



Color & Appearance Testing Program

Summary Report # 150 - 4th Q 2009

[About the Color Program](#), [About CTS](#)

[Key to Tables and Graphs](#)

Analysis **Analysis Name**

[408](#) [Color & Color Difference \(Paint Chips\) - 45-0](#)

[409](#) [Color & Color Difference \(Paint Chips\) Sphere](#)

[Instrument Code List](#)

ABOUT THE 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 three opaque color paint chips, selected from throughout the full color spectrum, consisting of a metameric and 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 50 countries, currently participate in the CTS programs.

If there are any questions on the report or testing program, please contact:

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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 mailed 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:

<u>DATA FLAG</u>	<u>STATISTICALLY INCLUDED/EXCLUDED</u>	<u>ACTION REQUIRED</u>
*	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.

Interlaboratory Testing Program for Color & Appearance

Analysis 408

Color and Color Difference - Paint Chips - 45-0 Geometry Instruments
 CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
3ABWUY		D91	52.79	-17.98	10.46	0.83	-0.29	-0.33	0.94	GH
		D92	53.62	-18.27	10.13					
468Q4D		D91	52.36	-18.21	10.38	0.98	-0.26	-0.41	1.09	GH
		D92	53.34	-18.47	9.97					
5EVXBH		D91	52.68	-18.06	10.45	0.98	-0.22	-0.40	1.08	XT
		D92	53.65	-18.27	10.05					
5TK1QT		D91	52.55	-18.04	9.98	0.94	-0.25	-0.38	1.04	HW
		D92	53.49	-18.29	9.60					
6AQ2DY		D91	52.63	-18.07	10.29	0.95	-0.30	-0.40	1.07	XO
		D92	53.58	-18.37	9.90					
6NP1ZH		D91	52.39	-17.91	10.62	0.97	-0.29	-0.41	1.09	XP
		D92	53.36	-18.20	10.22					
8P7GSH		D91	52.78	-17.97	10.65	0.94	-0.30	-0.37	1.05	HK
		D92	53.72	-18.27	10.28					
8TL3VN		D91	52.78	-18.33	10.48	0.85	-0.28	-0.39	0.97	GH
		D92	53.63	-18.61	10.09					
9TNMFA		D91	52.43	-17.98	9.96	0.91	-0.27	-0.40	1.03	XX
		D92	53.34	-18.25	9.56					
B9MD6K		D91	52.76	-17.86	9.93	0.91	-0.32	-0.35	1.02	HW
		D92	53.67	-18.17	9.58					
C18E3D		D91	52.62	-18.18	9.91	0.86	-0.29	-0.33	0.96	HW
		D92	53.48	-18.47	9.58					
CA24YL		D91	52.54	-17.83	10.62	0.94	-0.28	-0.37	1.04	XR
		D92	53.47	-18.11	10.26					
CZC9TU		D91	52.56	-17.93	10.35	0.94	-0.26	-0.39	1.04	XU
		D92	53.50	-18.19	9.96					
F2SD2D		D91	52.24	-17.83	9.97	0.90	-0.26	-0.32	0.99	GU
		D92	53.14	-18.09	9.65					

Interlaboratory Testing Program for Color & Appearance

Analysis 408

Color and Color Difference - Paint Chips - 45-0 Geometry Instruments
 CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
GV69SV		D91	52.47	-18.03	9.80	0.90	-0.30	-0.36	1.01	HW
		D92	53.37	-18.32	9.44					
HCKDU8		D91	52.44	-17.62	10.53	0.93	-0.28	-0.31	1.02	GU
		D92	53.37	-17.90	10.22					
J182ZW		D91	52.65	-18.14	10.07	1.07	-0.26	-0.45	1.19	HW
		D92	53.72	-18.40	9.62					
JQBFYM		D91	52.52	-18.03	10.02	0.87	-0.23	-0.37	0.97	HW
		D92	53.39	-18.26	9.65					
MRYLXG		D91	52.47	-18.14	9.92	0.85	-0.31	-0.34	0.97	MG
		D92	53.33	-18.44	9.58					
PQ5VF8		D91	52.70	-17.99	10.45	0.90	-0.31	-0.37	1.02	XU
		D92	53.60	-18.30	10.08					
SJKJK2		D91	52.64	-17.89	10.18	0.92	-0.25	-0.37	1.02	XO
		D92	53.56	-18.14	9.81					
SSLLAM		D91	52.56	-17.80	10.22	0.94	-0.31	-0.39	1.06	XK
		D92	53.50	-18.11	9.84					
TUTN43		D91	53.07	-18.03	11.03	0.86	-0.32	-0.43	1.01	XV
		D92	53.93	-18.35	10.60					
U22YT3		D91	52.80	-17.89	10.63	0.88	-0.30	-0.36	0.99	GE
		D92	53.67	-18.19	10.27					
W4ZCZR	X	D91	52.81	18.00	10.42	0.95	0.26	-0.40	1.06	GE
		D92	53.76	18.25	10.02					
W9XR38	X	D91	52.75	-17.25	10.55	1.05	-0.40	-0.40	1.19	TN
		D92	53.80	-17.65	10.15					
WB28AC	X	D91	52.22	-17.25	9.84	0.94	-0.27	-0.40	1.05	HK
		D92	53.16	-17.52	9.45					
WML9N		D91	52.88	-17.90	11.15	0.90	-0.28	-0.40	1.02	GA
		D92	53.78	-18.18	10.76					

Interlaboratory Testing Program for Color & Appearance

Analysis 408

Color and Color Difference - Paint Chips - 45-0 Geometry Instruments
CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
X3BV3Q		D91	52.76	-17.97	10.39	0.91	-0.25	-0.38	1.02	XM
		D92	53.67	-18.22	10.01					
XEDT53		D91	52.74	-18.07	10.41	0.86	-0.25	-0.37	0.97	XN
		D92	53.60	-18.31	10.04					
XFS5C8		D91	52.69	-18.00	9.83	0.81	-0.29	-0.33	0.92	HW
		D92	53.50	-18.28	9.50					
Y1WE8K		D91	52.82	-18.11	10.40	0.90	-0.27	-0.41	1.02	GD
		D92	53.71	-18.38	9.99					
ZYKRSW		D91	52.84	-18.17	10.35	0.95	-0.25	-0.40	1.05	XO
		D92	53.78	-18.42	9.95					

Summary Statistics

Samples	L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*
Grand Means							
D91	52.63	-18.00	10.30	0.91	-0.28	-0.37	1.02
D92	53.54	-18.27	9.93				
Stnd Dev Btwn Labs							
D91	0.19	0.14	0.34	0.05	0.03	0.03	0.05
D92	0.19	0.14	0.33				

Statistics based on of 33 reporting participants

Comments assigned on Data Flags for Test #408

W4ZCZR(X) - It appears that the lab may have forgotten to include the negative sign when reporting "a*" values.

W9XR38(X) - High "a*" values.

WB28AC(X) - High "a*" values.

Interlaboratory Testing Program for Color & Appearance

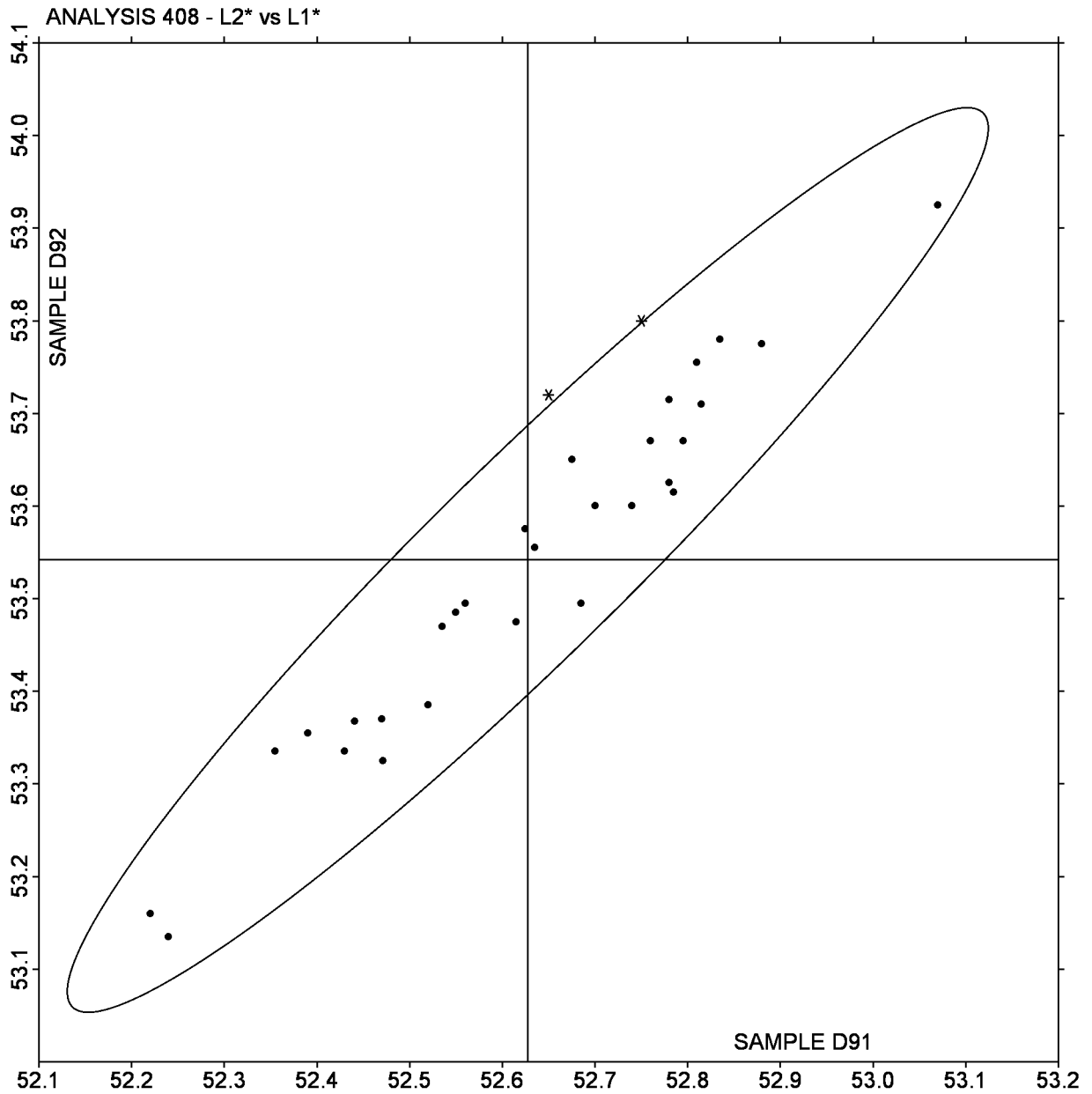
Analysis 408

Color and Color Difference - Paint Chips - 45-0 Geometry Instruments
CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

L2* vs L1*

SAMPLE D91 = 52.63

SAMPLE D92 = 53.54



Interlaboratory Testing Program for Color & Appearance

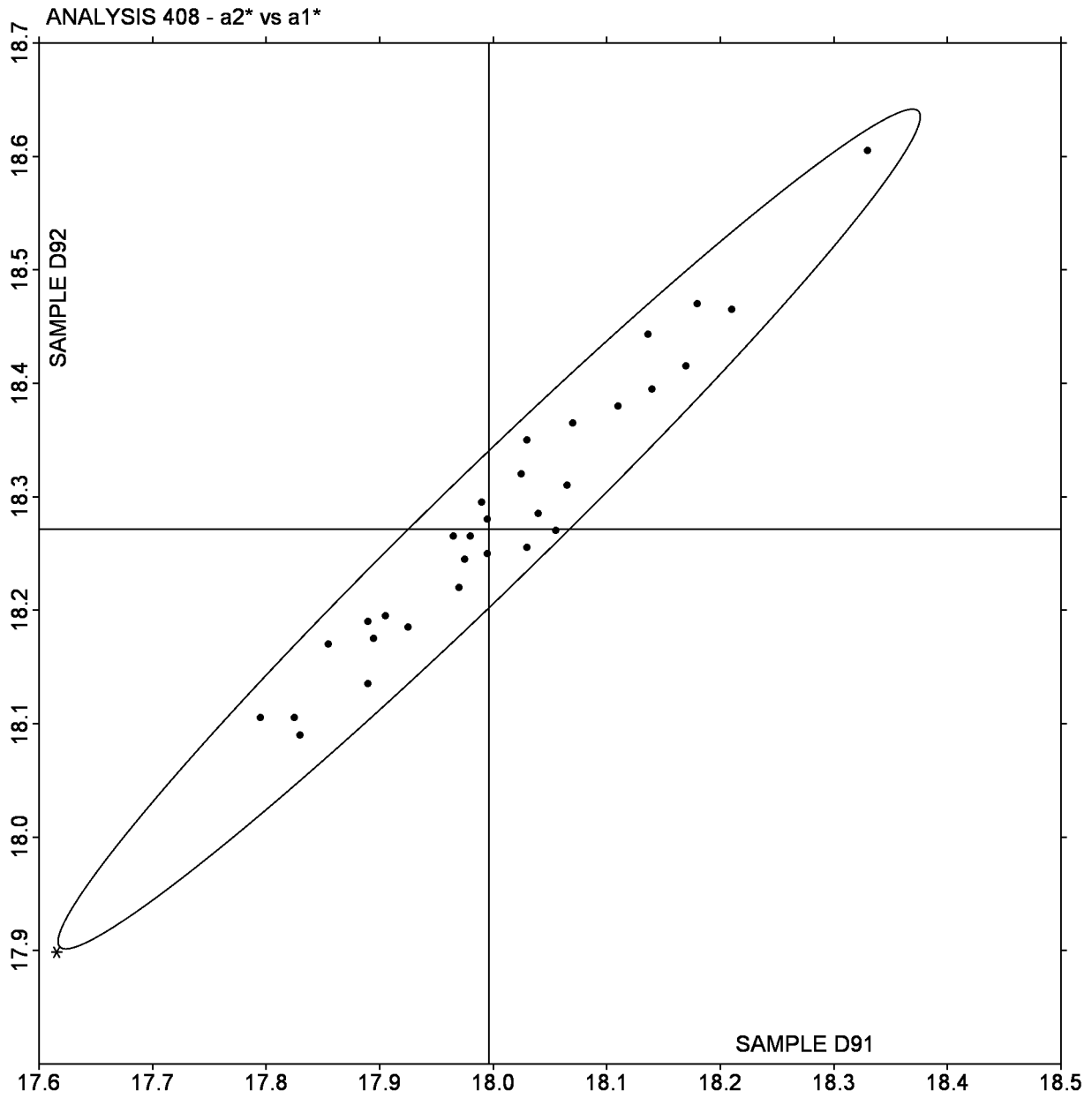
Analysis 408

Color and Color Difference - Paint Chips - 45-0 Geometry Instruments
CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

a2* vs a1*

SAMPLE D91 = -18.00

SAMPLE D92 = -18.27



Plot created using absolute values.

Interlaboratory Testing Program for Color & Appearance

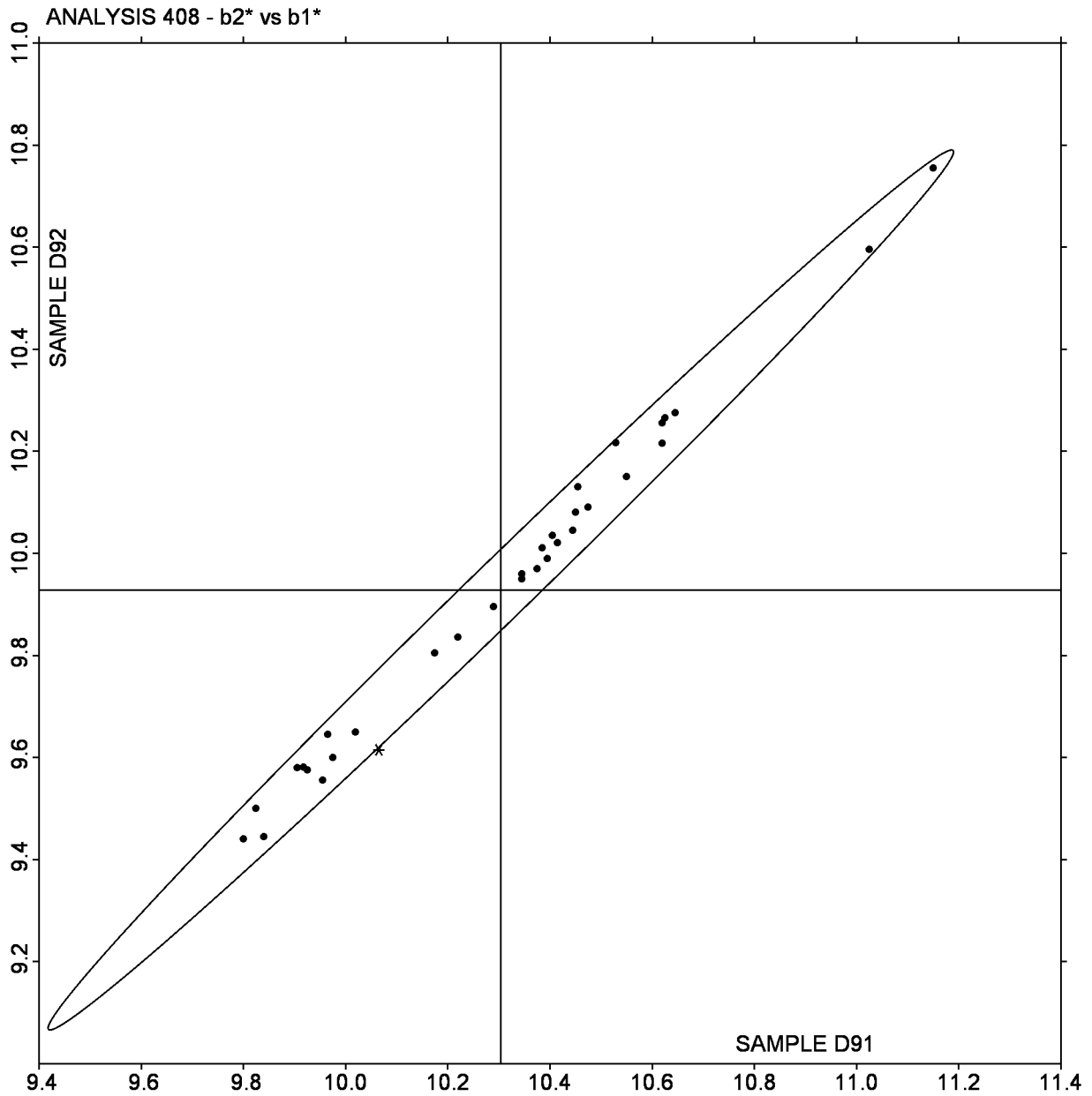
Analysis 408

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b2* vs b1*

SAMPLE D91 = 10.30

SAMPLE D92 = 9.93



Interlaboratory Testing Program for Color & Appearance

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WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
18R8J7		D91	52.73	-17.71	9.98	0.91	-0.34	-0.33	1.02	AJ
		D92	53.64	-18.05	9.66					
1AG4U2		D91	52.57	-17.81	9.98	0.91	-0.29	-0.37	1.02	AP
		D92	53.48	-18.10	9.62					
1BTYWD		D91	52.89	-17.77	9.98	0.89	-0.24	-0.39	1.00	AM
		D92	53.78	-18.01	9.59					
1DAWVJ		D91	53.01	-17.75	9.81	0.89	-0.23	-0.39	0.99	AO
		D92	53.89	-17.97	9.42					
1FSF6M		D91	53.00	-17.68	9.95	0.87	-0.31	-0.35	0.98	HF
		D92	53.86	-17.99	9.60					
1HD7VE		D91	53.01	-17.78	10.04	0.98	-0.21	-0.48	1.11	AO
		D92	53.98	-17.99	9.56					
216WWC		D91	52.84	-17.85	10.13	0.97	-0.23	-0.41	1.07	MV
		D92	53.81	-18.08	9.72					
2DQPZ1		D91	52.74	-17.46	9.93	0.87	-0.28	-0.36	0.98	MJ
		D92	53.61	-17.74	9.57					
2GHADA		D91	52.79	-17.84	10.01	0.94	-0.23	-0.41	1.05	MM
		D92	53.73	-18.07	9.60					
2J4SF8		D91	52.98	-17.95	10.06	0.95	-0.29	-0.43	1.07	HP
		D92	53.92	-18.23	9.63					
2LBZN8		D91	52.96	-17.81	9.98	0.89	-0.29	-0.34	1.00	AM
		D92	53.85	-18.10	9.64					
2ZXEPM		D91	52.79	-17.56	10.06	0.96	-0.29	-0.43	1.09	MK
		D92	53.75	-17.85	9.63					
33U92Y		D91	53.12	-17.86	10.11	0.93	-0.22	-0.47	1.06	GG
		D92	54.05	-18.07	9.64					
3D61G5		D91	52.82	-17.83	9.91	0.81	-0.28	-0.38	0.94	HF
		D92	53.63	-18.10	9.53					

Interlaboratory Testing Program for Color & Appearance

Analysis 409

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

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
3W3422		D91	52.83	-17.26	10.02	0.89	-0.26	-0.37	1.00	MM
		D92	53.72	-17.52	9.65					
3Z4U31		D91	53.08	-17.78	10.03	0.86	-0.29	-0.38	0.98	AO
		D92	53.94	-18.07	9.65					
42C7GN		D91	53.15	-17.80	9.68	0.89	-0.29	-0.35	1.00	HW
		D92	54.04	-18.08	9.33					
465P29		D91	52.74	-17.75	9.97	0.94	-0.24	-0.41	1.05	MM
		D92	53.68	-17.99	9.56					
4K9K32		D91	52.93	-18.02	10.06	0.92	-0.28	-0.38	1.03	MX
		D92	53.85	-18.29	9.68					
4PQWA4		D91	52.83	-17.82	9.98	0.88	-0.24	-0.39	0.98	AJ
		D92	53.71	-18.05	9.60					
4S4KKE		D91	52.85	-17.71	10.06	0.93	-0.25	-0.46	1.06	AM
		D92	53.78	-17.96	9.60					
4XHL3M		D91	53.00	-17.71	10.02	0.91	-0.25	-0.39	1.01	AJ
		D92	53.90	-17.96	9.64					
5KTXPY		D91	53.15	-17.80	10.04	0.89	-0.33	-0.34	1.00	AJ
		D92	54.04	-18.12	9.70					
5MDQKH		D91	52.86	-17.71	9.93	0.99	-0.26	-0.46	1.12	AJ
		D92	53.85	-17.97	9.47					
5U8HMU		D91	52.94	-18.00	10.17	0.93	-0.24	-0.42	1.05	CA
		D92	53.87	-18.24	9.75					
5XHWF1		D91	52.89	-17.49	10.25	0.93	-0.30	-0.39	1.05	MK
		D92	53.82	-17.79	9.86					
62PZNE		D91	52.98	-17.59	10.07	0.87	-0.30	-0.37	0.99	AM
		D92	53.85	-17.88	9.71					
67WVHV		D91	52.80	-17.95	10.00	0.90	-0.25	-0.35	1.00	CA
		D92	53.70	-18.20	9.65					

Interlaboratory Testing Program for Color & Appearance

Analysis 409

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

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
6FH773	X	D91	54.16	-17.94	10.96	0.99	-0.21	-0.44	1.10	AQ
		D92	55.15	-18.16	10.52					
6KL7ZS		D91	52.94	-17.63	10.21	0.92	-0.26	-0.48	1.07	AM
		D92	53.86	-17.88	9.74					
6LVU5D		D91	52.95	-17.72	10.03	0.93	-0.31	-0.39	1.05	AM
		D92	53.87	-18.03	9.64					
6TY5NE		D91	52.97	-17.87	10.10	0.96	-0.26	-0.41	1.07	MT
		D92	53.92	-18.13	9.69					
7BK312		D91	52.91	-17.84	9.89	0.94	-0.26	-0.37	1.04	AJ
		D92	53.85	-18.10	9.53					
7BNL5S		D91	52.56	-17.44	9.99	0.87	-0.24	-0.37	0.98	MG
		D92	53.43	-17.69	9.62					
7KUUME		D91	53.11	-17.95	10.12	0.91	-0.25	-0.40	1.02	MV
		D92	54.02	-18.19	9.72					
7LG34E		D91	52.88	-17.62	10.15	0.91	-0.28	-0.40	1.03	AM
		D92	53.79	-17.89	9.75					
7WAAEK		D91	52.76	-17.80	9.98	0.92	-0.25	-0.37	1.02	MM
		D92	53.68	-18.05	9.61					
814W4N		D91	52.76	-17.71	10.19	0.95	-0.29	-0.39	1.06	AL
		D92	53.71	-18.00	9.80					
8B8VZZ		D91	52.91	-17.69	9.91	0.85	-0.25	-0.33	0.94	MK
		D92	53.76	-17.94	9.58					
8NVRVK		D91	52.87	-17.78	9.93	0.91	-0.28	-0.37	1.02	XR
		D92	53.78	-18.05	9.56					
8SW8DR		D91	52.71	-17.77	9.78	0.88	-0.29	-0.33	0.98	XO
		D92	53.59	-18.06	9.45					
9HHAXF		D91	52.95	-17.88	10.22	0.92	-0.29	-0.41	1.04	AJ
		D92	53.86	-18.17	9.82					

Interlaboratory Testing Program for Color & Appearance

Analysis 409

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

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
A37F7X		D91	52.86	-17.85	10.13	0.94	-0.23	-0.51	1.09	HP
		D92	53.79	-18.08	9.62					
AKQRQK		D91	52.72	-17.71	9.85	0.92	-0.28	-0.35	1.02	MM
		D92	53.64	-17.99	9.50					
AMCAP		D91	52.79	-17.71	9.93	0.87	-0.27	-0.36	0.98	MM
		D92	53.66	-17.99	9.57					
B1NF8U	X	D91	53.31	-17.77	9.45	0.89	-0.28	-0.34	0.99	MH
		D92	54.20	-18.04	9.11					
BE71TN	X	D91	52.07	-17.29	10.35	0.86	-0.27	-0.39	0.98	GH
		D92	52.93	-17.56	9.97					
BK6XQ1	X	D91	52.94	-17.88	9.70	0.92	-0.21	-0.46	1.05	HW
		D92	53.86	-18.08	9.24					
BMY3FM		D91	52.62	-17.65	10.02	0.87	-0.26	-0.35	0.97	HW
		D92	53.49	-17.91	9.67					
CXRG43		D91	52.86	-17.37	9.90	0.96	-0.24	-0.43	1.07	AD
		D92	53.81	-17.61	9.47					
DCMQB	X	D91	53.56	-18.26	10.05	0.67	-0.18	-0.40	0.79	AP
		D92	54.23	-18.44	9.66					
DTV5NW		D91	53.08	-17.85	10.02	0.94	-0.22	-0.43	1.05	AJ
		D92	54.02	-18.06	9.60					
EBFRKY		D91	53.09	-17.59	9.92	0.92	-0.24	-0.35	1.01	HP
		D92	54.00	-17.83	9.58					
EGA8UT		D91	53.01	-17.71	9.82	0.91	-0.28	-0.37	1.01	HW
		D92	53.92	-17.99	9.45					
ER9QYE		D91	52.94	-17.88	9.95	0.89	-0.25	-0.37	0.99	AM
		D92	53.83	-18.13	9.59					
ESM21Q		D91	53.08	-17.77	10.01	0.90	-0.24	-0.36	0.99	AJ
		D92	53.97	-18.01	9.65					

Interlaboratory Testing Program for Color & Appearance

Analysis 409

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

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
FKTPVU		D91	52.95	-17.58	10.11	0.98	-0.22	-0.48	1.11	MM
		D92	53.93	-17.81	9.64					
FS9A1S		D91	52.57	-17.44	9.80	0.87	-0.21	-0.37	0.96	HG
		D92	53.44	-17.64	9.43					
GHSYN7		D91	53.00	-17.75	10.05	0.85	-0.35	-0.30	0.97	SH
		D92	53.85	-18.10	9.75					
GHW2SK		D91	52.88	-17.66	9.94	0.84	-0.30	-0.35	0.96	MM
		D92	53.72	-17.96	9.58					
GN5KRC		D91	52.99	-18.05	10.18	0.96	-0.24	-0.39	1.06	MV
		D92	53.94	-18.29	9.79					
HK3HME		D91	52.99	-17.65	10.07	0.93	-0.27	-0.29	1.00	GF
		D92	53.91	-17.92	9.78					
HV1EDY		D91	52.91	-17.57	10.06	0.92	-0.26	-0.41	1.04	AJ
		D92	53.83	-17.83	9.65					
HWJA6H		D91	52.81	-18.11	10.24	0.89	-0.27	-0.38	1.00	AJ
		D92	53.70	-18.38	9.87					
J2QW16	X	D91	50.51	-16.72	9.28	1.75	-0.25	-1.25	2.16	GD
		D92	52.26	-16.97	8.03					
JKYSZB		D91	52.87	-17.81	10.28	0.95	-0.27	-0.39	1.06	AJ
		D92	53.82	-18.08	9.90					
JLY1HN		D91	52.88	-17.52	9.82	0.92	-0.33	-0.35	1.03	AJ
		D92	53.80	-17.85	9.47					
JQN6UK		D91	52.76	-18.00	10.10	0.92	-0.28	-0.37	1.02	MV
		D92	53.67	-18.28	9.73					
K3DSXY		D91	52.90	-17.67	10.09	0.89	-0.28	-0.37	1.00	AM
		D92	53.78	-17.95	9.72					
K6D3UY		D91	53.01	-17.82	9.85	0.89	-0.24	-0.41	1.00	AM
		D92	53.90	-18.06	9.44					

Interlaboratory Testing Program for Color & Appearance

Analysis 409

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

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
KKAQW		D91	53.03	-17.96	10.18	0.93	-0.21	-0.44	1.04	AM
		D92	53.96	-18.17	9.74					
KQKY7H		D91	52.70	-17.83	10.16	0.90	-0.30	-0.37	1.01	EE
		D92	53.59	-18.13	9.79					
L78HRA	X	D91	52.17	-17.36	10.69	0.86	-0.42	-0.02	0.96	GH
		D92	53.03	-17.78	10.68					
LA7WD1		D91	53.00	-17.90	10.12	0.94	-0.26	-0.36	1.04	MV
		D92	53.94	-18.16	9.76					
LC6EUE		D91	52.76	-17.69	9.82	0.88	-0.28	-0.35	0.98	XU
		D92	53.64	-17.97	9.48					
LG5KWZ		D91	52.91	-17.68	9.89	0.91	-0.24	-0.38	1.02	MK
		D92	53.82	-17.92	9.51					
M4KTYN		D91	52.86	-17.66	9.74	0.87	-0.28	-0.35	0.98	MZ
		D92	53.73	-17.94	9.39					
MDZYG		D91	52.70	-17.76	9.95	0.89	-0.24	-0.37	0.99	MJ
		D92	53.59	-18.00	9.59					
MJ59BD		D91	52.86	-17.84	10.10	0.87	-0.25	-0.38	0.98	HP
		D92	53.73	-18.09	9.72					
MTH4T2		D91	52.91	-17.66	10.11	0.96	-0.30	-0.38	1.07	HP
		D92	53.87	-17.96	9.74					
MZ4LAP		D91	52.89	-17.71	10.00	0.93	-0.25	-0.39	1.04	MK
		D92	53.81	-17.96	9.60					
N495RN		D91	53.10	-17.79	10.04	0.88	-0.25	-0.39	0.99	AM
		D92	53.98	-18.04	9.65					
NUSXCC	X	D91	52.69	-17.92	9.96	0.84	-0.55	-0.42	1.09	XO
		D92	53.53	-18.46	9.54					
P7DNKY		D91	52.89	-17.79	10.28	0.88	-0.30	-0.37	1.00	AJ
		D92	53.77	-18.09	9.91					

Interlaboratory Testing Program for Color & Appearance

Analysis 409

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

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
Q7B4GS	X	D91	52.76	-17.40	10.45	0.92	-0.32	-0.32	1.02	HG
		D92	53.68	-17.72	10.13					
QDE6LS	X	D91	52.91	-17.60	10.01	0.34	-0.31	-0.35	0.58	MM
		D92	53.26	-17.90	9.66					
QHLBSC		D91	52.84	-17.67	10.04	0.84	-0.25	-0.38	0.95	AM
		D92	53.68	-17.92	9.67					
QPR45G		D91	52.75	-17.77	9.77	0.86	-0.28	-0.32	0.96	MM
		D92	53.61	-18.05	9.45					
QQ6FW1		D91	52.96	-17.61	10.25	0.86	-0.31	-0.29	0.95	HP
		D92	53.81	-17.92	9.96					
QRKAQ3		D91	52.74	-17.62	10.05	0.93	-0.29	-0.41	1.05	MM
		D92	53.67	-17.90	9.65					
QZWKW	X	D91	53.06	-17.60	9.38	0.92	-0.23	-0.43	1.04	HH
		D92	53.98	-17.83	8.96					
R8KK9Z		D91	52.99	-17.75	10.07	0.88	-0.28	-0.37	0.99	AJ
		D92	53.87	-18.03	9.70					
RL8MSS		D91	52.92	-17.83	10.08	0.90	-0.31	-0.39	1.02	MV
		D92	53.82	-18.13	9.69					
RVN5XU		D91	52.95	-17.77	9.99	0.92	-0.26	-0.40	1.03	AO
		D92	53.86	-18.03	9.59					
RZ83FJ		D91	53.01	-17.82	10.01	0.88	-0.28	-0.34	0.98	AJ
		D92	53.89	-18.09	9.68					
S5EJH2		D91	52.81	-17.98	10.19	0.90	-0.30	-0.37	1.02	XI
		D92	53.71	-18.28	9.82					
S8WFSN		D91	52.77	-17.76	10.00	0.94	-0.25	-0.42	1.05	XO
		D92	53.71	-18.00	9.58					
SAY8WU		D91	52.72	-17.53	9.81	0.96	-0.23	-0.44	1.07	GD
		D92	53.68	-17.75	9.38					

Interlaboratory Testing Program for Color & Appearance

Analysis 409

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

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
SFWMYB		D91	52.75	-17.83	9.88	0.92	-0.23	-0.39	1.02	XP
		D92	53.67	-18.06	9.49					
SNR549		D91	52.67	-17.94	10.03	0.94	-0.29	-0.40	1.06	MI
		D92	53.61	-18.23	9.63					
TBRH53		D91	52.84	-17.74	9.77	0.88	-0.12	-0.17	0.90	MK
		D92	53.72	-17.86	9.61					
TD4DG1		D91	52.67	-17.37	10.33	0.93	-0.23	-0.43	1.05	HX
		D92	53.60	-17.60	9.91					
THEG5Y		D91	52.97	-17.86	9.83	0.93	-0.27	-0.41	1.05	AJ
		D92	53.90	-18.13	9.42					
TXGZ38		D91	53.09	-17.82	10.17	0.92	-0.27	-0.41	1.04	MV
		D92	54.01	-18.09	9.76					
TZ3VJQ	X	D91	52.09	-18.09	10.34	0.99	-0.23	-0.47	1.12	MI
		D92	53.08	-18.32	9.86					
U6HL9V		D91	52.68	-17.86	9.81	0.90	-0.27	-0.37	1.00	XL
		D92	53.57	-18.13	9.44					
UF7LXE		D91	52.71	-17.54	9.92	0.89	-0.27	-0.39	1.01	MJ
		D92	53.60	-17.81	9.53					
UN3YZE		D91	52.96	-17.45	9.82	0.91	-0.27	-0.36	1.02	MM
		D92	53.88	-17.72	9.46					
V7S9GC		D91	52.96	-17.82	10.10	0.91	-0.32	-0.37	1.03	AJ
		D92	53.86	-18.14	9.73					
VVBZNM		D91	52.90	-17.79	9.93	0.92	-0.26	-0.39	1.03	AJ
		D92	53.81	-18.05	9.54					
VXQR8V		D91	52.86	-17.84	10.11	0.93	-0.25	-0.43	1.05	MV
		D92	53.78	-18.09	9.69					
W7QSYX	X	D91	52.66	-17.18	9.85	0.86	-0.28	-0.36	0.97	MI
		D92	53.51	-17.45	9.49					

Interlaboratory Testing Program for Color & Appearance

Analysis 409

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

WebCode	Flag	Samples	CIE L* a* b* Color Values			Color Difference Values				InstrCode
			L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*	
WFZRAQ		D91	52.78	-17.56	9.98	0.91	-0.27	-0.41	1.03	MM
		D92	53.68	-17.82	9.57					
X29G1P	X	D91	52.27	-17.66	10.00	1.37	-0.29	-0.34	1.44	MK
		D92	53.63	-17.95	9.67					
XG8TQH		D91	53.07	-17.91	9.92	0.89	-0.27	-0.36	1.00	AM
		D92	53.96	-18.17	9.56					
XGSLRB		D91	52.93	-17.95	10.05	0.98	-0.29	-0.40	1.09	HP
		D92	53.91	-18.24	9.65					
XKUC4H		D91	52.75	-17.53	10.33	1.01	-0.26	-0.47	1.14	AJ
		D92	53.76	-17.79	9.87					
YAP45R	X	D91	95.41	1.10	-7.55	-0.01	-0.14	0.28	0.31	MV
		D92	95.40	0.96	-7.28					
YB131L		D91	53.20	-17.73	9.89	0.73	-0.17	-0.40	0.84	XQ
		D92	53.93	-17.90	9.49					
YL785G		D91	52.80	-17.74	9.85	0.86	-0.29	-0.37	0.98	XI
		D92	53.66	-18.02	9.48					
YSJVT6		D91	52.77	-17.89	10.28	0.89	-0.26	-0.35	0.99	PE
		D92	53.66	-18.15	9.94					
YWXT3D	X	D91	52.33	-18.37	10.24	0.93	-0.26	-0.39	1.04	AJ
		D92	53.25	-18.63	9.85					
Z3ZXVX		D91	52.69	-17.53	9.92	0.87	-0.25	-0.38	0.98	GD
		D92	53.56	-17.78	9.55					
ZJR4JH		D91	52.88	-17.54	10.05	0.97	-0.24	-0.35	1.05	AM
		D92	53.85	-17.78	9.70					
ZSGLEE		D91	53.05	-17.80	10.11	0.84	-0.30	-0.31	0.94	MV
		D92	53.89	-18.10	9.80					

Interlaboratory Testing Program for Color & Appearance

Analysis 409

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

Summary Statistics							
Samples	L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*
Grand Means							
D91	52.87	-17.74	10.02				
D92	53.78	-18.00	9.63	0.91	-0.26	-0.38	1.02
Std Dev Btwn Labs							
D91	0.13	0.16	0.14				
D92	0.14	0.16	0.13	0.04	0.03	0.04	0.05

Statistics based on of 125 reporting participants

Comments assigned on Data Flags for Test #409

6FH773(X) - High "L*" and "b*" values.

B1NF8U(X) - High "L*" values and low "b*" values.

BE71TN(X) - Low "L*" values.

BK6XQ1(X) - Low "b*" values for Sample D92.

DCMQBN(X) - High "L*" values and low "a*" values for Sample D91.

J2QW16(X) - High "a*" values and low "L*" and "c*" values. Large replication difference for all values.

L78HRA(X) - High "b*" values and low "L*" values.

NUSXCC(X) - Low "a*" values for Sample D92.

Q7B4GS(X) - High "b*" values.

QDE6LS(X) - Low "L*" value for sample D92. Large replication difference for "L" value on Sample D92.

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

TZ3VJQ(X) - Low "L*" values.

W7QSYP(X) - High "a*" values.

X29G1P(X) - Low "L*" value for Sample D91. Large replication difference for "L" value on Sample D91.

YAP45R(X) - Apparently measured back of the samples.

YWXT3D(X) - Low "L*" and "a*" values.

Interlaboratory Testing Program for Color & Appearance

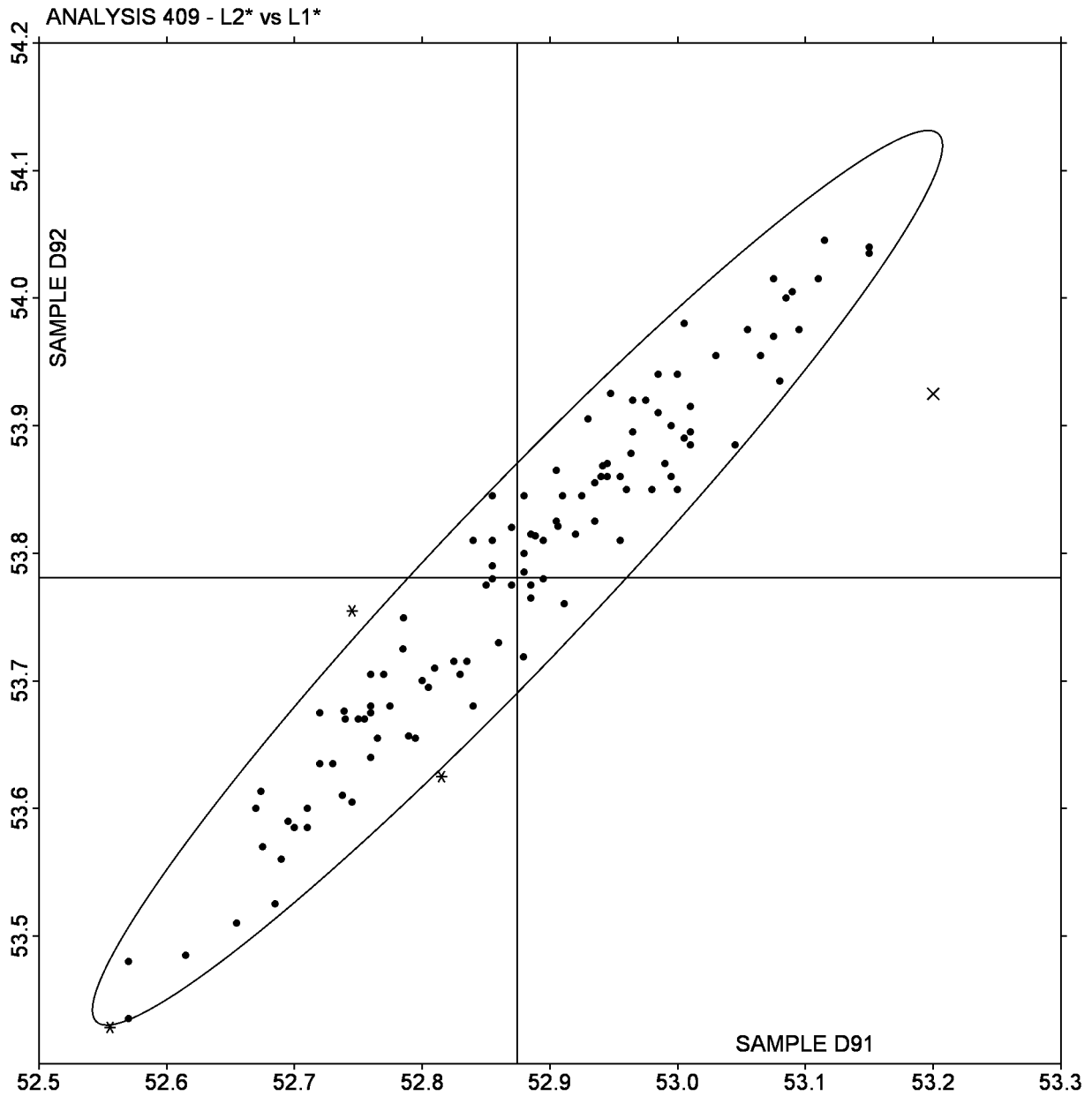
Analysis 409

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

L2* vs L1*

SAMPLE D91 = 52.87

SAMPLE D92 = 53.78



Interlaboratory Testing Program for Color & Appearance

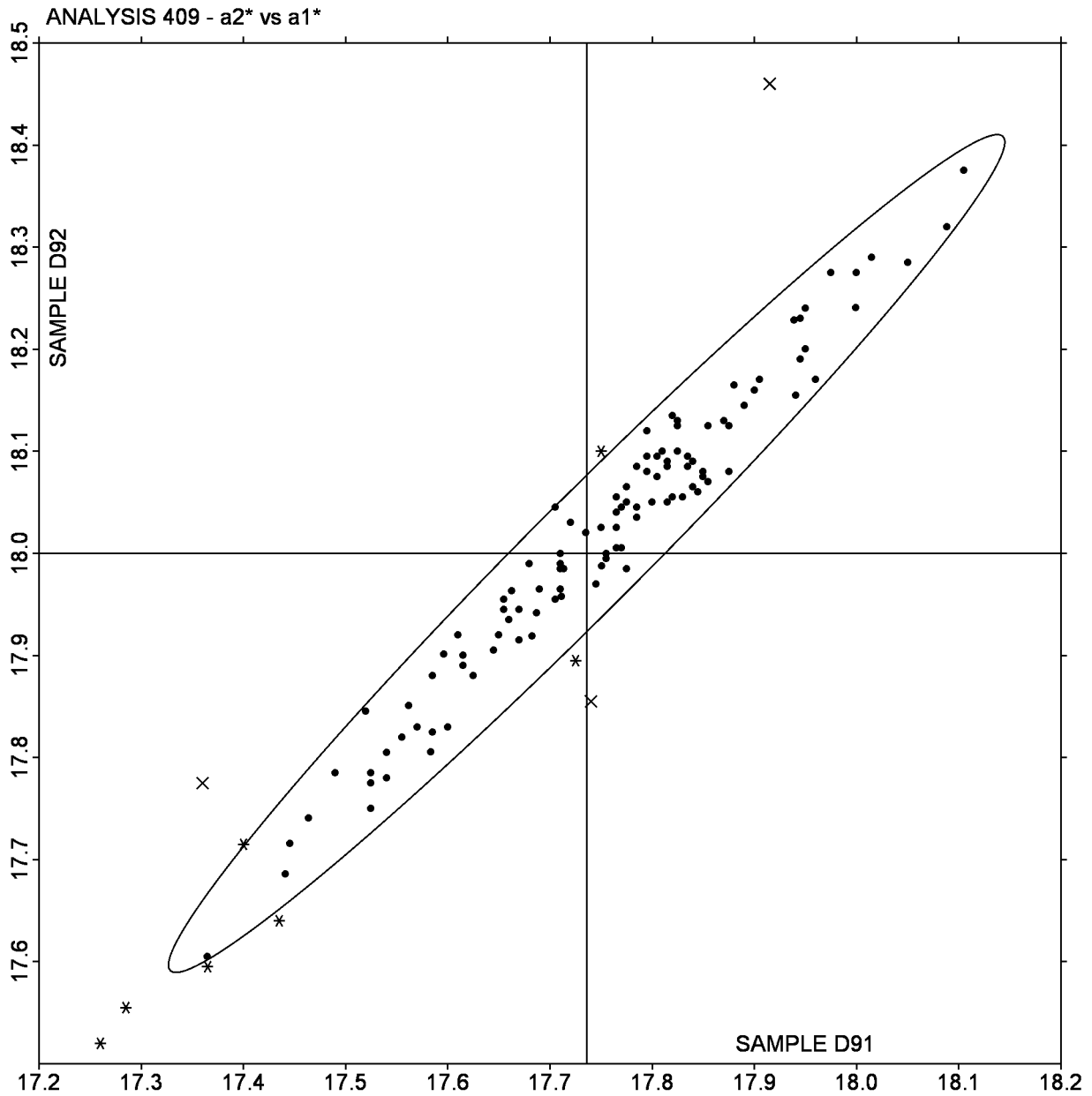
Analysis 409

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

a2* vs a1*

SAMPLE D91 = -17.74

SAMPLE D92 = -18.00



Plot created using absolute values.

Interlaboratory Testing Program for Color & Appearance

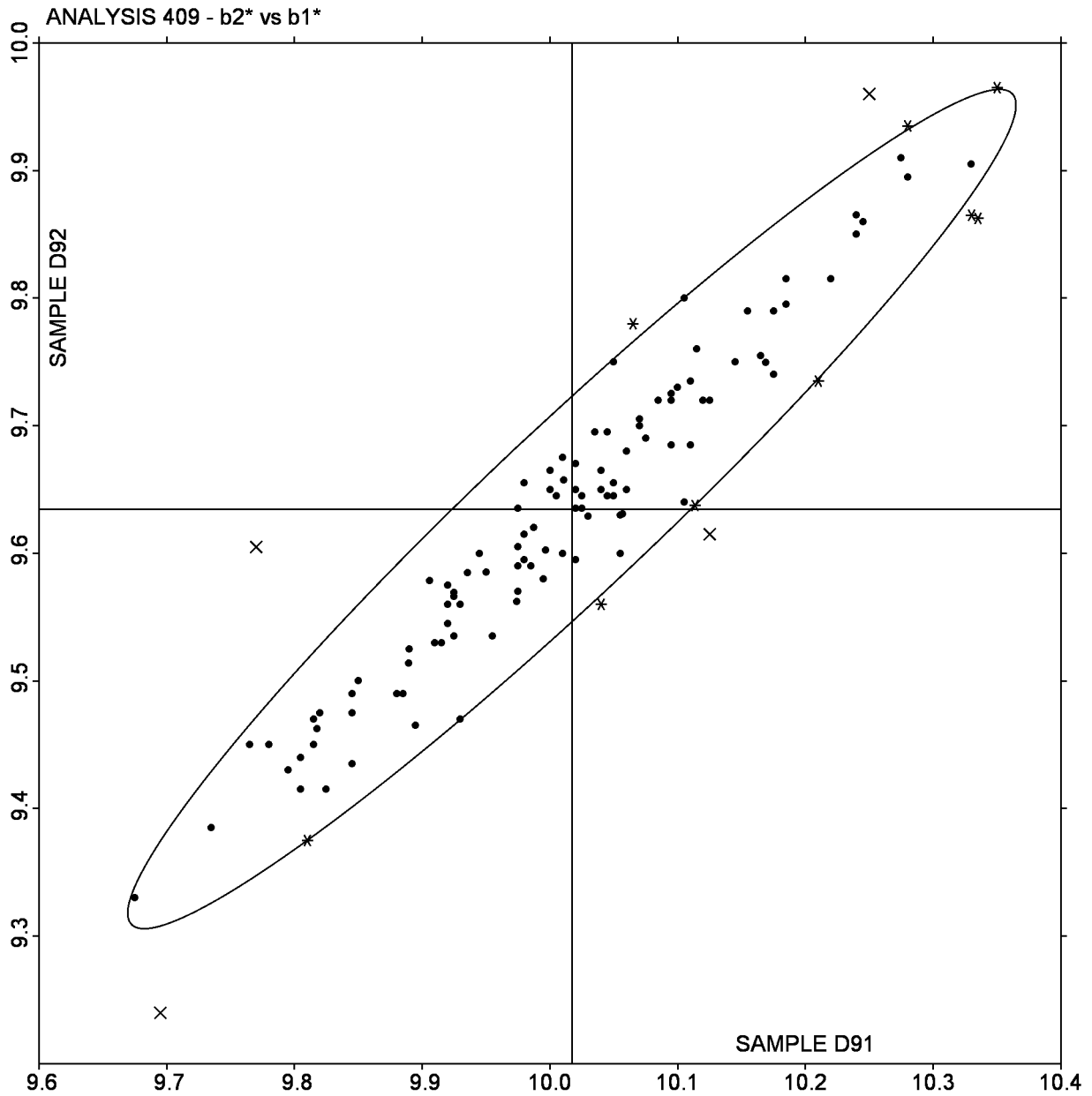
Analysis 409

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

b2* vs b1*

SAMPLE D91 = 10.02

SAMPLE D92 = 9.63



Instrument Code List - Report# 150

Instrument information as provided by laboratories

<u>Analysis</u>	<u>Analysis Name</u>
408	<u>Color & Color Difference (Paint Chips) - 45-0</u>

Instrument code and description

GA	BYK-Gardner Color Guide (45/0)
GD	BYK-Gardner The Color Machine
GE	BYK-Gardner spectro-guide (45/0)
GH	BYK-Gardner Color-View
GU	Gretag Spectrolino Spectrophotometer
HK	Hunter MiniScan XE (45/0)
HW	Hunter LabScan XE
MG	Macbeth 1500/PLUS or 2025+ Color Eye
TN	Topcon SR-1 Spectroradiometer
XK	X-Rite MA100 Multi-Angle SpectroPhotometer
XM	X-Rite MA58 Multi-Angle SpectroPhotometer
XN	X-Rite MA68 Multi-Angle SpectroPhotometer
XO	X-Rite MA68 II Multi-Angle SpectroPhotometer
XP	X-Rite 962 SpectroPhotometer
XR	X-Rite 968 Portable SpectroPhotometer
XT	X-Rite 948 SpectroColorimeter
XU	X-Rite 964 Portable SpectroPhotometer
XV	X-Rite 939 SpectroDensitometer
XX	Instrument make/model not specified by lab

409	<u>Color & Color Difference (Paint Chips) Sphere</u>
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Instrument code and description

AD	ACS Chroma-Sensor CS-5	MT	Minolta CM-2600d
AJ	ACS-Datascolor Intl. Spectraflash 600	MV	Minolta CM-3000d Series Spectrophotometer
AL	ACS-Datascolor Intl. Dataflash 100	MX	Minolta CM-508d Spectrophotometer
AM	ACS-Datascolor Intl. Spectraflash 600 Plus	MZ	Minolta CM-2002 Spectrophotometer
AO	ACS-Datascolor Intl. Spectraflash 650X	PE	Perkin Elmer Spectrophotometer
AP	DataColor Check Plus	SH	SIMADZU UV 3101PC
AQ	ACS-Datascolor Intl. Spectraflash 600X	XI	X-Rite Color i7
CA	Cary 5000	XL	X-Rite SP60 Portable Sphere Spectrophotometer
EE	Datacolor Elrepho 2000	XO	X-Rite SP64 Portable Sphere Spectrophotometer
GD	BYK-Gardner spectro-guide sphere	XP	X-Rite SP88 Portable Sphere Spectrophotometer
GF	BYK-Gardner The Color Sphere (TCS)	XQ	X-Rite SP68 Portable Sphere Spectrophotometer
GG	BYK-Gardner TCS II	XR	X-Rite SP78 Portable Sphere Spectrophotometer
GH	BYK Gardner Color-Guide Sphere	XU	X-Rite Color Premier 8200 Spectrophotometer
HF	Hunter ColorFlex Diffuse		
HG	Hunter ColorQUEST		
HH	Hunter ColorQUEST XE		
HP	Hunter UltraScan PRO		
HW	Hunter UltraScan XE		
HX	Hitachi C-2000S Spectrophotometer		
MG	Macbeth 2180 Color Eye		
MH	Macbeth Color-Eye XTH		
MI	Macbeth Color i 5		
MJ	Macbeth Color-Eye 3000		
MK	Macbeth Color-Eye 7000		
MM	Macbeth Color-Eye 7000a		