Collaborative Testing Services, Inc.

Color & Appearance Testing Program

Summary Report #176 - 2nd Qtr 2016

About The Color & Appearance Program

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

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

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

ABOUT CTS

Founded in 1971, CTS is a privately-owned company that specializes in interlaboratory tests for a wide variety of industries, including rubber, plastics, fasteners and metals, containerboard, paper, color, and wine as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality control objectives. Labs from the U.S., as well as more than 80 countries, currently participate in the CTS programs.

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Key for Color Program Web Summary Report

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

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 mailed 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
*	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. 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 an X on individual wavelength values as follows:

X - The laboratory's mean for that wavelength is greater than a 95% deviation from the GRAND MEAN.

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 mailed 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
2PVQ4K		B161	43.60	10.43	-26.29	1.09	-0.02	0.12	1.09	HY
		B162	44.68	10.41	-26.17					
3U22FC		B161	44.07	10.85	-26.34	0.97	-0.04	0.14	0.98	HW
		B162	45.04	10.81	-26.20					
69RMTG		B161	43.98	10.16	-26.10	0.99	-0.10	0.22	1.02	XU
		B162	44.97	10.06	-25.89					
6V6EBH		B161	44.34	10.98	-26.33	1.01	-0.02	0.07	1.01	HW
		B162	45.35	10.97	-26.26					
78EDFB		B161	44.05	10.75	-26.26	1.00	-0.06	0.21	1.02	HW
		B162	45.04	10.69	-26.06					
7GJFK9		B161	44.31	10.05	-26.03	0.94	-0.02	0.15	0.95	HK
		B162	45.24	10.03	-25.88					
8BWVDL		B161	44.08	10.13	-26.40	0.92	-0.08	0.18	0.94	XZ
		B162	45.00	10.05	-26.22					
99M6MH		B161	44.30	9.81	-25.59	0.89	-0.04	0.12	0.89	HG
		B162	45.18	9.78	-25.48					
9X3XL8		B161	44.26	9.92	-25.73	0.99	0.03	0.05	0.99	GE
		B162	45.24	9.95	-25.68					
A84LE6		B161	44.30	10.53	-26.19	0.83	-0.06	0.19	0.85	XZ
		B162	45.13	10.47	-26.01					
AACTK4		B161	44.11	9.55	-25.46	0.89	0.07	-0.02	0.89	GE
		B162	45.00	9.62	-25.48					
AD9GX6		B161	43.93	9.83	-26.52	0.99	0.01	0.05	0.99	FA
		B162	44.92	9.84	-26.48					
ALQ26B		B161	43.96	10.32	-26.04	0.97	-0.06	0.15	0.98	XU
		B162	44.92	10.26	-25.89					
BA67EA		B161	44.42	10.38	-26.28	0.86	-0.04	0.14	0.87	XO
		B162	45.27	10.34	-26.15					
BNQKH9		B161	44.33	10.52	-26.06	0.89	-0.09	0.23	0.92	HW
		B162	45.22	10.43	-25.83					
D2MCH4		B161	44.86	10.02	-26.16	-0.02	0.03	-0.07	0.08	XZ
		B162	44.85	10.05	-26.23					

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
DBPWE6		B161	44.89	10.97	-26.76	1.00	-0.02	0.13	1.00	HW
		B162	45.88	10.95	-26.63					
E64436		B161	44.41	10.72	-26.42	0.97	-0.04	0.16	0.98	HW
		B162	45.38	10.68	-26.26					
FV8MQ7		B161	44.19	10.55	-26.30	0.92	-0.04	0.08	0.92	XK
		B162	45.10	10.51	-26.23					
GXG3N4		B161	44.26	10.44	-26.31	0.89	-0.21	0.33	0.97	XN
		B162	45.15	10.24	-25.98					
GXVEH3		B161	43.70	10.62	-26.68	0.94	0.00	0.03	0.94	TO
		B162	44.64	10.62	-26.66					
JMLT4Y		B161	44.70	9.96	-26.24	0.97	-0.05	0.09	0.97	HY
		B162	45.67	9.91	-26.15					
JPU2BY		B161	44.15	10.29	-26.13	1.15	-0.06	0.23	1.17	XM
		B162	45.29	10.23	-25.90					
KNYTNZ		B161	44.03	10.66	-26.16	0.89	-0.16	0.26	0.94	HW
		B162	44.92	10.50	-25.90					
L2EZE7		B161	43.82	11.32	-26.34	0.93	-0.13	0.24	0.97	MG
		B162	44.75	11.20	-26.10					
MHYD2W		B161	44.31	10.53	-26.17	0.95	-0.05	0.14	0.96	XO
		B162	45.25	10.48	-26.03					
MLZE7Z		B161	44.01	10.91	-26.20	1.00	0.09	-0.02	1.00	HW
		B162	45.00	11.00	-26.22					
N73NPU		B161	44.00	10.89	-26.29	0.96	0.04	0.09	0.96	HW
		B162	44.96	10.93	-26.20					
NRMNT4		B161	44.89	10.41	-26.43	1.01	-0.10	0.18	1.03	XZ
		B162	45.90	10.32	-26.26					
PED8HR		B161	44.64	10.26	-26.47	0.92	-0.12	0.22	0.95	AB
		B162	45.55	10.15	-26.25					
PEX29U		B161	44.40	9.95	-25.74	0.92	-0.10	0.21	0.94	GB
		B162	45.31	9.85	-25.54					
PJ6EZZ		B161	44.71	10.36	-26.48	0.90	-0.13	0.15	0.92	AE
		B162	45.61	10.23	-26.33					

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Color and Color Difference - Paint Chips - 45-0 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
QYU6FU		B161	43.93	9.88	-26.05	0.95	-0.02	0.04	0.95	XR
		B162	44.88	9.86	-26.02					
TXVDMK		B161	44.59	10.05	-25.95	0.98	0.04	-0.03	0.98	MA
		B162	45.57	10.09	-25.97					
ULVARP		B161	44.32	10.67	-26.38	1.01	-0.02	0.12	1.02	HW
		B162	45.33	10.65	-26.26					
UNPVNM		B161	44.36	10.42	-26.19	0.98	-0.10	0.13	0.99	XO
		B162	45.33	10.33	-26.06					
WAX6FU		B161	44.65	10.19	-25.96	0.97	-0.04	0.06	0.97	GH
		B162	45.62	10.15	-25.91					
X3FYJN		B161	44.43	10.42	-26.25	0.96	0.00	0.08	0.96	XO
		B162	45.39	10.42	-26.17					
X887XP		B161	44.31	10.03	-25.82	0.81	-0.19	0.30	0.88	GH
		B162	45.11	9.84	-25.52					
XDWUHM		B161	44.21	10.34	-26.38	0.89	-0.08	0.18	0.91	XU
		B162	45.10	10.26	-26.20					
XFDBML		B161	44.24	10.90	-26.39	0.92	-0.17	0.30	0.98	HW
		B162	45.15	10.74	-26.09					
XFXR3N		B161	44.13	10.31	-26.23	0.91	-0.16	0.14	0.93	HK
		B162	45.04	10.15	-26.09					
XJCLJL		B161	44.54	9.94	-25.85	0.94	-0.14	0.26	0.98	AB
		B162	45.48	9.80	-25.60					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
B161	44.26	10.38	-26.19				
B162	45.20	10.32	-26.05	0.92	-0.06	0.14	0.94
Stnd Dev Btwn Labs							
B161	0.29	0.38	0.27				
B162	0.29	0.38	0.27	0.16	0.07	0.09	0.15

Statistics based on 43 of 43 reporting participants

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Key to Instrument Codes Reported by Participants

AB	Data Color	AE	ACS Chroma-Sensor CS-3
FA	BYK Mac	GB	BYK-Gardner spectro-guide sphere gloss
GE	BYK-Gardner spectro-guide (45/0)	GH	BYK-Gardner Color-View
HG	Hunter ColorQUEST	HK	Hunter MiniScan XE (45/0)
HW	Hunter LabScan XE	HY	Hunter Color Flex 45/0
MA	Macbeth	MG	Macbeth 1500/PLUS or 2025+ Color Eye
TO	Topcon SR-3 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	XR	X-Rite 968 Portable SpectroPhotometer
XU	X-Rite 964 Portable SpectroPhotometer	XZ	X-Rite

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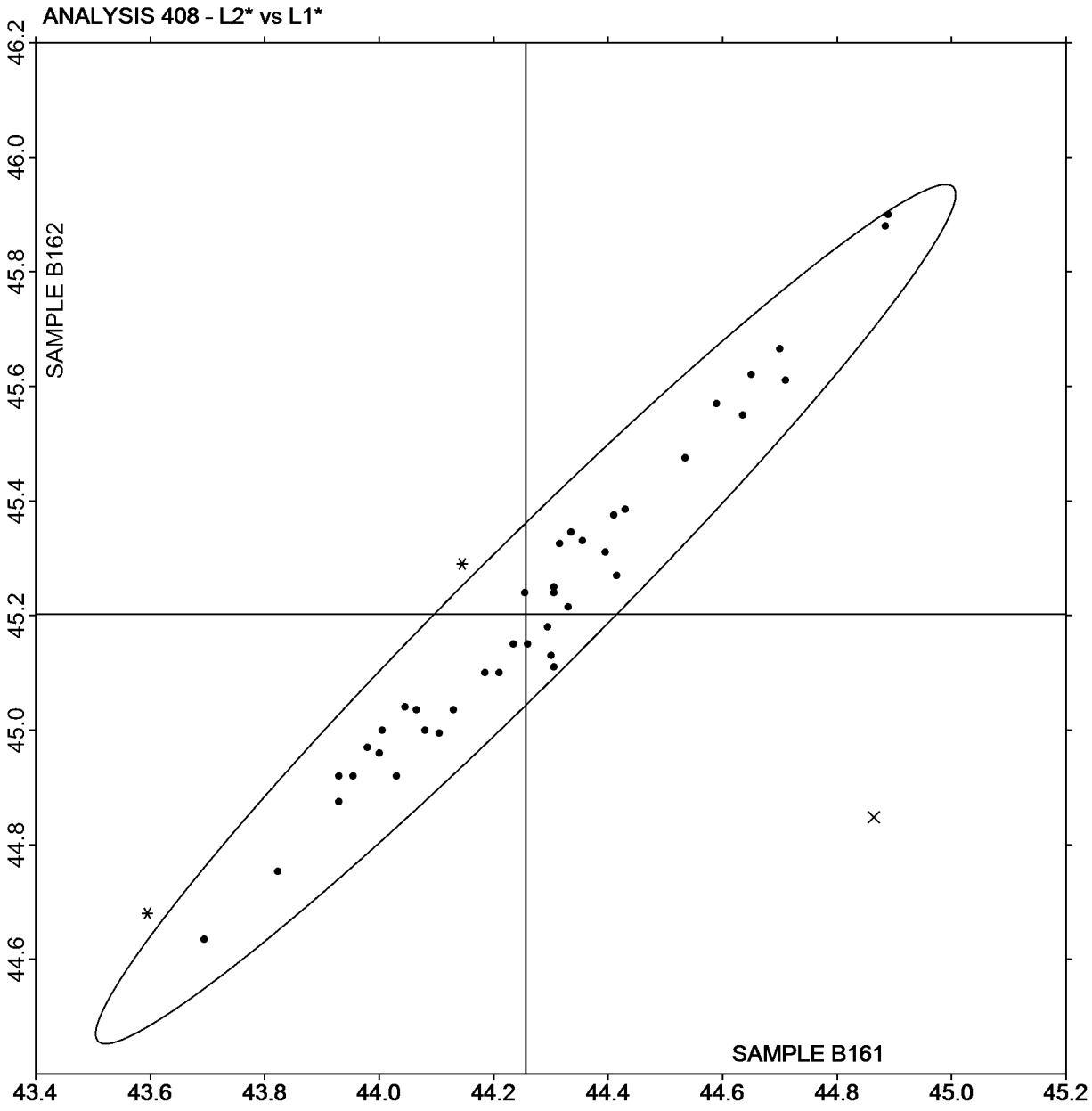
L2* vs L1*

SAMPLE B161 = 44.26 SAMPLE B162 = 45.20



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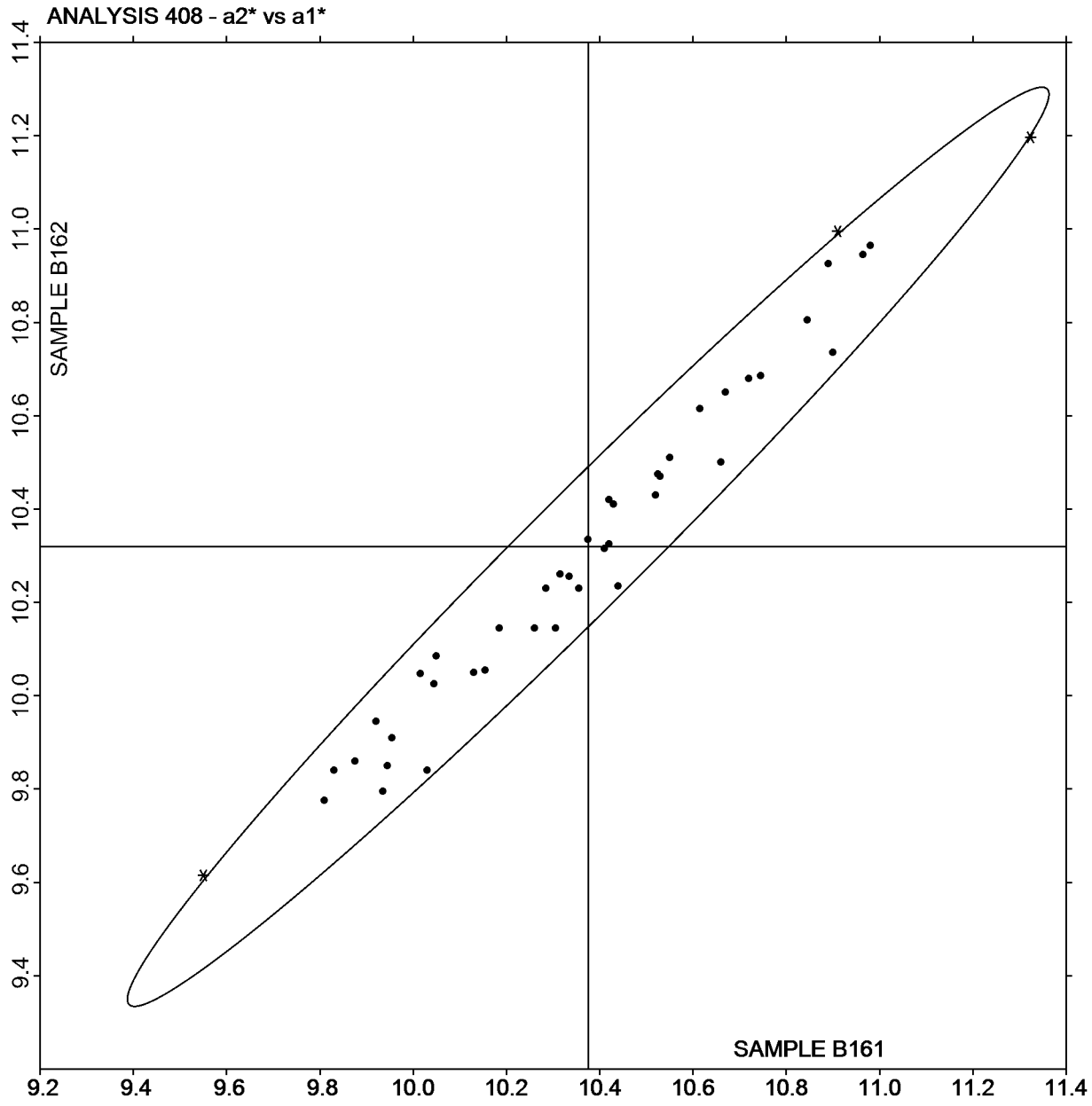
a2* vs a1*

SAMPLE B161 = 10.38 SAMPLE B162 = 10.32



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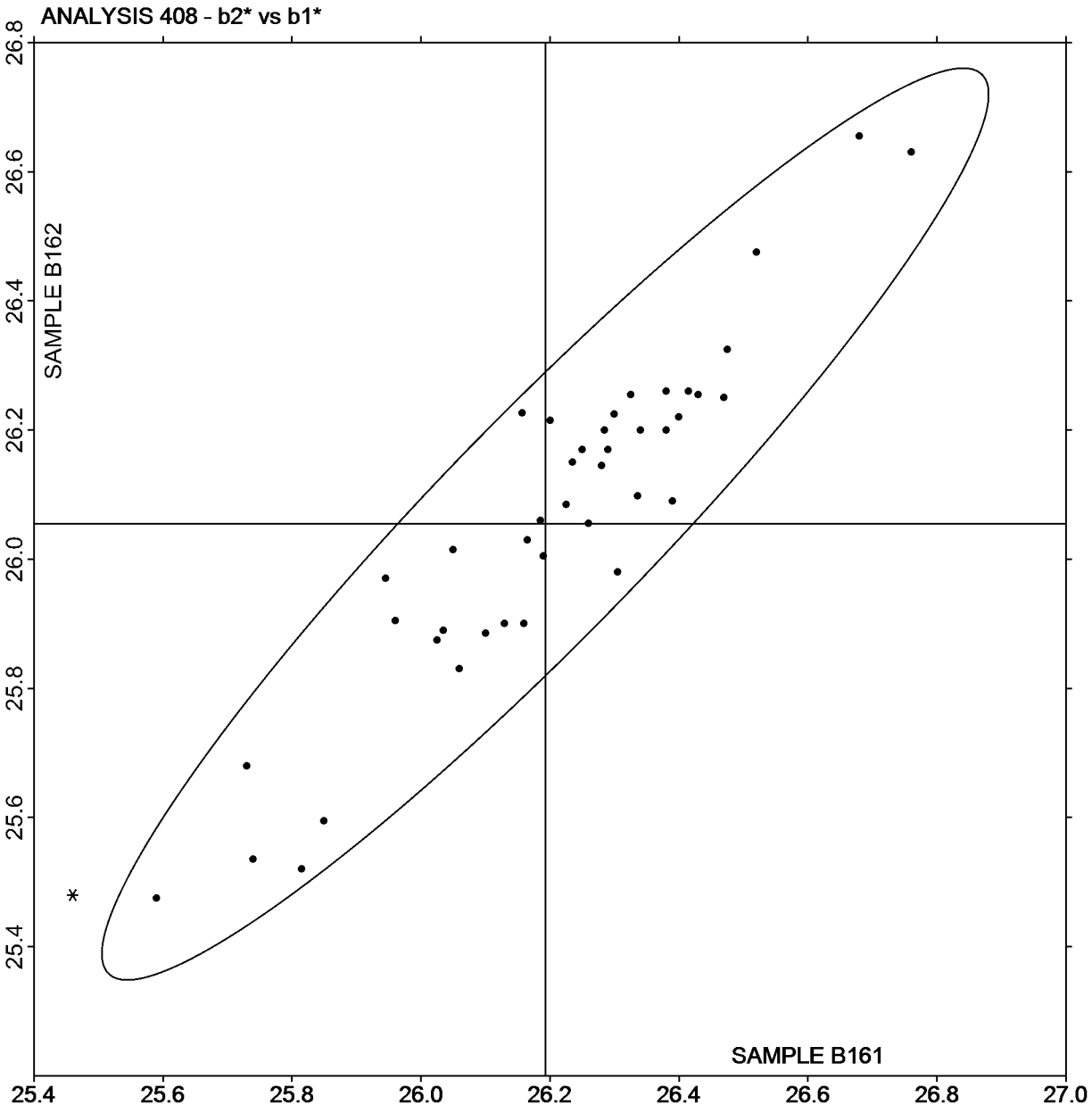
b2* vs b1*

SAMPLE B161 = -26.19 SAMPLE B162 = -26.05



Plot created using absolute values.

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
2EGKHH		B161 B162	44.43 45.44	10.35 10.30	-26.14 -25.96	1.01	-0.05	0.18	1.02	XI
2Q8P2E		B161 B162	44.51 45.47	10.35 10.21	-26.04 -25.81	0.96	-0.14	0.23	0.99	XI
2U74LJ		B161 B162	44.64 45.58	10.36 10.50	-26.51 -26.53	0.94	0.14	-0.02	0.95	AM
3B7D6F		B161 B162	44.51 45.51	10.02 10.02	-25.94 -25.88	1.00	-0.01	0.07	1.00	MM
3X6EHJ		B161 B162	44.69 45.60	10.19 10.08	-26.53 -26.38	0.91	-0.11	0.15	0.92	AJ
44P8WF		B161 B162	44.58 45.53	10.39 10.22	-26.38 -26.12	0.95	-0.18	0.26	1.00	AJ
4JKE7B	X	B161 B162	44.52 44.51	10.16 10.19	-25.89 -25.82	-0.01	0.03	0.07	0.08	AO
4JZVYH		B161 B162	44.62 45.54	10.31 10.14	-26.33 -26.09	0.92	-0.17	0.25	0.97	XI
4P7CTD		B161 B162	44.51 45.50	10.41 10.34	-26.56 -26.42	0.99	-0.07	0.15	1.00	AQ
673EMM		B161 B162	44.35 45.32	10.28 10.28	-26.15 -26.04	0.97	0.00	0.11	0.98	XI
6CBHVA		B161 B162	44.67 45.62	10.09 10.06	-26.08 -26.05	0.95	-0.03	0.04	0.95	AQ
6G7CTB		B161 B162	44.56 45.53	9.95 9.92	-25.80 -25.65	0.97	-0.03	0.16	0.98	XX
6GMLLC		B161 B162	44.59 45.51	10.19 10.11	-26.25 -26.15	0.92	-0.08	0.10	0.92	MV
6KMUQL		B161 B162	44.60 45.54	10.33 10.19	-26.51 -26.31	0.94	-0.14	0.21	0.97	AJ
6WZWCJ	X	B161 B162	44.71 45.66	9.38 9.36	-25.67 -25.55	0.96	-0.03	0.13	0.96	GF
72AAUH		B161 B162	44.28 45.34	10.02 9.92	-26.00 -25.74	1.06	-0.11	0.26	1.10	XH

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
72PTEF		B161	44.34	10.03	-26.13	0.94	0.06	0.01	0.94	HG
		B162	45.28	10.08	-26.12					
7C9B8M		B161	44.42	10.53	-26.26	0.93	-0.20	0.34	1.01	XH
		B162	45.35	10.33	-25.92					
7HGQFB		B161	44.40	10.14	-26.47	0.93	-0.15	0.18	0.96	HP
		B162	45.33	9.99	-26.29					
7HWU9G		B161	44.45	10.29	-26.31	0.93	-0.06	0.17	0.95	AJ
		B162	45.38	10.23	-26.14					
7M9XYJ		B161	44.56	10.21	-26.16	0.92	-0.11	0.18	0.95	MM
		B162	45.48	10.10	-25.98					
8CRDEM		B161	44.69	10.15	-26.26	0.95	-0.01	0.09	0.95	AJ
		B162	45.64	10.14	-26.17					
8X7YBN		B161	44.60	10.44	-26.38	0.95	-0.05	0.12	0.95	MV
		B162	45.54	10.39	-26.27					
99M6MH		B161	44.41	10.26	-26.13	0.91	-0.10	0.18	0.93	XI
		B162	45.32	10.16	-25.95					
9CJVR9		B161	44.45	10.38	-26.54	1.01	-0.07	0.12	1.02	AR
		B162	45.46	10.31	-26.42					
9X3XL8	X	B161	44.47	10.69	-26.23	0.99	-0.04	0.10	0.99	MM
		B162	45.45	10.66	-26.14					
AACTK4	X	B161	44.53	8.62	-25.70	1.06	-0.10	0.13	1.07	GD
		B162	45.58	8.52	-25.58					
ABJ9RA		B161	44.14	10.23	-25.79	1.00	-0.07	0.18	1.02	MG
		B162	45.14	10.16	-25.61					
AJ2GF7		B161	44.67	10.51	-26.58	0.92	-0.10	0.14	0.93	AJ
		B162	45.59	10.42	-26.44					
ALQ26B		B161	44.61	9.97	-25.94	0.89	-0.05	0.14	0.90	XI
		B162	45.49	9.92	-25.80					
BXUT2F		B161	44.57	10.17	-25.91	0.94	-0.09	0.17	0.96	XI
		B162	45.51	10.09	-25.74					
BZJ28A		B161	44.56	10.29	-26.48	0.93	-0.11	0.16	0.94	XX
		B162	45.49	10.18	-26.33					

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
C97HFB		B161 B162	44.56 45.52	9.90 9.96	-25.91 -25.91	0.96	0.07	0.00	0.96	MM
CKLCQ4		B161 B162	44.54 45.47	10.00 9.97	-26.02 -25.97	0.94	-0.03	0.06	0.94	MM
D8VX72		B161 B162	44.57 45.49	9.92 9.89	-25.72 -25.65	0.92	-0.03	0.07	0.92	AJ
DNYCPF		B161 B162	44.45 45.39	10.38 10.32	-26.50 -26.35	0.94	-0.06	0.15	0.95	AJ
DU67JC		B161 B162	44.47 45.45	9.96 9.98	-26.34 -26.29	0.98	0.02	0.05	0.98	AM
E7YL67		B161 B162	44.67 45.65	10.23 10.26	-26.45 -26.44	0.99	0.04	0.01	0.99	AR
EPRKB6		B161 B162	44.56 45.56	10.26 10.26	-26.44 -26.38	1.00	0.01	0.07	1.00	AO
ETRW76		B161 B162	44.21 45.19	10.26 10.22	-25.93 -25.83	0.98	-0.04	0.11	0.99	XM
EVG6CZ		B161 B162	44.83 45.74	10.25 10.21	-26.23 -26.03	0.91	-0.04	0.21	0.93	HH
FV8MQ7		B161 B162	44.68 45.62	10.34 10.23	-26.68 -26.51	0.94	-0.11	0.18	0.96	AO
FVPWJ8		B161 B162	44.51 45.52	10.33 10.47	-26.09 -26.20	1.02	0.14	-0.11	1.03	XI
G7R6A6		B161 B162	44.66 45.59	10.35 10.25	-26.03 -25.79	0.93	-0.10	0.24	0.96	XH
GXG3N4		B161 B162	44.24 45.25	10.33 10.22	-25.85 -25.61	1.01	-0.11	0.24	1.04	XO
GXVEH3		B161 B162	44.11 45.08	9.95 9.91	-26.13 -26.07	0.97	-0.04	0.06	0.97	CA
HEWLAA	X	B161 B162	44.59 45.03	10.07 10.02	-25.93 -25.78	0.44	-0.06	0.15	0.46	XI
HPZVGY		B161 B162	44.53 45.47	10.45 10.30	-26.39 -26.17	0.94	-0.15	0.22	0.98	MU

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
J7Z6XB		B161 B162	44.52 45.49	10.18 10.14	-26.33 -26.28	0.97	-0.05	0.05	0.97	MV
JAWUDW		B161 B162	44.21 45.21	10.41 10.39	-25.99 -25.88	1.00	-0.03	0.12	1.00	XM
JBTCEX	X	B161 B162	42.96 43.81	13.07 13.06	-27.42 -27.22	0.85	-0.01	0.20	0.87	XM
JE9W4Y		B161 B162	44.68 45.58	10.18 10.13	-26.32 -26.20	0.91	-0.05	0.12	0.91	AJ
JKWKX6		B161 B162	44.46 45.46	10.24 10.27	-26.48 -26.46	1.00	0.03	0.02	1.00	HP
K8N4MT		B161 B162	44.38 45.36	10.35 10.33	-26.24 -26.10	0.98	-0.02	0.15	0.99	MV
KFJYPX		B161 B162	44.36 45.35	10.27 10.30	-26.20 -26.17	0.99	0.03	0.03	0.99	XH
KTAVQV	X	B161 B162	44.96 45.96	9.77 9.76	-25.93 -25.86	1.00	-0.01	0.07	1.00	MM
KXYD22		B161 B162	44.35 45.28	9.82 9.78	-25.98 -25.89	0.93	-0.04	0.09	0.94	GD
LCEQXT		B161 B162	44.62 45.08	10.36 10.26	-26.46 -26.26	0.46	-0.10	0.20	0.51	AJ
LRVTDV		B161 B162	44.61 45.52	10.20 10.20	-26.14 -26.11	0.91	0.01	0.04	0.91	MT
LYTHUZ		B161 B162	44.58 45.50	10.32 10.17	-26.48 -26.22	0.92	-0.15	0.27	0.97	AJ
LZM4RX		B161 B162	44.66 45.58	10.20 10.19	-26.26 -26.22	0.92	-0.01	0.04	0.92	AM
M44NCR		B161 B162	44.68 45.58	10.27 10.23	-26.24 -26.18	0.90	-0.04	0.06	0.90	AJ
NTCWYX		B161 B162	44.37 45.33	10.10 9.98	-26.46 -26.30	0.96	-0.12	0.17	0.98	HP
NV7HWV		B161 B162	44.50 45.44	9.90 10.01	-25.50 -25.58	0.94	0.11	-0.08	0.94	XI

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
NZXPE4		B161 B162	44.70 45.60	10.41 10.28	-26.12 -25.96	0.91	-0.13	0.17	0.93	XI
P27GKQ		B161 B162	44.41 45.30	10.37 10.30	-26.09 -25.92	0.89	-0.07	0.17	0.91	XH
PLA3KW		B161 B162	44.59 45.50	10.20 10.27	-25.97 -26.06	0.91	0.07	-0.09	0.91	XI
PNYBPR		B161 B162	44.60 45.53	10.27 10.11	-26.21 -25.95	0.94	-0.16	0.26	0.98	MM
PQ7Q24	X	B161 B162	44.20 45.18	9.22 9.12	-26.07 -25.94	0.99	-0.10	0.13	1.00	GD
PR2A36		B161 B162	44.61 45.56	10.24 10.15	-26.62 -26.42	0.95	-0.09	0.20	0.97	AO
QHQ8G6		B161 B162	44.49 45.41	10.38 10.26	-26.31 -26.09	0.92	-0.12	0.23	0.95	MK
QK3XTU		B161 B162	44.17 45.14	10.40 10.37	-26.00 -25.97	0.97	-0.03	0.03	0.97	XH
QUMDCN		B161 B162	44.60 45.50	10.14 10.09	-26.24 -26.12	0.90	-0.06	0.12	0.90	MV
RCWT8N		B161 B162	44.63 45.59	9.94 9.83	-25.93 -25.71	0.96	-0.11	0.22	0.99	MM
RJULYU		B161 B162	44.12 45.05	10.36 10.29	-26.09 -25.91	0.94	-0.08	0.18	0.96	XH
RRA29R		B161 B162	44.68 45.69	9.98 10.00	-26.01 -25.96	1.01	0.02	0.05	1.01	MM
RXYLAL	X	B161 B162	42.61 43.55	10.30 10.23	-26.29 -26.19	0.95	-0.07	0.10	0.95	AJ
T4LQLM		B161 B162	44.83 45.71	10.04 10.11	-26.35 -26.39	0.88	0.07	-0.05	0.88	AO
T4LVWP		B161 B162	44.68 45.49	10.20 10.19	-26.26 -26.12	0.82	-0.01	0.15	0.83	AM
T4ZG7R		B161 B162	44.58 45.57	10.26 10.26	-26.41 -26.38	1.00	0.00	0.03	1.00	AM

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
TQXLEQ		B161 B162	44.37 45.34	10.13 10.12	-25.94 -25.82	0.98	-0.01	0.13	0.98	XI
TXVDMK		B161 B162	44.59 45.57	10.05 10.09	-25.95 -25.97	0.98	0.04	-0.03	0.98	MM
TXVKMR		B161 B162	44.62 45.58	10.24 10.11	-26.03 -25.81	0.96	-0.13	0.22	0.99	AJ
U4E4JY	X	B161 B162	44.33 45.22	9.04 9.00	-25.60 -25.57	0.90	-0.05	0.03	0.90	GD
U99XGZ		B161 B162	44.35 45.35	10.34 10.29	-26.35 -26.21	1.00	-0.05	0.14	1.01	AM
UBY7MV		B161 B162	44.64 45.63	10.47 10.39	-26.63 -26.46	0.99	-0.08	0.17	1.01	AM
UPZVLG		B161 B162	44.42 45.34	10.36 10.31	-26.05 -25.91	0.92	-0.05	0.15	0.93	XO
V63YGR		B161 B162	44.40 45.41	10.39 10.35	-26.70 -26.56	1.01	-0.04	0.14	1.02	AM
VPU8EM		B161 B162	44.48 45.52	10.02 9.92	-25.83 -25.63	1.04	-0.10	0.20	1.06	XZ
WAX6FU		B161 B162	44.53 45.46	10.27 10.15	-26.17 -25.98	0.94	-0.12	0.20	0.96	MV
WGENVM		B161 B162	44.57 45.53	10.17 10.14	-26.76 -26.66	0.96	-0.04	0.10	0.97	CA
WXZ63Q		B161 B162	44.44 45.34	10.19 10.15	-26.04 -25.94	0.90	-0.04	0.10	0.90	XO
X3FYJN		B161 B162	44.44 45.43	10.40 10.33	-26.28 -26.19	0.99	-0.07	0.09	0.99	MI
X7CMVN		B161 B162	44.49 45.45	10.30 10.17	-26.51 -26.22	0.96	-0.13	0.29	1.01	AQ
XDWUHM		B161 B162	44.39 45.28	10.16 10.10	-26.22 -26.07	0.90	-0.06	0.15	0.91	XI
XE9HXT		B161 B162	44.51 45.49	10.13 10.09	-26.30 -26.19	0.98	-0.05	0.11	0.99	AL

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			CIE L* a* b* Color Values			Color Difference Values				
WebCode	Flag	Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*	InstrCode
XK86KM	X	B161	44.06	10.31	-25.68	0.90	-0.01	-0.02	0.90	XO
		B162	44.96	10.30	-25.70					
YRLDLN		B161	44.57	10.00	-26.17	1.03	0.03	0.02	1.03	MM
		B162	45.60	10.03	-26.15					
YY873U		B161	44.72	10.32	-26.19	0.90	-0.20	0.38	0.99	XI
		B162	45.61	10.12	-25.81					
YY949J	X	B161	43.24	16.04	-27.88	0.99	0.01	0.11	0.99	MU
		B162	44.22	16.05	-27.77					
ZDZDBF		B161	44.42	9.80	-26.01	0.95	0.04	-0.04	0.95	PE
		B162	45.37	9.84	-26.05					
ZGJCLP		B161	44.46	10.40	-26.42	0.92	-0.11	0.21	0.94	MM
		B162	45.37	10.30	-26.21					
ZZCBTN	X	B161	43.95	8.06	-26.88	0.96	0.00	0.12	0.97	AQ
		B162	44.91	8.06	-26.76					

Summary Statistics

Samples	L*	a*	b*	ΔL*	Δa*	Δb*	ΔE*
Grand Means							
B161	44.50	10.21	-26.19				
B162	45.46	10.16	-26.07	0.94	-0.05	0.13	0.96
Stnd Dev Btwn Labs							
B161	0.15	0.17	0.27				
B162	0.14	0.15	0.27	0.07	0.07	0.09	0.06

Statistics based on 90 of 103 reporting participants

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Comments Assigned on Data Flags for Test #409

4JKE7B(X) - Low L values for Sample B162.
6WZWCJ(X) - Low a values for both samples.
9X3XL8(X) - High a values for both samples.
AACTK4(X) - Low a values for both samples.
HEWLAA(X) - Low L values for Sample B162. Inconsistent in testing within L values for Sample B162.
JBTCEX(X) - Low L and b values for both samples. High a values for both samples.
KTAVQV(X) - High L values for both samples.
PQ7Q24(X) - Low a values for both samples.
RXYLAL(X) - Low L values for both samples.
U4E4JY(X) - Low a values for both samples.
XK86KM(X) - Low L Values for both samples.
YY949J(X) - Low L and b values for both samples. High a values for both samples.
ZZCBTN(X) - All values are low. Inconsistent in testing within both samples.

Key to Instrument Codes Reported by Participants

AJ	ACS-Datacolor 600	AL	ACS-Datacolor Intl. Dataflash 100
AM	ACS-Datacolor 600 Plus	AO	ACS-Datacolor 650X
AQ	ACS-Datacolor 600X	AR	Datacolor 400
CA	Cary 5000	GD	BYK-Gardner spectro-guide sphere
GF	BYK-Gardner The Color Sphere (TCS)	HG	Hunter ColorQUEST
HH	Hunter ColorQUEST XE	HP	Hunter UltraScan PRO
MG	Macbeth 2180 Color Eye	MI	Macbeth Color i 5
MK	Macbeth Color-Eye 7000	MM	Macbeth Color-Eye 7000a
MT	Minolta CM-2600d	MU	Minolta
MV	Minolta CM-3000d Series Spectrophotometer	PE	Perkin Elmer Spectrophotometer
XH	X-Rite Color i5	XI	X-Rite Color i7
XM	X-Rite SP62 Portable Sphere Spectrophotometer	XO	X-Rite SP64 Portable Sphere Spectrophotometer
XX	Instrument make/model not specified by lab	XZ	X-Rite

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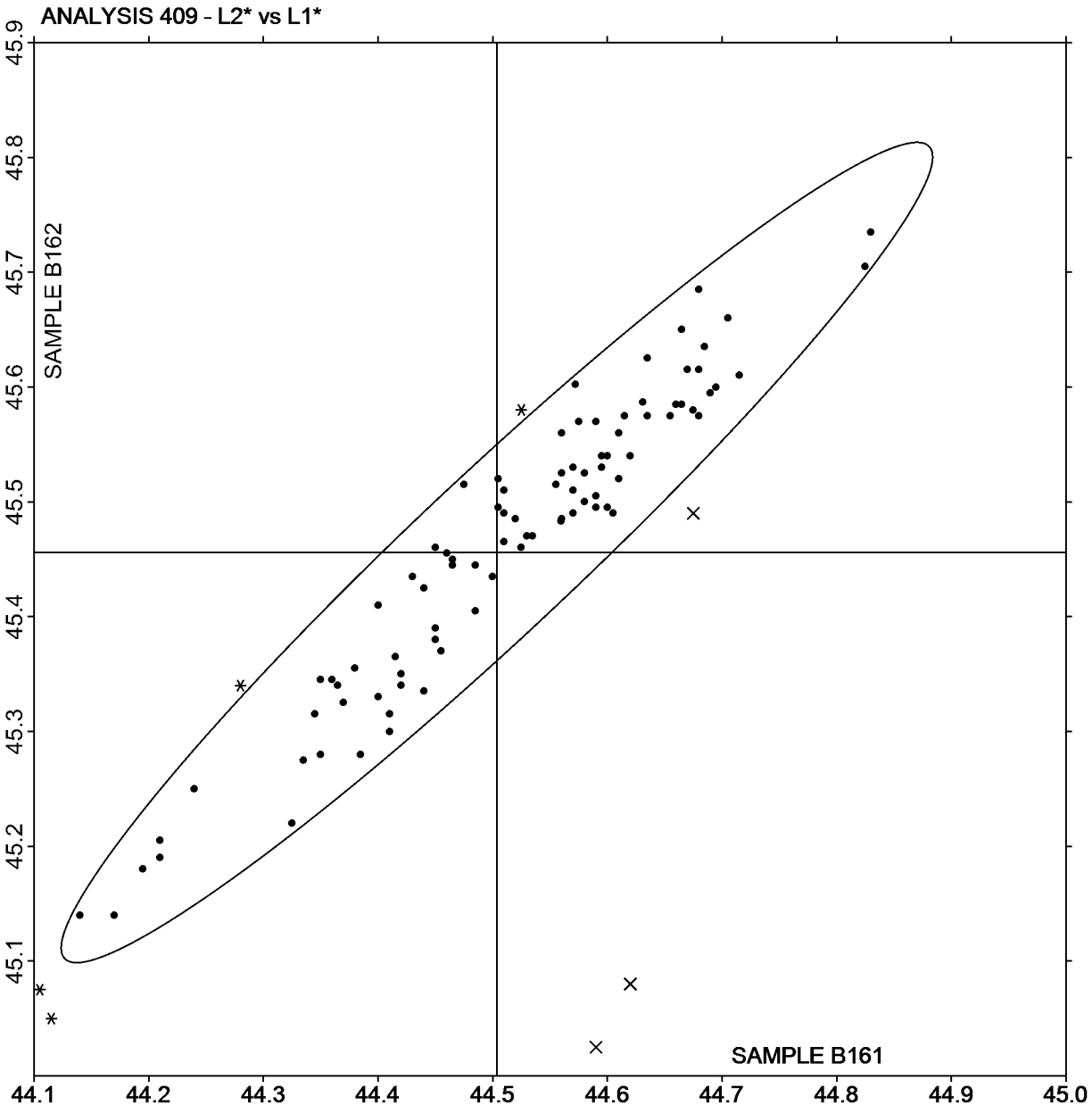
L2* vs L1*

SAMPLE B161 = 44.50 SAMPLE B162 = 45.46



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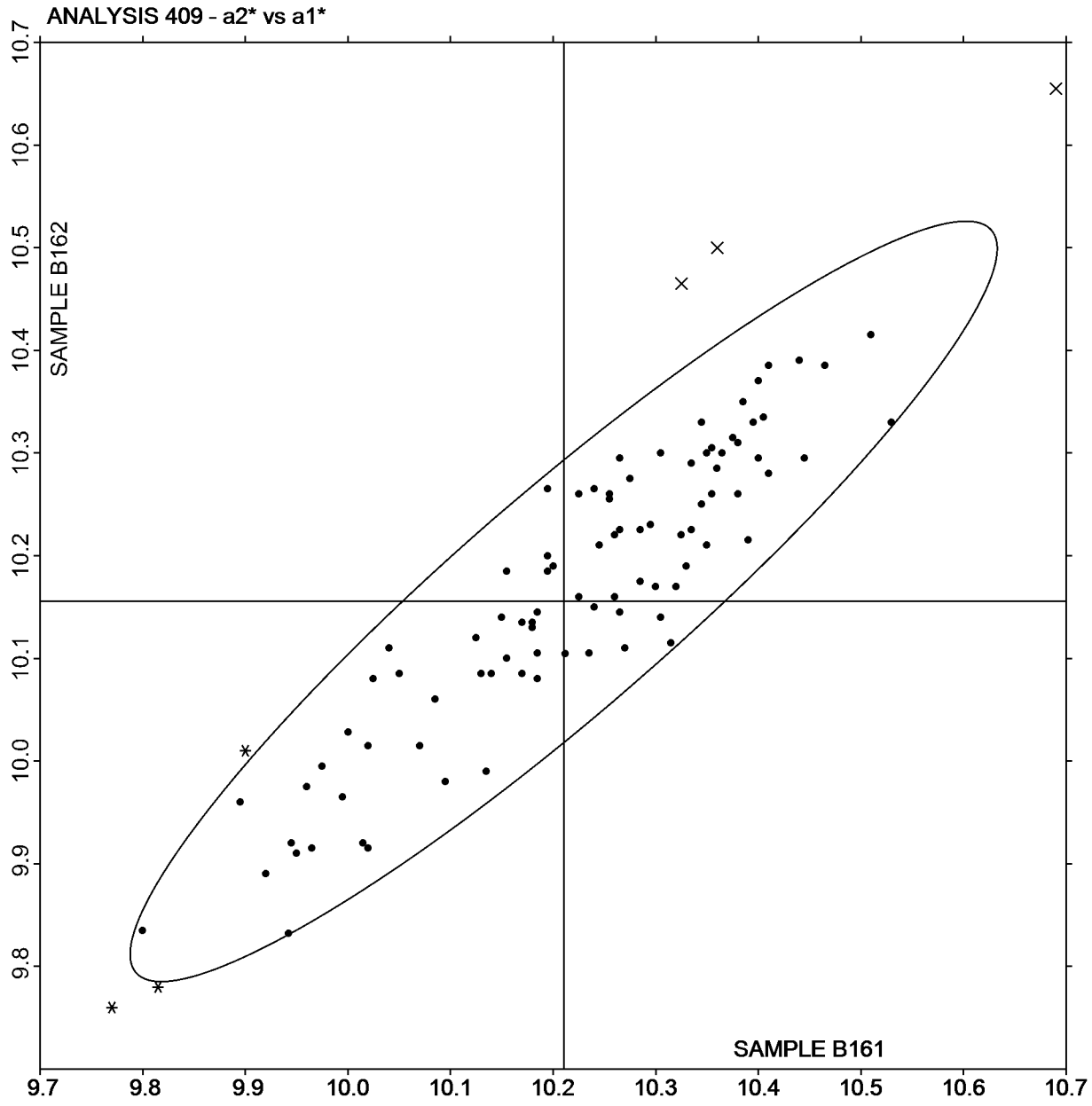
a2* vs a1*

SAMPLE B161 = 10.21 SAMPLE B162 = 10.16



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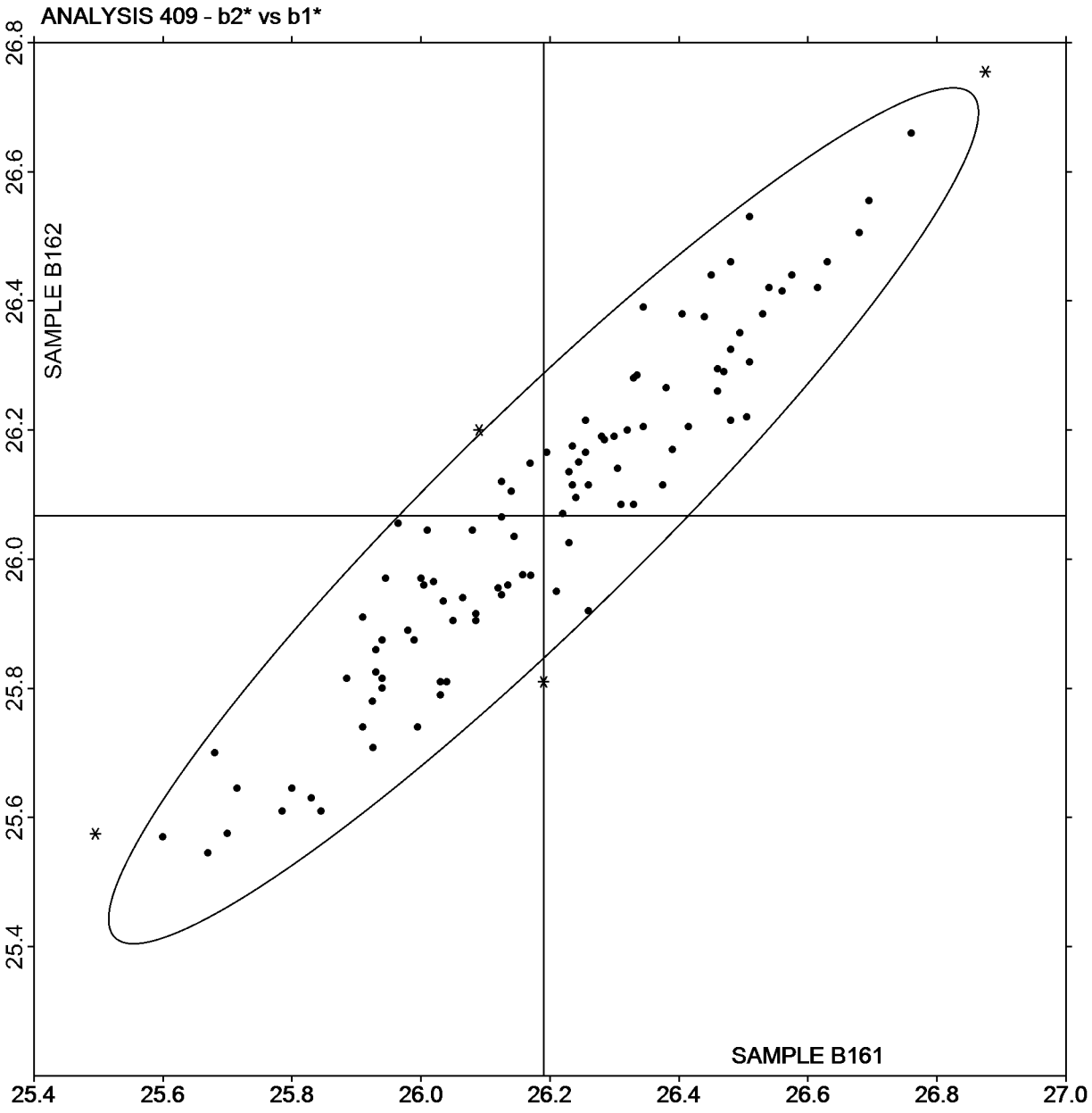
b2* vs b1*

SAMPLE B161 = -26.19 SAMPLE B162 = -26.07



Plot created using absolute values.

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Spectrophotometric Reflectance values (as %) at selected wavelengths

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
Sample B161																		
2EGKHH		21.88	27.21	29.40	29.15	24.12	18.98	14.37	12.04	9.16	10.90	13.79	14.21	18.09	21.44	18.87	17.51	XI
2Q8P2E		22.13	27.35	29.42	29.15	24.16	19.04	14.45	12.07	9.24	11.00	13.83	14.31	18.22	21.44	18.75	17.51	XI
2U74LJ		23.01	27.68	29.92	29.59	24.37	19.26	14.61	12.19	9.16	10.80	13.92	14.25	18.11	21.79	19.41	17.57	AM
3B7D6F		22.46	27.28	29.30	29.05	24.19	19.07	14.50	12.15	9.35	10.83	13.78	14.27	17.88	21.31	19.09	17.58	MM
3X6EHJ		22.28	27.87	29.96	29.63	24.57	19.41	14.61	12.33	9.25	10.72	13.87	14.30	18.02	21.76	18.56	17.75	AJ
44P8WF		22.37	27.64	29.73	29.38	24.36	19.19	14.41	12.20	9.25	10.86	13.88	14.26	18.00	21.71	18.98	17.68	AJ
4JKE7B		22.15	27.30	29.41	29.12	24.10	19.10	14.43	12.11	9.18	10.95	13.86	14.25	18.05	21.41	18.89	17.45	XI
4JZVYH		22.21	27.65	29.72	29.48	24.42	19.22	14.52	12.18	9.25	10.96	13.92	14.27	18.10	21.55	18.92	17.47	XI
673EMM		22.17	27.24	29.28	29.02	24.00	18.95	14.33	12.00	9.18	10.78	13.71	14.12	17.93	21.39	18.98	17.50	XI
6CBHVA		23.83	27.51	29.56	29.45	24.26	19.29	14.53	12.26	9.34	10.88	13.90	14.24	18.02	21.84	19.10	17.75	AQ
6G7CTB		21.72	27.37	29.43	29.00	24.22	19.08	14.48	12.13	9.36	10.86	13.74	14.32	18.94X	21.45	18.20	17.10	XX
6GMLLC		21.98	27.61	29.63	29.56	24.32	19.22	14.46	12.18	9.13	10.90	14.02	14.16	17.92	21.73	19.31	17.37	MV
72AAUH		21.37	27.03	29.01	28.93	23.96	18.94	14.33	11.98	9.21	10.64	13.65	14.10	17.71	21.16	18.87	17.33	XH
72PTEF		18.69X	27.49	29.19	29.07	24.21	19.02	14.38	11.96	9.10	10.74	13.65	14.12	17.77	21.13	18.97	17.54	HG
7C9B8M		21.82	27.32	29.45	29.27	24.18	18.97	14.35	11.99	9.14	10.93	13.80	14.27	18.15	21.46	18.88	17.47	XH
7HGQFB		22.74	27.67	29.74	29.39	24.14	19.09	14.40	12.21	9.15	10.40X	13.90	13.89	17.48	21.96	19.21	17.26	HP
7M9XYJ		22.21	27.52	29.64	29.35	24.30	19.12	14.46	12.15	9.25	10.81	13.90	14.25	18.02	21.58	19.24	17.55	MM
8CRDEM		22.50	27.80	29.80	29.50	24.50	19.40	14.55	12.30	9.20	10.80	14.00	14.20	18.00	21.70	18.35	17.50	AJ
8X7YBN		22.13	27.75	29.84	29.61	24.28	19.15	14.44	12.21	9.09	10.93	14.06	14.13	18.05	21.95	19.33	17.46	MV
99M6MH		21.97	27.30	29.30	29.11	24.15	18.99	14.41	12.02	9.16	10.82	13.77	14.19	18.05	21.36	18.81	17.51	XI
9CJVR9	X	22.68	27.63	29.73	29.43	24.18	19.11	14.39	12.13	11.43X	16.13X	21.74X	16.63X	13.52X	17.81X	18.86	17.33	AR
9X3XL8		22.71	27.68	29.80	29.10	24.00	18.85	14.31	12.03	9.14	11.07	13.83	14.31	18.13	21.49	18.94	17.50	MM
AACTK4	X	25.53X	26.66	29.04	29.23	25.33X	19.69	14.62	11.54X	9.81X	11.08	12.95X	13.54X	17.78	21.34	19.64	12.55X	GD
ABJ9RA		21.96	26.72	28.91	28.63	23.55	18.65	14.13	11.84	9.10	10.87	13.57	13.88	17.72	21.16	18.58	17.31	MG
AJ2GF7		22.41	28.02	30.07	29.59	24.37	19.31	14.56	12.18	9.33	10.89	13.94	14.37	18.21	21.45	19.11	17.33	AJ

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Spectrophotometric Reflectance values (as %) at selected wavelengths

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
								Sample B161										
ALQ26B		22.08	27.34	29.41	29.22	24.24	19.18	14.57	12.22	9.36	10.96	13.89	14.23	17.92	21.29	18.98	17.53	XI
BXUT2F		21.96	27.30	29.42	29.27	24.23	19.12	14.47	12.09	9.23	10.97	13.90	14.32	18.15	21.50	18.86	17.55	XI
BZJ28A		22.46	27.71	29.76	29.49	24.42	19.23	14.47	12.21	9.25	10.81	13.86	14.43	17.90	21.63	18.89	17.39	XX
C97HFB		22.21	27.41	29.46	29.15	24.23	19.09	14.54	12.14	9.38	10.78	13.78	14.29	17.86	21.22	19.18	17.59	MM
CKLCQ4		22.30	27.38	29.46	29.24	24.26	19.12	14.48	12.16	9.28	10.77	13.78	14.23	17.94	21.38	18.98	17.48	MM
D8VX72		21.78	27.31	29.39	29.02	24.14	19.06	14.52	12.09	9.43	10.88	13.70	14.35	17.98	21.33	19.13	17.76	AJ
DNYCPF		22.28	27.64	29.72	29.33	24.24	19.09	14.39	12.13	9.15	10.72	13.78	14.11	17.84	21.55	18.58	17.51	AJ
DU67JC		22.02	27.60	29.60	29.28	24.33	19.20	14.46	12.15	9.21	10.58	13.75	14.07	17.74	21.31	18.89	17.13	AM
EPRKB6		22.41	27.56	29.73	29.46	24.50	19.31	14.46	12.21	9.13	10.80	13.93	14.11	17.93	21.68	18.10	17.12	AO
ETRW76		23.24	27.53	29.68	29.21	24.00	19.01	14.47	12.08	9.37	11.34X	14.02	14.07	18.37	22.19	19.83	17.92	HW
EVG6CZ		22.63	27.64	30.17	29.69	24.51	19.34	14.64	12.34	9.19	11.17	14.19	14.12	18.28	22.51X	18.92	16.80	HH
FV8MQ7		22.36	27.88	30.06	29.74	24.68	19.41	14.53	12.28	9.22	10.77	13.89	14.26	18.07	21.78	19.09	17.62	AO
FVPWJ8		22.05	27.32	29.51	29.16	24.20	19.03	14.46	12.09	9.26	11.00	13.82	14.33	18.08	21.36	18.70	17.39	XI
GXG3N4		22.17	27.00	29.17	28.68	23.83	18.72	14.23	11.89	9.06	10.92	13.66	14.18	18.06	21.21	18.82	17.15	XO
GXVEH3		22.79	26.86	28.80	28.94	23.81	18.80	14.08	12.00	8.97	10.49	13.64	13.72	17.47	21.31	18.79	16.90	CA
HEWLAA		22.23	27.44	29.46	29.23	24.32	19.15	14.48	12.17	9.25	10.94	13.89	14.19	18.20	21.59	18.83	17.62	XI
HPZVGY		21.99	27.64	29.71	29.57	24.35	19.10	14.42	12.10	9.08	10.78	14.10	14.14	18.03	21.87	19.33	17.44	MV
J7Z6XB		23.37	27.54	29.51	29.51	24.32	19.22	14.44	12.14	9.06	10.78	13.96	14.08	17.94	21.78	19.10	17.45	MV
JAWUDW		21.91	27.01	29.13	28.87	23.70	18.67	14.12	11.90	9.05	10.86	13.63	14.06	17.86	21.21	18.87	17.20	XM
JBTCEX		21.94	27.04	29.15	28.88	23.72	18.70	14.16	11.95	9.09	10.50	13.67	14.10	17.89	21.24	18.91	17.22	XM
JE9W4Y		23.83	27.69	29.77	29.45	24.51	19.34	14.55	12.29	9.34	10.79	13.89	14.28	18.06	21.74	19.04	17.87	AJ
JKWKX6		22.88	27.64	29.71	29.50	24.26	19.17	14.30	12.16	9.23	10.48	13.98	14.08	17.77	21.52	19.23	17.27	HP
K8N4MT		22.02	27.38	29.39	29.29	23.97	18.99	14.28	12.06	8.98	10.82	13.93	14.03	17.82	21.65	19.08	17.20	MV
KFJYPX		22.03	27.32	29.35	29.14	24.14	18.96	14.37	12.03	9.23	10.74	13.72	14.20	17.95	21.24	18.95	17.48	XH
KTAVQV		22.75	27.92	29.95	29.57	24.65	19.46	14.89X	12.44	9.63X	10.97	13.99	14.57	18.12	21.47	19.50	18.00	MM

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Spectrophotometric Reflectance values (as %) at selected wavelengths

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
								Sample B161										
LCEQXT		22.57	27.71	29.81	29.53	24.45	19.30	14.50	12.23	9.22	10.86	13.98	14.23	18.00	21.58	18.11	17.08	AO
LRVTDV		21.84	27.51	29.64	29.53	24.28	19.22	14.50	12.18	9.21	10.85	14.01	14.23	18.02	21.88	19.33	17.57	MT
LYTHUZ		22.27	27.72	29.81	29.52	24.44	19.29	14.48	12.24	9.18	10.77	13.91	14.26	18.05	21.73	18.12	17.33	AJ
LZM4RX		24.00	27.66	29.70	29.39	24.45	19.30	14.51	12.28	9.32	10.85	13.90	14.27	18.05	21.70	18.96	17.80	AM
NTCWYX		23.04	27.50	29.53	29.44	24.13	19.08	14.36	12.11	9.10	10.40X	13.95	13.91	17.52	21.98	19.18	17.25	HP
NV7HWV		22.22	27.15	29.07	28.59	23.90	18.88	14.48	12.01	9.27	11.02	13.72	14.18	17.95	21.05	18.41	17.15	XI
NZXPE4		22.33	27.52	29.67	29.45	24.38	19.23	14.56	12.18	9.32	11.05	13.99	14.47	18.41	21.74	19.10	17.78	XI
P27GKQ		21.72	27.15	29.31	29.14	24.10	18.93	14.37	12.00	9.20	10.86	13.74	14.31	18.08	21.40	19.00	17.51	XH
PLA3KW		22.15	27.33	29.46	29.19	24.24	19.08	14.52	12.14	9.32	11.04	13.88	14.31	18.11	21.37	18.62	17.41	XI
PNYBPR		22.34	27.53	29.60	29.38	24.37	19.16	14.51	12.19	9.31	10.86	13.93	14.32	18.11	21.62	19.21	18.70	MM
PQ7Q24		25.14	26.70	29.03	29.07	24.75	18.55	14.45	11.16X	9.73X	10.81	12.73X	13.71	17.74	20.80	19.63	13.08X	GD
PR2A36		22.38	27.81	29.88	29.73	24.50	19.37	14.54	12.21	9.25	10.72	13.88	14.15	17.95	21.67	19.26	17.46	AO
QHQ8G6		22.27	27.48	29.58	29.30	24.22	19.07	14.43	12.11	9.22	10.84	13.87	14.23	18.00	21.52	19.10	17.47	MK
QK3XTU		21.53	27.02	28.98	28.76	23.77	18.75	14.17	11.81	9.10	10.80	13.61	14.13	17.88	21.11	18.42	17.21	XH
RCWT8N		22.12	27.45	29.56	29.23	24.32	19.17	14.55	12.20	9.38	10.83	13.85	14.33	17.96	21.43	19.26	17.66	MM
RJULYU		21.51	26.99	29.10	28.81	23.79	18.64	14.12	11.78	9.04	10.67	13.58	14.01	17.78	21.06	18.66	17.23	XH
RRA29R		22.47	27.57	29.59	29.24	24.35	19.23	14.64	12.27	9.48	10.86	13.88	14.40	17.97	21.38	19.31	17.74	MM
RXYLAL	X	20.62	25.55X	27.57X	27.15X	22.37X	17.52X	13.07X	11.00X	8.15X	9.67X	12.51X	12.81X	16.39X	19.86X	16.85X	15.99	AJ
T4LQLM		22.26	27.86	29.95	29.67	24.70	19.50	14.70	12.42	9.34	10.90	14.02	14.27	18.06	21.64	18.41	17.26	AO
T4LVWP		23.21	27.50	29.50	29.28	24.32	19.16	14.45	12.20	9.20	10.80	13.89	14.12	17.88	21.49	18.86	17.72	AM
T4ZG7R		23.21	27.60	29.72	29.41	24.51	19.31	14.52	12.22	9.12	10.77	13.94	14.19	18.00	21.74	18.24	17.51	AM
TQXLEQ		21.89	27.18	29.23	28.94	24.04	18.92	14.34	11.99	9.18	10.79	13.67	14.14	17.97	21.31	18.71	17.39	XI
TXVDMK		22.66	27.39	29.37	29.15	24.24	19.12	14.55	12.20	9.39	10.87	13.90	14.31	17.90	21.37	19.18	17.55	MM
TXVKMR		24.38	27.42	29.53	29.25	24.16	19.11	14.53	12.20	9.35	10.97	13.91	14.36	18.07	21.52	19.24	17.47	AJ
U4E4JY		28.48X	25.91X	28.98	28.62	24.12	19.21	14.51	12.26	9.39	11.15	12.00X	13.30X	17.78	21.63	19.59	17.96	GD

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Spectrophotometric Reflectance values (as %) at selected wavelengths

WebCode	Data Flag	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700	Instr Code
Sample B161																		
U99XGZ		21.81	27.40	29.52	29.07	24.18	18.99	14.38	11.98	9.19	10.73	13.70	14.20	17.94	21.26	18.66	16.59	AM
UBY7MV		22.26	27.86	29.99	29.70	24.60	19.36	14.50	12.21	9.17	10.79	13.93	14.24	18.10	22.13	18.18	17.28	AM
UPZVLG		22.26	27.26	29.42	29.06	24.07	18.87	14.31	12.03	9.17	10.91	13.81	14.20	18.07	21.45	19.08	17.38	XO
V63YGR		22.23	27.86	29.83	29.49	24.25	19.14	14.44	12.06	9.18	10.72	13.73	14.21	17.86	20.42X	18.79	17.08	AM
VPU8EM		20.50	27.09	29.16	28.98	23.73	19.08	14.26	12.16	9.22	10.88	13.89	14.19	17.83	21.53	19.26	17.52	XZ
WAX6FU		21.95	27.41	29.58	29.38	24.29	19.09	14.43	12.11	9.12	10.82	14.06	14.09	17.96	21.79	19.25	17.37	MV
WGENVM		23.78	28.01	29.88	30.03	24.70	19.50	14.61	12.46	9.31	10.87	14.09	14.16	18.01	21.94	19.36	17.43	CA
WXZ63Q		22.17	27.28	29.51	29.12	24.13	18.94	14.38	12.06	9.18	10.83	13.78	14.22	17.97	21.42	19.10	17.30	XO
X3FYJN		21.90	27.43	29.46	29.29	24.18	19.08	14.39	12.03	9.18	10.81	13.80	14.29	18.01	21.47	19.02	17.49	MI
X7CMVN		22.08	27.57	29.71	29.49	24.29	19.19	14.46	12.10	9.17	10.73	13.79	14.12	17.91	21.52	18.96	17.68	AQ
XDWUHM		22.02	27.35	29.38	29.12	24.10	19.08	14.40	12.05	9.18	10.79	13.71	14.12	17.84	21.26	18.95	17.48	XI
XE9HXT		22.09	27.47	29.55	29.42	24.36	19.20	14.48	12.13	9.26	10.73	13.85	14.16	17.85	21.51	19.26	17.37	AL
XK86KM		21.68	26.86	28.63X	28.42X	23.51X	18.29X	14.03X	11.82	9.01	10.78	13.55	13.96	17.60	21.08	18.78	16.95	XO
YRLDLN		22.30	27.56	29.61	29.40	24.35	19.18	14.53	12.21	9.29	10.73	13.85	14.22	17.90	21.44	19.14	17.49	MM
YY873U		22.77	27.67	29.75	29.50	24.37	19.26	14.55	12.28	9.36	11.05	14.01	14.34	18.18	21.72	19.11	17.63	XI
YY949J		22.00	27.40	29.40	29.30	24.00	18.90	14.30	12.00	8.90	10.80	13.90	14.10	17.80	21.70	19.00	17.35	MU
ZDZDBF		23.08	27.21	29.10	29.25	24.09	19.07	14.31	12.23	9.18	10.67	13.84	13.91	17.66	21.44	18.91	17.08	PE
ZGJCLP		22.41	27.52	29.66	29.32	24.24	19.07	14.41	12.10	9.19	10.80	13.82	14.22	17.99	21.48	19.07	17.49	MM
ZZCBTN		23.77	28.13	30.21	29.97	24.69	19.63	14.80	12.52	9.46	11.05	14.17	14.55	18.42	22.08	19.31	17.88	AQ

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Summary Statistics

	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700
Grand Means	22.41	27.44	29.52	29.27	24.23	19.10	14.44	12.12	9.22	10.83	13.82	14.18	17.98	21.52	18.95	17.40
Stnd Dev Btwn Labs	1.01	0.33	0.31	0.29	0.25	0.22	0.14	0.17	0.13	0.15	0.26	0.17	0.20	0.30	0.34	0.54

Comments Assigned on Data Flags for Test #411

9CJVR9 (X) - High % reflectance data at wavelengths 560-620 and low data at 640-660. Also inconsistent in testing within 560-660 readings.

AACTK4 (X) - High and low % reflectance data at various wavelengths.

RXYLAL (X) - High % reflectance data at most wavelengths.

Key to Instrument Codes Reported by Participants

AJ	ACS-Datacolor 600	AL	ACS-Datacolor Intl. Dataflash 100	AM	ACS-Datacolor 600 Plus
AO	ACS-Datacolor 650	AQ	ACS-Datacolor 600X	AR	Datacolor 400
CA	Cary 5000	GD	BYK-Gardner spectro-guide sphere	HG	Hunter ColorQUEST
HH	Hunter ColorQUEST XE	HP	Hunter UltraScan PRO	HW	Hunter UltraScan XE
MG	Macbeth 2180 Color Eye	MI	Macbeth Color i5	MK	Macbeth Color-Eye 7000 Spectrophotometer
MM	Macbeth Color-Eye 7000a	MT	Minolta CM-2600d	MU	Minolta
MV	Minolta CM-3000d Series Spectrophotometer	PE	Perkin Elmer Spectrophotometer	XH	X-Rite Color i5
XI	X-Rite Color i7	XM	X-Rite SP62	XO	X-Rite SP64
XX	Instrument make/model not specified by lab	XZ	X-Rite		

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WebCode	Data Flag	Sample F161 Lab Mean	Sample F161 Difference from Grand Mean	Sample F161 Comparative Performance Value	Sample F162 Lab Mean	Sample F162 Difference from Grand Mean	Sample F162 Comparative Performance Value	Instr Code
2NGGVK		35.50	1.47	2.17	46.20	1.10	1.42	GL
2Q8P2E		33.58	-0.46	-0.68	44.35	-0.75	-0.97	GL
2U74LJ		34.08	0.04	0.06	44.58	-0.52	-0.68	GK
3X6EHJ		33.20	-0.83	-1.23	43.73	-1.37	-1.77	GK
4P7CTD		32.75	-1.28	-1.90	43.75	-1.35	-1.74	PC
4T6QEG		35.13	1.09	1.62	45.43	0.33	0.42	GK
673EMM		33.95	-0.08	-0.12	44.53	-0.57	-0.74	MH
69RMTG		33.15	-0.88	-1.31	44.30	-0.80	-1.03	RA
6WZWCJ		33.90	-0.13	-0.20	45.18	0.08	0.10	GL
74F3JB		32.70	-1.33	-1.98	44.05	-1.05	-1.35	XX
7C9B8M		34.28	0.24	0.36	45.90	0.80	1.03	GK
7GJFK9		34.75	0.72	1.06	45.93	0.83	1.07	GK
7HGQFB		33.85	-0.18	-0.27	45.98	0.88	1.13	XX
7HWU9G		35.45	1.42	2.10	46.45	1.35	1.74	GL
7M9XYJ		33.95	-0.08	-0.12	44.85	-0.25	-0.32	GL
8BWVDL	*	35.80	1.77	2.62	46.88	1.78	2.29	GK
8CRDEM		33.50	-0.53	-0.79	44.68	-0.42	-0.55	XX
99M6MH		34.00	-0.03	-0.05	45.10	0.00	0.00	GL
9X3XL8		33.70	-0.33	-0.49	45.35	0.25	0.32	GL
A2X4KA		33.43	-0.61	-0.90	45.00	-0.10	-0.13	GK
AACTK4		34.23	0.19	0.28	45.45	0.35	0.45	GN
ABJ9RA		34.35	0.32	0.47	45.80	0.70	0.90	GL
AD9GX6	X	37.60	3.57	5.29	49.20	4.10	5.29	GL
ALQ26B		34.25	0.22	0.32	45.20	0.10	0.13	GN
CKLCQ4		33.08	-0.96	-1.42	43.85	-1.25	-1.61	GL
D9AFA8		34.23	0.19	0.28	45.25	0.15	0.20	GK
E7YL67		34.53	0.49	0.73	46.08	0.98	1.26	GN
ETRW76		34.75	0.72	1.06	46.00	0.90	1.16	GK
FV8MQ7		33.05	-0.98	-1.46	44.40	-0.70	-0.90	GQ
FVPWJ8		34.59	0.55	0.82	45.40	0.30	0.39	GL

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WebCode	Data Flag	Sample F161 Lab Mean	Sample F161 Difference from Grand Mean	Sample F161 Comparative Performance Value	Sample F162 Lab Mean	Sample F162 Difference from Grand Mean	Sample F162 Comparative Performance Value	Instr Code
GK6PJW		33.65	-0.38	-0.57	45.05	-0.05	-0.06	GX
GQCFL3		34.65	0.62	0.91	46.18	1.08	1.39	GN
GXG3N4		34.13	0.09	0.14	45.43	0.33	0.42	GL
GXVEH3		32.75	-1.28	-1.90	43.90	-1.20	-1.55	GL
HHGPKT		34.33	0.29	0.43	45.70	0.60	0.78	GL
HPZVGY		33.35	-0.68	-1.01	44.48	-0.62	-0.80	GL
J7Z6XB		34.28	0.24	0.36	45.00	-0.10	-0.13	RA
JAWUDW	*	33.90	-0.13	-0.20	46.20	1.10	1.42	HA
JPU2BY		33.90	-0.13	-0.20	45.15	0.05	0.07	GL
JPVYLU		34.18	0.14	0.21	46.10	1.00	1.29	GX
KFJYPX		33.38	-0.66	-0.98	44.40	-0.70	-0.90	GL
KXYD22	*	33.28	-0.76	-1.12	43.20	-1.90	-2.45	GB
LYTHUZ	X	36.53	2.49	3.69	47.70	2.60	3.35	MW
M44NCR		33.53	-0.51	-0.75	44.50	-0.60	-0.77	MW
MHYD2W		34.83	0.79	1.17	46.03	0.93	1.19	GL
N33B6P		33.80	-0.23	-0.35	44.98	-0.12	-0.16	GL
NRMNT4	X	36.13	2.09	3.10	47.93	2.83	3.64	GL
NWVR2Q		35.28	1.24	1.84	46.03	0.93	1.19	MW
NZXPE4		34.18	0.14	0.21	45.45	0.35	0.45	GL
PEX29U		33.88	-0.16	-0.23	44.85	-0.25	-0.32	GB
PFTKBV		34.40	0.37	0.54	45.10	0.00	0.00	GL
PLWDJ6		34.20	0.17	0.25	45.93	0.83	1.07	GK
PQ7Q24		34.35	0.32	0.47	44.55	-0.55	-0.71	GB
Q6JLPY		34.98	0.94	1.40	45.43	0.33	0.42	GK
QK3XTU		33.65	-0.38	-0.57	44.55	-0.55	-0.71	GL
RCWT8N		33.70	-0.33	-0.49	44.80	-0.30	-0.39	GL
RCWWHQ		34.38	0.34	0.51	45.48	0.38	0.49	MW
RJULYU		33.95	-0.08	-0.12	45.15	0.05	0.07	GL
RRA29R		34.60	0.57	0.84	45.63	0.53	0.68	RA
TXVKMR	*	32.60	-1.43	-2.12	42.80	-2.30	-2.96	GK

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Interlaboratory Testing Program for Color & Appearance

Analysis 440

60 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample F161 Lab Mean	Sample F161 Difference from Grand Mean	Sample F161 Comparative Performance Value	Sample F162 Lab Mean	Sample F162 Difference from Grand Mean	Sample F162 Comparative Performance Value	Instr Code
U4E4JY		34.88	0.84	1.25	45.38	0.28	0.36	GB
UNPVNM		33.30	-0.73	-1.09	44.30	-0.80	-1.03	GL
UNY6BR		34.18	0.14	0.21	44.98	-0.12	-0.16	GN
UPZVLG		35.13	1.09	1.62	46.08	0.98	1.26	GN
V8WKEP		33.80	-0.23	-0.35	45.33	0.23	0.29	GN
WXZ63Q		34.33	0.29	0.43	45.23	0.13	0.16	XX
X3FYJN		34.18	0.14	0.21	44.58	-0.52	-0.68	GL
X887XP		33.58	-0.46	-0.68	44.93	-0.17	-0.22	GA
XBNQLQ		34.58	0.54	0.80	45.48	0.38	0.49	GL
XDWUHM		34.33	0.29	0.43	45.35	0.25	0.32	GL
XE9HXT		33.93	-0.11	-0.16	45.55	0.45	0.58	GL
XFXR3N		33.15	-0.88	-1.31	44.18	-0.92	-1.19	GL
XK86KM		33.63	-0.41	-0.60	43.93	-1.17	-1.51	GK
XQH9LM		34.28	0.24	0.36	45.08	-0.02	-0.03	GK
YRLDLN		33.43	-0.61	-0.90	45.15	0.05	0.07	GL
Z686QP		34.35	0.32	0.47	45.35	0.25	0.32	GL
ZZCBTN		33.75	-0.28	-0.42	44.88	-0.22	-0.29	GK

Summary Statistics

	Sample F161	Sample F162
Grand Means	34.03 Gloss Units	45.10 Gloss Units
Stnd Dev Btwn Labs	0.67 Gloss Units	0.78 Gloss Units

Statistics based on 74 of 77 reporting participants

Comments on Assigned Data Flags for Test #440

AD9GX6(X) - Data for both samples are high.

LYTHUZ(X) - Data for both samples are high. Possible Systematic Error.

NRMNT4(X) - Data for both samples are high. Possible Systematic Error.

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Key to Instrument Codes Reported by Participants

GA	BYK Gardner Color - Guide Gloss	GB	BYK Gardner Spectro - Guide Sphere Gloss
GK	BYK-Gardner micro-gloss (60)	GL	BYK-Gardner micro-TRI-gloss
GN	BYK-Gardner new micro-TRI-gloss	GQ	BYK-Gardner haze-gloss
GX	BYK-Gardner (model not specified)	HA	Horiba 60 Degree Glossmeter
MH	X-Rite/Macbeth Color-Eye XTH	MW	Minolta Multi-Gloss 268
PC	Picogloss 503 Erichson	RA	Rhopoint Novo-Gloss Glossmeter
XX	Instrument make/model not specified by lab		

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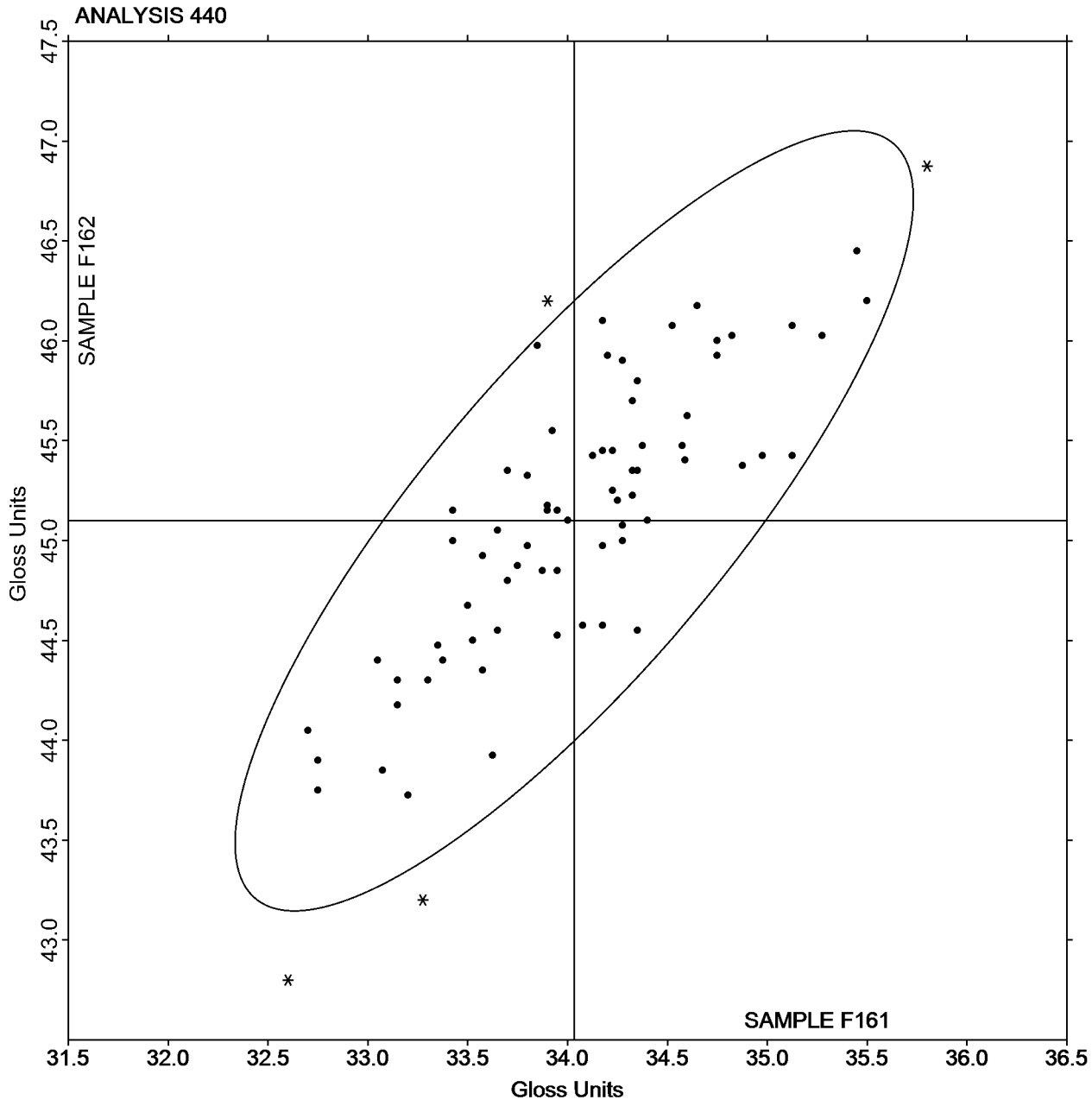
SAMPLE F161 = 34.03 Gloss Units SAMPLE F162 = 45.10 Gloss Units



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Interlaboratory Testing Program for Color & Appearance

Report #176
2nd Qtr 2016

Analysis 442

85 Degree Gloss - Paint Chips

ASTM Method D 523

WebCode	Data Flag	Sample K161 Lab Mean	Sample K161 Difference from Grand Mean	Sample K161 Comparative Performance Value	Sample K162 Lab Mean	Sample K162 Difference from Grand Mean	Sample K162 Comparative Performance Value	Instr Code
2Q8P2E		13.03	0.24	0.34	16.63	0.17	0.18	GL
99M6MH		13.08	0.29	0.41	17.48	1.02	1.08	RA
AACTK4		13.28	0.49	0.69	17.13	0.67	0.71	GN
CKLCQ4		12.68	-0.11	-0.15	16.40	-0.05	-0.06	GL
GXVEH3		11.45	-1.33	-1.85	14.95	-1.50	-1.59	GL
HPZVGY		12.70	-0.08	-0.11	16.45	0.00	0.00	GL
QK3XTU		12.85	0.07	0.10	16.63	0.17	0.18	GL
RCWT8N		12.03	-0.76	-1.05	14.95	-1.50	-1.59	GN
UPZVLG		13.95	1.17	1.63	17.48	1.02	1.08	GN

Summary Statistics

	Sample K161	Sample K162
Grand Means	12.78 Gloss Units	16.45 Gloss Units
Stnd Dev Btwn Labs	0.72 Gloss Units	0.94 Gloss Units

Statistics based on 9 of 9 reporting participants

Key to Instrument Codes Reported by Participants

GL	BYK-Gardner micro-TRI-gloss	GN	BYK-Gardner new micro-TRI-gloss
RA	Rhopoint		

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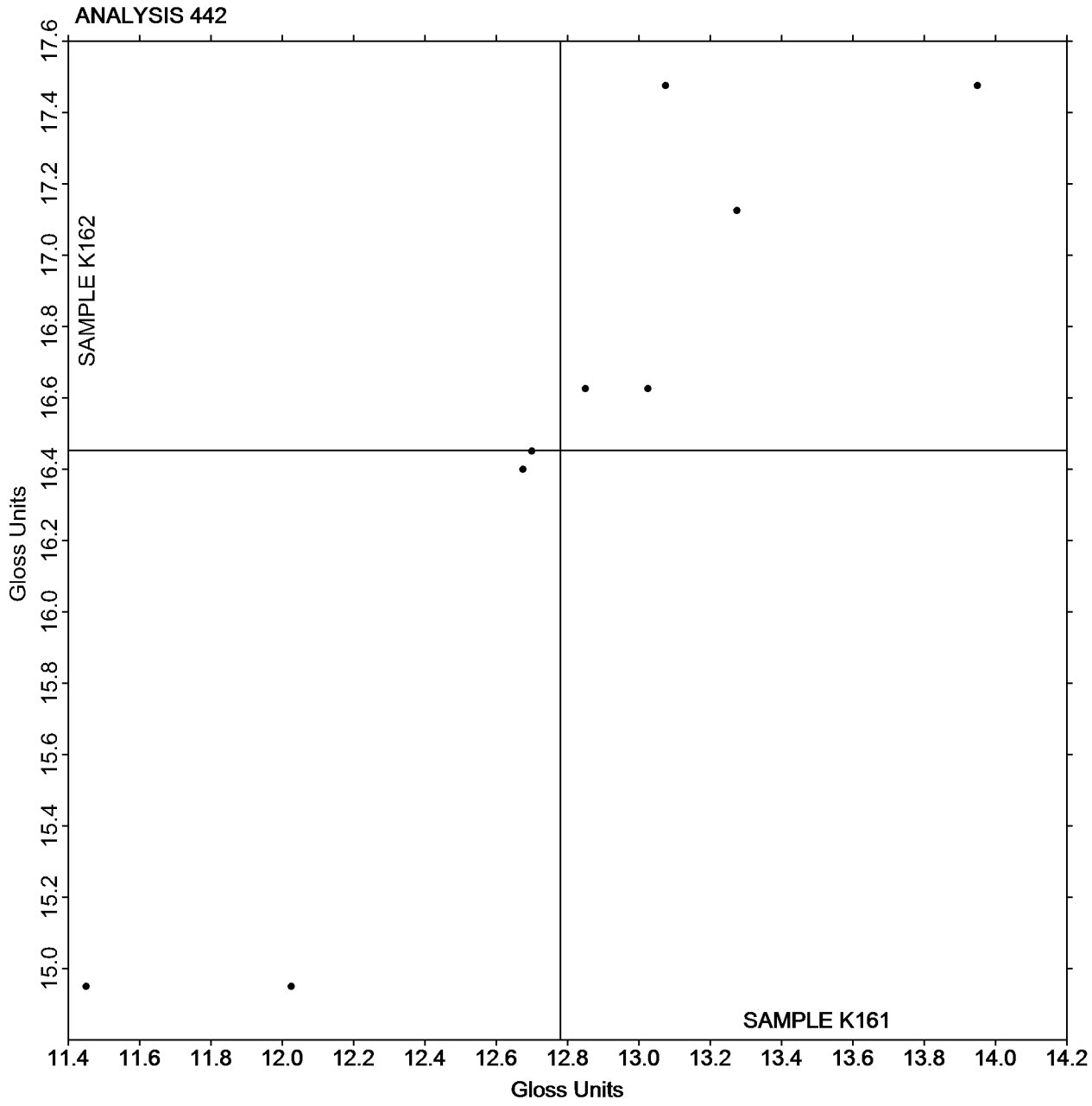
SAMPLE K161 = 12.78 Gloss Units SAMPLE K162 = 16.45 Gloss Units



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