Collaborative Testing Services, Inc.

Color & Appearance Testing Program

Summary Report #189 - 3rd Qtr 2019

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
3PG3RM		C191	37.68	-7.14	-9.42	0.75	-0.56	-0.42	1.02	XD
		C192	38.43	-7.70	-9.84					
3PX7FM	X	C191	36.52	-7.96	-9.82	0.99	-0.51	-0.54	1.24	FA
		C192	37.52	-8.46	-10.36					
3UB4RF		C191	37.34	-7.29	-9.52	0.75	-0.51	-0.55	1.06	XU
		C192	38.10	-7.80	-10.06					
43XLG9	X	C191	99.16	0.90	-17.09	-0.29	0.38	0.30	0.57	HW
		C192	98.87	1.28	-16.79					
6AHY4D		C191	36.91	-7.19	-9.50	0.77	-0.53	-0.55	1.09	XX
		C192	37.68	-7.72	-10.05					
6QM8JF		C191	37.70	-7.26	-9.78	0.81	-0.55	-0.59	1.15	XB
		C192	38.51	-7.81	-10.37					
76GBZC		C191	37.31	-7.28	-9.32	0.99	-0.52	-0.53	1.24	GE
		C192	38.29	-7.80	-9.85					
7FHNC6		C191	37.56	-7.22	-9.71	0.76	-0.54	-0.53	1.07	XO
		C192	38.32	-7.76	-10.23					
7RU7QU	X	C191	38.32	-7.40	-10.12	0.05	0.01	0.01	0.05	MU
		C192	38.36	-7.39	-10.11					
83ABJB		C191	37.40	-7.34	-9.30	0.92	-0.47	-0.54	1.16	GE
		C192	38.31	-7.81	-9.84					
9CPNVC		C191	37.04	-7.37	-9.49	1.03	-0.49	-0.53	1.26	MQ
		C192	38.07	-7.86	-10.02					
APU4EM		C191	36.78	-7.30	-9.75	0.75	-0.52	-0.55	1.07	HY
		C192	37.54	-7.82	-10.30					
AX8ZG9		C191	37.49	-7.18	-9.66	0.66	-0.53	-0.49	0.98	XO
		C192	38.15	-7.71	-10.15					
AYH6N6		C191	37.88	-7.20	-9.77	0.96	-0.53	-0.52	1.22	AB
		C192	38.84	-7.73	-10.29					
CN7RK7		C191	37.22	-7.13	-9.82	0.93	-0.48	-0.53	1.17	HW
		C192	38.15	-7.61	-10.35					
CX3D27		C191	37.20	-7.02	-9.70	0.85	-0.50	-0.56	1.13	HW
		C192	38.05	-7.52	-10.26					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
ECVRAY	X	C191	36.59	-7.88	-9.87	1.06	-0.50	-0.52	1.28	FA
		C192	37.64	-8.38	-10.39					
EJEVG2		C191	37.08	-7.29	-9.60	1.07	-0.47	-0.55	1.30	TO
		C192	38.15	-7.76	-10.15					
EKKJCX		C191	37.30	-7.08	-9.94	0.73	-0.57	-0.58	1.09	HW
		C192	38.03	-7.65	-10.52					
FVHMD7		C191	37.31	-7.31	-9.54	1.00	-0.52	-0.59	1.28	MU
		C192	38.32	-7.83	-10.13					
GJMV78		C191	37.39	-7.23	-9.71	0.97	-0.52	-0.57	1.24	XZ
		C192	38.36	-7.75	-10.29					
GYGBED		C191	37.10	-7.12	-9.66	0.81	-0.51	-0.52	1.09	HK
		C192	37.91	-7.62	-10.18					
H3THDW		C191	37.15	-7.12	-9.87	0.91	-0.55	-0.57	1.20	HW
		C192	38.06	-7.68	-10.44					
HZ8WKA		C191	37.40	-7.27	-9.36	0.89	-0.51	-0.55	1.16	GE
		C192	38.29	-7.78	-9.91					
JPLE3M		C191	37.35	-7.34	-9.55	0.89	-0.50	-0.51	1.15	XZ
		C192	38.25	-7.84	-10.06					
JUF4R7		C191	37.39	-7.20	-9.67	0.77	-0.54	-0.54	1.08	XU
		C192	38.16	-7.74	-10.21					
LCNWKY		C191	37.86	-7.00	-9.35	0.71	-0.51	-0.55	1.03	XZ
		C192	38.57	-7.52	-9.89					
LEFVYX		C191	37.16	-7.18	-9.76	0.91	-0.53	-0.56	1.19	HK
		C192	38.07	-7.71	-10.32					
LZF3F2		C191	37.68	-7.45	-9.62	0.61	-0.54	-0.56	0.99	XZ
		C192	38.29	-7.98	-10.19					
MXLWBV		C191	37.39	-7.19	-9.53	0.74	-0.53	-0.59	1.08	XU
		C192	38.13	-7.72	-10.12					
NJHWZ4	X	C191	41.28	-6.20	-8.16	0.16	-0.59	-0.60	0.86	XN
		C192	41.44	-6.79	-8.76					
NP9CK4		C191	37.34	-7.07	-9.85	0.86	-0.54	-0.56	1.16	HW
		C192	38.20	-7.61	-10.42					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
PB6AHM		C191	37.28	-6.91	-9.79	0.86	-0.51	-0.54	1.13	HW
		C192	38.14	-7.41	-10.32					
R72DNC		C191	37.58	-7.38	-9.49	1.00	-0.53	-0.51	1.24	GH
		C192	38.58	-7.90	-10.00					
RBTK7K		C191	37.34	-7.18	-9.87	0.87	-0.53	-0.56	1.16	HW
		C192	38.21	-7.71	-10.43					
RZF6JL		C191	37.59	-7.11	-9.88	0.73	-0.52	-0.54	1.04	HW
		C192	38.32	-7.63	-10.42					
TXLWPB		C191	37.40	-7.05	-9.80	0.75	-0.45	-0.60	1.06	HW
		C192	38.15	-7.50	-10.40					
UNTXJM		C191	36.98	-7.38	-9.75	1.02	-0.53	-0.53	1.27	XM
		C192	38.00	-7.92	-10.28					
WANLY9		C191	37.17	-6.91	-9.89	0.73	-0.54	-0.58	1.08	MG
		C192	37.90	-7.45	-10.47					
XCM4VE		C191	36.92	-7.26	-9.81	0.86	-0.52	-0.55	1.15	HY
		C192	37.79	-7.78	-10.36					
XZBU8P		C191	36.91	-7.27	-9.51	0.80	-0.49	-0.54	1.08	AB
		C192	37.71	-7.75	-10.05					
YR2KJW		C191	37.38	-7.26	-9.31	0.84	-0.50	-0.53	1.11	GE
		C192	38.21	-7.76	-9.84					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
C191	37.28	-7.20	-9.66	0.85	-0.52	-0.54	1.13
C192	38.14	-7.72	-10.21				
Stnd Dev Btwn Labs							
C191	0.31	0.13	0.18	0.11	0.03	0.03	0.08
C192	0.28	0.13	0.19				

Statistics based on 37 of 42 reporting participants

Comments Assigned on Data Flags for Test #408

3PX7FM(X) - Low "a*" values.

43XLG9(X) - Lab apparently measured back of the samples.

7RU7QU(X) - High "L*" value for Sample C191. Large replication difference for "L*", "a*" & "b*" values. Small Delta L & Delta E. Large Delta a & Delta b.

ECVRAY(X) - Low "a*" values.

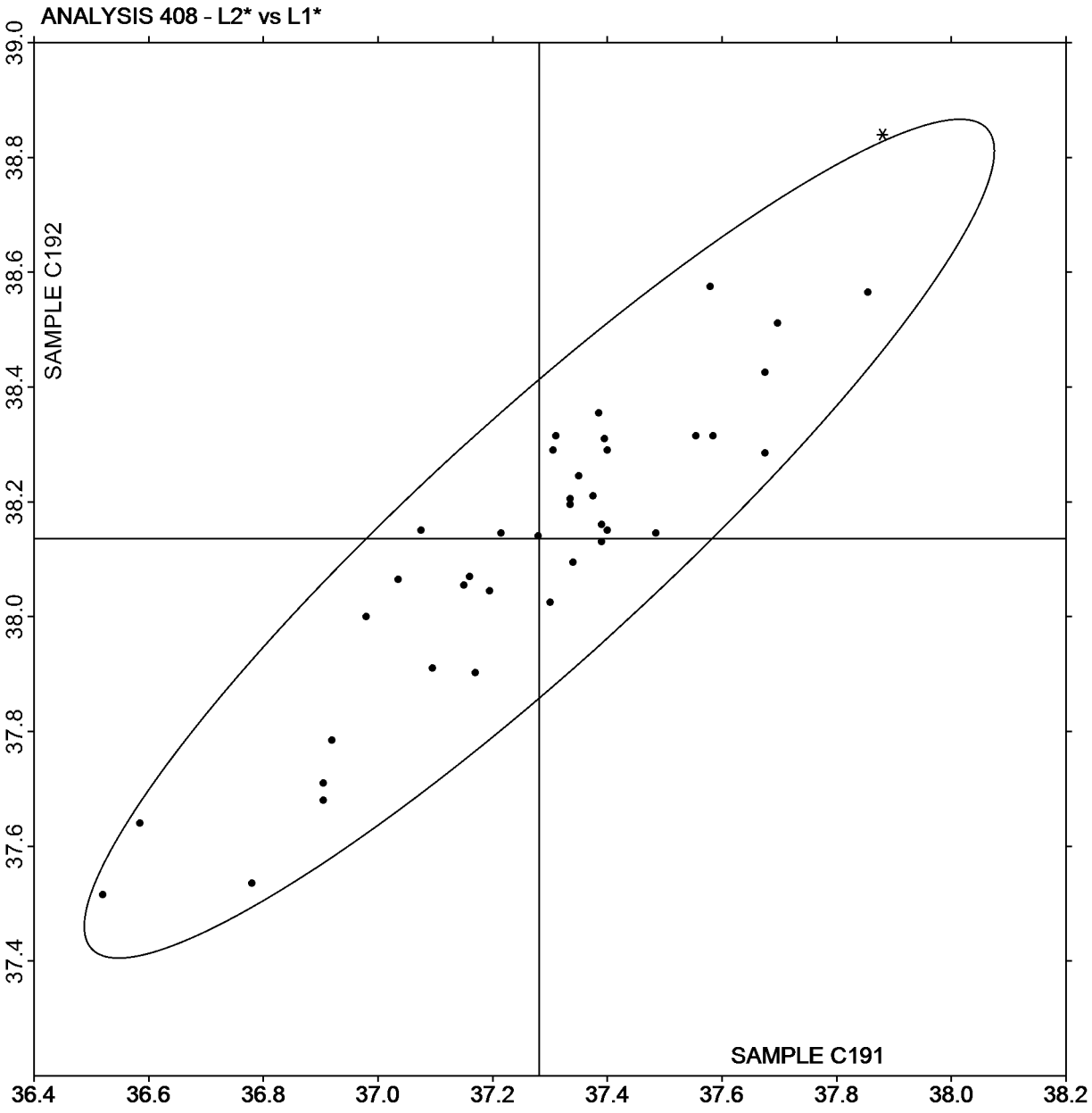
NJHWZ4(X) - All values are very high. Small Delta L, Delta a & Delta E.

Key to Instrument Codes Reported by Participants

AB	Data Color	FA	BYK Mac
GE	BYK-Gardner spectro-guide (45/0)	GH	BYK-Gardner Color-View
HK	Hunter MiniScan XE (45/0)	HW	Hunter LabScan XE
HY	Hunter Color Flex 45/0	MG	Macbeth 1500/PLUS or 2025+ Color Eye
MQ	Minolta CM-503c Spectrophotometer	MU	Minolta
TO	Topcon SR-3 Spectroradiometer	XB	X-Rite i1Basic Pro 2
XD	X-Rite 500 Series SpectroDensitometer	XM	X-Rite MA58 Multi-Angle Spectrophotometer
XN	X-Rite MA68 Multi-Angle Spectrophotometer	XO	X-Rite MA68 II Multi-Angle Spectrophotometer
XU	X-Rite 964 Portable Spectrophotometer	XX	Instrument make/model not specified by lab
XZ	X-Rite		

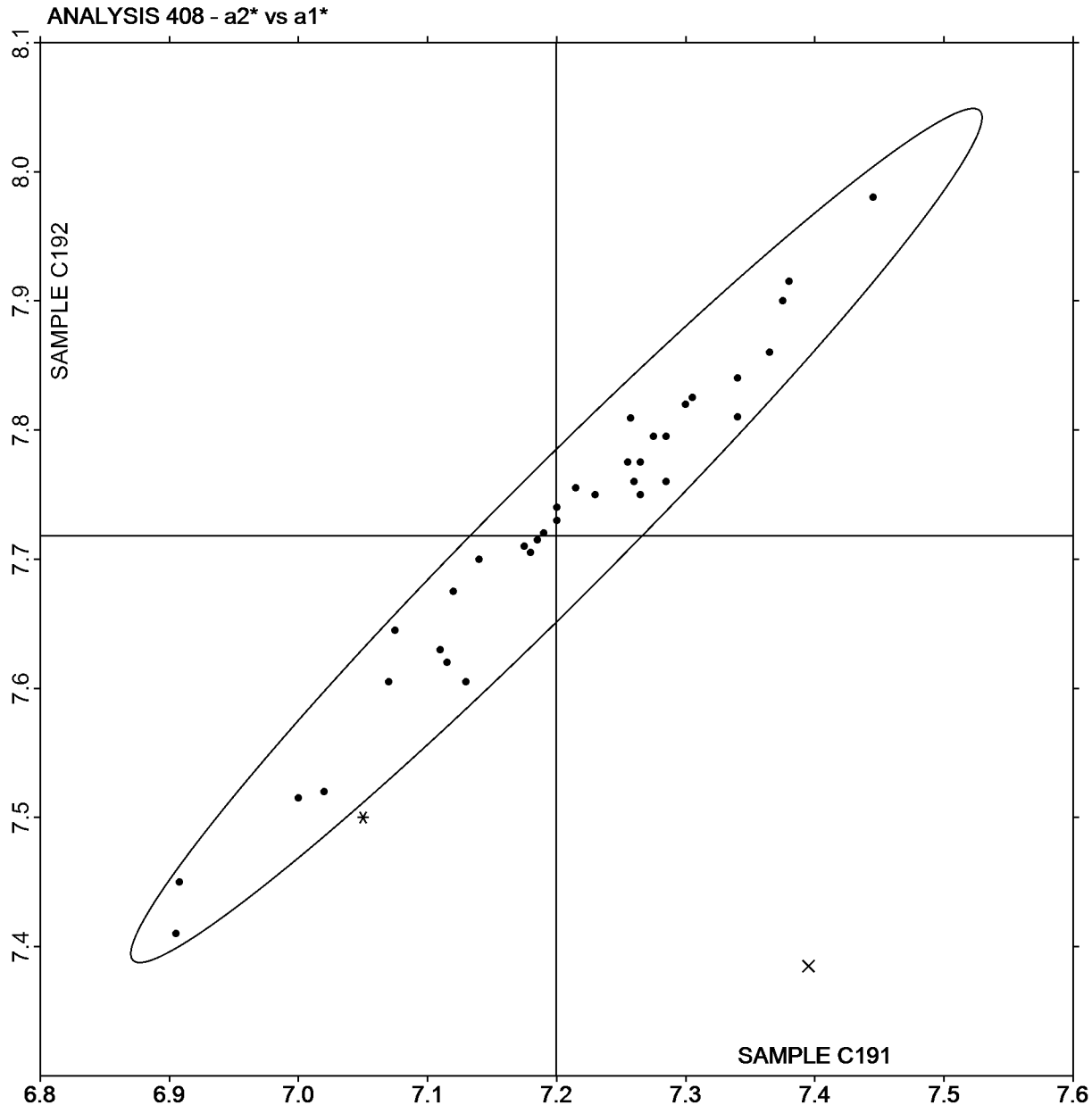
L2* vs L1*

SAMPLE C191 = 37.28 SAMPLE C192 = 38.14



a2* vs a1*

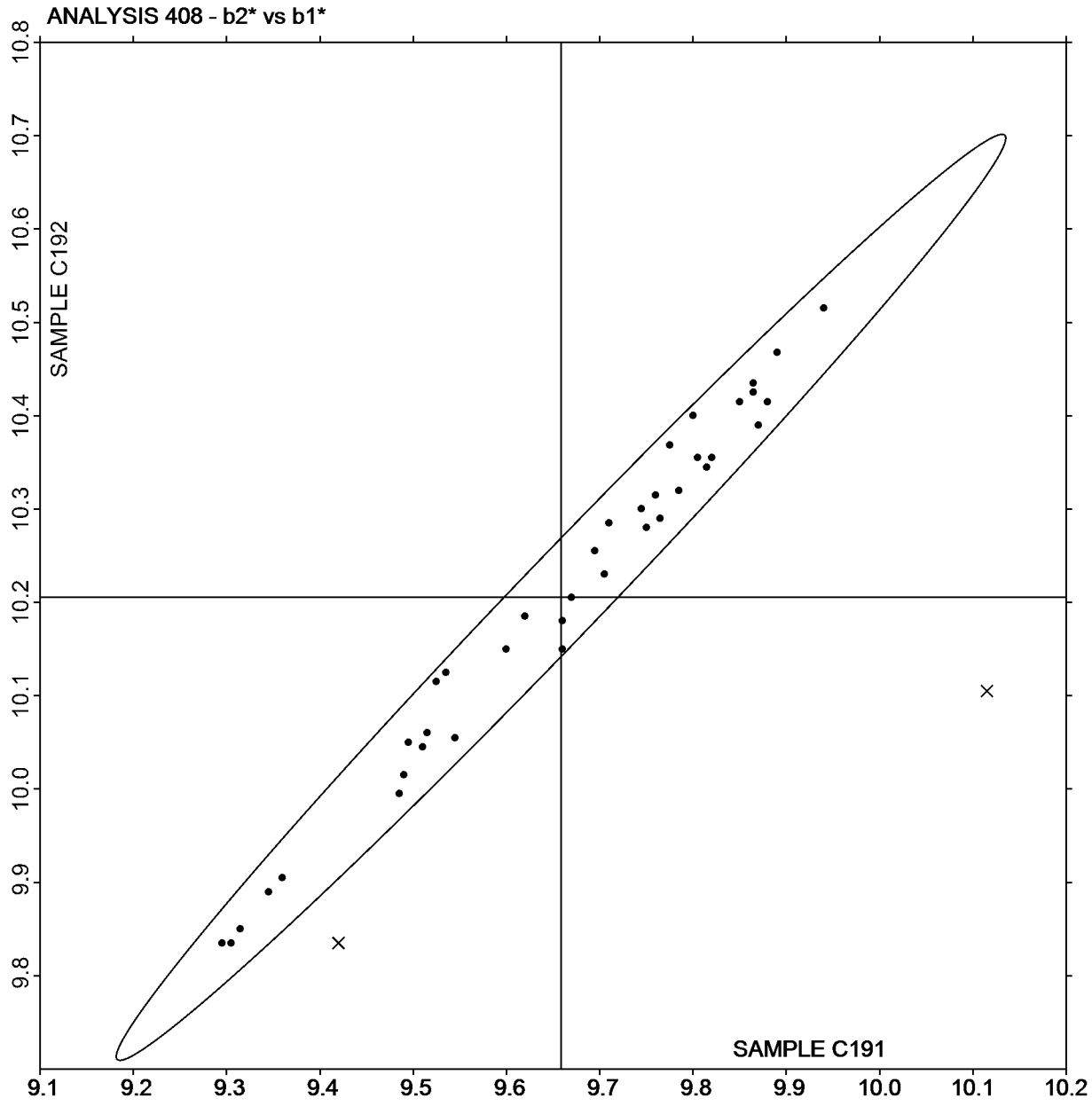
SAMPLE C191 = -7.20 SAMPLE C192 = -7.72



Plot created using absolute values.

b2* vs b1*

SAMPLE C191 = -9.66 SAMPLE C192 = -10.21



Plot created using absolute values.

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
2JZ32P		C191 C192	38.04 38.88	-7.04 -7.52	-9.65 -10.19	0.84	-0.48	-0.55	1.11	XH
367EX2		C191 C192	37.80 38.61	-7.22 -7.73	-9.59 -10.13	0.81	-0.51	-0.54	1.10	MV
3V6R76	X	C191 C192	37.18 37.88	-6.00 -6.63	-11.10 -11.65	0.70	-0.63	-0.55	1.09	HP
67FY2V		C191 C192	37.95 38.66	-7.15 -7.70	-9.75 -10.28	0.70	-0.55	-0.53	1.04	MK
6AHY4D	X	C191 C192	37.17 37.96	-7.36 -7.85	-9.61 -10.18	0.78	-0.49	-0.57	1.09	GD
6QLJVB		C191 C192	38.11 38.85	-7.22 -7.75	-9.92 -10.47	0.74	-0.53	-0.55	1.06	XM
6QZZUA		C191 C192	37.81 38.72	-7.08 -7.58	-9.76 -10.29	0.91	-0.50	-0.54	1.17	XI
76GBZC		C191 C192	37.51 38.48	-7.11 -7.60	-9.78 -10.30	0.96	-0.49	-0.52	1.20	GD
79G9PJ		C191 C192	38.08 38.87	-7.17 -7.73	-9.83 -10.35	0.78	-0.55	-0.52	1.09	AQ
7TNRJK		C191 C192	37.85 38.69	-7.16 -7.73	-9.81 -10.41	0.84	-0.56	-0.60	1.17	AM
7WKFZR		C191 C192	37.94 38.71	-7.16 -7.68	-9.72 -10.25	0.77	-0.52	-0.53	1.07	XI
7XHQUA		C191 C192	38.04 38.97	-7.21 -7.66	-9.77 -10.30	0.94	-0.45	-0.53	1.17	XI
838KB9		C191 C192	37.70 38.57	-7.07 -7.61	-9.74 -10.30	0.86	-0.55	-0.56	1.17	XM
8HK2D4		C191 C192	37.82 38.67	-7.25 -7.72	-9.85 -10.36	0.84	-0.47	-0.52	1.10	XZ
9CQE4F		C191 C192	38.05 38.89	-7.22 -7.71	-9.83 -10.37	0.84	-0.49	-0.55	1.12	AJ
9D6PXE		C191 C192	37.86 38.73	-7.18 -7.67	-9.82 -10.38	0.88	-0.49	-0.55	1.15	XB

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
9ED3DV		C191	37.90	-7.23	-9.83	0.87	-0.54	-0.56	1.16	MM
		C192	38.76	-7.77	-10.38					
A68BWD		C191	38.00	-7.19	-9.76	0.80	-0.51	-0.53	1.09	AJ
		C192	38.81	-7.70	-10.29					
ACMZ88		C191	37.99	-7.22	-9.66	0.70	-0.55	-0.57	1.06	AS
		C192	38.69	-7.77	-10.23					
AF93YD		C191	38.01	-7.23	-9.68	0.86	-0.52	-0.56	1.15	AS
		C192	38.87	-7.74	-10.24					
AG3T37		C191	37.96	-7.07	-9.84	0.61	-0.53	-0.55	0.98	XO
		C192	38.57	-7.60	-10.39					
AX8ZG9		C191	38.05	-6.91	-9.77	0.79	-0.53	-0.57	1.11	MI
		C192	38.84	-7.44	-10.34					
BC4U6M		C191	37.81	-7.19	-9.64	0.98	-0.45	-0.52	1.19	XU
		C192	38.78	-7.64	-10.15					
BLC7K6		C191	37.86	-7.18	-9.67	0.99	-0.57	-0.56	1.27	AS
		C192	38.85	-7.75	-10.23					
BPCHF6		C191	38.03	-7.19	-9.68	0.92	-0.54	-0.57	1.21	AJ
		C192	38.95	-7.72	-10.25					
BVGE2Q		C191	38.11	-7.15	-9.81	0.78	-0.52	-0.53	1.08	AJ
		C192	38.90	-7.67	-10.34					
C3TPUG		C191	37.84	-7.11	-9.64	0.81	-0.53	-0.55	1.12	AJ
		C192	38.65	-7.64	-10.19					
C3TRJL		C191	37.91	-7.23	-9.78	0.76	-0.54	-0.51	1.06	AD
		C192	38.67	-7.77	-10.29					
CAV2QE		C191	37.80	-7.10	-9.60	0.69	-0.52	-0.57	1.03	XO
		C192	38.49	-7.62	-10.16					
CL92M8		C191	37.99	-7.32	-9.76	0.85	-0.51	-0.55	1.13	MV
		C192	38.84	-7.83	-10.30					
CYQYJV		C191	37.59	-6.96	-9.64	0.93	-0.46	-0.59	1.20	XH
		C192	38.52	-7.42	-10.23					
D37LX2	X	C191	37.72	-7.13	-9.26	0.81	-0.51	-0.52	1.10	XI
		C192	38.54	-7.65	-9.78					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
D843AU		C191	38.01	-7.17	-9.80	0.87	-0.53	-0.52	1.15	AJ
		C192	38.88	-7.70	-10.33					
DB4D7U		C191	38.14	-7.12	-9.75	0.85	-0.51	-0.55	1.13	AO
		C192	38.99	-7.62	-10.31					
DQUFHR		C191	38.11	-7.18	-9.73	0.76	-0.54	-0.57	1.09	MM
		C192	38.87	-7.71	-10.30					
E74LB3		C191	38.01	-7.19	-9.69	0.75	-0.53	-0.55	1.07	XI
		C192	38.76	-7.72	-10.23					
E8YAPR		C191	37.77	-7.08	-9.62	0.79	-0.47	-0.55	1.07	XH
		C192	38.57	-7.55	-10.17					
EJEVG2	X	C191	37.67	-7.00	-8.02	1.93	-0.65	-0.71	2.15	CA
		C192	39.59	-7.66	-8.73					
EK479U		C191	38.05	-7.19	-9.77	0.76	-0.53	-0.53	1.06	XI
		C192	38.81	-7.72	-10.30					
ELUL4N		C191	38.08	-7.17	-9.90	0.66	-0.56	-0.53	1.01	AO
		C192	38.74	-7.72	-10.43					
EV8B73		C191	38.10	-7.21	-9.77	0.84	-0.54	-0.54	1.14	AO
		C192	38.94	-7.75	-10.31					
EYJLWB		C191	38.05	-7.15	-9.63	0.82	-0.52	-0.55	1.11	AJ
		C192	38.87	-7.66	-10.18					
FPXHMQ		C191	37.79	-7.07	-9.67	0.81	-0.56	-0.56	1.13	XI
		C192	38.59	-7.63	-10.23					
G4AF6W		C191	37.83	-7.13	-9.78	0.85	-0.49	-0.54	1.12	XI
		C192	38.68	-7.62	-10.32					
GB978Y		C191	37.90	-7.21	-9.72	0.78	-0.54	-0.55	1.09	MM
		C192	38.68	-7.75	-10.27					
GKFWZ2		C191	38.07	-7.23	-9.71	0.79	-0.48	-0.57	1.08	AJ
		C192	38.86	-7.71	-10.28					
GP6JLU		C191	37.89	-7.13	-9.68	0.83	-0.48	-0.53	1.10	XM
		C192	38.72	-7.61	-10.21					
GRUKRH	X	C191	38.68	-6.94	-10.01	0.69	-0.47	-0.51	0.98	HH
		C192	39.37	-7.41	-10.53					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
GRX99W		C191	38.21	-7.31	-9.85	0.81	-0.52	-0.55	1.10	CA
		C192	39.01	-7.83	-10.39					
HGAH4V		C191	37.95	-7.09	-9.82	0.76	-0.51	-0.54	1.06	HP
		C192	38.71	-7.60	-10.36					
HMVTWQ		C191	38.13	-7.15	-9.70	0.83	-0.44	-0.60	1.11	HF
		C192	38.96	-7.60	-10.30					
HNQEJP		C191	37.93	-7.23	-9.69	0.96	-0.49	-0.53	1.20	AS
		C192	38.90	-7.73	-10.22					
JBY3TX	X	C191	37.74	-7.00	-9.45	0.90	-0.50	-0.60	1.19	XH
		C192	38.64	-7.50	-10.05					
JQCDJ7		C191	37.73	-7.21	-9.78	0.87	-0.51	-0.53	1.14	MM
		C192	38.60	-7.71	-10.31					
JUF4R7		C191	37.94	-7.24	-9.66	0.78	-0.54	-0.55	1.10	XI
		C192	38.72	-7.78	-10.21					
K2BFEM		C191	37.60	-7.36	-9.77	0.94	-0.52	-0.55	1.20	CA
		C192	38.54	-7.88	-10.32					
KVJ9UT		C191	37.78	-7.12	-9.71	0.70	-0.57	-0.53	1.05	XB
		C192	38.48	-7.69	-10.24					
KY49WV		C191	37.74	-7.18	-9.77	0.95	-0.52	-0.54	1.21	MV
		C192	38.69	-7.70	-10.31					
LDYY7X		C191	38.00	-7.21	-9.75	0.80	-0.55	-0.54	1.11	MM
		C192	38.80	-7.75	-10.29					
MWUP9J		C191	38.22	-7.23	-9.69	0.89	-0.53	-0.54	1.16	AS
		C192	39.11	-7.76	-10.22					
MXLWBV		C191	37.94	-7.14	-9.79	0.75	-0.55	-0.51	1.06	XI
		C192	38.69	-7.69	-10.30					
N3VL6N		C191	37.74	-7.06	-9.70	0.77	-0.51	-0.58	1.09	XH
		C192	38.51	-7.57	-10.28					
NB7MQP		C191	38.03	-7.19	-9.91	0.86	-0.54	-0.54	1.15	AQ
		C192	38.89	-7.72	-10.45					
NJHWZ4		C191	37.70	-7.22	-9.61	0.85	-0.59	-0.56	1.18	XO
		C192	38.56	-7.80	-10.17					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
NJYVBF		C191	37.96	-7.21	-9.69	0.92	-0.49	-0.52	1.16	XI
		C192	38.88	-7.70	-10.21					
P3A6PL		C191	38.07	-7.18	-9.76	0.88	-0.53	-0.51	1.15	AO
		C192	38.96	-7.71	-10.27					
PJEJ4U		C191	37.90	-7.13	-9.69	0.80	-0.53	-0.52	1.09	MM
		C192	38.70	-7.65	-10.21					
PQVCVK	X	C191	37.67	-7.49	-9.95	0.90	-0.50	-0.50	1.14	CA
		C192	38.57	-7.98	-10.45					
PQXZHP		C191	37.93	-7.09	-9.79	0.88	-0.48	-0.55	1.14	XI
		C192	38.81	-7.57	-10.34					
QMP4A7		C191	37.99	-7.19	-9.71	0.85	-0.51	-0.49	1.11	AJ
		C192	38.85	-7.70	-10.20					
QUR97W		C191	37.86	-7.18	-9.74	0.98	-0.49	-0.53	1.22	XB
		C192	38.84	-7.67	-10.27					
QWZ7V8		C191	37.83	-7.21	-9.82	1.00	-0.49	-0.51	1.23	AQ
		C192	38.83	-7.70	-10.33					
QXRK2W		C191	37.82	-7.01	-9.60	0.91	-0.48	-0.54	1.16	XH
		C192	38.73	-7.50	-10.14					
R72DNC		C191	38.10	-7.18	-9.73	0.97	-0.46	-0.51	1.19	MV
		C192	39.07	-7.64	-10.24					
R8RC4V		C191	37.85	-7.15	-9.82	0.87	-0.52	-0.54	1.15	XB
		C192	38.72	-7.67	-10.37					
T4BCHN		C191	38.05	-7.20	-9.78	0.70	-0.52	-0.55	1.03	HU
		C192	38.75	-7.73	-10.33					
TBA3KQ		C191	37.53	-7.23	-9.71	0.83	-0.53	-0.56	1.13	GD
		C192	38.36	-7.76	-10.28					
TGC34T	X	C191	37.96	-7.03	-10.05	0.70	-0.54	-0.54	1.03	AM
		C192	38.66	-7.56	-10.59					
TQ84MR		C191	37.74	-6.93	-9.65	0.79	-0.53	-0.52	1.08	XH
		C192	38.53	-7.46	-10.16					
TTQ3X2		C191	37.96	-7.20	-9.84	0.77	-0.54	-0.54	1.09	AH
		C192	38.74	-7.74	-10.38					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
UBQAP9		C191	37.94	-7.11	-9.84	0.86	-0.50	-0.53	1.12	XB
		C192	38.80	-7.61	-10.37					
UGBEFN		C191	37.96	-7.20	-9.79	0.80	-0.53	-0.49	1.07	MM
		C192	38.75	-7.73	-10.28					
UKAQCM		C191	37.81	-7.17	-9.79	0.78	-0.55	-0.55	1.10	XI
		C192	38.59	-7.72	-10.34					
UZ9TX2		C191	37.96	-7.22	-9.60	0.89	-0.47	-0.58	1.16	AS
		C192	38.84	-7.69	-10.18					
V38QJE		C191	37.82	-7.16	-9.68	0.78	-0.50	-0.50	1.06	MM
		C192	38.60	-7.66	-10.18					
V6EQZE		C191	38.03	-7.17	-9.78	0.67	-0.57	-0.54	1.03	AS
		C192	38.70	-7.74	-10.32					
VDQZAT		C191	37.95	-7.18	-9.82	0.89	-0.50	-0.56	1.16	XI
		C192	38.84	-7.68	-10.38					
VHJ6ZC		C191	37.70	-7.16	-9.88	0.78	-0.54	-0.51	1.08	XI
		C192	38.48	-7.69	-10.39					
VP2BY4		C191	37.89	-7.26	-9.81	0.80	-0.55	-0.55	1.12	XB
		C192	38.69	-7.81	-10.37					
VW83BM		C191	38.12	-7.19	-9.75	0.78	-0.53	-0.52	1.07	AS
		C192	38.90	-7.72	-10.27					
W6E2FH		C191	37.68	-6.97	-9.54	0.77	-0.59	-0.53	1.10	MI
		C192	38.45	-7.57	-10.07					
WK64ZR		C191	38.00	-7.17	-9.71	0.72	-0.53	-0.52	1.04	MM
		C192	38.73	-7.70	-10.23					
WZW3KZ		C191	37.97	-7.22	-9.76	0.84	-0.51	-0.53	1.11	MM
		C192	38.81	-7.72	-10.29					
XN39NW		C191	38.19	-7.06	-9.74	0.84	-0.48	-0.55	1.11	XH
		C192	39.03	-7.54	-10.28					
XXLKYA		C191	38.25	-7.25	-9.81	0.85	-0.50	-0.54	1.12	AO
		C192	39.10	-7.75	-10.34					
YL8MU6		C191	37.88	-7.23	-9.70	0.92	-0.50	-0.54	1.18	AS
		C192	38.80	-7.73	-10.24					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
YPRKEP		C191	38.00	-7.27	-9.71	0.90	-0.49	-0.52	1.15	MT
		C192	38.90	-7.76	-10.23					
YX4UQP	X	C191	37.43	-5.53	-10.61	0.82	-0.44	-0.60	1.11	AS
		C192	38.26	-5.97	-11.21					
Z6WN2R		C191	38.32	-7.00	-9.65	0.60	-0.57	-0.62	1.04	SH
		C192	38.93	-7.57	-10.27					
ZL7GMA		C191	38.09	-7.23	-9.74	0.89	-0.47	-0.55	1.15	AR
		C192	38.99	-7.71	-10.29					
ZYRR9F		C191	37.75	-7.13	-9.91	0.77	-0.55	-0.58	1.11	XM
		C192	38.52	-7.68	-10.49					
ZYUEWK		C191	38.10	-7.22	-9.85	0.66	-0.55	-0.55	1.02	MU
		C192	38.76	-7.77	-10.40					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
C191	37.92	-7.16	-9.75	0.82	-0.52	-0.54	1.12
C192	38.74	-7.68	-10.29				
Stnd Dev Btwn Labs							
C191	0.16	0.08	0.09	0.08	0.03	0.02	0.05
C192	0.17	0.09	0.09				

Statistics based on 93 of 102 reporting participants

Comments Assigned on Data Flags for Test #409

3V6R76(X) - Low "L*" values & very low "b*" values. Very high "a*" values.

6AHY4D(X) - Low "L*" values.

D37LX2(X) - High "b*" values.

EJEVG2(X) - High "L*" values for C192. Large replication difference for "L*" values. Large replication difference for "a*" & "b*" Sample C191. Very high "b*" values. High Delta L & E, low Delta a & b.

GRUKRH(X) - High "L*" values.

JBY3TX(X) - High "b*" values.

PQVCVK(X) - Low "a*" values.

TGC34T(X) - Low "b*" values.

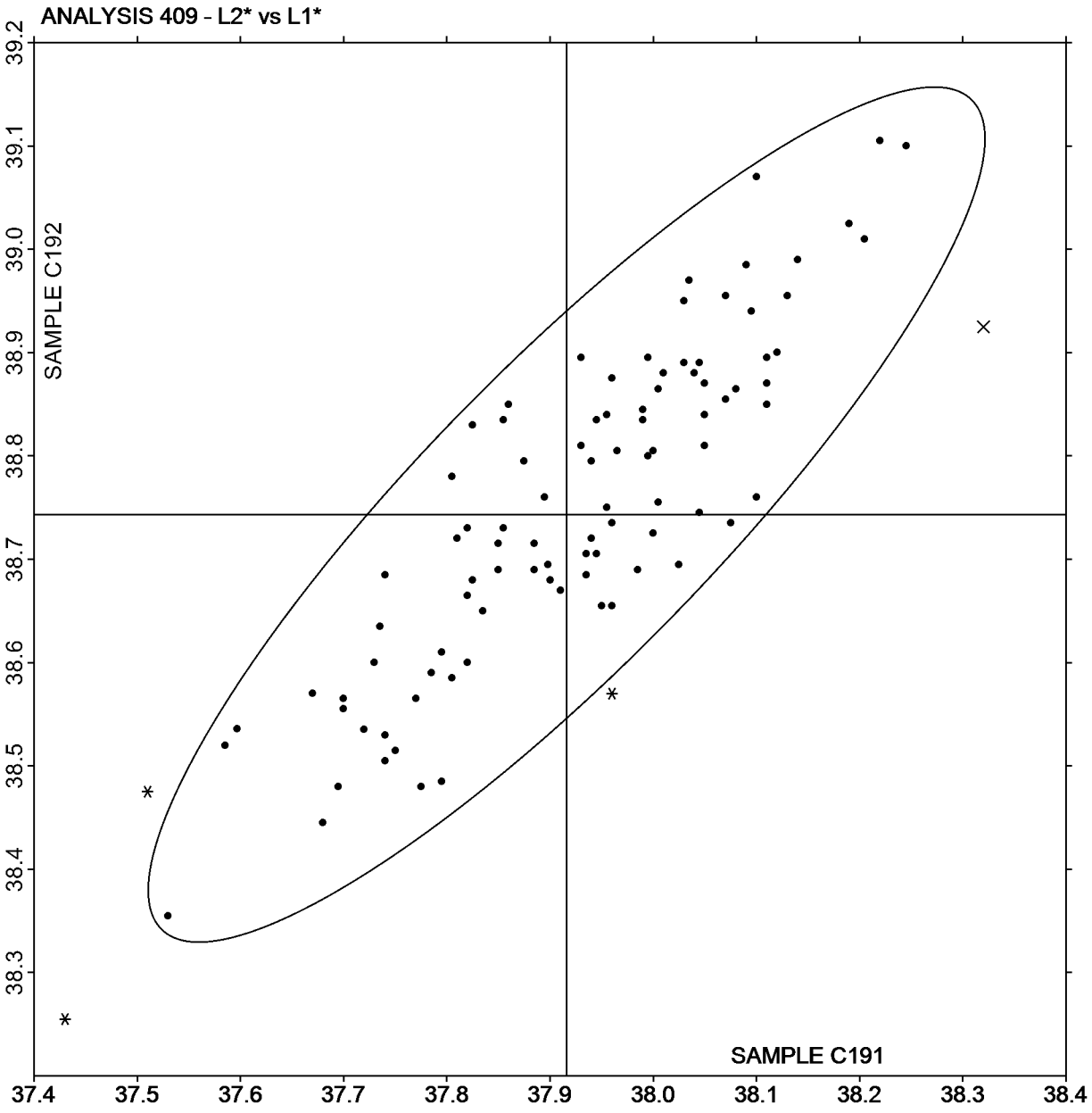
YX4UQP(X) - Very high "a*" & very low "b*" values.

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
HF	Hunter ColorFlex Diffuse	HH	Hunter ColorQUEST XE
HP	Hunter UltraScan PRO	HU	Hunter UltraScan
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
SH	SIMADZU UV 3101PC	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
XU	X-Rite Color Premier 8200 Spectrophotometer	XZ	X-Rite

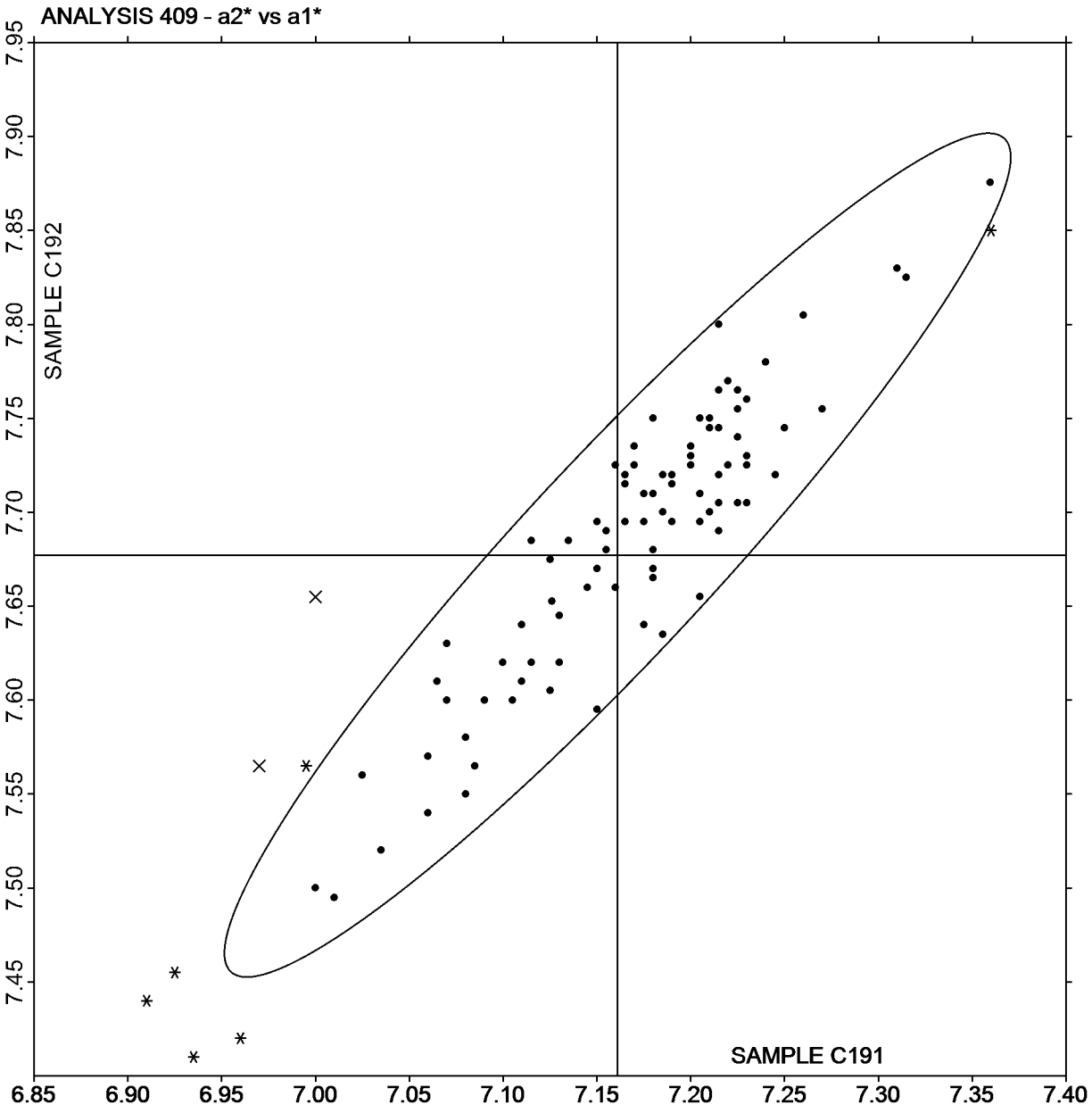
L2* vs L1*

SAMPLE C191 = 37.92 SAMPLE C192 = 38.74



a2* vs a1*

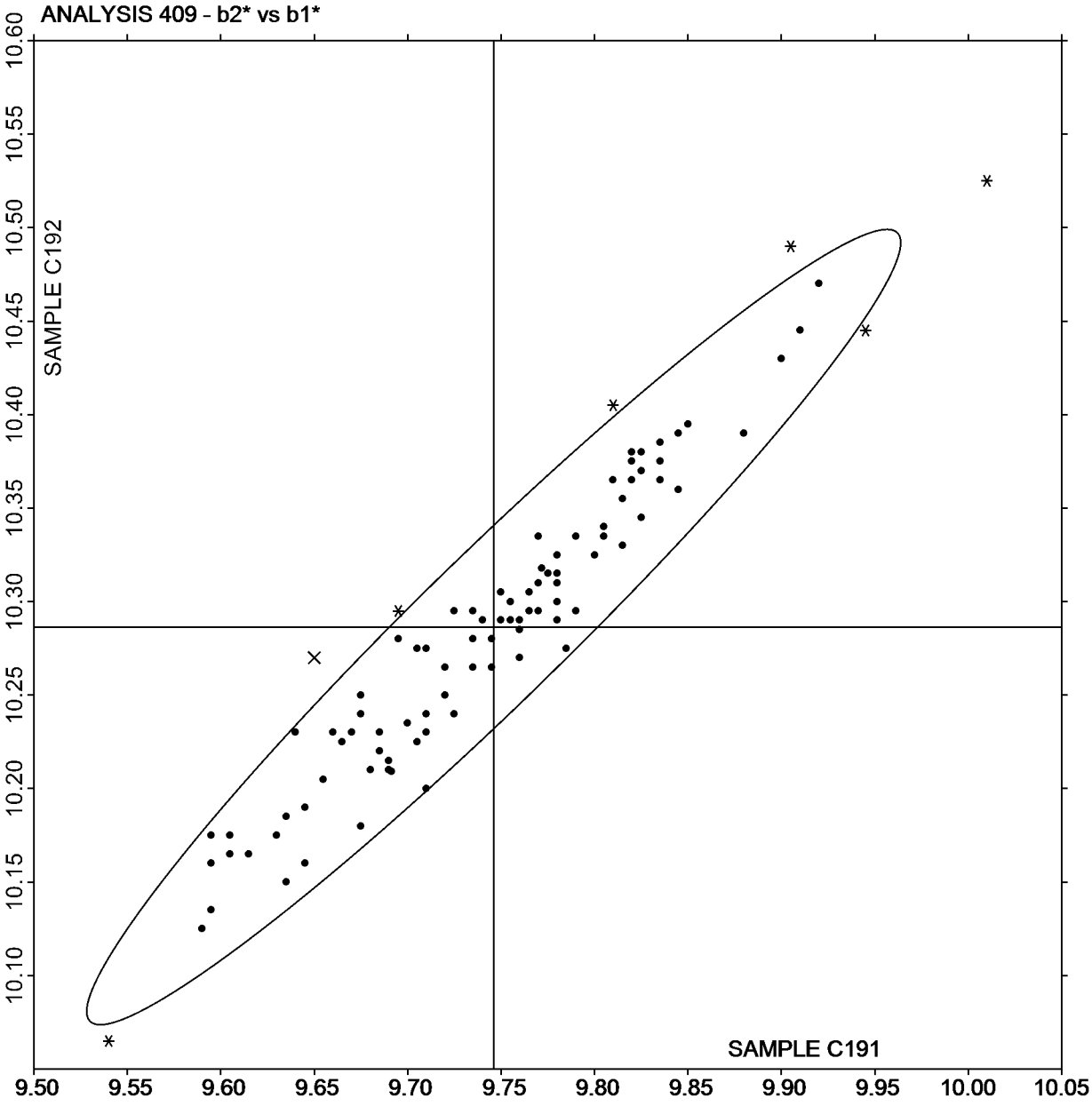
SAMPLE C191 = -7.16 SAMPLE C192 = -7.68



Plot created using absolute values.

b2* vs b1*

SAMPLE C191 = -9.75 SAMPLE C192 = -10.29



Plot created using absolute values.

Spectrophotometric Reflectance values (as %) at selected wavelengths

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
								Sample C191										
3V6R76		12.52	13.67	13.80	13.65	13.16	12.78	12.09	9.95X	8.70X	7.80*	7.20	6.81	6.71*	6.91	6.58X	6.43	HP
67FY2V		12.50	13.59	13.81	13.63	13.22	12.80	12.17	11.07	9.38	7.97	7.22	6.91	6.88	7.01	6.90	6.62	MK
6AHY4D	X	11.97*	12.92X	13.21X	13.10X	12.70X	12.30X	11.70X	10.66*	8.99X	7.55X	6.84X	6.54X	6.50X	6.63X	6.55X	6.29X	XX
6QLJVB		12.79	13.84	14.00	13.79	13.38	12.95	12.33	11.17	9.41	7.99	7.27	6.95	6.90	7.05	6.96	6.65	XF
6QZZUA		12.49	13.54	13.74	13.49	13.13	12.71	12.09	10.97	9.26	7.88	7.21	6.90	6.83	6.97	6.83	6.57	XI
76GBZC		12.87	13.35	13.48*	13.41	13.03	12.55*	11.95*	10.81	9.05*	7.79*	7.03X	6.88	6.70*	6.85	6.71	6.47	GD
79G9PJ		13.58X	13.76	13.90	13.73	13.32	12.90	12.27	11.15	9.44	7.99	7.31	6.95	6.90	7.00	6.87	6.65	AQ
7TNRJK		12.57	13.60	13.77	13.52	13.18	12.75	12.14	11.04	9.29	7.90	7.21	6.86	6.78	6.80*	6.80	6.56	AM
7WKFZR		12.65	13.60	13.78	13.61	13.18	12.81	12.18	11.08	9.34	7.94	7.23	6.92	6.85	6.95	6.79	6.47	XI
7XHQUA		12.56	13.70	13.89	13.66	13.25	12.90	12.23	11.11	9.42	8.01	7.24	6.95	6.85	7.03	6.89	6.56	XI
838KB9		12.85	13.60	13.90	13.65	13.20	12.80	12.20	11.00	9.30	7.90	7.20	6.90	6.90	7.20X	6.80	6.60	HW
8HK2D4		12.54	13.57	13.75	13.56	13.16	12.75	12.11	11.00	9.30	7.86	7.15	6.83	6.73	6.87	6.73	6.44	XZ
9CQE4F		12.62	13.73	13.90	13.69	13.32	12.90	12.25	11.15	9.40	7.97	7.27	6.92	6.86	6.95	6.85	6.64	AJ
9ED3DV		12.49	13.60	13.79	13.62	13.22	12.78	12.16	11.04	9.35	7.91	7.19	6.85	6.80	6.95	6.84	6.55	MM
A68BWD		12.53	13.69	13.84	13.66	13.28	12.85	12.22	11.09	9.42	7.95	7.26	6.92	6.85	6.96	6.89	6.64	AJ
ACMZ88		12.55	13.59	13.77	13.62	13.22	12.81	12.20	11.11	9.40	7.96	7.26	6.92	6.87	7.00	6.90	6.66	AS
AF93YD		12.56	13.59	13.82	13.62	13.26	12.85	12.22	11.11	9.44	7.98	7.29	6.92	6.84	6.97	6.86	6.68	AS
AG3T37		12.55	13.70	13.75	13.71	13.29	12.88	12.21	11.12	9.37	7.98	7.26	6.94	6.92	7.04	6.94	6.64	XO
AX8ZG9		12.57	13.67	13.89	13.69	13.26	12.82	12.23	11.08	9.42	8.03	7.32	7.04	6.99*	7.13	7.00	6.78	MI
BLC7K6		12.78	13.53	13.67	13.54	13.17	12.74	12.07	11.02	9.34	7.93	7.23	6.88	6.82	6.90	6.82	6.58	AS
BPCHF6		13.78X	13.66	13.82	13.64	13.24	12.84	12.21	11.13	9.44	7.98	7.28	6.93	6.89	6.98	6.92	6.67	AJ
BVGE2Q		12.79	13.78	13.91	13.76	13.39	12.92	12.25	11.17	9.48	7.99	7.30	6.98	6.92	7.01	6.88	6.70	AJ
C3TRJL		12.50	13.61	13.78	13.59	13.25	12.78	12.16	11.05	9.35	7.91	7.20	6.89	6.83	6.92	6.83	6.40	AE

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 C191										
CAV2QE		12.31	13.39	13.63	13.49	13.10	12.66	12.08	10.99	9.29	7.91	7.21	6.87	6.86	6.97	6.89	6.59	XO
CL92M8		12.47	13.64	13.86	13.58	13.21	12.94	12.21	11.11	9.41	7.90	7.23	6.91	6.80	7.05	6.91	6.60	MV
CYQYJV		12.07	13.35	13.52*	13.30*	12.92*	12.50*	11.93*	10.80	9.19	7.82	7.12	6.83	6.82	6.90	6.78	6.55	XH
D37LX2		12.00*	13.18X	13.43X	13.30*	12.90*	12.58	11.98	10.93	9.28	7.91	7.20	6.90	6.83	6.92	6.78	6.49	XI
D843AU		12.70	13.76	13.85	13.66	13.28	12.85	12.21	11.10	9.44	7.96	7.28	6.94	6.85	6.95	6.86	6.70	AJ
DB4D7U		12.80	13.80	13.90	13.80	13.40	12.90	12.20	11.20	9.50	8.00	7.35	7.00	6.90	7.10	7.00	6.75	AO
DQUFHR		12.57	13.70	13.90	13.73	13.32	12.89	12.27	11.16	9.47	8.03	7.30	6.98	6.93	7.06	6.96	6.67	MM
E8YAPR		12.08	13.44	13.63	13.47	13.05	12.67	12.03	10.94	9.27	7.90	7.50X	6.89	6.82	6.94	6.81	6.53	XH
EJEVG2	X	11.05X	12.35X	12.82X	12.85X	12.61X	12.34X	11.85X	10.90	9.36	7.99	7.39	7.10*	7.03X	7.16*	7.12X	6.82	CA
EK479U		12.62	13.74	13.87	13.69	13.26	12.88	12.24	11.15	9.41	7.99	7.28	6.95	6.86	6.96	6.86	6.53	XI
ELUL4N		12.69	13.78	13.90	13.80	13.37	12.92	12.22	11.16	9.43	7.99	7.27	6.95	6.88	6.99	6.89	6.68	AO
EV8B73		12.68	13.71	13.89	13.74	13.35	12.90	12.25	11.17	9.48	8.00	7.29	6.96	6.90	7.00	6.96	6.70	AO
FPXHMQ		12.34	13.48	13.65	13.46	13.08	12.70	12.06	10.95	9.26	7.87	7.21	6.89	6.84	6.97	6.82	6.56	XI
G4AF6W		12.59	13.56	13.72	13.54	13.13	12.74	12.12	10.96	9.28	7.92	7.19	6.87	6.81	6.93	6.75	6.47	XI
GB978Y	X	19.29X	23.58X	25.33X	26.68X	27.00X	27.05X	25.89X	22.14X	17.34X	15.16X	14.56X	15.18X	18.62X	21.02X	18.92X	17.72X	MM
GKFWZ2		12.69	13.66	13.86	13.69	13.29	12.86	12.25	11.16	9.45	8.01	7.29	6.95	6.86	6.97	6.93	6.65	AJ
GP6JLU		12.38	13.56	13.75	13.53	13.18	12.76	12.13	11.04	9.33	7.93	7.22	6.88	6.86	6.97	6.88	6.61	XM
GRUKRH	X	13.20*	14.24X	14.56X	14.19X	13.73X	13.27X	12.66X	11.48X	9.81X	8.30X	7.58X	7.24X	7.20X	7.35X	7.21X	6.94X	HH
GRX99W		12.83	13.75	14.04*	13.85	13.44	13.00	12.38*	11.25	9.50	8.03	7.29	6.96	6.90	7.06	6.95	6.64	CA
HGAH4V		12.81	13.70	13.83	13.64	13.23	12.76	12.20	11.03	9.38	7.91	7.25	6.89	6.88	7.11	6.73	6.62	HP
HMVTWQ		12.52	13.87	13.79	13.74	13.28	12.96	12.33	11.11	9.48	8.07	7.27	7.12X	6.83	7.21X	7.11X	7.21X	HF
HNQEJP		12.60	13.54	13.76	13.60	13.22	12.78	12.12	11.06	9.37	7.95	7.24	6.90	6.83	6.91	6.85	6.64	AS

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 C191																		
JBY3TX		12.34	13.32	13.53*	13.36*	12.97	12.63	11.99	10.90	9.25	7.93	7.20	6.92	6.87	6.99	6.87	6.61	XH
JUF4R7		12.46	13.53	13.74	13.59	13.20	12.81	12.17	11.07	9.37	7.96	7.26	6.91	6.82	6.93	6.83	6.64	XI
K2BFEM		12.39	13.29*	13.58	13.40	13.01	12.60	12.00	10.90	9.17	7.73X	7.02X	6.70X	6.63X	6.80*	6.69	6.39	CA
KVJ9UT		12.54	13.49	13.68	13.48	13.08	12.66	12.05	10.98	9.28	7.89	7.16	6.84	6.76	6.90	6.79	6.51	XB
KY49WV		12.40	13.51	13.66	13.51	13.06	12.70	12.08	10.96	9.23	7.84	7.12	6.84	6.76	6.93	6.84	6.54	MV
LDYY7X		12.54	13.63	13.84	13.67	13.25	12.83	12.19	11.11	9.41	7.98	7.23	6.93	6.87	7.01	6.92	6.61	MM
MXLWBV		12.58	13.70	13.78	13.61	13.19	12.83	12.16	11.07	9.31	7.96	7.27	6.91	6.85	6.98	6.84	6.63	XI
N3VL6N		12.21	13.45	13.66	13.46	13.04	12.61	12.03	10.96	9.24	7.90	7.17	6.83	6.79	6.95	6.80	6.52	XH
NB7MQP		13.47X	13.70	13.92	13.71	13.27	12.88	12.28	11.12	9.39	7.95	7.25	6.95	6.85	6.92	6.79	6.61	AQ
NJHWZ4		12.10	13.27*	13.55	13.35*	12.99	12.61	12.02	10.93	9.18	7.79*	7.10	6.78	6.75	6.88	6.78	6.51	XO
NJYVBF		12.58	13.65	13.77	13.61	13.22	12.80	12.19	11.08	9.37	7.96	7.23	6.92	6.86	7.00	6.82	6.56	XI
P3A6PL		12.79	13.72	13.84	13.71	13.31	12.90	12.25	11.15	9.48	7.99	7.30	6.94	6.89	6.97	6.98	6.70	AO
PJEJ4U		12.34	13.59	13.74	13.56	13.18	12.77	12.13	11.02	9.35	7.92	7.23	6.92	6.86	6.95	6.84	6.56	MM
PQVCVK		12.60	13.57	13.84	13.68	13.28	12.86	12.22	11.14	9.40	7.94	7.22	6.89	6.82	6.98	6.88	6.58	CA
PQXZHP		12.54	13.69	13.82	13.62	13.21	12.77	12.18	11.06	9.35	7.96	7.24	6.89	6.87	6.99	6.84	6.54	XI
QMP4A7		12.61	13.64	13.80	13.63	13.26	12.85	12.21	11.12	9.39	7.96	7.29	6.92	6.87	6.95	6.81	6.66	AJ
QUR97W		12.49	13.54	13.74	13.54	13.15	12.73	12.11	11.01	9.32	7.91	7.19	6.86	6.77	6.92	6.77	6.49	XB
QWZ7V8		12.40	13.53	13.71	13.58	13.20	12.78	12.09	10.98	9.31	7.87	7.19	6.84	6.80	6.87	6.78	6.56	AQ
QXRK2W		12.33	13.43	13.65	13.48	13.10	12.66	12.05	10.98	9.29	7.94	7.24	6.93	6.90	7.02	6.85	6.57	XH
R72DNC		12.66	13.69	13.90	13.74	13.35	12.91	12.29	11.17	9.41	8.00	7.32	6.99	6.97	7.11	7.01	6.71	MV
R8RC4V		12.62	13.59	13.76	13.57	13.18	12.74	12.11	11.01	9.30	7.90	7.19	6.86	6.79	6.94	6.83	6.54	XB
T4BCHN		12.50	13.69	13.85	13.73	13.30	12.89	12.22	11.11	9.45	8.02	7.26	6.93	6.83	7.12	6.69	6.52	HU
TBA3KQ		12.80	13.25*	13.46*	13.33*	12.88X	12.44X	11.91*	11.00	9.07*	7.81	7.08*	6.55X	6.70*	6.82	6.75	6.48	GD

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 C191																		
TGC34T		12.63	13.83	13.97	13.71	13.28	12.83	12.20	11.05	9.34	7.95	7.26	6.92	6.86	6.94	6.84	6.57	AM
TTQ3X2		12.53	13.69	13.82	13.66	13.24	12.79	12.20	11.09	9.39	7.93	7.24	6.88	6.82	6.90	6.80	6.60	AH
UBQAP9		12.67	13.68	13.86	13.63	13.22	12.79	12.17	11.07	9.37	7.94	7.23	6.92	6.86	6.97	6.85	6.57	XB
UGBEFN		12.51	13.64	13.80	13.65	13.22	12.82	12.18	11.07	9.39	7.95	7.21	6.90	6.84	6.99	6.88	6.59	MM
UKAQCM		12.49	13.55	13.70	13.53	13.15	12.71	12.12	10.96	9.27	7.89	7.15	6.86	6.85	6.94	6.74	6.52	XI
UZ9TX2		12.55	13.53	13.74	13.56	13.22	12.81	12.15	11.08	9.38	7.98	7.29	6.90	6.85	6.94	6.90	6.66	AJ
V38QJE		12.33	13.48	13.67	13.52	13.13	12.70	12.08	10.99	9.33	7.89	7.17	6.85	6.81	6.92	6.84	6.56	MM
V6EQZE		12.70	13.64	13.86	13.67	13.27	12.85	12.21	11.12	9.42	7.97	7.29	6.94	6.86	6.96	6.90	6.69	AS
VDQZAT		12.54	13.68	13.79	13.63	13.22	12.81	12.16	11.09	9.36	7.94	7.21	6.90	6.84	6.96	6.81	6.51	XI
VP2BY4		12.56	13.60	13.80	13.59	13.20	12.78	12.15	11.05	9.34	7.91	7.18	6.83	6.74	6.90	6.76	6.43	XB
VW83BM		12.75	13.74	13.92	13.74	13.34	12.93	12.31	11.20	9.48	8.02	7.35	6.97	6.90	7.03	6.93	6.72	AS
W6E2FH		12.14	13.31*	13.54	13.34*	12.98	12.54*	11.94*	10.91	9.25	7.87	7.19	6.90	6.78	6.95	6.84	6.63	MI
WK64ZR		12.55	13.62	13.84	13.64	13.25	12.84	12.22	11.10	9.40	7.98	7.26	6.95	6.88	7.02	6.92	6.63	MM
WZW3KZ		12.48	13.60	13.82	13.64	13.23	12.82	12.18	11.07	9.38	7.95	7.22	6.90	6.84	7.00	6.88	6.60	MM
XN39NW		12.59	13.81	13.97	13.78	13.35	12.93	12.31	11.20	9.50	8.09*	7.37	7.05	6.99*	7.12	6.99	6.68	XH
XXLKYA		12.80	13.80	14.00	13.80	13.50*	13.10*	12.40*	11.25	9.50	8.05	7.40*	7.00	6.90	7.10	7.00	6.80	AO
YL8MU6		12.70	13.58	13.70	13.54	13.20	12.80	12.14	11.03	9.33	7.89	7.23	6.87	6.83	6.92	6.79	6.58	AS
YPRKEP		12.40	13.60	13.82	13.67	13.25	12.84	12.22	11.13	9.40	7.96	7.25	6.90	6.83	6.98	6.88	6.59	MT
YX4UQP		12.58	13.63	13.79	13.61	13.23	12.83	12.20	11.08	9.39	7.94	7.23	6.90	6.82	6.95	6.93	6.67	AS
Z6WN2R		12.74	13.78	14.06*	13.82	13.41	12.98	12.40*	11.28	9.58	8.14X	7.46X	7.15X	7.07X	7.22X	7.13X	6.81	SH
ZYRR9F		12.44	13.53	13.74	13.53	13.12	12.73	12.07	10.94	9.21	7.83	7.14	6.82	6.78	6.92	6.84	6.54	XF
ZYUEWK		12.53	13.77	13.94	13.81	13.37	12.92	12.32	11.18	9.43	7.99	7.29	6.95	6.90	7.05	6.96	6.66	MV

Summary Statistics

	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700
Grand Means	12.58	13.60	13.78	13.61	13.21	12.79	12.17	11.05	9.35	7.94	7.24	6.91	6.84	6.97	6.85	6.60
SD Btwn Labs	0.27	0.14	0.13	0.12	0.12	0.12	0.10	0.15	0.12	0.07	0.08	0.07	0.07	0.08	0.09	0.11

Comments Assigned on Data Flags for Test #411

6AHY4D (X) - Low % reflectance data for almost all wavelengths.

EJEVG2 (X) - High and low % reflectance data at various wavelengths.

GB978Y (X) - Very high % reflectance data at all wavelengths.

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

Key to Instrument Codes Reported by Participants

AE ACS-Datacolor 110
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
HF Hunter ColorFlex Diffuse
HH Hunter ColorQUEST XE
HP Hunter UltraScan PRO
HU Hunter UltraScan
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
SH SIMADZU UV 3101PC
XB X-Rite Ci7000 Series Benchtop Spectrophotometer
XF X-Rite Ci6x Series Portable Spectrophotometer
XH X-Rite Color i5
XI X-Rite Color i7
XM X-Rite SP62
XO X-Rite SP64
XX Instrument make/model not specified by lab
XZ X-Rite

WebCode	Data Flag	Sample G191 Lab Mean	Sample G191 Diff from Grand Mean	Sample G191 CPV	Sample G192 Lab Mean	Sample G192 Diff from Grand Mean	Sample G192 CPV	Instr Code
367EX2		50.73	-0.35	-0.51	61.63	0.18	0.27	GN
3PX7FM		50.45	-0.62	-0.92	61.48	0.03	0.04	GL
3WK4WM		49.95	-1.12	-1.65	60.90	-0.55	-0.81	GK
76GBZC		49.73	-1.35	-1.99	60.45	-1.00	-1.48	GN
7RU7QU	X	57.15	6.08	8.95	57.15	-4.30	-6.40	GK
838KB9		50.30	-0.77	-1.14	60.83	-0.62	-0.92	GK
83ABJB		50.28	-0.80	-1.18	61.38	-0.07	-0.10	GB
9D6PXE		51.05	-0.02	-0.03	60.58	-0.87	-1.30	GL
ACMZ88		50.93	-0.15	-0.22	61.23	-0.22	-0.33	GL
AG3T37		50.28	-0.80	-1.18	61.10	-0.35	-0.51	MW
AGWGGV		51.83	0.75	1.11	62.43	0.98	1.46	GN
AX8ZG9		50.95	-0.12	-0.18	61.40	-0.05	-0.07	GL
AY2NVX		51.30	0.23	0.33	61.88	0.43	0.64	GK
BC4U6M		52.13	1.05	1.55	62.15	0.70	1.05	GK
BVGE2Q	*	50.80	-0.27	-0.40	60.15	-1.30	-1.93	GL
C3TPUG		51.25	0.18	0.26	62.08	0.63	0.94	GL
C3TRJL		51.55	0.48	0.70	62.03	0.58	0.86	GL
CAV2QE	*	52.05	0.98	1.44	61.05	-0.40	-0.59	GN
CXJCBX		51.63	0.55	0.81	61.55	0.10	0.16	GL
E74LB3		51.35	0.28	0.41	61.70	0.25	0.38	GL
E8YAPR		51.40	0.33	0.48	62.03	0.58	0.86	GL
ECVRAY		50.73	-0.35	-0.51	61.00	-0.45	-0.66	GL
EJEVG2		52.08	1.00	1.47	62.38	0.93	1.39	GL
EQPG4A		50.95	-0.12	-0.18	61.58	0.13	0.19	GL
EYJLWB	X	59.33	8.25	12.15	73.53	12.08	18.01	KB
F3Z7G7		51.90	0.83	1.22	62.20	0.75	1.13	GN
F72ELF	X	27.05	-24.02	-35.38	26.53	-34.92	-52.06	GL
FPXHMQ		50.80	-0.27	-0.40	61.20	-0.25	-0.37	MM
FYGXA7		51.53	0.45	0.66	61.78	0.33	0.49	GN
G4AF6W		51.85	0.77	1.14	62.23	0.78	1.17	GL

WebCode	Data Flag	Sample G191 Lab Mean	Sample G191 Diff from Grand Mean	Sample G191 CPV	Sample G192 Lab Mean	Sample G192 Diff from Grand Mean	Sample G192 CPV	Instr Code
GB978Y		51.30	0.23	0.33	61.35	-0.10	-0.14	GL
GRUKRH		50.76	-0.31	-0.46	60.96	-0.48	-0.72	RA
GYGBED		50.38	-0.70	-1.03	61.48	0.03	0.04	GL
HFK8C3		51.30	0.23	0.33	61.65	0.20	0.31	GL
HZ8WKA		51.70	0.63	0.92	61.65	0.20	0.31	GN
J3Q7D8	*	49.10	-1.97	-2.91	60.00	-1.45	-2.15	GK
JBKB89		50.58	-0.50	-0.73	61.53	0.08	0.12	GL
JBY3TX		50.93	-0.15	-0.22	61.75	0.30	0.45	GL
JPLE3M		51.05	-0.02	-0.03	60.53	-0.92	-1.37	RA
JUF4R7		50.80	-0.27	-0.40	60.90	-0.55	-0.81	GL
KZFTZX	X	48.90	-2.17	-3.20	57.85	-3.60	-5.36	RA
LDYY7X		50.23	-0.85	-1.25	60.20	-1.25	-1.86	RA
LZF3F2		51.95	0.88	1.29	62.50	1.05	1.57	GN
MXLWBV		50.73	-0.35	-0.51	61.55	0.10	0.16	GL
MZPGEU		51.70	0.63	0.92	62.05	0.60	0.90	GL
NB7MQP	*	49.15	-1.92	-2.83	59.58	-1.87	-2.79	GK
NJHWZ4		51.88	0.80	1.18	62.13	0.68	1.01	GL
PQXZHP		52.03	0.95	1.40	61.90	0.45	0.68	GK
QBVX9V		50.90	-0.17	-0.26	61.23	-0.22	-0.33	GX
QMP4A7		50.38	-0.70	-1.03	60.25	-1.20	-1.78	MW
QXRK2W		51.08	0.00	0.00	61.90	0.45	0.68	GK
TBA3KQ		50.93	-0.15	-0.22	61.23	-0.22	-0.33	GK
TQ84MR		51.29	0.21	0.31	61.54	0.09	0.14	GL
UKAQCM		51.43	0.35	0.52	61.95	0.50	0.75	GL
UNTXJM		51.35	0.28	0.41	60.93	-0.52	-0.78	GL
UZ9TX2		50.83	-0.25	-0.37	61.60	0.15	0.23	GK
VHJ6ZC		51.20	0.13	0.19	62.40	0.95	1.42	GL
VP2BY4		51.95	0.88	1.29	61.90	0.45	0.68	ZA
VW2YAG		51.03	-0.05	-0.07	61.08	-0.37	-0.55	GL
W6E2FH		51.65	0.58	0.85	62.35	0.90	1.35	GL

Interlaboratory Testing Program for Color & Appearance

Analysis 440

60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample G191 Lab Mean	Sample G191 Diff from Grand Mean	Sample G191 CPV	Sample G192 Lab Mean	Sample G192 Diff from Grand Mean	Sample G192 CPV	Instr Code
XN39NW		50.75	-0.32	-0.48	61.38	-0.07	-0.10	GL
YR2KJW		51.63	0.55	0.81	61.50	0.05	0.08	GK
ZL7GMA		51.73	0.65	0.96	62.60	1.15	1.72	GN
ZYRR9F		51.63	0.55	0.81	61.70	0.25	0.38	GK
ZYUEWK		50.53	-0.55	-0.81	60.63	-0.82	-1.22	GL

Summary Statistics

	Sample G191	Sample G192
Grand Means	51.07 Gloss Units	61.45 Gloss Units
Stnd Dev Btwn Labs	0.68 Gloss Units	0.67 Gloss Units

Statistics based on 61 of 65 reporting participants

Comments on Assigned Data Flags for Test #440

7RU7QU(X) - Extreme data.

EYJLWB(X) - Extreme data.

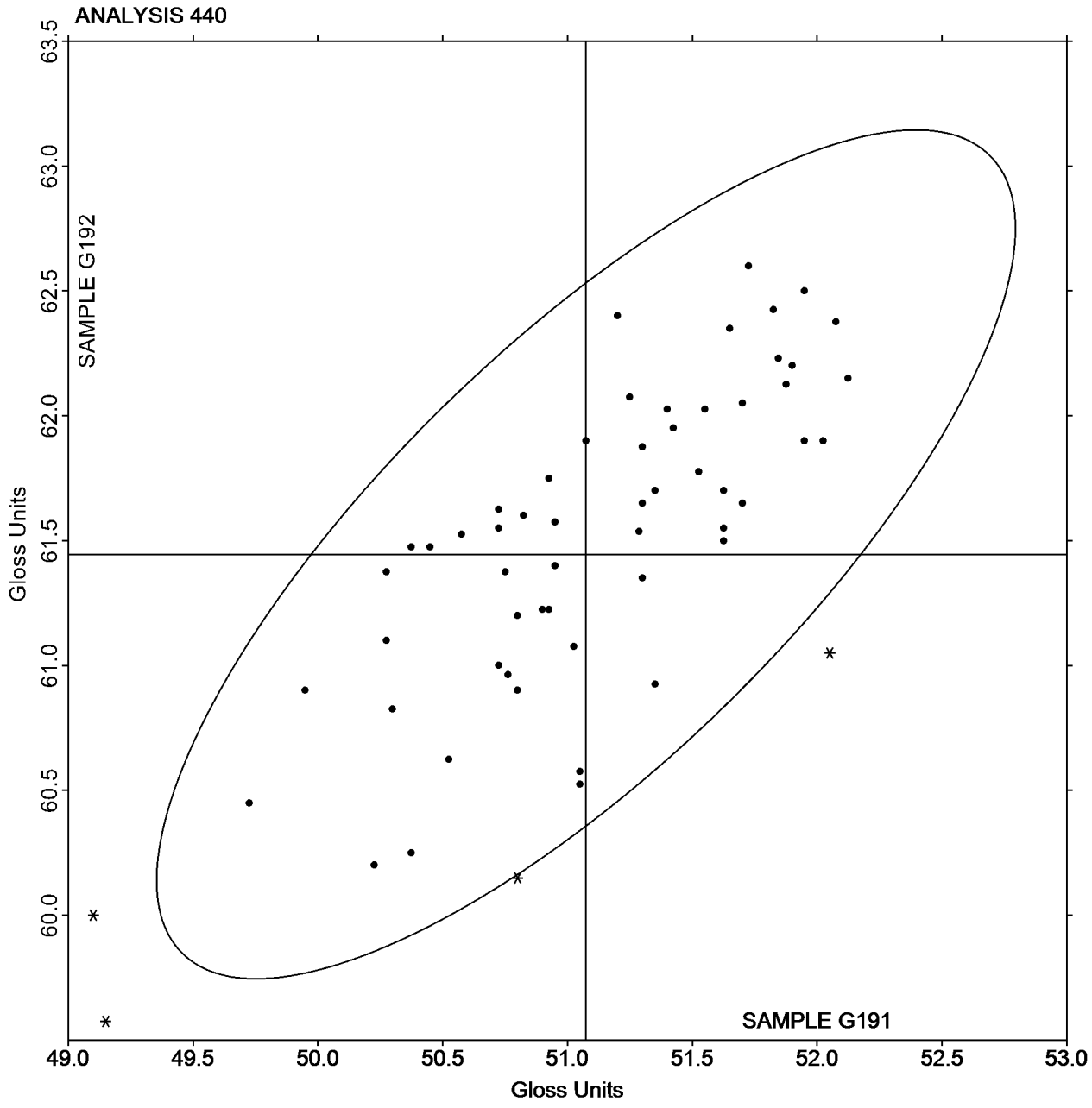
F72ELF(X) - Extreme data.

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

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
GX	BYK-Gardner (model not specified)	KB	KSJ MG268 Multiangle Glossmeter
MM	Macbeth Lab-Gloss	MW	Minolta Multi-Gloss 268
RA	Rhopoint Novo-Gloss Glossmeter	ZA	Zehntner ZGM Series

SAMPLE G191 = 51.07 Gloss Units SAMPLE G192 = 61.45 Gloss Units



-End of Report-