

Applications

Applications Note

Insight on Color

Vol. 14, No. 11

Calibration Verification, Calibration, and Certificates of Calibration

HunterLab offers several services to ensure proper calibration and accurate operation of your instrument.

I. Calibration Verification

HunterLab's calibration verification service is available for the following instruments:

- ColorFlex
- ColorQuest 45/0 LAV
- ColorQuest XE
- ColorQuest XT
- D25A
- D25L
- D25LT
- LabScan XE
- MiniScan XE Plus
- UltraScan XE
- UltraScan PRO
- UltraScan VIS.

The results of this check indicate whether the instrument is still in calibration or if it requires service. The report obtained at the end of the check is given to you and should be kept in a safe place.

The calibration verification service is generally performed in conjunction with a preventive maintenance service either at your site or at HunterLab. It involves reading a set of stable, colored tiles on your instrument through a special software package which then compares the instrument's readings to the tiles' target values. Each tile has a target value and a range of values around the target value that are considered acceptable based on the instrument's performance tolerances. Your instrument is unlikely to return the exact target value for a tile, but it should be close if the instrument is operating properly. The software assesses whether the instrumental result is within the acceptable range and assigns a pass or fail indicator.

For instance, the yellow tile might have target values of $L^* = 83.51$, $a^* = 1.68$, and $b^* = 76.40$ and the acceptable ranges for UltraScan XE are L^* between 83.26 and 83.76, a^* between 1.43 and 1.93, and b^* between 76.15 and 76.65. An instrument with a yellow tile reading of $L^* = 83.51$, $a^* = 1.52$, and $b^* = 76.30$ would pass the yellow tile check because all values fall within the specified ranges, while an instrument with yellow tile values of $L^* = 83.78$, $a^* = 1.45$, and $b^* = 76.08$ would fail because the L^* and b^* values are outside the acceptable range.

- Pass indicates that the X, Y, and Z (or L, a, and b) values read by your instrument for the standard tile fall within the specified range. If readings for all tiles pass, the instrument passes the calibration verification and no service is required.
- Fail indicates that the X, Y, and Z (or L, a, b) values read by your instrument for the standard tile fall outside the specified range. If readings for any tile fail, the instrument fails the calibration verification check and service on the instrument should be performed.

Note: Target values and ranges differ by instrument, are proprietary to HunterLab, and are subject to change without notice.

The calibration verification check is ordinarily run at the beginning of an instrument service session to give the technician an idea of its performance, and then run again after maintenance and any required service is performed. If the instrument still fails the check after it is serviced, recalibration of the instrument at HunterLab is recommended.

When the check is complete, HunterLab then provides a signed Calibration Verification Report. An example report is shown on the next page.

The calibration verification service is billed at a flat rate, which is added to the cost of your normal preventive maintenance or service call. All parts and labor associated with instrument repairs are billed separately. Contact HunterLab Technical Support for pricing.



Hunter Associates Laboratory
Performance Plus Verification Service

Calibration Verification Report

Date/Time: 1/25/02 10:25:06 AM

INSTRUMENT INFORMATION

Owner Name: **Hunter Associates Laboratory, Inc.** Type: **ColorQUEST Sphere**
 Address: **11491 Sunset Hills Road** Description: **ColorQUEST II (Sphere)**
 City/State/Zip: **Reston, VA 20190** Serial Number: **6103**
 Country: **USA** Condition: **Good**

TEST RESULT: PASS

Individual Tile Results

Temperature (deg. F) **71.4**
 Illuminant/Observer: **D65/2**

Tile Name	Tile Color	Readings (XYZ)			Pass/Fail
C83-2	Sat. Blue	11.29	12.35	26.08	Pass
C83-3	Sat. Yellow	54.49	54.7	8.36	Pass
C83-4	Sat. Red	21.74	14.00	6.09	Pass
C83-5	Sat. Green	19.03	25.46	21.81	Pass
C83-6	Dark Grey	8.85	9.34	10.16	Pass
C83-7	Pastel Blue	39.52	44.46	61.25	Pass
C83-8	Pastel Yellow	58.65	61.84	40.70	Pass
C83-9	Pink	49.25	46.27	41.57	Pass
C83-10	Pastel Green	39.20	46.57	44.61	Pass

TESTING LAB INFORMATION

Name: **Hunter Associates Laboratory, Inc.** Report Number: **75797670**
 Address: **11491 Sunset Hills Road** Technician Name: **C. Zarobila**
Reston, Virginia 20190 U.S.A.
 Phone: **(703) 471-6870**
www.hunterlab.com Technician Signature _____

HunterLab recommends re-testing of this instrument within 15 months from the date of this report.

II. Calibration

True instrument recalibration, which must be performed at HunterLab, involves checking the instrument against a master set of colored, calibrated tiles (in a fashion very similar to that described for the calibration verification described above), noting what tiles are failing, and then servicing the instrument so that the instrument will read all the tiles within the acceptable range. At this time, the instrument's white tile is recalibrated and the green tile (for spectrophotometers) or colored tiles' (for D25s) "values read at factory" reassigned. This service, recalibration, and reassignment of values ensures that the instrument now reads accurately.

Note: Target values and ranges differ by instrument, are proprietary to HunterLab, and are subject to change without notice.

Often, customers will request that an instrument be recalibrated and then when it arrives at HunterLab it already reads all tiles acceptably. In this case, the instrument is not recalibrated, as it is unnecessary. Rather, the customer is then ensured that the instrument is "still calibrated."

Calibration and calibration checking is provided at HunterLab's normal service labor rate. Additional fees for calibration files or EPROMs may be applicable. Contact HunterLab Technical Support for pricing.

III. Certificates of Calibration

A certificate of calibration is created when the instrument is recalibrated. For this reason, they may only be provided with service that is performed at HunterLab. The certificate generated lists the master tiles read, the instrument readings, and the range within which the readings must fall for measurements made on your instrument before calibration and then again after calibration so you can see the improvement. An example certificate is shown on the next few pages. This will be given to you and should be kept in a safe place.

Note: Target values and ranges differ by instrument and are subject to change without notice.

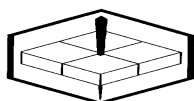
The certificate of calibration package is billed at a flat rate and includes preventive maintenance on the instrument, the certificate of calibration, a certificate of traceability for the recalibrated white tile, and an updated calibration file or EPROM. All parts and labor associated with instrument repairs are billed separately. Contact HunterLab Technical Support for pricing.

November 21, 2000

Certificate of Instrument Calibration for HunterLab ColorFlex

This certificate certifies that instrument model ColorFlex, serial number CX0000 conforms with HunterLab's Engineering Performance Specification A50-1010-756 for reproducibility. The performance specification tests for reproducibility using HunterLab master standards set identified as HCL-215. HunterLab's Engineering documents are proprietary information, which are on file at HunterLab and will remain the property of HunterLab. A service report will document the repairs made to the instrument.

Mary Ellen Zuyus
Director, Technical Service



HunterLab

11491 Sunset Hills Road
Reston, VA 20190

Values read on
your instrument
are filled into
blocks

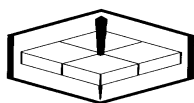
Phone: (703) 471-6870
FAX: (703) 471-4237

**ColorFlex 45/0 Specifications
BEFORE**

Tile		L^*	a^*	b^*
Pale Grey	Min	82.27	-.54	.20
	Max	82.44	-.41	.47
Mid Grey	Min	55.24	-.59	-.03
	Max	55.50	-.42	.38
Diff. Grey	Min	55.76	-2.40	2.11
	Max	55.96	-2.21	2.55
Deep Grey	Min	25.06	-.58	.52
	Max	25.74	-.16	1.03
Deep Pink	Min	38.28	27.98	4.13
	Max	38.68	28.40	4.86
Red	Min	33.28	51.05	38.68
	Max	33.87	51.69	41.23
Orange	Min	63.74	42.70	61.13
	Max	64.27	43.34	62.53
Bright Yellow	Min	81.98	2.04	87.24
	Max	82.21	2.70	88.75
Green	Min	50.66	-32.77	15.78
	Max	50.93	-32.11	16.73
Diff.Green	Min	51.21	-32.90	19.14
	Max	51.49	-32.23	20.21
Cyan	Min	51.79	-19.47	-30.20
	Max	52.10	-18.66	-29.45
Deep Blue	Min	9.10	19.76	-34.26
	Max	10.94	21.11	-32.63
Erie Ceramic	Min	93.83	-1.04	.17
	Max	93.93	-.96	.29

Instrument Serial No.:

Date:

**HunterLab**11491 Sunset Hills Road
Reston, VA 20190Phone: (703) 471-6870
FAX: (703) 471-4237

ColorFlex 45/0 Specifications AFTER				
<i>Tile</i>		<i>L*</i>	<i>a*</i>	<i>b*</i>
Pale Grey	<i>Min</i>	82.27	-.54	.20
	<i>Max</i>	82.44	-.41	.47
Mid Grey	<i>Min</i>	55.24	-.59	-.03
	<i>Max</i>	55.50	-.42	.38
Diff. Grey	<i>Min</i>	55.76	-2.40	2.11
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	<i>Max</i>	10.94	21.11	-32.63
Erie Ceramic	<i>Min</i>	93.83	-1.04	.17
	<i>Max</i>	93.93	-.96	.29

Instrument Serial No.:

Date:

For Additional Information Contact:

Technical Services Department
Hunter Associates Laboratory, Inc.
11491 Sunset Hills Road
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Telephone: 703-471-6870
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