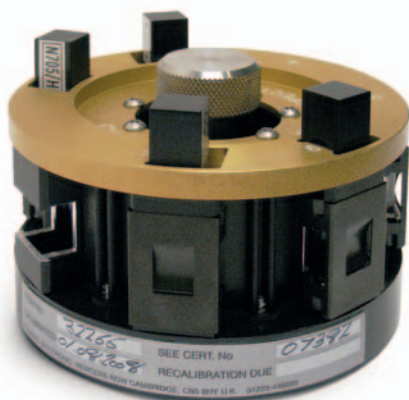


Ensure the accuracy and reliability of your data while saving time and money with hands free performance verification for your Thermo Scientific spectrophotometer in accordance with USP regulations and GMP or GLP procedures.

Accessories for Automated Performance Verification

NIST/NPL-traceable standards for automated performance verification



Simplify your qualification procedures (IQ, OQ, PQ, RQ) with automated performance verification accessories. Automated accessories provide a rapid, accurate and reliable way to verify your spectrophotometer's performance in accordance with the United States Pharmacopeia (USP) and Good Manufacturing or Laboratory Practice procedures (GMP or GLP). See Thermo Scientific Application Note No. 51111 *U.S. and European Pharmacopoeias and UV-Visible Spectrophotometers* for more information on these requirements.

Automated performance verification saves time and money by reducing the amount of hands-on time required to complete qualification and testing. Automating testing can save more than four hours of your analyst's time (see Table 1), thereby improving the efficiency of your laboratory. Combining a CVC and mercury lamp accessory automates testing over the entire UV to near IR region from 254 to 810 nm.

To perform testing, the user simply selects the desired tests from the software menu, presses the test button to run them, and returns to collect the results when the tests are complete. The Thermo Scientific VISION^{pra}™ or VISION^{security}™ software generates a full report, which can be signed electronically and printed for insertion into your compliance log book. See Thermo Scientific Technical Note No. 51686 *Performance Verification of the Evolution 300 UV-Visible Spectrophotometer in the Regulated Laboratory* for information on performing verification testing.

Automated testing includes parameters for:

- Wavelength Accuracy
- Wavelength Repeatability
- Photometric Accuracy
- UV Photometric Accuracy
- Photometric Repeatability
- Stray Light
- Photometric Noise
- Photometric Stability or Drift
- Baseline Flatness
- Bandwidth Accuracy

Advantages of Automated Performance Testing

Automated testing reduces the potential for human and transcriptional errors by:

- Automatic detection of serial numbers associated with standards
- Eliminating the need to copy standard values from certificates
- Eliminating the need to analyze standards individually
- Eliminating the need to match standards to data
- Eliminating the need for manual calculations
- Eliminating the need for manual transcription and reporting of results

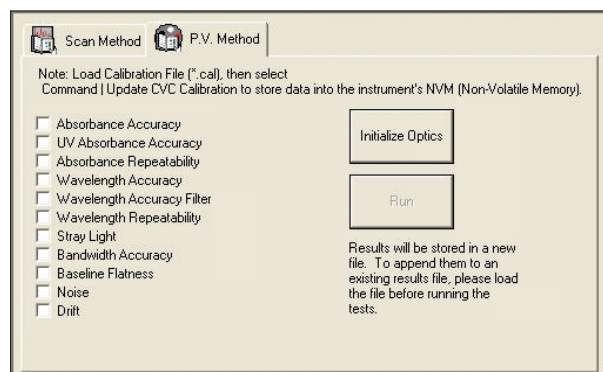


Table 1: Timetable for Automated vs. Manual Performance Verification Testing

| PV Test Performed | Automated Standard | Total Automated Method Time (minutes) | Manual Standard | Manual Measurement Time (minutes) | Manual Calculation Time (minutes) | Total Manual Method (minutes) |
|----------------------------------------|--------------------------------|---------------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|-------------------------------|
| Wavelength Accuracy | Mercury Lamp | 5 | Holmium Perchlorate Solution | 10 | 15 | 25 |
| Wavelength Repeatability | Mercury Lamp | 8 | Holmium Perchlorate Solution | 36 | 32 | 68 |
| Photometric Accuracy | Potassium Dichromate | 2 | Neutral Density Filter (Vis Only) | 6 | 20 | 28 |
| UV Photometric Accuracy | Potassium Dichromate | | Potassium Dichromate | 2 | | |
| Photometric Repeatability | Neutral Density Filter | <1 | Neutral Density Filter | 4 | 12 | 16 |
| Stray Light | 220 and 340 nm Cut-off Filters | 1 | Sodium Iodide | 4 | 15 | 19 |
| | | | Sodium Nitrite | | | |
| Photometric Noise | Clear Beam Filter | 7 | Clear Beam (0A) | 7 | 13 | 20 |
| | Neutral Density Filter (1A) | | Neutral Density Filter (1A) | | | |
| Photometric Stability (Drift) | No External Standard | 60 | No External Standard | 60 | 10 | 70 |
| Baseline Flatness | No External Standard | 12 | No External Standard | 12 | 5 | 17 |
| Bandwidth Accuracy | Mercury Lamp | 3 | Mercury Lamp | 10 | 15 | 25 |
| Total Time for Automated Method | | 100 minutes | Total Time for Manual Method | | 288 minutes | |
| Total Time for User | | 2–3 minutes | Total Time for User | | 288 minutes | |

Calibration Validation Carousel (CVC)

Each CVC is supplied with its own unique serial number matched to a data file containing the calibrated values of the standards and the instrument specifications. Standards within the CVC (Table 2) are certified in Thermo Fisher Scientific's own ISO/IEC 17025 accredited standards laboratory and traceable to the National Institute of Standards and Technology (NIST) in the United States or the National Physical Laboratory (NPL) in the United Kingdom. The ability to perform re-certifications in our factory provides an improved turn around time for all Thermo Scientific standards.

Mercury Lamp Accessory

The mercury lamp is recommended by the USP as the preferred standard for testing wavelength accuracy. The mercury lamp accessory¹ is not only a useful tool for PV testing, but it gives laboratory personnel the added benefit of performing an instrument calibration as it was performed at the factory. The calibration method uses seven mercury lamp lines from wavelength 253.65 to 810 nm and uses a unique calibration curve for every spectral bandwidth available. See Thermo Scientific Application Note No. 51171 *Wavelength Accuracy – Measurement and Effect on Performance in UV-Visible Spectrophotometry* for more information.

Notes

- The mercury lamp accessory is available for the Evolution 300 and 600 models only. A deuterium lamp source may also be used for bandwidth and wavelength measurements, where applicable.

Table 2: USP Compliant Calibration Validation Carousel (CVC) Standard Configuration

| CVC | Position Standard | Test Performed |
|-----|------------------------------|---------------------------------------|
| 1 | Open | Photometric Noise and Stability |
| 2 | Holmium Perchlorate Solution | Wavelength Accuracy and Repeatability |
| 3 | Neutral Density Filter | Noise at 1A Specification |
| 4 | Open | |
| 5 | Potassium Dichromate | Photometric Accuracy |
| 6 | 220 nm Cut-off Glass Filter | Stray Light |
| 7 | 340 nm Cut-off Glass Filter | Stray Light |

Ordering Information

Accessories for the Thermo Scientific Evolution 300 and 600 UV-Visible Spectrophotometers

| Description | Part Number |
|--------------------------------------------------------------|-------------|
| Smart Calibration Validation Carousel (CVC) – NIST-traceable | 10010721 |
| Smart Calibration Validation Carousel (CVC) – NPL-traceable | 10010621 |
| Mercury Lamp Accessory – Evolution 300 | 10020201 |
| Mercury Lamp Accessory – Evolution 600 | 10022101 |

Accessories for the Thermo Scientific AquaMate Plus, BioMate 6, Evolution 160, Helios Zeta/Omega, and UV-10 UV-Visible Spectrophotometers

| Description | Part Number |
|--------------------------------------------------------|--------------|
| Calibration Validation Carousel (CVC) – NIST-traceable | 9423UV61460E |
| Calibration Validation Carousel (CVC) – NPL-traceable | 9423UV61400E |