Collaborative Testing Services, Inc.

Color & Appearance Testing Program

Summary Report #199 - 1st Qtr 2022

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, 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
2GQTL7		A221	54.93	6.76	11.42	0.91	-0.25	-0.25	0.98	GE
		A222	55.84	6.51	11.16					
37PH22	X	A221	58.78	6.38	10.69	0.91	-0.24	-0.24	0.97	XP
		A222	59.68	6.15	10.45					
38FQZ6		A221	54.38	6.85	10.83	0.92	-0.26	-0.29	1.00	GG
		A222	55.30	6.59	10.54					
3AQJ76		A221	54.87	6.90	10.67	0.92	-0.21	-0.25	0.98	HW
		A222	55.79	6.69	10.42					
3HX79D		A221	54.81	6.78	10.42	0.95	-0.23	-0.28	1.01	MS
		A222	55.75	6.55	10.15					
3R9KZ8		A221	55.19	6.86	10.81	0.89	-0.28	-0.33	0.99	XE
		A222	56.08	6.58	10.48					
3V4NE8	X	A221	55.80	7.00	10.90	1.00	-0.30	-0.30	1.09	HW
		A222	56.80	6.70	10.60					
4ZAEHD		A221	54.79	6.79	10.85	0.96	-0.23	-0.27	1.02	HW
		A222	55.75	6.57	10.58					
68B2Y6		A221	55.13	6.76	11.10	0.88	-0.25	-0.29	0.96	GH
		A222	56.00	6.52	10.80					
7T3PT4		A221	55.10	6.83	10.85	0.92	-0.25	-0.31	1.00	HW
		A222	56.02	6.58	10.54					
8NVELV		A221	54.88	6.89	10.81	0.90	-0.25	-0.29	0.97	HW
		A222	55.78	6.64	10.52					
933YCY		A221	54.95	7.10	11.03	0.95	-0.25	-0.34	1.04	GE
		A222	55.90	6.85	10.69					
9RHPN6		A221	54.72	6.86	10.78	0.87	-0.20	-0.27	0.93	MD
		A222	55.59	6.66	10.50					
9UUF42		A221	54.83	6.85	10.70	0.94	-0.19	-0.22	0.99	XU
		A222	55.77	6.66	10.48					
AU8FBV		A221	54.66	6.88	10.79	0.92	-0.23	-0.31	1.00	XU
		A222	55.58	6.65	10.48					
C8677Y		A221	54.89	6.88	10.89	0.89	-0.24	-0.30	0.97	XS
		A222	55.78	6.64	10.59					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
C8AEMY		A221	55.04	6.80	10.87	1.02	-0.23	-0.28	1.08	HW
		A222	56.06	6.57	10.59					
DZL3XW		A221	55.05	6.90	10.75	0.95	-0.20	-0.25	1.00	HW
		A222	56.00	6.70	10.50					
E8FMH4		A221	54.61	6.97	10.77	0.97	-0.22	-0.30	1.04	XU
		A222	55.58	6.74	10.47					
E8WWCP		A221	54.77	6.86	10.80	0.89	-0.24	-0.28	0.96	XU
		A222	55.66	6.63	10.52					
EK6PVP		A221	54.88	7.04	10.93	0.98	-0.22	-0.23	1.04	GA
		A222	55.86	6.82	10.70					
G63W3J		A221	55.11	6.93	10.43	1.09	-0.21	-0.26	1.14	PR
		A222	56.20	6.72	10.17					
G8VJ6M		A221	54.85	6.81	10.82	0.88	-0.21	-0.24	0.94	XU
		A222	55.74	6.60	10.58					
GA3YHK		A221	54.75	6.95	10.86	0.91	-0.26	-0.32	1.00	XU
		A222	55.66	6.69	10.54					
KLZ8MR		A221	55.05	6.84	10.87	0.87	-0.26	-0.33	0.96	HW
		A222	55.92	6.58	10.54					
KQWXRH	X	A221	46.97	7.58	10.74	0.96	-0.25	-0.26	1.02	GE
		A222	47.93	7.34	10.48					
L9AQ9Q		A221	54.66	6.94	10.51	0.97	-0.27	-0.31	1.05	HK
		A222	55.63	6.67	10.20					
MNUYJU		A221	54.96	7.16	11.06	0.91	-0.25	-0.32	1.00	GE
		A222	55.87	6.91	10.74					
NT7CRK		A221	54.87	6.79	10.89	0.97	-0.25	-0.29	1.04	MG
		A222	55.84	6.54	10.60					
PDMXYK		A221	55.40	6.90	10.90	0.90	-0.20	-0.30	0.97	HW
		A222	56.30	6.70	10.60					
Q7NVAE		A221	55.05	6.94	10.82	0.98	-0.23	-0.26	1.04	XD
		A222	56.03	6.71	10.56					
QCHJFL		A221	54.91	6.78	10.14	0.92	-0.24	-0.28	0.99	XX
		A222	55.83	6.54	9.86					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
RMWV9A	X	A221	54.34	7.26	11.30	0.91	-0.17	-0.29	0.98	MP
		A222	55.25	7.09	11.01					
RYHJQM		A221	54.58	6.87	11.22	0.97	-0.23	-0.25	1.02	BG
		A222	55.55	6.65	10.97					
TJ8X6C		A221	55.14	6.79	10.90	0.95	-0.25	-0.32	1.03	HW
		A222	56.09	6.54	10.58					
TWTHDC		A221	55.15	6.75	10.18	0.96	-0.23	-0.32	1.03	XX
		A222	56.10	6.52	9.86					
TZTU9C		A221	54.18	6.80	10.77	0.92	-0.21	-0.25	0.98	GG
		A222	55.10	6.59	10.53					
UGA7AG		A221	54.89	7.09	11.06	0.92	-0.25	-0.31	1.00	GE
		A222	55.81	6.84	10.76					
UPPVYG		A221	55.12	6.87	10.72	0.85	-0.22	-0.21	0.90	XM
		A222	55.96	6.65	10.51					
UTP8UG		A221	55.02	6.89	10.21	0.89	-0.25	-0.30	0.97	MR
		A222	55.91	6.65	9.91					
XK2CGH		A221	54.65	6.90	10.61	0.94	-0.26	-0.20	1.00	XB
		A222	55.60	6.63	10.41					
XU6R3G		A221	55.04	6.91	10.91	0.96	-0.23	-0.30	1.03	XC
		A222	56.00	6.67	10.61					
XVYFLC		A221	54.70	7.09	10.86	0.91	-0.28	-0.34	1.01	HX
		A222	55.61	6.82	10.52					
Y9KABB		A221	54.65	6.86	11.06	0.94	-0.27	-0.32	1.03	BG
		A222	55.59	6.60	10.74					
YWVYD6		A221	54.89	6.74	10.65	0.90	-0.23	-0.29	0.97	XW
		A222	55.79	6.52	10.37					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
A221	54.86	6.88	10.80	0.93	-0.24	-0.28	1.00
A222	55.79	6.64	10.52				
Stnd Dev Btwn Labs							
A221	0.24	0.10	0.26	0.04	0.02	0.04	0.04
A222	0.24	0.10	0.26				

Statistics based on 41 of 45 reporting participants

Comments Assigned on Data Flags for Test #408

37PH22(X) - Extreme data for both "L" values. Very low "a*" values for both samples.

3V4NE8(X) - High "L*" values for both samples. Small Delta a.

KQWXRH(X) - Extreme data for both "L" & "a" values.

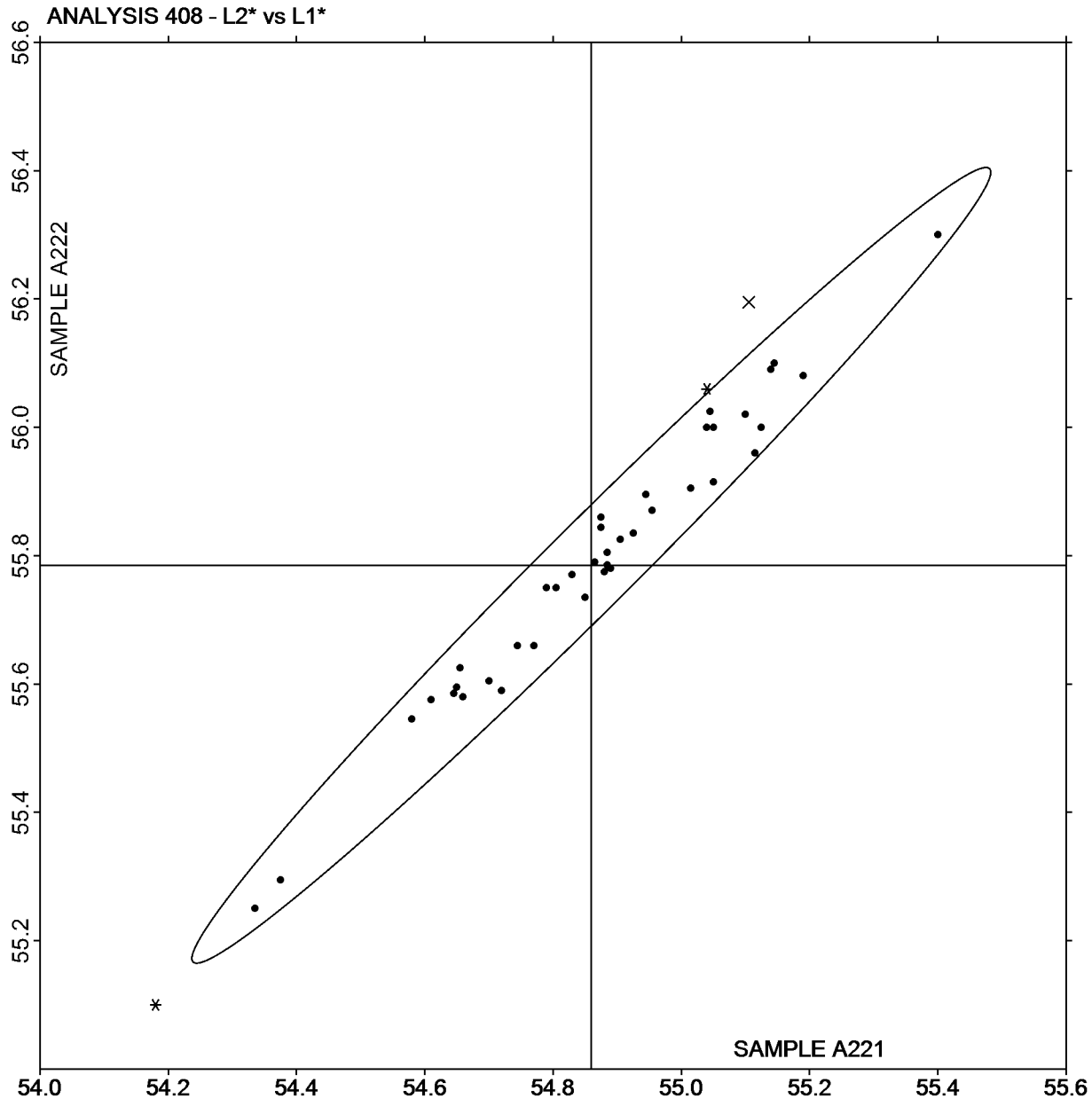
RMWV9A(X) - High "a*" values for both samples. Large Delta a.

Key to Instrument Codes Reported by Participants

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	HK	Hunter MiniScan XE (45/0)
HW	Hunter LabScan XE	HX	Hunter Color FlexEZ 45/0
MD	Minolta FD 7	MG	Macbeth 1500/PLUS or 2025+ Color Eye
MP	Minolta CM-2500c Spectrophotometer	MR	Minolta CM-3600A Spectrophotometer
MS	Minolta CM-600d Spectrophotometer	PR	PhotoResearch PR730
XB	X-Rite i1Basic Pro 2	XC	X-Rite i1Basic Pro
XD	X-Rite 500 Series SpectroDensitometer	XE	X-Rite eXact Portable Spectrophotometer
XM	X-Rite MA58 Multi-Angle Spectrophotometer	XP	X-Rite MA9 Multi-Angle Spectrophotometer
XS	X-Rite 962 Portable Spectrophotometer	XU	X-Rite 964 Portable Spectrophotometer
XW	X-Rite	XX	Instrument make/model not specified by lab

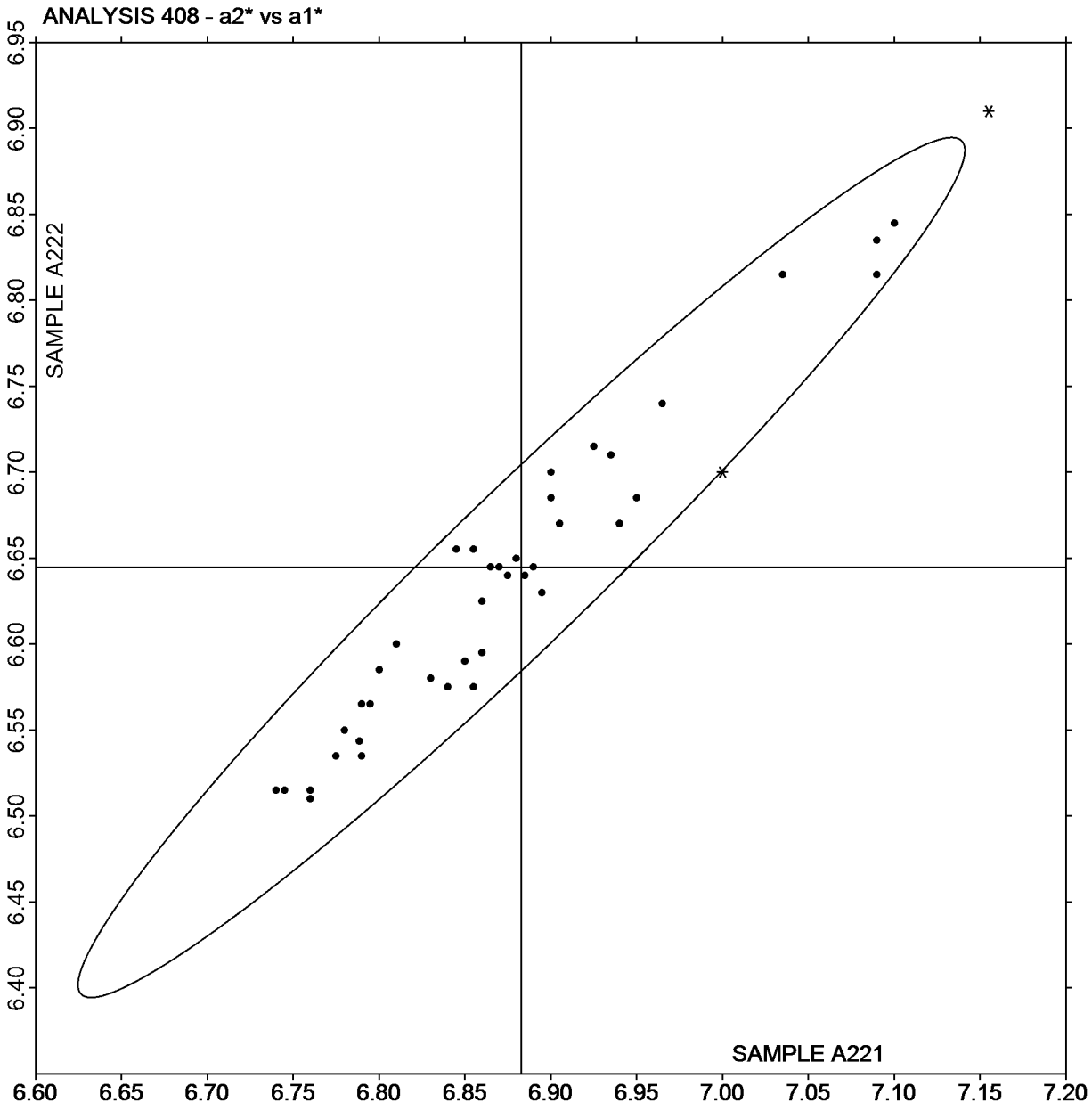
L2* vs L1*

SAMPLE A221 = 54.86 SAMPLE A222 = 55.79



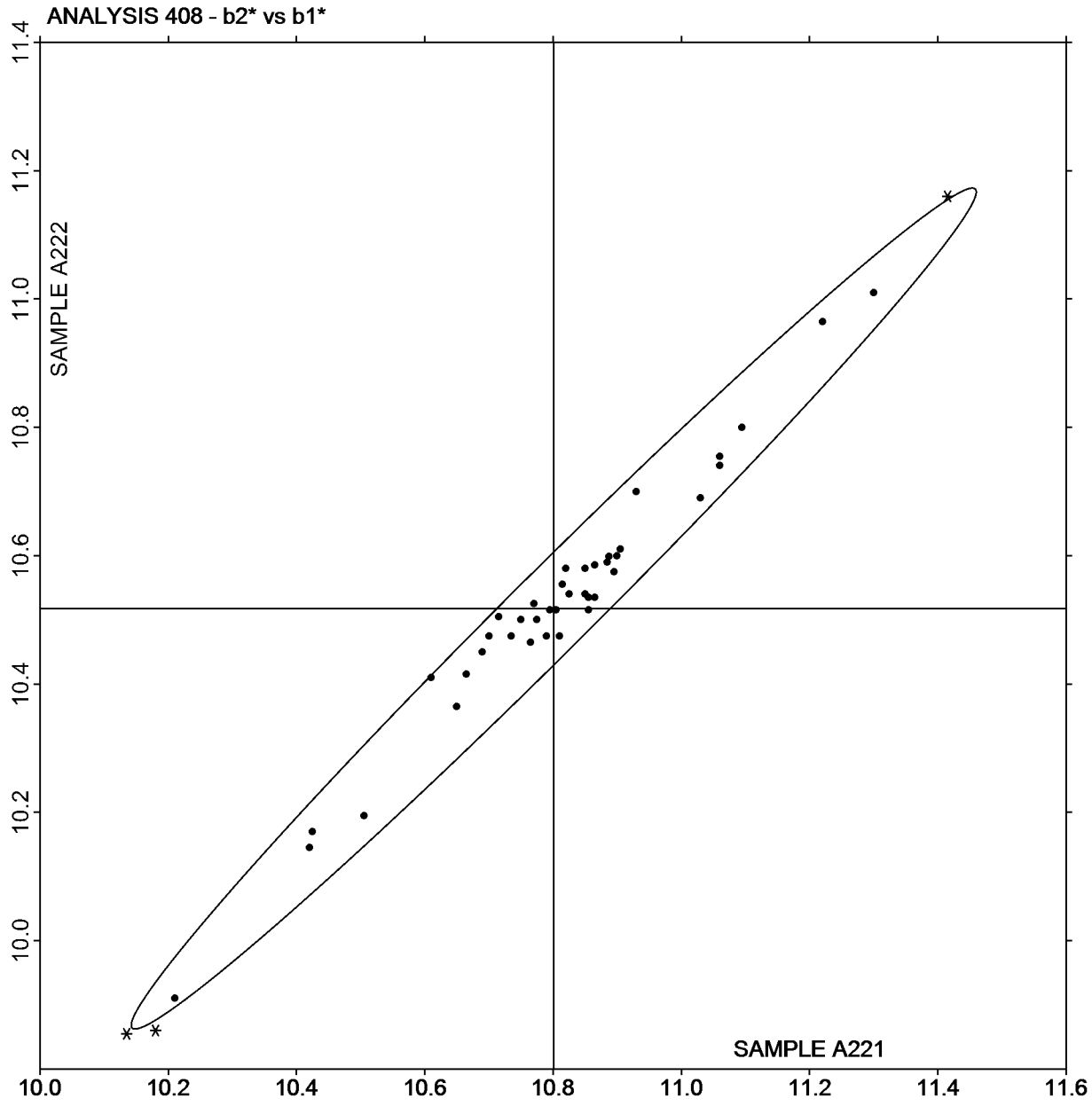
a2* vs a1*

SAMPLE A221 = 6.88 SAMPLE A222 = 6.64



b2* vs b1*

SAMPLE A221 = 10.80 SAMPLE A222 = 10.52



			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
2ARYY6		A221	54.72	6.85	10.32	0.93	-0.22	-0.27	0.99	XH
		A222	55.65	6.62	10.05					
2GQTL7		A221	54.73	6.72	10.31	0.92	-0.24	-0.31	1.01	GD
		A222	55.65	6.48	10.00					
2UFJWA		A221	55.00	6.67	10.17	0.91	-0.20	-0.28	0.97	XI
		A222	55.91	6.47	9.88					
33A73Z		A221	55.29	6.73	10.21	0.89	-0.24	-0.28	0.96	AO
		A222	56.18	6.49	9.94					
37PH22		A221	55.01	6.62	10.32	0.90	-0.23	-0.30	0.98	XF
		A222	55.91	6.40	10.02					
38FQZ6		A221	54.69	6.79	10.50	0.94	-0.25	-0.31	1.02	GE
		A222	55.63	6.54	10.19					
3AJNAC		A221	55.11	6.78	10.34	0.88	-0.25	-0.31	0.97	XD
		A222	55.99	6.53	10.03					
3BK8NZ		A221	55.20	6.68	10.29	0.95	-0.21	-0.29	1.02	AO
		A222	56.15	6.47	10.01					
3EEFH9		A221	55.17	6.84	10.28	0.94	-0.21	-0.26	1.00	AS
		A222	56.11	6.63	10.02					
3VANQ9		A221	54.77	6.80	10.43	0.84	-0.29	-0.37	0.96	XH
		A222	55.61	6.51	10.06					
4ZFHK6		A221	54.98	6.66	10.01	0.87	-0.24	-0.30	0.95	XD
		A222	55.86	6.43	9.71					
623RHB	X	A221	-40.79	10.80	-1.78	0.62	-0.21	0.07	0.65	GD
		A222	-40.18	10.60	-1.70					
6623DB		A221	55.17	6.79	10.26	0.88	-0.26	-0.32	0.97	AJ
		A222	56.05	6.53	9.93					
667F8Y		A221	55.15	6.80	10.26	0.89	-0.26	-0.34	0.99	AT
		A222	56.04	6.54	9.92					
674LTY	X	A221	55.96	6.87	10.15	0.86	-0.26	-0.33	0.95	CA
		A222	56.81	6.61	9.83					
68B2Y6		A221	55.20	6.85	10.36	0.95	-0.23	-0.27	1.01	MV
		A222	56.14	6.62	10.10					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
6FQHUZ		A221	55.24	6.80	10.31	0.89	-0.27	-0.34	0.99	AT
		A222	56.13	6.53	9.97					
6MKYT4		A221	55.20	6.69	10.08	0.92	-0.25	-0.33	1.01	HP
		A222	56.12	6.44	9.76					
73YDY9		A221	55.04	6.72	10.14	0.92	-0.23	-0.30	0.99	XD
		A222	55.96	6.49	9.84					
8RPG62		A221	55.06	6.78	10.27	0.94	-0.25	-0.30	1.02	MW
		A222	56.00	6.53	9.97					
9RRE44		A221	55.15	6.76	10.23	0.93	-0.24	-0.32	1.01	XD
		A222	56.08	6.52	9.91					
9UUF42	X	A221	54.50	6.85	10.40	0.97	-0.19	-0.26	1.02	XI
		A222	55.47	6.66	10.15					
9ZY4TV	X	A221	56.20	5.09	12.31	0.92	-0.17	-0.31	0.98	AT
		A222	57.12	4.92	12.01					
A9LJXQ		A221	55.48	6.78	10.20	0.94	-0.23	-0.28	1.01	CA
		A222	56.42	6.55	9.92					
ANH2MN		A221	54.86	6.66	10.24	0.95	-0.23	-0.26	1.02	XM
		A222	55.82	6.43	9.98					
AWVUZ6		A221	55.15	6.89	10.26	0.94	-0.21	-0.27	1.00	AS
		A222	56.09	6.68	9.99					
BHCDXU		A221	55.20	6.78	10.19	0.92	-0.25	-0.27	0.99	XB
		A222	56.12	6.54	9.92					
C8677Y		A221	54.97	6.77	10.28	0.92	-0.21	-0.28	0.99	AJ
		A222	55.89	6.55	10.01					
DAWDE3		A221	55.16	6.74	10.03	0.90	-0.23	-0.27	0.97	XI
		A222	56.06	6.52	9.76					
DMZQMM		A221	54.89	6.88	10.27	0.91	-0.23	-0.28	0.98	MV
		A222	55.80	6.64	9.99					
E2AWBQ	X	A221	55.13	6.81	10.32	1.37	-0.27	-0.33	1.44	XD
		A222	56.51	6.54	9.99					
E8WWCP		A221	55.10	6.77	10.16	0.88	-0.22	-0.27	0.95	XB
		A222	55.98	6.55	9.89					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
EAKHYK		A221	55.05	6.79	10.21	0.90	-0.24	-0.30	0.98	XD
		A222	55.95	6.55	9.91					
EBZQBU		A221	55.16	6.76	10.30	0.94	-0.22	-0.27	1.00	AT
		A222	56.10	6.54	10.03					
EK6PVP		A221	55.04	6.84	10.23	0.89	-0.26	-0.32	0.98	AJ
		A222	55.93	6.58	9.91					
EUDA8X		A221	55.15	6.79	10.21	0.93	-0.23	-0.29	0.99	XX
		A222	56.07	6.56	9.92					
F3M2A2		A221	55.16	6.82	10.24	0.92	-0.27	-0.33	1.02	AS
		A222	56.08	6.54	9.91					
F4DBU3		A221	55.26	6.81	10.08	0.95	-0.23	-0.28	1.01	AQ
		A222	56.21	6.57	9.81					
G63W3J	X	A221	55.26	6.75	9.85	1.05	-0.21	-0.32	1.12	CA
		A222	56.31	6.54	9.53					
G8VJ6M		A221	55.00	6.70	10.15	0.89	-0.21	-0.25	0.95	XI
		A222	55.89	6.49	9.90					
GNHXML		A221	55.00	6.80	10.24	0.70	-0.27	-0.30	0.81	AB
		A222	55.70	6.53	9.94					
H7C7TV		A221	55.29	6.70	9.96	0.91	-0.23	-0.29	0.98	XI
		A222	56.20	6.47	9.68					
HAQ29T		A221	55.37	6.70	10.34	0.95	-0.24	-0.25	1.01	XH
		A222	56.31	6.46	10.09					
HGWLLP		A221	55.05	6.81	10.33	0.96	-0.22	-0.28	1.02	XB
		A222	56.01	6.59	10.06					
HU2V2Y		A221	55.36	6.88	10.37	0.97	-0.22	-0.28	1.03	CA
		A222	56.33	6.66	10.09					
JUXTQK		A221	55.10	6.76	10.16	0.91	-0.25	-0.32	0.99	AQ
		A222	56.00	6.51	9.84					
KFV9EM		A221	55.04	6.62	10.34	0.96	-0.21	-0.26	1.02	XM
		A222	56.00	6.42	10.08					
KJUPPW		A221	55.27	6.88	10.15	0.97	-0.24	-0.22	1.03	HP
		A222	56.25	6.64	9.93					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
KKKYAX		A221	55.12	6.84	10.33	0.91	-0.25	-0.30	0.99	AS
		A222	56.03	6.58	10.04					
KRLDWK		A221	54.97	6.77	10.19	0.86	-0.28	-0.33	0.97	XI
		A222	55.83	6.49	9.85					
KWKDLG		A221	55.08	6.73	10.28	0.97	-0.24	-0.33	1.06	XI
		A222	56.05	6.50	9.95					
LFT3CJ		A221	55.10	6.80	10.26	0.92	-0.21	-0.28	0.99	MK
		A222	56.03	6.59	9.99					
LMLKGU		A221	55.00	6.62	10.14	0.94	-0.18	-0.27	1.00	XI
		A222	55.94	6.44	9.87					
LPVHXH		A221	55.03	6.77	10.28	0.92	-0.22	-0.28	0.99	XD
		A222	55.95	6.55	10.00					
LVZ7MD		A221	55.09	6.67	10.34	0.87	-0.25	-0.32	0.96	XC
		A222	55.95	6.42	10.02					
MDCHQM		A221	55.08	6.77	10.25	0.92	-0.24	-0.26	0.99	MS
		A222	56.00	6.53	9.99					
ML7KVJ		A221	55.06	6.78	10.26	0.93	-0.25	-0.32	1.02	MU
		A222	55.99	6.53	9.94					
MUYV3U		A221	55.17	6.81	10.31	0.95	-0.24	-0.28	1.02	AS
		A222	56.13	6.57	10.04					
N7TBRV		A221	55.01	6.75	10.18	0.94	-0.28	-0.33	1.03	MM
		A222	55.95	6.47	9.85					
NBMGBR		A221	54.96	6.77	10.17	0.89	-0.20	-0.26	0.95	XI
		A222	55.85	6.57	9.92					
NLMXXM		A221	55.20	6.77	10.23	0.93	-0.21	-0.29	1.00	AH
		A222	56.13	6.56	9.94					
P39UXG		A221	55.24	6.82	10.40	0.96	-0.26	-0.30	1.04	AS
		A222	56.21	6.57	10.09					
PPGENL		A221	55.09	6.77	10.19	0.92	-0.21	-0.30	0.99	AJ
		A222	56.02	6.56	9.90					
PQCXPN		A221	55.16	6.84	10.11	0.85	-0.25	-0.33	0.95	AS
		A222	56.01	6.59	9.78					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
PTMN6J		A221	55.30	6.81	10.18	0.81	-0.24	-0.34	0.91	MI
		A222	56.11	6.57	9.84					
QA8Y8C		A221	55.14	6.75	10.14	0.99	-0.24	-0.29	1.06	HP
		A222	56.13	6.52	9.85					
QCHJFL		A221	54.92	6.77	10.15	0.92	-0.26	-0.31	1.01	XH
		A222	55.84	6.51	9.83					
RA2V6K		A221	55.03	6.75	10.33	0.89	-0.22	-0.31	0.97	XH
		A222	55.92	6.53	10.02					
RC8HHP	X	A221	55.72	-0.91	4.25	-0.14	0.00	0.00	0.14	AS
		A222	55.58	-0.91	4.25					
RMWV9A		A221	55.11	6.70	10.20	0.98	-0.21	-0.25	1.03	XB
		A222	56.09	6.50	9.95					
RU7JKM		A221	55.36	6.72	10.32	0.90	-0.19	-0.21	0.95	HW
		A222	56.26	6.53	10.11					
RVP7GK	X	A221	55.67	6.66	10.26	0.45	-0.26	-0.32	0.61	XR
		A222	56.12	6.40	9.94					
RZH8KJ		A221	55.10	6.75	10.27	0.93	-0.26	-0.28	1.01	AS
		A222	56.03	6.49	9.99					
TU7T38		A221	55.16	6.71	10.12	0.93	-0.25	-0.31	1.02	MM
		A222	56.10	6.45	9.81					
TWTHDC		A221	55.15	6.75	10.18	0.96	-0.23	-0.32	1.03	AJ
		A222	56.10	6.52	9.86					
U2XQ8L		A221	55.29	6.81	10.46	0.93	-0.24	-0.31	1.01	AS
		A222	56.22	6.57	10.15					
UTP8UG		A221	55.16	6.82	10.22	0.92	-0.18	-0.19	0.96	MW
		A222	56.08	6.65	10.03					
UWTKYA		A221	55.07	6.76	10.12	0.90	-0.23	-0.29	0.97	AJ
		A222	55.97	6.53	9.84					
VH6ZXD		A221	54.73	6.70	10.27	1.07	-0.21	-0.25	1.12	XO
		A222	55.80	6.49	10.02					
WK6PB7		A221	54.92	6.75	10.07	0.94	-0.25	-0.29	1.02	XI
		A222	55.87	6.51	9.78					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
X9RPJJ		A221	55.16	6.79	10.17	0.90	-0.24	-0.31	0.97	AJ
		A222	56.06	6.56	9.87					
XAHZ4K		A221	55.09	6.80	10.34	0.98	-0.24	-0.29	1.05	MT
		A222	56.07	6.56	10.05					
XLWXAA		A221	55.06	6.86	10.19	0.92	-0.23	-0.28	0.99	MV
		A222	55.98	6.63	9.92					
XPUEM4		A221	55.09	6.86	10.27	0.98	-0.24	-0.30	1.05	AJ
		A222	56.07	6.62	9.97					
XZYDL6		A221	55.16	6.81	10.12	0.98	-0.21	-0.28	1.04	AO
		A222	56.14	6.59	9.85					
YJM8HK		A221	55.05	6.77	10.22	0.98	-0.27	-0.33	1.07	MM
		A222	56.04	6.50	9.89					
YMKWR6		A221	54.92	6.85	10.25	0.83	-0.26	-0.30	0.93	XH
		A222	55.76	6.58	9.95					
Z7WVL2		A221	55.36	6.64	10.13	0.89	-0.22	-0.31	0.97	XI
		A222	56.26	6.41	9.82					
ZB9U78		A221	55.11	6.79	10.15	0.92	-0.25	-0.29	1.00	HP
		A222	56.04	6.54	9.86					
ZBCGJE	X	A221	55.11	6.63	9.92	0.91	-0.22	-0.25	0.97	XI
		A222	56.02	6.41	9.67					
ZMZFC3		A221	55.09	6.73	10.22	0.97	-0.23	-0.27	1.04	AJ
		A222	56.07	6.50	9.96					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
A221	55.10	6.77	10.23	0.92	-0.24	-0.29	1.00
A222	56.02	6.53	9.94				
Stnd Dev Btwn Labs							
A221	0.14	0.06	0.10	0.05	0.02	0.03	0.04
A222	0.15	0.06	0.10				

Statistics based on 82 of 91 reporting participants

Comments Assigned on Data Flags for Test #409

623RHB(X) - Extreme data for both L*, a* & b* values. Small Delta L & Delta E. Large Delta b.

674LTY(X) - Very high "L*" values for both samples. Large replication difference for "L*" Sample A222.

9UUF42(X) - Low data for both "L*" values.

9ZY4TV(X) - Extreme data for both L*, a* & b* values. Large Delta a.

E2AWBQ(X) - High "L*" values for Sample A222. Large replication difference for "L*" Sample A222. Large Delta L & Delta E.

G63W3J(X) - Large replication difference for "L*" Sample A222. Low "b*" values for both samples. Large Delta L & Delta E.

RC8HHP(X) - Extreme data for both a* & b* values. High "L*" values for Sample A221. Large replication difference for "L*" Sample A221. Low "L*" values for Sample A222. Small Delta L & Delta E. Large Delta a & Delta b.

RVP7GK(X) - High "L*" values for Sample A221. Large replication difference for "L*" Sample A221. Small Delta L & Delta E.

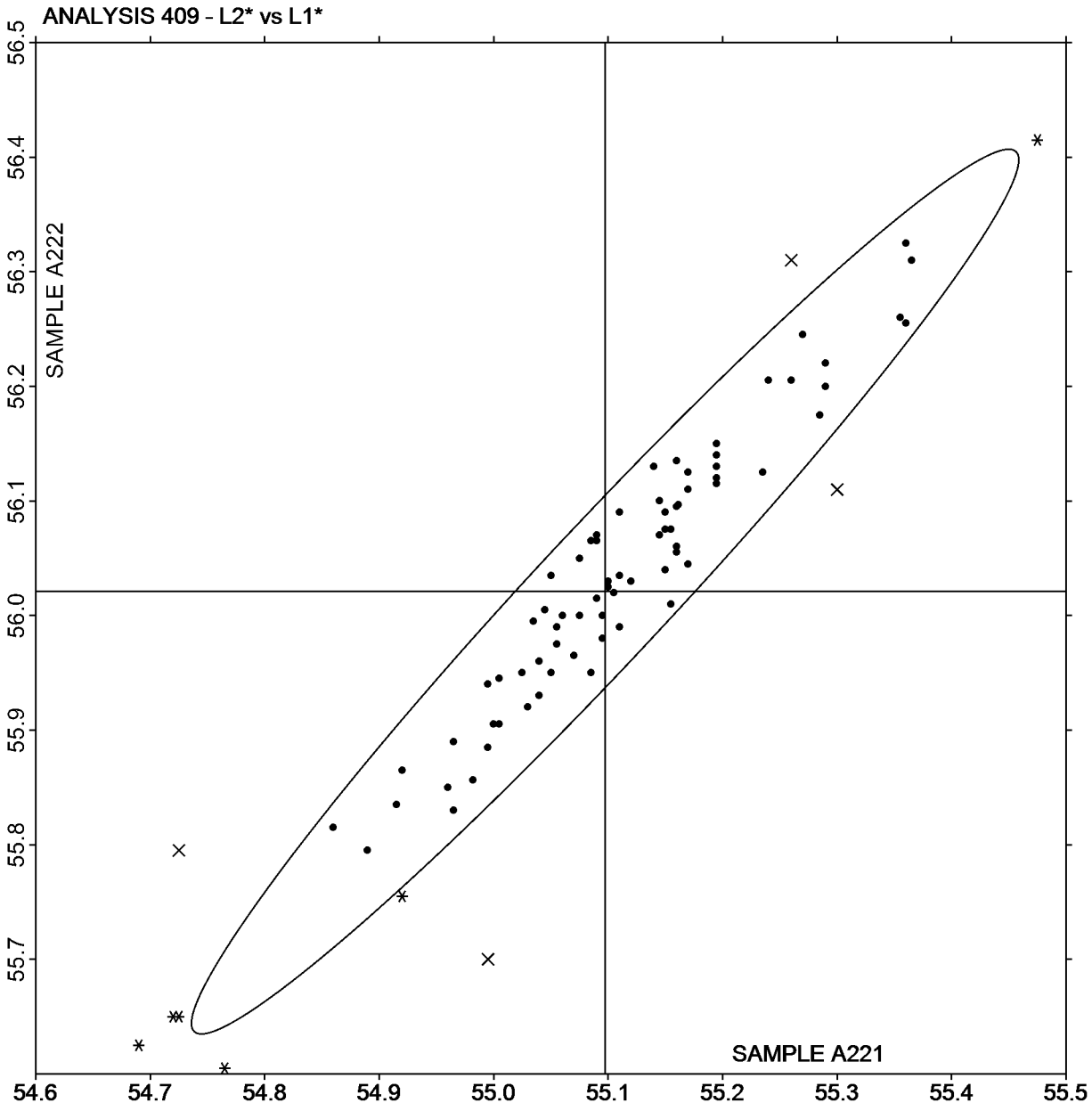
ZBCGJE(X) - Low "b*" values for Sample A221.

Key to Instrument Codes Reported by Participants

AB	Datacolor 100	AH	DataColor 550
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
HP	Hunter UltraScan PRO	HW	Hunter UltraScan XE
MI	Macbeth Color i5	MK	Macbeth Color-Eye 7000
MM	Macbeth Color-Eye 7000a	MS	Minolta CM-600d
MT	Minolta CM-2600d	MU	Minolta
MV	Minolta CM-3000d Spectrophotometer	MW	Minolta CM 3700a Spectrophotometer
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
XR	X-Rite	XX	Instrument make/model not specified by lab

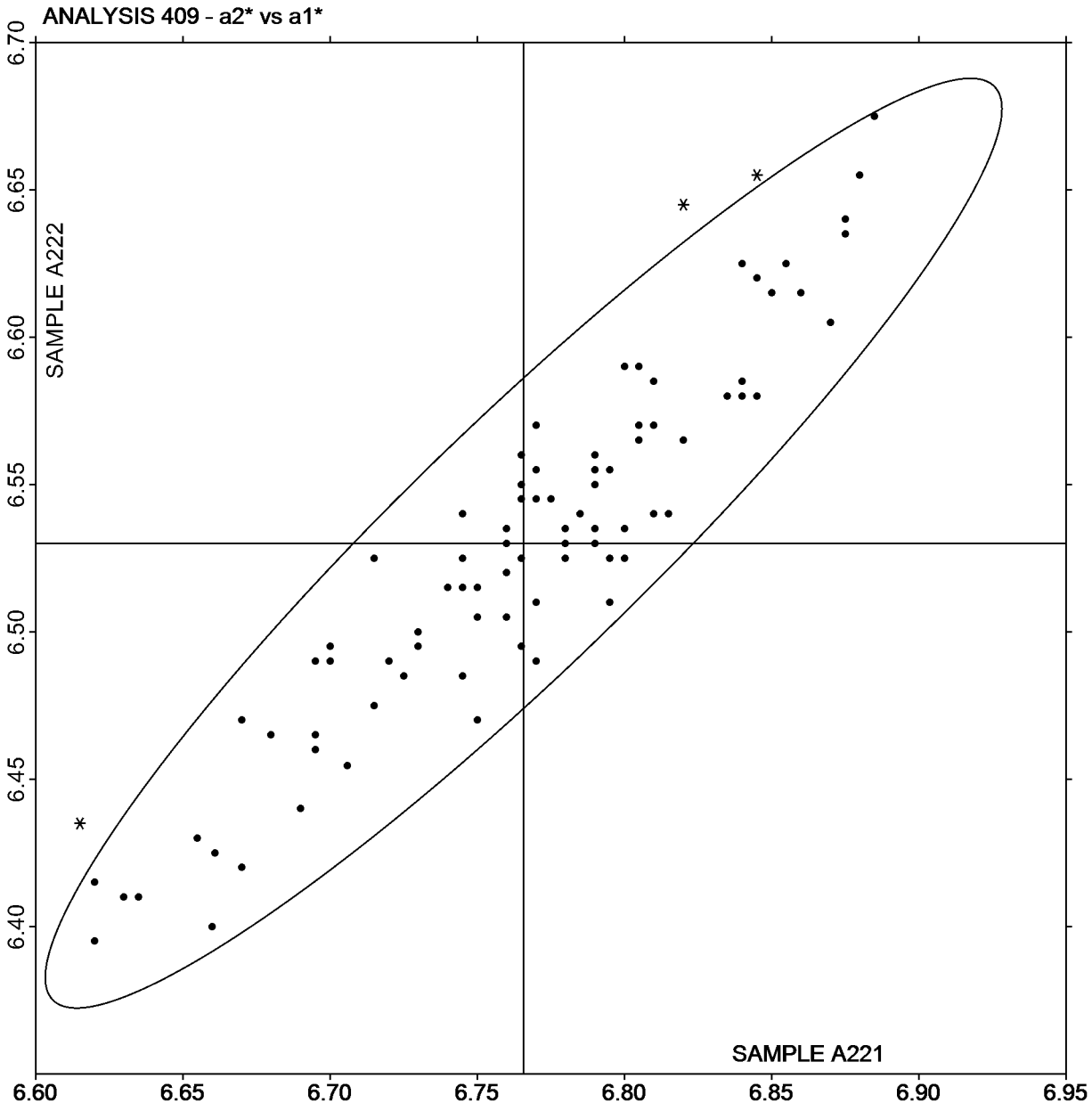
L2* vs L1*

SAMPLE A221 = 55.10 SAMPLE A222 = 56.02



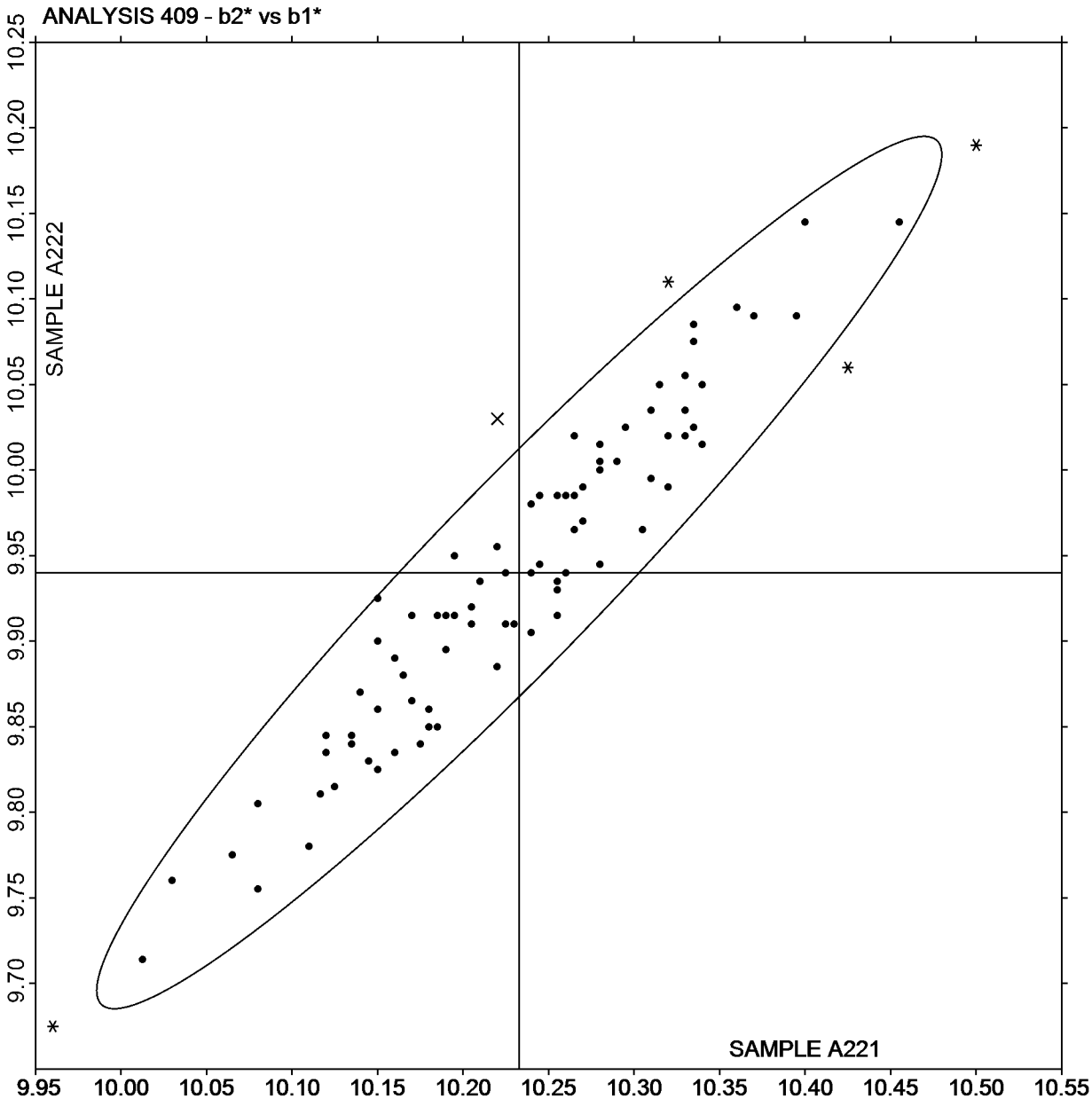
a2* vs a1*

SAMPLE A221 = 6.77 SAMPLE A222 = 6.53



b2* vs b1*

SAMPLE A221 = 10.23 SAMPLE A222 = 9.94



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 A221										
2GQTL7		14.43	15.67*	17.16X	17.90*	17.90X	18.54X	19.78*	20.99	22.42X	26.13	28.00*	28.04*	27.83	27.63	27.45	27.36	GD
2UFJWA		14.24	16.01	17.50	18.17	18.18	18.85	19.96	21.10	22.94	26.41	28.17	28.25	27.96	27.60	27.32	27.04	XI
33A73Z		14.50	16.20	17.70	18.40	18.40	19.10	20.20	21.30	23.10	26.70	28.60	28.70	28.40	28.20	27.70	27.20	AN
37PH22		14.20	15.92	17.50	18.11	18.18	18.88	19.97	21.13	22.98	26.32	28.24	28.29	27.99	27.70	27.44	27.27	XR
38FQZ6		13.64*	15.51X	17.16X	17.75X	17.88X	18.53X	19.63X	20.78X	22.60*	26.06*	28.01*	28.14*	27.85	27.61	27.47	27.34	GE
3AJNAC		14.93	16.01	17.53	18.18	18.23	18.88	20.01	21.16	23.03	26.04*	28.45	28.52	28.18	27.89	27.61	27.40	XD
3BK8NZ		14.40	16.10	17.60	18.30	18.45	19.05	20.10	21.30	23.00	26.60	28.50	28.60	28.30	28.10	27.65	27.10	AN
3EEFH9		14.27	16.04	17.62	18.23	18.38	18.96	20.10	21.21	23.01	26.55	28.51	28.64	28.39	28.23	27.56	27.04	AS
3VANQ9		13.84	15.68*	17.15X	17.86*	17.92*	18.61*	19.70*	20.88*	22.70	26.12*	28.02*	28.16	27.93	27.59	27.41	27.26	XH
4ZFHK6		14.33	16.08	17.60	18.25	18.22	18.84	19.96	21.10	22.88	26.30	28.22	28.28	27.92	27.65	27.42	27.26	XD
623RHB	X	14.93	15.36X	16.84X	17.71X	17.77X	18.01X	19.73*	20.74X	22.24X	26.06*	27.79X	27.93X	27.65X	27.40*	27.22*	26.91	GD
6623DB		14.30	16.06	17.60	18.27	18.36	18.97	20.12	21.25	23.01	26.51	28.52	28.61	28.33	28.11	27.62	27.09	AJ
667F8Y		14.34	16.03	17.60	18.26	18.35	18.96	20.08	21.21	23.04	26.60	28.49	28.56	28.23	27.95	27.41	27.07	AT
674LTY	X	15.32X	16.81X	18.35X	18.95X	18.94X	19.62X	20.77X	21.94X	23.75X	27.51X	29.47X	29.48X	29.10X	28.73X	28.42X	28.11X	CA
68B2Y6		14.07	16.01	17.55	18.31	18.32	18.94	20.06	21.20	23.10	26.59	28.65	28.69	28.40	28.05	27.83	27.68	MV
6FQHUZ		14.40	16.10	17.61	18.29	18.39	19.03	20.13	21.26	23.13	26.69	28.57	28.65	28.33	28.04	27.76	26.85	AT
6MKYT4		14.64	16.29	17.71	18.40	18.44	19.09	20.22	21.33	23.02	26.37	28.50	28.63	28.30	28.04	27.82	27.57	HP
73YDY9		14.36	16.07	17.57	18.21	18.26	18.88	19.98	21.14	22.97	26.40	28.26	28.37	28.03	27.73	27.45	27.25	XD
9RRE44		14.36	16.08	17.61	18.24	18.29	18.94	20.06	21.21	23.07	26.60	28.43	28.48	28.12	27.83	27.59	27.40	XD
9UUF42	X	13.59*	15.47X	16.94X	17.67X	17.74X	18.37X	19.46X	20.58X	22.41X	25.84X	27.80X	27.92X	27.52X	27.21X	27.00X	26.73*	XI
9ZY4TV		14.46	16.11	17.58	18.22	18.37	18.97	20.09	21.22	23.01	26.60	28.52	28.56	28.28	28.01	27.26	27.10	AT
A9LJXQ		14.63	16.27	17.90*	18.58*	18.58*	19.23*	20.38*	21.53*	23.28	26.93*	28.87*	28.91*	28.54*	28.21	28.01*	27.83*	CA

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 A221																
ANH2MN		14.65	16.10	17.70	18.30	18.40	19.00	20.20	21.30	23.40*	26.80	28.60	28.60	28.30	27.95	27.70	27.50	HW
AWVUZ6		14.69	16.11	17.58	18.23	18.36	18.94	20.05	21.18	23.03	26.62	28.54	28.55	28.29	28.20	27.99*	27.63	AS
BHCDXU		14.41	16.15	17.69	18.33	18.35	18.96	20.10	21.29	23.13	26.63	28.50	28.59	28.26	27.96	27.69	27.54	XB
DAWDE3		14.40	16.24	17.70	18.35	18.39	19.02	20.09	21.26	23.05	26.49	28.45	28.49	28.15	27.80	27.50	27.20	XI
DMZQMM		14.08	15.85	17.38	18.07	18.07	18.70	19.83	20.93	22.74	26.34	28.28	28.31	27.96	27.70	27.46	27.34	MV
E2AWBQ	X	15.04*	16.89X	18.42X	19.08X	19.15X	19.79X	20.92X	22.11X	23.90X	27.37X	29.29X	29.33X	29.45X	28.63X	28.34X	28.03X	XD
E8WWCP		14.42	16.10	17.62	18.23	18.28	18.91	20.04	21.19	23.00	26.46	28.38	28.45	28.13	27.85	27.61	27.38	XB
EAKHYK		14.27	16.01	17.53	18.17	18.22	18.87	19.98	21.16	22.94	26.36	28.35	28.46	28.12	27.87	27.58	27.35	XD
EBZQBU		14.26	16.07	17.55	18.21	18.36	18.97	20.10	21.25	23.09	26.51	28.52	28.62	28.24	28.04	27.61	27.16	AT
EUDA8X		14.37	16.10	17.62	18.26	18.30	18.94	20.07	21.23	23.05	26.53	28.45	28.53	28.18	27.89	27.62	27.41	XX
F3M2A2		15.26X	16.10	17.59	18.23	18.36	19.00	20.11	21.24	22.98	26.49	28.53	28.64	28.34	28.07	27.81	27.63	AS
F4DBU3		15.35X	16.28	17.75	18.42	18.50	19.11	20.17	21.26	23.15	26.63	28.57	28.66	28.38	28.12	27.82	27.56	AQ
G63W3J		14.68	16.28	17.88*	18.50	18.47	19.08	20.23	21.31	23.07	26.68	28.58	28.61	28.21	27.89	27.67	27.46	CA
G8VJ6M		14.40	16.04	17.53	18.15	18.18	18.83	19.93	21.08	22.97	26.45	28.20	28.26	27.87	27.56	27.31	27.05	XI
GNHXML		14.03	15.91	17.50	18.14	18.21	18.84	19.96	21.10	22.86	26.31	28.30	28.45	28.12	27.85	27.62	27.36	AB
H7C7TV		14.74	16.40*	17.83	18.50	18.50	19.10	20.23	21.40	23.21	26.67	28.49	28.60	28.21	27.90	27.63	27.35	XI
HAQ29T		14.36	16.14	17.65	18.47	18.51	19.09	20.21	21.41	23.42*	26.77	28.69	28.65	28.26	28.17	27.75	27.75	XH
HGWLLP		14.15	15.96	17.47	18.12	18.19	18.84	19.96	21.13	22.97	26.40	28.38	28.48	28.12	27.84	27.56	27.35	XB
HU2V2Y		14.44	16.05	17.66	18.31	18.36	19.01	20.13	21.28	23.05	26.75	28.65	28.65	28.30	27.98	27.77	27.57	CA
JUXTQK		14.20	16.03	17.59	18.25	18.37	18.95	20.07	21.14	23.01	26.46	28.37	28.48	28.17	27.88	27.62	27.36	AQ
KFV9EM		14.09	15.97	17.47	18.11	18.19	18.84	20.03	21.22	23.04	26.30	28.32	28.53	28.12	27.83	27.61	27.47	XM
KJUPPW		14.56	16.41*	17.68	18.38	18.51	19.05	20.20	21.59X	22.40X	26.54	28.78*	28.91*	28.59*	28.18	28.11X	27.85*	HP

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 A221																		
KKKYAX		14.22	15.98	17.50	18.18	18.31	18.92	20.03	21.17	22.99	26.49	28.48	28.59	28.33	28.04	27.40	27.07	AS
KRLDWK		14.18	15.98	17.44	18.16	18.16	18.85	19.92	21.04	22.86	26.28	28.26	28.37	28.03	27.62	27.41	27.24	XI
KWKDLG		14.47	16.06	17.50	18.19	18.22	18.86	19.97	21.15	23.04	26.48	28.36	28.47	28.11	27.76	27.45	27.16	XI
LFT3CJ		14.19	16.00	17.54	18.21	18.27	18.92	20.01	21.19	23.00	26.48	28.43	28.52	28.18	27.89	27.64	27.44	MK
LMLKGU		14.22	16.07	17.55	18.17	18.22	18.87	19.94	21.12	22.95	26.32	28.18	28.30	27.93	27.66	27.37	27.10	XI
LPVHXH		14.26	15.98	17.49	18.13	18.18	18.82	19.95	21.11	22.96	26.43	28.33	28.36	28.01	27.73	27.45	27.22	XD
LVZ7MD		14.19	15.95	17.50	18.12	18.19	18.89	20.02	21.16	23.09	26.48	28.54	28.34	28.03	27.73	27.55	27.35	XC
MDCHQM		14.18	16.01	17.52	18.23	18.26	18.88	20.04	21.17	22.95	26.39	28.39	28.50	28.17	27.87	27.65	27.46	MS
ML7KVJ		14.09	15.99	17.47	18.23	18.26	18.85	20.02	21.13	22.92	26.37	28.45	28.50	28.16	27.88	27.68	27.51	MV
MUYV3U		14.55	16.08	17.58	18.21	18.33	18.97	20.07	21.19	23.09	26.62	28.54	28.52	28.27	28.11	28.01*	27.63	AS
N7TBRV		14.26	15.95	17.51	18.18	18.24	18.85	19.95	21.12	22.87	26.29	28.30	28.44	28.12	27.86	27.62	27.44	MM
NBMGBR		14.27	15.98	17.49	18.12	18.16	18.79	19.91	21.06	22.88	26.33	28.23	28.31	27.96	27.67	27.41	27.20	XI
NLMXXM		14.31	16.14	17.63	18.30	18.42	19.04	20.15	21.25	23.10	26.58	28.53	28.61	28.32	28.07	27.58	27.05	AH
P39UXG		14.34	16.09	17.48	18.26	18.38	19.01	20.09	21.27	23.15	26.72	28.59	28.72	28.30	28.11	27.92	26.79*	AS
PPGENL		14.32	16.02	17.57	18.24	18.33	18.97	20.03	21.17	22.98	26.47	28.40	28.48	28.15	27.91	27.45	27.09	AJ
PQCXPN		14.39	16.12	17.71	18.30	18.41	19.01	20.10	21.22	22.95	26.48	28.50	28.63	28.34	28.12	27.67	26.97	AS
PTMN6J		14.38	16.16	17.74	18.41	18.44	19.07	20.18	21.34	23.20	26.66	28.64	28.79	28.36	28.02	27.77	27.61	MI
QA8Y8C		14.78	16.05	17.69	18.32	18.32	19.03	20.08	21.28	22.80	26.46	28.54	28.56	28.13	27.92	27.72	27.41	HP
QCHJFL		14.23	15.96	17.42	18.14	18.12	18.75	19.84	21.02	22.84	26.28	28.16	28.26	27.88	27.59	27.35	27.10	XH
RA2V6K		14.29	15.94	17.48	18.12	18.16	18.80	19.92	21.06	23.03	26.53	28.32	28.34	28.06	27.65	27.46	27.09	XH
RMWV9A		14.27	16.05	17.57	18.25	18.30	18.95	20.08	21.23	22.99	26.50	28.40	28.45	28.01	27.67	27.41	27.14	XB
RVP7GK		14.33	16.07	17.60	18.25	18.31	18.95	20.08	21.25	23.09	26.55	28.44	28.49	28.12	27.79	27.51	27.27	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 A221																		
RZH8KJ		14.48	16.00	17.54	18.18	18.33	18.96	20.05	21.18	22.95	26.45	28.38	28.51	28.24	27.99	27.67	27.48	AS
TU7T38		14.37	16.18	17.67	18.34	18.39	19.02	20.09	21.27	23.05	26.40	28.43	28.61	28.27	27.96	27.77	27.54	MM
TWTHDC		14.37	16.09	17.64	18.28	18.38	19.00	20.08	21.16	22.99	26.55	28.48	28.50	28.22	28.04	27.68	27.23	AJ
U2XQ8L		14.33	16.05	17.59	18.28	18.44	19.02	20.19	21.35	23.15	26.70	28.68	28.77	28.48	28.18	27.57	26.78*	AS
UTP8UG		14.11	15.93	17.51	18.21	18.18	18.83	19.96	21.06	22.82	26.37	28.43	28.53	28.18	27.89	27.64	27.53	MY
UWTKYA		14.26	16.13	17.57	18.25	18.36	18.92	20.03	21.17	22.88	26.33	28.41	28.53	28.23	27.94	27.71	27.53	AJ
VH6ZXD		13.91	15.81	17.23*	17.90*	17.96*	18.60*	19.73*	20.86*	22.72	26.05*	27.96*	27.97X	27.73*	27.48*	27.32	26.90	XO
WK6PB7		14.26	16.04	17.53	18.12	18.16	18.76	19.87	21.05	22.85	26.23	28.19	28.24	27.86	27.50*	27.34	27.01	XI
X9RPJJ		15.58X	16.13	17.65	18.26	18.38	19.01	20.12	21.25	23.00	26.48	28.49	28.61	28.30	28.04	27.79	27.60	AJ
XAHZ4K		14.08	15.90	17.49	18.24	18.22	18.87	20.03	21.16	22.94	26.44	28.45	28.56	28.24	27.93	27.70	27.54	MT
XLWXAA		14.10	15.96	17.59	18.20	18.22	18.89	19.96	21.06	22.91	26.48	28.45	28.47	28.11	27.85	27.63	27.49	MV
XPUEM4		14.31	16.05	17.54	18.18	18.29	18.91	20.00	21.14	22.95	26.50	28.43	28.55	28.24	28.02	27.53	26.98	AJ
XZYDL6		14.37	16.14	17.70	18.31	18.41	18.96	20.09	21.24	23.04	26.56	28.48	28.56	28.16	27.92	27.72	27.42	AO
YJM8HK		14.31	16.02	17.53	18.18	18.23	18.86	19.98	21.15	22.98	26.45	28.31	28.42	28.07	27.79	27.54	27.29	MM
YMKWR6		14.21	15.94	17.41	18.06	18.09	18.70	19.82	21.01	22.85	26.33	28.20	28.30	27.95	27.64	27.43	27.18	XH
Z7WVL2		14.65	16.35*	17.80	18.50	18.50	19.20*	20.30*	21.40	23.25	26.75	28.60	28.65	28.35	28.00	27.70	27.50	XI
ZBCGJE		14.46	16.28	17.73	18.33	18.42	19.01	20.09	21.24	23.01	26.45	28.30	28.34	28.07	27.69	27.43	27.16	XI
ZMZFC3		14.29	16.02	17.41	18.25	18.36	18.99	20.01	21.19	22.95	26.38	28.39	28.55	28.18	27.98	27.69	27.30	AJ

Summary Statistics

	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700
Grand Means	14.36	16.05	17.56	18.23	18.29	18.92	20.04	21.18	22.98	26.47	28.42	28.50	28.17	27.89	27.60	27.31
SD Btwn Labs	0.29	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.16	0.17	0.17	0.17	0.17	0.19	0.18	0.23

623RHB (X) - Low % reflectance data for most wavelengths. Large replication difference for almost all wavelengths.

674LTY (X) - High % reflectance data at all wavelengths.

9UUF42 (X) - Low % reflectance data for almost all wavelengths.

E2AWBQ (X) - High % reflectance data for almost all wavelengths.

Key to Instrument Codes Reported by Participants

AB Datacolor 100
AH Datacolor 550
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
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
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
XH X-Rite Color i5 Benchtop Spectrophotometer
XI X-Rite Color i7 Benchtop Spectrophotometer
XM X-Rite SP62 Sphere Spectrophotometer
XO X-Rite SP64 Sphere Spectrophotometer
XR X-Rite
XX Instrument make/model not specified by lab

WebCode	Data Flag	Sample E221 Lab Mean	Sample E221 Diff from Grand Mean	Sample E221 CPV	Sample E222 Lab Mean	Sample E222 Diff from Grand Mean	Sample E222 CPV	Instr Code
2ARYY6		27.51	-0.09	-0.14	38.24	0.05	0.06	GL
2GQTL7		28.00	0.39	0.61	38.33	0.13	0.16	GN
2UFJWA		27.29	-0.31	-0.48	38.50	0.30	0.36	GL
3AJNAC		28.55	0.94	1.45	38.83	0.63	0.75	RA
3EEFH9		27.18	-0.43	-0.66	37.93	-0.27	-0.32	GK
3R9KZ8	X	30.35	2.74	4.21	30.25	-7.94	-9.49	RQ
623RHB		27.20	-0.41	-0.62	37.43	-0.77	-0.92	GK
6623DB		26.30	-1.31	-2.00	36.75	-1.44	-1.73	GL
6DFPNZ		27.25	-0.36	-0.55	37.90	-0.29	-0.35	PA
89Y7H3		27.43	-0.18	-0.28	38.20	0.01	0.01	GN
8RPG62		27.68	0.07	0.11	38.10	-0.09	-0.11	GN
8ZMX68		28.03	0.42	0.64	37.95	-0.24	-0.29	GN
933YCY		27.95	0.34	0.53	38.88	0.68	0.81	GN
9UUF42		27.83	0.22	0.34	38.73	0.53	0.63	GN
A3X2GU		27.60	-0.01	-0.01	37.90	-0.29	-0.35	GL
ANH2MN		26.93	-0.68	-1.04	37.68	-0.52	-0.62	GK
AU8FBV		27.73	0.12	0.18	39.03	0.83	0.99	GK
C8677Y		27.35	-0.26	-0.39	37.45	-0.74	-0.89	GL
CF3RHR		27.65	0.04	0.07	37.95	-0.24	-0.29	GL
D9FBG3		27.85	0.24	0.38	38.73	0.53	0.63	GK
DXEWLV		26.95	-0.66	-1.01	36.88	-1.32	-1.58	GL
E8FMH4		26.43	-1.18	-1.81	36.65	-1.54	-1.84	EN
E8WWCP		28.13	0.52	0.80	38.93	0.73	0.87	GL
EAKHYK		28.20	0.59	0.91	38.90	0.71	0.84	GL
EK6PVP		27.18	-0.43	-0.66	37.83	-0.37	-0.44	GK
G63W3J		26.90	-0.71	-1.08	36.95	-1.24	-1.49	GL
G8VJ6M		27.78	0.17	0.26	38.65	0.46	0.54	GL
GA3YHK		26.40	-1.21	-1.85	36.95	-1.24	-1.49	GL
GNHXML		27.75	0.14	0.22	39.10	0.91	1.08	GL
HAQ29T		28.38	0.77	1.18	38.43	0.23	0.28	GL

Interlaboratory Testing Program for Color & Appearance

Analysis 440

60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample E221 Lab Mean	Sample E221 Diff from Grand Mean	Sample E221 CPV	Sample E222 Lab Mean	Sample E222 Diff from Grand Mean	Sample E222 CPV	Instr Code
KLZ8MR		28.20	0.59	0.91	38.70	0.51	0.60	GL
KQWXRH		27.43	-0.18	-0.28	37.23	-0.97	-1.16	GD
L9AQ9Q		26.98	-0.63	-0.97	37.75	-0.44	-0.53	GL
LMLKGU		26.63	-0.98	-1.51	36.43	-1.77	-2.11	GT
MDCHQM		27.33	-0.28	-0.43	37.78	-0.42	-0.50	GK
MFMARG		27.23	-0.38	-0.58	38.65	0.46	0.54	GK
ML7KVJ		26.80	-0.81	-1.24	37.43	-0.77	-0.92	GL
MNUYJU		27.34	-0.27	-0.41	37.98	-0.22	-0.26	GL
MUYV3U		27.68	0.07	0.11	38.08	-0.12	-0.14	GK
N7TBRV		26.57	-1.04	-1.59	36.88	-1.31	-1.57	GL
PMXZKL		27.03	-0.58	-0.89	37.88	-0.32	-0.38	GK
PPGENL	X	29.10	1.49	2.29	37.58	-0.62	-0.74	MW
PTMN6J		27.63	0.02	0.03	38.05	-0.14	-0.17	GL
QCHJFL		28.23	0.62	0.95	38.85	0.66	0.78	GL
RA2V6K		28.38	0.77	1.18	39.63	1.43	1.71	GL
RMWV9A		27.20	-0.41	-0.62	37.78	-0.42	-0.50	ZA
RU7JKM		28.88	1.27	1.95	39.80	1.61	1.92	GL
RVP7GK		28.08	0.47	0.72	39.38	1.18	1.41	GK
RYHJQM		27.60	-0.01	-0.01	37.20	-0.99	-1.19	GL
TDW23M		26.15	-1.46	-2.23	37.03	-1.17	-1.40	GK
TU7T38		27.60	-0.01	-0.01	38.60	0.41	0.49	GL
TWTHDC		28.95	1.34	2.06	39.98	1.78	2.13	GL
TZTU9C		28.63	1.02	1.57	39.00	0.81	0.96	GD
U2XQ8L		27.08	-0.53	-0.81	37.60	-0.59	-0.71	GL
U7XRDA		27.35	-0.26	-0.39	37.78	-0.42	-0.50	GK
UGA7AG		27.83	0.22	0.34	38.15	-0.04	-0.05	GK
UPPVYG		27.63	0.02	0.03	38.40	0.21	0.25	GL
UTP8UG		28.80	1.19	1.83	40.23	2.03	2.43	GL
V2GTFL	X	29.03	1.42	2.18	29.73	-8.47	-10.12	GL
VH6ZXD	X	28.53	0.92	1.41	33.88	-4.32	-5.16	MW

Interlaboratory Testing Program for Color & Appearance

Report #199
1st Qtr 2022

Analysis 440

60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample E221 Lab Mean	Sample E221 Diff from Grand Mean	Sample E221 CPV	Sample E222 Lab Mean	Sample E222 Diff from Grand Mean	Sample E222 CPV	Instr Code
VMHX3E	X	29.68	2.07	3.18	31.90	-6.29	-7.52	GK
X8VLEA		28.58	0.97	1.49	39.05	0.86	1.02	GL
XDME2C	X	29.25	1.64	2.53	38.25	0.06	0.07	RA
XK2CGH	X	29.55	1.94	2.99	28.28	-9.92	-11.85	GL
XPEGTH		28.00	0.39	0.61	39.13	0.93	1.11	GK
XPUEM4		27.50	-0.11	-0.16	37.78	-0.42	-0.50	GL
YMKWR6		28.15	0.54	0.84	38.60	0.41	0.49	GK
YWVYD6		28.30	0.69	1.07	38.98	0.78	0.93	GN
ZB9U78		27.50	-0.11	-0.16	38.13	-0.07	-0.08	GL
ZMZFC3		28.60	0.99	1.53	38.68	0.48	0.57	NH

Summary Statistics

Grand Means

27.61 Gloss Units — 38.19 Gloss Units

Stnd Dev Btwn Labs

0.65 Gloss Units — 0.84 Gloss Units

Statistics based on 63 of 70 reporting participants

Comments on Assigned Data Flags for Test #440

3R9KZ8(X) - Extreme data.

PPGENL(X) - Inconsistent in testing between samples. Inconsistent within the determinations for Sample E222.

V2GTFL(X) - Extreme data.

VH6ZXD(X) - Inconsistent in testing between samples. Low data for Sample E222. Inconsistent within the determinations for Sample E222.

VMHX3E(X) - Extreme data.

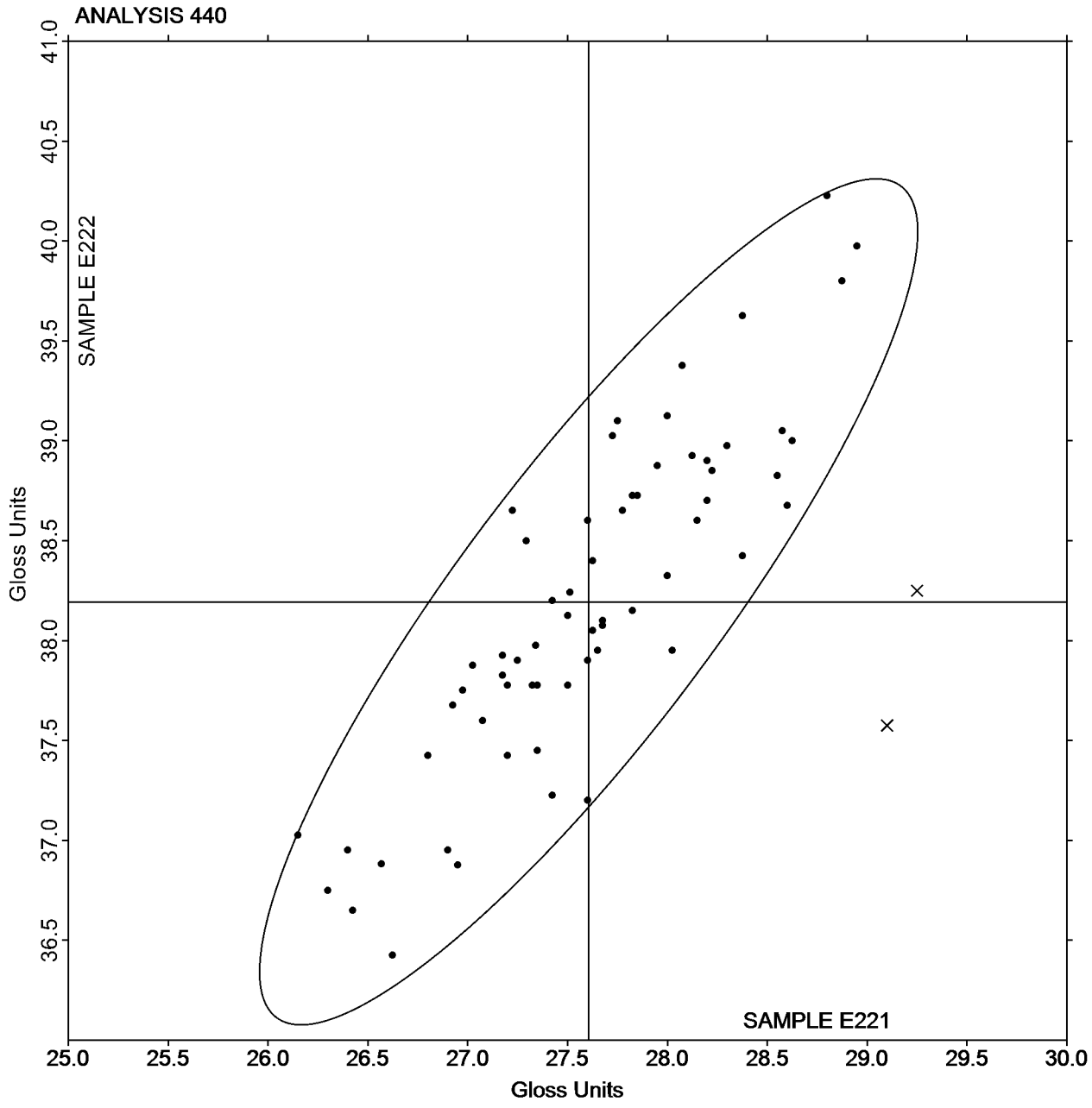
XDME2C(X) - Inconsistent in testing between samples. Inconsistent within the determinations for Sample E221.

XK2CGH(X) - Extreme data.

Key to Instrument Codes Reported by Participants

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	GT	Gardco Novo-Gloss (20/60/85)
MW	Minolta Multi-Gloss 268	NH	3nh NHG268 Multi-angle Precise Gloss Meter
PA	Photovolt micto-TRI-gloss G3	RA	Rhopoint Novo-Gloss Glossmeter
RQ	Rhopoint IQ Goniophotometer 20/60/85°	ZA	Zehntner ZGM Series

SAMPLE E221 = 27.61 Gloss Units SAMPLE E222 = 38.19 Gloss Units



-End of Report-