Collaborative Testing Services, Inc.

Color & Appearance Testing Program

Summary Report #192 - 2nd Qtr 2020

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
28AGU7		B201	37.85	7.15	-6.50	0.80	0.15	-0.75	1.11	HW
		B202	38.65	7.30	-7.25					
2MMMCW		B201	36.83	7.07	-7.01	0.95	0.04	-0.59	1.12	BG
		B202	37.78	7.11	-7.59					
3DCMA9		B201	37.73	7.08	-6.61	0.82	0.16	-0.76	1.14	HW
		B202	38.55	7.23	-7.38					
4UVZYK		B201	37.52	6.95	-6.63	0.80	0.15	-0.74	1.10	MF
		B202	38.31	7.10	-7.37					
6JVMMQ		B201	37.56	7.28	-6.47	0.80	0.09	-0.75	1.10	GE
		B202	38.36	7.37	-7.22					
7ALMK3		B201	37.42	7.07	-6.47	0.95	0.11	-0.80	1.25	HK
		B202	38.37	7.18	-7.27					
7XA8LB		B201	37.84	7.27	-6.54	0.88	0.12	-0.63	1.08	HW
		B202	38.72	7.38	-7.16					
8P9JY3		B201	37.28	7.25	-6.63	0.94	0.15	-0.73	1.20	HX
		B202	38.22	7.40	-7.36					
9VWGAC	X	B201	37.36	8.56	-6.75	0.80	0.24	-0.65	1.06	XU
		B202	38.17	8.80	-7.40					
A3PCKF		B201	37.46	7.16	-6.42	0.80	0.10	-0.75	1.10	HW
		B202	38.27	7.26	-7.16					
AVN6WZ		B201	37.57	7.17	-6.37	0.79	0.11	-0.68	1.05	GE
		B202	38.36	7.28	-7.05					
CXRAV7	X	B201	36.98	7.27	-5.97	0.81	0.09	-0.67	1.06	MP
		B202	37.79	7.36	-6.64					
CYLZ2K		B201	37.53	7.16	-6.23	0.83	0.03	-0.69	1.08	GA
		B202	38.36	7.19	-6.91					
DGDKVB		B201	38.24	7.07	-6.84	0.92	0.07	-0.72	1.17	MU
		B202	39.16	7.15	-7.56					
DMZBH7		B201	37.01	7.30	-6.87	0.60	0.06	-0.57	0.83	XM
		B202	37.62	7.36	-7.44					
ELNYD9		B201	37.48	7.03	-6.43	0.84	0.17	-0.72	1.12	XU
		B202	38.32	7.20	-7.16					

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
ENBMP9		B201	36.62	7.05	-6.84	0.83	0.15	-0.77	1.15	BG
		B202	37.46	7.20	-7.61					
JDEZV8		B201	37.58	7.11	-6.57	0.86	0.17	-0.76	1.17	XN
		B202	38.44	7.28	-7.34					
K3C44P		B201	37.54	7.03	-6.45	0.83	0.14	-0.72	1.10	XO
		B202	38.37	7.17	-7.17					
K4M67B		B201	37.55	7.15	-6.35	0.82	0.09	-0.73	1.10	GE
		B202	38.37	7.23	-7.08					
K6W7UV		B201	37.64	7.23	-6.46	0.96	0.16	-0.72	1.21	MG
		B202	38.60	7.39	-7.18					
KLRCLD		B201	37.32	7.10	-6.93	0.92	0.15	-0.74	1.19	TO
		B202	38.24	7.25	-7.67					
LEZQMP		B201	36.84	7.05	-7.00	0.79	0.09	-0.63	1.01	BG
		B202	37.62	7.15	-7.63					
LUFMBY		B201	37.63	7.33	-6.39	0.75	0.11	-0.67	1.01	HW
		B202	38.38	7.44	-7.06					
M984D2	X	B201	-28.67	8.71	-6.97	0.75	0.17	-0.68	1.02	GE
		B202	-27.93	8.87	-7.65					
MJPK69		B201	37.09	6.96	-6.44	0.88	0.09	-0.76	1.17	XX
		B202	37.97	7.05	-7.20					
MPGWYJ		B201	37.53	7.09	-6.48	0.87	0.16	-0.81	1.20	XS
		B202	38.40	7.24	-7.30					
NFNYTV		B201	37.61	7.07	-6.60	0.79	0.19	-0.72	1.08	XO
		B202	38.40	7.25	-7.31					
NTXC9B		B201	37.02	7.22	-6.64	0.90	0.16	-0.77	1.19	HY
		B202	37.92	7.37	-7.41					
PU7WQJ		B201	37.46	7.23	-6.31	0.91	0.11	-0.76	1.19	GE
		B202	38.37	7.33	-7.07					
PWNBUK		B201	37.59	7.14	-6.43	0.82	0.11	-0.68	1.07	HW
		B202	38.42	7.25	-7.11					
RVQFQ9		B201	37.32	7.04	-6.53	0.81	0.02	-0.67	1.06	XU
		B202	38.13	7.06	-7.20					

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
RWZK4W		B201	37.44	6.99	-6.68	0.99	0.07	-0.75	1.24	XZ
		B202	38.43	7.06	-7.43					
U3F2CN	X	B201	37.41	8.80	-6.50	0.88	0.21	-0.76	1.18	HW
		B202	38.29	9.01	-7.26					
U6MAVG		B201	37.57	7.11	-6.51	0.86	0.16	-0.74	1.14	XX
		B202	38.42	7.27	-7.25					
VLBUWM		B201	37.40	7.12	-6.49	0.82	0.09	-0.72	1.10	XU
		B202	38.23	7.22	-7.21					
W46YUF		B201	37.47	7.36	-6.50	0.89	0.11	-0.72	1.16	HW
		B202	38.36	7.47	-7.23					
WCFCVJ		B201	37.60	7.08	-6.27	0.84	0.11	-0.79	1.16	GH
		B202	38.44	7.19	-7.06					
XFYQWY		B201	37.55	7.22	-6.47	0.88	0.00	-0.67	1.11	HW
		B202	38.43	7.23	-7.14					
XJULDC		B201	37.76	7.20	-6.48	0.85	0.19	-0.74	1.14	HW
		B202	38.61	7.40	-7.21					
Y6AGPG		B201	37.54	7.17	-6.58	0.84	0.09	-0.75	1.13	XU
		B202	38.38	7.26	-7.33					
YV78JQ		B201	37.49	7.00	-6.48	0.86	0.16	-0.76	1.16	XU
		B202	38.34	7.15	-7.25					
ZVYE4F		B201	37.69	6.95	-6.62	0.84	0.08	-0.68	1.09	NH
		B202	38.53	7.03	-7.30					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
B201	37.46	7.13	-6.56	0.85	0.11	-0.72	1.12
B202	38.31	7.24	-7.28				
Stnd Dev Btwn Labs							
B201	0.29	0.11	0.19	0.07	0.05	0.05	0.07
B202	0.30	0.11	0.18				

Statistics based on 39 of 43 reporting participants

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Comments Assigned on Data Flags for Test #408

9VWGAC(X) - Extreme data for "a*" values.
CXRAV7(X) - High data for "b*" values.
M984D2(X) - Extreme data for "L*" and "a*" values.
U3F2CN(X) - Extreme data for "a*" values.

Key to Instrument Codes Reported by Participants

BG	BYK Mac i	GA	BYK-Gardner
GE	BYK-Gardner spectro-guide (45/0)	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
MF	Minolta FD Series	MG	Macbeth 1500/PLUS or 2025+ Color Eye
MP	Minolta CM-2500c Spectrophotometer	MU	Minolta
NH	3nh Precision Colorimeter	TO	Topcon SR-3 Spectroradiometer
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	XX	Instrument make/model not specified by lab
XZ	X-Rite		

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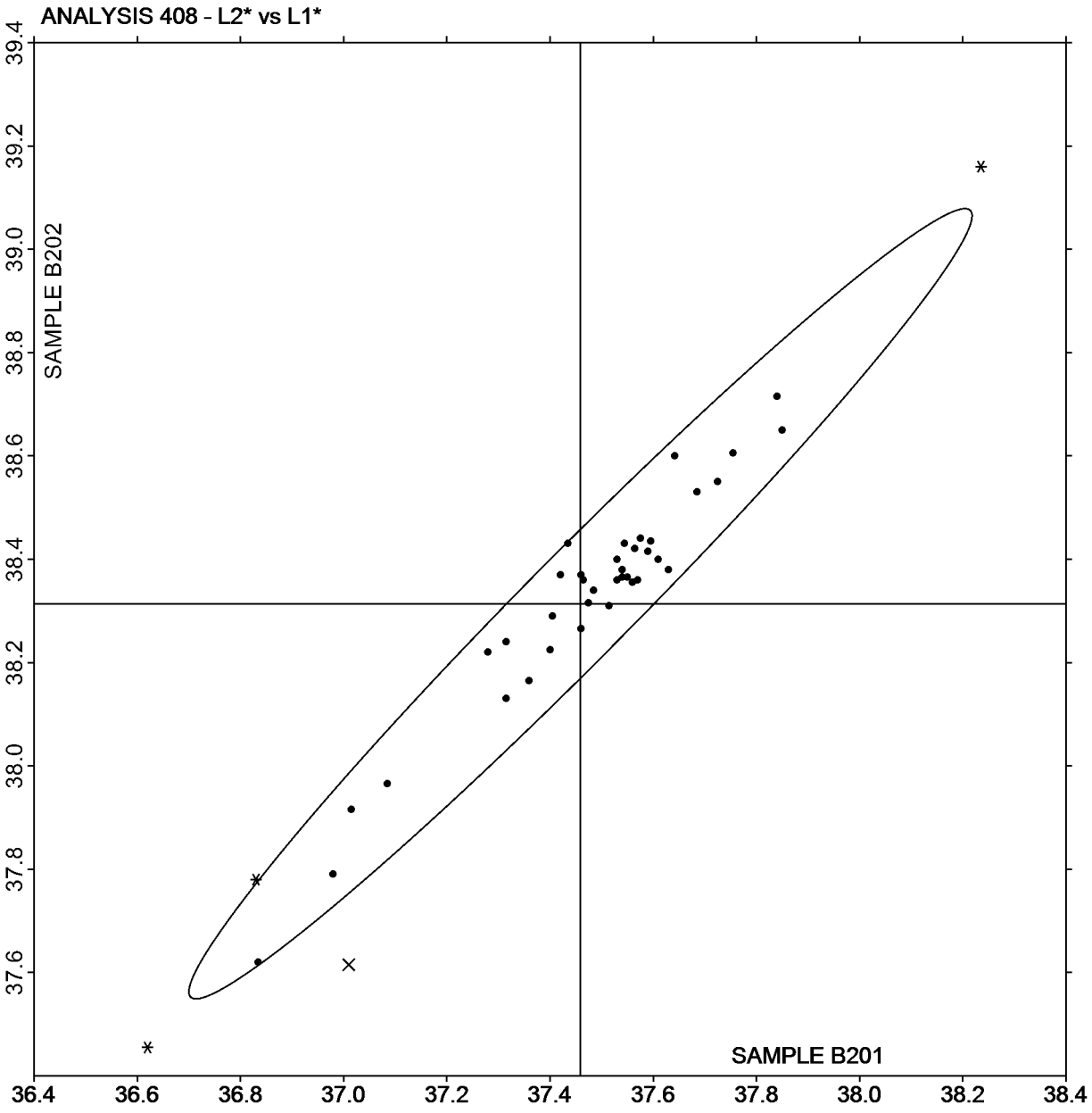
L2* vs L1*

SAMPLE B201 = 37.46 SAMPLE B202 = 38.31



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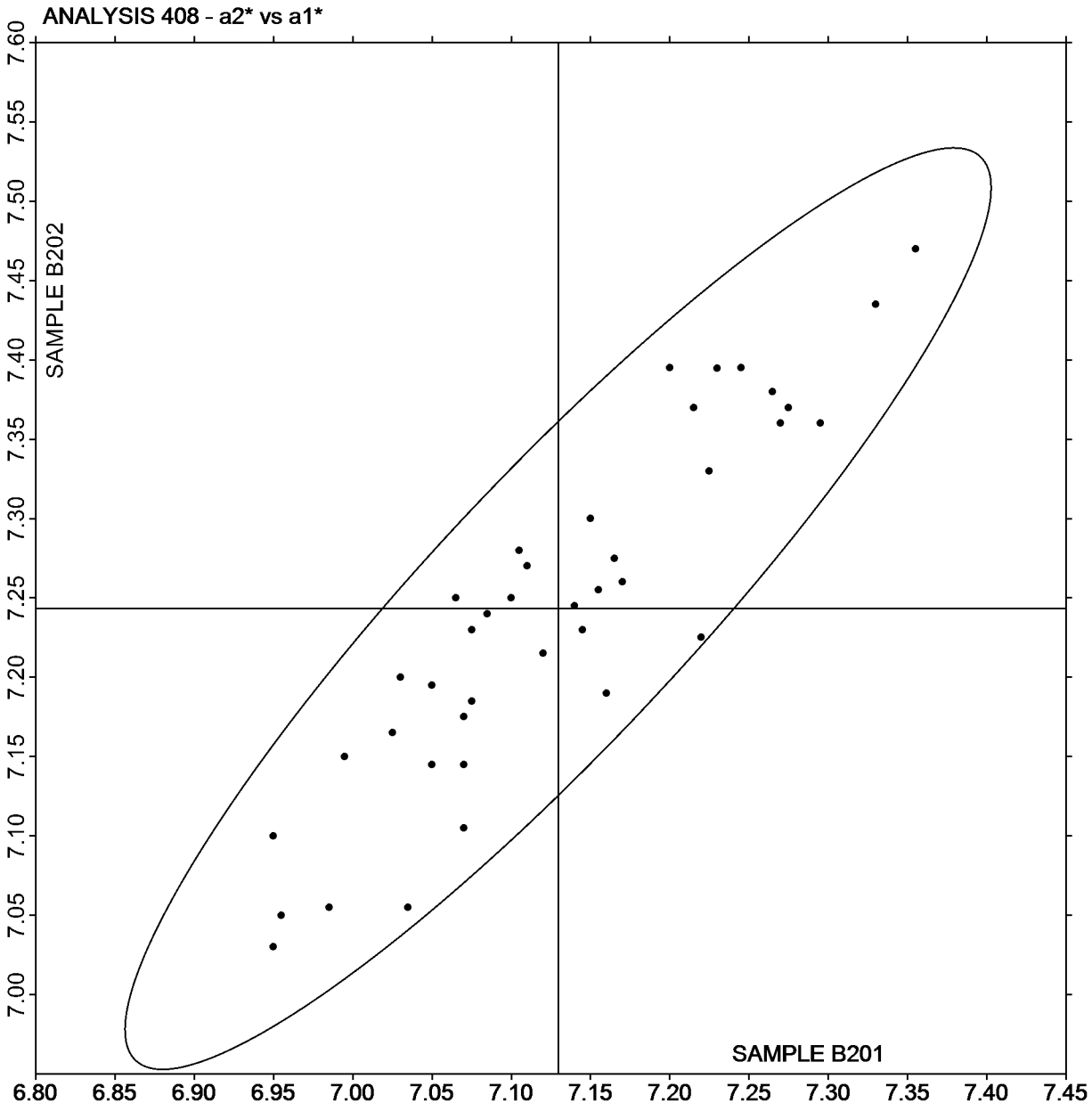
a2* vs a1*

SAMPLE B201 = 7.13 SAMPLE B202 = 7.24



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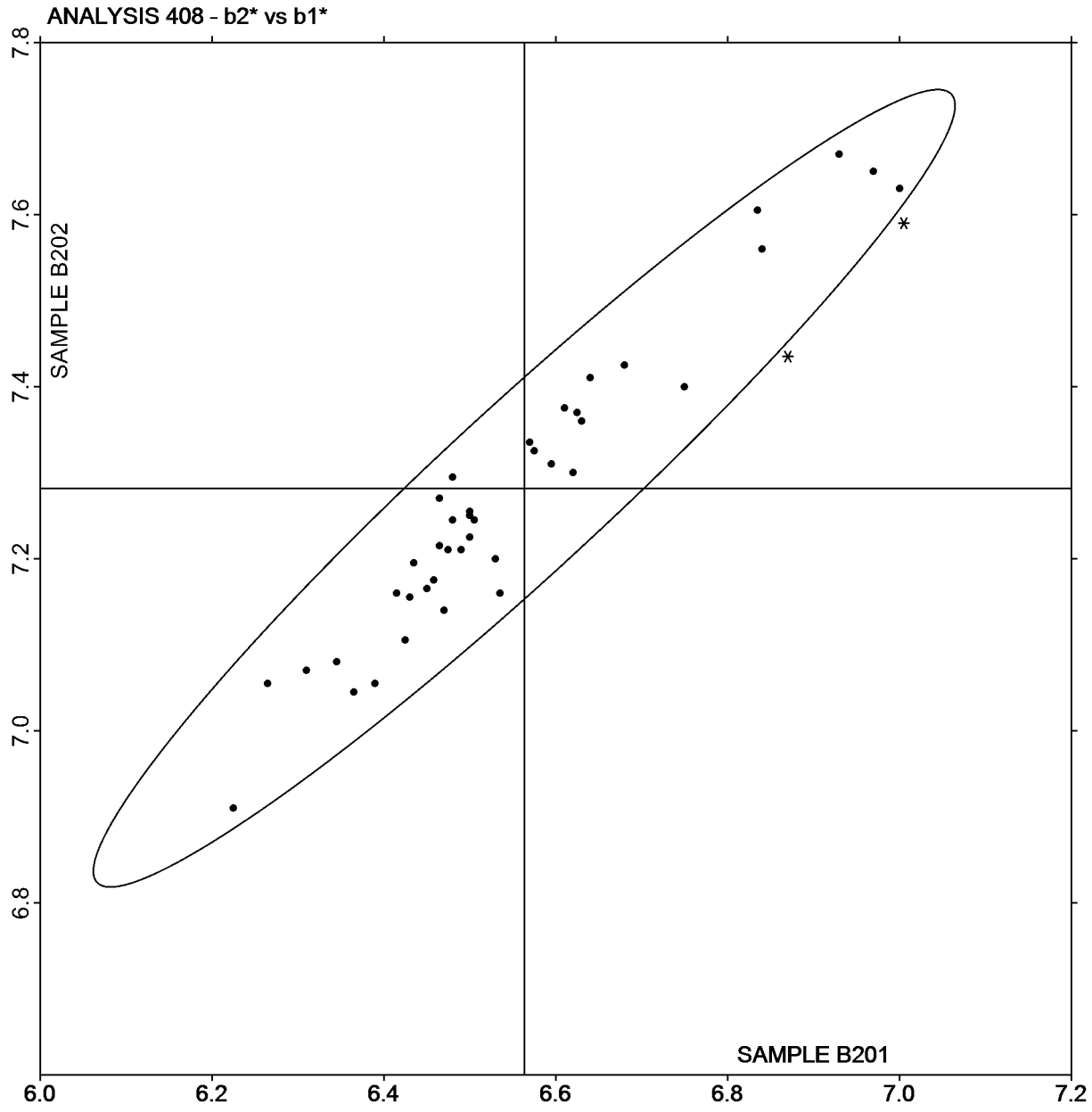
b2* vs b1*

SAMPLE B201 = -6.56 SAMPLE B202 = -7.28



Plot created using absolute values.

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
22H7K8		B201	37.94	7.05	-6.69	0.86	0.07	-0.62	1.06	XM
		B202	38.80	7.12	-7.31					
268DBV		B201	38.23	7.03	-6.78	0.94	0.06	-0.74	1.20	AO
		B202	39.18	7.09	-7.52					
2QJF2K		B201	38.20	7.00	-6.86	0.85	0.06	-0.60	1.05	XB
		B202	39.05	7.06	-7.47					
2VDB28		B201	38.33	6.94	-6.72	0.78	0.16	-0.67	1.04	AH
		B202	39.11	7.10	-7.39					
39ZU2V		B201	38.38	7.04	-6.86	0.91	0.07	-0.71	1.16	CA
		B202	39.29	7.11	-7.57					
3YCY2E		B201	38.39	6.92	-6.79	0.87	0.13	-0.74	1.15	AO
		B202	39.26	7.05	-7.53					
46CMB7		B201	38.12	6.89	-6.77	0.88	0.15	-0.72	1.15	MM
		B202	39.00	7.03	-7.49					
48349L		B201	38.28	6.96	-6.83	0.76	0.17	-0.66	1.02	AS
		B202	39.04	7.13	-7.49					
4DPUUG		B201	38.29	6.87	-6.83	0.82	0.09	-0.59	1.01	XB
		B202	39.11	6.97	-7.42					
4FD7UL		B201	38.34	6.96	-6.79	0.78	0.10	-0.61	1.00	XI
		B202	39.12	7.06	-7.40					
4WZJ8E		B201	38.51	6.92	-6.77	0.91	0.08	-0.65	1.12	CA
		B202	39.41	7.00	-7.42					
6XF6GF		B201	38.11	6.82	-6.70	0.83	0.08	-0.63	1.04	XI
		B202	38.94	6.90	-7.33					
7C8JRU		B201	38.05	7.03	-6.91	0.99	0.09	-0.72	1.23	AJ
		B202	39.04	7.12	-7.63					
8LQDJG		B201	38.17	7.00	-6.83	0.80	0.16	-0.66	1.05	MK
		B202	38.97	7.16	-7.49					
8M6NFZ		B201	37.91	6.96	-6.96	0.93	0.09	-0.72	1.18	HP
		B202	38.84	7.05	-7.68					
8U2E6G		B201	38.24	6.98	-7.00	0.87	0.16	-0.67	1.10	AO
		B202	39.11	7.15	-7.66					

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
8WN3GG		B201	38.15	6.92	-6.83	0.86	0.12	-0.69	1.11	MM
		B202	39.01	7.04	-7.52					
9G9JY2		B201	38.26	6.97	-6.80	0.87	0.15	-0.76	1.16	MM
		B202	39.12	7.12	-7.56					
9HPGRZ		B201	38.33	6.95	-6.72	0.96	0.10	-0.70	1.19	XH
		B202	39.29	7.05	-7.42					
9RW7DC		B201	38.06	6.98	-6.75	0.87	0.04	-0.58	1.05	XO
		B202	38.93	7.02	-7.33					
A6G99A		B201	38.16	7.00	-6.94	0.77	0.05	-0.52	0.93	XH
		B202	38.93	7.06	-7.46					
AVN6WZ		B201	38.19	7.05	-6.69	0.88	0.13	-0.72	1.15	MM
		B202	39.07	7.18	-7.41					
AYCCMN		B201	38.44	6.91	-6.83	0.89	0.10	-0.69	1.13	MM
		B202	39.33	7.01	-7.52					
AYQXWP		B201	38.10	6.95	-6.85	0.95	0.05	-0.66	1.16	AQ
		B202	39.05	7.00	-7.51					
B7NRNW		B201	37.79	7.05	-6.79	0.94	0.08	-0.72	1.18	CA
		B202	38.73	7.13	-7.51					
BKA3JE		B201	38.26	6.99	-6.82	0.84	0.08	-0.61	1.04	AJ
		B202	39.10	7.07	-7.43					
BNM3F7	X	B201	38.86	6.86	-7.05	0.80	0.07	-0.59	0.99	HH
		B202	39.66	6.93	-7.63					
CCA3JC		B201	38.19	6.86	-6.72	0.80	0.18	-0.72	1.09	XB
		B202	38.99	7.05	-7.44					
CEWQVC		B201	38.22	6.93	-6.70	0.87	0.13	-0.70	1.12	AJ
		B202	39.09	7.06	-7.40					
CTUTHC		B201	38.31	6.97	-6.94	0.80	0.08	-0.61	1.01	AJ
		B202	39.11	7.06	-7.55					
CXRAV7		B201	38.09	6.93	-6.83	0.85	0.08	-0.68	1.10	XB
		B202	38.94	7.02	-7.51					
CYLZ2K		B201	38.19	7.07	-6.63	0.84	0.01	-0.69	1.09	AJ
		B202	39.04	7.09	-7.32					

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
DMZBH7		B201	38.22	6.93	-6.79	0.77	0.05	-0.51	0.93	XQ
		B202	38.99	6.98	-7.30					
DWBD37		B201	38.11	7.00	-6.98	0.83	0.04	-0.55	1.00	MW
		B202	38.94	7.05	-7.54					
E3BCQ2		B201	38.20	6.97	-6.69	0.92	0.18	-0.80	1.24	AS
		B202	39.12	7.15	-7.49					
ELNYD9		B201	38.25	6.75	-6.61	0.88	0.15	-0.71	1.14	XI
		B202	39.13	6.90	-7.32					
FEZK49		B201	38.11	7.02	-6.82	0.87	0.15	-0.72	1.14	XB
		B202	38.98	7.16	-7.54					
FGN8HG		B201	38.17	7.03	-6.79	0.93	0.09	-0.72	1.18	MU
		B202	39.09	7.12	-7.51					
FLH2G4		B201	38.18	6.98	-6.65	0.91	0.08	-0.70	1.15	MM
		B202	39.09	7.05	-7.36					
FR7NCA		B201	38.05	7.00	-6.72	0.77	0.12	-0.61	0.99	XH
		B202	38.81	7.12	-7.33					
G7L7HH		B201	38.23	6.92	-6.81	0.76	0.12	-0.63	1.00	XI
		B202	38.99	7.03	-7.45					
GHERQY		B201	38.25	6.91	-6.83	0.91	0.13	-0.70	1.16	XI
		B202	39.16	7.04	-7.53					
GHVQYP		B201	38.08	7.10	-6.87	0.92	0.04	-0.73	1.18	AS
		B202	39.01	7.14	-7.60					
GK7ND8		B201	38.02	6.92	-6.71	0.86	0.16	-0.70	1.12	XH
		B202	38.88	7.08	-7.40					
GPXVVF		B201	37.98	7.05	-6.79	0.93	0.08	-0.72	1.18	MV
		B202	38.91	7.13	-7.51					
GQ9XJZ		B201	38.32	6.94	-6.85	0.88	0.12	-0.63	1.09	AJ
		B202	39.20	7.06	-7.48					
GV3RG2		B201	38.32	6.79	-6.79	0.70	0.08	-0.51	0.86	XI
		B202	39.01	6.87	-7.30					
HWC4WG		B201	38.15	6.98	-6.74	0.96	0.08	-0.68	1.18	MM
		B202	39.10	7.06	-7.42					

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
J6HA46		B201	38.11	6.99	-6.82	0.98	0.10	-0.67	1.19	MT
		B202	39.09	7.09	-7.49					
JDEZV8		B201	38.01	6.94	-6.81	0.88	0.15	-0.78	1.19	XO
		B202	38.90	7.10	-7.58					
K4M67B	X	B201	38.07	6.55	-6.81	0.85	0.12	-0.71	1.11	GD
		B202	38.93	6.67	-7.51					
KE3232		B201	38.16	7.07	-6.84	0.95	0.07	-0.72	1.19	AJ
		B202	39.11	7.15	-7.55					
KLRCLD	X	B201	37.66	6.98	-6.91	0.85	0.16	-0.72	1.13	CA
		B202	38.51	7.14	-7.63					
LMUUWD		B201	38.15	6.93	-6.62	0.92	0.08	-0.74	1.18	XB
		B202	39.07	7.01	-7.36					
LQTCTK		B201	37.85	7.17	-6.71	0.98	0.03	-0.69	1.20	XH
		B202	38.82	7.20	-7.41					
MJPK69	X	B201	37.64	6.90	-6.47	0.98	0.06	-0.71	1.21	GE
		B202	38.61	6.95	-7.18					
MPGWYJ		B201	38.07	6.98	-6.62	0.90	0.15	-0.76	1.19	AJ
		B202	38.98	7.13	-7.38					
MTDCRZ		B201	38.13	6.93	-6.86	0.96	0.08	-0.69	1.19	AJ
		B202	39.09	7.01	-7.55					
NDEVWY		B201	38.15	6.97	-6.72	0.91	0.12	-0.71	1.15	AS
		B202	39.06	7.09	-7.43					
NFNYTV		B201	38.30	7.09	-6.87	0.90	0.13	-0.67	1.13	MI
		B202	39.20	7.22	-7.54					
P284DZ		B201	38.17	6.94	-6.92	0.85	0.11	-0.64	1.07	XB
		B202	39.02	7.05	-7.56					
P94VLT		B201	38.06	6.90	-6.79	0.92	0.07	-0.66	1.13	XI
		B202	38.98	6.97	-7.45					
QLNXGQ		B201	38.15	6.81	-6.76	0.87	0.06	-0.64	1.08	XI
		B202	39.02	6.87	-7.40					
QV8D2K		B201	38.24	6.99	-6.78	0.91	0.13	-0.72	1.17	AR
		B202	39.15	7.12	-7.50					

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
RDNXHN		B201	37.88	6.99	-6.80	0.80	0.12	-0.59	1.01	XH
		B202	38.68	7.11	-7.40					
T6A9GV		B201	38.13	7.00	-6.67	0.94	0.06	-0.71	1.18	MM
		B202	39.07	7.06	-7.38					
TE2RV4		B201	38.09	6.87	-6.84	0.82	0.11	-0.66	1.06	AM
		B202	38.91	6.98	-7.50					
TK7ME4		B201	38.00	6.99	-6.55	0.89	0.06	-0.70	1.13	XM
		B202	38.89	7.06	-7.25					
TQRPET		B201	38.02	6.89	-6.68	0.92	0.11	-0.73	1.18	XI
		B202	38.94	7.01	-7.41					
TVMAQP		B201	38.23	6.97	-6.80	0.89	0.16	-0.70	1.14	AJ
		B202	39.12	7.13	-7.50					
U2RFXF		B201	38.25	7.00	-6.90	0.79	0.13	-0.63	1.03	AS
		B202	39.04	7.13	-7.53					
U8TRTC		B201	38.02	6.95	-6.53	0.88	0.09	-0.73	1.15	XH
		B202	38.90	7.04	-7.26					
UDKU44		B201	38.18	7.05	-6.78	0.94	0.06	-0.71	1.18	AS
		B202	39.12	7.11	-7.49					
UGYR97		B201	38.14	7.01	-6.76	0.94	0.12	-0.77	1.22	AJ
		B202	39.08	7.13	-7.53					
VM6K32		B201	38.04	6.99	-6.52	0.86	0.00	-0.63	1.06	XO
		B202	38.90	6.99	-7.14					
VXMAVE		B201	38.12	6.92	-6.67	0.80	0.13	-0.68	1.06	XI
		B202	38.92	7.05	-7.35					
VYWAZL		B201	38.03	7.01	-6.82	0.83	0.07	-0.65	1.05	AD
		B202	38.86	7.08	-7.47					
W8AH2N		B201	38.04	6.88	-6.58	0.88	0.12	-1.03	1.36	XM
		B202	38.93	7.00	-7.61					
WCFCVJ		B201	38.27	7.09	-6.68	0.93	0.08	-0.70	1.16	MV
		B202	39.20	7.17	-7.38					
WH6WYY	X	B201	38.05	7.06	-6.79	1.45	0.06	-0.72	1.62	MV
		B202	39.50	7.12	-7.51					

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
WMYQWZ		B201	38.09	6.88	-6.77	0.89	0.03	-0.68	1.12	XI
		B202	38.98	6.91	-7.45					
WRWAZK		B201	38.19	6.98	-6.90	0.80	0.10	-0.60	1.01	XZ
		B202	38.99	7.08	-7.49					
WUFBXR		B201	38.26	6.97	-6.95	0.80	0.13	-0.73	1.09	AQ
		B202	39.06	7.10	-7.68					
WVVLWK		B201	38.21	6.99	-6.80	0.82	0.10	-0.63	1.04	AS
		B202	39.03	7.09	-7.43					
X8J8FK		B201	38.06	7.00	-6.65	0.84	0.07	-0.68	1.09	XI
		B202	38.91	7.06	-7.33					
XMUXAC		B201	38.13	6.92	-6.64	0.88	0.13	-0.73	1.15	MV
		B202	39.00	7.05	-7.38					
XQFD9K		B201	38.38	6.91	-6.77	0.82	0.10	-0.66	1.06	AO
		B202	39.21	7.00	-7.42					
Y6AGPG		B201	38.20	6.96	-6.78	0.91	0.08	-0.72	1.16	XI
		B202	39.10	7.04	-7.49					
YLGFWY		B201	38.17	6.93	-6.82	0.95	0.06	-0.67	1.17	MM
		B202	39.12	7.00	-7.50					
YV78JQ		B201	37.94	6.99	-6.87	0.95	0.12	-0.73	1.21	XI
		B202	38.89	7.11	-7.60					
YZZ49H		B201	38.12	6.85	-6.70	0.86	0.19	-0.75	1.15	XI
		B202	38.97	7.04	-7.45					
ZLYRCJ		B201	38.17	6.97	-6.73	0.87	0.17	-0.73	1.15	AS
		B202	39.04	7.15	-7.46					
ZWENAA		B201	37.93	7.08	-6.95	0.89	0.14	-0.69	1.13	CA
		B202	38.81	7.22	-7.64					

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Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
B201	38.15	6.96	-6.78	0.87	0.10	-0.68	1.12
B202	39.03	7.06	-7.46				
Stnd Dev Btwn Labs							
B201	0.13	0.07	0.11	0.06	0.04	0.07	0.08
B202	0.13	0.07	0.10				

Statistics based on 88 of 93 reporting participants

Comments Assigned on Data Flags for Test #409

BNM3F7(X) - Very high "L*" values.

K4M67B(X) - Very low "a*" values.

KLRCLD(X) - Low "L*" values.

MJPK69(X) - Low "L*" values.

WH6WYY(X) - High "L*" values for Sample B202. Large replication difference for "L*" values for Sample B202. Large Delta L & Delta E.

Key to Instrument Codes Reported by Participants

AD	Datacolor 100	AH	ACS-DataColor 550
AJ	ACS-Datacolor 600	AM	ACS-Datacolor 600 Plus
AO	ACS-Datacolor 650X	AQ	ACS-Datacolor 600X
AR	Datacolor 400	AS	ACS-Datacolor 800 Series
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 i 5
MK	Macbeth Color-Eye 7000	MM	Macbeth Color-Eye 7000a
MT	Minolta CM-2600d	MU	Minolta
MV	Minolta CM-3000d Series Spectrophotometer	MW	Minolta Benchtop Spectrophotometer CM-3600A
XB	X-Rite Ci7000 Series Benchtop 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
XZ	X-Rite		

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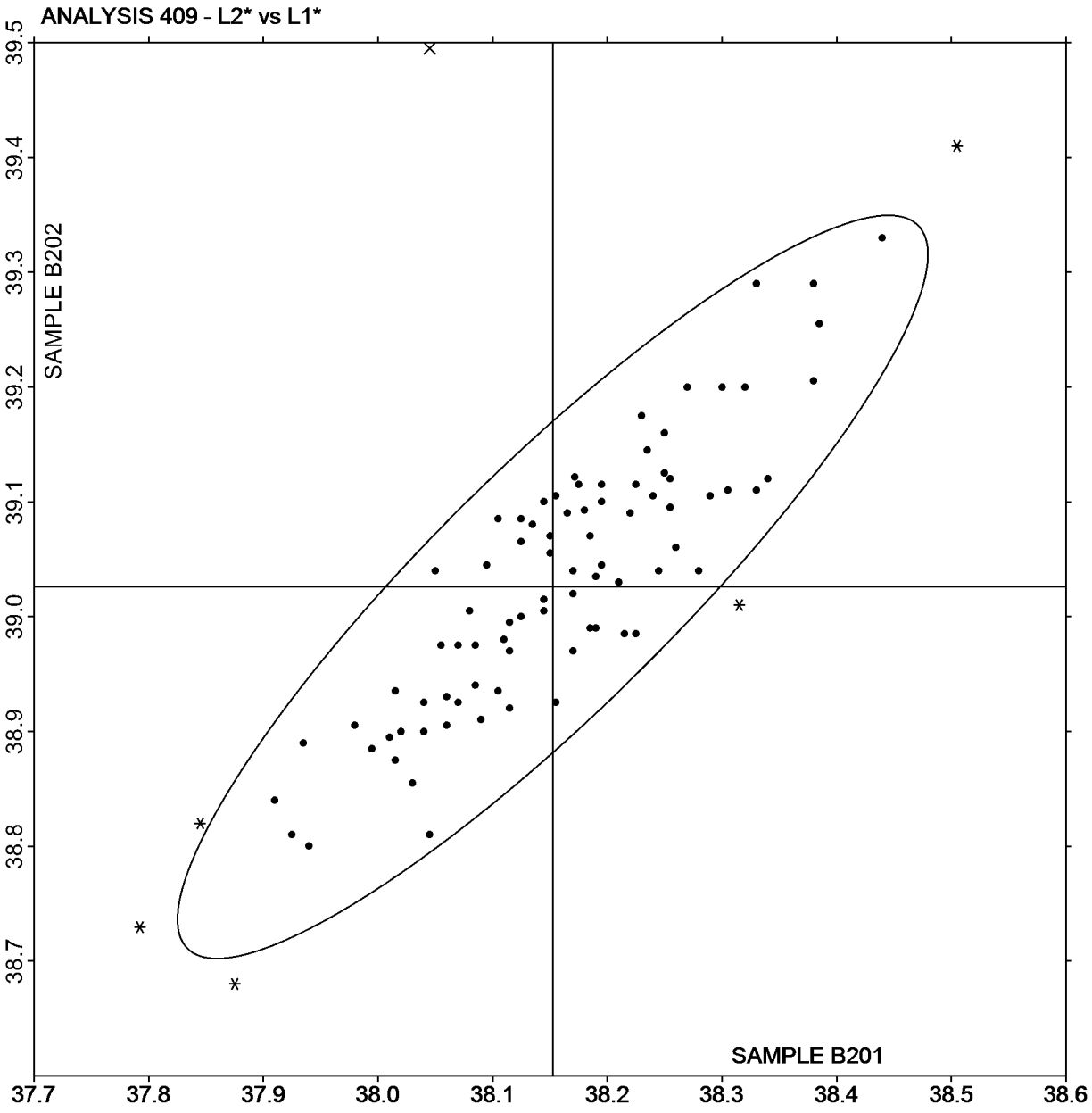
L2* vs L1*

SAMPLE B201 = 38.15 SAMPLE B202 = 39.03



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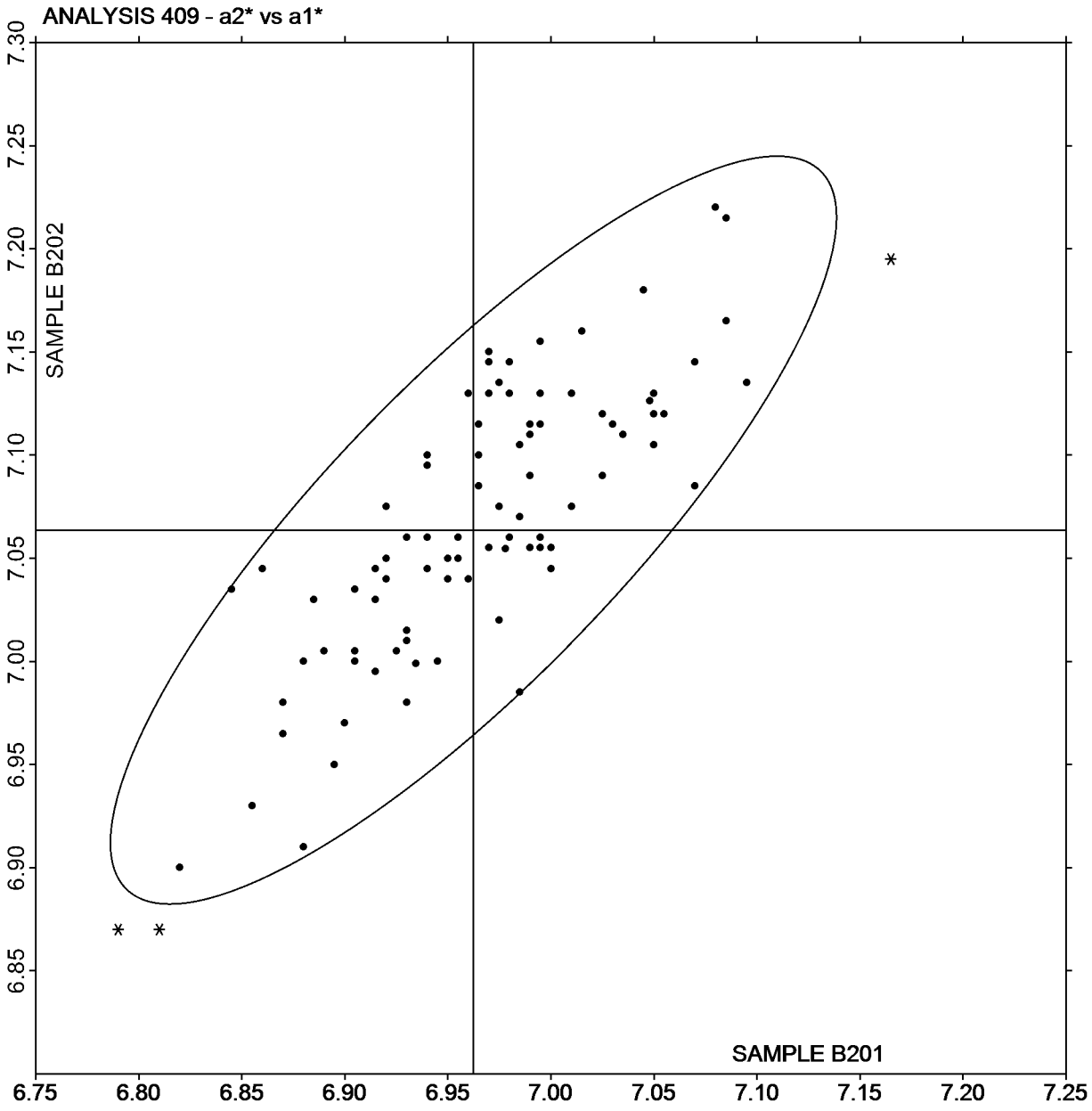
a2* vs a1*

SAMPLE B201 = 6.96 SAMPLE B202 = 7.06



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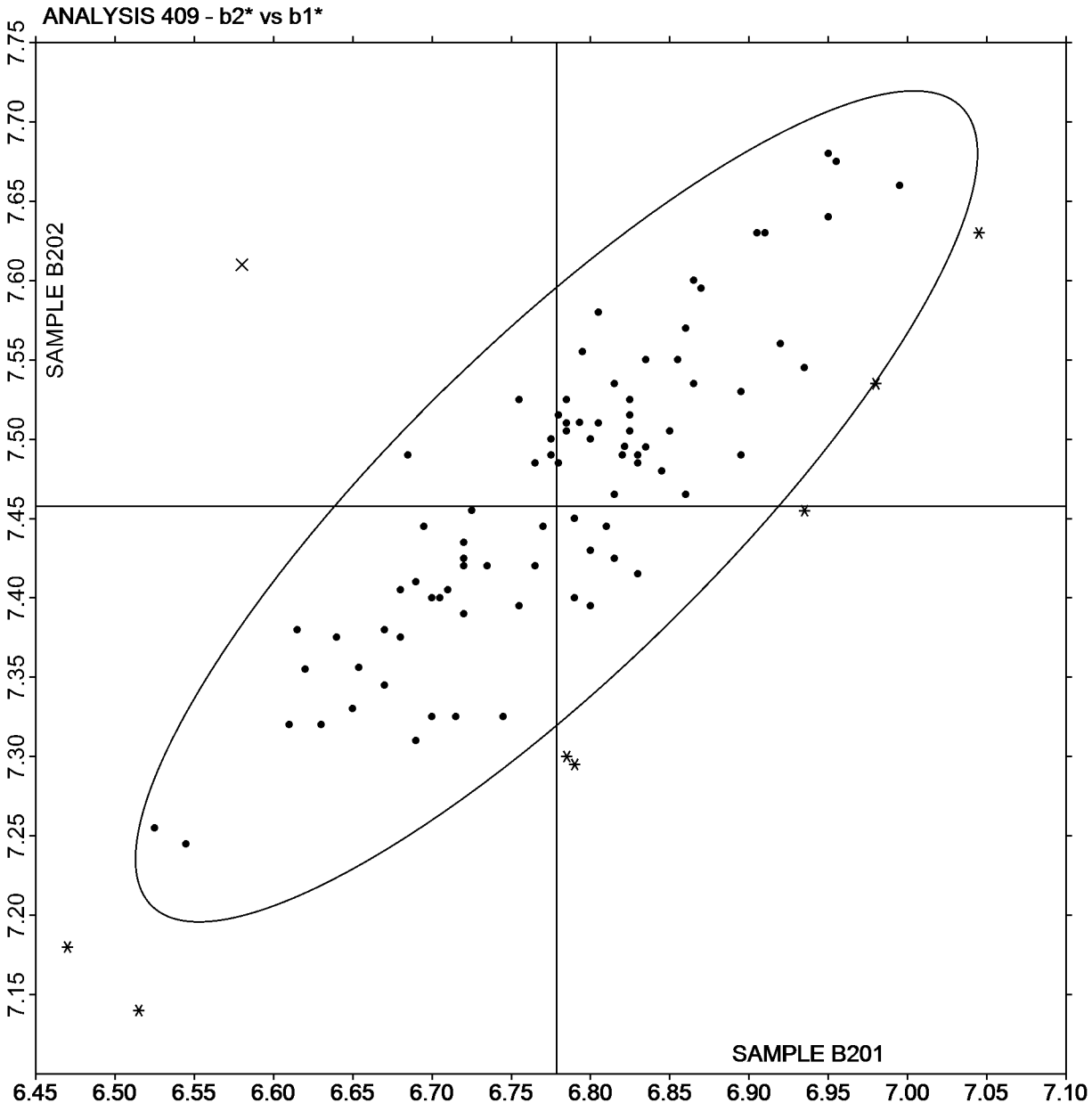
b2* vs b1*

SAMPLE B201 = -6.78

SAMPLE B202 = -7.46



Plot created using absolute values.

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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 B201																		
268DBV		12.92	13.39	13.06	12.51	11.79	10.60	9.38	8.90	9.11	10.18	11.95	11.62	11.94	13.99	15.00	15.05	AO
2VDB28		12.92	13.47	13.08	12.55	11.83	10.63	9.45	8.97	9.20	10.20	11.88	11.60	11.98	14.06	15.02	14.98	AH
39ZU2V		13.09	13.55	13.17	12.65	11.92	10.66	9.46	8.93	9.14	10.24	12.10*	11.60	11.98	14.06	15.13*	15.36*	CA
3YCY2E		13.00	13.50	13.20	12.60	11.90	10.70	9.40	9.00	9.15	10.20	12.00	11.60	12.00	14.10*	15.10	15.10	AO
46CMB7	X	32.88X	45.40X	45.29X	43.48X	40.19X	36.73X	32.48X	31.48X	33.81X	47.92X	61.55X	67.25X	68.62X	69.11X	69.31X	69.49X	MM
48349L		13.00	13.48	13.13	12.55	11.84	10.63	9.40	8.95	9.11	10.18	11.95	11.59	11.98	13.98	14.94	14.95	AS
4DPUUG		12.88	13.53	13.11	12.55	11.81	10.62	9.47	8.94	9.11	10.26	11.87	11.45	12.02	13.92	14.82	15.01	XB
4FD7UL		12.76	13.46	13.12	12.60	11.87	10.64	9.45	8.96	9.13	10.27	11.94	11.55	12.10	13.92	14.94	15.12	XI
4WZJ8E		13.10	13.60*	13.22	12.70*	12.00*	10.74*	9.54*	9.02*	9.23*	10.30	12.15X	11.65	12.02	14.08*	15.14*	15.46X	CA
7C8JRU		12.71	13.38	12.98	12.45	11.69	10.49	9.30	8.84	9.01	10.00	11.78	11.54	11.88	13.87	14.88	14.96	AJ
8LQDJG		12.75	13.37	13.03	12.52	11.76	10.55	9.38	8.86	9.04	10.14	11.87	11.49	11.93	13.87	14.88	15.11	MK
8M6NFZ		12.76	13.26	12.89	12.40	11.65	10.43	9.25	8.72	8.91	9.92*	11.74	11.39	11.50X	13.63	14.60*	14.93	HP
8U2E6G		12.87	13.52	13.08	12.64	11.85	10.63	9.39	8.91	9.11	10.14	11.85	11.60	11.89	13.90	14.93	15.11	AO
8WN3GG		12.35	13.38	13.02	12.49	11.77	10.54	9.38	8.86	9.04	10.10	11.83	11.48	11.91	13.82	14.84	15.05	MM
9G9JY2		12.82	13.41	13.08	12.54	11.83	10.62	9.42	8.90	9.11	10.19	11.91	11.55	11.95	13.90	14.94	15.15	MM
9HPGRZ		12.75	13.48	13.09	12.56	11.81	10.63	9.43	8.95	9.15	10.32*	11.89	11.59	12.04	13.93	14.91	15.10	XH
9RW7DC		12.57	13.29	12.95	12.41	11.64	10.46	9.27	8.82	9.01	10.13	11.77	11.38	11.92	13.81	14.81	14.98	XO
A6G99A		12.90	13.46	13.07	12.55	11.75	10.53	9.36	8.86	9.04	10.18	11.79	11.45	11.97	13.80	14.73	14.88	XH
AVN6WZ		12.83	13.43	12.97	12.46	11.68	10.47	9.33	8.87	9.09	10.20	11.87	11.47	12.03	13.93	14.90	15.07	MM
AYCCMN		13.03	13.61*	13.20	12.70*	11.89	10.69	9.55*	9.02	9.20	10.29	11.91	11.71*	12.13*	13.98	15.05	15.33*	MM
AYQXWP		12.69	13.33	12.95	12.47	11.73	10.52	9.31	8.82	9.08	10.09	11.74	11.45	11.84	13.84	14.82	15.06	AQ
B7NRNW		12.67	13.12*	12.75*	12.25*	11.54	10.33*	9.13X	8.63X	8.83X	9.90X	11.76	11.27*	11.64X	13.69	14.76	14.97	CA

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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 B201										
BKA3JE		13.05	13.41	13.09	12.55	11.83	10.60	9.38	8.93	9.13	10.20	11.92	11.62	11.91	13.92	14.94	15.10	AJ
BNM3F7	X	13.31	13.99X	13.69X	13.04X	12.25X	10.99X	9.78X	9.25X	9.41X	10.54X	12.35X	11.72*	12.10	14.50X	15.48X	15.60X	HH
CCA3JC		12.75	13.34	12.99	12.48	11.76	10.56	9.39	8.90	9.09	10.18	11.82	11.48	11.91	13.79	14.75	14.86	XB
CEWQVC		12.86	13.39	12.99	12.48	11.77	10.58	9.39	8.92	9.09	10.16	11.92	11.54	11.92	13.97	14.89	14.95	AJ
CTUTHC		12.95	13.53	13.19	12.59	11.89	10.65	9.42	8.96	9.11	10.21	11.93	11.60	11.92	13.95	14.95	14.98	AJ
CXRAV7		12.79	13.35	12.96	12.43	11.72	10.51	9.33	8.82	9.00	10.09	11.85	11.38	11.77	13.73	14.71	14.82	XB
DWBD37		12.80	13.41	13.01	12.54	11.76	10.58	9.34	8.79	8.98	10.05	11.88	11.48	11.78	13.83	14.90	15.13	MV
E3BCQ2		12.79	13.36	13.00	12.45	11.73	10.57	9.38	8.90	9.08	10.13	11.88	11.56	11.91	13.99	14.93	14.97	AS
ELNYD9		12.72	13.31	12.96	12.49	11.77	10.62	9.45	8.92	9.13	10.21	11.88	11.48	11.91	13.74	14.74	15.09	XI
FEZK49		12.92	13.37	13.48X	12.45	11.72	10.51	9.33	8.83	9.03	10.13	11.84	11.44	11.88	13.80	14.78	15.00	XB
FGN8HG		12.73	13.40	12.99	12.50	11.76	10.55	9.34	8.83	9.04	10.14	11.92	11.51	11.87	13.86	15.01	15.22	MV
FLH2G4		12.68	13.36	13.00	12.43	11.66	10.49	9.36	8.88	9.08	10.17	11.81	11.56	12.02	13.86	14.92	15.10	MM
G7L7HH		12.81	13.44	13.05	12.50	11.80	10.60	9.42	8.89	9.06	10.21	11.85	11.47	11.99	13.86	14.74	14.88	XI
GHERQY		12.80	13.44	13.08	12.56	11.81	10.61	9.44	8.90	9.10	10.19	11.88	11.49	12.02	13.93	14.83	15.02	XI
GHVQYP		12.86	13.34	13.03	12.45	11.72	10.51	9.29	8.82	8.99	10.06	11.87	11.49	11.91	13.90	14.98	14.93	AS
GK7ND8		12.68	13.24	12.90	12.34	11.60	10.44	9.27	8.83	8.98	10.12	11.72	11.36	11.82	13.66	14.64	14.86	XH
GPXVVF		12.69	13.26	12.87	12.37	11.64	10.46	9.24	8.73	8.91*	10.04	11.84	11.36	11.77	13.82	14.86	15.11	MV
GQ9XJZ		12.99	13.51	13.14	12.59	11.88	10.66	9.42	8.95	9.14	10.20	11.96	11.65	11.98	13.48X	14.98	15.10	AJ
GV3RG2		12.88	13.45	13.15	12.55	11.81	10.67	9.48	8.95	9.15	10.26	11.87	11.49	11.95	13.83	14.76	14.90	XI
HWC4WG		12.75	13.33	12.97	12.47	11.72	10.53	9.36	8.84	9.05	10.14	11.85	11.47	11.95	13.88	14.89	15.10	MM
J6HA46		12.68	13.34	12.96	12.48	11.73	10.52	9.33	8.82	8.99	10.08	11.85	11.48	11.86	13.86	14.91	15.14	MT
JDEZV8	X	13.84X	14.14X	13.85X	13.31X	12.41X	11.11X	9.76X	9.23X	9.37X	10.51X	12.26X	11.86X	12.42X	14.38X	15.34X	15.52X	XO

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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 B201																		
K4M67B		13.53*	13.17	12.88	12.48	11.89	10.60	9.35	8.92	9.01	9.95*	11.51X	11.44	11.87	13.75	14.78	14.76	GD
KE3232		13.82X	13.39	13.00	12.48	11.73	10.51	9.32	8.86	9.07	10.12	11.86	11.56	11.89	13.89	14.95	15.11	AJ
KLRCLD	X	12.51	13.00X	12.65X	12.18X	11.49*	10.28X	9.08X	8.57X	8.76X	9.82X	11.64*	11.16X	11.51X	13.52X	14.54*	14.79	CA
LMUUWD		12.75	13.28	12.91	12.41	11.68	10.52	9.37	8.86	9.06	10.14	11.86	11.50	11.93	13.83	14.84	15.04	XB
LQTCTK		12.44	13.24	12.74*	12.24*	11.47*	10.29X	9.17*	8.67*	8.91	10.01	11.70	11.32	11.89	13.77	14.67	14.92	XH
MJPK69	X	12.29*	12.85X	12.52X	12.04X	11.37X	10.22X	9.05X	8.59X	8.78X	9.88X	11.51X	11.22X	11.63X	13.52X	14.59*	14.84	GE
MTDCRZ		12.75	13.40	13.04	12.46	11.76	10.56	9.34	8.85	9.03	10.04	11.82	11.53	11.83	13.82	14.88	15.13	AJ
NDEVWY		12.81	13.33	12.97	12.45	11.71	10.55	9.33	8.89	9.07	10.11	11.85	11.56	11.93	13.89	14.80	14.87	AS
NFNYTV		12.93	13.56	13.22	12.74*	12.05X	10.90X	9.46	8.92	9.13	10.24	11.90	11.66	12.10	13.92	14.97	15.21	MI
P284DZ		12.87	13.45	13.05	12.52	11.78	10.57	9.37	8.87	9.05	10.15	11.81	11.51	11.84	13.73	14.73	14.90	XB
P94VLT		12.68	13.30	12.93	12.42	11.67	10.49	9.32	8.81	9.00	10.11	11.74	11.37	11.87	13.77	14.66	14.79	XI
QLNXGQ		12.90	13.35	12.99	12.47	11.71	10.57	9.37	8.87	9.04	10.15	11.75	11.43	11.89	13.76	14.66	14.77	XI
RDNXHN		12.46	13.16*	12.86	12.28*	11.56	10.38	9.20*	8.71*	8.90*	10.01	11.65*	11.30*	11.75	13.64	14.64	14.79	XH
T6A9GV		12.71	13.29	12.94	12.42	11.68	10.50	9.32	8.83	9.03	10.13	11.85	11.47	11.96	13.90	14.93	15.14	MM
TE2RV4		12.83	13.33	13.02	12.39	11.69	10.52	9.33	8.86	8.98	10.09	11.79	11.50	11.80	13.70	14.78	14.92	AM
TK7ME4		13.05	13.40	13.10	12.50	11.75	10.50	9.40	8.90	9.10	10.30	12.00	11.40	11.90	13.90	14.80	15.10	HW
TQRPET		12.62	13.19	12.87	12.36	11.63	10.42	9.28	8.80	8.97	10.10	11.68	11.39	11.86	13.75	14.71	14.92	XI
TVMAQP		14.12X	13.43	13.07	12.51	11.77	10.60	9.39	8.92	9.10	10.15	11.89	11.61	11.93	13.90	14.91	15.13	AJ
U2RFXF		13.03	13.45	13.12	12.56	11.83	10.62	9.39	8.92	9.12	10.16	11.96	11.54	11.95	13.95	15.07	15.03	AS
U8TRTC		12.38	13.14*	12.82	12.31	11.56	10.41	9.26	8.76	8.99	10.12	11.74	11.40	11.97	13.84	14.72	14.89	XH
UDKU44		12.85	13.36	13.02	12.46	11.77	10.55	9.33	8.89	9.07	10.13	11.93	11.53	11.91	13.97	15.00	15.03	AS
UGYR97		12.82	13.35	12.99	12.44	11.72	10.52	9.33	8.88	9.07	10.11	11.88	11.52	11.90	13.88	14.90	14.97	AJ

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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 B201																		
VM6K32		12.49	13.14*	12.81	12.35	11.59	10.39	9.26	8.81	9.03	10.13	11.82	11.41	11.95	13.82	14.89	15.06	XO
VYWAZL		12.57	13.29	12.92	12.40	11.68	10.50	9.28	8.77	9.00	10.04	11.79	11.48	11.79	13.74	14.82	14.90	AB
W8AH2N		12.47	13.23	12.86	12.30	11.60	10.43	9.29	8.85	9.04	10.08	11.76	11.41	11.91	13.73	14.81	15.04	XM
WCFCVJ		12.85	13.38	13.02	12.53	11.80	10.58	9.34	8.87	9.09	10.26	12.01	11.57	12.01	13.99	15.07	15.31*	MV
WH6WYY		12.66	13.29	12.98	12.36	11.66	10.51	9.26	8.72	8.97	10.06	11.93	11.39	11.75	13.88	14.90	15.15	MV
WMYQWZ		12.80	13.30	13.00	12.40	11.70	10.50	9.30	8.80	9.00	10.10	11.75	11.40	11.90	13.75	14.70	14.90	XI
WRWAZK	X	13.27	13.85X	13.47X	12.92X	12.15X	10.86X	9.57X	9.04*	13.28X	13.84X	13.47X	12.91X	12.14*	10.85X	9.57X	9.03X	XZ
WUFBXR		13.32	13.50	13.14	12.58	11.83	10.62	9.44	8.93	9.12	10.18	11.89	11.54	11.90	13.88	14.99	15.11	AQ
WVVLWK		13.07	13.41	13.02	12.50	11.79	10.60	9.34	8.92	9.08	10.13	11.92	11.58	11.93	13.94	14.94	15.12	AS
X8J8FK		12.70	13.26	12.88	12.35	11.62	10.44	9.29	8.80	9.01	10.14	11.79	11.42	11.88	13.80	14.76	14.95	XI
XQFD9K		13.00	13.55	13.10	12.60	11.90	10.70	9.50	9.00	9.20	10.20	12.00	11.60	12.00	14.05	15.05	15.00	AO
Y6AGPG		12.77	13.41	13.01	12.48	11.76	10.57	9.39	8.87	9.05	10.16	11.86	11.48	12.03	13.96	14.89	15.11	XI
YLGFWY		12.83	13.42	13.04	12.49	11.77	10.56	9.38	8.86	9.05	10.11	11.80	11.53	11.98	13.84	14.91	15.15	MM
YV78JQ		12.76	13.32	12.92	12.40	11.60	10.46	9.27	8.77	8.94	10.07	11.71	11.35	11.86	13.70	14.66	14.91	XI
YZZ49H		12.78	13.31	12.93	12.42	11.66	10.54	9.38	8.83	9.03	10.18	11.75	11.41	11.93	13.70	14.64	14.73*	XI
ZLYRCJ		13.11	13.34	12.95	12.47	11.77	10.55	9.35	8.89	9.08	10.12	11.95	11.51	11.91	13.90	14.95	15.05	AS
ZWENAA		12.93	13.43	13.04	12.55	11.83	10.59	9.39	8.87	9.08	10.15	12.00	11.50	11.87	13.90	14.95	15.18	CA

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Summary Statistics

	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700
Grand Means	12.84	13.37	13.01	12.48	11.75	10.55	9.36	8.86	9.06	10.14	11.85	11.49	11.91	13.85	14.86	15.03
SD Btwn Labs	0.27	0.11	0.12	0.10	0.10	0.09	0.08	0.08	0.07	0.08	0.10	0.09	0.10	0.11	0.13	0.14

46CMB7 (X) - Extreme data for all wavelengths.

BNM3F7 (X) - High % reflectance data for almost all wavelengths.

JDEZV8 (X) - High % reflectance data at all wavelengths.

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

MJPK69 (X) - Low % reflectance data for almost all wavelengths.

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

Key to Instrument Codes Reported by Participants

AB ACS-Datacolor 100
AH ACS-Datacolor 550
AJ ACS-Datacolor 600
AM ACS-Datacolor 600 Plus
AO ACS-Datacolor 650
AQ ACS-Datacolor 600X
AS ACS-Datacolor 800 Series
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 Spectrophotometer
MM Macbeth Color-Eye 7000a
MT Minolta CM-2600d
MV Minolta CM-3000d Series Spectrophotometer
XB X-Rite Ci7000 Series Benchtop Spectrophotometer
XH X-Rite Color i5
XI X-Rite Color i7
XM X-Rite SP62
XO X-Rite SP64
XZ X-Rite

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WebCode	Data Flag	Sample F201 Lab Mean	Sample F201 Diff from Grand Mean	Sample F201 CPV	Sample F202 Lab Mean	Sample F202 Diff from Grand Mean	Sample F202 CPV	Instr Code
2MMMCW		37.40	0.23	0.22	47.43	0.15	0.13	GL
2QJF2K		36.13	-1.04	-0.98	46.05	-1.23	-1.06	GL
46CMB7		36.72	-0.45	-0.42	46.30	-0.98	-0.85	GL
48349L		36.28	-0.89	-0.84	46.88	-0.40	-0.35	GK
6JVMMQ		37.60	0.43	0.41	48.03	0.75	0.65	GN
6XF6GF		37.63	0.46	0.43	47.93	0.65	0.56	GL
7ALMK3		36.30	-0.87	-0.82	46.40	-0.88	-0.76	GL
7C8JRU		35.55	-1.62	-1.53	45.38	-1.90	-1.65	GK
7DKXF3		37.50	0.33	0.32	48.40	1.12	0.97	GK
7MP4CQ		37.03	-0.14	-0.13	46.75	-0.53	-0.46	GL
8WN3GG	*	38.83	1.66	1.57	48.05	0.77	0.67	RA
984CK2		39.00	1.83	1.73	49.25	1.97	1.71	GN
9HPGRZ		36.00	-1.17	-1.10	45.63	-1.65	-1.43	GL
9RW7DC		37.10	-0.07	-0.06	47.68	0.40	0.34	MW
A6G99A		36.75	-0.42	-0.39	46.93	-0.35	-0.31	GL
AEYUAX		37.65	0.48	0.46	47.95	0.67	0.58	GK
AVN6WZ		35.61	-1.55	-1.47	46.24	-1.04	-0.90	GL
BNM3F7		35.90	-1.27	-1.20	46.40	-0.88	-0.76	RA
CEWQVC		35.80	-1.37	-1.29	45.88	-1.40	-1.22	GL
CXRAV7		37.23	0.06	0.06	47.68	0.40	0.34	ZA
CYLZ2K		37.53	0.36	0.34	47.83	0.55	0.47	GK
DGDKVB		37.40	0.23	0.22	48.15	0.87	0.75	GK
DMZBH7		37.30	0.13	0.13	47.53	0.25	0.21	GL
DWBD37		37.53	0.36	0.34	47.93	0.65	0.56	GL
ELNYD9		36.60	-0.57	-0.53	46.50	-0.78	-0.68	GL
ENBMP9		37.85	0.68	0.65	47.30	0.02	0.02	GL
FGN8HG		36.13	-1.04	-0.98	46.43	-0.85	-0.74	GL
FR7NCA		35.98	-1.18	-1.12	46.37	-0.91	-0.79	GL
GK7ND8		37.25	0.08	0.08	47.35	0.07	0.06	GK
GQ9XJZ		36.35	-0.82	-0.77	46.05	-1.23	-1.06	GL

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WebCode	Data Flag	Sample F201 Lab Mean	Sample F201 Diff from Grand Mean	Sample F201 CPV	Sample F202 Lab Mean	Sample F202 Diff from Grand Mean	Sample F202 CPV	Instr Code
J3VLR6		37.75	0.58	0.55	47.80	0.52	0.45	GK
K3C44P		38.03	0.86	0.81	48.13	0.85	0.73	GL
K4M67B		36.20	-0.97	-0.91	46.73	-0.55	-0.48	GN
KLRCLD	*	37.95	0.78	0.74	47.15	-0.13	-0.11	GL
M984D2		36.38	-0.79	-0.75	46.10	-1.18	-1.02	GB
MJ8JEZ		37.98	0.81	0.77	48.13	0.85	0.73	XX
MPGWYJ		37.90	0.73	0.69	47.73	0.45	0.39	GL
NFNYTV		36.98	-0.19	-0.18	47.65	0.37	0.32	GL
PU7WQJ		38.13	0.96	0.91	48.20	0.92	0.80	GK
Q79YA6		36.38	-0.79	-0.75	46.25	-1.03	-0.89	GL
QV8D2K		37.00	-0.17	-0.16	47.48	0.20	0.17	GN
RVQFQ9		37.20	0.03	0.03	47.18	-0.10	-0.09	GK
RWZK4W		37.95	0.78	0.74	48.20	0.92	0.80	GN
RYM9FW		36.60	-0.57	-0.53	46.30	-0.98	-0.85	GN
TBF3BQ		37.43	0.26	0.25	47.88	0.60	0.52	GL
TK7ME4		36.30	-0.87	-0.82	45.63	-1.65	-1.43	GK
TQRPET	*	39.90	2.73	2.59	50.18	2.90	2.51	GT
U8TRTC		37.28	0.11	0.10	47.30	0.02	0.02	GL
UGYR97	*	39.85	2.68	2.54	50.30	3.02	2.62	MW
V9MTEU		37.60	0.43	0.41	47.33	0.05	0.04	GL
VLBUWM		36.35	-0.82	-0.77	46.53	-0.75	-0.65	GL
VM6K32	*	40.00	2.83	2.68	50.58	3.30	2.85	GN
VXMAVE		36.90	-0.27	-0.25	47.38	0.10	0.08	GL
VYWAZL		36.88	-0.29	-0.27	47.33	0.05	0.04	GL
WH94W7		35.20	-1.97	-1.86	44.93	-2.35	-2.04	GK
WRWAZK	X	33.13	-4.04	-3.82	31.45	-15.83	-13.71	GK
XMFBXP		38.88	1.71	1.62	48.73	1.45	1.25	GL
XMUXAC		36.95	-0.22	-0.20	47.35	0.07	0.06	GN
Y6AGPG		38.40	1.23	1.17	48.73	1.45	1.25	GN
YLGFWY	X	34.70	-2.47	-2.33	45.88	-1.40	-1.22	GL

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Interlaboratory Testing Program for Color & Appearance

Report #192
2nd Qtr 2020

Analysis 440

60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample F201 Lab Mean	Sample F201 Diff from Grand Mean	Sample F201 CPV	Sample F202 Lab Mean	Sample F202 Diff from Grand Mean	Sample F202 CPV	Instr Code
YV78JQ		35.25	-1.92	-1.81	45.48	-1.80	-1.56	GL
YZZ49H		36.83	-0.33	-0.31	46.28	-1.00	-0.87	GL
ZBWQDJ		36.53	-0.64	-0.61	46.28	-1.00	-0.87	RA
ZLDBWF		37.45	0.28	0.27	47.58	0.30	0.26	GK

Summary Statistics

	Sample F201	Sample F202
Grand Means	37.17 Gloss Units	47.28 Gloss Units
Stnd Dev Btwn Labs	1.06 Gloss Units	1.15 Gloss Units

Statistics based on 62 of 64 reporting participants

Comments on Assigned Data Flags for Test #440

WRWAZK(X) - Extreme data.

YLGFWY(X) - Inconsistent in testing between samples.

Key to Instrument Codes Reported by Participants

GB	BYK Gardner Spectro - Guide Sphere Gloss	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
RA	Rhopoint Novo-Gloss Glossmeter	XX	Instrument make/model not specified by lab
ZA	Zehntner ZGM Series		

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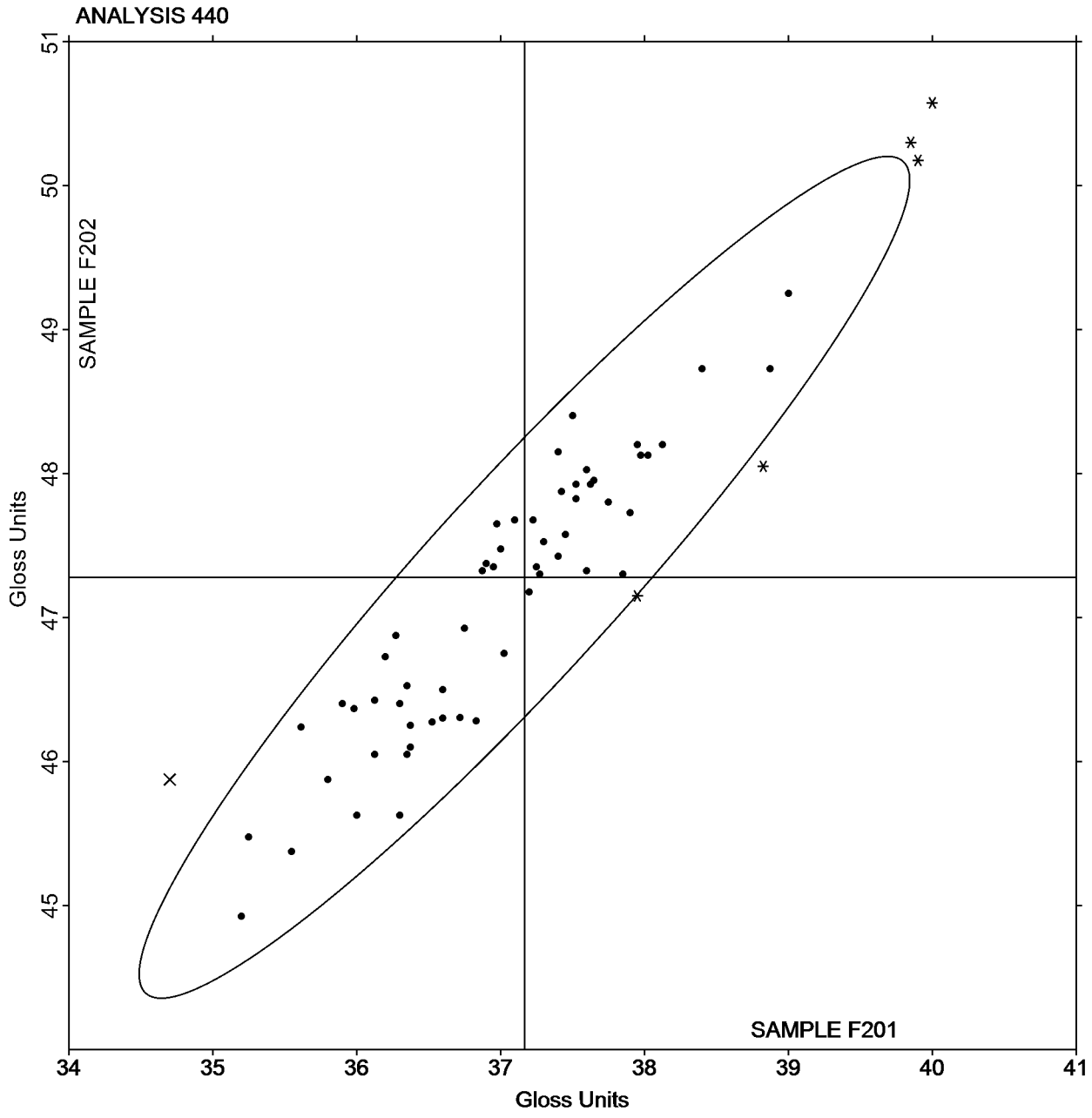
SAMPLE F201 = 37.17 Gloss Units SAMPLE F202 = 47.28 Gloss Units



-End of Report-

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