Collaborative Testing Services, Inc.

Color & Appearance Testing Program

Summary Report #195 - 1st Qtr 2021

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 (Paint Chips) - 45-0
409	Color & Color Difference (Paint Chips) Sphere
411	Spectrophotometric (Paint Chips) - Sphere
440	Gloss 60 Degree (Paint Chips)

About The Color & Appearance Program

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

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

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

ABOUT CTS

Founded in 1971, CTS is a privately-owned company that specializes in interlaboratory tests for a wide variety of industries, including rubber, plastics, fasteners and metals, containerboard, paper, color, and wine as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality control objectives. Labs from the U.S., as well as more than 80 countries, currently participate in the CTS programs.

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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
2HT474		A211	52.20	6.58	8.59	1.00	-0.07	-0.04	1.00	GE
		A212	53.19	6.50	8.56					
2KCKZ9		A211	52.58	6.35	8.41	1.02	-0.13	-0.12	1.03	HW
		A212	53.60	6.22	8.29					
2VUY3B		A211	52.26	6.56	8.53	1.00	-0.11	-0.14	1.02	GE
		A212	53.26	6.45	8.39					
3HLEJH		A211	52.14	6.24	8.00	1.05	-0.14	-0.20	1.08	GB
		A212	53.19	6.10	7.80					
6DHLYB		A211	52.28	6.33	8.37	1.01	-0.14	-0.13	1.03	MG
		A212	53.29	6.19	8.24					
A36TX6		A211	52.22	6.54	8.57	0.99	-0.12	-0.11	1.00	GE
		A212	53.21	6.43	8.46					
A4FVJ4		A211	52.04	6.30	8.39	1.03	-0.12	-0.11	1.04	HW
		A212	53.07	6.18	8.28					
B8B48B		A211	52.09	6.36	8.35	0.98	-0.13	-0.15	1.00	MD
		A212	53.07	6.23	8.19					
BKZZ99		A211	52.46	6.27	8.06	1.00	-0.11	-0.12	1.01	XE
		A212	53.45	6.16	7.95					
BPEJN6	X	A211	53.73	6.45	8.40	0.98	-0.12	-0.08	0.99	XE
		A212	54.71	6.34	8.32					
BQPKA4		A211	52.40	6.35	8.30	1.00	-0.15	-0.15	1.02	HW
		A212	53.40	6.20	8.15					
CETU6Q		A211	52.13	6.34	8.44	1.02	-0.10	-0.15	1.04	XU
		A212	53.16	6.23	8.29					
CKHE87		A211	52.36	6.37	8.34	0.97	-0.13	-0.16	1.00	XM
		A212	53.33	6.25	8.18					
EQUA26		A211	52.16	6.36	8.34	0.97	-0.12	-0.09	0.98	XO
		A212	53.13	6.24	8.25					
EY82TN		A211	52.06	6.36	8.31	1.03	-0.13	-0.14	1.05	HW
		A212	53.10	6.23	8.17					
FKL9HM		A211	52.16	6.36	8.35	1.03	-0.11	-0.13	1.04	XU
		A212	53.19	6.25	8.22					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
FPGYNY		A211	52.37	6.35	8.38	1.02	-0.12	-0.16	1.04	XS
		A212	53.39	6.22	8.22					
FUW8CX		A211	52.47	6.36	8.30	1.01	-0.13	-0.16	1.03	HW
		A212	53.48	6.23	8.14					
GGGYNW		A211	51.82	6.36	8.56	1.06	-0.14	-0.14	1.07	BG
		A212	52.87	6.22	8.42					
GY2PMV		A211	52.61	6.40	8.51	1.00	-0.09	-0.20	1.02	HW
		A212	53.61	6.31	8.31					
LC96XG		A211	52.11	6.39	8.31	1.00	-0.13	-0.13	1.02	XN
		A212	53.11	6.26	8.18					
LG7QMY		A211	52.33	5.99	8.68	1.02	-0.12	-0.17	1.04	XU
		A212	53.34	5.87	8.51					
LZGFZW		A211	51.81	6.71	8.92	1.01	-0.13	-0.11	1.02	MP
		A212	52.82	6.58	8.80					
MLCKGU		A211	52.43	6.32	8.40	1.01	-0.13	-0.14	1.02	HW
		A212	53.44	6.19	8.26					
MQLXYT	X	A211	56.36	6.82	8.88	0.86	-0.11	-0.07	0.86	XU
		A212	57.22	6.72	8.80					
PYGGGE		A211	52.39	6.22	8.22	0.97	-0.13	-0.14	0.98	XW
		A212	53.36	6.09	8.08					
QAAH7N		A211	52.00	6.42	8.10	1.02	-0.15	-0.11	1.04	HK
		A212	53.02	6.27	7.99					
QUGPLM		A211	52.00	6.63	8.34	1.01	-0.16	-0.14	1.04	HX
		A212	53.01	6.47	8.20					
T8RAVQ		A211	52.22	6.45	8.31	1.00	-0.14	-0.14	1.02	HW
		A212	53.22	6.32	8.17					
TJ6ARJ		A211	52.28	6.29	8.88	1.02	-0.12	-0.06	1.03	GE
		A212	53.30	6.17	8.81					
U6JGGH		A211	51.77	6.33	8.40	0.96	-0.12	-0.12	0.97	GG
		A212	52.73	6.22	8.28					
UBARQF		A211	52.20	6.63	8.59	1.03	-0.20	-0.33	1.10	GA
		A212	53.23	6.43	8.26					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
UDX4PL		A211	52.35	6.26	8.63	0.98	-0.11	-0.11	1.00	GH
		A212	53.33	6.15	8.52					
UF6LNG		A211	51.82	6.37	8.59	1.04	-0.13	-0.12	1.05	BG
		A212	52.85	6.24	8.47					
UNFNAH		A211	51.97	6.41	8.78	0.88	-0.13	-0.19	0.91	TO
		A212	52.85	6.28	8.60					
UNYQGH		A211	52.35	6.40	8.40	1.05	-0.10	-0.20	1.07	HW
		A212	53.40	6.30	8.20					
UTP2RG		A211	52.38	6.39	8.33	1.05	-0.14	-0.11	1.06	XD
		A212	53.42	6.24	8.21					
VAAA7Q		A211	51.76	6.38	8.73	1.00	-0.14	-0.12	1.02	BG
		A212	52.76	6.24	8.62					
XJ9QRD		A211	51.73	6.51	8.39	1.03	-0.13	-0.16	1.05	HY
		A212	52.75	6.38	8.22					
ZDF7YG		A211	51.53	6.32	8.41	0.97	-0.13	-0.13	0.99	GG
		A212	52.50	6.18	8.28					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
A211	52.17	6.39	8.44	1.01	-0.13	-0.14	1.02
A212	53.18	6.26	8.31				
Stnd Dev Btwn Labs							
A211	0.26	0.14	0.21	0.03	0.02	0.05	0.03
A212	0.26	0.14	0.22				

Statistics based on 38 of 40 reporting participants

Comments Assigned on Data Flags for Test #408

BPEJN6(X) - Very high "L*" values for both samples.

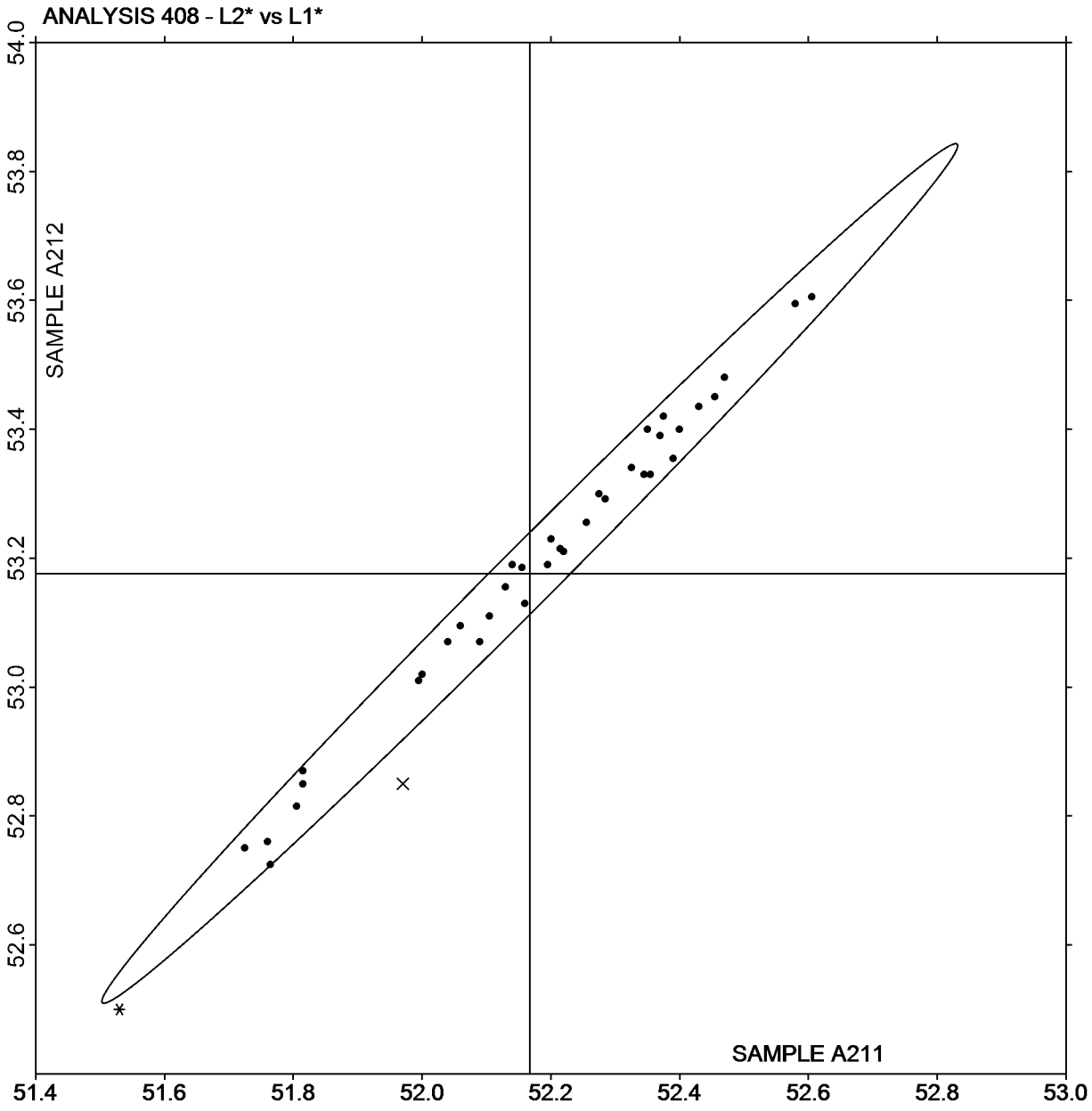
MQLXYT(X) - Extreme Data. Very high "L*" values for both samples. Small Delta L & E.

Key to Instrument Codes Reported by Participants

BG	BYK Mac i	GA	BYK-Gardner
GB	BYK-Gardner spectro-guide sphere gloss	GE	BYK-Gardner spectro-guide (45/0)
GG	BYK-Gardner spectro2-guide (45/0) gloss	GH	BYK-Gardner Color-View
HK	Hunter MiniScan XE (45/0)	HW	Hunter LabScan XE
HX	Hunter Color FlexEZ 45/0	HY	Hunter Color Flex 45/0
MD	Minolta FD 7	MG	Macbeth 1500/PLUS or 2025+ Color Eye
MP	Minolta CM-2500c Spectrophotometer	TO	Topcon SR-3 Spectroradiometer
XD	X-Rite 500 Series SpectroDensitometer	XE	X-Rite eXact Portable Spectrophotometer
XM	X-Rite MA58 Multi-Angle Spectrophotometer	XN	X-Rite MA68 Multi-Angle Spectrophotometer
XO	X-Rite MA68 II Multi-Angle Spectrophotometer	XS	X-Rite 962 Portable Spectrophotometer
XU	X-Rite 964 Portable Spectrophotometer	XW	X-Rite

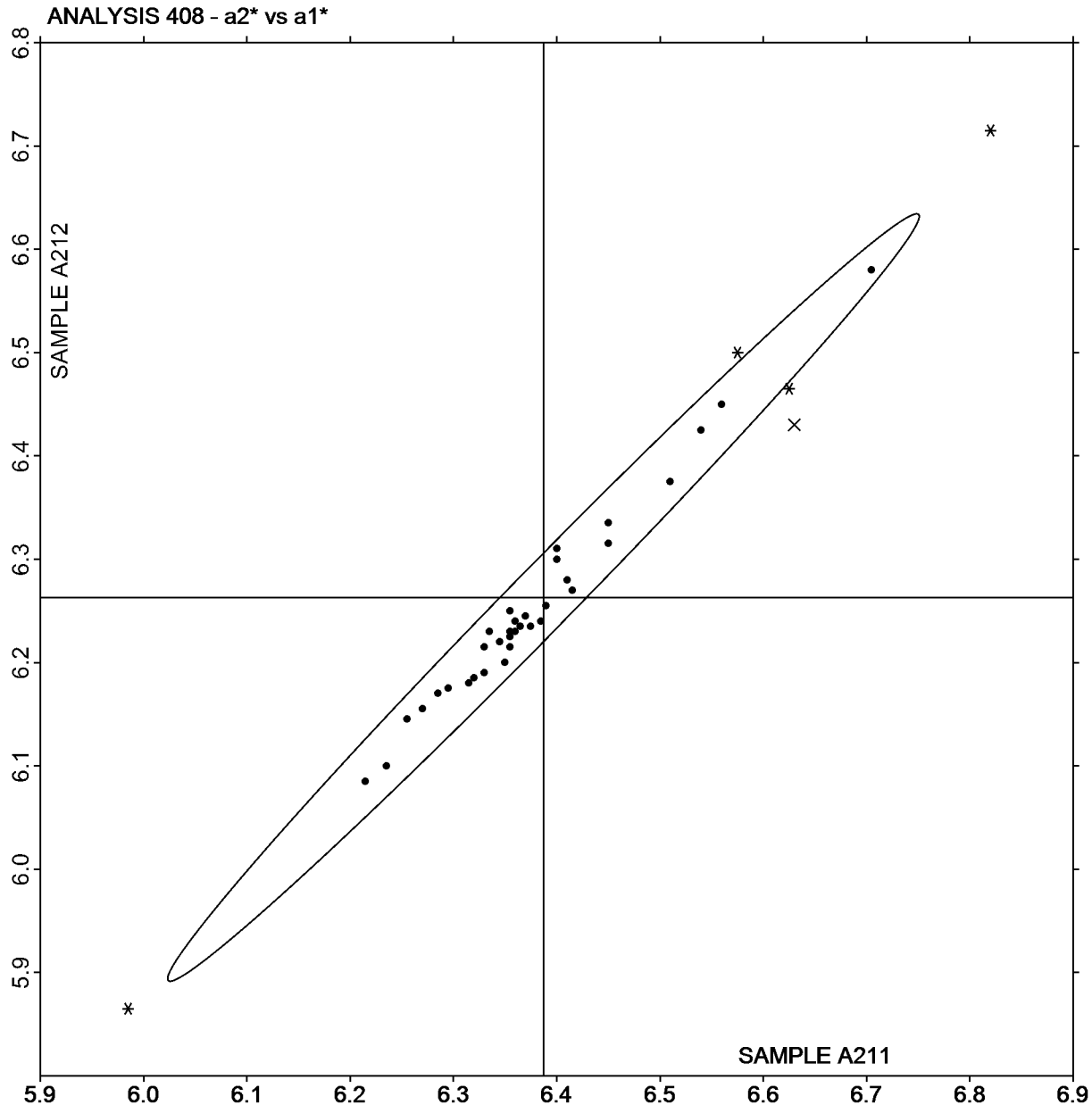
L2* vs L1*

SAMPLE A211 = 52.17 SAMPLE A212 = 53.18



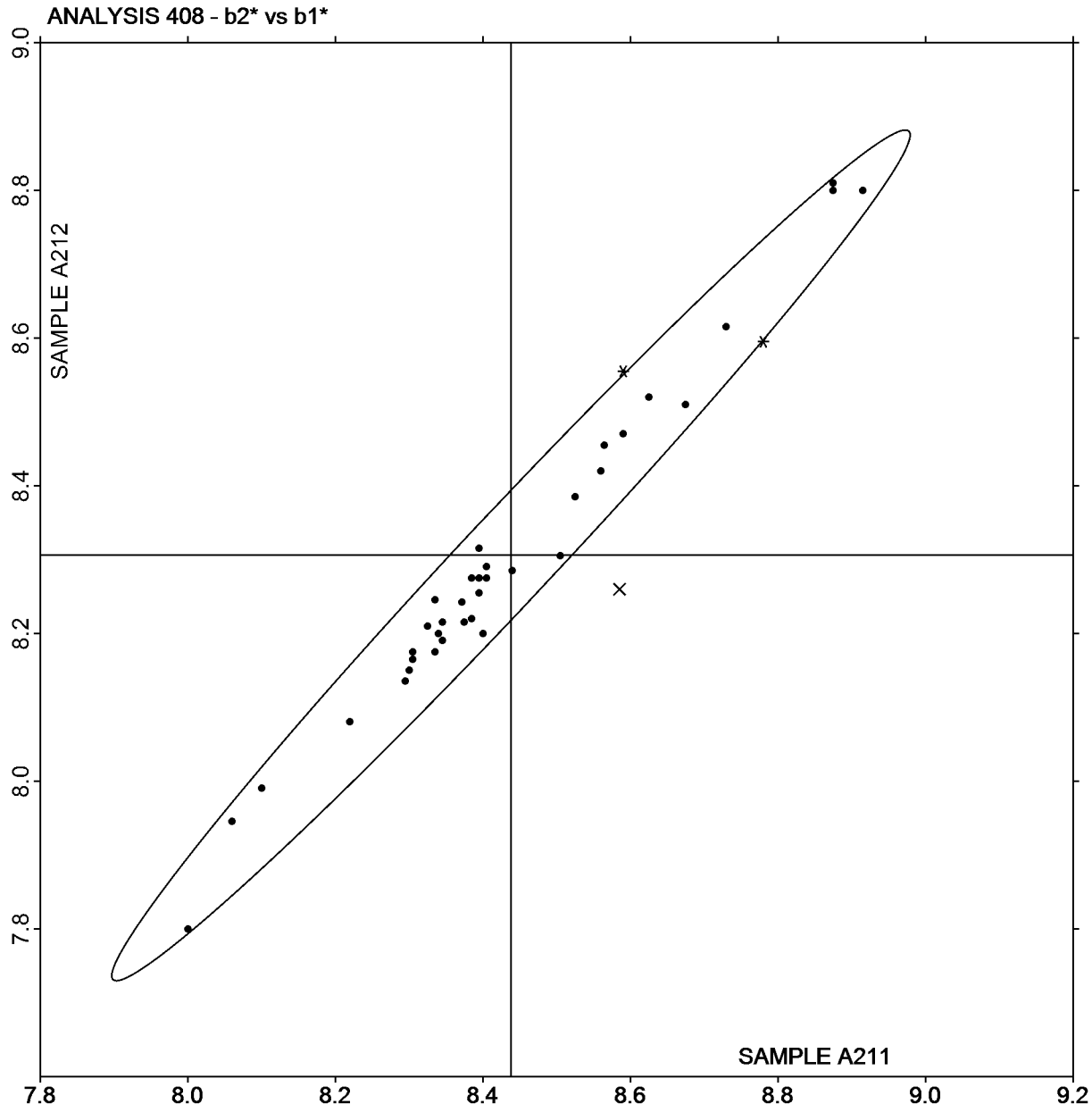
a2* vs a1*

SAMPLE A211 = 6.39 SAMPLE A212 = 6.26



b2* vs b1*

SAMPLE A211 = 8.44 SAMPLE A212 = 8.31



			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
2E8LNJ		A211	52.43	6.17	7.61	0.99	-0.14	-0.13	1.01	XI
		A212	53.42	6.03	7.48					
2EL3NH		A211	52.41	6.31	7.85	0.99	-0.11	-0.14	1.01	XD
		A212	53.40	6.20	7.71					
2XJB2G		A211	52.65	6.20	7.90	0.97	-0.13	-0.13	0.99	AO
		A212	53.62	6.08	7.77					
2YTDNF		A211	52.58	6.21	7.76	0.99	-0.13	-0.15	1.01	AJ
		A212	53.57	6.08	7.61					
36WJ3H		A211	52.42	6.18	7.70	0.98	-0.10	-0.15	1.00	HP
		A212	53.41	6.08	7.55					
3E77VJ		A211	52.52	6.24	7.95	1.00	-0.14	-0.16	1.02	AS
		A212	53.52	6.10	7.79					
3HLEJH		A211	52.16	6.22	7.97	1.01	-0.11	-0.17	1.03	GD
		A212	53.17	6.11	7.81					
3MFFJC		A211	52.63	6.31	7.84	0.98	-0.10	-0.13	0.99	AS
		A212	53.61	6.21	7.71					
3UFU9J		A211	52.50	6.30	7.94	1.02	-0.14	-0.15	1.04	AS
		A212	53.52	6.16	7.79					
3VAKCD		A211	52.62	6.19	7.74	1.02	-0.13	-0.15	1.04	XI
		A212	53.64	6.06	7.59					
47M6AE	X	A211	51.75	5.89	8.45	1.01	-0.13	-0.13	1.03	XI
		A212	52.76	5.76	8.33					
4MQWVF		A211	52.45	6.26	7.85	1.00	-0.14	-0.14	1.02	XD
		A212	53.45	6.12	7.71					
4P3EAE		A211	52.55	6.31	7.99	1.02	-0.13	-0.16	1.03	AS
		A212	53.57	6.18	7.84					
4V4MG8		A211	52.27	6.27	7.79	0.97	-0.12	-0.13	0.99	XI
		A212	53.24	6.15	7.66					
6V2FPY		A211	52.50	6.31	7.83	1.03	-0.14	-0.15	1.05	AJ
		A212	53.53	6.17	7.68					
6WHCHY		A211	52.54	6.29	7.75	1.02	-0.13	-0.17	1.05	AO
		A212	53.57	6.15	7.58					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
6Y2QLY		A211	52.16	6.41	7.91	0.98	-0.14	-0.14	1.00	XH
		A212	53.15	6.27	7.77					
7322EE		A211	52.35	6.24	7.72	0.96	-0.13	-0.13	0.98	MM
		A212	53.31	6.11	7.59					
7944JE		A211	52.54	6.43	8.01	1.01	-0.13	-0.18	1.03	AS
		A212	53.55	6.29	7.83					
7PRL99		A211	52.24	6.31	7.68	1.02	-0.12	-0.16	1.03	HP
		A212	53.26	6.20	7.52					
7VEA4E		A211	52.43	6.30	7.97	1.01	-0.12	-0.17	1.03	XB
		A212	53.44	6.18	7.81					
89LGKW		A211	52.52	6.24	7.79	1.01	-0.12	-0.16	1.03	AJ
		A212	53.54	6.12	7.64					
8BPADA		A211	52.40	6.29	7.83	0.99	-0.13	-0.15	1.00	MK
		A212	53.39	6.16	7.68					
8KBDKA		A211	52.50	6.17	7.89	1.06	-0.13	-0.19	1.09	XR
		A212	53.57	6.04	7.70					
8N9Y87		A211	52.72	6.28	8.09	0.99	-0.13	-0.13	1.01	AS
		A212	53.71	6.15	7.96					
9AQN2U		A211	52.57	6.29	7.72	0.98	-0.13	-0.13	0.99	XB
		A212	53.55	6.15	7.59					
9DPZWU		A211	52.45	6.21	7.89	0.98	-0.13	-0.13	1.00	XB
		A212	53.44	6.09	7.75					
9L3RND		A211	52.49	6.30	7.90	1.03	-0.13	-0.14	1.05	MT
		A212	53.52	6.18	7.75					
9LGHB3		A211	52.48	6.18	7.72	1.06	-0.13	-0.12	1.08	MM
		A212	53.54	6.05	7.59					
9P6UA9	X	A211	52.88	6.24	7.32	0.97	-0.12	-0.10	0.98	HH
		A212	53.84	6.12	7.23					
A8F7F4		A211	52.28	6.21	7.88	1.13	-0.13	-0.13	1.14	XM
		A212	53.41	6.09	7.75					
AUUQC6		A211	52.58	6.25	7.76	1.01	-0.14	-0.14	1.02	XH
		A212	53.59	6.11	7.62					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
B4CVW9		A211	52.25	6.24	7.87	1.00	-0.12	-0.12	1.02	XO
		A212	53.26	6.12	7.75					
BETEG6		A211	52.33	6.19	7.77	0.99	-0.14	-0.13	1.01	XI
		A212	53.32	6.06	7.63					
BLUQC3		A211	52.49	6.26	7.85	1.01	-0.13	-0.15	1.03	MS
		A212	53.50	6.12	7.70					
C4U4L4		A211	52.59	6.24	7.90	0.99	-0.13	-0.13	1.01	AS
		A212	53.59	6.11	7.77					
CETU6Q		A211	52.61	6.19	7.87	0.99	-0.11	-0.12	1.00	XI
		A212	53.60	6.08	7.76					
CKHE87		A211	52.40	6.12	7.90	1.02	-0.15	-0.17	1.05	XQ
		A212	53.43	5.98	7.74					
DGEXE9		A211	52.64	6.28	7.74	1.02	-0.12	-0.15	1.04	AQ
		A212	53.67	6.16	7.59					
DKDGCZ		A211	52.53	6.35	7.99	1.01	-0.13	-0.15	1.03	AS
		A212	53.54	6.23	7.85					
DNDK79		A211	52.52	6.26	7.86	1.00	-0.12	-0.12	1.01	AJ
		A212	53.52	6.14	7.74					
DRR3L6		A211	52.61	6.19	7.86	1.02	-0.13	-0.16	1.05	AO
		A212	53.63	6.06	7.70					
DYFL78		A211	52.44	6.09	7.84	0.98	-0.13	-0.13	0.99	XI
		A212	53.42	5.96	7.71					
EAALTV		A211	52.39	6.39	7.81	0.96	-0.12	-0.10	0.97	MV
		A212	53.34	6.27	7.71					
EHZ484		A211	52.59	6.31	7.82	1.01	-0.13	-0.14	1.03	AO
		A212	53.60	6.18	7.68					
EQUA26		A211	52.64	6.28	7.79	1.00	-0.10	-0.13	1.01	MI
		A212	53.64	6.18	7.66					
EWLJB4		A211	52.53	6.28	7.85	1.00	-0.14	-0.15	1.03	AJ
		A212	53.53	6.14	7.69					
FKL9HM		A211	52.82	6.29	7.70	0.51	-0.13	-0.16	0.54	XI
		A212	53.33	6.17	7.55					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
FPGYNY		A211	52.41	6.26	7.95	1.03	-0.13	-0.19	1.06	AJ
		A212	53.44	6.13	7.76					
FR6BM4		A211	52.35	6.14	7.78	1.00	-0.13	-0.15	1.02	XI
		A212	53.35	6.01	7.63					
G2P2M2		A211	52.52	6.32	7.63	1.02	-0.13	-0.13	1.03	AO
		A212	53.53	6.19	7.49					
GEBGQZ	X	A211	52.92	6.31	7.86	0.98	-0.13	-0.17	1.00	CA
		A212	53.90	6.17	7.69					
GKH3H4		A211	52.50	6.33	7.81	0.99	-0.13	-0.13	1.01	MM
		A212	53.49	6.20	7.68					
H6JHCZ		A211	52.40	6.34	7.90	1.06	-0.29	-0.15	1.11	XC
		A212	53.46	6.05	7.75					
J4QMPR		A211	52.35	6.24	7.93	0.98	-0.14	-0.10	0.99	XO
		A212	53.32	6.10	7.83					
JTA37V		A211	52.52	6.25	7.82	0.99	-0.12	-0.13	1.01	AJ
		A212	53.52	6.13	7.69					
LGPAUQ		A211	52.45	6.29	7.87	1.02	-0.13	-0.16	1.04	MU
		A212	53.47	6.16	7.71					
LZGFZW		A211	52.49	6.26	7.81	1.00	-0.13	-0.11	1.02	XB
		A212	53.49	6.12	7.70					
MBWP4F		A211	52.49	6.22	7.91	1.00	-0.14	-0.13	1.02	XH
		A212	53.49	6.08	7.78					
MEHENT		A211	52.31	6.33	7.82	1.22	-0.14	-0.21	1.24	AS
		A212	53.53	6.19	7.62					
MQ8EEV		A211	52.27	6.32	7.74	1.02	-0.13	-0.13	1.03	XI
		A212	53.29	6.19	7.62					
MQLXYT	X	A211	56.32	6.82	8.88	0.90	-0.11	-0.07	0.91	XI
		A212	57.22	6.72	8.80					
MY2J9W		A211	52.42	6.20	7.81	1.01	-0.13	-0.13	1.03	XI
		A212	53.43	6.07	7.68					
NFLPVF		A211	52.41	6.30	7.84	0.95	-0.13	-0.14	0.97	AS
		A212	53.37	6.17	7.70					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
NGFF2V		A211	52.32	6.36	7.82	1.01	-0.14	-0.12	1.02	MV
		A212	53.32	6.22	7.70					
P49NYM		A211	52.32	6.23	7.88	1.02	-0.10	-0.13	1.03	MI
		A212	53.34	6.13	7.75					
PABVEP		A211	52.41	6.32	7.89	1.02	-0.13	-0.16	1.04	MW
		A212	53.43	6.19	7.73					
PCHDCL		A211	52.53	6.26	7.96	1.00	-0.13	-0.13	1.02	XB
		A212	53.54	6.13	7.82					
PE7PCQ		A211	52.13	6.38	7.82	0.97	-0.13	-0.11	0.98	XH
		A212	53.10	6.25	7.71					
PVUZYT		A211	52.27	6.18	7.96	1.02	-0.12	-0.14	1.04	XM
		A212	53.29	6.06	7.82					
PY9N86		A211	52.51	6.26	7.65	1.02	-0.13	-0.17	1.04	XX
		A212	53.53	6.13	7.48					
QB2GKL		A211	52.47	6.34	7.88	0.97	-0.14	-0.14	0.99	MV
		A212	53.44	6.20	7.73					
QT7NYN		A211	52.55	6.37	7.97	1.02	-0.13	-0.14	1.04	CA
		A212	53.57	6.24	7.83					
R6UAHN	X	A211	52.25	6.50	7.81	0.98	-0.45	-0.13	1.09	XI
		A212	53.23	6.05	7.68					
R9UKEN		A211	52.50	6.33	7.72	1.00	-0.14	-0.13	1.02	AJ
		A212	53.50	6.19	7.59					
RCR72K		A211	52.62	6.33	8.06	0.99	-0.13	-0.13	1.01	AS
		A212	53.62	6.20	7.94					
REJXFC		A211	52.26	6.32	7.79	1.02	-0.14	-0.10	1.03	XH
		A212	53.28	6.18	7.69					
T4DDQN		A211	52.49	6.31	7.85	1.00	-0.13	-0.15	1.02	AB
		A212	53.48	6.18	7.70					
TJ6ARJ		A211	52.26	6.22	7.88	1.00	-0.10	-0.13	1.01	GD
		A212	53.25	6.11	7.75					
TYHLHR		A211	52.41	6.18	7.73	0.97	-0.13	-0.13	0.99	XI
		A212	53.38	6.05	7.60					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
U64XWK		A211	52.47	6.22	7.79	0.99	-0.12	-0.13	1.00	AQ
		A212	53.46	6.10	7.67					
U6JGGH	X	A211	52.28	6.19	8.13	0.97	-0.12	-0.12	0.98	GE
		A212	53.25	6.08	8.01					
UBARQF		A211	52.42	6.30	7.84	1.02	-0.13	-0.19	1.05	AJ
		A212	53.44	6.18	7.64					
UDX4PL		A211	52.59	6.27	7.95	1.02	-0.14	-0.14	1.04	MV
		A212	53.61	6.13	7.81					
UMPGTR		A211	52.29	6.19	7.83	1.04	-0.14	-0.13	1.05	XI
		A212	53.33	6.05	7.70					
UNFNAH		A211	52.19	6.25	7.83	1.00	-0.13	-0.11	1.01	CA
		A212	53.19	6.12	7.72					
UPQPVG	X	A211	52.05	6.38	8.42	1.02	-0.14	-0.14	1.04	XF
		A212	53.07	6.24	8.28					
UVDDQM		A211	52.47	6.22	7.87	1.00	-0.13	-0.12	1.01	AS
		A212	53.47	6.09	7.76					
V23CK9		A211	52.45	6.23	7.71	1.05	-0.15	-0.17	1.07	AJ
		A212	53.50	6.09	7.54					
W4LQLM		A211	52.17	6.26	7.71	1.01	-0.11	-0.13	1.02	HP
		A212	53.18	6.15	7.57					
WLGJ7L		A211	52.33	6.21	7.74	1.00	-0.13	-0.13	1.02	XI
		A212	53.33	6.08	7.62					
WVRH3H		A211	52.49	6.30	7.81	0.98	-0.13	-0.10	0.99	AS
		A212	53.47	6.17	7.70					
WYUJ3E		A211	52.46	6.26	7.81	1.06	-0.15	-0.15	1.08	MM
		A212	53.52	6.11	7.66					
XCBYJJ		A211	52.53	6.33	7.74	1.02	-0.12	-0.17	1.03	AJ
		A212	53.55	6.21	7.58					
XJT88F		A211	52.39	6.24	7.93	1.02	-0.13	-0.16	1.04	XB
		A212	53.42	6.11	7.77					
Y4BYJG		A211	52.23	6.15	7.75	0.97	-0.12	-0.14	0.98	XD
		A212	53.20	6.03	7.61					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
Y9Q78G		A211	52.28	6.26	7.86	1.05	-0.15	-0.16	1.07	XH
		A212	53.33	6.11	7.70					
Z3JZ7J		A211	52.44	6.29	7.83	1.01	-0.14	-0.15	1.03	MM
		A212	53.45	6.15	7.67					
Z92MJK		A211	52.40	6.20	7.76	0.98	-0.13	-0.13	1.00	MM
		A212	53.38	6.08	7.63					
ZBRUZB		A211	52.83	6.29	7.85	0.98	-0.11	-0.14	1.00	CA
		A212	53.81	6.18	7.71					
ZW7EWC		A211	52.55	6.18	7.94	1.02	-0.13	-0.14	1.03	AT
		A212	53.56	6.06	7.80					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
A211	52.44	6.26	7.83	1.00	-0.13	-0.14	1.02
A212	53.44	6.13	7.69				
Stnd Dev Btwn Labs							
A211	0.14	0.06	0.09	0.06	0.02	0.02	0.06
A212	0.14	0.06	0.09				

Statistics based on 94 of 101 reporting participants

Comments Assigned on Data Flags for Test #409

47M6AE(X) - Low "L*" and "a*" values for both samples. Very high "b*" values for both samples.

9P6UA9(X) - High "L*" values and low "b*" values for both samples.

GEBGQZ(X) - High "L*" values for both samples. Large replication difference for "L*" values for both samples.

MQLXYT(X) - Extreme data. Very high "L*", "a*" and "b*" values for both samples. Large Delta b.

R6UAHN(X) - High "a*" values for Sample A211. Large replication difference for "a*" values for Sample A211. Small Delta a.

U6JGGH(X) - High "b*" values for both samples.

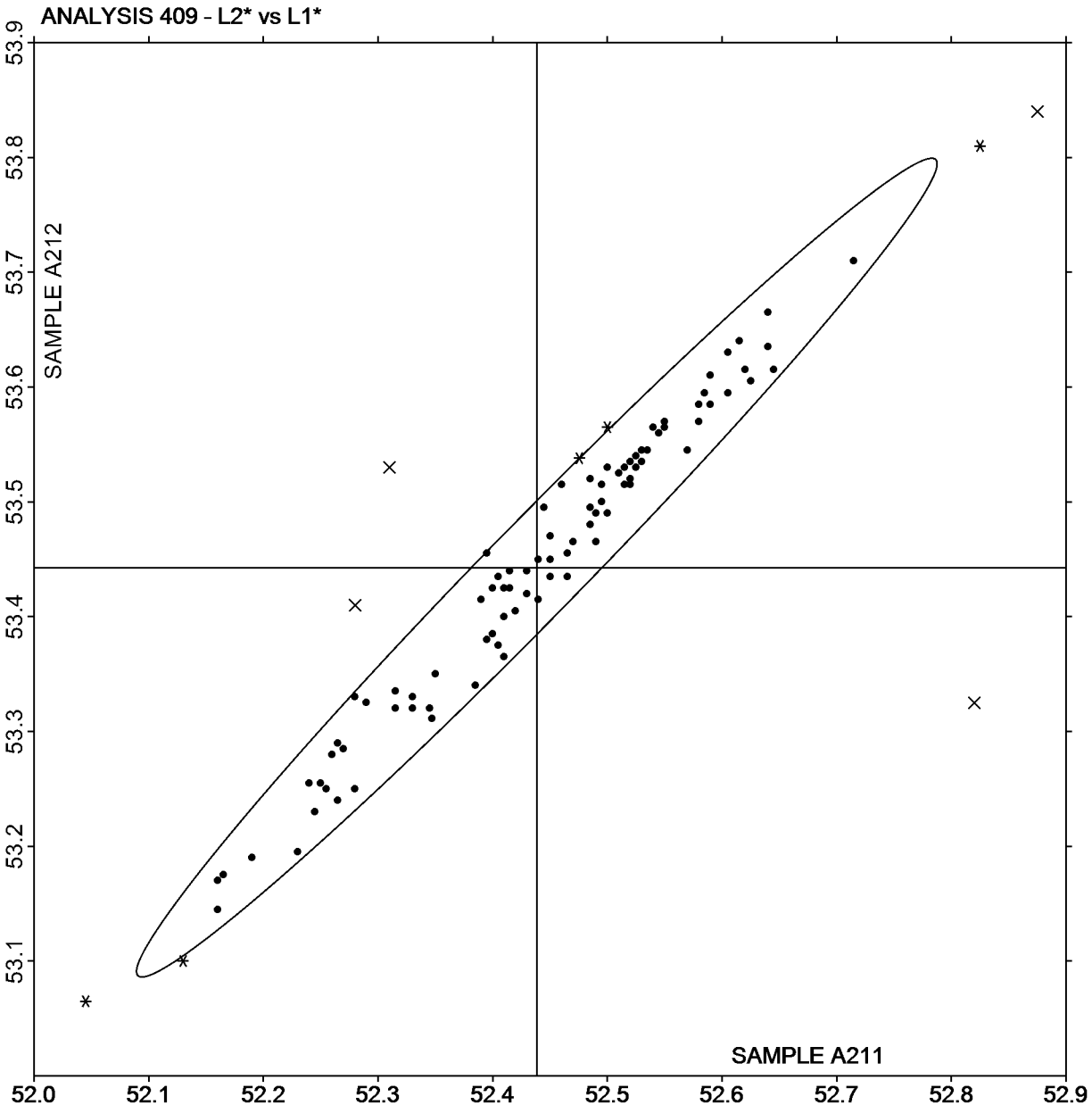
UPQPVG(X) - Very high "b*" values for both samples.

Key to Instrument Codes Reported by Participants

AB	Datacolor 100	AJ	Datacolor 600
AO	Datacolor 650x	AQ	Datacolor 600x
AS	Datacolor 800	AT	Datacolor 850
CA	Cary 5000	GD	BYK-Gardner Spectro-Guide Sphere
GE	BYK-Gardner Spectro2-Guide Sphere Gloss	HH	Hunter ColorQUEST XE
HP	Hunter UltraScan PRO	MI	Macbeth Color i5
MK	Macbeth Color-Eye 7000	MM	Macbeth Color-Eye 7000a
MS	Minolta CM-600d	MT	Minolta CM-2600d
MU	Minolta	MV	Minolta CM-3000d Spectrophotometer
MW	Minolta CM 3700a Spectrophotometer	XB	X-Rite Ci7000 Series Benchtop Spectrophotometer
XC	X-Rite Ci4200 Benchtop Spectrophotometer	XD	X-Rite Ci7800 Benchtop Spectrophotometer
XF	X-Rite Ci6x Portable Spectrophotometer	XH	X-Rite Color i5 Benchtop Spectrophotometer
XI	X-Rite Color i7 Benchtop Spectrophotometer	XM	X-Rite SP62 Portable Sphere Spectrophotometer
XO	X-Rite SP64 Portable Sphere Spectrophotometer	XQ	X-Rite SP68 Portable Sphere Spectrophotometer
XR	X-Rite	XX	Instrument make/model not specified by lab

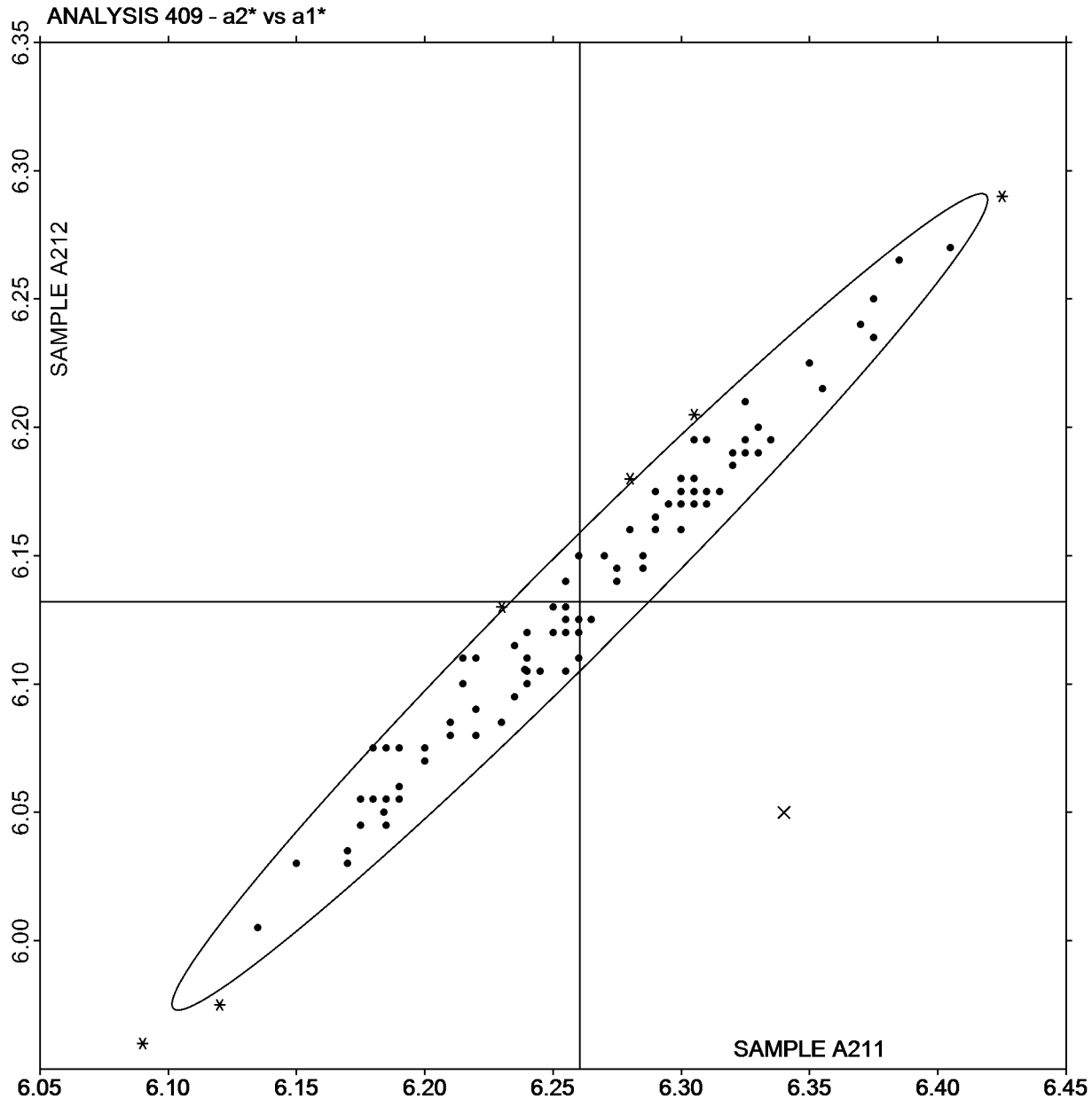
L2* vs L1*

SAMPLE A211 = 52.44 SAMPLE A212 = 53.44



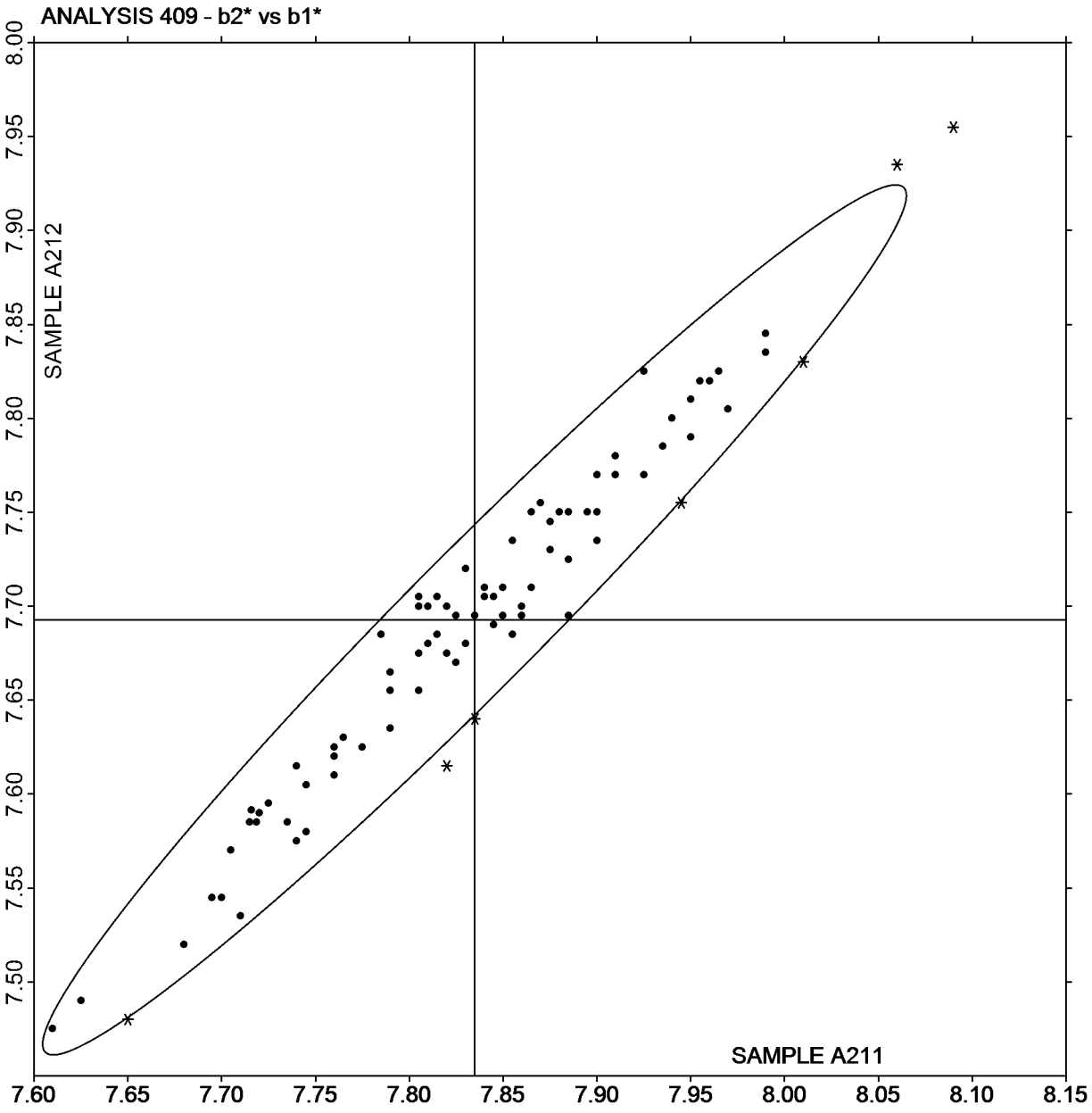
a2* vs a1*

SAMPLE A211 = 6.26 SAMPLE A212 = 6.13



b2* vs b1*

SAMPLE A211 = 7.83 SAMPLE A212 = 7.69



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 A211										
2E8LNJ		14.02	15.59	16.75	17.18	17.07	17.43	18.13	18.89	20.31	23.28	24.90	24.85	24.53	24.25	23.98	23.62	XI
2EL3NH		14.57*	15.46	16.63	17.03	16.98	17.37	18.09	18.85	20.30	23.30	24.95	25.00	24.68	24.38	24.07	23.85	XD
2XJB2G		14.20	15.60	16.75	17.20	17.30	17.60	18.30	19.05	20.40	23.50	25.20	25.30	24.90	24.70	24.30	23.80	AN
2YTDNF		14.17	15.64	16.81	17.23	17.22	17.59	18.28	18.98	20.37	23.39	25.12	25.15	24.87	24.65	24.30	23.85	AJ
36WJ3H		14.06	15.48	16.65	17.14	17.04	17.45	18.16	18.87	20.20	23.10	24.94	24.99	24.68	24.40	24.16	23.93	HP
3E77VJ		13.97	15.48	16.70	17.09	17.11	17.45	18.16	18.92	20.39	23.43	25.08	25.12	24.84	24.53	23.97	23.46	AS
3HLEJH		14.36	14.99X	16.23X	16.84*	16.72*	16.89X	18.09	18.78	19.81X	23.17	24.75	24.61*	24.41	24.22	23.97	23.66	GD
3MFFJC		14.21	15.57	16.74	17.16	17.17	17.55	18.27	19.01	20.49	23.51	25.18	25.15	24.92	24.71	24.56*	24.20	AS
3UFU9J		13.99	15.49	16.63	17.07	17.08	17.47	18.16	18.89	20.35	23.40	25.08	25.09	24.82	24.53	23.91	23.60	AS
3VAKCD		14.26	15.69	16.86	17.24	17.15	17.56	18.28	19.06	20.55	23.47	25.04	25.11	24.77	24.47	24.21	23.88	XI
47M6AE	X	13.01X	14.58X	15.74X	16.30X	16.33X	16.83X	17.57X	18.38X	19.81X	22.58X	24.20X	24.27X	23.88X	23.43X	23.34X	23.04X	XI
4P3EAE		14.25	15.41	16.68	17.11	17.11	17.46	18.21	18.94	20.34	23.52	25.15	25.15	24.82	24.57	24.18	23.95	AS
4V4MG8		13.83	15.37	16.53	16.97	16.88	17.32	17.98	18.70	20.16	23.12	24.80	24.85	24.51	24.18	23.91	23.67	XI
6V2FPY		14.06	15.60	16.68	17.11	17.09	17.43	18.15	18.92	20.36	23.43	25.00	25.12	24.78	24.46	24.26	23.98	AJ
6WHCHY		14.04	15.62	16.73	17.23	17.17	17.50	18.24	18.98	20.38	23.34	25.07	25.15	24.84	24.58	24.37	24.03	AN
7322EE		14.00	15.50	16.66	17.05	16.98	17.35	18.04	18.83	20.24	23.13	24.86	24.96	24.62	24.33	24.09	23.85	MM
7944JE		13.99	15.51	16.53	17.09	17.12	17.43	18.15	18.93	20.29	23.51	25.18	25.17	24.92	24.79	24.52	24.18	AS
7PRL99		13.98	15.40	16.57	17.01	16.93	17.31	18.01	18.72	19.98*	22.93	24.82	24.94	24.49	24.32	24.06	23.77	HP
7VEA4E		13.88	15.41	16.58	17.01	16.95	17.34	18.08	18.88	20.33	23.30	24.97	25.04	24.71	24.40	24.11	23.90	XB
89LGKW		13.96	15.54	16.77	17.15	17.16	17.53	18.19	18.93	20.35	23.44	25.02	25.08	24.73	24.49	24.14	23.68	AJ
8BPADA		13.83	15.41	16.62	17.07	16.99	17.40	18.09	18.87	20.25	23.21	24.94	25.02	24.73	24.43	24.19	23.99	MK
8KBDKA		14.02	15.50	16.69	17.10	17.04	17.44	18.18	18.94	20.39	23.40	25.01	25.04	24.66	24.34	24.03	23.74	XR

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 A211										
8N9Y87		13.99	15.52	16.70	17.21	17.23	17.60	18.33	19.10	20.54	23.59	25.31	25.35	25.08	24.75	24.32	23.79	AS
9AQN2U		14.17	15.65	16.83	17.22	17.13	17.52	18.24	19.00	20.45	23.45	25.07	25.11	24.81	24.47	24.24	23.96	XB
9DPZWU		13.91	15.45	16.64	17.05	17.02	17.41	18.14	18.92	20.36	23.31	24.93	25.00	24.67	24.39	24.04	23.82	XB
9L3RND		13.82	15.42	16.67	17.14	17.06	17.42	18.19	18.89	20.32	23.29	25.08	25.16	24.81	24.47	24.27	24.06	MT
9LGHB3		14.07	15.63	16.79	17.19	17.15	17.52	18.23	18.98	20.37	23.26	25.01	25.13	24.79	24.50	24.28	24.03	MM
9P6UA9		14.57*	16.00X	17.37X	17.55X	17.44X	17.83*	18.52X	19.28X	20.51	23.67	25.31	25.34	25.06	24.71	24.53	24.36*	HH
AUUQC6		14.04	15.68	16.81	17.21	17.14	17.53	18.24	19.02	20.47	23.42	25.07	25.12	24.84	24.50	24.31	23.99	XH
B4CVW9	X	14.46	16.17X	17.39X	17.76X	17.70X	18.08X	18.86X	19.61X	21.13X	24.06X	25.73X	25.73X	25.45X	25.18X	25.04X	24.64X	XO
BETEG6		13.96	15.45	16.59	17.03	16.93	17.34	18.04	18.80	20.25	23.21	24.78	24.83	24.50	24.15	23.88	23.56	XI
BLUQC3		13.95	15.50	16.70	17.15	17.10	17.45	18.20	18.95	20.35	23.30	25.05	25.15	24.85	24.45	24.25	24.05	MS
C4U4L4		14.02	15.57	16.74	17.15	17.17	17.54	18.25	19.01	20.48	23.46	25.11	25.21	24.84	24.65	24.19	23.73	AS
CETU6Q		13.99	15.54	16.73	17.22	17.15	17.58	18.26	19.03	20.50	23.46	25.12	25.17	24.78	24.43	24.17	24.05	XI
DGEXE9		15.00X	15.69	16.82	17.31	17.25	17.61	18.29	19.01	20.49	23.52	25.16	25.21	24.93	24.62	24.34	24.08	AQ
DKDGCZ	X	395.50X	542.50X	567.00X	706.00X	,714.00X	745.00X	820.00X	891.50X	,033.00X	338.00X	514.00X	519.50X	496.50X	476.00X	411.50X	364.00X	AS
DNDK79		14.48*	15.50	16.69	17.16	17.12	17.49	18.21	18.94	20.34	23.37	25.04	25.10	24.85	24.63	24.14	23.70	AJ
DRR3L6		14.20	15.60	16.70	17.20	17.15	17.60	18.30	19.00	20.40	23.45	25.10	25.20	24.90	24.70	24.20	23.70	AN
DYFL78		13.72	15.47	16.67	17.10	17.05	17.44	18.14	18.94	20.36	23.28	24.89	24.90	24.66	24.41	24.06	23.78	XI
EHZ484		14.10	15.60	16.80	17.19	17.18	17.58	18.25	18.98	20.41	23.48	25.18	25.18	24.87	24.64	24.28	23.76	AN
EQUA26		14.06	15.62	16.85	17.24	17.20	17.63	18.30	19.05	20.51	23.46	25.16	25.29	24.95	24.64	24.40	24.27	MI
EWLJB4	X	15.78X	16.36X	17.61X	18.00X	18.01X	18.39X	19.11X	19.88X	21.24X	24.31X	26.00X	26.10X	25.82X	25.54X	25.24X	25.02X	AJ
FKL9HM		13.98	15.48	16.62	17.06	16.92	17.31	18.00	18.79	20.20	23.21	24.78	24.87	24.59	24.28	23.99	23.78	XI
G2P2M2		14.17	15.62	16.82	17.27	17.19	17.48	18.18	18.94	20.34	23.39	25.03	25.12	24.74	24.50	24.34	24.08	AO

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 A211																
GEBGQZ		14.36	15.76	17.05*	17.46*	17.38*	17.79*	18.52X	19.26X	20.68*	23.87*	25.55X	25.54X	25.17*	24.87*	24.63*	24.41*	CA
GKH3H4		14.01	15.51	16.72	17.14	17.09	17.46	18.17	18.92	20.35	23.36	25.08	25.12	24.78	24.51	24.29	24.04	MM
H6JHCZ		13.79	15.31	16.54	16.96	16.92	17.33	18.07	18.82	20.30	23.20	24.84	24.88	24.60	24.34	24.07	23.88	XC
J4QMPR		13.78	15.40	16.55	17.01	16.95	17.28	18.08	18.82	20.32	23.27	24.92	24.95	24.68	24.35	24.21	23.87	XO
JTA37V		14.02	15.53	16.75	17.17	17.15	17.52	18.20	18.93	20.35	23.37	25.06	25.12	24.80	24.55	24.14	23.76	AJ
LC96XG		14.15	15.48	16.63	17.04	16.92	17.28	18.02	18.77	20.21	23.04	24.67*	24.69*	24.41	24.12	23.93	23.77	XO
LGPAUQ		13.85	15.46	16.63	17.12	17.05	17.39	18.15	18.86	20.30	23.30	25.08	25.06	24.74	24.46	24.24	24.04	MV
LZGFZW		14.00	15.51	16.71	17.12	17.07	17.47	18.19	18.93	20.33	23.39	25.04	25.04	24.63	24.27	24.03	23.74	XB
MEHENT		14.12	15.51	16.75	17.14	17.15	17.50	18.18	18.93	20.27	23.39	25.08	25.15	24.83	24.61	24.12	23.60	AS
MQLXYT		14.04	15.69	16.82	17.31	17.26	17.64	18.32	19.05	20.43	23.37	25.11	25.21	24.90	24.56	24.29	24.05	XI
MY2J9W		14.00	15.50	16.70	17.10	17.00	17.40	18.10	18.85	20.30	23.30	24.90	24.95	24.65	24.30	24.00	23.70	XI
NFLPVF		14.03	15.46	16.66	17.04	17.04	17.40	18.10	18.81	20.26	23.31	24.95	25.00	24.70	24.46	23.95	23.51	AS
NGFF2V		13.87	15.35	16.60	17.00	16.90	17.30	18.00	18.72	20.15	23.25	24.91	24.95	24.59	24.35	24.08	23.91	MV
P49NYM		13.71	15.35	16.54	16.97	16.89	17.29	18.02	18.80	20.27	23.10	24.82	24.90	24.58	24.24	23.97	23.68	MI
PCHDCL		13.98	15.48	16.65	17.10	17.06	17.46	18.20	18.98	20.42	23.39	25.08	25.13	24.80	24.45	24.17	23.90	XB
PE7PCQ		13.56*	15.29	16.43	16.84*	16.77*	17.15*	17.86*	18.61*	20.03*	21.49X	24.66*	24.82	24.44	24.20	23.88	23.66	XH
PVUZYT		14.30	15.50	16.80	17.20	17.10	17.50	18.30	19.00	20.70*	23.70	25.20	25.20	24.90	24.60	24.30	24.05	HW
PY9N86		14.11	15.65	16.80	17.22	17.18	17.49	18.22	18.93	20.36	23.36	24.99	25.08	24.74	24.45	24.26	23.96	XX
QB2GKL		13.87	15.42	16.71	17.06	16.98	17.46	18.13	18.83	20.30	23.42	25.11	25.08	24.75	24.51	24.24	24.01	MV
QT7NYN		14.20	15.60	16.84	17.27	17.18	17.59	18.32	19.04	20.49	23.69	25.32	25.26	24.93	24.61	24.38	24.19	CA
R6UAHN	X	14.41	16.16X	17.35X	17.79X	17.74X	18.15X	18.86X	19.60X	21.08X	24.08X	25.66X	25.67X	25.31X	24.98*	24.71X	24.52X	XI
R9UKEN		14.10	15.61	16.77	17.15	17.12	17.46	18.15	18.91	20.33	23.38	25.02	25.12	24.78	24.57	23.91	23.59	AJ

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 A211									
RCR72K		14.03	15.50	16.68	17.14	17.17	17.53	18.26	19.03	20.45	23.49	25.23	25.28	25.02	24.74	24.10	23.50	XX
REJXFC		13.95	15.40	16.56	16.95	16.87	17.24	17.96	18.71	20.19	23.15	24.77	24.86	24.49	24.16	23.97	23.69	XH
T4DDQN		13.91	15.52	16.69	17.12	17.08	17.45	18.17	18.93	20.33	23.30	25.02	25.14	24.83	24.56	24.28	23.96	AB
TJ6ARJ		14.21	15.30	16.46	16.93	16.84	17.17	18.05	18.90	19.93*	23.16	24.79	24.81	24.65	24.37	24.13	24.12	GD
TYHLHR		13.98	15.55	16.67	17.08	17.03	17.41	18.12	18.90	20.32	23.17	24.86	24.94	24.57	24.29	23.96	23.70	XI
U64XWK		13.94	15.48	16.70	17.15	17.13	17.47	18.18	18.90	20.34	23.32	24.96	25.02	24.71	24.43	24.16	23.89	AQ
U6JGGH		13.63	15.07X	16.43	16.85*	16.85	17.25	17.99	18.76	20.20	23.15	24.81	24.90	24.61	24.34	24.16	23.93	GE
UDX4PL		14.01	15.50	16.73	17.16	17.11	17.50	18.23	18.97	20.48	23.44	25.20	25.20	24.93	24.60	24.38	24.19	MV
UNFNAH		13.77	15.17*	16.46	16.85*	16.79*	17.23	17.96	18.66*	20.02*	23.10	24.79	24.79	24.46	24.17	23.93	23.71	CA
UVDDQM		14.26	15.49	16.66	17.07	17.10	17.49	18.15	18.89	20.31	23.31	24.98	25.03	24.76	24.53	24.18	23.98	AS
V23CK9		13.97	15.59	16.73	17.15	17.12	17.44	18.15	18.91	20.25	23.21	24.95	25.07	24.78	24.49	24.24	24.04	AJ
WLGJ7L		13.95	15.48	16.59	17.04	16.97	17.35	18.04	18.80	20.23	23.17	24.80	24.88	24.51	24.18	23.89	23.57	XI
WVRH3H		14.16	15.50	16.76	17.10	17.12	17.51	18.20	18.89	20.31	23.39	25.03	25.08	24.79	24.56	24.08	23.74	AS
WYUJ3E		13.96	15.47	16.68	17.11	17.04	17.45	18.14	18.90	20.34	23.31	24.99	25.02	24.69	24.43	24.18	23.97	MM
XCBYJJ		14.17	15.55	16.81	17.19	17.16	17.50	18.18	18.96	20.39	23.37	25.06	25.19	24.85	24.55	24.39	24.01	AJ
XJT88F		14.01	15.40	16.60	16.99	16.92	17.32	18.07	18.84	20.27	23.30	24.94	24.97	24.62	24.31	24.06	23.78	XB
Y4BYJG		13.81	15.38	16.55	16.95	16.87	17.22	17.92	18.72	20.20	23.13	24.75	24.70*	24.15X	23.60X	23.32X	23.03X	XD
Y9Q78G		13.93	15.40	16.51	16.94	16.85	17.26	17.94	18.71	20.25	23.20	24.79	24.81	24.55	24.18	23.96	23.58	XH
Z3JZ7J		13.91	15.44	16.66	17.10	17.04	17.41	18.12	18.88	20.33	23.29	24.96	25.04	24.71	24.42	24.17	23.95	MM
Z92MJK	X	25.79X	31.67X	30.97X	30.37X	30.20X	32.91X	35.31X	37.49X	41.67X	55.09X	62.24X	63.57X	63.68X	63.64X	63.68X	63.71X	MM
ZBRUZB		14.26	15.68	16.97	17.40*	17.31	17.72	18.45*	19.19*	20.58	23.74	25.42*	25.43*	25.08	24.79	24.55*	24.34*	CA
ZW7EWC		14.14	15.54	16.69	17.07	17.13	17.52	18.21	18.97	20.31	23.44	25.09	25.10	24.85	24.51	23.84	23.66	AT

Summary Statistics

	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700
Grand Means	14.04	15.50	16.69	17.11	17.07	17.44	18.16	18.91	20.33	23.32	25.01	25.06	24.74	24.45	24.15	23.86
SD Btwn Labs	0.21	0.14	0.14	0.13	0.14	0.14	0.12	0.12	0.15	0.26	0.17	0.17	0.17	0.19	0.20	0.23

47M6AE (X) - Low % reflectance data at all wavelengths.
B4CVW9 (X) - High % reflectance data for almost all wavelengths.
DKDGCZ (X) - Extreme data for all wavelengths.
EWLJB4 (X) - High % reflectance data at all wavelengths.
R6UAHN (X) - High % reflectance data for almost all wavelengths.
Z92MJK (X) - High % reflectance data at all wavelengths.

Key to Instrument Codes Reported by Participants

AB Datacolor 100
AJ Datacolor 600
AN Datacolor 650
AO Datacolor 650x
AQ Datacolor 600x
AS Datacolor 800
AT Datacolor 850
CA Cary 5000
GD BYK-Gardner Spectro-Guide Sphere
GE BYK-Gardner Spectro2-Guide Sphere Gloss
HH Hunter ColorQUEST XE
HP Hunter UltraScan PRO
HW Hunter UltraScan XE
MI Macbeth Color i5
MK Macbeth Color-Eye 7000
MM Macbeth Color-Eye 7000a
MS Minolta CM-600d
MT Minolta CM-2600d
MV Minolta CM-3000d Spectrophotometer
XB X-Rite Ci7000 Series Benchtop Spectrophotometer
XC X-Rite Ci4200 Benchtop Spectrophotometer
XD X-Rite Ci7800 Benchtop Spectrophotometer
XH X-Rite Color i5 Benchtop Spectrophotometer
XI X-Rite Color i7 Benchtop Spectrophotometer
XO X-Rite SP64 Sphere Spectrophotometer
XR X-Rite
XX Instrument make/model not specified by lab

WebCode	Data Flag	Sample E211 Lab Mean	Sample E211 Diff from Grand Mean	Sample E211 CPV	Sample E212 Lab Mean	Sample E212 Diff from Grand Mean	Sample E212 CPV	Instr Code
2EL3NH		29.75	0.55	0.84	39.05	0.20	0.26	RA
2HT474		28.78	-0.42	-0.64	37.95	-0.90	-1.18	GB
2VUY3B		29.65	0.45	0.69	39.50	0.65	0.85	GN
2YTDNF		28.90	-0.30	-0.45	38.55	-0.30	-0.39	GL
3HLEJH		28.80	-0.40	-0.60	37.98	-0.88	-1.15	GK
3MFFJC		29.00	-0.20	-0.30	38.48	-0.38	-0.49	GK
3UFU9J		29.85	0.65	0.99	40.00	1.15	1.51	GL
4MQWVF		28.90	-0.30	-0.45	38.70	-0.15	-0.20	GL
6Y2QLY		29.41	0.21	0.33	39.06	0.21	0.27	GL
86YZ3C		29.18	-0.02	-0.03	39.10	0.25	0.33	GN
8KBDKA		29.00	-0.20	-0.30	39.20	0.35	0.46	GK
8N9Y87		28.78	-0.42	-0.64	38.88	0.02	0.03	GK
9LGHB3		29.03	-0.17	-0.26	38.65	-0.20	-0.26	GL
9P6UA9		28.78	-0.42	-0.64	37.98	-0.88	-1.15	RA
A36TX6		29.28	0.08	0.12	39.40	0.55	0.72	GK
AUUQC6		29.55	0.35	0.54	38.60	-0.25	-0.33	GL
AVLPQ3		28.08	-1.12	-1.70	37.38	-1.48	-1.94	GL
B4CVW9		29.13	-0.07	-0.11	39.48	0.62	0.82	MW
BETEG6		29.17	-0.03	-0.05	38.42	-0.43	-0.56	GL
BLUQC3		29.95	0.75	1.15	39.65	0.80	1.05	GK
BPEJN6		30.10	0.90	1.37	39.60	0.75	0.98	RA
C26RLX		28.40	-0.80	-1.21	38.85	0.00	0.00	GL
CETU6Q		29.30	0.10	0.16	38.78	-0.08	-0.10	GL
CKHE87		28.23	-0.97	-1.47	38.35	-0.50	-0.66	GL
CM4VQQ		29.03	-0.17	-0.26	38.45	-0.40	-0.53	GK
DGU39Z		28.60	-0.60	-0.90	38.25	-0.60	-0.79	GK
DJ2GF7		29.20	0.00	0.01	38.40	-0.45	-0.59	GL
DKDGCZ		29.13	-0.07	-0.11	38.38	-0.48	-0.62	GK
DM2TB7		28.65	-0.55	-0.83	38.10	-0.75	-0.98	GL
DNDK79	*	27.40	-1.80	-2.73	37.53	-1.33	-1.74	GL

WebCode	Data Flag	Sample E211 Lab Mean	Sample E211 Diff from Grand Mean	Sample E211 CPV	Sample E212 Lab Mean	Sample E212 Diff from Grand Mean	Sample E212 CPV	Instr Code
DYFL78		28.40	-0.80	-1.21	37.33	-1.53	-2.00	GT
EQUA26		28.25	-0.95	-1.44	38.40	-0.45	-0.59	GL
F8W9PY		29.45	0.25	0.39	39.45	0.60	0.79	GK
FGHEHW		29.53	0.33	0.50	39.53	0.67	0.89	GL
FKL9HM		30.23	1.03	1.56	39.88	1.02	1.34	GL
FPGYNY		29.15	-0.05	-0.07	38.78	-0.08	-0.10	GL
FR6BM4		28.90	-0.30	-0.45	38.30	-0.55	-0.72	GL
G6CJ6L		29.23	0.03	0.04	38.78	-0.08	-0.10	GL
HBWYB6		30.28	1.08	1.64	39.70	0.85	1.11	GN
J4QMPR		30.60	1.40	2.13	40.33	1.47	1.93	GN
JTA37V	*	31.05	1.85	2.82	40.80	1.95	2.56	MW
LC96XG		29.28	0.08	0.12	38.35	-0.50	-0.66	GL
LGPAUQ		28.13	-1.07	-1.63	37.50	-1.35	-1.77	GL
LZGFZW		28.63	-0.57	-0.87	38.18	-0.68	-0.89	ZA
M8XBGQ		28.35	-0.85	-1.28	38.40	-0.45	-0.59	GK
MQ8EEV		29.73	0.53	0.80	40.28	1.42	1.87	GL
MQLXYT		29.38	0.18	0.27	38.85	0.00	0.00	GN
MY2J9W		29.28	0.08	0.12	39.53	0.67	0.89	GK
NFLPVF		28.80	-0.40	-0.60	38.00	-0.85	-1.12	GK
P49NYM		29.30	0.10	0.16	39.15	0.30	0.39	GL
PABVEP		29.18	-0.02	-0.03	39.08	0.22	0.29	GN
PVUZYT		27.83	-1.37	-2.08	37.70	-1.15	-1.51	GK
PYGGGE		29.08	-0.12	-0.18	38.98	0.12	0.16	GN
Q6VMQQ		28.43	-0.77	-1.17	38.18	-0.68	-0.89	GL
QAAH7N		28.10	-1.10	-1.66	37.53	-1.33	-1.74	GL
R6UAHN		29.95	0.75	1.15	39.58	0.72	0.95	MM
RCR72K		29.00	-0.20	-0.30	38.83	-0.03	-0.03	GL
REJXFC		29.98	0.78	1.18	39.28	0.42	0.56	GK
T4DDQN		29.78	0.58	0.88	39.50	0.65	0.85	GL
TJ6ARJ		29.98	0.78	1.18	39.40	0.55	0.72	GN

Interlaboratory Testing Program for Color & Appearance

Analysis 440

60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample E211 Lab Mean	Sample E211 Diff from Grand Mean	Sample E211 CPV	Sample E212 Lab Mean	Sample E212 Diff from Grand Mean	Sample E212 CPV	Instr Code
TUAKYA		29.23	0.03	0.04	38.43	-0.43	-0.56	GK
UBARQF		29.30	0.10	0.16	39.15	0.30	0.39	GK
UF6LNG	*	30.05	0.85	1.30	40.73	1.87	2.46	GL
UMPGTR		29.33	0.13	0.20	39.23	0.37	0.49	GL
UNFNAH		29.13	-0.07	-0.11	38.90	0.05	0.07	GL
VAAA7Q		29.53	0.33	0.50	38.55	-0.30	-0.39	GL
W2Y8KP		28.90	-0.30	-0.45	38.03	-0.83	-1.08	GX
W4LQLM		29.33	0.13	0.20	38.73	-0.13	-0.16	GL
XCBYJJ		30.05	0.85	1.30	39.85	1.00	1.31	GN
Y9Q78G		29.85	0.65	0.99	39.50	0.65	0.85	GL
Z92MJK		29.43	0.23	0.35	39.23	0.37	0.49	GL
ZDF7YG		29.85	0.65	0.99	38.78	-0.08	-0.10	GD
ZZWF6L	X	26.40	-2.80	-4.24	36.13	-2.73	-3.58	GK

Summary Statistics

Grand Means

29.20 Gloss Units — 38.85 Gloss Units

Stnd Dev Btwn Labs

0.66 Gloss Units — 0.76 Gloss Units

Statistics based on 72 of 73 reporting participants

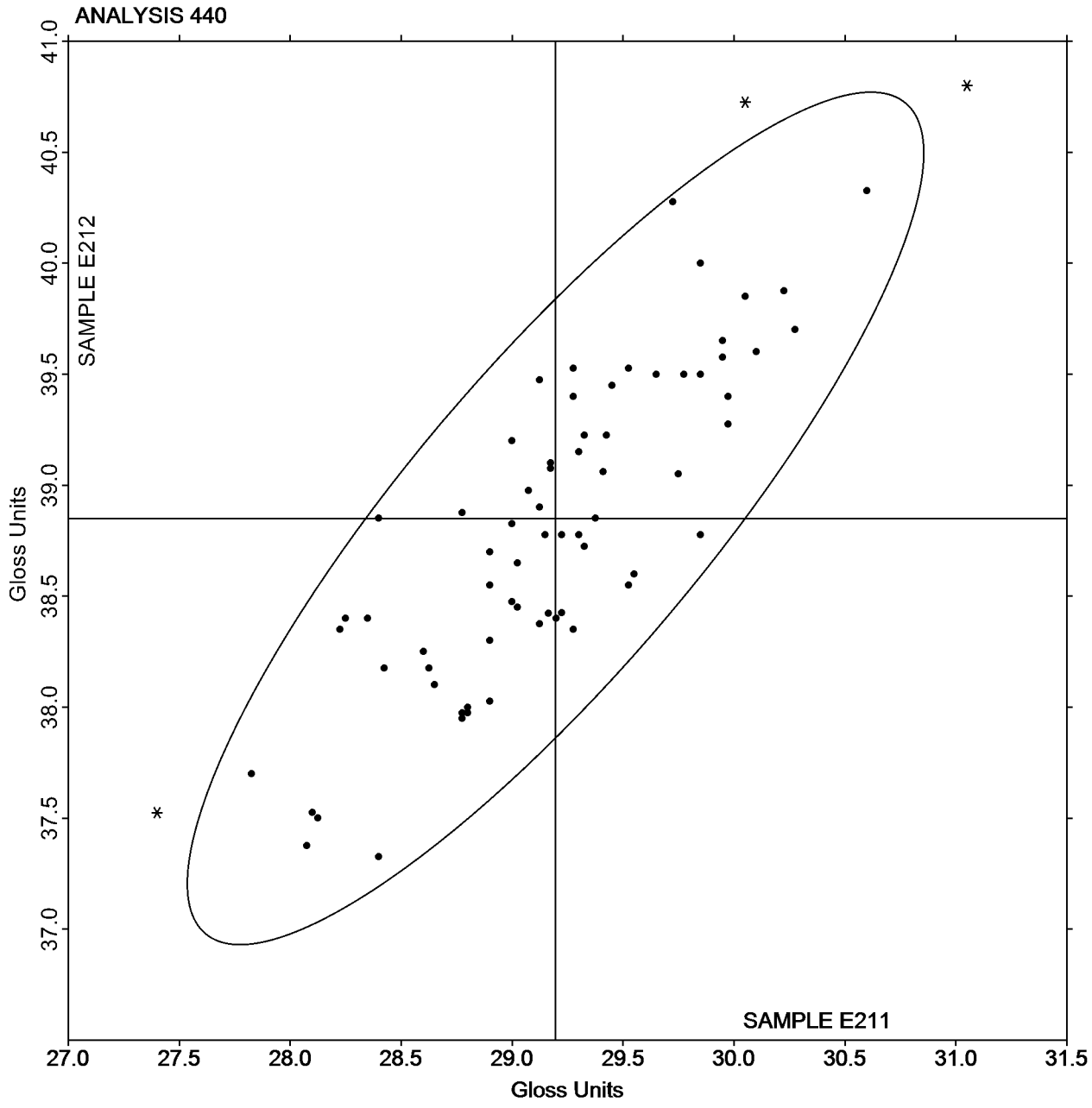
Comments on Assigned Data Flags for Test #440

ZZWF6L(X) - Data for both samples are low. Possible systematic error.

Key to Instrument Codes Reported by Participants

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	GT	Gardco Novo-Gloss (20/60/85)
GX	BYK-Gardner (model not specified)	MM	Macbeth Lab-Gloss
MW	Minolta Multi-Gloss 268	RA	Rhopoint Novo-Gloss Glossmeter
ZA	Zehntner ZGM Series		

SAMPLE E211 = 29.20 Gloss Units SAMPLE E212 = 38.85 Gloss Units



-End of Report-