



Color & Appearance Testing Program

Summary Report # 145 - 3rd Q 2008

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

[Key to Tables and Graphs](#)

<u>Analysis</u>	<u>Analysis Name</u>
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408	Color & Color Difference (Paint Chips) - 45/0
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409	Color & Color Difference (Paint Chips) Sphere
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[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^*	
11LZQA		C81	42.37	-19.61	-4.20	0.88	0.01	0.29	0.92	HW
		C82	43.24	-19.61	-3.91					
12JALD	X	C81	41.75	-20.95	-5.70	1.05	-0.05	0.30	1.09	GU
		C82	42.80	-21.00	-5.40					
2AWLPQ		C81	42.51	-20.10	-3.58	0.93	-0.02	0.20	0.95	GD
		C82	43.44	-20.11	-3.38					
2VZAZY		C81	42.83	-19.66	-4.27	0.96	-0.08	0.28	1.00	HW
		C82	43.79	-19.74	-3.99					
33MSS7		C81	42.10	-20.13	-3.58	0.96	-0.06	0.22	0.98	MQ
		C82	43.05	-20.18	-3.36					
6GFH22		C81	42.25	-19.95	-3.11	1.02	-0.02	0.21	1.04	GU
		C82	43.26	-19.96	-2.90					
7RF6VJ		C81	42.73	-19.98	-3.79	0.94	-0.01	0.21	0.96	XO
		C82	43.67	-19.99	-3.59					
8X49AT		C81	42.39	-19.94	-3.62	1.02	-0.04	0.24	1.05	XS
		C82	43.41	-19.97	-3.38					
AG4YWL		C81	42.24	-19.43	-4.34	1.00	-0.06	0.21	1.02	HW
		C82	43.24	-19.49	-4.13					
AU88BV		C81	42.57	-19.68	-3.40	0.87	-0.11	0.24	0.90	GE
		C82	43.44	-19.78	-3.16					
B7DSGT		C81	42.14	-19.98	-3.74	0.95	-0.02	0.22	0.98	GH
		C82	43.09	-20.00	-3.52					
CLCY6H		C81	42.51	-19.50	-4.23	0.88	-0.04	0.29	0.92	HW
		C82	43.39	-19.54	-3.94					
DM6X8N		C81	42.59	-19.86	-3.63	0.91	-0.07	0.23	0.94	XU
		C82	43.49	-19.93	-3.41					
DRFD45	X	C81	42.25	-21.08	-4.25	1.10	-0.04	0.26	1.13	XK
		C82	43.35	-21.11	-3.99					

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^*	
E1KUHF		C81	42.20	-19.63	-4.22	0.98	0.04	0.26	1.01	HW
		C82	43.18	-19.59	-3.97					
E6CY9Z		C81	42.53	-19.96	-3.62	1.02	0.01	0.23	1.04	MH
		C82	43.55	-19.95	-3.39					
FHQBCL		C81	42.21	-19.48	-4.16	0.99	-0.05	0.19	1.00	HW
		C82	43.19	-19.53	-3.97					
FL7HQN		C81	42.70	-19.77	-3.70	0.82	-0.07	0.24	0.85	XM
		C82	43.52	-19.83	-3.46					
GNBPPT	X	C81	41.65	-19.56	-3.35	1.86	-0.03	0.28	1.88	GA
		C82	43.51	-19.59	-3.07					
HQU71A		C81	42.70	-19.96	-3.77	1.01	0.03	0.26	1.04	XO
		C82	43.71	-19.94	-3.51					
JU3SK2		C81	42.57	-19.90	-3.76	0.91	-0.03	0.26	0.95	XO
		C82	43.48	-19.92	-3.51					
JY19ZG		C81	42.32	-19.46	-4.07	0.94	-0.06	0.25	0.97	HW
		C82	43.26	-19.52	-3.82					
K3D9W8	X	C81	43.65	-18.55	-2.90	-0.95	0.15	-0.35	1.02	TN
		C82	42.70	-18.40	-3.25					
K3PFT9		C81	42.06	-19.32	-4.20	1.07	-0.12	0.18	1.09	XX
		C82	43.13	-19.43	-4.02					
KH5B86		C81	42.54	-19.48	-3.60	0.90	-0.05	0.26	0.93	XX
		C82	43.43	-19.53	-3.34					
KJEC3R		C81	42.66	-19.83	-3.22	0.94	0.10	0.25	0.97	GU
		C82	43.60	-19.73	-2.97					
LTKJTC		C81	42.23	-19.33	-4.26	0.93	-0.08	0.26	0.97	MG
		C82	43.16	-19.41	-4.00					
NVJHX2		C81	42.47	-20.06	-3.68	0.94	0.04	0.27	0.98	XP
		C82	43.41	-20.02	-3.41					

**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^*	
PLR6Z9	X	C81	41.97	-18.42	-5.98	1.03	-0.02	0.30	1.07	HN
		C82	43.00	-18.44	-5.68					
PPHGG8		C81	42.39	-20.11	-3.64	0.91	-0.08	0.22	0.93	GH
	C82	43.29	-20.18	-3.42						
PWQB1E		C81	42.32	-19.52	-3.96	0.93	0.00	0.25	0.96	HK
	C82	43.24	-19.52	-3.72						
QB1EZE		C81	42.28	-20.19	-3.73	0.92	0.00	0.26	0.95	GH
	C82	43.20	-20.19	-3.48						
QLQ3W3	X	C81	42.39	-21.35	-5.45	0.78	0.12	0.35	0.86	GU
		C82	43.17	-21.24	-5.10					
RE6Z37		C81	42.69	-20.06	-3.88	1.14	0.09	0.27	1.17	XN
	C82	43.83	-19.97	-3.62						
RLA3QK		C81	42.30	-19.56	-4.34	0.97	-0.06	0.25	1.00	HW
	C82	43.26	-19.62	-4.09						
RTJGMU		C81	42.47	-19.96	-3.23	0.99	-0.03	0.23	1.01	XR
	C82	43.46	-19.98	-3.00						
RZ21E8		C81	42.66	-19.63	-4.39	0.91	-0.06	0.28	0.95	HW
	C82	43.57	-19.69	-4.11						
SXC13J		C81	42.25	-19.24	-4.17	0.97	-0.06	0.24	1.00	HW
	C82	43.22	-19.30	-3.93						
VNY4MH		C81	42.43	-19.91	-3.89	0.86	0.00	0.28	0.90	HK
	C82	43.29	-19.91	-3.61						
VR2LBY		C81	42.42	-19.48	-4.19	0.94	-0.01	0.28	0.98	HW
	C82	43.36	-19.48	-3.91						
W2TRP4		C81	43.02	-19.92	-3.66	0.95	0.04	0.28	0.99	MU
	C82	43.97	-19.88	-3.38						
X5ZGJQ		C81	42.66	-19.93	-3.35	0.96	0.05	0.27	0.99	GU
	C82	43.62	-19.88	-3.09						

**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^*	
XR76GB		C81	42.51	-19.78	-3.59	0.98	-0.02	0.24	1.01	XT
		C82	43.49	-19.80	-3.36					
Y672VW		C81	42.43	-19.79	-3.66	0.88	-0.08	0.26	0.91	XU
		C82	43.31	-19.86	-3.41					
ZJ87B8		C81	42.59	-19.84	-3.46	0.96	-0.06	0.19	0.98	GH
		C82	43.55	-19.89	-3.28					

Summary Statistics

Samples	L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*
Grand Means							
C81	42.41	-19.76	-3.81				
C82	43.36	-19.78	-3.57	0.95	-0.03	0.24	0.98
Std Dev Btwn Labs							
C81	0.24	0.25	0.35				
C82	0.22	0.24	0.35	0.06	0.05	0.03	0.06

Statistics based on 39 of 45 reporting participants

Comments assigned on Data Flags for Test #408

12JALD(X) - Low "L*" values for Sample C81 and all "a*" and "b*" values.

DRFD45(X) - Low "a*" values.

GNBPPT(X) - Low "L*" values for Sample C81.

K3D9W8(X) - High "L*" values for Sample C81 and low "L*" values for Sample C82. High all "a*" values. Large replication difference for "b*" measurements.

PLR6Z9(X) - High "a*" values and low "b*" values.

QLQ3W3(X) - Low "a*" and "b*" values.

Interlaboratory Testing Program for Color & Appearance

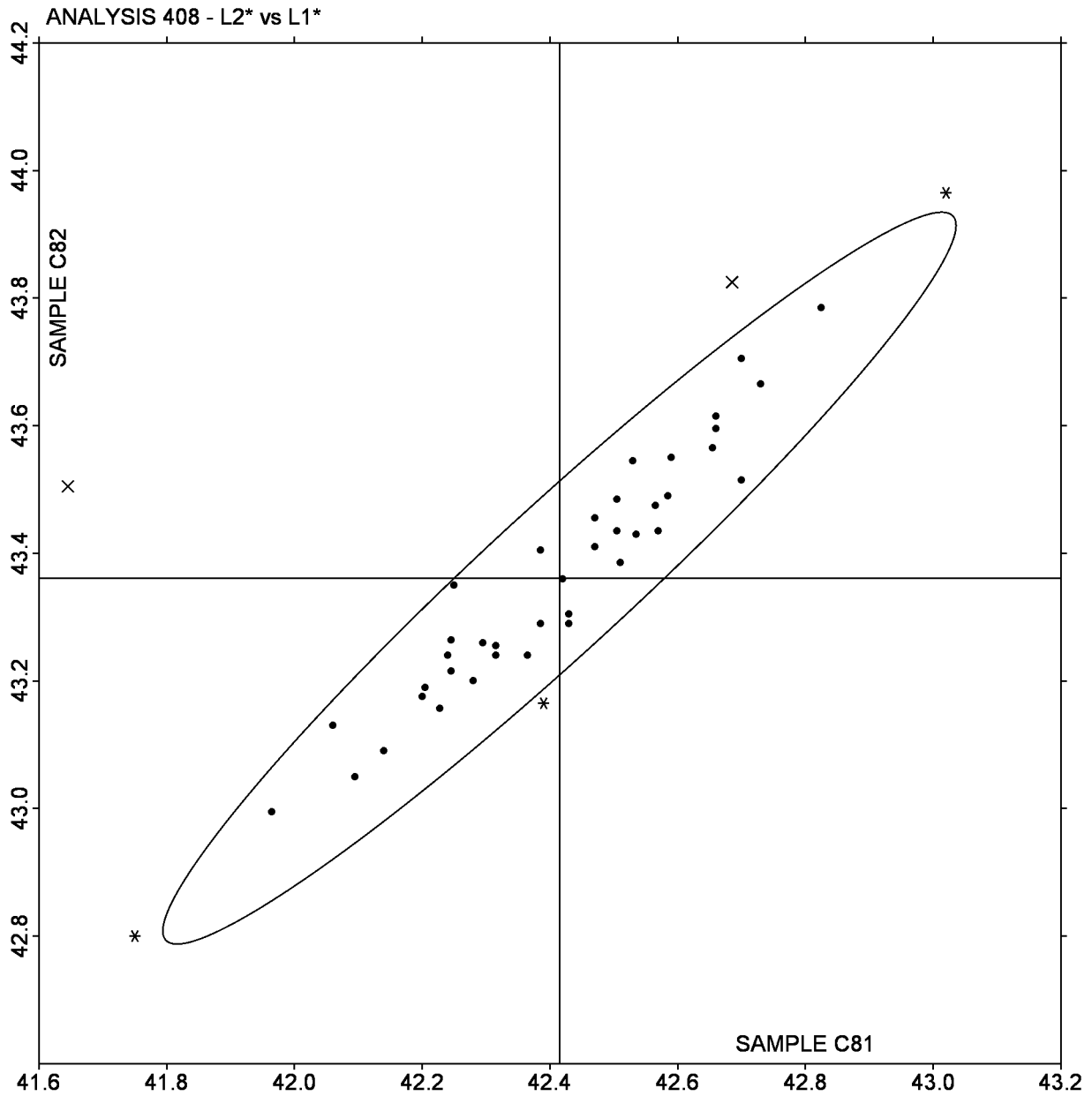
Analysis 408

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 C81 = 42.41

SAMPLE C82 = 43.36



Interlaboratory Testing Program for Color & Appearance

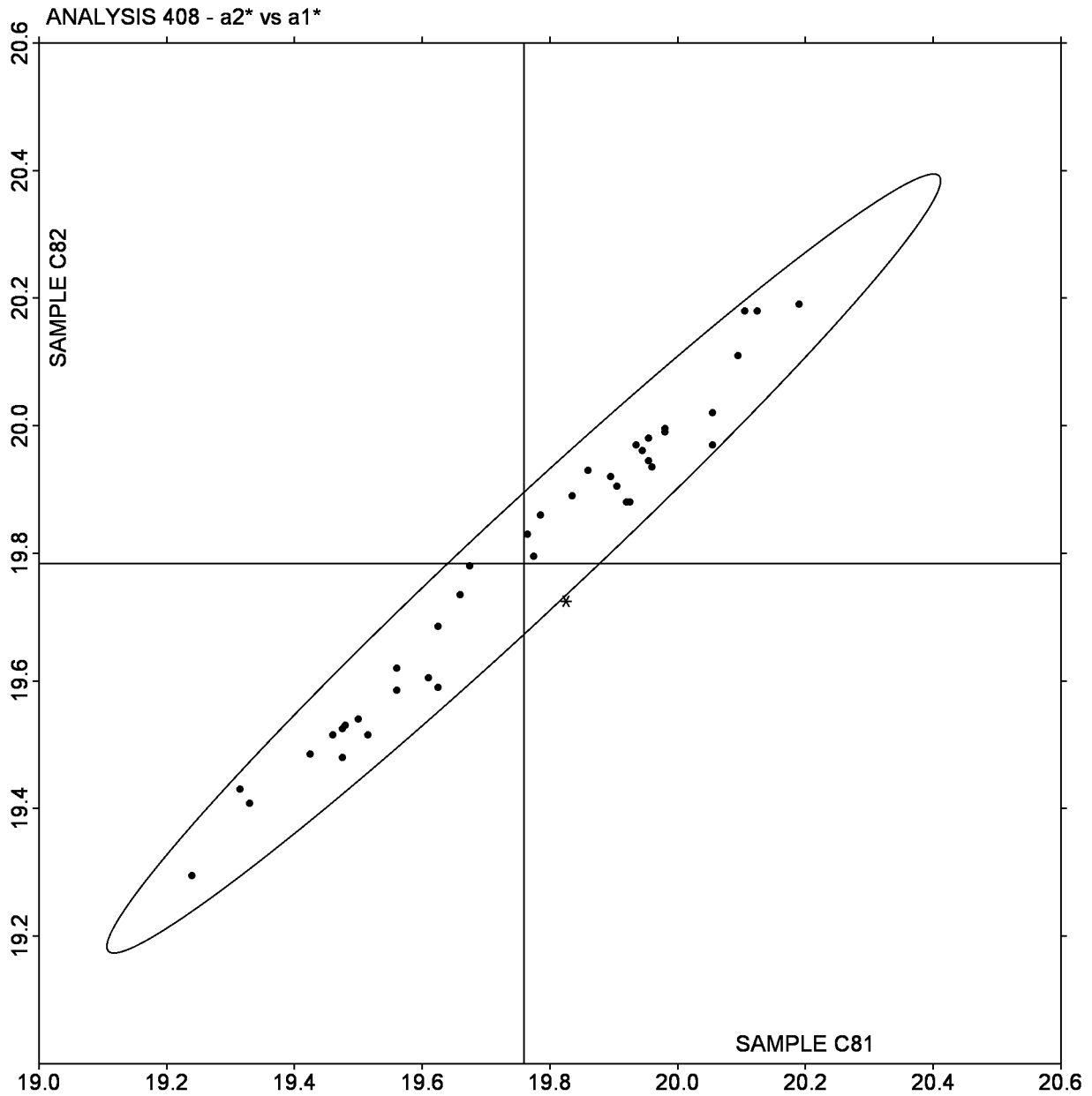
Analysis 408

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 C81 = -19.76

SAMPLE C82 = -19.78



Interlaboratory Testing Program for Color & Appearance

Analysis 408

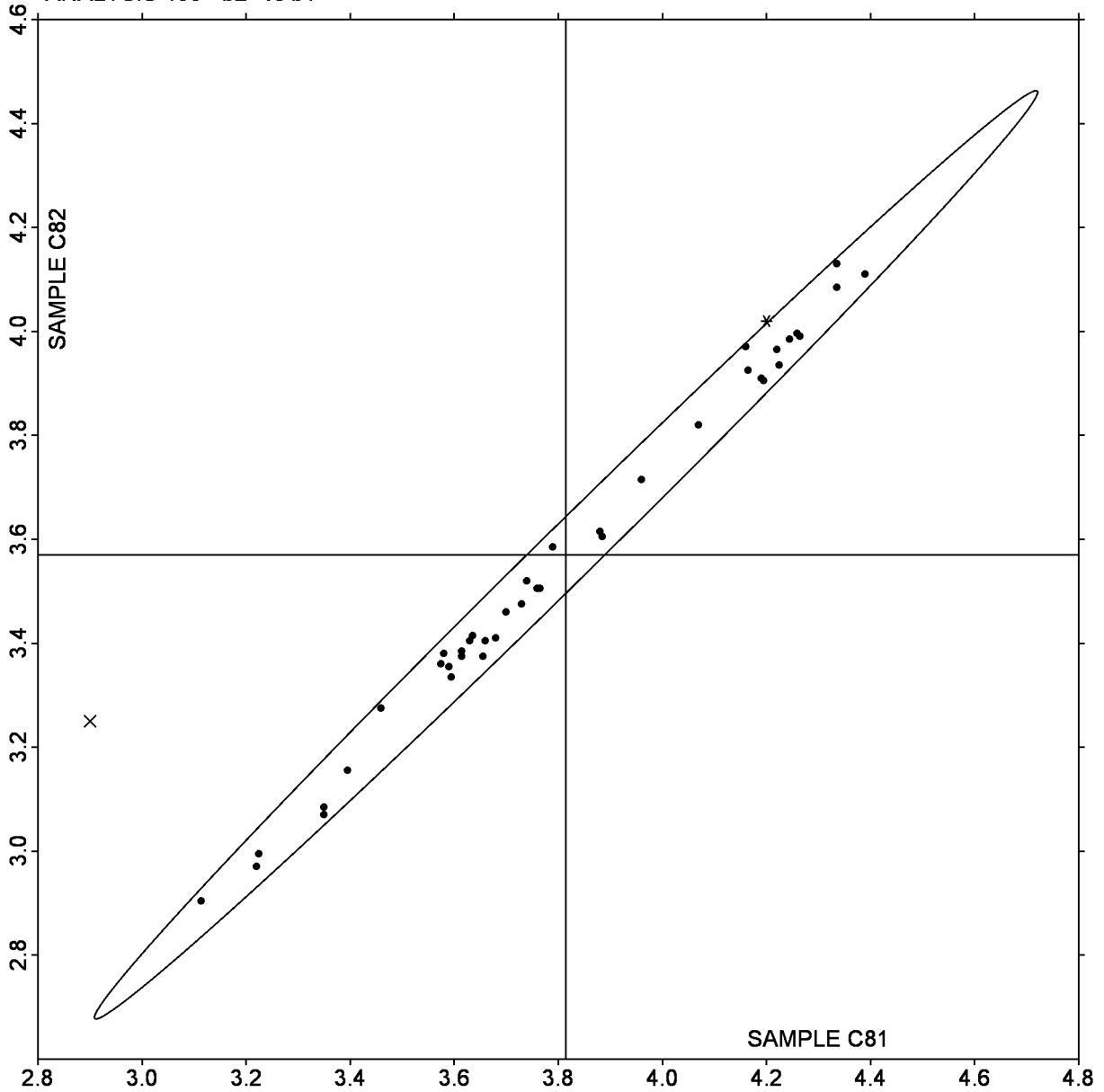
Color and Color Difference - Paint Chips - 45/0 Geometry Instruments
CIE L*a*b* Color Space - Illuminant D65 - CIE 1964 (10 Degree) Observer

b2* vs b1*

SAMPLE C81 = -3.81

SAMPLE C82 = -3.57

ANALYSIS 408 - b2* vs b1*



**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^*	
15PUMK		C81	43.16	-19.95	-3.98	0.90	0.04	0.32	0.95	AG
		C82	44.06	-19.91	-3.67					
171ET9		C81	42.76	-19.41	-4.02	0.84	-0.06	0.28	0.88	XL
		C82	43.59	-19.46	-3.74					
1HT7SJ		C81	42.65	-19.52	-3.81	1.01	-0.02	0.28	1.05	XO
		C82	43.66	-19.54	-3.54					
1LYJXZ		C81	43.06	-19.48	-3.96	0.94	-0.05	0.20	0.96	HU
		C82	44.00	-19.52	-3.77					
1Y4P26		C81	42.68	-19.65	-3.88	1.03	0.01	0.27	1.06	MM
		C82	43.71	-19.64	-3.61					
1YFCAK		C81	42.94	-19.73	-3.77	0.94	0.03	0.28	0.98	AJ
		C82	43.88	-19.70	-3.49					
2JM6UP		C81	43.02	-19.57	-3.81	0.85	0.04	0.30	0.90	AJ
		C82	43.87	-19.53	-3.51					
2P7565		C81	43.00	-19.82	-3.99	0.90	-0.01	0.27	0.94	AM
		C82	43.90	-19.83	-3.72					
3B42E9		C81	42.71	-19.63	-3.89	0.92	-0.12	0.26	0.96	XI
		C82	43.63	-19.74	-3.63					
3CP93A		C81	43.00	-19.41	-3.44	0.90	0.05	0.27	0.94	MJ
		C82	43.90	-19.36	-3.17					
3CWX2H		C81	42.78	-19.53	-3.80	0.98	-0.02	0.22	1.00	MK
		C82	43.76	-19.54	-3.58					
3FGW7Z		C81	42.73	-19.29	-3.71	1.01	0.13	0.28	1.05	MJ
		C82	43.74	-19.17	-3.43					
3RHADS		C81	42.86	-19.73	-3.90	0.93	0.04	0.27	0.97	AJ
		C82	43.79	-19.69	-3.63					
3ZCAWR		C81	43.05	-19.66	-3.47	0.88	-0.08	0.24	0.91	MK
		C82	43.92	-19.74	-3.24					

**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^*	
46SG63		C81	42.82	-19.73	-3.72	1.00	0.01	0.23	1.02	MV
		C82	43.82	-19.72	-3.49					
47YX48		C81	42.95	-19.97	-3.74	0.94	0.02	0.27	0.98	MV
		C82	43.89	-19.95	-3.48					
4AP3VK		C81	42.98	-19.36	-3.81	0.91	-0.05	0.24	0.94	ME
		C82	43.89	-19.41	-3.58					
4CEEFB		C81	43.09	-19.92	-3.56	0.85	-0.02	0.27	0.89	AJ
		C82	43.94	-19.94	-3.29					
4E5KYM		C81	42.88	-19.41	-3.83	0.84	-0.03	0.27	0.88	MJ
		C82	43.72	-19.43	-3.56					
4Z8A9V		C81	42.87	-19.61	-3.90	1.01	-0.04	0.22	1.03	MM
		C82	43.88	-19.64	-3.68					
5GN2SS		C81	42.97	-19.35	-3.73	0.92	0.04	0.28	0.96	MK
		C82	43.89	-19.32	-3.45					
5HHLVD		C81	42.93	-19.67	-3.67	1.01	-0.06	0.17	1.02	AJ
		C82	43.94	-19.73	-3.50					
5TXKG9		C81	43.03	-19.62	-3.68	1.04	-0.02	0.10	1.04	AJ
		C82	44.07	-19.64	-3.59					
5UB8KM		C81	43.00	-19.78	-3.88	0.89	-0.08	0.28	0.93	AQ
		C82	43.89	-19.85	-3.60					
62XQDV		C81	42.88	-19.79	-3.86	1.11	0.06	0.27	1.14	AG
		C82	43.99	-19.74	-3.59					
67TGNC		C81	42.96	-19.65	-3.77	0.83	-0.04	0.32	0.88	MV
		C82	43.78	-19.69	-3.45					
68646R		C81	42.91	-19.63	-4.02	1.02	-0.01	0.23	1.04	AJ
		C82	43.92	-19.64	-3.79					
6C626K	X	C81	42.71	-19.95	-3.29	0.97	0.02	0.26	1.00	HG
		C82	43.68	-19.93	-3.03					

**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^*	
73TJWK		C81	42.72	-19.49	-3.70	1.21	-0.07	0.24	1.24	AM
		C82	43.93	-19.55	-3.46					
79JPY2		C81	42.92	-19.07	-4.14	0.94	-0.06	0.28	0.98	HW
		C82	43.85	-19.13	-3.86					
79KGW9		C81	42.98	-19.50	-3.89	0.93	-0.05	0.25	0.96	GG
		C82	43.90	-19.55	-3.64					
7JS99A		C81	42.91	-19.66	-3.80	0.86	-0.07	0.26	0.90	MT
		C82	43.77	-19.73	-3.54					
7T4SAS		C81	42.90	-19.74	-3.72	0.99	0.09	0.26	1.03	MM
		C82	43.89	-19.65	-3.46					
88Z9ZR		C81	42.74	-19.75	-3.52	1.03	-0.04	0.22	1.05	MV
		C82	43.77	-19.78	-3.30					
8CYNMF		C81	42.76	-19.69	-3.82	0.98	0.08	0.23	1.01	MM
		C82	43.74	-19.61	-3.59					
8FULPS		C81	42.91	-19.88	-3.60	0.96	0.08	0.27	1.00	MV
		C82	43.87	-19.81	-3.33					
8PSXH2		C81	42.92	-19.86	-4.07	1.05	0.11	0.25	1.08	AM
		C82	43.96	-19.76	-3.82					
978E7F		C81	42.95	-19.88	-3.75	0.95	0.03	0.27	0.98	MV
		C82	43.89	-19.85	-3.48					
99D7YU		C81	42.94	-19.88	-3.85	1.01	0.01	0.18	1.02	AJ
		C82	43.95	-19.87	-3.67					
9CVDCV		C81	42.91	-19.71	-3.74	0.93	0.02	0.28	0.97	MV
		C82	43.84	-19.69	-3.46					
9L5XFR		C81	42.94	-19.65	-3.74	0.97	-0.05	0.24	1.00	AM
		C82	43.91	-19.70	-3.50					
9N62WS		C81	42.62	-19.83	-3.77	0.93	-0.01	0.29	0.97	EE
		C82	43.54	-19.84	-3.48					

**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^*	
9VGS1L		C81	42.90	-19.28	-3.77	0.84	-0.03	0.27	0.88	MJ
		C82	43.73	-19.31	-3.50					
9WQ2PB		C81	43.00	-19.61	-3.71	0.96	0.01	0.25	0.99	MM
		C82	43.96	-19.60	-3.45					
9YBTS2		C81	42.84	-19.67	-3.86	0.97	-0.01	0.24	1.00	MK
		C82	43.81	-19.68	-3.62					
9Z4PEA		C81	42.81	-19.36	-3.93	0.97	-0.20	0.29	1.03	XQ
		C82	43.77	-19.56	-3.64					
A135DT		C81	42.83	-19.81	-3.81	1.03	0.02	0.18	1.04	AJ
		C82	43.86	-19.79	-3.63					
AGQM2N		C81	42.87	-19.59	-3.74	1.00	-0.02	0.22	1.02	AJ
		C82	43.87	-19.61	-3.52					
B2KEFK		C81	42.81	-19.78	-3.78	0.92	0.06	0.26	0.95	AP
		C82	43.73	-19.72	-3.52					
B5BQXJ		C81	42.98	-19.74	-3.91	0.94	-0.06	0.23	0.97	AJ
		C82	43.92	-19.79	-3.68					
BK77MH		C81	42.94	-19.79	-3.91	1.06	0.12	0.23	1.08	AJ
		C82	43.99	-19.68	-3.69					
BPUHDM		C81	43.00	-19.60	-3.70	0.90	-0.10	-0.10	0.91	SH
		C82	43.90	-19.70	-3.80					
BSJ8Z6	X	C81	42.99	-19.42	-4.22	0.96	0.03	0.20	0.98	HW
		C82	43.95	-19.39	-4.02					
C852Y9	X	C81	42.90	-19.44	-5.32	2.86	-0.49	0.00	2.90	PE
		C82	45.75	-19.93	-5.32					
CKWTJD		C81	42.94	-19.90	-3.75	1.05	0.07	0.25	1.08	AJ
		C82	43.99	-19.83	-3.50					
CQP4LP		C81	42.81	-19.35	-3.97	0.90	0.00	0.25	0.93	XQ
		C82	43.71	-19.35	-3.72					

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**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^*	
D72YKP		C81	42.74	-19.59	-3.94	0.90	0.01	0.27	0.94	MM
		C82	43.65	-19.57	-3.67					
D8N7B6	X	C81	42.95	-19.30	-4.32	0.88	-0.04	0.24	0.91	AD
		C82	43.83	-19.34	-4.08					
DWS892		C81	42.81	-19.53	-3.70	0.99	-0.01	0.24	1.02	MK
		C82	43.80	-19.54	-3.47					
DZXM68		C81	43.02	-19.77	-4.14	0.97	0.03	0.27	1.01	AG
		C82	43.99	-19.74	-3.87					
E9EV1E		C81	42.88	-19.46	-3.81	0.95	-0.04	0.26	0.98	AJ
		C82	43.83	-19.49	-3.55					
ECE6UU		C81	42.92	-19.80	-3.68	0.95	-0.02	0.24	0.97	AM
		C82	43.87	-19.81	-3.44					
EGBSKB	X	C81	43.13	19.80	3.66	0.89	0.04	-0.27	0.93	MV
		C82	44.02	19.83	3.40					
EH5BJ4	X	C81	42.16	-19.00	-3.53	0.90	0.05	0.21	0.92	GH
		C82	43.06	-18.95	-3.32					
EQ1H64		C81	42.69	-19.69	-3.73	0.94	-0.02	0.23	0.97	AL
		C82	43.63	-19.71	-3.50					
EQD8YU		C81	42.95	-19.52	-3.80	0.94	-0.01	0.23	0.97	XR
		C82	43.89	-19.53	-3.57					
EWZYKQ		C81	42.70	-19.14	-3.76	0.89	-0.09	0.23	0.92	GD
		C82	43.59	-19.22	-3.53					
F76XB4		C81	42.94	-19.35	-4.03	0.90	-0.11	0.28	0.94	HW
		C82	43.84	-19.45	-3.75					
FMGJVU		C81	42.92	-19.52	-3.83	0.87	-0.03	0.26	0.91	MK
		C82	43.80	-19.55	-3.57					
G4HUVH	X	C81	42.24	-18.94	-3.11	0.86	-0.13	0.28	0.91	GH
		C82	43.10	-19.07	-2.83					

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**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^*	
G6H78A		C81	43.01	-19.67	-3.78	0.97	0.14	0.23	1.01	HP
		C82	43.98	-19.53	-3.55					
GETJEF		C81	43.01	-19.88	-3.73	0.94	0.02	0.28	0.98	XX
		C82	43.95	-19.86	-3.45					
GP2SDU		C81	42.85	-19.74	-3.86	1.00	0.06	0.25	1.03	AM
		C82	43.85	-19.68	-3.61					
GR8C3F		C81	42.96	-19.71	-3.75	1.01	-0.03	0.22	1.03	MV
		C82	43.97	-19.73	-3.54					
GUS9QK		C81	42.73	-19.41	-3.84	0.91	-0.05	0.27	0.95	HW
		C82	43.64	-19.45	-3.57					
H7ETQ8	X	C81	43.12	-18.99	-4.32	0.97	-0.04	0.23	0.99	HH
		C82	44.09	-19.03	-4.09					
J3UAYA		C81	42.81	-19.51	-3.41	1.06	-0.43	0.21	1.16	HG
		C82	43.87	-19.94	-3.20					
JGHAYQ		C81	42.97	-19.77	-3.85	0.98	0.06	0.28	1.02	AJ
		C82	43.95	-19.71	-3.57					
JL9PAD		C81	43.17	-19.46	-3.82	0.97	0.05	0.24	1.00	HP
		C82	44.14	-19.41	-3.58					
JUH5YC		C81	42.95	-19.86	-3.83	1.03	0.10	0.25	1.06	AM
		C82	43.97	-19.76	-3.59					
JVT7MW		C81	43.01	-19.87	-3.84	0.84	0.05	0.27	0.88	AM
		C82	43.85	-19.82	-3.57					
JX7HT2		C81	42.89	-19.67	-3.74	1.03	-0.07	0.15	1.04	MM
		C82	43.91	-19.73	-3.59					
K2JQSL		C81	43.10	-19.89	-3.74	0.96	-0.02	0.29	1.00	MV
		C82	44.06	-19.91	-3.45					
KAT5KE		C81	42.61	-19.42	-4.02	1.01	0.09	0.28	1.05	XO
		C82	43.61	-19.34	-3.75					

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**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^*	
KKEBDC		C81	42.95	-19.68	-3.73	0.88	-0.06	0.26	0.92	AJ
		C82	43.83	-19.73	-3.48					
KRK3PV		C81	42.95	-19.64	-3.92	0.87	-0.07	0.31	0.92	AJ
		C82	43.81	-19.71	-3.61					
KY8ZA4		C81	42.95	-19.53	-3.82	0.81	-0.07	0.30	0.86	MM
		C82	43.76	-19.60	-3.52					
KYAPE2		C81	42.85	-19.68	-3.82	0.90	-0.01	0.27	0.94	AM
		C82	43.75	-19.69	-3.55					
L73D1W		C81	42.84	-19.51	-3.91	1.00	0.01	0.21	1.02	MK
		C82	43.85	-19.50	-3.69					
LALCB6		C81	42.93	-19.50	-3.86	0.99	0.08	0.25	1.03	MK
		C82	43.93	-19.43	-3.61					
LSL9P9		C81	42.87	-19.72	-3.98	1.00	0.07	0.25	1.03	AJ
		C82	43.87	-19.65	-3.74					
MLJQV3		C81	42.92	-19.75	-3.78	0.85	-0.07	0.29	0.90	AJ
		C82	43.77	-19.82	-3.50					
MMFUV5		C81	42.83	-19.25	-4.01	0.94	-0.01	0.21	0.96	MG
		C82	43.77	-19.26	-3.80					
MQX6LU		C81	42.96	-19.74	-3.80	0.97	-0.01	0.23	1.00	AJ
		C82	43.93	-19.75	-3.57					
N6MMC		C81	43.02	-19.85	-3.95	0.89	-0.02	0.30	0.93	AG
		C82	43.90	-19.86	-3.66					
ND6QHE		C81	42.61	-19.67	-3.84	1.01	0.08	0.28	1.05	MI
		C82	43.62	-19.59	-3.56					
NNJ929		C81	42.92	-19.86	-3.55	0.97	0.08	0.27	1.00	MV
		C82	43.89	-19.78	-3.29					
NTC598		C81	42.73	-19.44	-3.99	1.00	-0.03	0.22	1.02	MM
		C82	43.73	-19.47	-3.77					

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**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^*	
P1A3N4		C81	42.92	-19.20	-3.63	0.97	-0.08	0.25	1.01	MJ
		C82	43.89	-19.28	-3.38					
P7D926		C81	42.80	-19.75	-3.85	1.00	0.07	0.28	1.03	AJ
		C82	43.79	-19.68	-3.58					
PBTKFA		C81	42.90	-19.54	-3.51	0.95	-0.05	0.27	0.98	HX
		C82	43.85	-19.59	-3.24					
PDT234		C81	43.04	-19.76	-4.15	0.92	0.01	0.29	0.96	AO
		C82	43.96	-19.75	-3.86					
PTUMXE		C81	42.93	-19.77	-3.85	1.02	-0.01	0.19	1.03	AJ
		C82	43.94	-19.78	-3.66					
PVWLW		C81	43.04	-19.73	-3.77	0.99	0.02	0.23	1.02	AQ
		C82	44.03	-19.71	-3.54					
Q1G11J		C81	43.04	-19.91	-3.71	0.87	-0.03	0.29	0.91	AG
		C82	43.91	-19.93	-3.42					
QASZUU		C81	42.81	-19.63	-4.07	0.94	-0.04	0.32	0.99	HF
		C82	43.75	-19.67	-3.76					
QEZQX1		C81	42.82	-19.56	-3.91	0.93	0.01	0.26	0.97	MM
		C82	43.75	-19.55	-3.65					
RG9YWC		C81	42.85	-19.53	-3.77	0.97	-0.05	0.23	1.00	MK
		C82	43.82	-19.58	-3.54					
RKFCMR		C81	43.11	-19.85	-3.88	0.94	-0.08	0.24	0.97	AO
		C82	44.05	-19.92	-3.65					
RNDQBB		C81	42.87	-19.75	-3.55	0.98	0.09	0.26	1.01	PE
		C82	43.84	-19.66	-3.29					
RPS94M		C81	42.75	-19.50	-3.90	1.11	0.19	0.16	1.14	MZ
		C82	43.86	-19.31	-3.74					
S2FM43		C81	42.87	-19.63	-3.85	0.90	0.05	0.30	0.95	MM
		C82	43.77	-19.58	-3.55					

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^*	
S5XTG4		C81	42.81	-19.56	-3.95	0.90	0.04	0.30	0.94	XP
		C82	43.70	-19.53	-3.66					
SJ8Q7W		C81	42.73	-19.55	-3.88	1.12	0.01	0.23	1.14	MK
		C82	43.85	-19.54	-3.65					
SUBWB		C81	43.00	-19.68	-3.69	0.92	-0.06	0.22	0.94	GF
		C82	43.92	-19.73	-3.47					
T4Z15H		C81	42.85	-19.85	-3.54	0.96	0.01	0.26	0.99	HP
		C82	43.80	-19.84	-3.28					
T97D1V		C81	42.88	-19.31	-4.12	0.95	0.05	0.27	0.98	GD
		C82	43.82	-19.26	-3.86					
TAH8MM		C81	42.86	-19.54	-3.75	0.94	-0.04	0.22	0.97	MM
		C82	43.80	-19.58	-3.53					
TR6R9W	X	C81	43.42	-19.40	-3.90	0.92	-0.04	0.23	0.94	HF
		C82	44.34	-19.43	-3.67					
TU9C9E		C81	42.97	-19.68	-3.67	0.94	-0.06	0.25	0.97	AJ
		C82	43.91	-19.73	-3.43					
TUNZAG		C81	42.62	-19.49	-3.68	0.99	0.05	0.27	1.03	MJ
		C82	43.61	-19.44	-3.41					
UEV8KD	X	C81	42.69	-19.05	-3.61	1.07	0.01	0.23	1.10	MJ
		C82	43.76	-19.04	-3.38					
UHS293		C81	43.21	-19.46	-3.97	0.95	-0.01	0.27	0.99	AJ
		C82	44.16	-19.47	-3.70					
UTZQB1		C81	43.05	-19.41	-4.08	0.92	-0.01	0.28	0.96	HW
		C82	43.96	-19.42	-3.81					
V7TNPW		C81	42.76	-19.68	-3.97	0.96	0.04	0.25	0.99	AJ
		C82	43.72	-19.64	-3.72					
VMN6M7		C81	42.73	-19.49	-4.18	1.01	0.01	0.22	1.03	HW
		C82	43.73	-19.49	-3.96					

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**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^*	
VNHPQU		C81	42.86	-19.80	-3.81	0.97	-0.07	0.24	1.00	AM
		C82	43.83	-19.87	-3.57					
VXNJY1		C81	42.98	-19.35	-4.03	0.92	-0.02	0.27	0.95	HW
		C82	43.90	-19.36	-3.76					
W1EGDH		C81	42.67	-19.20	-3.80	0.90	0.01	0.25	0.93	GD
		C82	43.56	-19.19	-3.55					
W3VF8T		C81	42.98	-19.42	-3.92	1.04	-0.01	0.19	1.05	AJ
		C82	44.01	-19.43	-3.73					
W8NKZB		C81	43.06	-19.78	-4.05	0.86	0.05	0.29	0.91	AJ
		C82	43.92	-19.73	-3.76					
WDB7UG		C81	43.19	-19.42	-3.63	0.97	0.01	0.22	0.99	HW
		C82	44.16	-19.42	-3.41					
WE7M4T		C81	42.71	-19.69	-3.81	0.98	-0.03	0.24	1.00	HP
		C82	43.69	-19.72	-3.57					
WHRWX		C81	42.91	-19.75	-3.99	1.01	0.02	0.26	1.04	AM
		C82	43.92	-19.73	-3.73					
WKX4FJ		C81	42.86	-19.60	-3.79	0.96	-0.02	0.25	0.99	MM
		C82	43.82	-19.62	-3.55					
WXM1F		C81	43.00	-19.95	-4.15	1.10	0.25	0.45	1.21	CA
		C82	44.10	-19.70	-3.70					
X5RR25		C81	42.98	-19.92	-3.78	0.91	0.07	0.22	0.94	AJ
		C82	43.89	-19.85	-3.57					
XAM4DV		C81	43.03	-19.72	-3.73	0.96	0.01	0.29	1.00	AM
		C82	43.99	-19.71	-3.44					
XT2HQY		C81	43.10	-19.42	-3.86	0.94	0.05	0.27	0.98	MM
		C82	44.04	-19.37	-3.59					
Y8TTYM		C81	43.06	-19.83	-3.82	1.07	0.01	0.16	1.08	AO
		C82	44.12	-19.83	-3.67					

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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^*	
Y8X8C8		C81	42.50	-19.61	-3.96	0.98	0.05	0.26	1.01	MI
		C82	43.48	-19.57	-3.70					
YDJ7HM		C81	42.77	-19.52	-3.93	0.99	0.01	0.24	1.02	XO
		C82	43.76	-19.51	-3.69					
YK6X5H		C81	42.85	-19.99	-3.76	1.09	0.14	0.16	1.11	AM
		C82	43.94	-19.86	-3.60					
YR9VL9		C81	42.79	-19.74	-3.93	0.96	0.06	0.28	1.00	MM
		C82	43.75	-19.68	-3.65					
YRPHXW		C81	43.07	-19.90	-3.61	1.01	0.09	0.20	1.03	AM
		C82	44.07	-19.81	-3.41					
YUURJZ		C81	42.81	-19.47	-3.81	0.92	-0.05	0.24	0.95	MK
		C82	43.73	-19.52	-3.56					
ZV1KLC		C81	43.00	-19.71	-3.93	0.94	0.03	0.30	0.99	AM
		C82	43.94	-19.68	-3.63					

Summary Statistics

Samples	L*	a*	b*	ΔL^*	Δa^*	Δb^*	ΔE^*
Grand Means							
C81	42.90	-19.63	-3.82				
C82	43.85	-19.63	-3.57	0.96	0.00	0.25	0.99
Std Dev Btwn Labs							
C81	0.13	0.19	0.15				
C82	0.13	0.18	0.15	0.07	0.07	0.05	0.06

Statistics based on 137 of 147 reporting participants

**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**

Comments assigned on Data Flags for Test #409

6C626K(X) - High "a*" values and low "b*" values.

BSJ8Z6(X) - Low "b*" values for Sample C82.

C852Y9(X) - High "L*" values for Sample C82 and low "b*" values. Inconsistent within the determinations for all measurements.

D8N7B6(X) - Low "b*" values.

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

EH5BJ4(X) - High "a*" values and low "L*" values.

G4HUVH(X) - High "a*" and "b*" values and low "L*" values.

H7ETQ8(X) - High "b*" values.

TR6R9W(X) - High "L*" values.

UEV8KD(X) - High "a*" values.

Interlaboratory Testing Program for Color & Appearance

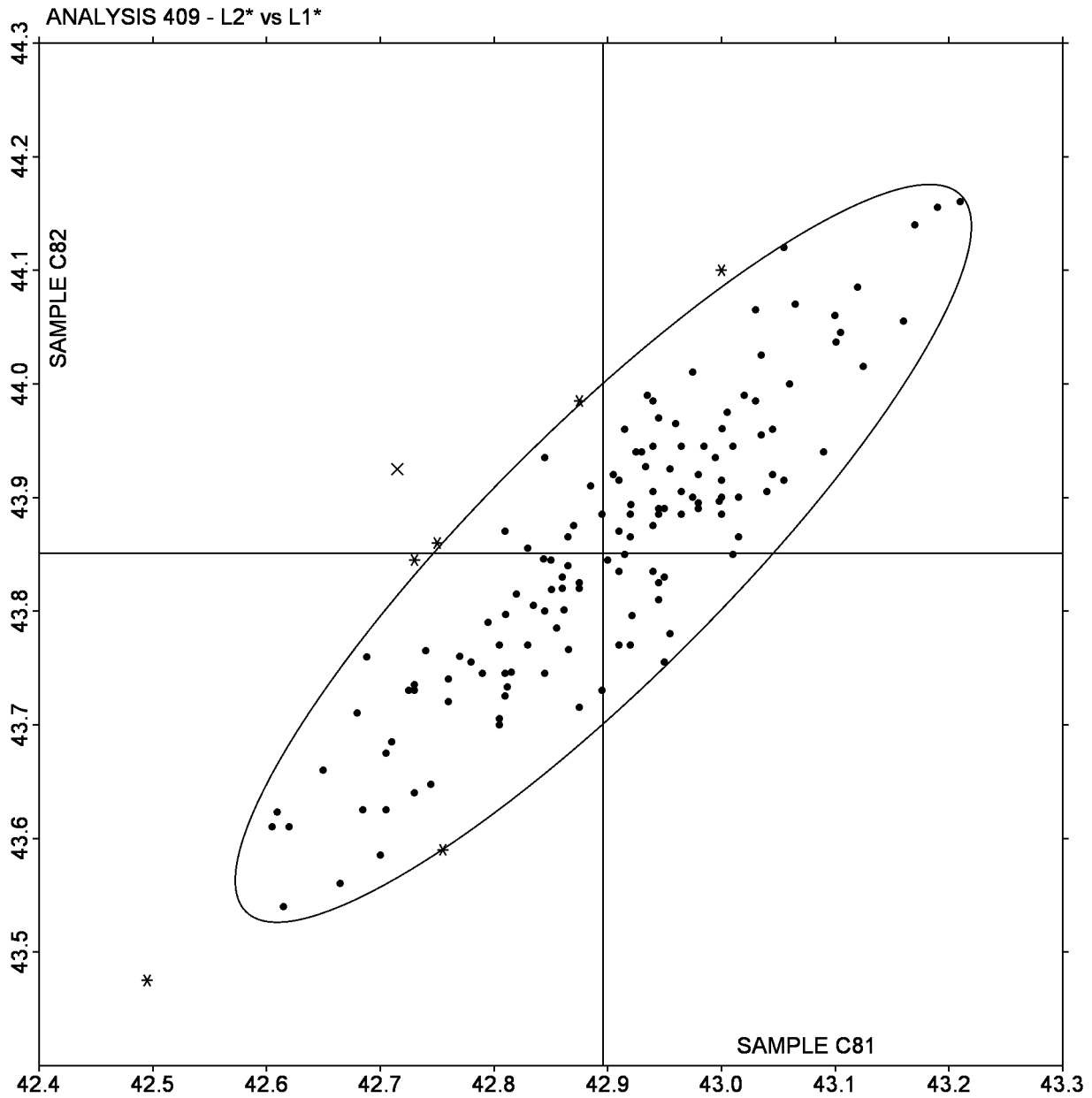
Analysis 409

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 C81 = 42.90

SAMPLE C82 = 43.85



Interlaboratory Testing Program for Color & Appearance

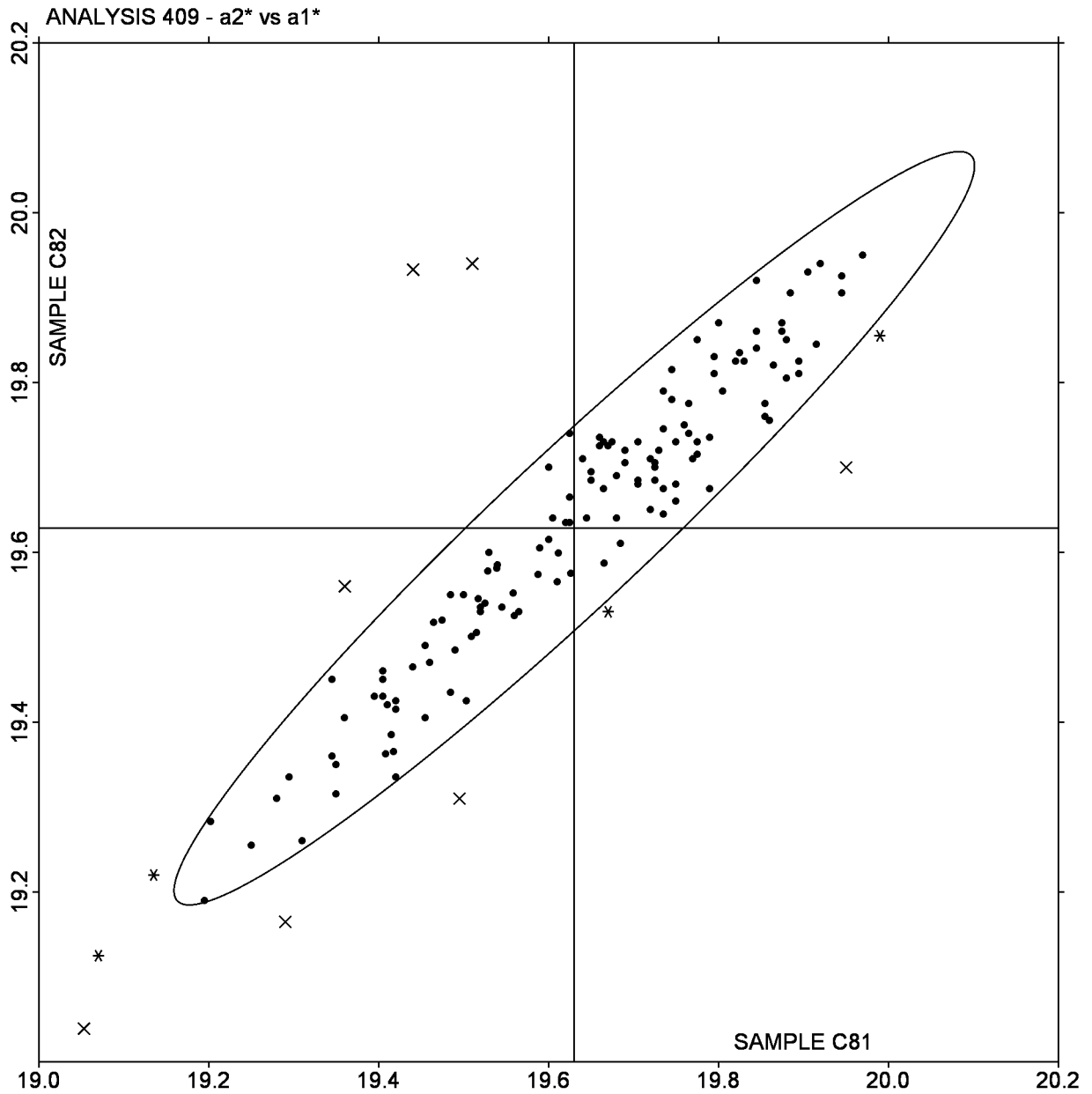
Analysis 409

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 C81 = -19.63

SAMPLE C82 = -19.63



Interlaboratory Testing Program for Color & Appearance

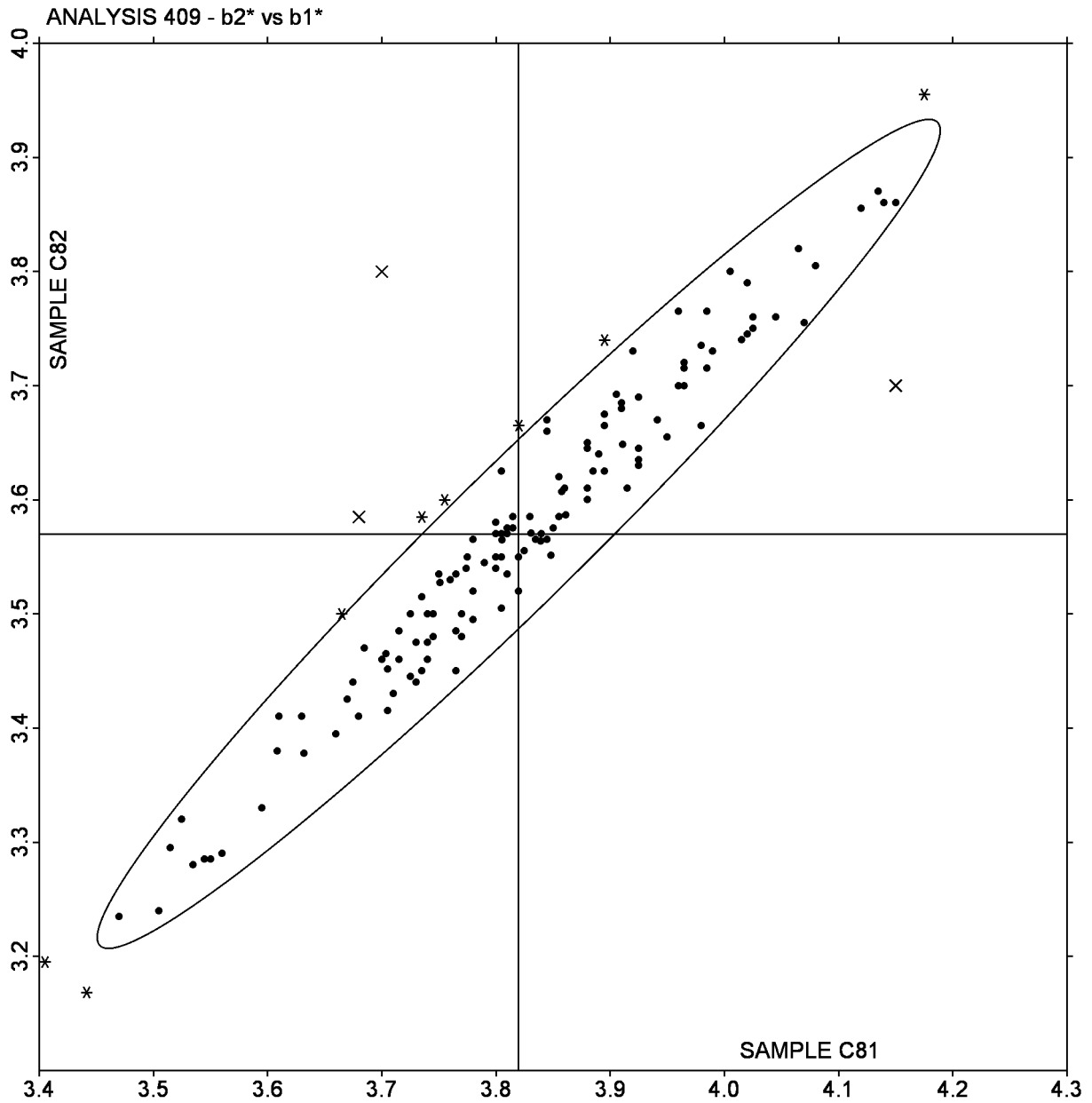
Analysis 409

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 C81 = -3.82

SAMPLE C82 = -3.57



Instrument Code List - Report# 145

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)
HN	Hunter D25M-9 Colorimeter
HW	Hunter LabScan XE
MG	Macbeth 1500/PLUS or 2025+ Color Eye
MH	Macbeth CE 2145
MQ	Minolta CM-503c Spectrophotometer
MU	Minolta CM-3600D
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
XS	X-Rite 938 SpectroDensitometer
XT	X-Rite 948 SpectroColorimeter
XU	X-Rite 964 Portable SpectroPhotometer
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	ME	Macbeth 1500/PLUS or 2020+ Color Eye
AG	ACS-DataColor Intl. Spectraflash 450	MG	Macbeth 2180 Color Eye
AJ	ACS-Datacolor Intl. Spectraflash 600	MI	Macbeth Color i 5
AL	ACS-Datacolor Intl. Dataflash 100	MJ	Macbeth Color-Eye 3000
AM	ACS-Datacolor Intl. Spectraflash 600 Plus	MK	Macbeth Color-Eye 7000
AO	ACS-Datacolor Intl. Spectraflash 650X	MM	Macbeth Color-Eye 7000a
AP	DataColor Check Plus	MT	Minolta CM-2600
AQ	ACS-Datacolor Intl. Spectraflash 600X	MV	Minolta CM-3000d Series Spectrophotometer
CA	Cary 5000	MZ	Minolta CM-2002 Spectrophotometer
EE	Datacolor Elrepho 2000	PE	Perkin Elmer Spectrophotometer
GD	BYK-Gardner spectro-guide sphere	SH	SIMADZU UV 3101PC
GF	BYK-Gardner The Color Sphere (TCS)	XI	X-Rite Color i7
GG	BYK-Gardner TCS II	XL	X-Rite SP60 Portable Sphere Spectrophotometer
GH	BYK Gardner Color-Guide Sphere	XO	X-Rite SP64 Portable Sphere Spectrophotometer
HF	ColorFlex Diffuse	XP	X-Rite SP88 Portable Sphere Spectrophotometer
HG	Hunter ColorQUEST	XQ	X-Rite SP68 Portable Sphere Spectrophotometer
HH	Hunter ColorQUEST XE	XR	X-Rite SP78 Portable Sphere Spectrophotometer
HP	Hunter UltraScan PRO	XX	Instrument make/model not specified by lab
HU	Hunter UltraScan		
HW	Hunter UltraScan XE		
HX	Hitachi C-2000S Spectrophotometer		