Collaborative Testing Services, Inc.

Color & Appearance Testing Program

Summary Report #206 - 4th Qtr 2023

About the Color Program, About CTS

Key to Tables and Graphs (Color Tests)

Key to Tables and Graphs (Spectro Test)

Key to Tables and Graphs (Gloss Tests)

Analysis	Analysis Name
408	Color & Color Difference-45-0, D65/10° Observer
409	Color & Color Difference Sphere, D65/10°Observer
411	Spectrophotometric - Sphere
440	Gloss 60 Degree

About The Color & Appearance Program

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

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

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

ABOUT CTS

Founded in 1971, Collaborative Testing Services, Inc. (CTS) is a privately - owned company that specializes in interlaboratory tests for a variety of industries including color, rubber, plastics, fasteners and metals, containerboard, paper, agriculture, hemp, and wine, as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality assurance objectives. Labs from the U.S., as well as more than 100 countries, currently participate in the CTS programs.

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Key for Color Program Web Summary Report

WebCode — Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Color Report published on the CTS web site. The Web Code for each analysis can be found in the Performance Analysis Report emailed to each participant.

Lab Mean — The average of the 2 test results obtained by the participant for CIE L*,a*,b* color space values.

Grand Mean — The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.

Between-Lab Standard Deviation — An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).

Comparative Performance Value — An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa). The critical value for each CPV will vary depending on the number of labs participating in a test.

Graphs — For each laboratory, the LAB MEAN for the first sample is plotted against the LAB MEAN for the second sample with each point representing a laboratory. The horizontal and vertical axes are the GRAND MEANS for each sample. For each test there are three plots: L*2 vs L*1, a*2 vs a*1 and b*2 vs b*1. The a* and b* plots are created using absolute values.

Inst Code — A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section).

Data Flag — DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

DATA FLAG	STATISTICALLY INCLUDED/EXCLUDED	ACTION REQUIRED
*	INCLUDED	**CAUTION** - review testing procedure and monitor future results. Results fall outside 95% ellipse but within a 99% ellipse that is calculated but not drawn.
X	EXCLUDED	**STOP** - immediate review of data and/or testing procedure is required. Results fall outside the 99% ellipse and one or more CPV are greater than critical value. See specific notes following each table for more information on why the data is excluded. It is also possible to have an "X" for individual color coordinate (L*, a* or b*) without overall "X" flag. It means that results fall outside the 99% ellipse for particular coordinate but have no CPV flags. Those results will not require any action.
M	EXCLUDED	**PROCEED** - lab was unable to report data for at least one sample. However, a lab receiving two of more M flags for a test may need to stop and review its testing procedures.

Key for Spectrophotometric Web Summary Report

WebCode — Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Color Report published on the CTS web site. The Web Code for each analysis can be found in the Performance Analysis Report emailed to each participant.

Grand Mean — The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.

Between-Lab Standard Deviation — An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).

Inst Code — A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section).

Data Flag — DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

DATA FLAG	STATISTICALLY INCLUDED/EXCLUDED	ACTION REQUIRED
X	EXCLUDED	**STOP** - immediate review of data and/or testing procedure is required. See specific notes following each table for more information on why the data is excluded.

In addition to the DATA FLAG column, it is also possible to have a flag on individual wavelength values as follows:

*	The laboratory's mean for that wavelength deviates from the GRAND MEAN by more than two BETWEEN-LAB STANDARD DEVIATIONS.
X	The laboratory's mean for that wavelength deviates from the GRAND MEAN by more than the critical limit determined by a 99.5% confidence interval.

Key for Gloss Web Summary Report

WebCode — Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Color Report published on the CTS web site. The Web Code for each analysis can be found in the Performance Analysis Report emailed to each participant.

Lab Mean — The average of the test results obtained by the participant.

Grand Mean — The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.

Difference from Grand Mean — The difference of the LAB MEAN from the GRAND MEAN.

Between-Lab Standard Deviation — An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).

Comparative Performance Value — An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa). The critical value for each CPV will vary depending on the number of labs participating in a test.

Inst Code — A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section).

Graphs — For each laboratory, the LAB MEAN for the first sample (x-axis) is plotted against the LAB MEAN for the second sample (y-axis) with each point representing a laboratory. The horizontal and vertical cross-hairs are the GRAND MEANS for each sample. When 20 or more laboratories are in the statistics, an ellipse is also drawn so that 95% of the time a randomly selected laboratory will be included inside the ellipse. Plotted data flags are explained above.

Data Flag — DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

DATA FLAG	STATISTICALLY INCLUDED/EXCLUDED	ACTION REQUIRED
*	INCLUDED	**CAUTION** - review testing procedure and monitor future results. Results fall outside 95% ellipse but within a 99% ellipse that is calculated but not drawn.
X	EXCLUDED	**STOP** - immediate review of data and/or testing procedure is required. Results fall outside the 99% ellipse. See specific notes following each table for more information on why the data is excluded.
M	EXCLUDED	**PROCEED** - lab was unable to report data for at least one sample. However, a lab receiving two of more M flags for a test may need to stop and review its testing procedures.

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
2EYVWF	X	D231	60.80	-19.75	7.30	0.90	0.00	-0.55	1.05	XE
		D232	61.70	-19.75	6.75					
2NXF9F		D231	59.85	-19.85	7.34	0.87	-0.02	-0.59	1.05	XU
		D232	60.72	-19.88	6.75					
2WE6WF		D231	59.82	-20.02	6.49	0.86	0.03	-0.57	1.03	HW
		D232	60.67	-20.00	5.92					
3TUHWF		D231	59.93	-19.76	7.33	0.84	0.00	-0.58	1.02	XS
		D232	60.78	-19.76	6.75					
3VWF89		D231	59.98	-19.81	7.20	0.83	-0.05	-0.54	0.99	XG
		D232	60.81	-19.86	6.66					
4B99EC	X	D231	63.39	-17.58	7.31	1.18	0.16	-0.57	1.32	XP
		D232	64.58	-17.42	6.74					
6PGTZ9		D231	59.79	-20.40	7.69	0.84	-0.06	-0.60	1.03	BG
		D232	60.63	-20.46	7.09					
78XAR9		D231	60.18	-19.71	7.11	0.86	-0.05	-0.60	1.05	HL
		D232	61.04	-19.76	6.51					
7TXC4C		D231	59.41	-19.71	7.34	0.81	-0.13	-0.63	1.03	GG
		D232	60.22	-19.84	6.71					
926PYC		D231	59.81	-20.05	7.60	0.86	-0.05	-0.59	1.04	BG
		D232	60.67	-20.10	7.01					
AUGNW6		D231	59.38	-19.74	7.33	0.93	-0.06	-0.62	1.12	GE
		D232	60.31	-19.81	6.72					
B2DQP4		D231	60.51	-19.65	7.32	0.78	-0.18	-0.66	1.03	XE
		D232	61.29	-19.82	6.67					
C2TAA2	X	D231	51.27	-23.49	6.71	-0.30	-0.21	0.06	0.36	MH
		D232	50.97	-23.70	6.77					
DEEYT4		D231	60.13	-19.61	6.76	0.85	-0.02	-0.56	1.02	XJ
		D232	60.98	-19.63	6.20					
E4QK37		D231	60.00	-19.80	6.80	0.90	0.00	-0.60	1.08	HW
		D232	60.90	-19.80	6.20					
E8VBB7		D231	59.77	-19.93	6.71	0.81	-0.11	-0.67	1.06	HW
		D232	60.58	-20.03	6.04					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
ERX2NZ		D231	59.37	-19.73	7.13	0.86	-0.06	-0.59	1.04	GA
		D232	60.23	-19.79	6.54					
F2F7PW		D231	59.71	-19.47	6.76	0.82	-0.02	-0.54	0.98	XH
		D232	60.52	-19.49	6.22					
GG6MGZ		D231	60.06	-19.63	7.63	0.85	-0.03	-0.59	1.04	GE
		D232	60.91	-19.66	7.04					
GHZWNW		D231	59.97	-19.71	7.61	0.73	-0.23	-0.70	1.04	MD
		D232	60.70	-19.95	6.91					
GNTAC7		D231	60.16	-19.71	7.37	0.81	-0.08	-0.60	1.02	XE
		D232	60.98	-19.79	6.77					
HMUDEV		D231	60.08	-19.69	7.02	0.81	-0.05	-0.53	0.97	XE
		D232	60.89	-19.74	6.49					
KWCM4Z		D231	59.78	-19.78	6.67	0.90	-0.03	-0.60	1.08	MG
		D232	60.67	-19.81	6.07					
KZA9QW		D231	60.03	-19.79	7.55	0.91	0.01	-0.56	1.07	GE
		D232	60.94	-19.78	6.98					
LGDXMU		D231	59.93	-19.76	7.37	0.85	-0.05	-0.61	1.04	XU
		D232	60.78	-19.81	6.77					
M3CQ3X		D231	60.10	-19.80	7.15	0.80	0.00	-0.65	1.03	HW
		D232	60.90	-19.80	6.50					
N2D3YT		D231	60.20	-20.00	6.80	0.85	-0.10	-0.60	1.05	HW
		D232	61.05	-20.10	6.20					
N9DGNZ		D231	59.72	-19.87	6.86	0.86	0.05	-0.49	0.99	HW
		D232	60.58	-19.82	6.37					
PTBDUU		D231	59.72	-20.06	7.26	0.84	-0.02	-0.62	1.04	HK
		D232	60.56	-20.08	6.65					
PWE44U		D231	59.60	-19.98	7.13	0.70	-0.11	-0.67	0.98	XW
		D232	60.31	-20.09	6.46					
TUE6JC		D231	60.13	-19.81	7.27	0.70	-0.08	-0.75	1.03	XM
		D232	60.83	-19.90	6.52					
TUXYVL		D231	59.63	-19.88	7.32	0.84	-0.01	-0.62	1.05	HM
		D232	60.47	-19.90	6.70					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
TXYYER	X	D231	60.35	-21.80	6.15	0.80	0.10	-0.65	1.04	HW
		D232	61.15	-21.70	5.50					
UFRC9B		D231	59.93	-19.61	6.74	0.87	-0.04	-0.60	1.05	XH
		D232	60.80	-19.65	6.14					
UU9CWN		D231	59.79	-19.87	6.77	0.82	-0.05	-0.62	1.03	HW
		D232	60.61	-19.92	6.16					
V6QB7Q		D231	59.67	-19.91	7.21	0.83	-0.04	-0.59	1.02	MT
		D232	60.50	-19.95	6.62					
VA7JUQ		D231	60.04	-19.81	7.50	0.78	-0.18	-0.64	1.02	GH
		D232	60.82	-19.99	6.86					
VLUPMK		D231	60.26	-19.32	6.61	0.79	-0.08	-0.61	1.00	XD
		D232	61.05	-19.40	6.00					
W6YUFL	X	D231	58.08	-19.95	6.82	0.87	-0.13	-0.46	0.99	HK
		D232	58.95	-20.08	6.35					
X6EDZJ	X	D231	61.09	-20.10	7.29	0.99	0.13	-0.48	1.11	XE
		D232	62.09	-19.97	6.82					
XBLUGK		D231	59.94	-20.08	7.37	0.88	-0.03	-0.57	1.05	XU
		D232	60.82	-20.11	6.80					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
D231	59.91	-19.82	7.12	0.83	-0.06	-0.60	1.03
D232	60.74	-19.87	6.53				
Stnd Dev Btwn Labs							
D231	0.26	0.19	0.35	0.05	0.06	0.05	0.03
D232	0.25	0.19	0.35				

Statistics based on 35 of 41 reporting participants

Comments Assigned on Data Flags for Test #408

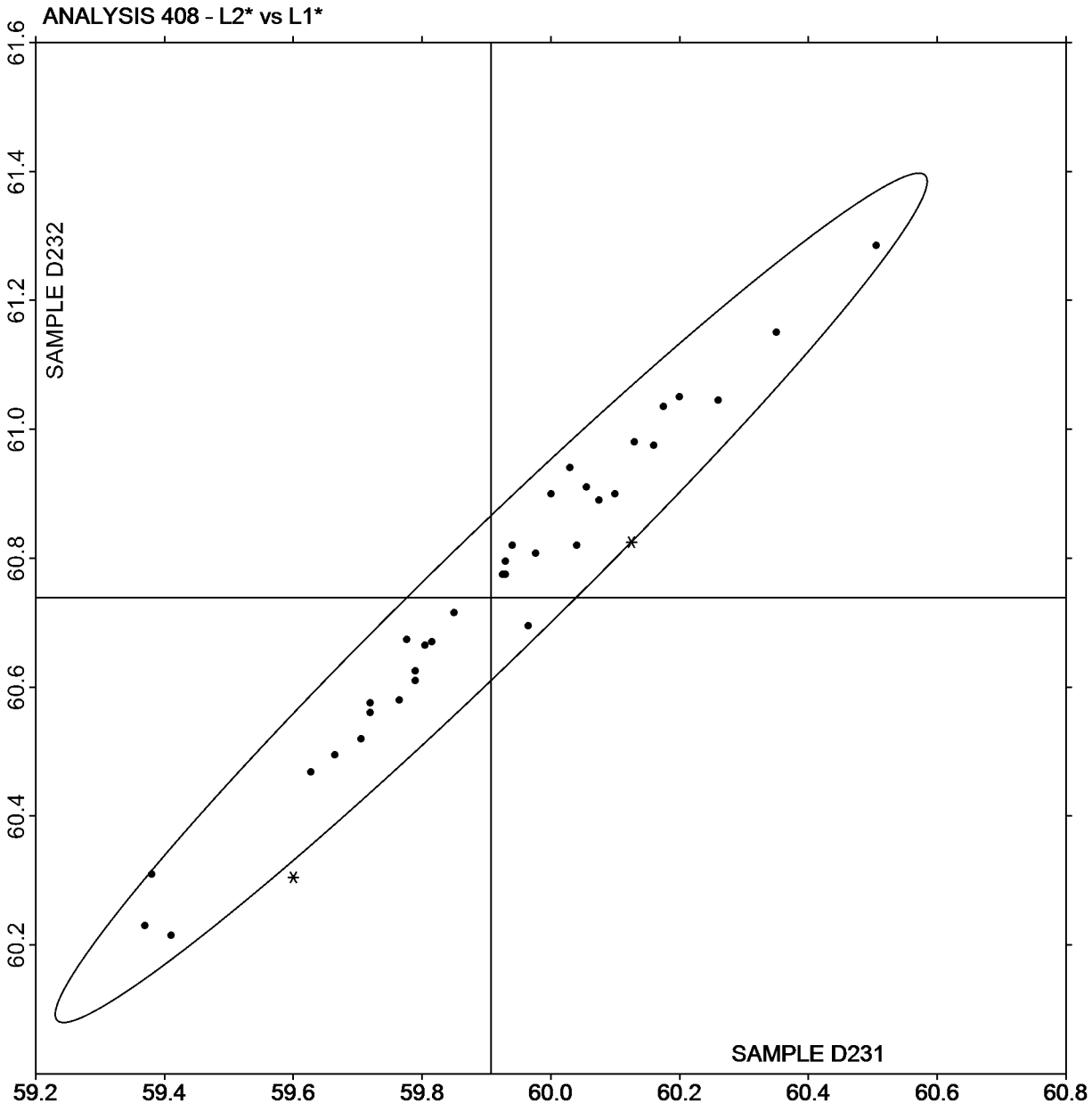
2EYVWF(X) - High L* values for both samples.
4B99EC(X) - Extreme data for both L* and a* values. Large Delta L, a & E.
C2TAA2(X) - Extreme data for both L* and a* values. Inconsistent in testing between the b* values for both samples. Small Delta L & E. Large Delta b.
TXYYER(X) - Extreme data for both a* values.
W6YUFL(X) - Extreme data for both L* values. Large Delta b.
X6EDZJ(X) - High L* values for both samples. Large Delta L & 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)
HL	Hunter Agera	HM	Hunter MiniScan EZ 4500L
HW	Hunter LabScan XE	MD	Minolta FD 7
MG	Macbeth 1500/PLUS or 2025+ Color Eye	MH	Minolta CM-2600 Spectrophotometer
MT	Minolta CM-25cG Spectrophotometer	XD	X-Rite 500 Series SpectroDensitometer
XE	X-Rite eXact Portable Spectrophotometer	XG	X-Rite i1 Pro 2
XH	X-Rite Color i5	XJ	X-Rite CI7XX0
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		

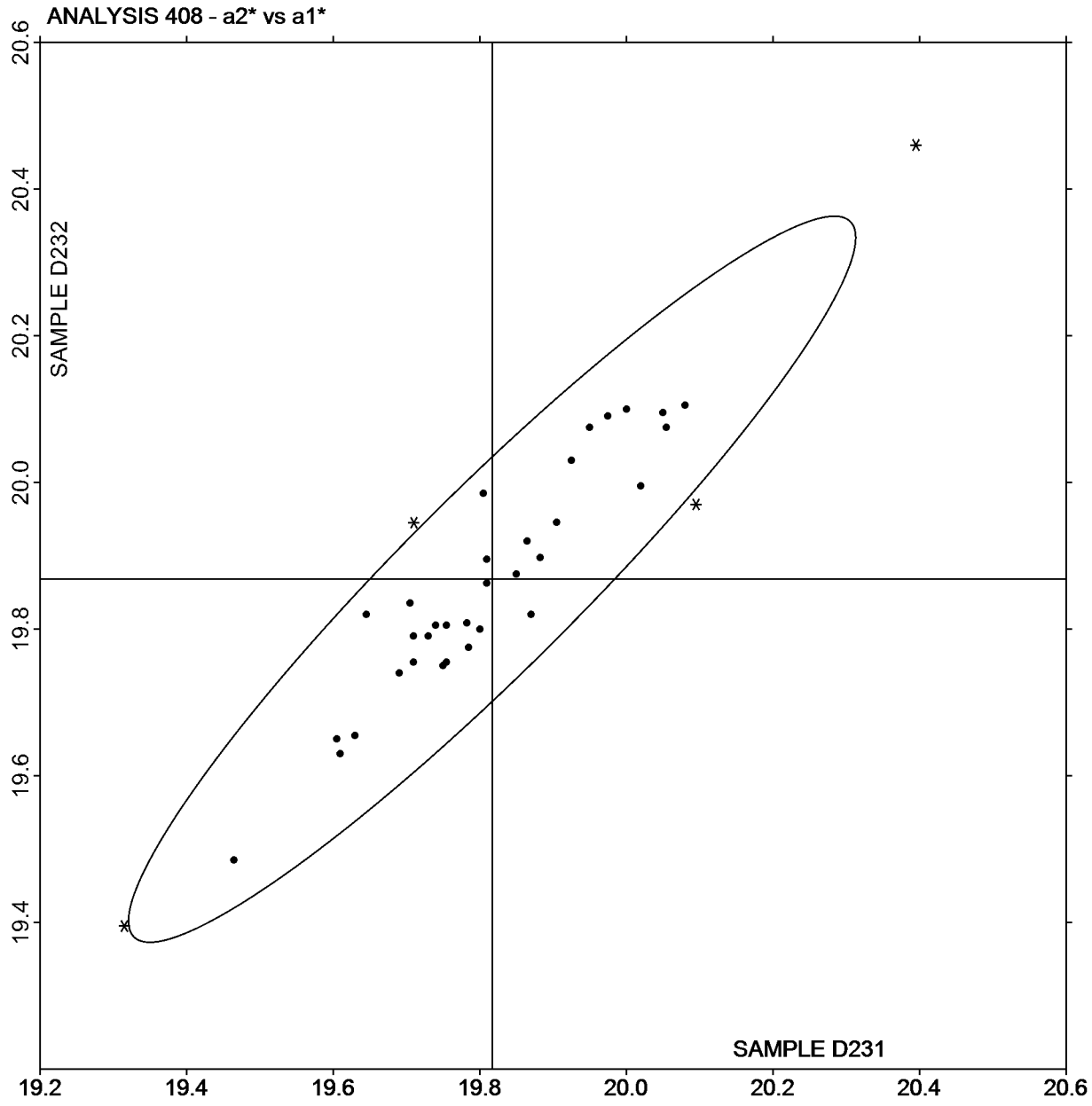
L2* vs L1*

SAMPLE D231 = 59.91 SAMPLE D232 = 60.74



a2* vs a1*

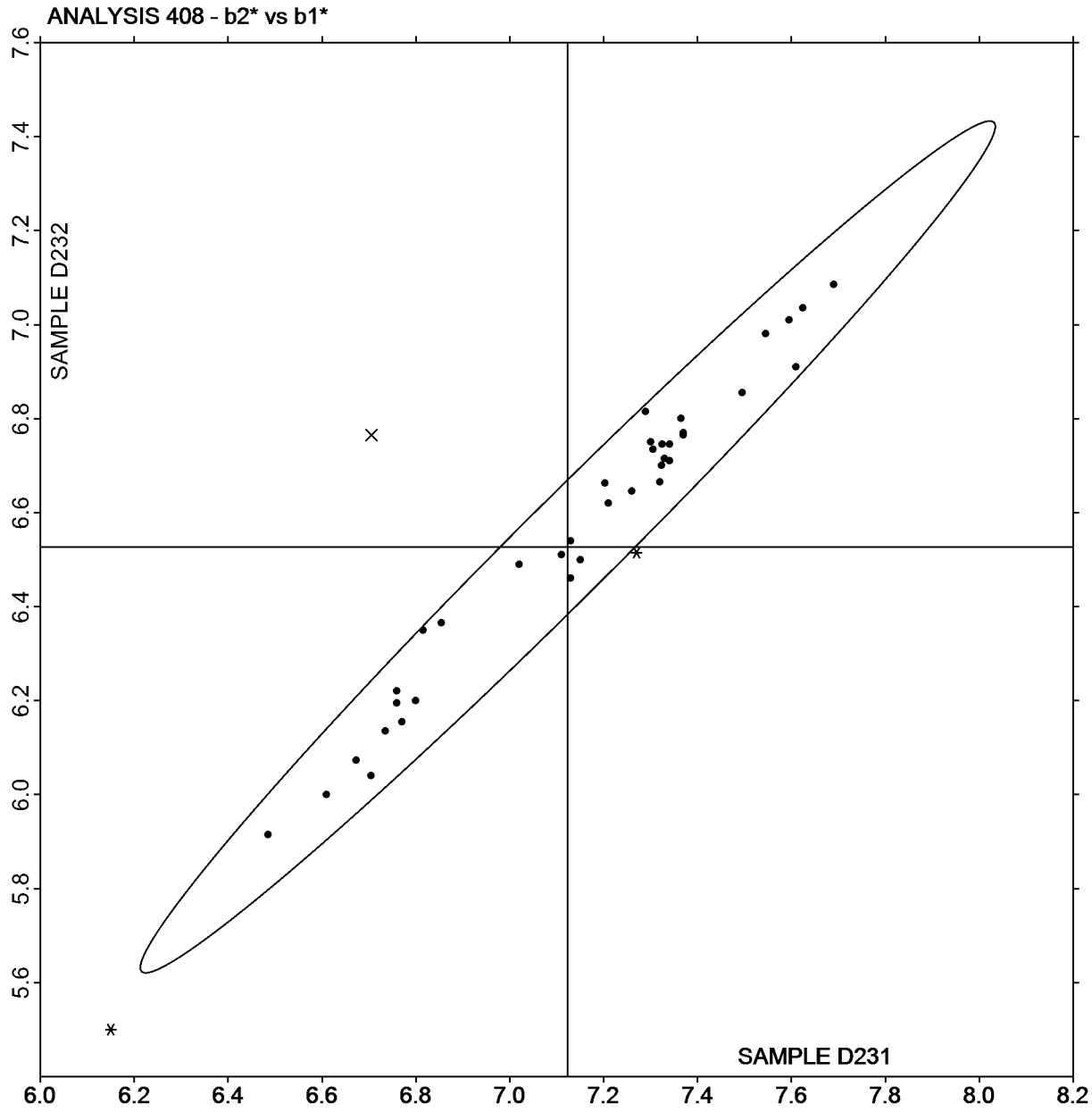
SAMPLE D231 = -19.82 SAMPLE D232 = -19.87



Plot created using absolute values.

b2* vs b1*

SAMPLE D231 = 7.12 SAMPLE D232 = 6.53



			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
2WAQKF		D231	60.28	-19.56	6.79	0.91	0.01	-0.62	1.10	XB
		D232	61.19	-19.55	6.18					
32ML76		D231	60.20	-19.63	7.09	0.88	-0.02	-0.59	1.06	AS
		D232	61.07	-19.65	6.50					
37V9HK		D231	60.12	-19.54	6.72	0.84	-0.02	-0.59	1.03	MI
		D232	60.96	-19.56	6.12					
3AE9VF		D231	60.34	-19.57	6.97	0.85	0.01	-0.58	1.03	AP
		D232	61.19	-19.57	6.39					
3PBHHL		D231	60.04	-19.58	6.84	0.82	-0.05	-0.61	1.02	XB
		D232	60.86	-19.62	6.23					
3PU7ZF		D231	60.05	-19.33	6.81	0.81	-0.09	-0.60	1.01	XD
		D232	60.86	-19.42	6.20					
3TUHWF		D231	60.10	-19.56	7.09	0.86	-0.01	-0.59	1.04	AJ
		D232	60.96	-19.57	6.50					
4B99EC		D231	59.89	-19.65	6.64	0.85	0.02	-0.55	1.02	XF
		D232	60.74	-19.63	6.09					
4FW32C		D231	60.24	-19.48	6.99	0.85	-0.02	-0.59	1.04	AU
		D232	61.10	-19.49	6.40					
4NX96E		D231	60.21	-19.33	6.91	0.84	-0.04	-0.62	1.05	AJ
		D232	61.05	-19.36	6.28					
4VB2GB		D231	60.08	-19.59	6.84	0.85	-0.02	-0.58	1.03	XD
		D232	60.93	-19.61	6.26					
4VBB2F		D231	59.98	-19.44	6.77	0.80	-0.04	-0.55	0.97	XD
		D232	60.77	-19.48	6.22					
67T2QC		D231	59.64	-19.46	6.93	0.84	-0.06	-0.61	1.04	XH
		D232	60.48	-19.52	6.32					
6YAZ49		D231	60.32	-19.83	6.83	0.66	-0.03	-0.58	0.88	CA
		D232	60.97	-19.85	6.25					
77KM89		D231	60.19	-19.26	6.73	0.84	-0.11	-0.61	1.04	XD
		D232	61.03	-19.37	6.13					
86BQQB		D231	60.20	-19.74	7.26	0.84	0.02	-0.52	1.00	HL
		D232	61.05	-19.71	6.73					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
86LXMC		D231	60.06	-19.42	6.89	0.79	-0.11	-0.64	1.02	MM
		D232	60.84	-19.54	6.25					
949FAX		D231	60.20	-19.63	7.05	0.76	-0.13	-0.64	1.00	AU
		D232	60.95	-19.75	6.41					
9B93YD		D231	60.16	-19.65	7.00	0.83	-0.13	-0.63	1.05	GG
		D232	60.99	-19.78	6.37					
9DVLZB		D231	59.97	-19.59	6.73	0.79	-0.18	-0.68	1.06	XI
		D232	60.76	-19.78	6.05					
9DY2DB		D231	60.11	-19.53	6.75	0.80	-0.11	-0.62	1.02	XB
		D232	60.91	-19.64	6.13					
9F3WWE		D231	60.21	-19.64	7.07	0.84	-0.06	-0.60	1.04	AU
		D232	61.06	-19.70	6.48					
9KJ6KD		D231	60.01	-19.64	6.77	0.79	-0.10	-0.63	1.01	XE
		D232	60.79	-19.74	6.14					
ACWV82		D231	60.17	-19.66	6.97	0.85	0.00	-0.57	1.02	MV
		D232	61.02	-19.66	6.40					
B6XN78		D231	60.31	-19.53	7.04	0.82	-0.02	-0.60	1.02	AP
		D232	61.13	-19.55	6.44					
BG97XA	X	D231	60.58	-19.95	6.96	0.81	-0.13	-0.68	1.06	CA
		D232	61.39	-20.08	6.28					
BJWDMD		D231	59.86	-19.65	6.81	0.75	-0.09	-0.62	0.98	XO
		D232	60.61	-19.75	6.19					
BRU6V8		D231	60.33	-19.66	7.10	0.83	0.02	-0.64	1.05	AS
		D232	61.16	-19.64	6.46					
C2AGG4	X	D231	52.89	-15.36	5.33	0.89	-0.11	-0.41	0.98	XO
		D232	53.78	-15.47	4.93					
CA3ZC4		D231	60.10	-19.66	7.12	0.82	-0.01	-0.57	1.00	MW
		D232	60.92	-19.67	6.55					
CA84FV		D231	60.05	-19.48	6.85	0.79	-0.10	-0.61	1.00	XI
		D232	60.84	-19.58	6.24					
CD6P6C		D231	59.89	-19.73	6.56	0.84	-0.07	-0.63	1.06	XF
		D232	60.73	-19.80	5.92					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
D8QLJ3		D231	60.29	-19.57	7.14	0.79	-0.21	-0.68	1.06	AS
		D232	61.08	-19.77	6.46					
D9QCXX		D231	60.05	-19.58	7.10	0.85	-0.02	-0.57	1.02	MU
		D232	60.90	-19.60	6.53					
DCRFR7		D231	60.09	-19.28	6.71	0.81	-0.11	-0.58	1.00	XI
		D232	60.90	-19.40	6.13					
E7FRQA		D231	59.98	-19.72	6.61	0.78	-0.14	-0.63	1.02	XO
		D232	60.76	-19.86	5.98					
ENE2A7		D231	60.33	-19.78	7.08	0.87	-0.05	-0.63	1.07	AT
		D232	61.20	-19.82	6.46					
ERX2NZ	X	D231	61.24	-19.48	7.13	-0.15	-0.07	-0.63	0.65	AJ
		D232	61.09	-19.55	6.50					
FE2LTW		D231	60.30	-19.62	7.09	0.84	-0.07	-0.59	1.03	AU
		D232	61.15	-19.69	6.50					
FE9JC9		D231	60.09	-19.46	6.83	0.77	-0.11	-0.61	0.98	XD
		D232	60.85	-19.57	6.22					
FFZHQ7		D231	60.35	-19.52	7.01	0.88	-0.02	-0.58	1.06	AO
		D232	61.23	-19.54	6.43					
FJYTL7		D231	60.42	-19.44	7.16	0.80	-0.05	-0.58	0.99	AO
		D232	61.23	-19.49	6.58					
G8NN8X		D231	60.20	-19.48	6.93	0.80	-0.07	-0.59	1.00	AN
		D232	61.00	-19.55	6.34					
GJDK9W		D231	59.64	-19.48	6.85	0.86	0.00	-0.60	1.05	XM
		D232	60.51	-19.48	6.25					
GWZX2X		D231	60.28	-19.68	7.06	0.77	-0.20	-0.71	1.07	AU
		D232	61.06	-19.88	6.35					
HH284Y		D231	60.30	-19.51	7.01	0.85	-0.05	-0.59	1.03	HP
		D232	61.15	-19.56	6.42					
JU8UCM		D231	60.02	-19.47	6.84	0.84	-0.12	-0.63	1.06	XI
		D232	60.86	-19.59	6.21					
K7F2KT		D231	60.01	-19.59	6.83	0.84	-0.04	-0.62	1.05	MM
		D232	60.86	-19.64	6.21					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
KE8FNY		D231	60.04	-19.60	6.86	0.80	-0.01	-0.53	0.96	XD
		D232	60.84	-19.61	6.33					
KNVBLT		D231	60.24	-19.60	6.97	0.84	-0.04	-0.59	1.03	AJ
		D232	61.08	-19.64	6.37					
KQ3FDW		D231	60.03	-19.45	7.03	0.83	-0.01	-0.55	1.00	MQ
		D232	60.87	-19.46	6.48					
LBMTNY		D231	60.08	-19.73	7.06	0.60	-0.06	-0.68	0.91	MW
		D232	60.68	-19.79	6.39					
LGDXMU		D231	60.07	-19.51	6.83	0.84	-0.03	-0.59	1.03	XE
		D232	60.91	-19.54	6.24					
MYP82Z	X	D231	59.60	-19.55	6.67	0.87	0.00	-0.56	1.04	XI
		D232	60.47	-19.56	6.11					
N8KNTG		D231	59.99	-19.75	6.99	0.84	-0.06	-0.59	1.03	MV
		D232	60.82	-19.81	6.39					
NJAKRU		D231	60.34	-19.73	7.26	0.84	-0.05	-0.61	1.04	AE
		D232	61.17	-19.78	6.65					
P9R996		D231	60.24	-19.79	6.74	0.60	0.09	-0.61	0.86	XC
		D232	60.84	-19.71	6.13					
PEUC4V		D231	60.29	-19.64	6.99	0.83	-0.03	-0.61	1.03	AT
		D232	61.12	-19.67	6.37					
PFPXRU		D231	60.09	-19.59	6.74	0.80	-0.03	-0.62	1.01	XD
		D232	60.88	-19.62	6.12					
PNGBVZ	X	D231	54.88	-20.97	6.02	-0.02	0.01	0.01	0.03	HP
		D232	54.85	-20.95	6.03					
PQNTTV		D231	60.15	-19.63	6.93	0.79	-0.11	-0.65	1.03	AS
		D232	60.94	-19.75	6.28					
PTFR8U		D231	59.84	-19.64	6.82	0.87	0.02	-0.55	1.03	XH
		D232	60.71	-19.63	6.27					
Q3V4UQ		D231	60.29	-19.49	7.06	0.81	-0.15	-0.71	1.08	AP
		D232	61.10	-19.64	6.35					
QJ4XNL		D231	60.03	-19.45	6.79	0.84	-0.02	-0.55	1.00	XG
		D232	60.87	-19.46	6.25					

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
RVWVTW		D231	59.88	-19.63	6.69	0.79	-0.05	-0.58	0.98	XI
		D232	60.67	-19.68	6.11					
RZ9JTT		D231	60.12	-19.60	6.99	0.79	-0.09	-0.62	1.01	MK
		D232	60.92	-19.69	6.37					
TFE8ET		D231	60.37	-19.61	7.16	0.85	-0.01	-0.59	1.03	AS
		D232	61.22	-19.62	6.57					
TJG7PK		D231	60.06	-19.66	6.89	0.90	0.02	-0.59	1.08	AQ
		D232	60.96	-19.64	6.30					
U3HQUJ		D231	60.34	-19.55	7.00	0.80	-0.16	-0.67	1.06	MT
		D232	61.14	-19.71	6.33					
U7PYAV		D231	60.05	-19.37	6.97	0.88	0.05	-0.54	1.03	XG
		D232	60.93	-19.32	6.43					
U9UQZN		D231	60.06	-19.33	6.85	0.84	-0.02	-0.57	1.02	XH
		D232	60.90	-19.35	6.28					
UDPH8K		D231	60.41	-19.70	7.08	0.84	-0.05	-0.63	1.05	AT
		D232	61.25	-19.74	6.45					
UFRC9B		D231	59.96	-19.57	6.76	0.80	-0.09	-0.64	1.03	XH
		D232	60.75	-19.67	6.12					
V6QB7Q		D231	60.20	-19.74	6.98	0.87	-0.04	-0.59	1.05	XB
		D232	61.06	-19.78	6.39					
VA7JUQ		D231	60.21	-19.76	6.92	0.83	-0.06	-0.63	1.04	MV
		D232	61.04	-19.81	6.29					
W7ZKUG		D231	60.25	-19.83	6.91	0.83	-0.04	-0.60	1.02	XD
		D232	61.08	-19.87	6.31					
WDWLNF		D231	60.06	-19.40	6.82	0.77	-0.20	-0.71	1.06	XD
		D232	60.83	-19.60	6.12					
WTR2WM		D231	60.25	-19.65	7.11	0.80	-0.11	-0.65	1.04	AS
		D232	61.05	-19.75	6.46					
X2YVQF		D231	60.06	-19.49	6.96	0.87	0.00	-0.58	1.04	XD
		D232	60.93	-19.49	6.38					
XBLUGK		D231	60.08	-19.61	6.72	0.86	-0.01	-0.53	1.02	XB
		D232	60.94	-19.62	6.19					

Color and Color Difference - Paint Chips - Sphere Geometry Instruments
CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
XDTCFF		D231	60.27	-19.62	7.14	0.83	-0.06	-0.60	1.03	AS
		D232	61.10	-19.68	6.54					
XFKBUE		D231	60.19	-19.59	7.31	0.86	-0.02	-0.58	1.04	MW
		D232	61.05	-19.61	6.73					
XJJLPE		D231	60.40	-19.53	7.11	0.78	-0.08	-0.61	1.00	AU
		D232	61.18	-19.61	6.50					
XKTR6N		D231	59.87	-19.33	6.81	0.83	-0.02	-0.60	1.02	XI
		D232	60.70	-19.34	6.22					
YF2MCJ		D231	60.31	-19.57	7.21	0.83	-0.04	-0.59	1.02	AJ
		D232	61.14	-19.61	6.62					
YLKWBG		D231	59.87	-19.84	6.58	0.84	-0.04	-0.56	1.01	XR
		D232	60.71	-19.87	6.02					
YMD3FD		D231	60.16	-19.39	6.75	0.80	-0.07	-0.59	1.00	MM
		D232	60.96	-19.46	6.16					
ZX9HUG		D231	60.35	-19.78	7.13	0.84	-0.02	-0.59	1.03	AS
		D232	61.19	-19.80	6.54					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
D231	60.13	-19.57	6.93	0.82	-0.05	-0.60	1.02
D232	60.96	-19.63	6.32				
Stnd Dev Btwn Labs							
D231	0.17	0.13	0.17	0.05	0.06	0.04	0.04
D232	0.18	0.13	0.17				

Statistics based on 83 of 88 reporting participants

Comments Assigned on Data Flags for Test #409

BG97XA(X) - Low a* values for both samples. Large replication difference for a* values for both samples.
C2AGG4(X) - Extreme data for both samples for L*, a* & b*. Large Delta b.
ERX2NZ(X) - Very high L* values for Sample D231. Large replication difference for L* Sample D231. Small Delta L & E.
MYP82Z(X) - Low L* values for both samples.
PNGBVZ(X) - Extreme data for both L* & a* values. Large replication difference for b* Sample D231. Small Delta L & E. Large Delta b.

Lab Note:

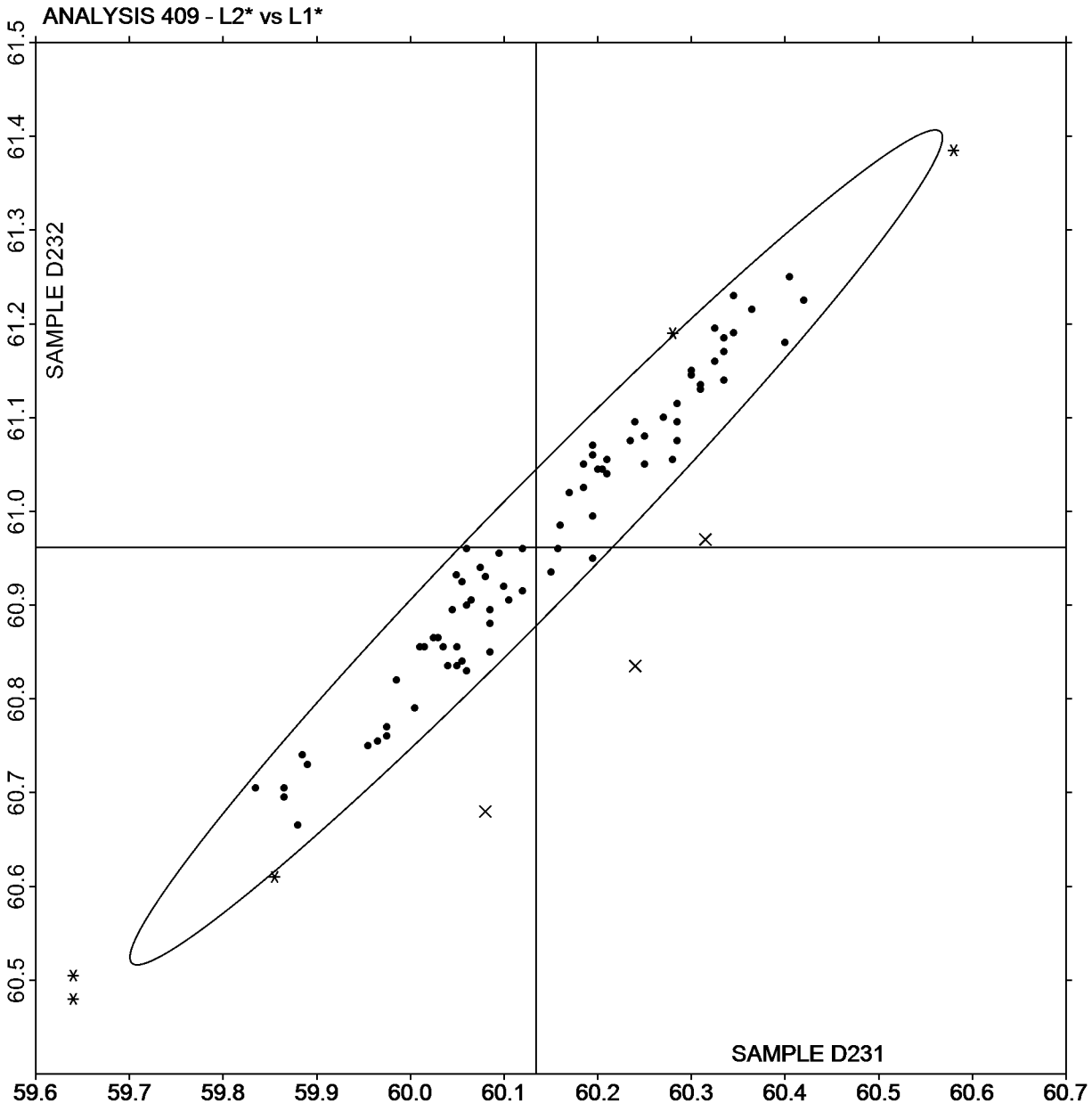
W7ZKUG Data appears to be transposed between samples. CTS will not correct going forward.

Key to Instrument Codes Reported by Participants

AE	Datacolor 110	AJ	Datacolor 600
AN	Datacolor 650	AO	Datacolor 650x
AP	Datacolor 750	AQ	Datacolor 600x
AS	Datacolor 800	AT	Datacolor 850
AU	Datacolor 1000	CA	Cary 5000
GG	BYK-Gardner TCS II	HL	Hunter Agera
HP	Hunter UltraScan PRO	MI	Macbeth Color i5
MK	Macbeth Color-Eye 7000	MM	Macbeth Color-Eye 7000a
MQ	Minolta CM-700d	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
XE	X-Rite Ci7600 Benchtop Spectrophotometer	XF	X-Rite Ci6x Portable Spectrophotometer
XG	X-Rite Ci7860 Benchtop Spectrophotometer	XH	X-Rite Color i5 Benchtop Spectrophotometer
XI	X-Rite Color i7 Benchtop Spectrophotometer	XM	X-Rite SP62 Portable Sphere Spectrophotometer
XO	X-Rite SP64 Portable Sphere Spectrophotometer	XR	X-Rite

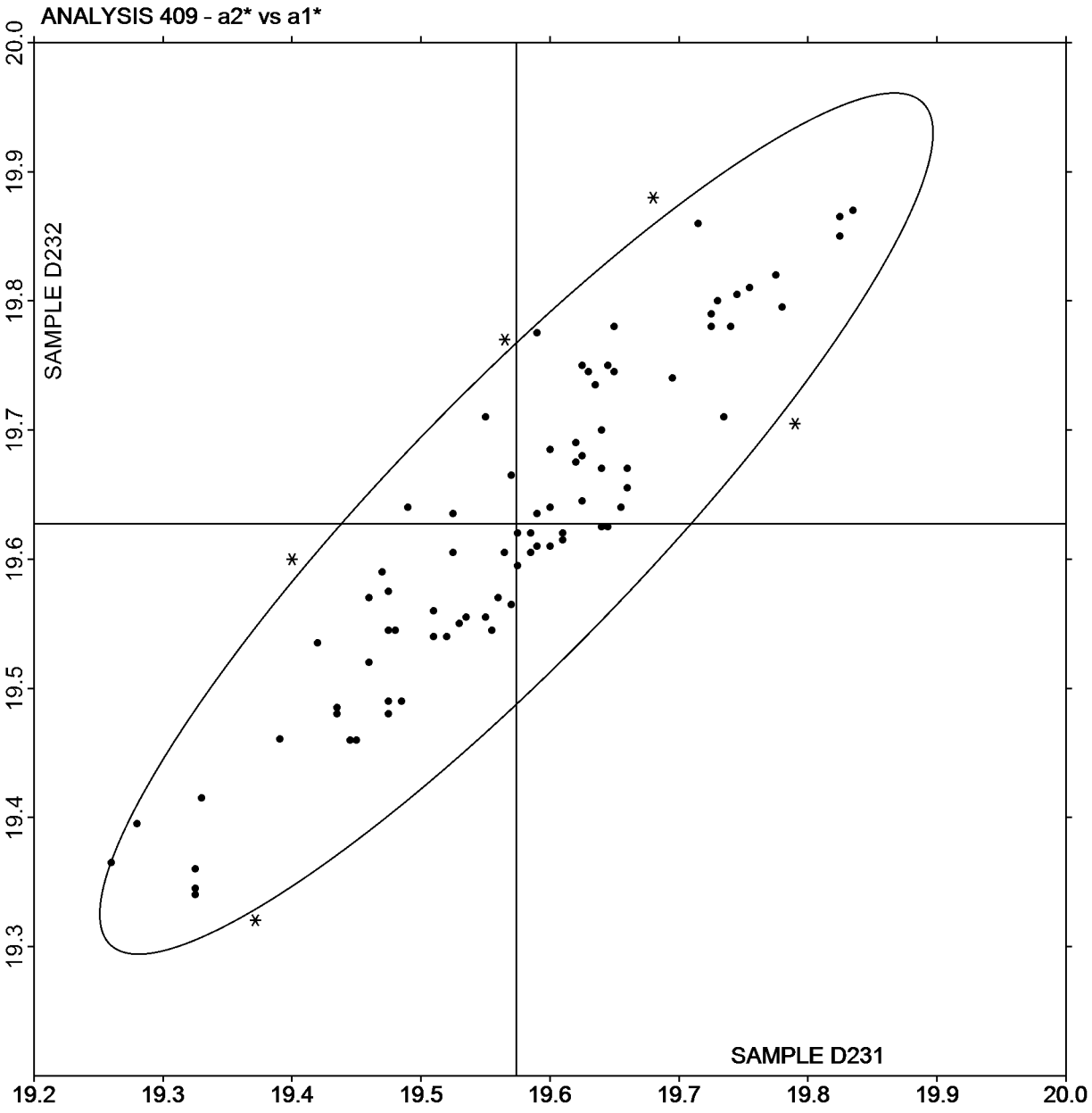
L2* vs L1*

SAMPLE D231 = 60.13 SAMPLE D232 = 60.96



a2* vs a1*

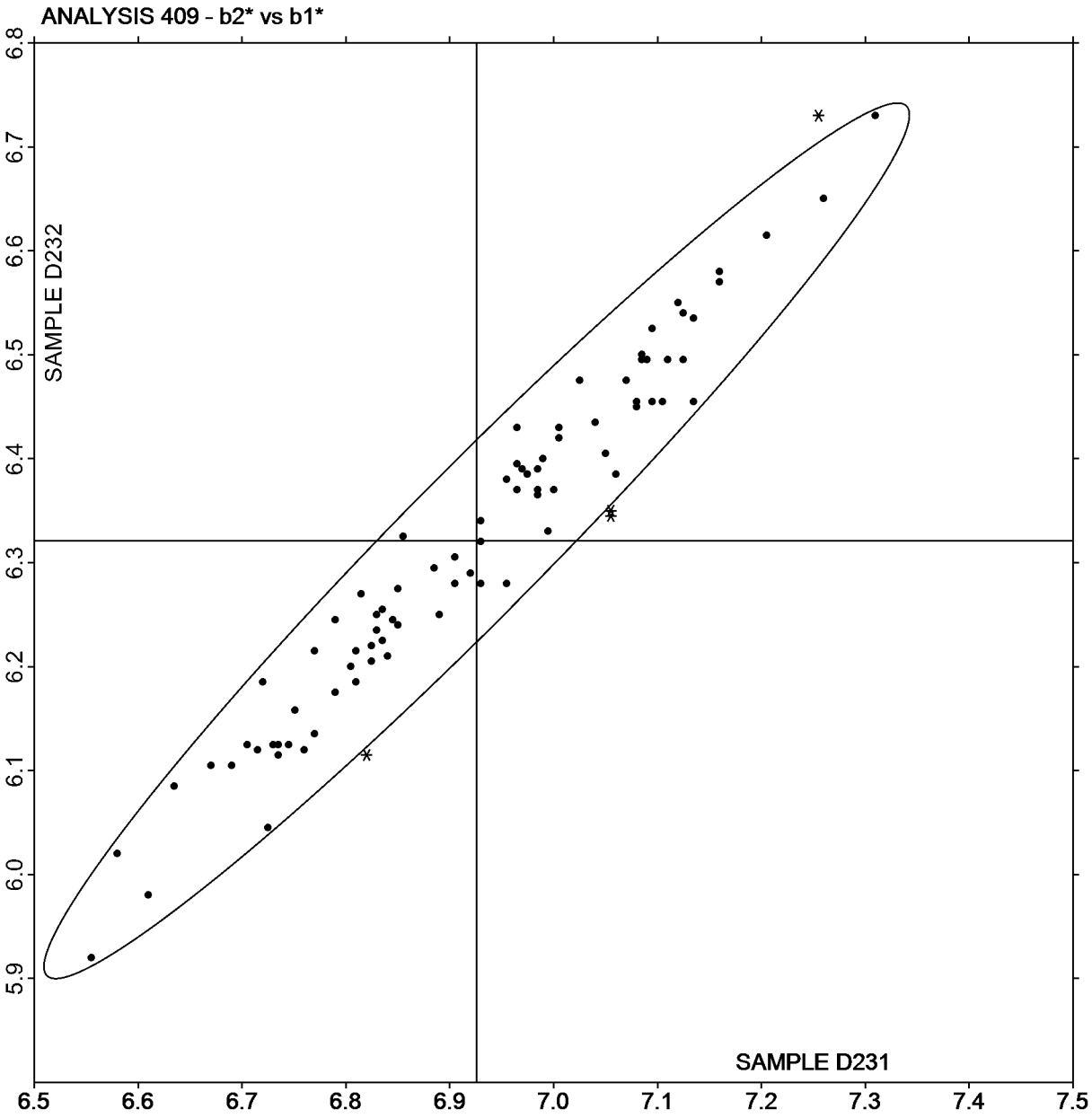
SAMPLE D231 = -19.57 SAMPLE D232 = -19.63



Plot created using absolute values.

b2* vs b1*

SAMPLE D231 = 6.93 SAMPLE D232 = 6.32



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 D231										
2WAQKF		16.08	19.09	23.02	25.72	26.66	29.64	34.88	37.11	30.22	23.40	19.84	18.06	17.78	18.76	18.45	16.71	XB
32ML76		16.12	18.75	22.74	25.51	26.47	29.41	34.68	36.98	30.36	23.32	19.80	17.92	17.68	18.63	18.35	16.66	AS
37V9HK		15.85	18.94	22.87	25.60	26.55	29.56	34.65	36.81	29.99	23.16	19.73	17.94	17.70	18.54	18.36	16.64	MI
3AE9VF		15.84	18.96	22.96	25.69	26.61	29.56	34.86	37.14	30.54	23.44	19.91	18.05	17.81	18.75	18.61	16.63	AP
3PBHHL		16.46*	18.91	22.79	25.40	26.37	29.38	34.57	36.76	30.02	23.15	19.64	17.83	17.55	18.48	18.23	16.51	XB
3PU7ZF		16.00	18.98	22.81	25.46	26.39	29.33	34.47	36.70	30.04	23.26	19.77	17.94	17.64	18.54	18.32	16.65	XD
4B99EC		15.62	18.66	22.75	25.31	26.30	29.29	34.56	36.43	29.61*	22.81*	19.38*	17.65*	17.46	18.39	18.16	16.50	XF
4FW32C		15.71	18.82	22.87	25.58	26.53	29.53	34.82	36.99	30.43	23.37	19.93	17.97	17.77	18.68	18.39	16.35	AU
4NX96E		15.93	18.94	22.90	25.52	26.54	29.46	34.67	36.79	30.37	23.40	19.88	18.00	17.80	18.65	18.41	16.70	AJ
4VB2GB	X	16.72X	19.98*	23.99X	26.74X	27.71X	30.68X	35.85	37.90	30.91*	23.94X	20.33X	18.52X	18.26X	19.25X	18.92*	17.10	XD
4VBB2F		15.90	18.91	22.76	25.42	26.36	29.34	34.52	36.71	29.94	23.07	19.58	17.84	17.60	18.59	18.28	16.54	XD
6YAZ49		16.08	18.90	23.05	25.79	26.64	29.66	35.06	37.49	30.31	23.23	19.73	17.91	17.59	18.63	18.44	16.72	CA
77KM89		16.21	19.12	23.05	25.65	26.55	29.54	34.73	36.92	30.18	23.40	19.86	18.05	17.76	18.65	18.45	16.66	XD
86BQQB		15.76	18.47	22.77	25.42	26.56	29.64	34.92	36.95	30.20	23.38	19.83	17.94	17.60	18.42	18.72	17.94X	HL
86LXMC		15.92	18.84	22.72	25.49	26.38	29.36	34.47	36.80	30.20	23.24	19.63	17.84	17.58	18.55	18.31	16.63	MM
949FAX		16.03	18.75	22.82	25.48	26.48	29.45	34.75	36.95	30.35	23.28	19.80	17.91	17.70	18.66	18.85*	16.79	AU
9B93YD		15.94	18.82	22.69	25.56	26.52	29.61	34.76	31.96X	30.21	23.25	19.72	17.90	17.66	18.57	18.43	16.73	GG
9DVLZB		15.75	18.83	22.70	25.38	26.38	29.33	34.50	36.46	29.87	23.04	19.53	17.84	17.64	18.53	18.13	16.48	XI
9DY2DB		15.95	19.01	22.89	25.54	26.52	29.48	34.66	36.79	30.08	23.25	19.68	17.92	17.69	18.52	18.14	16.46	XB
9F3WWE		15.80	18.81	22.76	25.49	26.48	29.52	34.78	36.98	30.33	23.31	19.82	17.95	17.73	18.62	18.56	16.39	AU
9KJ6KD		15.95	18.85	22.80	25.43	26.42	29.41	34.65	36.73	29.83	23.05	19.59	17.83	17.57	18.56	18.23	16.53	XE
ACWV82		15.62	18.82	22.80	25.64	26.35	29.37	34.78	37.25	30.23	23.13	19.68	17.90	17.57	18.67	18.52	16.78	MV

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 D231																
B6XN78		15.89	18.90	22.91	25.65	26.60	29.51	34.77	37.11	30.52	23.43	19.95	18.04	17.81	18.71	18.66	16.56	AP
BG97XA		16.20	19.14	23.24*	26.03X	26.88*	29.87	35.31	37.84	30.71	23.54	20.03	18.15	17.83	18.87	18.68	16.94	CA
BJWDMD		15.59	18.77	22.54	25.33	26.32	29.20	34.65	36.66	29.76	22.79*	19.49	17.68	17.50	18.36	18.10	16.41	XO
BRU6V8		15.87	18.81	22.75	25.62	26.62	29.54	34.86	37.17	30.50	23.46	19.86	18.05	17.81	18.69	18.73	16.47	AS
C2AGG4		15.58	14.63X	22.45	25.32	26.23	29.22	34.58	36.61	29.66	23.01	19.45	17.68	17.57	18.40	18.23	17.02	XO
CA3ZC4		15.47	18.74	22.55	25.51	26.30	29.19	34.71	37.01	30.36	23.12	19.64	17.79	17.55	18.53	18.47	16.74	MW
CA84FV		15.88	18.91	22.76	25.45	26.39	29.32	34.51	36.76	30.07	23.20	19.68	17.88	17.60	18.52	18.20	16.51	XI
CD6P6C		15.93	18.79	22.84	25.39	26.39	29.54	34.81	36.63	29.59*	22.80*	19.38*	17.67	17.53	18.51	18.24	16.54	XF
D8QLJ3		16.04	18.82	22.78	25.53	26.55	29.49	34.80	37.10	30.50	23.41	19.91	18.02	17.83	18.82	18.89*	16.98	AS
D9QCXX		15.49	18.70	22.54	25.47	26.25	29.13	34.67	36.90	30.22	23.09	19.64	17.84	17.57	18.57	18.49	16.73	MV
DCRFR7		16.04	19.06	22.91	25.56	26.48	29.50	34.69	36.75	30.00	23.18	19.76	18.00	17.76	18.65	18.32	16.55	XI
E7FRQA		15.57	18.78	22.90	25.46	26.46	29.59	34.91	36.68	29.71	22.90	19.44	17.74	17.62	18.57	18.26	16.58	XO
ENE2A7		15.74	18.83	22.89	25.58	26.59	29.62	34.95	37.25	30.45	23.34	19.86	18.01	17.78	18.76	18.42	16.65	AT
FE2LTW		15.71	18.83	22.89	25.61	26.55	29.56	34.85	37.06	30.52	23.43	19.93	18.00	17.79	18.74	18.47	16.52	AU
FE9JC9		15.95	18.93	22.84	25.49	26.42	29.38	34.59	36.81	30.07	23.20	19.70	17.95	17.70	18.61	18.18	16.45	XD
FFZHQ7		15.98	18.99	22.91	25.68	26.65	29.61	34.88	37.23	30.50	23.50	19.91	18.07	17.85	18.82	18.50	16.64	AN
FJYTL7		15.98	19.03	22.94	25.70	26.76	29.59	34.89	37.30	30.72	23.61	20.02	18.19*	17.91	18.87	18.60	16.84	AN
G8NN8X		15.88	18.91	22.88	25.53	26.54	29.47	34.77	36.96	30.35	23.32	19.82	17.94	17.74	18.70	18.36	16.56	AN
GJDK9W		16.20	18.90	23.10	25.60	26.60	29.60	34.90	36.70	29.90	23.15	19.70	17.90	17.60	18.85	18.70	17.20*	HW
GWZX2X		16.01	18.80	22.85	25.57	26.54	29.58	34.91	37.08	30.41	23.34	19.85	18.01	17.77	18.81	18.76	16.83	AU
HH284Y		16.21	19.06	22.91	25.66	26.60	29.61	34.91	37.15	30.46	23.51	19.94	17.99	17.65	18.64	18.50	16.81	HP
JU8UCM		15.86	18.88	22.73	25.42	26.36	29.28	34.46	36.71	30.03	23.16	19.65	17.85	17.58	18.48	18.17	16.48	XI

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 D231																		
KE8FNY		15.78	18.86	22.75	25.39	26.41	29.41	34.61	36.70	30.01	23.19	19.61	17.84	17.59	18.45	18.15	16.44	XD
KNVBLT		15.83	18.82	22.87	25.60	26.54	29.51	34.81	37.03	30.36	23.31	19.85	17.99	17.72	18.66	18.40	16.62	AJ
KQ3FDW		15.74	18.73	22.61	25.41	26.29	29.24	34.61	36.81	30.09	23.17	19.67	17.88	17.60	18.57	18.37	16.71	MQ
LGDXMU		15.99	18.91	22.84	25.45	26.39	29.42	34.65	36.72	30.02	23.25	19.68	17.87	17.64	18.58	18.28	16.43	XE
MYP82Z		15.53	18.51	22.42*	25.11*	26.07*	28.99*	34.02	36.08	29.45*	22.75*	19.23X	17.54X	17.23*	18.13X	17.90*	16.24	XI
N8KNTG		15.59	18.63	22.62	25.44	26.22	29.18	34.64	37.06	29.95	22.97	19.48	17.73	17.44	18.52	18.34	16.63	MV
NJAKRU		15.88	18.84	22.67	25.59	26.58	29.59	34.92	37.22	30.48	23.41	20.00	18.12	17.85	18.84	18.53	16.00*	AE
P9R996		15.88	18.97	23.03	25.65	26.65	29.80	35.11	37.01	30.10	23.22	19.70	17.94	17.79	18.74	18.52	16.85	XC
PEUC4V		15.91	18.92	22.89	25.65	26.60	29.57	34.90	37.11	30.47	23.37	19.84	17.98	17.76	18.84	18.78	16.45	AT
PFPXRU		15.98	18.94	22.91	25.53	26.46	29.47	34.70	36.86	29.94	23.17	19.67	17.90	17.62	18.57	18.20	16.49	XD
PQNTTV		16.10	18.86	22.81	25.49	26.47	29.42	34.68	36.96	30.27	23.22	19.74	17.85	17.63	18.65	18.33	16.67	AS
PTFR8U		15.80	18.76	22.55	25.26	26.20	29.15	34.38	36.49	29.78	22.92	19.41	17.66*	17.40	18.32	18.10	16.41	XH
Q3V4UQ		15.77	18.89	22.87	25.60	26.56	29.46	34.76	37.06	30.54	23.43	19.94	18.05	17.82	18.95*	18.55	16.66	AP
QJ4XNL		15.96	18.91	22.82	25.43	26.38	29.34	34.58	36.72	29.90	23.15	19.68	17.94	18.67X	18.63	18.32	16.60	XG
RVWVTW		15.75	18.86	22.71	25.36	26.29	29.29	34.47	36.52	29.76	22.94	19.42	17.69	17.51	18.36	18.04	16.29	XI
RZ9JTT		15.69	18.76	22.73	25.48	26.42	29.46	34.62	36.87	30.19	23.30	19.67	17.90	17.63	18.58	18.37	16.69	MK
TFE8ET		15.75	18.85	22.80	25.64	26.66	29.53	34.84	37.23	30.68	23.49	19.96	18.06	17.84	18.77	18.48	16.70	AS
TJG7PK		15.55	18.70	22.73	25.47	26.44	29.34	34.64	36.78	30.11	23.14	19.62	17.81	17.60	18.44	18.23	16.57	AQ
U3HQUJ		15.74	18.87	22.98	25.79	26.65	29.61	35.02	37.21	30.51	23.44	19.89	18.06	17.75	18.79	18.60	16.90	MT
U7PYAV		15.75	18.85	22.70	25.38	26.38	29.37	34.55	36.69	30.10	23.30	19.73	17.91	17.65	18.52	18.21	16.49	XD
U9UQZN		15.89	18.92	22.81	25.45	26.40	29.36	34.57	36.81	30.04	23.22	19.73	17.97	17.74	18.67	18.23	16.52	XH
UDPH8K		15.76	19.13	22.91	25.59	26.68	29.72	34.81	36.73	30.33	23.43	19.85	18.07	17.85	18.62	18.29	16.43	AT

Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

Spectrophotometric Reflectance values (as %) at selected wavelengths

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
Sample D231																		
UFRC9B		15.82	18.86	22.72	25.42	26.34	29.28	34.52	36.63	29.88	23.05	19.54	17.79	17.53	18.46	18.18	16.41	XH
V6QB7Q		15.81	18.86	22.80	25.55	26.53	29.47	34.79	37.11	30.21	23.23	19.74	17.91	17.55	18.54	18.27	16.39	XB
VA7JUQ		15.82	18.85	22.92	25.63	26.49	29.56	35.09	37.11	30.20	23.15	19.71	17.90	17.73	18.74	18.57	16.78	MV
W7ZKUG		16.00	18.90	22.95	25.60	26.58	29.65	34.91	37.23	30.22	23.28	19.76	17.91	17.54	18.50	18.28	16.48	XD
WDWLNF		16.71X	18.91	22.81	25.49	26.43	29.41	34.63	36.80	30.03	23.20	19.70	17.92	17.67	18.61	18.32	16.61	XD
WTR2WM		15.71	18.64	22.78	25.49	26.53	29.50	34.77	37.00	30.42	23.39	19.85	18.00	17.78	18.75	18.38	16.57	AS
X2YVQF		15.74	18.81	22.70	25.38	26.38	29.34	29.52X	36.73	30.06	23.25	19.68	17.92	17.64	18.55	18.19	16.47	XD
XBLUGK		16.02	18.98	22.92	25.50	26.46	29.48	34.75	36.84	29.91	23.10	19.65	17.90	17.64	18.62	18.30	16.44	XB
XDTCFF		15.71	18.78	22.79	25.53	26.55	29.47	34.78	37.06	30.50	23.37	19.87	18.00	17.77	18.71	18.48	16.57	AS
XFKBUE		15.40*	18.70	22.50	25.50	26.30	29.20	34.80	37.15	30.50	23.30	19.80	17.95	17.65	18.70	18.60	16.90	MW
XJJLPE		15.89	18.88	22.91	25.70	26.64	29.63	34.93	37.17	30.66	23.57	20.03	18.16	17.92	18.92	18.55	16.53	AU
YF2MCJ		15.80	18.81	22.61	25.59	26.59	29.44	34.75	37.13	30.59	23.46	19.99	18.06	17.81	18.72	18.44	16.79	AJ
YLKWBG		16.66X	19.78	23.92X	26.55X	27.59X	30.76X	35.99*	37.66	30.42	23.49	19.94	18.20*	18.08*	19.10X	18.78	16.99	XC
YMD3FD		15.95	19.08	22.94	25.61	26.59	29.59	34.68	36.80	30.28	23.35	19.74	17.93	17.66	18.54	18.39	16.72	MM
ZX9HUG		15.86	18.84	22.84	25.68	26.69	29.58	34.97	37.24	30.56	23.40	19.90	17.96	17.77	18.77	18.42	16.41	AS

Summary Statistics

	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700
Grand Means	15.87	18.82	22.82	25.54	26.49	29.47	34.68	36.87	30.20	23.25	19.74	17.92	17.69	18.63	18.39	16.62
SD Btwn Labs	0.23	0.50	0.19	0.18	0.19	0.21	0.63	0.62	0.29	0.19	0.17	0.13	0.17	0.16	0.20	0.24

4VB2GB (X) - High % reflectance data for most wavelengths.

Key to Instrument Codes Reported by Participants

AE	Datacolor 110	AJ	Datacolor 600	AN	Datacolor 650
AP	Datacolor 750	AQ	Datacolor 600x	AS	Datacolor 800
AT	Datacolor 850	AU	Datacolor 1000	CA	Cary 5000
GG	BYK-Gardner TCS II	HL	Hunter Agera	HP	Hunter UltraScan PRO
HW	Hunter UltraScan XE	MI	Macbeth Color i5	MK	Macbeth Color-Eye 7000
MM	Macbeth Color-Eye 7000a	MQ	Minolta CM-700d	MT	Minolta CM-2600d
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	XE	X-Rite Ci7600 Benchtop Spectrophotometer
XF	X-Rite Ci6x Portable Spectrophotometer	XG	X-Rite Ci7860 Benchtop Spectrophotometer	XH	X-Rite Color i5 Benchtop Spectrophotometer
XI	X-Rite Color i7 Benchtop Spectrophotometer	XO	X-Rite SP64 Sphere Spectrophotometer		

WebCode	Data Flag	Sample H231 Lab Mean	Sample H231 Diff from Grand Mean	Sample H231 CPV	Sample H232 Lab Mean	Sample H232 Diff from Grand Mean	Sample H232 CPV	Instr Code
2EYVWF	X	50.13	-2.42	-3.21	60.08	-3.68	-4.55	XX
2NXF9F		51.95	-0.59	-0.79	63.23	-0.53	-0.65	EN
37V9HK		53.63	1.08	1.44	64.68	0.92	1.14	GL
3TUHWF		51.68	-0.87	-1.15	63.70	-0.05	-0.07	GL
4B99EC		52.80	0.26	0.34	64.13	0.37	0.46	GL
4FW32C		51.58	-0.97	-1.28	62.78	-0.98	-1.21	GL
4NX96E		53.73	1.18	1.57	64.50	0.75	0.92	GL
4VBB2F		54.05	1.51	2.00	65.45	1.70	2.10	GK
62X8TB		52.93	0.38	0.51	64.50	0.75	0.92	GL
67T2QC		51.90	-0.64	-0.85	62.33	-1.43	-1.77	GL
6PGTZ9		50.90	-1.64	-2.18	62.18	-1.58	-1.95	GL
7TXC4C		53.25	0.71	0.94	65.13	1.37	1.70	GD
867CDA		53.53	0.98	1.30	64.45	0.70	0.86	GN
86LXMC		52.08	-0.46	-0.61	63.38	-0.38	-0.47	GL
8N24Y9		52.00	-0.54	-0.72	63.25	-0.50	-0.62	GL
9DVLZB		51.53	-1.01	-1.34	62.79	-0.96	-1.19	GL
9XZ7R4	X	51.90	-0.64	-0.85	57.53	-6.23	-7.70	MA
AUGNW6		53.28	0.73	0.97	64.28	0.52	0.65	GL
BJWDMD		53.15	0.61	0.81	64.23	0.47	0.58	MW
BTZR46		52.40	-0.14	-0.19	64.10	0.35	0.43	GK
BWKF66		52.98	0.43	0.57	64.28	0.52	0.65	GK
C2AGG4	*	50.80	-1.74	-2.31	61.40	-2.35	-2.91	GN
C2TAA2		51.73	-0.81	-1.07	63.13	-0.62	-0.77	QT
CA3ZC4		51.18	-1.37	-1.81	62.55	-1.20	-1.49	GT
D9QCXX	X	52.25	-0.29	-0.39	61.28	-2.48	-3.06	GL
ERX2NZ		53.03	0.48	0.64	64.25	0.50	0.61	GK
FE2LTW		52.70	0.16	0.21	64.03	0.27	0.34	GL
GG6MGZ		51.85	-0.69	-0.92	63.28	-0.48	-0.59	GD
GJDK9W		52.90	0.36	0.47	64.03	0.27	0.34	GK
GLLV6Z	X	49.88	-2.67	-3.54	62.08	-1.68	-2.08	XX
GNTAC7	*	53.15	0.61	0.81	63.10	-0.65	-0.81	RQ
HPEBUY	X	51.68	-0.87	-1.15	60.65	-3.10	-3.84	RA
KQ3FDW		51.78	-0.77	-1.02	63.95	0.20	0.24	MX

WebCode	Data Flag	Sample H231 Lab Mean	Sample H231 Diff from Grand Mean	Sample H231 CPV	Sample H232 Lab Mean	Sample H232 Diff from Grand Mean	Sample H232 CPV	Instr Code
KZA9QW		51.50	-1.04	-1.38	62.88	-0.88	-1.09	GK
LBMTNY		52.03	-0.52	-0.69	63.45	-0.30	-0.37	GN
LGDXMU		53.20	0.66	0.87	64.25	0.50	0.61	GL
LNVK8X		52.55	0.01	0.01	64.55	0.80	0.99	GD
MN8P9T		52.58	0.03	0.04	63.65	-0.10	-0.13	GK
MQC6RT		52.40	-0.14	-0.19	64.23	0.47	0.58	GL
MVBNJJ		51.43	-1.12	-1.48	62.33	-1.43	-1.77	ZA
MYP82Z		52.63	0.08	0.11	63.95	0.20	0.24	MM
NJAKRU		52.78	0.23	0.31	64.35	0.60	0.74	GL
PNGBVZ	X	1.40	-51.14	-67.88	1.60	-62.15	-76.86	GL
PWE44U		52.80	0.26	0.34	63.98	0.22	0.27	GN
QJ4XNL		53.00	0.46	0.61	64.30	0.55	0.68	GL
R3UN2Q		53.03	0.48	0.64	63.80	0.05	0.06	GL
RVWVTW		52.79	0.25	0.33	63.63	-0.12	-0.15	GL
TFE8ET		51.45	-1.09	-1.45	63.18	-0.58	-0.71	GK
THFFBP		53.03	0.48	0.64	63.68	-0.08	-0.10	RQ
TUE6JC		52.48	-0.07	-0.09	62.73	-1.03	-1.27	GL
U9UQZN		52.23	-0.32	-0.42	63.38	-0.38	-0.47	GL
UFRC9B		52.78	0.23	0.31	64.58	0.82	1.02	GL
V6QB7Q		53.15	0.61	0.81	63.88	0.12	0.15	ZA
WDWLNF	*	52.45	-0.09	-0.12	62.43	-1.33	-1.64	RA
WTR2WM		53.15	0.61	0.81	64.58	0.82	1.02	GL
X2YVQF		52.90	0.36	0.47	64.00	0.25	0.31	GL
XBLUGK		53.28	0.73	0.97	64.45	0.70	0.86	GL
XDTCFF		51.75	-0.79	-1.05	63.55	-0.20	-0.25	GK
XFKBUE	X	52.43	-0.12	-0.16	61.58	-2.18	-2.69	GK
XJJLPE		53.60	1.06	1.40	64.13	0.37	0.46	GL
XKTR6N		52.38	-0.17	-0.22	63.30	-0.45	-0.56	GL
YF2MCJ		53.58	1.03	1.37	65.03	1.27	1.57	NH
YLKWBG		52.35	-0.19	-0.26	63.35	-0.40	-0.50	GL
YMD3FD		53.55	1.01	1.34	64.65	0.90	1.11	GL
ZX9HUG		52.28	-0.27	-0.35	64.48	0.72	0.89	GK

Summary Statistics

Grand Means			
	52.54 Gloss Units		63.75 Gloss Units
Stnd Dev Btwn Labs			
	0.75 Gloss Units		0.81 Gloss Units

Statistics based on 58 of 65 reporting participants

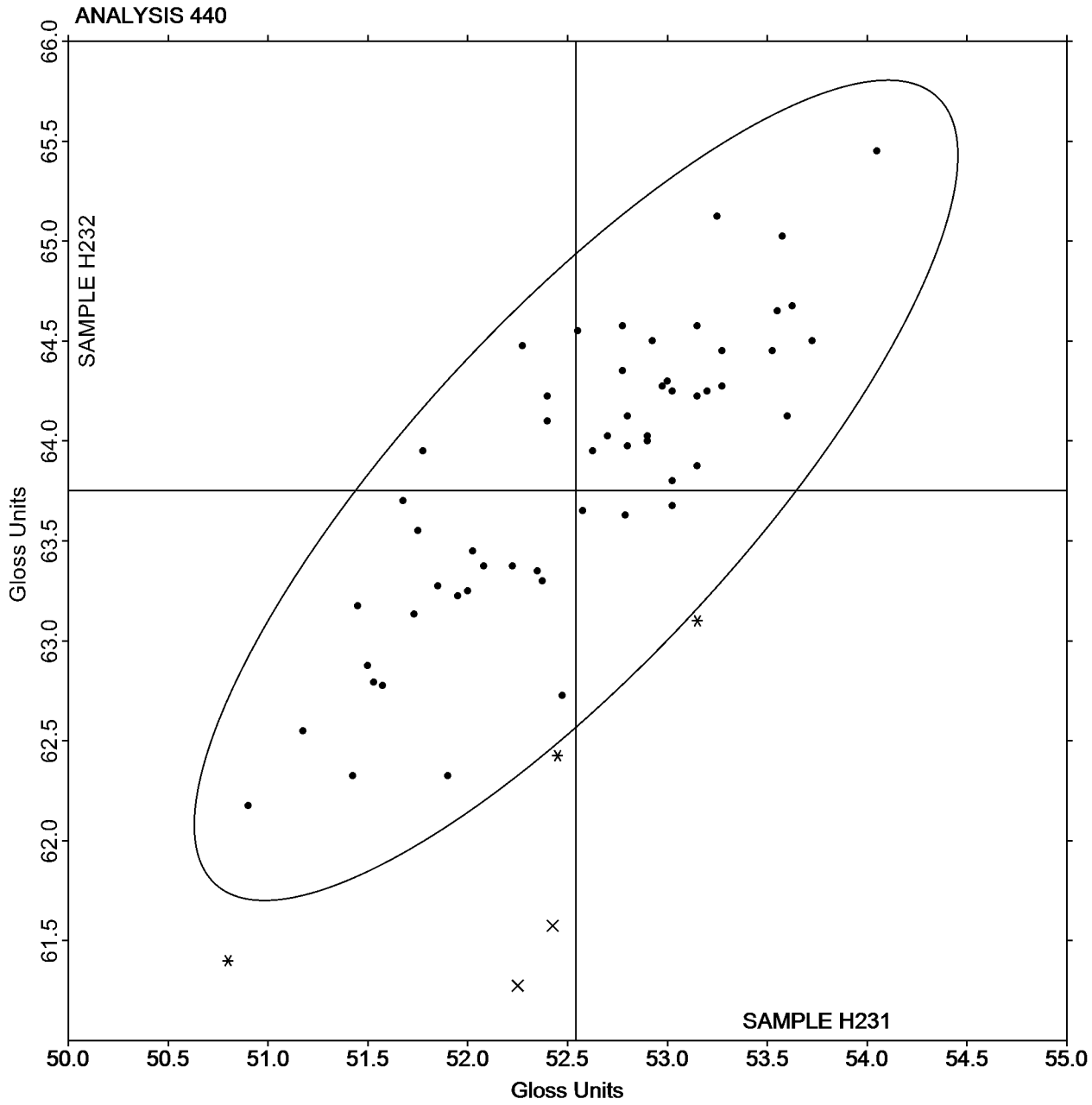
Comments on Assigned Data Flags for Test #440

2EYVWF(X) - Data for both samples are low. Possible systematic error.
9XZ7R4(X) - Extreme data for Sample H232.
D9QCXX(X) - Low data for Sample H232. Inconsistent within the determinations for Sample H232.
GLLV6Z(X) - Low data for Sample H231.
HPEBUY(X) - Low data for Sample H232.
PNGBVZ(X) - Extreme data.
XFKBUE(X) - Inconsistent in testing between samples. Inconsistent within the determinations for Sample H232.

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)
MA	M&A ETB-0833 Glossmeter	MM	Macbeth Lab-Gloss
MW	Minolta Multi-Gloss 268	MX	Minolta Multi-Gloss 268 Plus
NH	3nh NHG268 Multi-angle Precise Gloss Meter	QT	Qualitest Micro-Tri-Gloss
RA	Rhopoint Novo-Gloss Glossmeter	RQ	Rhopoint IQ Goniophotometer 20/60/85°
XX	Instrument make/model not specified by lab	ZA	Zehntner ZGM Series

SAMPLE H231 = 52.54 Gloss Units SAMPLE H232 = 63.75 Gloss Units



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