

Applications Note

AN 1113

$\Delta = 2t + \frac{\lambda}{2}$ (must equal a whole number of λ for a bright fringe or

$$n\lambda = 2t + \frac{\lambda}{2}$$

$$t = \frac{n\lambda - \frac{\lambda}{2}}{2} = \frac{\lambda}{2} \left(n - \frac{1}{2} \right)$$

substituting

$$D^2 = 2r \left[\frac{\lambda}{2} \left(n - \frac{1}{2} \right) \right]$$



ISO 9000 Part III: Certification/Confirmation of HunterLab's Instruments

... guidance is given by HunterLab in its User's Manuals, Service Manuals, and other documentation such as this Applications Note.

Abstract

This note provides additional information regarding Section 4.3 of "Quality assurance requirements for measuring equipment," International Standard ISO 10012-1:1992(E). Summary information was provided in Part I of this series of Applications Notes and will be quoted here. In order to be consistent with the ISO publication, you and your company (the user of HunterLab equipment) will be referred to here as "the Supplier."

Note: This information is presented as a guide only. HunterLab makes no claims concerning your potential ISO 9000 certification and your requirements may differ slightly from those suggested here.

A. You must have a system in place for the management, confirmation, and use of the measuring equipment and instrument standards.

This is the responsibility of the Supplier, but guidance is given by HunterLab in its User's Manuals, Service Manuals, and other documentation such as this Applications Note. This system would include information on how often and how to calibrate the instrument, how to confirm that the instrument is operating properly, and how to perform normal measurements on the instrument. You would also want to outline a maintenance schedule for the instrument and a recalibration system for the instrument standards.

An example of a method you might implement for confirmation of long-term performance of a spectrophotometer (in this case, 45/0 Instrument) is given below. Similar methods could be implemented for other types of instrument checking, calibration, and normal instrument operation.

Green Tile Check

Once a week, at the beginning of Monday's day shift, perform the green tile check as described below.

1. Standardize the spectrophotometer using the regular (1-inch) port.
2. Set up the Master Color Data display to show absolute XYZ values using the D₆₅ illuminant and 10° observer.
3. Set the software to average two measurements.
4. Place the green tile face down at the instrument port. Try to center the tile at the port.
5. Read the tile.
6. Rotate the tile 90° and measure it again.
7. Look at the average of the two readings and compare it to the Values Read at Factory recorded on the back of the tile. If the read values agree with the Values Read at Factory to within ± 0.3 XYZ units for all three parameters, record the read XYZ values in the Green Tile Log and the test is complete. If any of the three read values is more than 0.3 XYZ units from the Values Read at Factory, continue with the next step.
8. Clean the white and green tiles and the black glass and then perform the test again beginning with standardization. If the values are still not within the range specified, call the Shift Supervisor.

The Shift Supervisor would then also have a procedure to follow which might include such steps as a repeatability check and changing the lamp. Note that the green tile readings in this example were recorded in a log. Tracking of diagnostic data in logs, trend charts, or Statistical Process Control (SPC) is recommended.

B. Each instrument shall have an authorized officer to ensure the operation of the unit.

This officer would be appointed by the Supplier and be a member of the Supplier's staff. This person should be familiar with operation and maintenance of the instrument in order to train and supervise other operators and should be the Supplier's liaison with HunterLab in case of problems. In order to assist you, various types of training are available directly through HunterLab, both for this authorized officer and for normal operators. Call HunterLab's Richard S. Hunter Color Institute (703-471-6870) for more information about our Regional Color Seminars, Appearance Workshops, Color Technician Training, and/or On-site Training.

c When the instrument or standards are replaced or recalibrated, ISO procedures must be followed.

HunterLab is itself an ISO 9001-certified company. HunterLab supplies documents that provide evidence of the traceability of standards used to set the instrument photometric top of scale. Most HunterLab standards are traceable to National Institute of Standards and Technology (NIST) measurements. Notable exceptions include 20° TAPPI gloss and 75° TAPPI gloss standards and the standards for some custom modified instruments. Details concerning Certificates of Traceability will be covered in another Applications Note in this series. For customers who wish to provide evidence that their instrument is operating within manufacturing tolerances, HunterLab can also provide a Certificate of Instrument Calibration. An example is provided below.

A Certificate of Calibration attests that an instrument is in proper working condition and meets HunterLab's reproducibility specification. HunterLab recommends that a Certificate of Calibration be obtained for every benchtop and hand-held colorimeter, spectrophotometer, and glossmeter once a year (although policies of Suppliers may vary.) A certificate is obtained by sending the instrument to HunterLab's Service Department. The instrument is cleaned, and voltages, A/D counts, and other levels are adjusted as required. After all required maintenance is completed, performance testing is done and the results provided with the Certificate of Calibration. The instrument and certificate are generally returned after 3-5 business days. For more information on Certificates of Calibration, contact HunterLab's Field Service Department at 703-471-6870.

About HunterLab

HunterLab is the technology leader in color measurement solutions, providing instruments, software, knowledge and service to a wide variety of industries. With over 5 decades of experience in more than 65 countries, HunterLab applies our leading edge technology to your products helping you measure and communicate color simply and effectively.

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