

## Thermo Scientific Mercury Lamp Accessory

Primary standard for wavelength and bandwidth accuracy

Recommended by the USP, EP and ASTM for verification of wavelength accuracy, a mercury lamp accessory is a cost-effective standard that does not require recalibration. Thermo Scientific Mercury Lamp accessories provide the added benefit of allowing you to perform an instrument wavelength calibration exactly as it was performed at the factory.



The emission spectrum of a mercury lamp has a number of intense lines covering the UV and visible range. The frequencies of these lines are inherent, fundamental physical properties of mercury and do not change. Therefore, mercury lamps are primary standards and do not require recalibration, making them a dependable, economical solution for ensuring the performance of your Thermo Scientific UV-Visible spectrophotometer. Mercury lamp accessories can be used for:

- Verification of wavelength accuracy and repeatability
- Verification of bandwidth accuracy
- Instrument recalibration

Figure 1 shows the emission spectrum of a Mercury Lamp accessory in a Thermo Scientific Evolution 600 spectrophotometer.

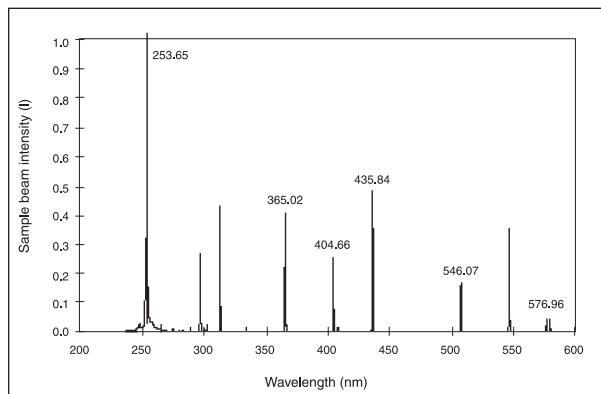


Figure 1: The emission from a Mercury Lamp accessory measured on an Evolution 600 UV-Visible spectrophotometer

### Wavelength Accuracy and Repeatability

Automated wavelength accuracy and repeatability performance verification (PV) tests are available when a Mercury Lamp accessory is installed. These tests evaluate wavelength accuracy across the UV-Visible spectrum at the wavelengths given in Table 1. The permitted tolerances for wavelength accuracy are provided in the specifications for each spectrophotometer model.

For more information on wavelength accuracy, see Thermo Scientific technical note *TN51151 – Wavelength Accuracy – Measurement and Effect on Performance in UV-Visible Spectrophotometry*.

Wavelength repeatability is measured using the same mercury lines as wavelength accuracy. A series of ten successive scanning measurements are made and the standard deviation is calculated and compared to the instrument's specification.

## Bandwidth Accuracy

Spectral bandwidth is the wavelength interval of radiation leaving the exit slit of the instrument's monochromometer measured at one half of the peak maximum.<sup>1</sup> The spectral bandwidth of an instrument affects both peak resolution and signal-to-noise ratio. Mercury Lamp accessories allow the user to verify the bandwidth accuracy of the instrument across the UV to near IR region of the spectrum.

## Instrument Recalibration

When required tolerances for wavelength accuracy are not met, as may occur following the replacement of an optical component, a wavelength recalibration is necessary. Recalibration using the Mercury Lamp accessory allows the user to recalibrate the instrument exactly as it was in the factory. This recalibration re-measures all relevant emission lines from 250 to 810 nm, then recalculates and replaces the software compensation equation. Unique calibration curves are generated for each spectral bandwidth available on your instrument.

## Ease of Use

Mercury lamp accessories for the Evolution™ 600, 300 and 200 series UV-Visible spectrophotometers are inserted into a lamp position within the optical system. The lamps are easy to install, require no alignment and are automatically detected by the software.<sup>2</sup> No additional power supply is necessary as the accessory is run completely from the spectrophotometer.

Evolution 600 (nm)	Evolution 300 (nm)	Evolution 200 Series (nm)
253.65	253.65	253.65
269.73	296.73	—
—	—	365.48
404.66	404.66	—
435.84	435.84	435.84
546.07	546.07	546.07
763.51	760.95	—
871.68	871.68	871.68

Table 1: Mercury lines used for Wavelength Accuracy Performance Verification tests in the Evolution 600, 300 and 200 Series UV-Visible spectrophotometers

## Notes and References

1. ASTM E 958 – 93 Standard Practices for Measuring Practical Spectral Bandwidth of Ultraviolet-Visible Spectrophotometers.
2. The Mercury Lamp accessory is compatible with Thermo Scientific INSIGHT, Thermo Scientific INSIGHT Security, Thermo Scientific VISION<sup>pro</sup>, Thermo Scientific VISION<sup>security</sup>, Thermo Scientific VISION<sup>lite</sup> and appropriate local control software.

## Ordering Information

Accessories	Part Number
Mercury Lamp Accessory – Evolution 600	10022101
Mercury Lamp Accessory – Evolution 300	10020201
Mercury Lamp Accessory – Evolution 200 Series	840-211300