



Color & Appearance Testing Program

Summary Report #182 - 4th Qtr 2017

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| <u>Analysis</u> | <u>Analysis Name</u> |
|------------------------|-----------------------------|
|------------------------|-----------------------------|

| | |
|---------------------|-------------------------------------------------------------------|
| 408 | Color & Color Difference (Paint Chips) - 45-0 |
|---------------------|-------------------------------------------------------------------|

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|---------------------|-------------------------------------------------------------------|
| 409 | Color & Color Difference (Paint Chips) Sphere |
|---------------------|-------------------------------------------------------------------|

| | |
|---------------------|-----------------------------------------------------------|
| 411 | Spectrophotometric (Paint Chips) - Sphere |
|---------------------|-----------------------------------------------------------|

| | |
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| 440 | Gloss 60 Degree (Paint Chips) |
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| 442 | Gloss 85 Degree (Paint Chips) |
|---------------------|-----------------------------------------------|

About The Color & Appearance Program

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

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

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

ABOUT CTS

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

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Key for Color Program Web Summary Report

| | |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WebCode | Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Color Report published on the CTS web site. The Web Code for each analysis can be found in the Performance Analysis Report emailed to each participant. |
| Lab Mean | The average of the 2 test results obtained by the participant for CIE L*,a*,b* color space values. |
| Grand Mean | The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN. |
| Between-Lab Standard Deviation | An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa). |
| Comparative Performance Value | An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa). The critical value for each CPV will vary depending on the number of labs participating in a test. |
| Graphs | For each laboratory, the LAB MEAN for the first sample is plotted against the LAB MEAN for the second sample with each point representing a laboratory. The horizontal and vertical axes are the GRAND MEANS for each sample. For each test there are three plots: L* ₂ vs L* ₁ , a* ₂ vs a* ₁ and b* ₂ vs b* ₁ . The a* and b* plots are created using absolute values. |
| Inst Code | A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section). |
| Data Flag | DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol: |

| <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. |

Key for Spectrophotometric Web Summary Report

| | |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WebCode | Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Color Report published on the CTS web site. The Web Code for each analysis can be found in the Performance Analysis Report emailed to each participant. |
| Grand Mean | The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN. |
| Between-Lab Standard Deviation | An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa). |
| Inst Code | A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section). |
| Data Flag | DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol: |

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

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

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

Key for Gloss Web Summary Report

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

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

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

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

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

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

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

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

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

| <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. 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. |



CTS Interlaboratory Testing Program for Color & Appearance

Report #182

Analysis 408

4th Qtr 2017

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^* | |
| 2PJD2Y | | D171 | 61.11 | -19.12 | 8.31 | 1.05 | 0.10 | -0.29 | 1.09 | HW |
| | | D172 | 62.16 | -19.03 | 8.03 | | | | | |
| 38Z4D4 | | D171 | 61.36 | -19.25 | 8.44 | 1.20 | 0.16 | -0.32 | 1.25 | MU |
| | | D172 | 62.56 | -19.10 | 8.13 | | | | | |
| 3WDXK7 | | D171 | 61.41 | -19.19 | 8.78 | 1.10 | 0.13 | -0.20 | 1.12 | XD |
| | | D172 | 62.51 | -19.06 | 8.58 | | | | | |
| 4JKVH4 | | D171 | 61.21 | -19.31 | 8.83 | 1.08 | 0.13 | -0.24 | 1.11 | XU |
| | | D172 | 62.29 | -19.18 | 8.60 | | | | | |
| 4VYXYV | | D171 | 61.24 | -19.19 | 8.67 | 1.15 | 0.08 | -0.31 | 1.19 | XN |
| | | D172 | 62.39 | -19.12 | 8.37 | | | | | |
| 4W9ZMF | | D171 | 61.31 | -19.39 | 8.80 | 1.08 | 0.13 | -0.25 | 1.12 | XM |
| | | D172 | 62.39 | -19.27 | 8.55 | | | | | |
| 4YHZXN | | D171 | 61.20 | -19.09 | 8.54 | 1.07 | 0.13 | -0.28 | 1.11 | XK |
| | | D172 | 62.27 | -18.96 | 8.26 | | | | | |
| 4ZAVMH | | D171 | 61.70 | -19.07 | 7.86 | 1.01 | 0.07 | -0.22 | 1.03 | XE |
| | | D172 | 62.70 | -19.00 | 7.64 | | | | | |
| 83T67U | | D171 | 61.46 | -19.27 | 9.25 | 0.96 | 0.06 | -0.25 | 0.99 | GB |
| | | D172 | 62.41 | -19.21 | 9.01 | | | | | |
| 9KZVFA | | D171 | 61.24 | -19.44 | 8.27 | 1.04 | 0.09 | -0.28 | 1.08 | HW |
| | | D172 | 62.28 | -19.35 | 7.99 | | | | | |
| A23XQM | | D171 | 61.52 | -19.59 | 8.43 | 1.05 | 0.14 | -0.32 | 1.10 | HW |
| | | D172 | 62.57 | -19.45 | 8.11 | | | | | |
| A3FKBL | | D171 | 61.27 | -19.26 | 8.93 | 1.04 | 0.13 | -0.23 | 1.07 | XZ |
| | | D172 | 62.31 | -19.13 | 8.71 | | | | | |
| AERWJA | | D171 | 61.50 | -19.48 | 8.69 | 1.01 | 0.12 | -0.29 | 1.05 | XZ |
| | | D172 | 62.51 | -19.36 | 8.40 | | | | | |
| AQ7RYA | | D171 | 61.15 | -19.43 | 8.49 | 1.14 | 0.14 | -0.32 | 1.19 | HW |
| | | D172 | 62.29 | -19.29 | 8.17 | | | | | |
| AQLBGL | | D171 | 60.66 | -19.28 | 8.78 | 0.96 | 0.08 | -0.26 | 0.99 | HY |
| | | D172 | 61.61 | -19.20 | 8.52 | | | | | |
| DBG44T | X | D171 | 61.27 | -19.63 | 9.04 | 1.06 | -0.03 | -0.12 | 1.07 | FA |
| | | D172 | 62.33 | -19.66 | 8.93 | | | | | |



CTS Interlaboratory Testing Program for Color & Appearance

Report #182

Analysis 408

4th Qtr 2017

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^* | |
| EXBCVT | | D171 | 61.41 | -19.52 | 8.62 | 1.02 | 0.13 | -0.26 | 1.06 | XZ |
| | | D172 | 62.43 | -19.39 | 8.36 | | | | | |
| FNYBDY | | D171 | 61.35 | -19.42 | 8.51 | 1.08 | 0.12 | -0.18 | 1.10 | XO |
| | | D172 | 62.43 | -19.30 | 8.33 | | | | | |
| FXPY8F | | D171 | 60.81 | -19.51 | 8.13 | 1.16 | 0.17 | -0.25 | 1.20 | MG |
| | | D172 | 61.97 | -19.35 | 7.88 | | | | | |
| H6G36A | | D171 | 61.38 | -19.42 | 9.11 | 1.16 | 0.17 | -0.38 | 1.23 | GH |
| | | D172 | 62.53 | -19.25 | 8.74 | | | | | |
| HNVPEN | | D171 | 60.79 | -19.37 | 9.02 | 1.08 | 0.03 | -0.53 | 1.20 | TO |
| | | D172 | 61.87 | -19.34 | 8.49 | | | | | |
| JTGUYC | | D171 | 61.23 | -19.28 | 8.61 | 1.31 | 0.10 | -0.28 | 1.34 | XO |
| | | D172 | 62.54 | -19.18 | 8.34 | | | | | |
| JZN9TU | | D171 | 61.54 | -19.59 | 8.56 | 1.06 | 0.13 | -0.22 | 1.09 | XB |
| | | D172 | 62.59 | -19.47 | 8.34 | | | | | |
| K7NCWX | X | D171 | 98.20 | 1.17 | -16.23 | 0.06 | -0.17 | 0.26 | 0.31 | HW |
| | | D172 | 98.26 | 1.00 | -15.97 | | | | | |
| LRE79C | | D171 | 61.31 | -19.45 | 8.22 | 1.11 | 0.12 | -0.30 | 1.15 | HW |
| | | D172 | 62.41 | -19.33 | 7.93 | | | | | |
| NNTQ7M | | D171 | 61.28 | -19.59 | 9.30 | 1.26 | 0.20 | -0.30 | 1.31 | GE |
| | | D172 | 62.54 | -19.39 | 9.00 | | | | | |
| PPMWZM | | D171 | 61.41 | -19.28 | 8.90 | 0.98 | 0.10 | -0.26 | 1.02 | GE |
| | | D172 | 62.39 | -19.18 | 8.64 | | | | | |
| PURV9Q | | D171 | 61.11 | -19.44 | 8.16 | 1.14 | 0.17 | -0.24 | 1.17 | HW |
| | | D172 | 62.24 | -19.27 | 7.92 | | | | | |
| R98HT9 | | D171 | 61.21 | -19.39 | 8.98 | 1.13 | 0.13 | -0.35 | 1.18 | XU |
| | | D172 | 62.33 | -19.26 | 8.63 | | | | | |
| REW4F2 | | D171 | 60.83 | -19.38 | 8.77 | 0.94 | 0.06 | -0.21 | 0.97 | HY |
| | | D172 | 61.77 | -19.32 | 8.56 | | | | | |
| RG4CQ8 | | D171 | 61.15 | -19.38 | 8.88 | 1.03 | 0.09 | -0.46 | 1.13 | XU |
| | | D172 | 62.17 | -19.29 | 8.42 | | | | | |
| RPTAAZ | | D171 | 61.10 | -19.02 | 8.23 | 1.07 | 0.13 | -0.28 | 1.11 | HK |
| | | D172 | 62.17 | -18.89 | 7.96 | | | | | |



CTS Interlaboratory Testing Program for Color & Appearance

**Report #182
4th Qtr 2017**

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^* | |
| RX4LA4 | | D171 | 61.59 | -19.34 | 8.83 | 1.06 | 0.12 | -0.19 | 1.08 | GH |
| | | D172 | 62.64 | -19.22 | 8.64 | | | | | |
| T29CGJ | X | D171 | 60.99 | 61.70 | 60.18 | 1.03 | 1.03 | 1.03 | 1.78 | MA |
| | | D172 | 62.02 | 62.72 | 61.21 | | | | | |
| TB8CJP | | D171 | 62.06 | -19.37 | 7.95 | 1.10 | 0.19 | -0.36 | 1.17 | NH |
| | | D172 | 63.15 | -19.19 | 7.59 | | | | | |
| WHWUWN | | D171 | 61.22 | -19.62 | 8.09 | 1.09 | 0.20 | -0.20 | 1.12 | HW |
| | | D172 | 62.30 | -19.42 | 7.89 | | | | | |
| XKGC4Y | | D171 | 61.49 | -19.60 | 8.29 | 1.03 | 0.08 | -0.28 | 1.07 | HW |
| | | D172 | 62.52 | -19.52 | 8.01 | | | | | |
| Y92VXE | | D171 | 61.04 | -19.47 | 8.85 | 1.06 | 0.17 | -0.22 | 1.09 | XR |
| | | D172 | 62.10 | -19.30 | 8.63 | | | | | |
| YKWWNW | | D171 | 61.44 | -19.45 | 8.26 | 0.94 | 0.10 | -0.24 | 0.97 | HW |
| | | D172 | 62.38 | -19.35 | 8.03 | | | | | |
| YQH28P | | D171 | 60.97 | -19.38 | 8.95 | 0.87 | 0.11 | -0.27 | 0.91 | XU |
| | | D172 | 61.83 | -19.27 | 8.68 | | | | | |
| YUZ7VM | | D171 | 61.19 | -19.50 | 8.79 | 0.97 | 0.08 | -0.20 | 0.99 | MU |
| | | D172 | 62.16 | -19.42 | 8.60 | | | | | |

| Summary Statistics | | | | | | | | |
|--------------------------|-------|--------|------|--------------|--------------|--------------|--------------|--|
| Samples | L* | a* | b* | ΔL^* | Δa^* | Δb^* | ΔE^* | |
| Grand Means | | | | | | | | |
| D171 | 61.26 | -19.37 | 8.61 | 1.07 | 0.12 | -0.27 | 1.11 | |
| D172 | 62.32 | -19.25 | 8.34 | | | | | |
| Std Dev Btwn Labs | | | | | | | | |
| D171 | 0.26 | 0.15 | 0.36 | 0.09 | 0.04 | 0.07 | 0.09 | |
| D172 | 0.28 | 0.14 | 0.36 | | | | | |

Statistics based on 38 of 41 reporting participants

Comments Assigned on Data Flags for Test #408

DBG44T(X) - Low "a*" value for Sample D172.

K7NCWX(X) - Extreme Data. May have measured back of the samples.

T29CGJ(X) - Extreme "a*" and "b*" data.



Key to Instrument Codes Reported by Participants

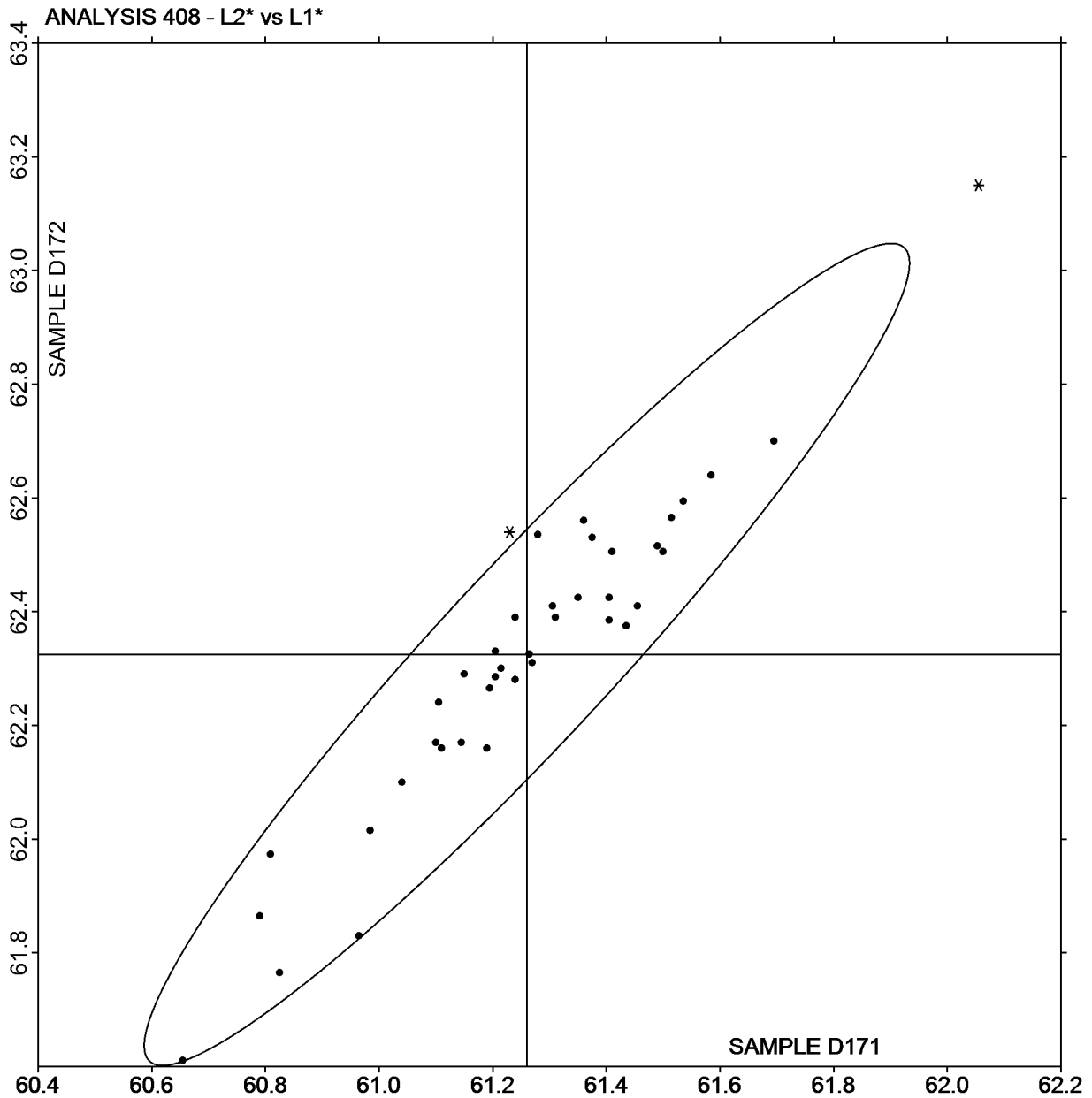
| | | | |
|-----------|----------------------------------------------|-----------|--------------------------------------------|
| FA | BYK Mac | GB | BYK-Gardner spectro-guide sphere gloss |
| GE | BYK-Gardner spectro-guide (45/0) | GH | BYK-Gardner Color-View |
| HK | Hunter MiniScan XE (45/0) | HW | Hunter LabScan XE |
| HY | Hunter Color Flex 45/0 | MA | Macbeth |
| MG | Macbeth 1500/PLUS or 2025+ Color Eye | MU | Minolta |
| NH | 3nh Precision Colorimeter | TO | Topcon SR-3 Spectroradiometer |
| XB | X-Rite i1Basic Pro 2 | XD | X-Rite 500 Series SpectroDensitometer |
| XE | X-Rite eXact Portable Spectrophotometer | 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 |



L2* vs L1*

SAMPLE D171 = 61.26

SAMPLE D172 = 62.32

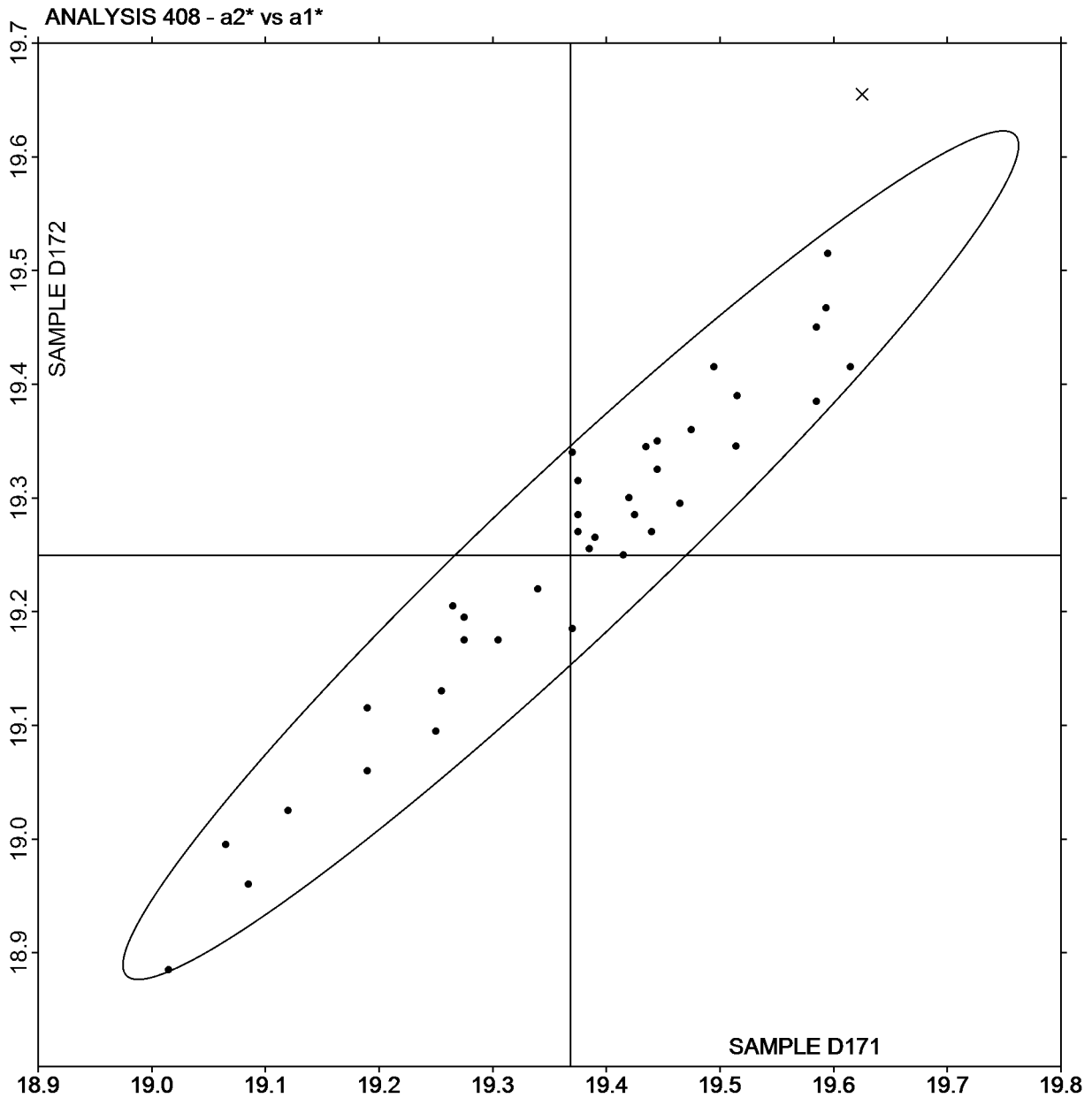




a2* vs a1*

SAMPLE D171 = -19.37

SAMPLE D172 = -19.25



Plot created using absolute values.

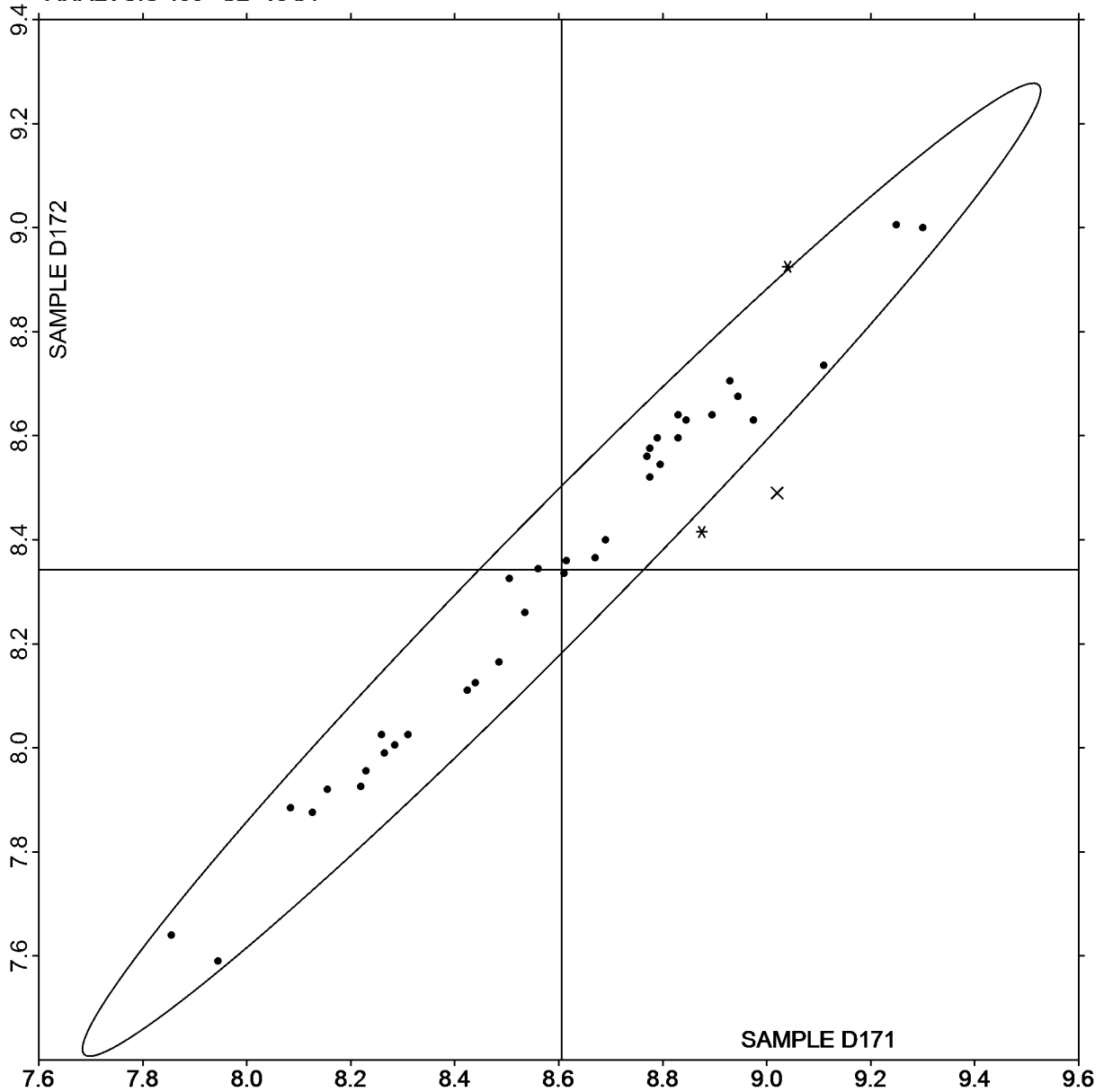


b2* vs b1*

SAMPLE D171 = 8.61

SAMPLE D172 = 8.34

ANALYSIS 408 - b2* vs b1*





CTS Interlaboratory Testing Program for Color & Appearance

Report #182

Analysis 409

4th Qtr 2017

**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^* | |
| 2GLP2M | | D171 | 61.71 | -19.14 | 8.49 | 0.95 | 0.12 | -0.27 | 0.99 | AQ |
| | | D172 | 62.66 | -19.02 | 8.23 | | | | | |
| 3G2CBN | | D171 | 61.46 | -19.17 | 8.36 | 1.08 | 0.10 | -0.26 | 1.11 | SH |
| | | D172 | 62.54 | -19.07 | 8.11 | | | | | |
| 3PX79M | | D171 | 61.43 | -19.41 | 8.64 | 1.04 | 0.12 | -0.28 | 1.09 | CA |
| | | D172 | 62.47 | -19.29 | 8.36 | | | | | |
| 3TGEJ8 | | D171 | 61.40 | -19.30 | 8.50 | 1.27 | 0.20 | -0.30 | 1.32 | MV |
| | | D172 | 62.67 | -19.11 | 8.20 | | | | | |
| 3V43TM | | D171 | 61.14 | -18.95 | 8.54 | 0.97 | 0.08 | -0.25 | 1.00 | XH |
| | | D172 | 62.11 | -18.87 | 8.29 | | | | | |
| 44WVNHK | | D171 | 61.65 | -19.46 | 8.46 | 1.01 | 0.10 | -0.26 | 1.04 | XB |
| | | D172 | 62.65 | -19.36 | 8.20 | | | | | |
| 4EFZX4 | | D171 | 61.64 | -19.29 | 8.48 | 1.00 | 0.16 | -0.21 | 1.03 | AS |
| | | D172 | 62.64 | -19.14 | 8.27 | | | | | |
| 4JKVH4 | | D171 | 61.18 | -19.09 | 8.29 | 1.06 | 0.12 | -0.17 | 1.08 | MM |
| | | D172 | 62.24 | -18.98 | 8.12 | | | | | |
| 4VYXYV | X | D171 | 60.54 | -19.04 | 7.98 | 1.01 | -0.12 | -0.28 | 1.05 | XO |
| | | D172 | 61.55 | -19.16 | 7.70 | | | | | |
| 4X7BJH | | D171 | 61.29 | -19.18 | 8.20 | 1.00 | 0.12 | -0.20 | 1.02 | XI |
| | | D172 | 62.28 | -19.06 | 8.01 | | | | | |
| 4YHZXN | | D171 | 61.69 | -19.28 | 8.34 | 1.09 | 0.13 | -0.30 | 1.13 | AO |
| | | D172 | 62.77 | -19.16 | 8.04 | | | | | |
| 662HTB | X | D171 | 60.57 | -19.31 | 8.02 | 1.04 | 0.14 | -0.24 | 1.07 | XM |
| | | D172 | 61.60 | -19.17 | 7.78 | | | | | |
| 66JLAN | X | D171 | 0.01 | 0.01 | -0.01 | 0.00 | 0.01 | -0.02 | 0.02 | AQ |
| | | D172 | 0.01 | 0.01 | -0.03 | | | | | |
| 6ATPCJ | | D171 | 61.65 | -19.03 | 8.46 | 0.98 | 0.10 | -0.25 | 1.01 | AJ |
| | | D172 | 62.63 | -18.93 | 8.21 | | | | | |
| 6EQ2FW | | D171 | 61.71 | -19.13 | 8.48 | 0.89 | 0.11 | -0.20 | 0.92 | AS |
| | | D172 | 62.60 | -19.02 | 8.28 | | | | | |
| 6FXNMA | | D171 | 61.66 | -19.18 | 8.53 | 0.99 | 0.11 | -0.26 | 1.03 | MT |
| | | D172 | 62.65 | -19.08 | 8.27 | | | | | |



CTS Interlaboratory Testing Program for Color & Appearance

Report #182

Analysis 409

4th Qtr 2017

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^* | |
| 6L4C73 | | D171 | 61.50 | -19.09 | 8.47 | 1.01 | 0.09 | -0.22 | 1.04 | AJ |
| | | D172 | 62.51 | -19.00 | 8.25 | | | | | |
| 6ML2WA | | D171 | 61.32 | -19.25 | 8.33 | 1.08 | 0.15 | -0.23 | 1.11 | XI |
| | | D172 | 62.40 | -19.11 | 8.10 | | | | | |
| 6PTG72 | | D171 | 61.74 | -19.39 | 8.42 | 1.07 | 0.13 | -0.18 | 1.09 | CA |
| | | D172 | 62.81 | -19.27 | 8.24 | | | | | |
| 6U23UY | | D171 | 61.54 | -19.18 | 8.42 | 1.14 | 0.17 | -0.20 | 1.16 | AS |
| | | D172 | 62.67 | -19.01 | 8.22 | | | | | |
| 72EF8N | | D171 | 61.33 | -19.21 | 8.35 | 1.07 | 0.15 | -0.19 | 1.10 | AS |
| | | D172 | 62.40 | -19.06 | 8.16 | | | | | |
| 7W8MGY | | D171 | 61.35 | -18.94 | 8.41 | 1.17 | 0.20 | -0.26 | 1.21 | MM |
| | | D172 | 62.52 | -18.73 | 8.15 | | | | | |
| 7Y7ALM | X | D171 | 63.49 | -19.54 | 7.77 | 1.06 | 0.11 | -0.30 | 1.11 | MM |
| | | D172 | 64.55 | -19.43 | 7.47 | | | | | |
| 84NMAG | | D171 | 61.85 | -19.06 | 8.32 | 0.95 | 0.08 | -0.17 | 0.96 | AO |
| | | D172 | 62.80 | -18.98 | 8.16 | | | | | |
| 8D9U6Y | X | D171 | 61.62 | -19.06 | 8.37 | 0.41 | 3.78 | -0.54 | 3.84 | AJ |
| | | D172 | 62.03 | -15.29 | 7.83 | | | | | |
| 8EGDKM | | D171 | 61.33 | -19.30 | 8.37 | 1.00 | 0.09 | -0.28 | 1.04 | XI |
| | | D172 | 62.33 | -19.21 | 8.10 | | | | | |
| 8HEWMK | | D171 | 61.50 | -19.20 | 8.37 | 1.13 | 0.15 | -0.33 | 1.18 | AQ |
| | | D172 | 62.62 | -19.05 | 8.05 | | | | | |
| 8RN2YB | X | D171 | 8.30 | 6.53 | 7.58 | -0.30 | 0.09 | 0.19 | 0.36 | MM |
| | | D172 | 8.00 | 6.61 | 7.77 | | | | | |
| 96CEX7 | | D171 | 61.62 | -19.00 | 8.23 | 1.04 | 0.19 | -0.24 | 1.08 | HF |
| | | D172 | 62.66 | -18.82 | 7.99 | | | | | |
| 9C6XQL | | D171 | 61.63 | -19.12 | 8.42 | 1.05 | 0.10 | -0.26 | 1.08 | AS |
| | | D172 | 62.68 | -19.02 | 8.17 | | | | | |
| 9LDHZA | | D171 | 61.73 | -19.31 | 8.30 | 1.01 | 0.17 | -0.20 | 1.04 | AO |
| | | D172 | 62.74 | -19.14 | 8.10 | | | | | |
| 9LEBVV | | D171 | 61.55 | -19.22 | 8.22 | 1.01 | 0.16 | -0.15 | 1.03 | AM |
| | | D172 | 62.56 | -19.07 | 8.07 | | | | | |



CTS Interlaboratory Testing Program for Color & Appearance

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Analysis 409

4th Qtr 2017

**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^* | |
| 9XPU7C | | D171 | 61.57 | -19.26 | 8.48 | 1.16 | 0.14 | -0.30 | 1.21 | AJ |
| | | D172 | 62.73 | -19.12 | 8.18 | | | | | |
| AC73RF | | D171 | 61.56 | -19.21 | 8.36 | 1.10 | 0.13 | -0.33 | 1.15 | AE |
| | | D172 | 62.66 | -19.08 | 8.04 | | | | | |
| AQLBGL | X | D171 | 59.17 | -21.44 | 9.80 | 1.07 | 0.20 | -0.32 | 1.13 | HP |
| | | D172 | 60.24 | -21.24 | 9.48 | | | | | |
| AWBJBR | | D171 | 61.09 | -19.17 | 8.39 | 1.03 | 0.09 | -0.27 | 1.06 | XH |
| | | D172 | 62.12 | -19.08 | 8.13 | | | | | |
| B47Z3A | | D171 | 61.64 | -19.17 | 8.29 | 1.10 | 0.17 | -0.24 | 1.14 | AO |
| | | D172 | 62.74 | -19.00 | 8.05 | | | | | |
| BKWT4A | | D171 | 61.28 | -19.21 | 8.32 | 1.11 | 0.13 | -0.26 | 1.14 | XI |
| | | D172 | 62.39 | -19.08 | 8.06 | | | | | |
| BULLDL | X | D171 | 61.95 | -19.12 | 9.23 | 1.54 | 0.09 | -0.25 | 1.56 | XZ |
| | | D172 | 63.49 | -19.04 | 8.99 | | | | | |
| C9GELT | | D171 | 61.11 | -19.21 | 8.39 | 0.97 | 0.09 | -0.16 | 0.99 | MI |
| | | D172 | 62.08 | -19.12 | 8.23 | | | | | |
| CAUUTF | | D171 | 61.58 | -19.17 | 8.46 | 1.18 | 0.14 | -0.36 | 1.24 | XX |
| | | D172 | 62.75 | -19.04 | 8.10 | | | | | |
| CN9BL4 | | D171 | 61.53 | -19.19 | 8.43 | 1.12 | 0.18 | -0.27 | 1.17 | AM |
| | | D172 | 62.65 | -19.01 | 8.16 | | | | | |
| CNPQWM | | D171 | 61.36 | -19.05 | 8.53 | 1.07 | 0.13 | -0.29 | 1.12 | MM |
| | | D172 | 62.43 | -18.92 | 8.24 | | | | | |
| D9W2B2 | | D171 | 61.47 | -19.60 | 7.99 | 1.09 | 0.13 | -0.31 | 1.14 | XM |
| | | D172 | 62.56 | -19.47 | 7.68 | | | | | |
| DBJT9P | | D171 | 61.37 | -19.30 | 8.54 | 1.02 | 0.11 | -0.14 | 1.03 | MU |
| | | D172 | 62.39 | -19.19 | 8.40 | | | | | |
| DLZKRT | | D171 | 61.74 | -19.21 | 8.31 | 0.97 | 0.12 | -0.20 | 1.00 | AO |
| | | D172 | 62.71 | -19.09 | 8.11 | | | | | |
| DQD4DG | | D171 | 61.17 | -19.38 | 8.42 | 0.97 | 0.13 | -0.20 | 0.99 | XH |
| | | D172 | 62.13 | -19.25 | 8.22 | | | | | |
| DUAW2J | | D171 | 61.46 | -19.17 | 8.30 | 0.92 | 0.10 | -0.23 | 0.95 | HP |
| | | D172 | 62.38 | -19.07 | 8.07 | | | | | |



CTS Interlaboratory Testing Program for Color & Appearance

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4th Qtr 2017

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^* | |
| DZFRKJ | | D171 | 61.26 | -19.35 | 8.66 | 0.98 | 0.09 | -0.25 | 1.02 | MV |
| | | D172 | 62.24 | -19.26 | 8.41 | | | | | |
| E2VYU8 | | D171 | 61.75 | -19.48 | 8.42 | 1.07 | 0.17 | -0.19 | 1.09 | AS |
| | | D172 | 62.82 | -19.31 | 8.23 | | | | | |
| E6TRGB | | D171 | 61.65 | -19.15 | 8.37 | 0.89 | 0.06 | -0.23 | 0.91 | XI |
| | | D172 | 62.53 | -19.10 | 8.15 | | | | | |
| E9RY6U | | D171 | 61.72 | -19.22 | 8.28 | 1.13 | 0.14 | -0.30 | 1.17 | AJ |
| | | D172 | 62.84 | -19.09 | 7.98 | | | | | |
| EUMDMJ | | D171 | 61.74 | -19.28 | 8.56 | 1.04 | 0.14 | -0.31 | 1.09 | AS |
| | | D172 | 62.78 | -19.14 | 8.25 | | | | | |
| EZXPY6 | X | D171 | 61.27 | -19.66 | 8.19 | 1.30 | 0.26 | -0.37 | 1.38 | XC |
| | | D172 | 62.57 | -19.40 | 7.82 | | | | | |
| FM7MV3 | | D171 | 61.13 | -19.22 | 8.23 | 1.04 | 0.15 | -0.20 | 1.06 | XM |
| | | D172 | 62.16 | -19.08 | 8.03 | | | | | |
| FNYBDY | | D171 | 61.29 | -19.19 | 8.26 | 1.05 | 0.17 | -0.21 | 1.08 | MI |
| | | D172 | 62.34 | -19.02 | 8.05 | | | | | |
| FVJKG2 | | D171 | 61.60 | -19.30 | 8.29 | 0.96 | 0.09 | -0.25 | 0.99 | AR |
| | | D172 | 62.56 | -19.21 | 8.05 | | | | | |
| GPMDBX | X | D171 | 62.35 | -22.12 | 8.01 | 1.03 | 0.16 | -0.28 | 1.07 | MU |
| | | D172 | 63.37 | -21.97 | 7.74 | | | | | |
| GZKEN3 | | D171 | 61.54 | -19.29 | 8.40 | 1.04 | 0.07 | -0.28 | 1.08 | PE |
| | | D172 | 62.58 | -19.22 | 8.12 | | | | | |
| HHN2Y2 | | D171 | 61.08 | -19.09 | 8.49 | 1.13 | 0.16 | -0.29 | 1.18 | XH |
| | | D172 | 62.21 | -18.93 | 8.21 | | | | | |
| HNVPEN | | D171 | 61.31 | -19.29 | 8.45 | 1.07 | 0.12 | -0.20 | 1.09 | CA |
| | | D172 | 62.38 | -19.17 | 8.26 | | | | | |
| HXZKV9 | | D171 | 61.38 | -19.09 | 8.13 | 0.97 | 0.09 | -0.22 | 1.00 | XI |
| | | D172 | 62.35 | -19.00 | 7.91 | | | | | |
| J4NMEX | | D171 | 61.00 | -19.25 | 7.89 | 1.09 | 0.17 | -0.23 | 1.13 | XM |
| | | D172 | 62.09 | -19.08 | 7.66 | | | | | |
| J9D246 | | D171 | 61.65 | -19.06 | 8.28 | 1.13 | 0.17 | -0.22 | 1.16 | AO |
| | | D172 | 62.78 | -18.89 | 8.06 | | | | | |



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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^* | |
| JHET2X | | D171 | 61.40 | -19.17 | 8.24 | 0.90 | 0.07 | -0.21 | 0.92 | XI |
| | | D172 | 62.29 | -19.11 | 8.03 | | | | | |
| JT4FDN | | D171 | 61.63 | -19.26 | 8.34 | 1.02 | 0.09 | -0.22 | 1.04 | MV |
| | | D172 | 62.65 | -19.17 | 8.13 | | | | | |
| JX9BWN | | D171 | 61.19 | -19.22 | 8.40 | 1.11 | 0.14 | -0.29 | 1.15 | XH |
| | | D172 | 62.29 | -19.08 | 8.12 | | | | | |
| KQBNIYW | | D171 | 61.33 | -19.02 | 8.45 | 1.11 | 0.14 | -0.28 | 1.15 | MM |
| | | D172 | 62.43 | -18.89 | 8.17 | | | | | |
| L2KXNX | | D171 | 61.39 | -19.29 | 8.56 | 1.12 | 0.18 | -0.23 | 1.15 | MV |
| | | D172 | 62.50 | -19.11 | 8.33 | | | | | |
| LU6XQA | | D171 | 61.81 | -19.08 | 8.66 | 1.06 | 0.12 | -0.26 | 1.09 | AJ |
| | | D172 | 62.86 | -18.96 | 8.40 | | | | | |
| LX72HW | | D171 | 61.19 | -19.20 | 8.33 | 1.16 | 0.18 | -0.28 | 1.21 | XI |
| | | D172 | 62.35 | -19.03 | 8.05 | | | | | |
| LZVGNX | | D171 | 61.89 | -19.61 | 8.46 | 0.97 | 0.10 | -0.25 | 1.00 | CA |
| | | D172 | 62.85 | -19.51 | 8.21 | | | | | |
| M4PXCC | | D171 | 61.51 | -19.17 | 8.40 | 0.88 | 0.05 | -0.16 | 0.90 | HP |
| | | D172 | 62.39 | -19.12 | 8.24 | | | | | |
| M9Y4XA | | D171 | 61.45 | -19.30 | 8.49 | 1.18 | 0.18 | -0.26 | 1.22 | AJ |
| | | D172 | 62.63 | -19.12 | 8.24 | | | | | |
| N4MG2K | | D171 | 61.45 | -19.14 | 8.31 | 1.00 | 0.10 | -0.15 | 1.02 | XB |
| | | D172 | 62.45 | -19.04 | 8.17 | | | | | |
| NGCFRM | | D171 | 61.33 | -18.84 | 8.40 | 1.04 | 0.11 | -0.19 | 1.06 | AJ |
| | | D172 | 62.36 | -18.73 | 8.21 | | | | | |
| NQFEF3 | | D171 | 61.42 | -19.09 | 8.64 | 1.03 | 0.13 | -0.29 | 1.07 | AJ |
| | | D172 | 62.45 | -18.97 | 8.35 | | | | | |
| NW66NJ | | D171 | 61.69 | -19.21 | 8.52 | 1.11 | 0.14 | -0.26 | 1.15 | AJ |
| | | D172 | 62.80 | -19.07 | 8.26 | | | | | |
| NXZQEP | X | D171 | 60.36 | -19.92 | 7.59 | 1.02 | 0.27 | -0.09 | 1.06 | XO |
| | | D172 | 61.38 | -19.65 | 7.50 | | | | | |
| NZKPK7 | | D171 | 61.39 | -19.22 | 8.43 | 1.02 | 0.11 | -0.25 | 1.06 | MS |
| | | D172 | 62.41 | -19.11 | 8.18 | | | | | |



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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^* | |
| PA4HA9 | X | D171 | 95.53 | 1.21 | -9.11 | -32.86 | -20.28 | 17.23 | 42.28 | MM |
| | | D172 | 62.67 | -19.07 | 8.13 | | | | | |
| PD3YL3 | | D171 | 61.56 | -19.22 | 8.49 | 1.21 | 0.14 | -0.38 | 1.27 | AJ |
| | D172 | 62.76 | -19.08 | 8.11 | | | | | | |
| PNRHB9 | | D171 | 61.59 | -19.02 | 8.31 | 0.89 | 0.07 | -0.20 | 0.91 | MM |
| | D172 | 62.48 | -18.95 | 8.12 | | | | | | |
| PPMWZM | | D171 | 61.34 | -19.55 | 8.61 | 0.99 | 0.10 | -0.28 | 1.03 | GD |
| | D172 | 62.32 | -19.45 | 8.33 | | | | | | |
| PQVB68 | | D171 | 61.07 | -19.28 | 8.26 | 1.04 | 0.14 | -0.23 | 1.07 | XI |
| | D172 | 62.11 | -19.14 | 8.04 | | | | | | |
| PUATFW | | D171 | 61.39 | -18.78 | 8.32 | 0.98 | 0.10 | -0.27 | 1.01 | AO |
| | D172 | 62.37 | -18.69 | 8.05 | | | | | | |
| PZY97P | | D171 | 61.59 | -19.00 | 7.94 | 0.95 | 0.12 | -0.24 | 0.98 | HH |
| | D172 | 62.54 | -18.88 | 7.70 | | | | | | |
| QBJWMA | | D171 | 61.28 | -19.28 | 8.39 | 1.13 | 0.13 | -0.31 | 1.17 | XH |
| | D172 | 62.40 | -19.16 | 8.09 | | | | | | |
| QPDJQG | | D171 | 61.45 | -19.34 | 8.34 | 1.17 | 0.15 | -0.34 | 1.22 | AM |
| | D172 | 62.61 | -19.19 | 8.00 | | | | | | |
| QQ9Z8K | | D171 | 61.31 | -19.13 | 8.29 | 1.08 | 0.16 | -0.22 | 1.11 | AO |
| | D172 | 62.39 | -18.97 | 8.07 | | | | | | |
| R8WUWF | | D171 | 61.51 | -19.13 | 8.18 | 0.95 | 0.11 | -0.22 | 0.98 | XI |
| | D172 | 62.46 | -19.02 | 7.97 | | | | | | |
| R98HT9 | | D171 | 61.36 | -19.03 | 8.28 | 1.11 | 0.12 | -0.34 | 1.16 | XI |
| | D172 | 62.47 | -18.91 | 7.94 | | | | | | |
| RCN2FN | | D171 | 61.42 | -19.03 | 8.29 | 1.11 | 0.15 | -0.22 | 1.14 | MM |
| | D172 | 62.53 | -18.88 | 8.07 | | | | | | |
| RG4CQ8 | | D171 | 61.41 | -19.18 | 8.38 | 1.02 | 0.12 | -0.31 | 1.07 | XI |
| | D172 | 62.42 | -19.06 | 8.07 | | | | | | |
| RX4LA4 | | D171 | 61.51 | -19.33 | 8.62 | 1.19 | 0.16 | -0.35 | 1.25 | MV |
| | D172 | 62.70 | -19.17 | 8.27 | | | | | | |
| TGZAGT | | D171 | 61.30 | -19.04 | 8.22 | 1.17 | 0.15 | -0.27 | 1.21 | XI |
| | D172 | 62.47 | -18.89 | 7.95 | | | | | | |



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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**

| <u>WebCode</u> | <u>Flag</u> | <u>Samples</u> | <u>CIE L* a* b* Color Values</u> | | | <u>Color Difference Values</u> | | | | <u>InstrCode</u> |
|----------------|-------------|----------------|----------------------------------|-----------|-----------|--------------------------------|------------|------------|------------|------------------|
| | | | <u>L*</u> | <u>a*</u> | <u>b*</u> | <u>ΔL*</u> | <u>Δa*</u> | <u>Δb*</u> | <u>ΔE*</u> | |
| TMNUK9 | | D171 | 61.79 | -19.41 | 8.53 | 0.90 | 0.11 | -0.19 | 0.92 | AJ |
| | | D172 | 62.69 | -19.31 | 8.34 | | | | | |
| TUNAAG | | D171 | 61.29 | -19.19 | 8.32 | 1.02 | 0.11 | -0.18 | 1.04 | XO |
| | | D172 | 62.31 | -19.08 | 8.14 | | | | | |
| TZCYR6 | | D171 | 61.28 | -19.03 | 8.26 | 1.06 | 0.05 | -0.25 | 1.09 | GD |
| | | D172 | 62.33 | -18.98 | 8.01 | | | | | |
| U6YDMP | | D171 | 61.37 | -19.44 | 8.66 | 0.96 | 0.08 | -0.27 | 1.00 | GD |
| | | D172 | 62.32 | -19.37 | 8.39 | | | | | |
| UGC7JC | | D171 | 61.79 | -19.06 | 7.96 | 0.98 | 0.09 | -0.21 | 1.00 | HH |
| | | D172 | 62.77 | -18.97 | 7.76 | | | | | |
| UQGDYC | | D171 | 61.52 | -19.26 | 8.37 | 1.10 | 0.12 | -0.28 | 1.14 | MK |
| | | D172 | 62.61 | -19.14 | 8.09 | | | | | |
| URCUFF | | D171 | 61.61 | -19.26 | 8.52 | 1.06 | 0.12 | -0.21 | 1.09 | AJ |
| | | D172 | 62.67 | -19.15 | 8.32 | | | | | |
| VBJNKR | | D171 | 61.69 | -19.42 | 8.44 | 1.08 | 0.18 | -0.21 | 1.11 | AJ |
| | | D172 | 62.76 | -19.24 | 8.23 | | | | | |
| VNPLKK | | D171 | 61.56 | -19.21 | 8.30 | 1.05 | 0.11 | -0.31 | 1.10 | AQ |
| | | D172 | 62.61 | -19.10 | 7.99 | | | | | |
| W67A8K | | D171 | 61.60 | -19.14 | 8.46 | 1.05 | 0.12 | -0.32 | 1.10 | MM |
| | | D172 | 62.65 | -19.03 | 8.14 | | | | | |
| WHYMRB | | D171 | 61.33 | -19.19 | 8.12 | 1.03 | 0.13 | -0.16 | 1.05 | XI |
| | | D172 | 62.36 | -19.07 | 7.96 | | | | | |
| WJT8JG | | D171 | 61.43 | -19.23 | 8.19 | 1.20 | 0.18 | -0.27 | 1.24 | XI |
| | | D172 | 62.63 | -19.05 | 7.92 | | | | | |
| XTC4Z9 | | D171 | 61.14 | -19.33 | 8.49 | 1.01 | 0.12 | -0.19 | 1.03 | XH |
| | | D172 | 62.15 | -19.21 | 8.30 | | | | | |
| XU64QR | | D171 | 61.73 | -19.22 | 8.53 | 1.08 | 0.11 | -0.30 | 1.13 | AS |
| | | D172 | 62.81 | -19.11 | 8.23 | | | | | |
| Y96HBL | | D171 | 61.29 | -19.20 | 8.43 | 1.25 | 0.47 | -0.32 | 1.37 | MM |
| | | D172 | 62.53 | -18.74 | 8.11 | | | | | |
| YFMNAD | | D171 | 61.38 | -19.37 | 8.65 | 1.14 | 0.15 | -0.25 | 1.18 | MV |
| | | D172 | 62.52 | -19.22 | 8.40 | | | | | |



| WebCode | Flag | Samples | CIE L* a* b* Color Values | | | Color Difference Values | | | | InstrCode |
|---------|------|---------|---------------------------|--------|------|-------------------------|--------------|--------------|--------------|-----------|
| | | | L* | a* | b* | ΔL^* | Δa^* | Δb^* | ΔE^* | |
| YQH28P | | D171 | 61.18 | -18.96 | 8.32 | 1.06 | 0.11 | -0.28 | 1.10 | XI |
| | | D172 | 62.23 | -18.86 | 8.05 | | | | | |
| ZGRMXR | | D171 | 61.61 | -19.16 | 8.44 | 1.10 | 0.13 | -0.23 | 1.13 | AJ |
| | | D172 | 62.71 | -19.03 | 8.21 | | | | | |
| ZJZQUN | | D171 | 61.29 | -19.12 | 8.21 | 0.92 | 0.06 | -0.19 | 0.94 | MK |
| | | D172 | 62.21 | -19.07 | 8.02 | | | | | |

| Summary Statistics | | | | | | | | |
|---------------------------|-------|--------|------|--------------|--------------|--------------|--------------|--|
| Samples | L* | a* | b* | ΔL^* | Δa^* | Δb^* | ΔE^* | |
| Grand Means | | | | | | | | |
| D171 | 61.46 | -19.21 | 8.36 | 1.05 | 0.13 | -0.24 | 1.09 | |
| D172 | 62.51 | -19.08 | 8.12 | | | | | |
| Stnd Dev Btwn Labs | | | | | | | | |
| D171 | 0.20 | 0.14 | 0.16 | 0.08 | 0.05 | 0.05 | 0.09 | |
| D172 | 0.20 | 0.14 | 0.16 | | | | | |

Statistics based on 103 of 115 reporting participants

Comments Assigned on Data Flags for Test #409

- 4VYXYV(X) - Low "L*" values. Large replication difference for "L*" & "a*" values on Sample D171.
- 662HTB(X) - Low "L*" values. Large replication difference for "L*" values on Sample D172.
- 66JLAN(X) - Extreme Data.
- 7Y7ALM(X) - Very high "L*" values. Low "b*" values.
- 8D9U6Y(X) - Very high "a*" values for Sample D172.
- 8RN2YB(X) - Extreme "L*" & "a*" values.
- AQLBGL(X) - Very low "L*" and "a*" values. High "b*" values.
- BULLDL(X) - High "b*" values. High "L*" values for Sample D172. Large replication difference for "L*" & "b*" values on Sample D172.
- EZXPY6(X) - Low "a*" values on Sample D171.
- GPMDBX(X) - High "L*" values and very low "a*" values.
- NXZQEP(X) - All values are low.
- PA4HA9(X) - Apparently measured back of Sample D171.



Key to Instrument Codes Reported by Participants

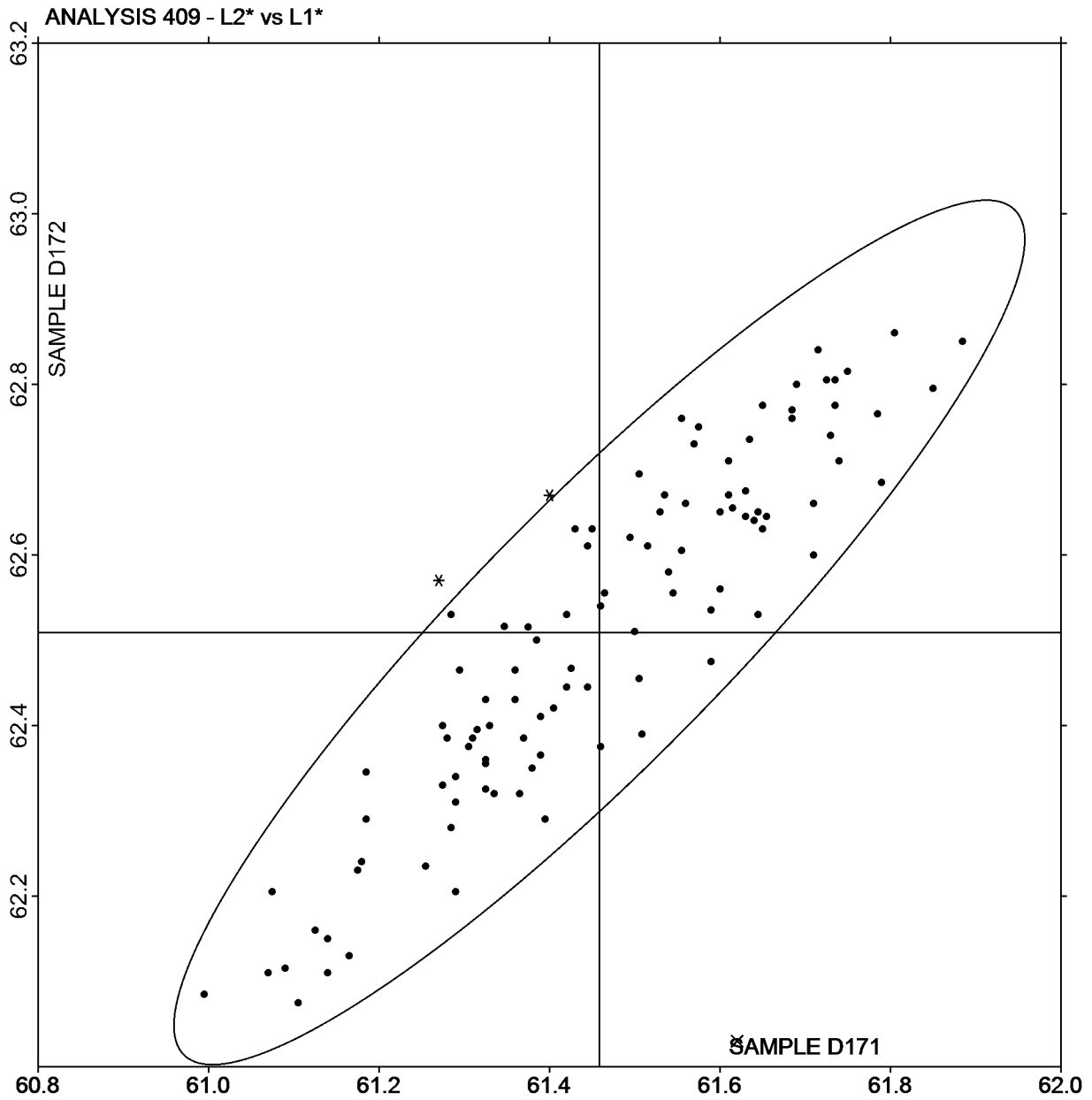
| | | | |
|-----------|-----------------------------------------------|-----------|-------------------------------------------------|
| AE | ACS-Datcolor 110 | AJ | ACS-Datcolor 600 |
| AM | ACS-Datcolor 600 Plus | AO | ACS-Datcolor 650X |
| AQ | ACS-Datcolor 600X | AR | Datcolor 400 |
| AS | ACS-Datcolor 800 Series | CA | Cary 5000 |
| GD | BYK-Gardner spectro-guide sphere | HF | Hunter ColorFlex Diffuse |
| HH | Hunter ColorQUEST XE | HP | Hunter UltraScan PRO |
| MI | Macbeth Color i 5 | MK | Macbeth Color-Eye 7000 |
| MM | Macbeth Color-Eye 7000a | MS | Minolta CM-600d |
| MT | Minolta CM-2600d | MU | Minolta |
| MV | Minolta CM-3000d Series Spectrophotometer | PE | Perkin Elmer Spectrophotometer |
| SH | SIMADZU UV 3101PC | XB | X-Rite Ci7000 Series Benchtop Spectrophotometer |
| XC | X-Rite Ci4200 Benchtop Spectrophotometer | XH | X-Rite Color i5 Benchtop Spectrophotometer |
| XI | X-Rite Color i7 Benchtop Spectrophotometer | XM | X-Rite SP62 Portable Sphere Spectrophotometer |
| XO | X-Rite SP64 Portable Sphere Spectrophotometer | XX | Instrument make/model not specified by lab |
| XZ | X-Rite | | |



L2* vs L1*

SAMPLE D171 = 61.46

SAMPLE D172 = 62.51

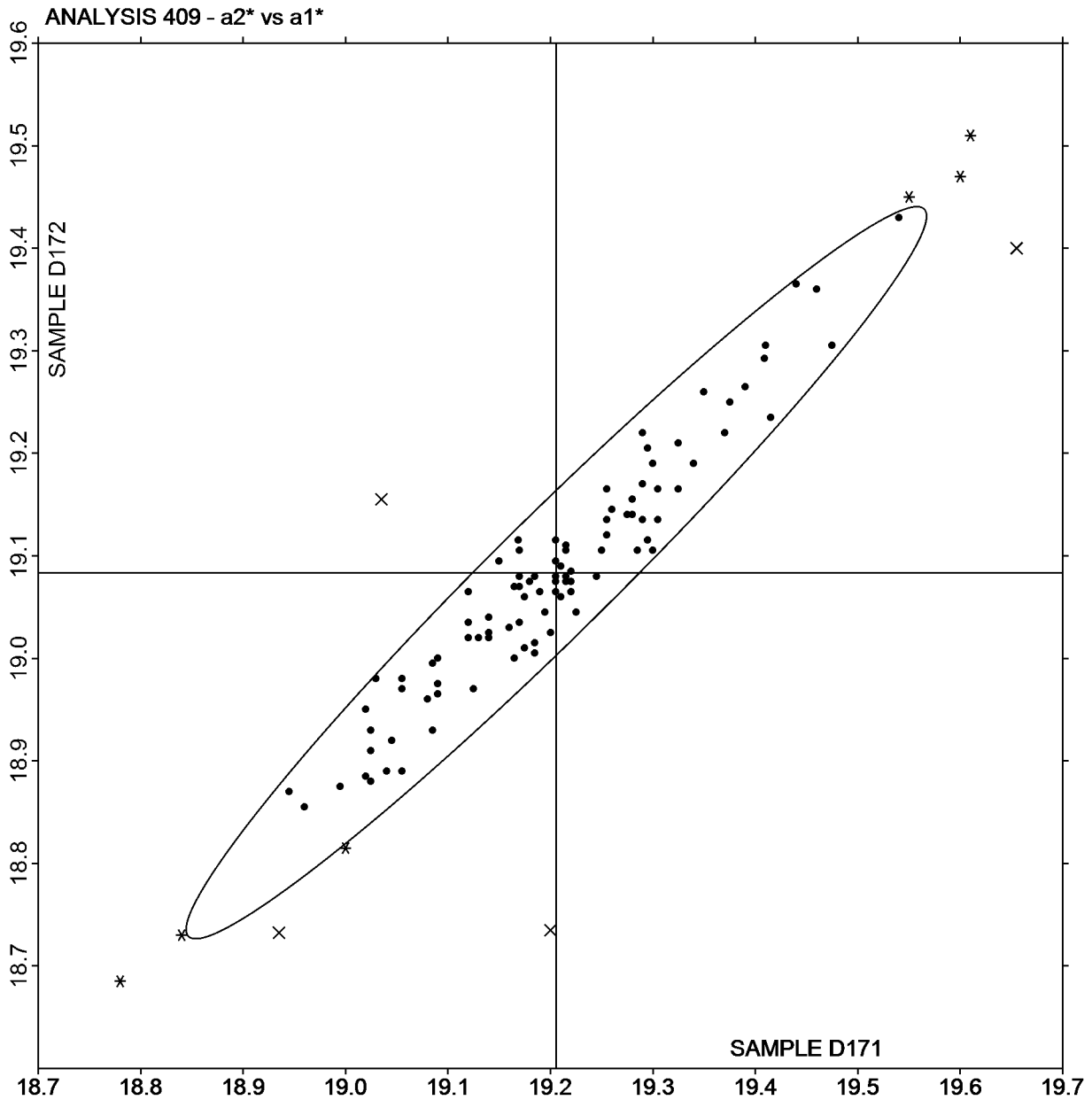




a2* vs a1*

SAMPLE D171 = -19.21

SAMPLE D172 = -19.08



Plot created using absolute values.

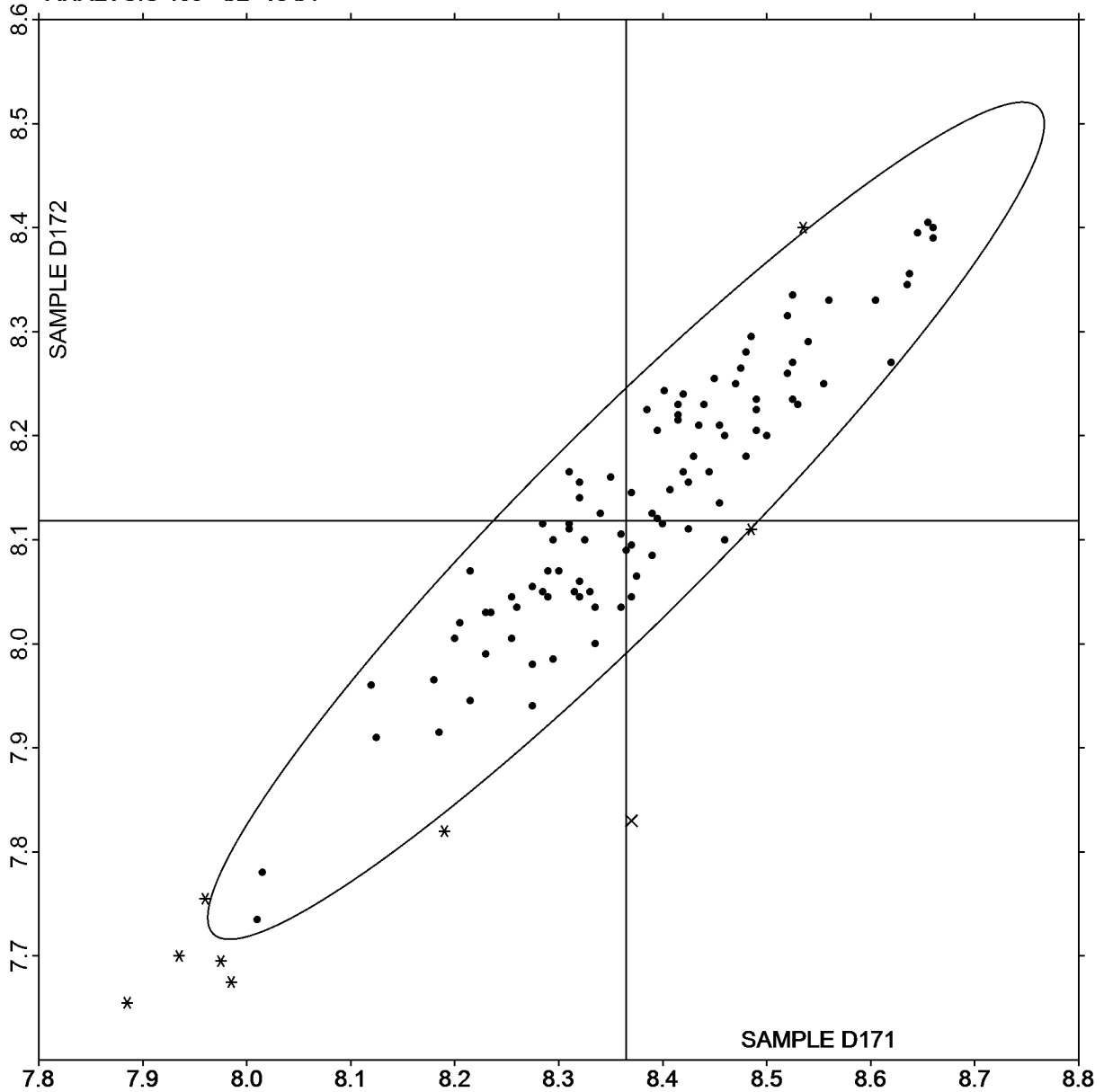


b2* vs b1*

SAMPLE D171 = 8.36

SAMPLE D172 = 8.12

ANALYSIS 409 - b2* vs b1*





CTS Interlaboratory Testing Program for Color & Appearance Analysis 411

**Report #182
4th Qtr 2017**

Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

| WebCode | Data Flag | Spectrophotometric Reflectance values (as %) at selected wavelengths | | | | | | | | | | | | | | | | Instr Code |
|-------------|-----------|----------------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|
| | | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 | 580 | 600 | 620 | 640 | 660 | 680 | 700 | |
| Sample D171 | | | | | | | | | | | | | | | | | | |
| 2GLP2M | | 17.37* | 19.40 | 23.36 | 26.24 | 27.29 | 30.35 | 36.13 | 39.20 | 32.59 | 25.16 | 21.48 | 19.61 | 19.41 | 20.70 | 20.39 | 18.43 | AQ |
| 3G2CBN | | 16.28 | 19.23 | 23.29 | 25.93 | 26.94 | 30.16 | 35.86 | 39.17 | 32.22 | 24.74 | 21.19 | 19.39 | 19.16 | 20.47 | 20.31 | 18.39 | SH |
| 3PX79M | | 15.87 | 18.89 | 22.99 | 25.85 | 26.85 | 30.00 | 35.87 | 39.25 | 32.20 | 24.66 | 21.05 | 19.24 | 18.99 | 20.36 | 20.14 | 18.11 | CA |
| 3TGEJ8 | | 15.70 | 19.10 | 23.10 | 26.00 | 26.90 | 30.00 | 35.90 | 39.20 | 32.25 | 24.70 | 21.10 | 19.30 | 19.10 | 20.40 | 20.25 | 18.30 | MV |
| 3V43TM | | 15.47 | 18.90 | 22.75 | 25.64 | 26.72 | 29.77 | 35.33 | 38.35 | 31.97 | 24.68 | 20.97 | 19.22 | 19.10 | 20.30 | 19.86 | 17.89 | XH |
| 44WNHK | | 16.15 | 19.36 | 23.34 | 26.15 | 27.21 | 30.42 | 36.19 | 39.36 | 32.41 | 24.96 | 21.25 | 19.44 | 19.16 | 20.43 | 20.09 | 17.89 | XB |
| 4EFZX4 | | 16.02 | 19.29 | 23.33 | 26.15 | 27.20 | 30.32 | 36.05 | 39.19 | 32.56 | 25.04 | 21.32 | 19.45 | 19.34 | 20.62 | 20.19 | 17.98 | AS |
| 4VYXYV | | 15.67 | 18.80 | 22.63* | 25.23X | 26.40X | 29.45* | 35.13* | 37.62X | 30.82X | 23.75X | 20.27X | 18.59* | 18.51X | 19.56* | 19.15X | 17.28X | XO |
| 4X7BJH | | 16.02 | 19.26 | 23.15 | 25.91 | 26.98 | 30.15 | 35.64 | 38.57 | 31.95 | 24.67 | 20.99 | 19.26 | 19.11 | 20.32 | 19.81 | 17.94 | XI |
| 4YHZXN | | 16.16 | 19.47 | 23.47 | 26.24 | 27.32 | 30.35 | 36.15 | 39.28 | 32.56 | 25.04 | 21.34 | 19.48 | 19.35 | 20.51 | 20.25 | 18.30 | AO |
| 662HTB | | 15.54 | 18.63* | 22.53* | 25.23X | 26.27X | 29.46* | 35.06* | 37.60X | 30.81X | 23.78X | 20.31X | 18.66* | 18.58* | 19.79 | 19.50* | 17.51* | XF |
| 66JLAN | | 17.13 | 19.34 | 23.47 | 26.22 | 27.27 | 30.36 | 36.17 | 39.18 | 32.33 | 24.97 | 21.28 | 19.46 | 19.32 | 20.44 | 20.12 | 18.21 | AQ |
| 6ATPCJ | | 15.99 | 19.40 | 23.28 | 26.16 | 27.24 | 30.26 | 35.99 | 39.25 | 32.62 | 25.12 | 21.42 | 19.57 | 19.41 | 20.59 | 20.32 | 18.28 | AM |
| 6EQ2FW | | 16.16 | 19.35 | 23.35 | 26.24 | 27.26 | 30.37 | 36.13 | 39.00 | 32.69 | 25.15 | 21.47 | 19.59 | 19.48 | 20.66 | 20.30 | 18.16 | AS |
| 6FXNMA | | 15.98 | 19.30 | 23.34 | 26.20 | 27.22 | 30.37 | 36.16 | 39.23 | 32.58 | 25.07 | 21.37 | 19.55 | 19.34 | 20.60 | 20.41 | 18.41 | MT |
| 6L4C73 | | 15.97 | 19.25 | 23.12 | 26.05 | 27.07 | 30.09 | 35.78 | 39.06 | 32.48 | 24.96 | 21.24 | 19.40 | 19.19 | 20.31 | 20.18 | 18.32 | AJ |
| 6PTG72 | | 16.29 | 19.32 | 23.44 | 26.32 | 27.27 | 30.46 | 36.32 | 39.64 | 32.52 | 24.96 | 21.31 | 19.51 | 19.27 | 20.61 | 20.38 | 18.36 | CA |
| 6U23UY | | 16.01 | 19.25 | 23.24 | 26.08 | 27.13 | 30.17 | 35.89 | 38.89 | 32.44 | 24.95 | 21.28 | 19.42 | 19.26 | 20.52 | 20.16 | 17.88 | AS |
| 72EF8N | | 16.22 | 19.14 | 23.09 | 25.90 | 26.91 | 30.02 | 35.67 | 38.69 | 32.14 | 24.65 | 21.13 | 19.22 | 19.12 | 20.37 | 19.95 | 18.08 | AS |
| 7W8MGY | | 15.94 | 19.17 | 23.07 | 25.87 | 26.96 | 30.10 | 35.61 | 38.61 | 32.17 | 24.92 | 21.14 | 19.36 | 19.18 | 20.32 | 20.12 | 18.26 | MM |
| 7Y7ALM | | 16.18 | 19.38 | 23.35 | 26.12 | 27.16 | 30.35 | 35.96 | 38.97 | 32.23 | 24.90 | 21.14 | 19.43 | 19.26 | 20.50 | 20.22 | 18.22 | MM |
| 84NMAG | | 16.40 | 19.66 | 23.63 | 26.41 | 27.52 | 30.64 | 36.33 | 39.40 | 32.83 | 25.28 | 21.57 | 19.70 | 19.59 | 20.92 | 20.55 | 18.19 | AO |
| 8D9U6Y | | 16.15 | 19.40 | 23.34 | 26.16 | 27.22 | 30.33 | 36.07 | 39.14 | 32.51 | 25.03 | 21.40 | 19.54 | 19.34 | 20.62 | 20.20 | 18.08 | AJ |
| 8HEWMK | | 15.93 | 19.21 | 23.24 | 26.05 | 27.10 | 30.17 | 35.91 | 38.91 | 32.29 | 24.91 | 21.21 | 19.39 | 19.20 | 20.40 | 20.15 | 18.18 | AQ |
| 8RN2YB | X | 19.45X | 23.32X | 26.08X | 27.15X | 30.30X | 35.84X | 38.74X | 32.36X | 25.10X | 21.30X | 19.55X | 19.33 | 20.48X | 20.27 | 18.43X | 18.27 | MM |



CTS Interlaboratory Testing Program for Color & Appearance Analysis 411

Report #182
4th Qtr 2017

Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

| WebCode | Data Flag | Spectrophotometric Reflectance values (as %) at selected wavelengths | | | | | | | | | | | | | | | | Instr Code |
|-------------|-----------|----------------------------------------------------------------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|------------|
| | | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 | 580 | 600 | 620 | 640 | 660 | 680 | 700 | |
| Sample D171 | | | | | | | | | | | | | | | | | | |
| 96CEX7 | | 15.78 | 19.81* | 23.62 | 26.33 | 27.16 | 30.42 | 36.36 | 38.68 | 32.70 | 24.95 | 21.53 | 19.40 | 19.16 | 21.04 | 20.20 | 19.04X | HF |
| 9C6XQL | | 16.25 | 19.31 | 23.38 | 26.12 | 27.26 | 30.29 | 36.04 | 38.86 | 32.64 | 25.05 | 21.39 | 19.52 | 19.38 | 20.60 | 20.34 | 18.02 | AS |
| 9LDHZA | | 16.25 | 19.51 | 23.49 | 26.32 | 27.41 | 30.56 | 36.29 | 39.22 | 32.60 | 25.11 | 21.38 | 19.55 | 19.40 | 20.60 | 20.27 | 18.09 | AO |
| 9LEBVV | | 15.96 | 19.52 | 23.40 | 26.16 | 27.21 | 30.36 | 36.13 | 38.93 | 32.23 | 24.95 | 21.26 | 19.41 | 19.25 | 20.32 | 20.10 | 18.28 | AM |
| 9XPU7C | | 16.05 | 19.28 | 23.23 | 26.09 | 27.10 | 30.26 | 36.03 | 38.96 | 32.44 | 24.95 | 21.30 | 19.43 | 19.31 | 20.63 | 20.36 | 17.97 | AJ |
| AC73RF | | 16.13 | 19.34 | 23.37 | 26.09 | 27.07 | 30.19 | 35.99 | 39.02 | 32.41 | 24.89 | 21.28 | 19.49 | 19.29 | 20.52 | 20.11 | 17.63 | AE |
| AWBJBR | | 15.69 | 19.03 | 22.77 | 25.62 | 26.69 | 29.84 | 35.37 | 38.36 | 31.68 | 24.51 | 20.80 | 19.16 | 19.02 | 20.23 | 19.73 | 17.77 | XH |
| B47Z3A | | 16.20 | 19.43 | 23.36 | 26.29 | 27.29 | 30.25 | 36.01 | 39.16 | 32.56 | 25.07 | 21.36 | 19.50 | 19.31 | 20.46 | 20.21 | 18.37 | AO |
| BKWT4A | | 15.90 | 19.15 | 23.04 | 25.86 | 26.92 | 30.07 | 35.61 | 38.58 | 32.05 | 24.69 | 20.96 | 19.22 | 19.11 | 20.26 | 19.94 | 18.02 | XI |
| BULLDL | | 14.76* | 19.11 | 23.33 | 26.25 | 27.21 | 30.55 | 36.35 | 39.59 | 32.78 | 25.26 | 21.51 | 19.66 | 19.43 | 20.70 | 20.55 | 18.58 | XI |
| C9GELT | | 15.62 | 18.95 | 22.84 | 25.61 | 26.72 | 29.92 | 35.34 | 38.33 | 31.83 | 24.54 | 20.82 | 19.12 | 18.91 | 20.10 | 19.84 | 17.86 | MI |
| CAUUTF | | 16.02 | 19.29 | 23.21 | 26.12 | 27.11 | 30.16 | 35.93 | 39.10 | 32.53 | 25.00 | 21.35 | 19.44 | 19.28 | 20.39 | 20.17 | 18.27 | AH |
| CN9BL4 | | 16.10 | 19.33 | 23.29 | 26.01 | 27.10 | 30.16 | 35.96 | 38.86 | 32.32 | 24.97 | 21.26 | 19.43 | 19.23 | 20.37 | 20.08 | 18.24 | AM |
| CNPGWM | | 15.79 | 19.09 | 22.99 | 25.84 | 26.86 | 29.98 | 35.58 | 38.70 | 32.18 | 24.88 | 21.13 | 19.37 | 19.20 | 20.42 | 20.15 | 18.18 | MM |
| D9W2B2 | | 16.03 | 19.39 | 23.40 | 26.20 | 27.34 | 30.65 | 36.41 | 38.98 | 31.89 | 24.63 | 20.98 | 19.22 | 19.09 | 20.30 | 20.00 | 18.03 | XF |
| DBJT9P | | 15.70 | 19.11 | 22.93 | 25.95 | 26.84 | 29.92 | 35.93 | 38.94 | 32.24 | 24.64 | 21.04 | 19.26 | 19.08 | 20.34 | 20.24 | 18.19 | MV |
| DLZKRT | | 16.24 | 19.52 | 23.42 | 26.41 | 27.39 | 30.46 | 36.19 | 39.28 | 32.62 | 25.17 | 21.42 | 19.59 | 19.42 | 20.57 | 20.44 | 18.37 | AO |
| DQD4DG | | 15.58 | 18.98 | 22.81 | 25.70 | 26.80 | 29.96 | 35.60 | 38.44 | 31.81 | 24.61 | 20.80 | 19.07 | 18.91 | 20.10 | 19.87 | 17.90 | XH |
| DUAW2J | | 16.35 | 19.17 | 23.35 | 26.02 | 27.04 | 30.26 | 35.95 | 38.92 | 32.20 | 24.91 | 21.25 | 19.33 | 19.05 | 20.40 | 20.00 | 18.21 | HP |
| E2VYU8 | | 16.50 | 19.37 | 23.47 | 26.31 | 27.39 | 30.56 | 36.34 | 39.39 | 32.56 | 25.01 | 21.37 | 19.52 | 19.38 | 20.60 | 20.27 | 18.21 | AS |
| E6TRGB | | 16.00 | 19.39 | 23.39 | 26.20 | 27.32 | 30.47 | 36.10 | 39.03 | 32.49 | 25.10 | 21.35 | 19.57 | 19.49 | 20.71 | 20.33 | 18.45 | XI |
| E9RY6U | | 16.19 | 19.51 | 23.58 | 26.30 | 27.39 | 30.45 | 36.18 | 39.32 | 32.56 | 25.10 | 21.41 | 19.56 | 19.39 | 20.57 | 20.25 | 18.19 | AJ |
| EUMDMJ | | 15.96 | 19.31 | 23.36 | 26.20 | 27.30 | 30.41 | 36.20 | 39.33 | 32.65 | 25.12 | 21.46 | 19.58 | 19.47 | 20.82 | 20.25 | 17.97 | AS |
| EZXPY6 | | 15.87 | 19.08 | 23.15 | 25.83 | 26.94 | 30.32 | 36.06 | 38.67 | 31.72 | 24.49 | 20.77 | 19.04 | 18.95 | 20.18 | 19.98 | 18.07 | XC |
| FM7MV3 | | 16.54 | 19.37 | 23.52 | 26.15 | 27.25 | 30.48 | 36.23 | 38.73 | 31.87 | 24.74 | 21.14 | 19.46 | 19.12 | 20.71 | 20.52 | 18.75 | HW |



CTS Interlaboratory Testing Program for Color & Appearance Analysis 411

**Report #182
4th Qtr 2017**

Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

| WebCode | Data Flag | Spectrophotometric Reflectance values (as %) at selected wavelengths | | | | | | | | | | | | | | | | Instr Code |
|-------------|-----------|----------------------------------------------------------------------|--------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|
| | | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 | 580 | 600 | 620 | 640 | 660 | 680 | 700 | |
| Sample D171 | | | | | | | | | | | | | | | | | | |
| FNYBDY | | 15.86 | 19.21 | 23.08 | 25.85 | 26.96 | 30.11 | 35.59 | 38.57 | 31.88 | 24.68 | 21.01 | 19.30 | 19.03 | 20.26 | 19.95 | 18.00 | MI |
| FVJKG2 | | 16.29 | 19.37 | 23.43 | 26.16 | 27.28 | 30.39 | 36.15 | 39.07 | 32.36 | 24.96 | 21.28 | 19.44 | 19.30 | 20.44 | 20.22 | 18.19 | AR |
| GPMD BX | | 16.20 | 19.75* | 23.81* | 26.91X | 27.73* | 31.17X | 37.20X | 40.32X | 32.83 | 25.29 | 21.62 | 19.91 | 19.82* | 21.19* | 20.91* | 18.79* | MU |
| GZKEN3 | | 16.19 | 19.25 | 23.33 | 26.11 | 27.01 | 30.31 | 36.00 | 39.26 | 32.25 | 24.81 | 21.19 | 19.40 | 19.19 | 20.48 | 20.23 | 18.19 | PE |
| HHN2Y2 | | 15.67 | 18.88 | 22.70 | 25.58 | 26.62 | 29.74 | 35.36 | 38.16 | 31.86 | 24.57 | 20.87 | 19.13 | 19.04 | 20.13 | 19.88 | 17.58 | XH |
| HNV PEN | | 15.91 | 18.95 | 22.96 | 25.84 | 26.83 | 29.93 | 35.68 | 39.05 | 32.01 | 24.60 | 21.02 | 19.23 | 18.98 | 20.31 | 20.04 | 18.08 | CA |
| HXZKV9 | | 16.08 | 19.41 | 23.28 | 26.09 | 27.12 | 30.31 | 35.86 | 38.75 | 32.06 | 24.80 | 21.09 | 19.37 | 19.19 | 20.41 | 20.00 | 18.10 | XI |
| J4NMEX | | 16.26 | 19.15 | 23.06 | 27.33X | 26.84 | 29.95 | 35.63 | 38.28 | 31.44 | 24.28 | 20.65 | 18.88 | 18.79 | 19.88 | 19.72 | 17.85 | XM |
| J9D246 | | 16.13 | 19.42 | 23.51 | 26.28 | 27.30 | 30.41 | 36.12 | 39.07 | 32.63 | 25.07 | 21.39 | 19.53 | 19.40 | 20.63 | 20.29 | 18.04 | AO |
| JHET2X | | 16.10 | 19.35 | 23.22 | 26.00 | 27.08 | 30.26 | 35.88 | 38.69 | 32.06 | 24.78 | 21.08 | 19.40 | 19.29 | 20.45 | 20.00 | 18.08 | XI |
| JT4FDN | | 16.12 | 19.43 | 23.44 | 26.29 | 27.14 | 30.32 | 36.20 | 39.40 | 32.44 | 24.89 | 21.24 | 19.49 | 19.27 | 20.62 | 20.42 | 18.44 | MV |
| JX9BWN | | 15.61 | 18.99 | 22.88 | 25.73 | 26.79 | 29.92 | 35.54 | 38.44 | 31.88 | 24.59 | 20.90 | 19.17 | 19.07 | 20.21 | 19.92 | 17.96 | XH |
| KQB NYW | | 15.98 | 19.13 | 23.01 | 25.85 | 26.88 | 30.02 | 35.57 | 38.72 | 32.18 | 24.83 | 21.05 | 19.30 | 19.13 | 20.33 | 20.08 | 18.12 | MM |
| L2KXNX | | 16.19 | 19.01 | 22.98 | 25.94 | 26.87 | 29.93 | 35.93 | 38.92 | 32.27 | 24.70 | 21.05 | 19.27 | 19.10 | 20.34 | 20.22 | 18.22 | MV |
| LX72HW | | 15.70 | 19.05 | 22.91 | 25.78 | 26.82 | 29.97 | 35.53 | 38.42 | 31.86 | 24.59 | 20.89 | 19.20 | 19.03 | 20.19 | 19.86 | 17.98 | XI |
| LZVGNX | | 16.38 | 19.46 | 23.55 | 26.46 | 27.38 | 30.56 | 36.41 | 39.82* | 32.70 | 25.08 | 21.40 | 19.57 | 19.34 | 20.70 | 20.46 | 18.42 | CA |
| M4PXCC | | 16.54 | 19.26 | 23.26 | 26.07 | 27.05 | 30.22 | 35.89 | 39.05 | 32.41 | 25.01 | 21.22 | 19.35 | 19.02 | 20.30 | 20.05 | 18.22 | HP |
| M9Y4XA | | 16.01 | 19.23 | 23.14 | 25.87 | 26.97 | 30.12 | 35.87 | 38.92 | 32.27 | 24.83 | 21.14 | 19.35 | 19.19 | 20.36 | 19.94 | 17.96 | AJ |
| N4MG2K | | 16.21 | 19.36 | 23.22 | 25.99 | 27.09 | 30.20 | 35.78 | 38.84 | 32.19 | 24.87 | 21.18 | 19.39 | 19.17 | 20.40 | 20.09 | 18.13 | XB |
| NGCFRM | | 15.81 | 19.21 | 23.05 | 25.83 | 27.03 | 30.17 | 35.68 | 38.31 | 32.12 | 24.95 | 21.23 | 19.40 | 19.30 | 20.22 | 20.03 | 18.27 | AJ |
| NW66NJ | | 16.08 | 19.32 | 23.30 | 26.15 | 27.28 | 30.39 | 36.15 | 38.97 | 32.63 | 25.12 | 21.42 | 19.56 | 19.45 | 20.61 | 20.27 | 18.11 | AJ |
| NXZQEP | | 15.58 | 18.68* | 22.63* | 25.36* | 26.36X | 29.45* | 35.25* | 37.71X | 30.44X | 23.31X | 19.76X | 18.06X | 17.94X | 18.94X | 18.72X | 16.90X | XO |
| NZKPK7 | | 16.04 | 19.16 | 23.08 | 25.94 | 26.96 | 30.07 | 35.93 | 38.91 | 32.12 | 24.78 | 21.06 | 19.30 | 19.11 | 20.38 | 20.15 | 18.20 | MS |
| PA4HA9 | X | 26.29X | 91.39X | 112.30X | 102.56X | 97.58X | 93.23X | 89.49X | 87.37X | 87.53X | 86.19X | 85.75X | 85.63X | 86.57X | 87.23X | 86.67X | 86.59X | MM |
| PD3YL3 | | 16.00 | 19.20 | 23.21 | 26.06 | 27.08 | 30.23 | 35.97 | 38.91 | 32.46 | 24.95 | 21.29 | 19.46 | 19.30 | 20.49 | 20.15 | 18.03 | AJ |



CTS Interlaboratory Testing Program for Color & Appearance Analysis 411

**Report #182
4th Qtr 2017**

Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

| WebCode | Data Flag | Spectrophotometric Reflectance values (as %) at selected wavelengths | | | | | | | | | | | | | | | | Instr Code |
|-------------|-----------|----------------------------------------------------------------------|--------|--------|-------|-------|--------|-------|--------|-------|-------|-------|--------|-------|--------|--------|--------|------------|
| | | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 | 580 | 600 | 620 | 640 | 660 | 680 | 700 | |
| Sample D171 | | | | | | | | | | | | | | | | | | |
| PNRHB9 | | 16.28 | 19.45 | 23.39 | 26.18 | 27.23 | 30.40 | 36.01 | 39.06 | 32.41 | 25.07 | 21.30 | 19.54 | 19.38 | 20.60 | 20.31 | 18.35 | MM |
| PPMWZM | | 12.13X | 19.44 | 22.87 | 25.88 | 26.94 | 30.34 | 36.30 | 38.80 | 32.29 | 25.05 | 21.20 | 18.26X | 19.06 | 20.14 | 20.17 | 18.70 | GD |
| PQVB68 | | 15.84 | 18.98 | 22.81 | 25.73 | 26.76 | 29.83 | 35.43 | 38.25 | 31.79 | 24.50 | 20.73 | 18.99 | 18.82 | 19.41X | 19.71 | 17.74 | XI |
| PUATFW | | 15.89 | 19.31 | 23.21 | 25.96 | 27.04 | 30.14 | 35.68 | 38.59 | 32.18 | 24.93 | 21.28 | 19.51 | 19.41 | 20.59 | 20.06 | 17.76 | AO |
| PZY97P | | 16.62 | 19.63 | 23.86* | 26.35 | 27.29 | 30.34 | 36.10 | 39.12 | 32.40 | 25.00 | 21.20 | 19.53 | 19.20 | 21.09 | 20.79* | 18.89* | HH |
| QPDJQG | | 15.63 | 19.30 | 23.16 | 26.02 | 27.17 | 30.33 | 35.94 | 38.71 | 32.22 | 24.89 | 21.14 | 19.28 | 19.10 | 20.20 | 19.88 | 18.17 | AM |
| QQ9Z8K | | 15.94 | 19.31 | 23.04 | 25.91 | 27.00 | 30.12 | 35.77 | 38.71 | 31.96 | 24.71 | 21.05 | 19.19 | 19.21 | 20.35 | 19.97 | 18.10 | XI |
| R8WUWF | | 16.36 | 19.49 | 23.39 | 26.14 | 27.18 | 30.30 | 35.91 | 38.93 | 32.27 | 24.90 | 21.17 | 19.43 | 19.34 | 20.49 | 20.15 | 18.18 | XI |
| R98HT9 | | 15.91 | 19.26 | 23.10 | 25.99 | 27.03 | 30.10 | 35.67 | 38.66 | 32.07 | 24.77 | 21.18 | 19.41 | 19.27 | 20.45 | 20.17 | 18.36 | XI |
| RCN2FN | | 16.04 | 19.32 | 23.22 | 26.03 | 27.10 | 30.23 | 35.78 | 38.71 | 32.29 | 24.93 | 21.14 | 19.38 | 19.18 | 20.29 | 20.13 | 18.22 | MM |
| RG4CQ8 | | 15.97 | 19.21 | 23.14 | 25.97 | 27.00 | 30.22 | 35.82 | 38.71 | 32.14 | 24.86 | 21.19 | 19.35 | 19.15 | 20.33 | 20.11 | 18.28 | XI |
| RX4LA4 | | 15.76 | 19.12 | 23.07 | 26.03 | 26.94 | 30.10 | 36.07 | 39.11 | 32.44 | 24.81 | 21.17 | 19.35 | 19.21 | 20.45 | 20.35 | 18.24 | MV |
| T29CGJ | | 16.22 | 19.55 | 23.48 | 26.30 | 27.42 | 30.57 | 36.17 | 39.10 | 32.47 | 25.16 | 21.38 | 19.63 | 19.48 | 20.57 | 20.36 | 18.43 | MM |
| TGZAGT | | 15.92 | 19.20 | 23.16 | 25.95 | 27.00 | 30.16 | 35.71 | 38.61 | 31.95 | 24.70 | 21.04 | 19.34 | 19.22 | 20.32 | 19.85 | 17.98 | XI |
| TMNUK9 | | 16.25 | 19.38 | 23.40 | 26.24 | 27.39 | 30.54 | 36.31 | 39.46 | 32.71 | 25.14 | 21.42 | 19.58 | 19.40 | 20.57 | 20.34 | 18.35 | AJ |
| TUNAAG | | 15.95 | 19.11 | 23.01 | 25.96 | 26.95 | 30.08 | 35.91 | 38.75 | 31.70 | 24.64 | 20.98 | 19.24 | 19.18 | 20.31 | 20.06 | 18.08 | XO |
| TZCYR6 | | 16.82 | 19.00 | 22.88 | 26.25 | 27.35 | 30.52 | 35.68 | 37.99* | 32.16 | 24.98 | 20.81 | 19.12 | 19.04 | 19.98 | 20.20 | 18.57 | GD |
| U6YDMP | | 18.78X | 17.96X | 22.48* | 25.93 | 26.85 | 29.07X | 36.16 | 39.64 | 32.38 | 25.06 | 21.05 | 17.86X | 19.19 | 20.15 | 20.17 | 18.67 | GD |
| UGC7JC | | 16.67 | 19.76* | 24.08X | 26.48 | 27.50 | 30.63 | 36.42 | 39.37 | 32.57 | 25.20 | 21.40 | 19.61 | 19.32 | 21.24* | 20.92X | 18.98* | HH |
| UQGDYC | | 16.06 | 19.29 | 23.27 | 26.07 | 27.11 | 30.34 | 35.96 | 38.98 | 32.26 | 24.95 | 21.15 | 19.41 | 19.23 | 20.46 | 20.22 | 18.23 | MK |
| VBJNKR | | 17.36* | 19.32 | 23.39 | 26.14 | 27.30 | 30.41 | 36.23 | 39.34 | 32.55 | 24.99 | 21.32 | 19.48 | 19.34 | 22.49X | 20.21 | 18.43 | AJ |
| VNPLKK | | 16.23 | 19.33 | 23.40 | 26.16 | 27.20 | 30.26 | 36.00 | 39.01 | 32.34 | 24.97 | 21.29 | 19.44 | 19.28 | 20.43 | 20.32 | 18.27 | AQ |
| W67A8K | | 16.07 | 19.37 | 23.30 | 26.11 | 27.19 | 30.31 | 35.90 | 39.09 | 32.48 | 25.11 | 21.28 | 19.53 | 19.36 | 20.56 | 20.30 | 18.34 | MM |
| WHYMRB | | 16.10 | 19.40 | 23.30 | 25.90 | 27.20 | 30.40 | 35.90 | 38.60 | 31.90 | 24.70 | 21.00 | 19.20 | 19.20 | 20.30 | 19.85 | 17.90 | XI |
| WJT8JG | | 16.02 | 19.40 | 23.24 | 26.10 | 27.15 | 30.27 | 35.88 | 38.77 | 32.14 | 24.84 | 21.12 | 19.28 | 19.17 | 20.38 | 20.00 | 18.08 | XI |



CTS Interlaboratory Testing Program for Color & Appearance Analysis 411

**Report #182
4th Qtr 2017**

Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

| WebCode | Data Flag | Spectrophotometric Reflectance values (as %) at selected wavelengths | | | | | | | | | | | | | | | | Instr Code |
|-------------|-----------|----------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| | | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 | 580 | 600 | 620 | 640 | 660 | 680 | 700 | |
| Sample D171 | | | | | | | | | | | | | | | | | | |
| XTC4Z9 | | 15.61 | 18.94 | 22.73 | 25.65 | 26.74 | 29.89 | 35.52 | 38.39 | 31.85 | 24.55 | 20.78 | 19.10 | 19.00 | 20.12 | 19.82 | 17.90 | XH |
| XU64QR | | 16.25 | 19.29 | 23.35 | 26.15 | 27.25 | 30.34 | 36.09 | 39.25 | 32.65 | 25.12 | 21.44 | 19.59 | 19.45 | 20.66 | 20.35 | 18.08 | AS |
| Y96HBL | | 15.86 | 19.07 | 23.01 | 25.82 | 26.86 | 30.02 | 35.63 | 38.67 | 32.04 | 24.74 | 20.98 | 19.26 | 19.09 | 20.29 | 20.01 | 18.05 | MM |
| YFMNAD | | 15.22 | 18.79 | 22.89 | 25.96 | 26.90 | 29.97 | 35.75 | 39.11 | 32.22 | 24.66 | 21.03 | 19.24 | 19.02 | 20.35 | 20.16 | 18.14 | MV |
| YQH28P | | 15.78 | 19.11 | 22.93 | 25.73 | 26.82 | 29.88 | 35.40 | 38.38 | 31.83 | 24.66 | 21.02 | 19.30 | 19.21 | 20.33 | 19.93 | 18.01 | XI |
| ZGRMXR | | 16.06 | 19.32 | 23.25 | 26.11 | 27.18 | 30.23 | 35.95 | 39.06 | 32.56 | 25.05 | 21.36 | 19.47 | 19.35 | 20.46 | 20.08 | 18.02 | AJ |
| ZJZQUN | | 16.02 | 19.20 | 23.16 | 25.94 | 27.02 | 30.25 | 35.72 | 38.63 | 31.89 | 24.69 | 21.02 | 19.30 | 19.17 | 20.30 | 19.92 | 17.94 | MK |

Summary Statistics

| | 400 | 420 | 440 | 460 | 480 | 500 | 520 | 540 | 560 | 580 | 600 | 620 | 640 | 660 | 680 | 700 |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Grand Means | 16.04 | 19.24 | 23.20 | 26.05 | 27.07 | 30.21 | 35.92 | 38.90 | 32.23 | 24.85 | 21.15 | 19.33 | 19.20 | 20.43 | 20.13 | 18.16 |
| SD Btwn Labs | 0.59 | 0.25 | 0.27 | 0.28 | 0.24 | 0.28 | 0.32 | 0.43 | 0.40 | 0.29 | 0.27 | 0.29 | 0.23 | 0.37 | 0.29 | 0.31 |

Comments Assigned on Data Flags for Test #411

8RN2YB (X) - High % reflectance data for most wavelengths.

PA4HA9 (X) - High % reflectance data at all wavelengths.



CTS Interlaboratory Testing Program for Color & Appearance Analysis 411

Report #182
4th Qtr 2017

Spectrophotometric - Sphere Geometry Instruments
Reflectance at 16 Selected Wavelengths

Key to Instrument Codes Reported by Participants

| | | |
|----------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------|
| AE ACS-Datcolor 110 | AH ACS-Datcolor 550 | AJ ACS-Datcolor 600 |
| AM ACS-Datcolor 600 Plus | AO ACS-Datcolor 650 | AQ ACS-Datcolor 600X |
| AR Datcolor 400 | AS ACS-Datcolor 800 Series | CA Cary 5000 |
| GD BYK-Gardner spectro-guide sphere | HF Hunter ColorFlex Diffuse | HH Hunter ColorQUEST XE |
| HP Hunter UltraScan PRO | HW Hunter UltraScan XE | MI Macbeth Color i5 |
| MK Macbeth Color-Eye 7000 Spectrophotometer | MM Macbeth Color-Eye 7000a | MS Minolta CM-600d |
| MT Minolta CM-2600d | MU Minolta | MV Minolta CM-3000d Series Spectrophotometer |
| PE Perkin Elmer Spectrophotometer | SH SIMADZU UV 3101PC | XB X-Rite Ci7000 Series Benchtop Spectrophotometer |
| XC X-Rite Ci4200 Benchtop Spectrophotometer | XF X-Rite Ci6x Series Portable Spectrophotometer | XH X-Rite Color i5 |
| XI X-Rite Color i7 | XM X-Rite SP62 | XO X-Rite SP64 |



Interlaboratory Testing Program for Color & Appearance

Report #182

Analysis 440

4th Qtr 2017

60 Degree Gloss - Paint Chips

ASTM Method D 523

| WebCode | Data Flag | Sample H171 | | | Sample H172 | | | Instr Code |
|---------|-----------|-------------|----------------------|--------|-------------|----------------------|--------|------------|
| | | Lab Mean | Diff from Grand Mean | CPV | Lab Mean | Diff from Grand Mean | CPV | |
| 38Z4D4 | | 60.13 | -0.28 | -0.35 | 71.23 | 0.15 | 0.24 | GK |
| 3R6GAW | | 60.00 | -0.41 | -0.51 | 71.03 | -0.05 | -0.07 | GK |
| 3V43TM | | 61.13 | 0.72 | 0.90 | 71.55 | 0.48 | 0.74 | GL |
| 44WNNHK | X | 61.28 | 0.87 | 1.09 | 73.25 | 2.18 | 3.39 | GL |
| 4VYXYV | | 60.78 | 0.37 | 0.46 | 71.58 | 0.50 | 0.78 | GL |
| 4W9ZMF | | 59.30 | -1.11 | -1.38 | 70.75 | -0.32 | -0.50 | GL |
| 4YHZXN | * | 61.00 | 0.59 | 0.74 | 70.65 | -0.42 | -0.66 | GQ |
| 662HTB | X | 62.65 | 2.24 | 2.80 | 74.55 | 3.48 | 5.42 | GK |
| 66JLAN | | 59.95 | -0.46 | -0.57 | 70.20 | -0.87 | -1.36 | GK |
| 6EQ2FW | | 61.95 | 1.54 | 1.93 | 72.05 | 0.98 | 1.52 | GN |
| 6ML2WA | | 60.38 | -0.03 | -0.04 | 71.18 | 0.10 | 0.16 | GL |
| 6RUW7C | | 60.20 | -0.21 | -0.26 | 71.35 | 0.28 | 0.43 | GL |
| 7E4AL3 | | 60.80 | 0.39 | 0.49 | 71.28 | 0.20 | 0.32 | GL |
| 7W8MGY | | 60.18 | -0.23 | -0.29 | 70.80 | -0.27 | -0.42 | GL |
| 83T67U | | 59.73 | -0.68 | -0.85 | 70.80 | -0.27 | -0.42 | GB |
| 8D9U6Y | | 59.83 | -0.58 | -0.73 | 70.58 | -0.50 | -0.77 | GL |
| 9ALWUE | | 61.25 | 0.84 | 1.05 | 72.00 | 0.93 | 1.45 | GL |
| A3FKBL | | 60.48 | 0.07 | 0.09 | 70.90 | -0.17 | -0.27 | RA |
| AC73RF | | 59.60 | -0.81 | -1.01 | 70.18 | -0.90 | -1.40 | GL |
| AWBJBR | | 60.38 | -0.03 | -0.03 | 71.12 | 0.05 | 0.08 | GL |
| C9GELT | | 60.20 | -0.21 | -0.26 | 70.78 | -0.30 | -0.46 | GL |
| CWM7FC | | 61.93 | 1.52 | 1.90 | 72.45 | 1.38 | 2.15 | IW |
| DBG44T | | 59.38 | -1.03 | -1.29 | 70.45 | -0.62 | -0.97 | GL |
| DBJT9P | | 60.33 | -0.08 | -0.10 | 71.00 | -0.07 | -0.11 | GL |
| DJDNK3 | X | 37.60 | -22.81 | -28.48 | 38.78 | -32.30 | -50.31 | MW |
| DZFRKJ | | 61.45 | 1.04 | 1.30 | 72.33 | 1.25 | 1.95 | GN |
| EUMDMJ | | 60.20 | -0.21 | -0.26 | 71.25 | 0.18 | 0.28 | ST |
| EXBCVT | | 61.93 | 1.52 | 1.90 | 72.08 | 1.00 | 1.56 | GK |
| FM7MV3 | | 60.05 | -0.36 | -0.44 | 70.73 | -0.35 | -0.54 | GK |
| FNYBDY | | 59.80 | -0.61 | -0.76 | 70.18 | -0.90 | -1.40 | GL |



Interlaboratory Testing Program for Color & Appearance

Report #182

Analysis 440

4th Qtr 2017

60 Degree Gloss - Paint Chips

ASTM Method D 523

| WebCode | Data Flag | Sample H171 | | | Sample H172 | | | Instr Code |
|---------|-----------|-------------|----------------------|-------|-------------|----------------------|-------|------------|
| | | Lab Mean | Diff from Grand Mean | CPV | Lab Mean | Diff from Grand Mean | CPV | |
| G3UEVU | | 60.60 | 0.19 | 0.24 | 71.30 | 0.23 | 0.36 | GL |
| H6G36A | | 59.50 | -0.91 | -1.13 | 70.85 | -0.22 | -0.35 | GK |
| HH66M2 | | 59.00 | -1.41 | -1.76 | 70.20 | -0.87 | -1.36 | TP |
| HHN2Y2 | | 59.85 | -0.56 | -0.69 | 70.88 | -0.20 | -0.31 | GL |
| HNVPEN | * | 59.93 | -0.48 | -0.60 | 69.85 | -1.22 | -1.90 | GL |
| JHET2X | | 59.50 | -0.91 | -1.13 | 70.40 | -0.67 | -1.05 | GL |
| JUYWUQ | | 61.73 | 1.32 | 1.65 | 71.93 | 0.85 | 1.33 | GL |
| JX9BWN | | 59.75 | -0.66 | -0.82 | 70.83 | -0.25 | -0.38 | GK |
| KG3D6C | | 59.38 | -1.03 | -1.29 | 70.20 | -0.87 | -1.36 | GK |
| KQBNIW | | 60.40 | -0.01 | -0.01 | 71.08 | 0.00 | 0.00 | GL |
| L2KXNX | | 61.45 | 1.04 | 1.30 | 71.63 | 0.55 | 0.86 | GL |
| LX72HW | | 60.22 | -0.19 | -0.23 | 70.67 | -0.40 | -0.63 | GL |
| NNTQ7M | | 59.83 | -0.58 | -0.73 | 71.43 | 0.35 | 0.55 | GK |
| NQFEF3 | | 61.18 | 0.77 | 0.96 | 71.60 | 0.53 | 0.82 | GL |
| NW66NJ | | 60.80 | 0.39 | 0.49 | 71.50 | 0.43 | 0.67 | GL |
| NXZQEP | | 60.50 | 0.09 | 0.12 | 70.85 | -0.22 | -0.35 | MW |
| NZKPK7 | | 61.70 | 1.29 | 1.62 | 71.78 | 0.70 | 1.10 | GK |
| PD3YL3 | | 60.53 | 0.12 | 0.15 | 70.58 | -0.50 | -0.77 | MW |
| PH4VF4 | | 60.20 | -0.21 | -0.26 | 70.73 | -0.35 | -0.54 | GL |
| PPMWZM | | 61.15 | 0.74 | 0.93 | 71.05 | -0.02 | -0.03 | GN |
| PQVB68 | | 60.50 | 0.09 | 0.12 | 71.38 | 0.30 | 0.47 | MH |
| PZFPYW | | 60.95 | 0.54 | 0.68 | 71.40 | 0.33 | 0.51 | GX |
| R98HT9 | | 59.33 | -1.08 | -1.35 | 70.93 | -0.15 | -0.23 | GL |
| RG4CQ8 | | 59.48 | -0.93 | -1.16 | 70.30 | -0.77 | -1.20 | GL |
| RLA9B8 | | 60.10 | -0.31 | -0.38 | 70.58 | -0.50 | -0.77 | GK |
| RMLRDP | | 60.65 | 0.24 | 0.30 | 71.33 | 0.25 | 0.39 | GL |
| RPTAAZ | | 60.33 | -0.08 | -0.10 | 71.08 | 0.00 | 0.00 | GL |
| TUNAAG | | 60.98 | 0.57 | 0.71 | 71.25 | 0.18 | 0.28 | GN |
| TZCYR6 | | 61.35 | 0.94 | 1.18 | 71.83 | 0.75 | 1.17 | GB |
| UGC7JC | X | 57.30 | -3.11 | -3.88 | 68.28 | -2.80 | -4.36 | RA |



Interlaboratory Testing Program for Color & Appearance

Report #182

Analysis 440

4th Qtr 2017

60 Degree Gloss - Paint Chips

ASTM Method D 523

| WebCode | Data Flag | Sample H171 | | | Sample H172 | | | Instr Code |
|---------|-----------|-------------|----------------------|--------|-------------|----------------------|--------|------------|
| | | Lab Mean | Diff from Grand Mean | CPV | Lab Mean | Diff from Grand Mean | CPV | |
| UJWDLK | X | 37.43 | -22.98 | -28.70 | 37.85 | -33.22 | -51.75 | GL |
| URCUFF | | 59.40 | -1.01 | -1.26 | 70.50 | -0.57 | -0.89 | MW |
| V9D28M | | 60.28 | -0.13 | -0.16 | 71.58 | 0.50 | 0.78 | GK |
| VNPLKK | | 61.78 | 1.37 | 1.71 | 71.88 | 0.80 | 1.25 | PC |
| WHYMRB | | 61.38 | 0.97 | 1.21 | 72.43 | 1.35 | 2.11 | GK |
| XTET46 | | 60.80 | 0.39 | 0.49 | 71.65 | 0.58 | 0.90 | GN |
| Y96HBL | | 59.73 | -0.68 | -0.85 | 70.68 | -0.40 | -0.62 | RA |
| YQH28P | | 61.75 | 1.34 | 1.68 | 71.53 | 0.45 | 0.71 | GL |
| Z83Y3P | | 60.65 | 0.24 | 0.30 | 71.10 | 0.03 | 0.04 | GK |
| ZE9LYY | | 59.60 | -0.81 | -1.01 | 70.60 | -0.47 | -0.73 | GL |
| ZGRMXR | * | 58.35 | -2.06 | -2.57 | 69.05 | -2.02 | -3.15 | GK |

Summary Statistics

Grand Means

60.41 Gloss Units

71.07 Gloss Units

Std Dev Btwn Labs

0.80 Gloss Units

0.64 Gloss Units

Statistics based on 66 of 71 reporting participants

Comments on Assigned Data Flags for Test #440

- 44WNHK(X) - High data for Sample H172.
- 662HTB(X) - Data for both samples are high.
- DJDNK3(X) - Data for both samples are extremely low.
- UGC7JC(X) - Data for both samples are low.
- UJWDLK(X) - Data for both samples are extremely low.

Key to Instrument Codes Reported by Participants

| | | | |
|-----------|------------------------------------------|-----------|-----------------------------------|
| GB | BYK Gardner Spectro - Guide Sphere Gloss | GK | BYK-Gardner micro-gloss (60) |
| GL | BYK-Gardner micro-TRI-gloss | GN | BYK-Gardner new micro-TRI-gloss |
| GQ | BYK-Gardner haze-gloss | GX | BYK-Gardner (model not specified) |
| IW | iWave WG68 | MH | X-Rite/Macbeth Color-Eye XTH |
| MW | Minolta Multi-Gloss 268 | PC | Picogloss 503 Erichson |
| RA | Rhpoint Novo-Gloss Glossmeter | ST | Sheen Tri-Glossmaster |
| TP | TQC Polygloss | | |



Interlaboratory Testing Program for Color & Appearance

Report #182

Analysis 440

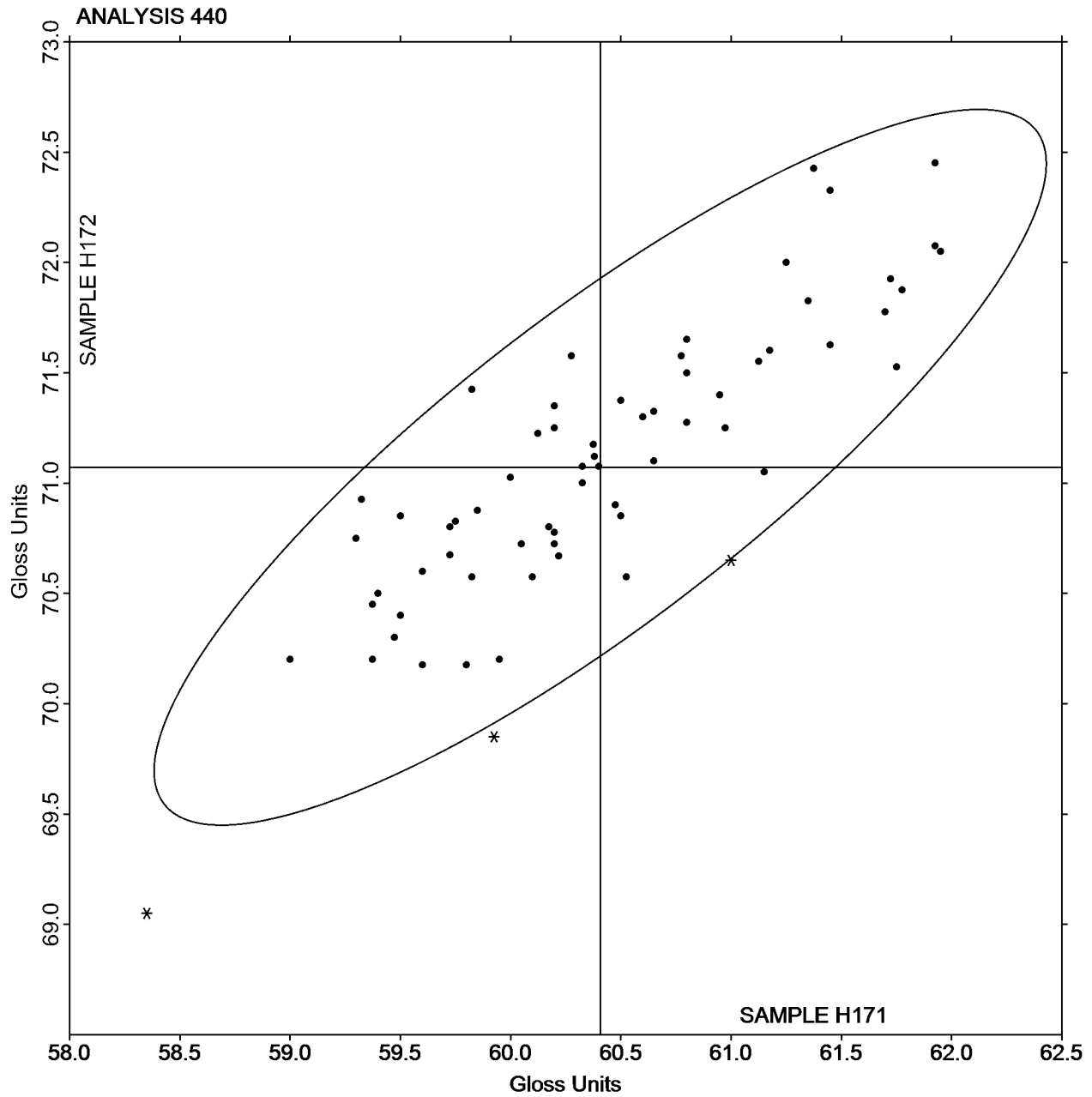
4th Qtr 2017

60 Degree Gloss - Paint Chips

ASTM Method D 523

SAMPLE H171 = 60.41 Gloss Units

SAMPLE H172 = 71.07 Gloss Units





Interlaboratory Testing Program for Color & Appearance

Report #182

Analysis 442

4th Qtr 2017

85 Degree Gloss - Paint Chips

ASTM Method D 523

| WebCode | Data Flag | Sample M171 | | | Sample M172 | | | Instr Code |
|---------|-----------|-------------|----------------------|--------|-------------|----------------------|-------|------------|
| | | Lab Mean | Diff from Grand Mean | CPV | Lab Mean | Diff from Grand Mean | CPV | |
| 7W8MGY | | 4.88 | 0.20 | 0.38 | 9.33 | 0.30 | 0.24 | GN |
| AWBJBR | | 4.83 | 0.15 | 0.29 | 9.50 | 0.48 | 0.38 | GL |
| CWM7FC | | 5.00 | 0.32 | 0.62 | 9.00 | -0.02 | -0.02 | WG |
| DBJT9P | | 4.90 | 0.22 | 0.43 | 9.85 | 0.83 | 0.66 | GL |
| HNVPEN | | 4.35 | -0.33 | -0.63 | 8.28 | -0.75 | -0.60 | GL |
| JHET2X | | 4.83 | 0.15 | 0.28 | 9.58 | 0.55 | 0.44 | GL |
| KQBNIW | | 4.90 | 0.22 | 0.43 | 9.45 | 0.43 | 0.34 | GL |
| L2KXNX | | 3.25 | -1.43 | -2.75 | 5.50 | -3.52 | -2.82 | GL |
| PPMWZM | | 5.00 | 0.32 | 0.62 | 9.93 | 0.90 | 0.72 | GN |
| TUNAAG | | 5.03 | 0.35 | 0.67 | 9.53 | 0.50 | 0.40 | GN |
| XTET46 | | 4.50 | -0.18 | -0.34 | 9.33 | 0.30 | 0.24 | XX |
| YQH28P | X | 61.33 | 56.65 | 109.27 | 72.10 | 63.08 | 50.47 | GL |

| Summary Statistics | |
|-----------------------------------------------------|------------------|
| Grand Means | |
| 4.68 Gloss Units | 9.02 Gloss Units |
| Std Dev Btwn Labs | |
| 0.52 Gloss Units | 1.25 Gloss Units |
| Statistics based on 11 of 12 reporting participants | |

Comments on Assigned Data Flags for Test #442

YQH28P(X) - Data for both samples are extremely high.

Key to Instrument Codes Reported by Participants

- GL BYK-Gardner micro-TRI-gloss
- GN BYK-Gardner new micro-TRI-gloss
- WG iWave WG68
- XX Instrument make/model not specified by lab



Interlaboratory Testing Program for Color & Appearance

Report #182

Analysis 442

4th Qtr 2017

85 Degree Gloss - Paint Chips

ASTM Method D 523

SAMPLE M171 = 4.68 Gloss Units SAMPLE M172 = 9.02 Gloss Units

