DEUTERIUM LAMPS

PHOTRON PTY. LTD.

SPECIALISTS IN LIGHT SOURCES

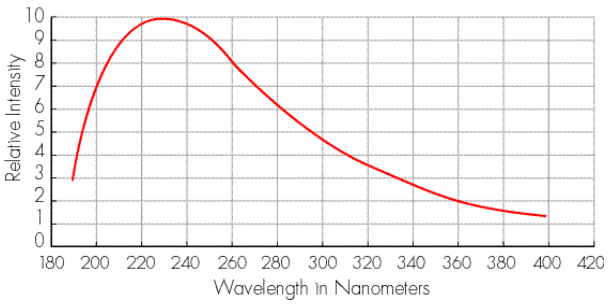
Deuterium Lamps

Deuterium lamps are discharge light sources that utilise the stable arc discharge of deuterium gas (D2). The spectral distribution of this arc is mainly in the ultra violet (UV) range.

Continuing development by Photron's Engineers has resulted in an unmatched economical UV light source with outstanding performance. As an OEM supplier, Photron is dedicated to meeting OEM's requirements, in fields of application such as spectrometers, HPLC Detectors, Densitometers, medical analysers, pollution analysers, colorimeters, stack gas analysers and Capillary zone Electrophoresis.

Photron deuterium lamps have been developed over the past decade to avoid the shortfalls of the traditional lamp design. This has resulted in a reliable economical UV light source.

The following graph details the Deuterium lamps output in the UV range.



The Deuterium lamp contains 6 essential components:-

Five pin base - The five pin base design enables the internal components to be mounted securely and also provides an unparalleled vacuum seal with the envelope.

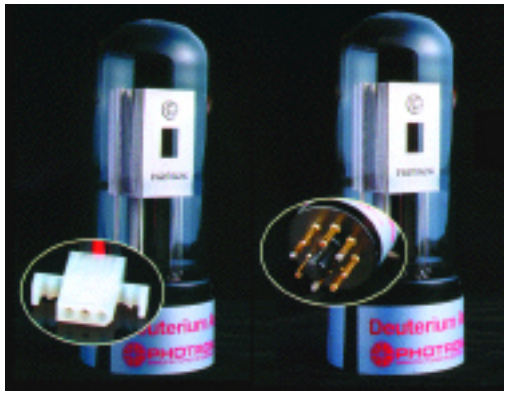
Filament (Hot cathode) - The horizontally positioned tungsten filament reduces internal noise produced by mechanical vibration. This also avoids the degradation of the emission cathode, which can cause premature lamp failure.

Box structure - The box structure is made of high purity nickel, to ensure a uniform discharge only occurs between anode and cathode. This proven box structure, gives consistent reproducibility, and warm up characteristics.

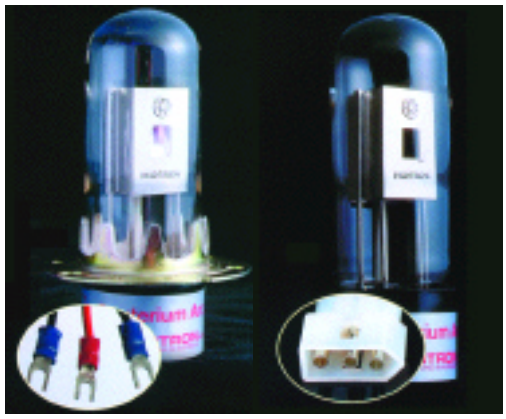
Aperture - A highly polished aperture enhance the reflecting and focusing of the UV discharge. See intensity distribution chart.

Envelope - Around this internal assembly is either a UV transmitting glass envelope or a quartz window envelope with a protruding nose.

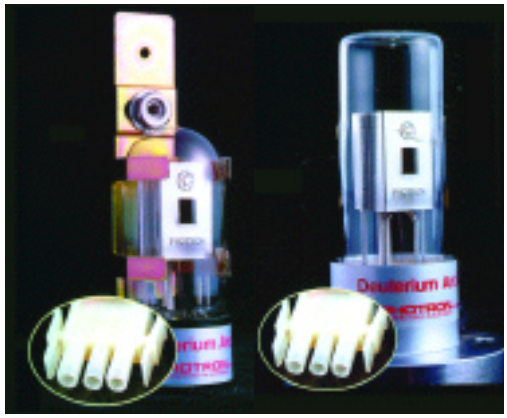
Anode - A consistently positioned anode ensures a narrow range of run volts over the deuterium lamp lifetime. It also ensures a reliable ignition of the deuterium lamp.



P701 - GBC **P719** - Shimadzu

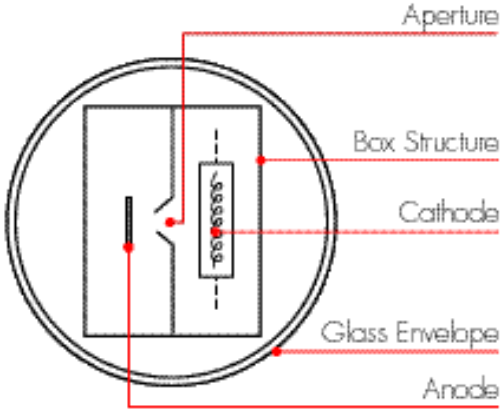


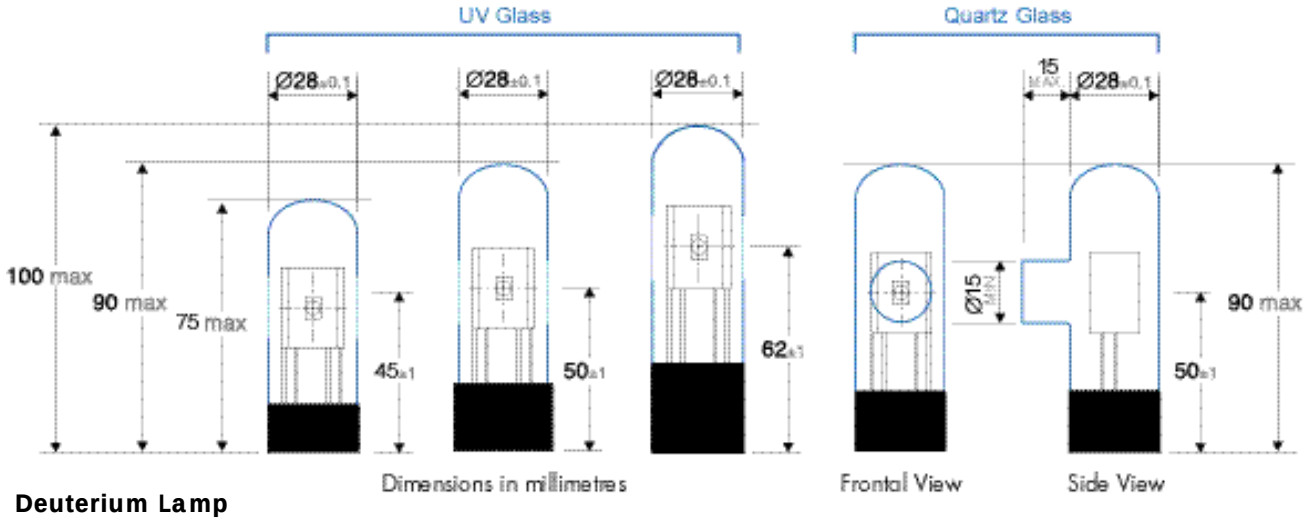
P703 - Hitachi **P706** - Varian



P712 - Perkin Elmer **P716** - Waters

Typical Construction (top view)



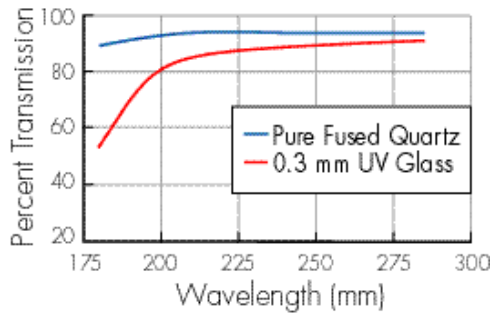


Deuterium Lamp
Standard Dimensions

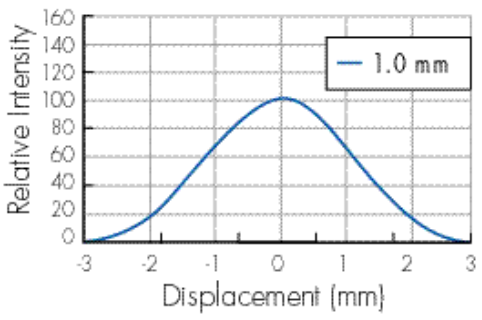
UV Glass – The lower limit of transmittance of UV glass is 190nm. The transmission between 190 and 250nm is improved by creating a 0.3mm UV optical window. These windows have the advantage of no solarization to the glass and greatly reduced diffusion loss of Deuterium.

Quartz Glass (Spectrosil) – The lower limit of transmittance of Quartz glass is 160nm. Some applications may require the highest possible intensity at lower wavelengths, in this case quartz has the best transmission. When Quartz is exposed to UV light it undergoes solarization, so there is a need for a protruding widow to lessen the solarization effect and reduces the flow of evaporated material.

UV Transmission of Materials



Spatial Intensity Distribution



Electrical performance – To ensure a reliable and stable arc discharge, the oxide coated cathode is pre-heated for approximately 20 seconds. The directly heated cathode produces an abundance of electrons. In order for the electrons to travel to the anode a " strike voltage" of greater than 350 volts is required to initiate the discharge.

Coupled to the strike supply is a regulated current source, which provides up to 300mA to the anode.

The cathode heater voltage is reduced after discharge is established, as itself heats the cathode.

A 10 volt filament is reduced to 5-7 volts, a 3 volt filament is reduced to 1.5-2 volts. This is required to prevent over heating of the cathode and to ensure emission from the cathode whilst maintaining thermal stability in the lamp operation.

Options

A time indicator enables the user to track operating hours during the warranty period.

Pre-aligned deuterium lamps with brackets are available to suit many instruments.

Safety – Photron deuterium lamps emit high intensity ultra-violet radiation, this can cause eye and skin damage. Please use protective measures. D2 lamps run at high thermal temperatures, do not touch glass when in use as minor burns will occur. D2 lamps also use a high voltage, please minimise the risk of electrical shock.

Care – While handling Photron Deuterium lamps please use gloves to minimise finger prints etc on glass, as this can deteriorate the signal. Cleaning glass with alcohol / acetone is recommended. Do not subject the lamp to shock or severe vibration as damage may occur.

Lifetime – Photron D2 lamps lifetime is determined by the drop of light output. This is determined by the point at which the total emitted energy drops to 50% of the initial energy level. For Photron D2 lamps 1500 hours of use at 300mA is expected. When lamps are used in pulsed systems with short duty cycles that have excessive peak currents greater than 600mA, lifetime is reduced.

Photron Warranty

- Up to 1000 hours at the recommended current of 300mA Dc.
- The lamp Intensity decreases below 50% of its initial intensity.
- Warranty is considered up to 1 year from purchase.
- Any replacement will date from the purchase of the original lamp.
- Misuse of lamp including accidental breakage voids warranty.
- For warranty to be considered a completed warranty card must accompany the returned lamp.
- Any replaced lamps will be warrantied for the balance of the 1000 hours of the original lamp.

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