Waters
THE SCIENCE OF WHAT'S POSSIBLE.™

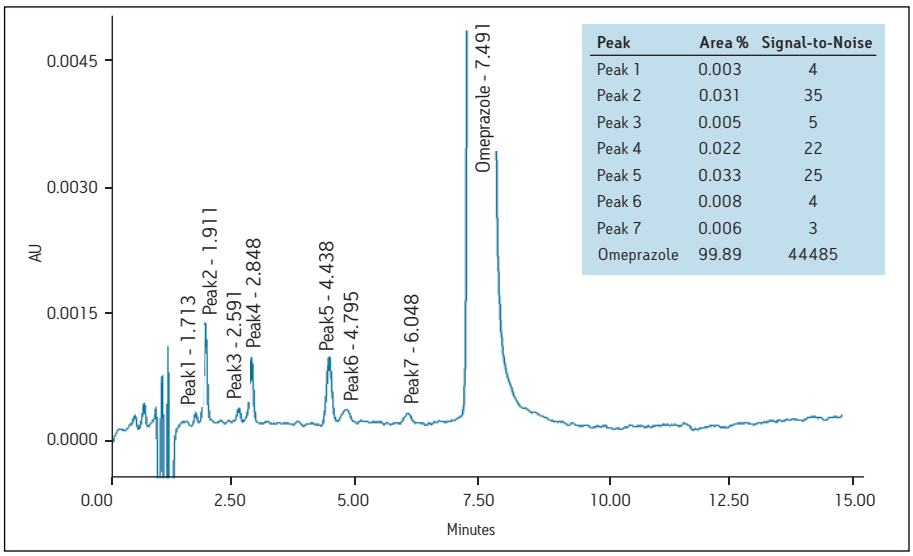
2998 PDA Detector

Ultimate chromatographic sensitivity in photodiode array detection

2998 Photodiode Array Detector.

THE PERFECT MATCH FOR ANY LC SYSTEM

Waters® 2998 Photodiode Array (PDA) Detector is designed to complement our LC and LC/MS systems. Its uniquely integrated software and optics innovations deliver no-compromise chromatographic and spectral sensitivity, and a noise specification, as low as 10 µAU. It is the ideal detector for any lab application, from compound identification to method development. For routine analyses, the 2998 PDA Detector is reliable, easy-to-use, and has enhanced software control to provide flexibility for simultaneous 2D and 3D operation with either Empower® or MassLynx® software.



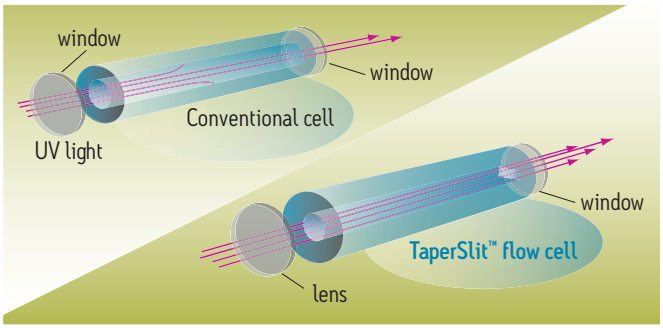
Peak	Area %	Signal-to-Noise
Peak 1	0.003	4
Peak 2	0.031	35
Peak 3	0.005	5
Peak 4	0.022	22
Peak 5	0.033	25
Peak 6	0.008	4
Peak 7	0.006	3
Omeprazole	99.89	44485

2998 PDA Detector enables exceptional signal-to-noise (S/N) ratios to quantify low-level impurities, and determine trace components.

The 2998 PDA Detector provides:

- Unprecedented trace impurity detection and quantification.
- Definitive compound identification and co-elution detection.
- Superior linear range with constant optical bandpass.
- Uncomplicated method development.

GROUND-BREAKING TECHNOLOGY TAKES PDA DETECTION TO THE NEXT LEVEL



Patented TaperSlit™ flow cell*

- Maximizes energy throughput.
- Eliminates refractive index effects.
- Maintains good peak shape, ensuring the highest sensitivity while maintaining optimal spectral performance.

Lamp optimization

- Designed to automatically maximize signal-to-noise in both the visible and UV spectra with the use of a single Deuterium lamp.
- Extends the useful life of the lamp for consistent results over time.

Thermal wander management

- Provides maximum baseline stability by managing the effects of ambient temperature and humidity changes.
- Minimizes vulnerability to hostile environmental conditions.
- Stabilizes long-term baseline wander for high-sensitivity analysis.

Spectral exposure optimization

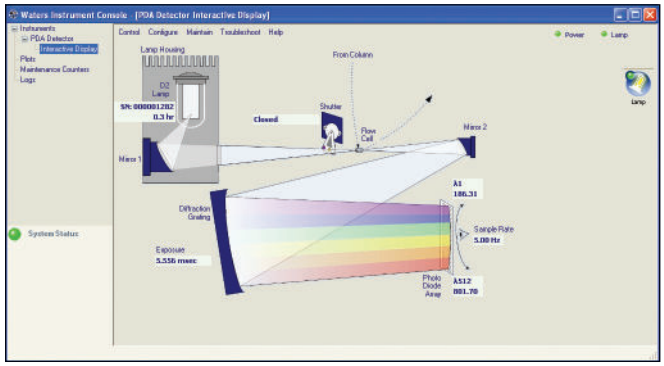
- Maximizes the signal-to-noise across the entire wavelength range.
- Improves noise performance in lower energy regions of the spectrum while maintaining optimal performance across the range.

Console software

The 2998 PDA detector is equipped with a customizable instrument console compatible with both Empower and MassLynx software, enabling users to easily stay in control. Instrument setup, status monitoring, and diagnostics are easily accessible through the software's intuitive, easy-to-learn interface.

The console interface:

- Uses a simple navigational approach, for easy system implementation and instrument usability.
- Allows for quick and easy access to critical instrument parameters, enabling the detector to be easily controlled, monitored, and diagnosed.



Instrument console, 2998 PDA Detector interactive display.

*Patent Number: 5,883,721 (U.S.)

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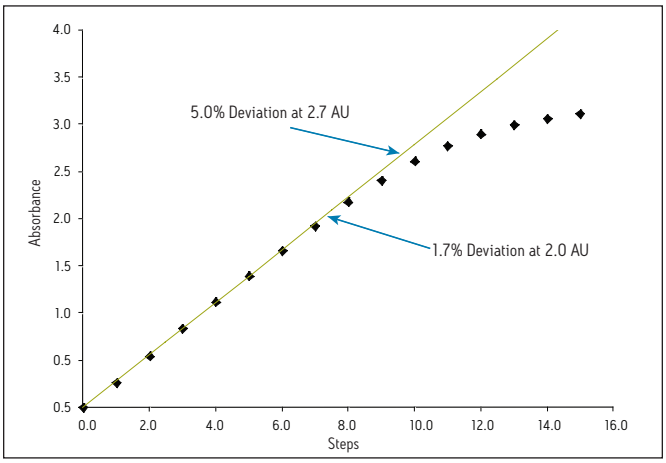
2998 PDA Detector with its choice of flow cells can easily be integrated into Waters HPLC and LC/MS system solutions, such as the Alliance® HPLC System.

OPTIMIZE YOUR DETECTION AND RESOLUTION WITHOUT COMPROMISE

Superior linearity

Wide linear dynamic range allows for simultaneous quantification of high- and low-level components within a single chromatographic separation.



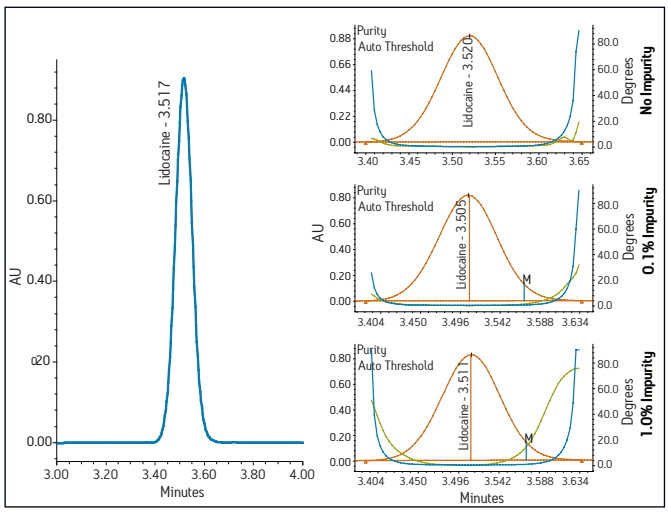
Wide linear dynamic range is demonstrated by the linearity plot of propyl paraben at 257 nm.

Optical and digital resolution

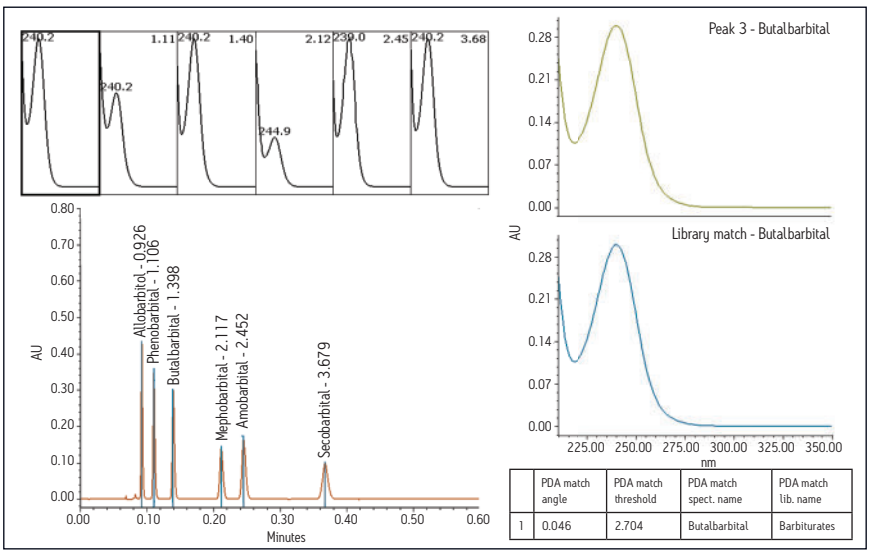
The 2998 PDA Detector operates at a fixed optical resolution of 1.2 nm, providing high-quality spectral resolution. The low detector noise performance allows you to operate at maximum digital resolution and not sacrifice linearity.

Reliable co-elution detection

The 2998 PDA Detector combined with Empower software employs powerful capabilities for determining spectral homogeneity, yielding confidence in method specificity.



Spectral analysis algorithms can aid in the assessment of peak purity. When low levels of an impurity were spiked into a sample as shown in this lidocaine example, the spectral analysis software was able to detect the impurity at levels as low as 0.1%.



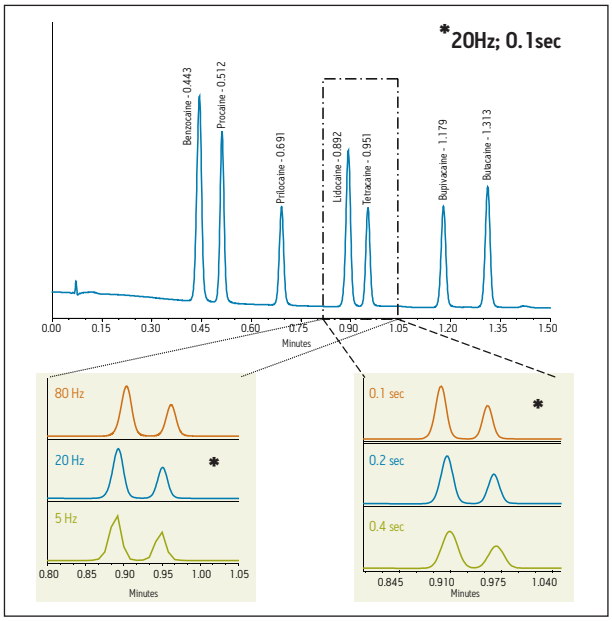
Definitive compound identification

While most PDA detectors can distinguish between compounds possessing comparatively large spectral differences, the 2998 PDA Detector can differentiate between the spectra of closely-related compounds.

Spectral analysis algorithms can distinguish closely related compounds, as shown in this barbiturates example, providing reliable library matching.

Fast HPLC with Intelligent Speed Columns

Supporting data rates up to 80 Hz, the 2998 PDA Detector allows for the independent optimization of data rates and filtering constants. This enables the accurate and reproducible quantitation of today's fast LC separations, which generate peaks only a few seconds wide, as seen with the Alliance HPLC System and Intelligent Speed™ Columns.



Independent manipulation of data rate and digital filtering results in ideal resolution, sensitivity, and repeatable quantification. In this example showing seven anesthetics, optimization of these parameters yielded a separation in less than 1.5 minutes with baseline resolution.

Powerful PDA data processing with Empower Software

Demonstrate peak homogeneity

Visualize any differences in spectra by using the Spectrum Index Plot to display apex spectrum and other peak spectra – all corrected for noise and normalized in a color-coded overlay plot.

Quantify peak purity

For a more quantitative analysis, the Purity Angle Plot mathematically compares the apex spectrum of the peak to that of every data point across a peak. With adjustments to noise and background solvent absorbance, spectral differences and potential impurities become virtually impossible to miss.

Confirm peak identity

The Library Match function automatically identifies each peak in a sample by mathematically comparing unknown peaks to the reference spectra stored in the library. Once initiated, the library automatically searches for the closest spectral match and reports findings indicating the degree to which it matches. Numerous libraries can be created, stored, searched, and shared among network users.

Document wavelength monitoring choices

Automatically select and store maximum absorbencies for each peak. Documentation of the λ-max will justify wavelength selection to auditors.

Construct a multi-wavelength chromatogram

Select and store maximum absorbencies for each peak to automatically construct a multi-wavelength chromatogram, resulting in a meticulous record of all the compounds detected.

Diagnostic tool and confirm method compliance

Routinely diagnose fluidic performance and confirm method compliance in LC/MS.

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February 2013 720002187EN VW-PC

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