

## UltrAA lamps — Increase sensitivity by up to 40%

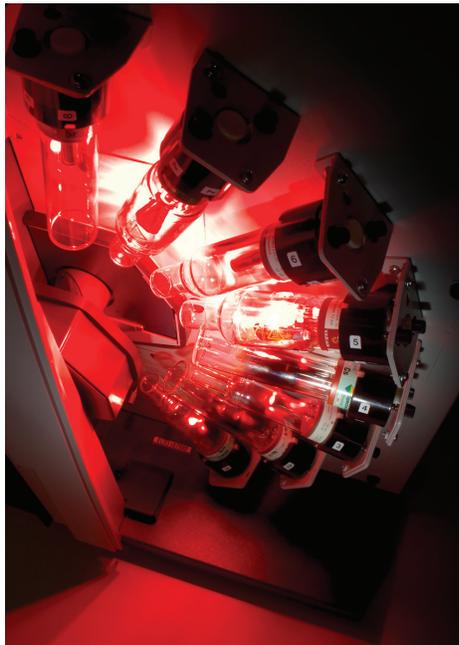
### Technical Overview

#### UltrAA lamps for 200 Series AA

##### Introduction

Agilent UltrAA lamps are a comprehensive range of high intensity boosted discharge hollow cathode lamps that can replace conventional lamps for AA determinations. UltrAA lamps lower detection limits for the most demanding flame, furnace and vapor AA applications, and offer:

- Extended calibration range while retaining analytical precision
- Longer lamp lifetimes, exceeding 8000 mA hours operation
- Plug and play for simpler operation



The UltrAA lamp control module supports simultaneous operation of two high intensity lamps for extra elemental capacity with Agilent's Fast Sequential AA determinations. This also allows one lamp to be in use with the other being pre-warmed ready for operation.

Agilent UltrAA lamps increase sensitivity and reduce detection limits, allowing determinations of trace metals at even lower levels. This is particularly beneficial for elements in the low UV region such as Se, As and Pb. Conventional lamps exhibit higher noise levels, degrading the signal-to-noise performance.

UltrAA lamps improve precision for determinations at both higher and lower concentrations. This allows you to extend the calibration range and measure a wider range of element concentrations for your most demanding applications.

The range of UltrAA high intensity lamps can be used with all Agilent AA instruments.

For superior cost effective performance with challenging applications, select high intensity UltrAA lamps — only from Agilent.

### Principle of operation

UltrAA lamps use the standard lamp current, and have an additional boost current applied to induce a second discharge within the lamp. The boost current is supplied from a secondary control module (either integrated into the instrument or an external control module). The secondary discharge re-excites the atom plume formed above the cathode, re-energizing the atoms and boosting the emission output by three to five times, compared with normal lamps. The resulting sharper emission profile also reduces self absorption and line broadening, increasing sensitivity by up to 40%. The higher emission intensity also reduces baseline noise levels, ensuring lower detection limits are achieved.

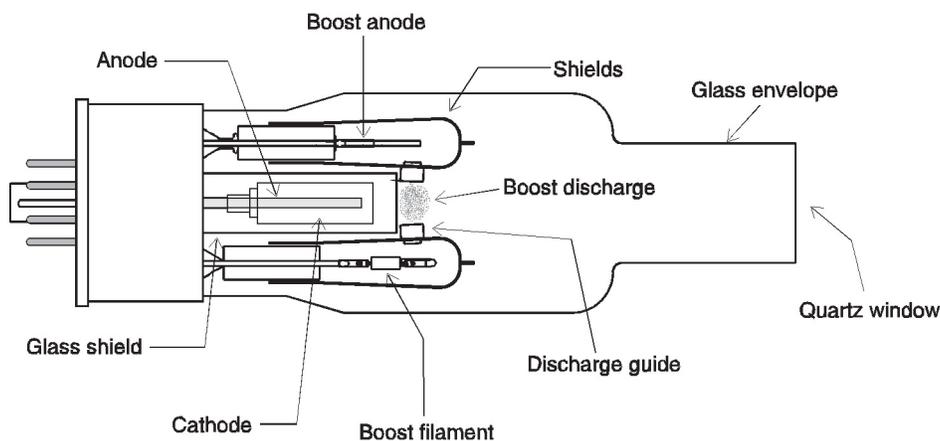


Figure 1. Schematic view of the Agilent UltrAA lamp

### Benefits of the UltrAA lamp

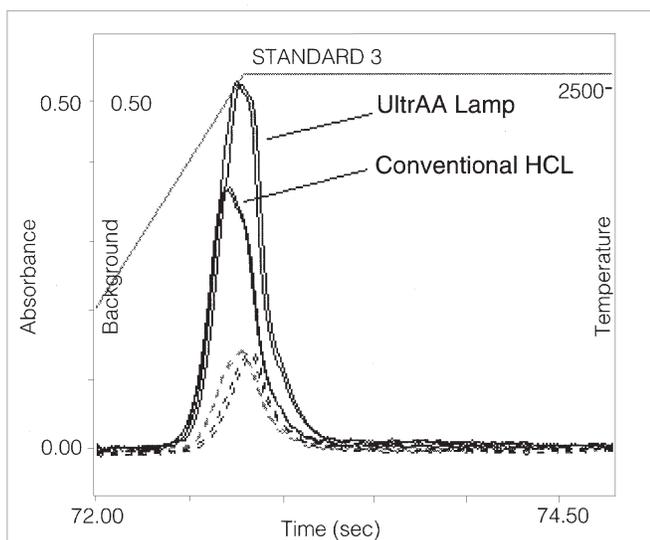
- Increased sensitivity. The sharper emission profile of the UltrAA lamp reduces self-absorption and line broadening, enhancing sensitivity by up to 40%
- Reduced baseline noise, due to the higher emission intensity
- Lower detection limits, resulting from the improved signal-to-noise performance.
- Enhanced calibration linearity
- Long lamp lifetimes for economical operation. Typical lifetimes exceed 8000 mA hours of operation
- Simple installation – lamps mount directly into the socket, just like conventional lamps (without any flying leads)
- Easy operation – the fixed boost current eliminates manual adjustments. Some high intensity lamps require complex optimization of the boost current for maximum intensity
- Simple upgrades to UltrAA lamp capability. Agilent Zeeman AA systems can feature an integrated (factory fitted) control module. Field upgrades are available for other Agilent AA systems, ensuring wide compatibility

### Why select Agilent UltrAA lamps?

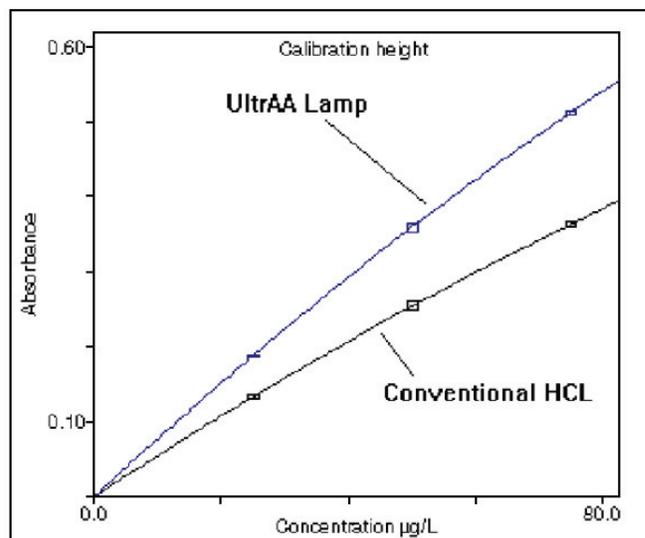
Only Agilent has the experience required to consistently produce high performance lamps. Agilent first developed a range of reliable hollow cathode lamps in the 1960s during development of the AA technique. Since then, we have had continuous experience in development, production and improvement of quality hollow cathode lamps. Agilent also offers an extensive range of conventional single element and multi-element lamps.

## Benefits of Agilent lamps

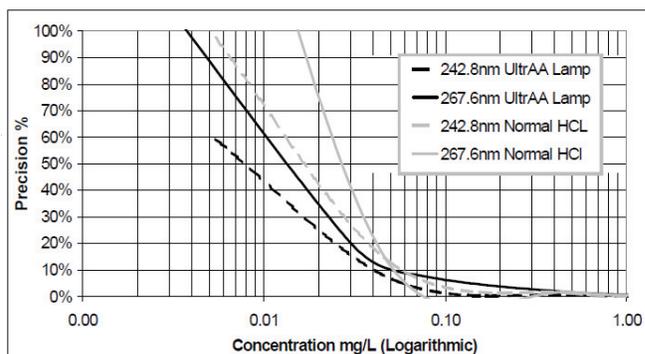
- Automatic lamp recognition enables the software to identify the lamp and select the recommended operating conditions
- Optimum warm-up time with good stability during operation
- High spectral purity, because of the specially pure materials and extended processing cycle
- Consistent performance is assured. No lamp leaves our factory without having satisfied our demanding standards for intensity and stability
- Unlimited shelf life because of the totally sealed, all glass construction
- Simple lamp identification from any angle using the element symbol on the lamp base
- Operating conditions are conveniently listed on the lamp base



**Figure 2.** Typical signals for a 75 ug/L Se standard demonstrate the enhanced sensitivity of the UltrAA lamp



**Figure 3.** A typical calibration for Se demonstrates the improved calibration linearity achieved using the UltrAA lamp



**Figure 4.** UltrAA lamps improve precision for low level Au determinations using flame AA. This avoids the need for more sensitive and slower furnace AA determinations

## For more information

For more information on our products and services, visit our website at [www.agilent.com/chem/](http://www.agilent.com/chem/)

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