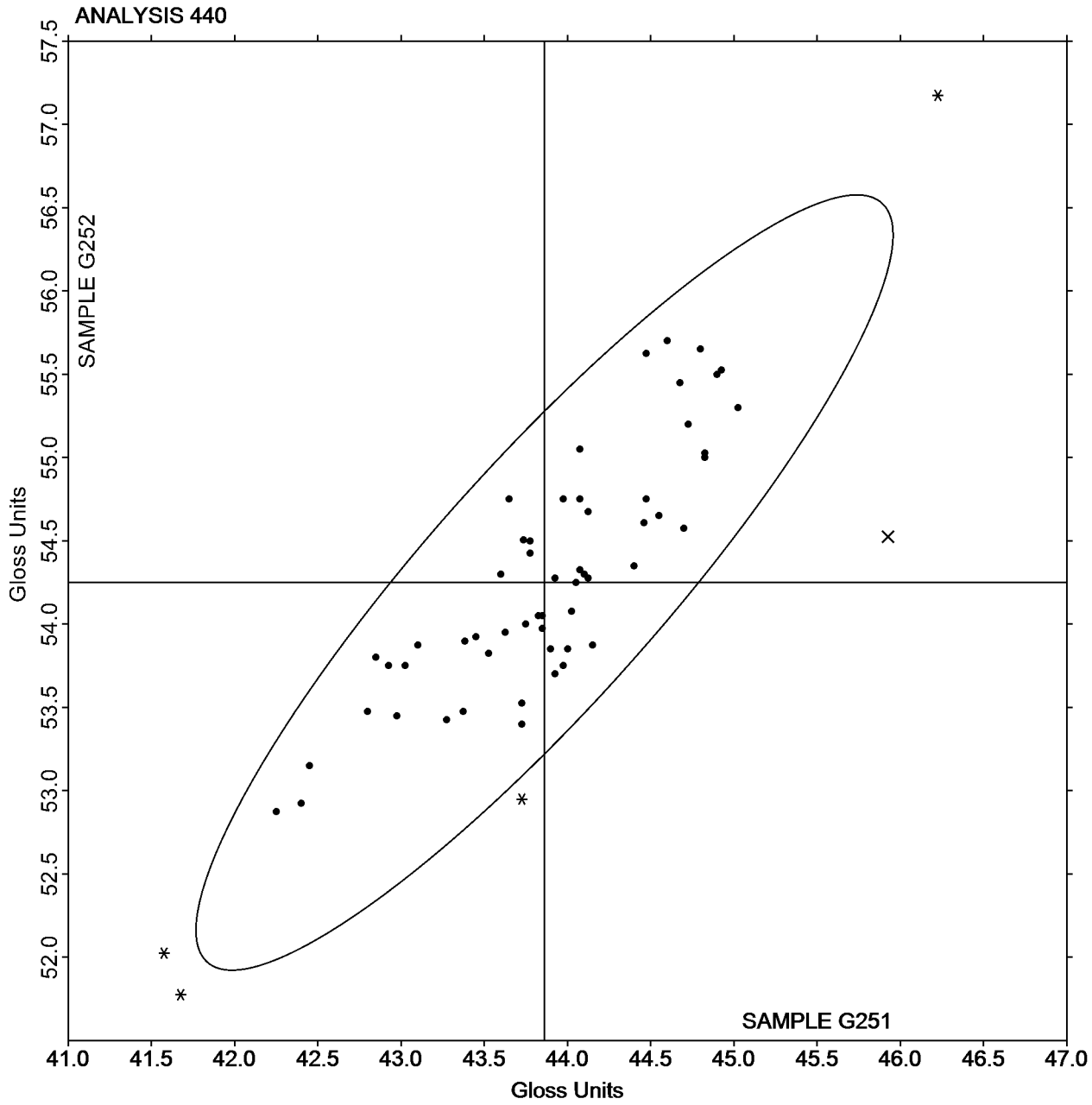
7EKFY9(X) - Low data for Sample G252. Inconsistent within the determinations for Sample G252.

H3983K(X) - Low data for Sample G252. Inconsistent within the determinations for Sample G252.

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	NH	3nh NHG268 Multi-angle Precise Gloss Meter
RA	Rhopoint Novo-Gloss Glossmeter	RQ	Rhopoint IQ Goniophotometer 20/60/85°
ST	Sheen Tri-Glossmaster	XX	Instrument make/model not specified by lab
ZA	Zehntner ZGM Series		

SAMPLE G251 = 43.86 Gloss Units SAMPLE G252 = 54.25 Gloss Units



-End of Report-