

Waters® 2487 Dual Wavelength Absorbance Detector

Maintain superior chromatographic sensitivity throughout the life of a lamp

Excellent Signal-to-Noise Performance via Superior Hardware Design

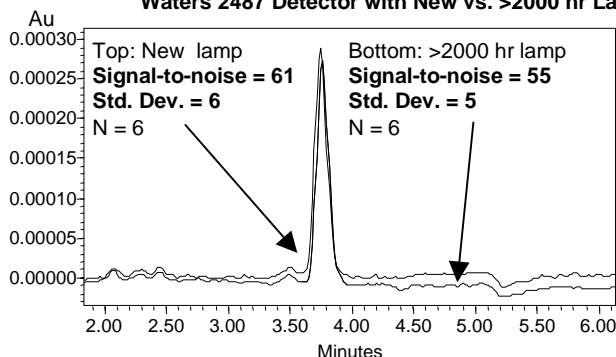
The Waters 2487 detector with its integral TaperSlit™ flow cell design helps chromatographers obtain the highest degree of sensitivity possible for the optimal detection of compounds. Previous Waters Performance PerSPECTives (WPP23, WPP28 and WPP29) have detailed the impact this unique flow cell design has on signal-to-noise performance. This Performance PerSPECTive highlights how the Waters 2487 Lamp Optimization Software also contributes to the performance characteristics of this next generation detector.

Waters 2487 Lamp Optimization Software

When a detector lamp ages, reduced lamp energy may decrease detection sensitivity as baseline noise levels increase. Changes in sensitivity, also defined as the signal-to-noise (S/N) ratio, can potentially effect the limit of detection (S/N=3) and limit of quantitation (S/N=10) of the analytical method and adversely impact analytical precision at low concentrations. In order to consistently obtain high quality data, chromatographers often replace the detector lamp after a predetermined time interval (e.g., > 2000 hrs). Compared to traditional UV/Vis detectors, use of Waters 2487 Lamp Optimization Software effectively maximizes signal-to-noise performance during lamp aging which significantly extends the useful life of the lamp. This is accomplished by the software's ability to select the optimal exposure time for the sample and reference diodes based upon the lamp energy and wavelength range chosen for the analysis. This optimization procedure is performed automatically on power-up of the detector and requires no manual adjustments by the user.

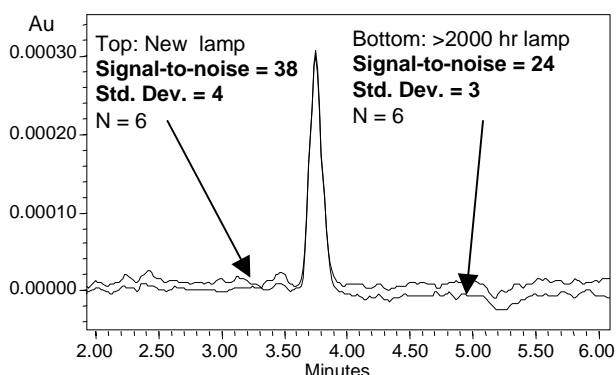
Shown below are data collected with the Waters 2487 detector compared to results obtained using a UV/Vis detector that lacked software based, lamp optimization ability. Data collected on the same 2487 detector with lamps of different age yielded statistically similar signal-to-noise ratios for the analysis of caffeine at 272nm. By comparison, signal-to-noise values were statistically lower when an older lamp was used in the detector that lacked lamp optimization ability.

Waters 2487 Detector with New vs. >2000 hr Lamp and Lamp Optimization Software



Column: Symmetry® C18 (4.6 x 150mm)
 Eluent A: Water with PIC® A
 Eluent B: Water/methanol (40:60) with PIC A
 Flow: 1.0 ml/min of 50%A / 50% B
 Sample: 0.625ngs of caffeine injected
 Temp: 30°C
 Detection: 272nm

Traditional UV/VIS Detector with New vs. >2000 hr Lamp (Lamp Optimization Not Available)

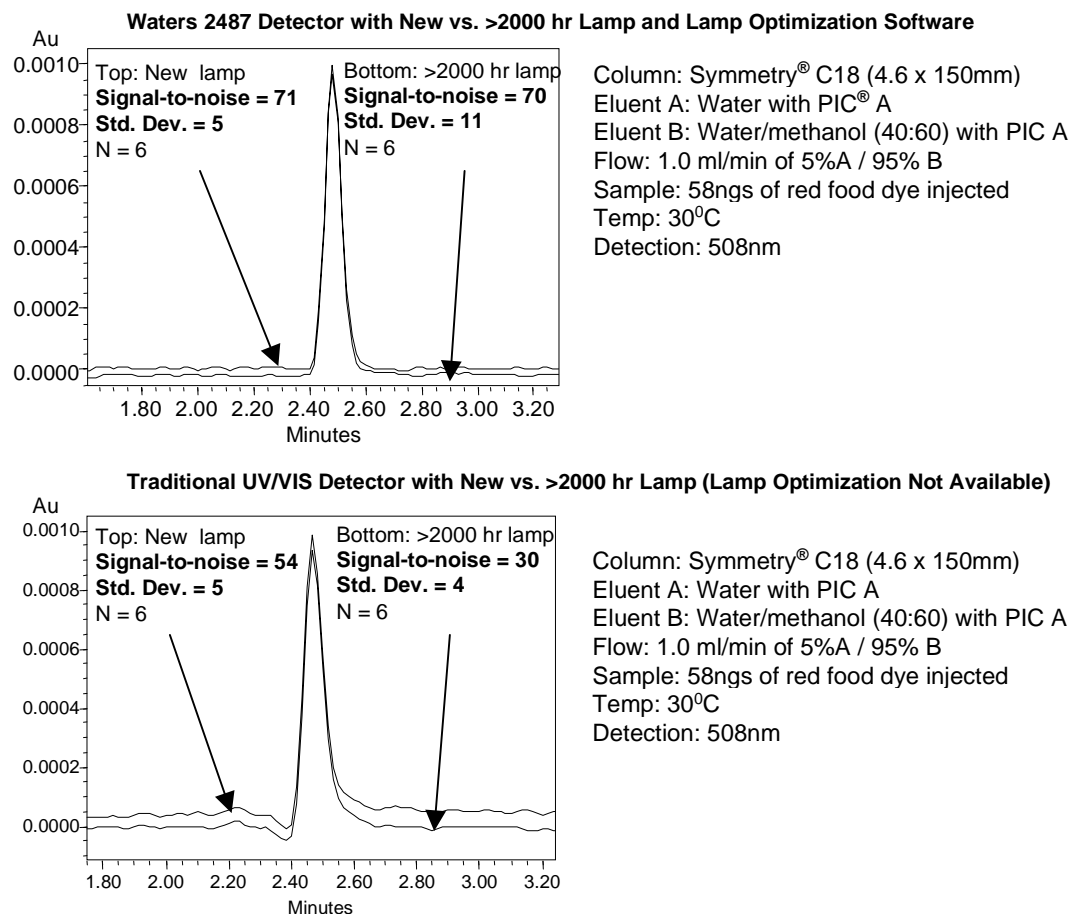


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Effect of Lamp Optimization Software in Visible Wavelength Range

As previously indicated, Waters Lamp Optimization Software automatically maximizes signal-to-noise detector performance throughout the wavelength range collected. Not only are consistent results obtained for compounds that absorb in the UV detection range (<350nm), but high quality data with new as well as older lamps can be obtained at wavelengths up to 700nm without resorting to dual lamp operating approaches.

Shown below are data collected at 508nm with the Waters 2487 detector and a "traditional" UV/Vis detector. Again, no signal-to-noise performance differences were observed when a red food dye was detected using the Waters 2487 detector with lamps of different vintage. By comparison, a statistically lower signal-to-noise performance was noted when an older lamp was used for the analysis in the detector that lacked the benefits of Lamp Optimization Software.



Summary

The Waters 2487 detector with its integral TaperSlit™ flow cell design features extended dynamic range and linearity for accurate quantitation across a wide concentration range (WPP36). This unique and patented flow cell design also provides reduced noise and increased signal across all wavelengths (WPP23).

As demonstrated in this Performance PerSPECTive, the Waters 2487 Lamp Optimization Software maintains the exceptional signal-to-noise characteristics of the detector across the life of the lamp. This allows the chromatographer to have confidence that the quantitative parameters for an established method (e.g., limit of detection or limit of quantitation) can be maintained throughout the useful life of the lamp.

The Waters 2487 Lamp Optimization Software also effectively allows a single lamp to be used for the analysis of compounds in both the UV and Vis wavelength ranges. By extending useful lamp life, less frequent lamp changes and detector re-validation are required. These features translate to reduced operator intervention with resultant time and cost savings.

Special thanks to Jon Mulvany for providing data for this study