The best light source is supported by the best electrode technology.
L2D2 Lamps (Deuterium Lamps)

LONG LIFE : 4000 HOURS
4 times longer guaranteed life

Life Characteristics
The L2-4000 series lamps assure an operating life of 4000 hours—4 times longer than conventional lamps. This is the longest operating life of any deuterium lamp.

Introducing the L2D2 lamps that Deuterium lamps used in The Hamamatsu L2D2 lamps respects operating life, stability. You will find significant differences open up a new generation of analytical instruments deliver high performance in all light output intensity.

HIGH STABILITY : 2 TIMES STABLE
Fluctuation: 2 × 10⁻⁵ A.U. p-p Max. (up to 2000 h)

Light Output Stability
By using a newly developed ceramic structure, a uniform and optimum temperature distribution, which are the most important factors for stable operation, can be obtained. This results in fluctuations at only 2 × 10⁻⁵ A.U. p-p in the light output, as well as a reduced drift of only ±0.3 %/h.

EXCELLENT TEMPERATURE CHARACTERISTICS
Use of a ceramic structure with excellent thermal stability ensures stable lamp operation even in the presence of ambient temperature variations.

HIGH OUTPUT : 1.3 TIMES HIGHER
1.1 times higher (L2-4000 series)

Radiant Output Intensity
The L2-2000 series lamps produce 1.3 times higher light output than conventional lamps. The L2-4000 series lamps even offer light output 1.1 times higher than conventional lamps.

SMALL INTENSITY VARIATIONS : 1/2
Compared to our conventional lamps

Intensity Variation
The spacing between electrodes is kept fixed by a molded ceramic spacer. This reduces the lamp to lamp variations in the light output to one half of that obtained with our lamps having a conventional all metal structure.

APPLICATIONS
- UV-VIS Spectrophotometers
- CE (Capillary Electrophoresis)
- S0xNOx Analyzers
- Film Thickness Measurement

LESS MOVEMENT OF ARC EMISSION POINT
Since the ceramic structure has a small thermal expansion coefficient, there is virtually no movement of the arc emission point during operation.

* conventional: metal structure type
**SPECIFICATIONS FOR L2D2 LAMPS**

### SELECTION GUIDE

<table>
<thead>
<tr>
<th>Type Consumption</th>
<th>Type</th>
<th>Series</th>
<th>Cathode Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>30W</td>
<td></td>
<td>L2-4000</td>
<td>2.5 V/1.0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L2-2000</td>
<td>3.0 V/0 V to 1 V</td>
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<tr>
<td></td>
<td></td>
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<td>2.5 V/1.0 V</td>
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<td>2.5 V/1.7 V</td>
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<td>3.0 V/0 V to 1 V</td>
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<td></td>
<td></td>
<td>10 V/2.5 V to 6.0 V</td>
</tr>
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<td></td>
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<td></td>
<td>10 V/7.0 V</td>
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<td>12 V to 15 V/0 V</td>
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<td>2.5 V/1.0 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 V/7.0 V</td>
</tr>
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</table>

### SPECIFICATIONS

#### STANDARD TYPE

<table>
<thead>
<tr>
<th>Series</th>
<th>Type No.</th>
<th>Dimensional outline</th>
<th>Window Material</th>
<th>Spectral Distribution (nm)</th>
<th>Aperture Diameter (mm)</th>
<th>Output Stability at 230 nm</th>
<th>Guaranteed Life (h)</th>
<th>Required Discharge Starting Voltage Min. (V dc)</th>
<th>Anode Current (mA dc)</th>
<th>Tube Drop Voltage Typ. (V dc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2-4000</td>
<td>L6565</td>
<td>UV glass</td>
<td>185 to 400</td>
<td>1.0</td>
<td>±0.3</td>
<td>0.005</td>
<td>4000</td>
<td>350</td>
<td>300±30</td>
<td>80</td>
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<tr>
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<td>L2-2000</td>
<td>L6301</td>
<td>UV glass</td>
<td>185 to 400</td>
<td>0.5</td>
<td>±0.3</td>
<td>0.005</td>
<td>2000</td>
<td>400</td>
<td>300±30</td>
<td>80</td>
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<td>L6307</td>
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<td>L6309</td>
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<td>L7296</td>
<td>Synthetic silica</td>
<td>160 to 400</td>
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<td></td>
<td>L6311</td>
<td>UV glass</td>
<td>185 to 400</td>
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<td></td>
<td>L6311-50</td>
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<tr>
<td></td>
<td>L7292</td>
<td>MgF2</td>
<td>115 to 400</td>
<td>1.0</td>
<td>—</td>
<td>—</td>
<td>2000</td>
<td>350</td>
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<td>L7293-50</td>
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</tbody>
</table>

### SEE-THROUGH TYPE

<table>
<thead>
<tr>
<th>Series</th>
<th>Type No.</th>
<th>Dimensional outline</th>
<th>Window Material</th>
<th>Spectral Distribution (nm)</th>
<th>Aperture Diameter (mm)</th>
<th>Output Stability</th>
<th>Guaranteed Life (h)</th>
<th>Required Discharge Starting Voltage Min. (V dc)</th>
<th>Anode Current (mA dc)</th>
<th>Tube Drop Voltage Typ. (V dc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2-2000</td>
<td>L6999</td>
<td>UV glass</td>
<td>185 to 400</td>
<td>0.5</td>
<td>±0.3</td>
<td>0.005</td>
<td>2000</td>
<td>400</td>
<td>300±30</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>L6999-50</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>L9030</td>
<td>Synthetic silica</td>
<td>160 to 400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>L9030-50</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**
- Lamps with an aperture of 0.5 mm diameter are high brightness types. These lamps provide 1.4 times higher brightness than standard lamps with an aperture of 1.0 mm diameter. (Refer to page 8.)
- A trigger voltage higher than this value is required to start lamp discharge. For reliable lighting, an application of 500 V to 600 V is recommended. The maximum rated voltage that can be applied is 650 V.
- The heater current during warming-up period is so high that the enough voltage may not be supplied to the lamp in case the cable between the lamp and the power supply is long because of voltage drop at the cable. The power supply for the heater should be designed so as to supply specified voltage at the lamp terminal.
- The lamp life end is defined as the point when the light output falls to 50 % of its initial value at 230 nm or when output fluctuation (p-p) exceeds 0.05 %.
An Example for optics of See-through type

The see-through type electrode structure enables straight-line arrangement of the halogen lamp, deuterium lamp, optical system and optical passage. This simplifies optical design of UV-VIS spectrophotometer etc., and eliminates loss of light amount caused by the half mirror.

**SEE-THROUGH TYPE**

**Recommended operating voltage is 3.5 V ± 0.5 V.**

- In these lamps, discharge current is allowed to flow into the filament during operation so that cathode temperature is maintained at an optimum level. So there is no need for input of external power to keep the filament heated.
- Average operating life: Operating life depends on environmental conditions (vacuum atmosphere). It is recommended that these lamps be used in an oil-free environment.
- We recommend using Hamamatsu deuterium lamp power supplies in order to obtain the full performance from our lamps (refer to page 7 and 9).

### Filament Ratings

<table>
<thead>
<tr>
<th>Voltage (V dc, ac)</th>
<th>Current Typ. (A dc, ac)</th>
<th>Time Min. (s)</th>
<th>Voltage (V dc)</th>
<th>Current Typ. (V dc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5±0.25</td>
<td>4</td>
<td>20</td>
<td>1.0±0.1</td>
<td>1.8</td>
</tr>
<tr>
<td>3.0±0.3</td>
<td>5</td>
<td></td>
<td>0 to 1</td>
<td>0 to 1.8</td>
</tr>
<tr>
<td>2.5±0.25</td>
<td>4</td>
<td>20</td>
<td>1.0±0.1</td>
<td>1.8</td>
</tr>
<tr>
<td>3.0±0.3</td>
<td>5</td>
<td></td>
<td>0 to 1</td>
<td>0 to 1.8</td>
</tr>
<tr>
<td>10±1</td>
<td>0.8</td>
<td>20</td>
<td>7.0±0.5</td>
<td>1</td>
</tr>
<tr>
<td>12 to 15</td>
<td>0.5 to 0.55</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10±1</td>
<td>0.8</td>
<td>20</td>
<td>2.5 to 6.0</td>
<td>0.3 to 0.6</td>
</tr>
<tr>
<td>2.5±0.25</td>
<td>4</td>
<td></td>
<td>1.0±0.1</td>
<td>1.8</td>
</tr>
</tbody>
</table>

### Filament Ratings

<table>
<thead>
<tr>
<th>Voltage (V dc, ac)</th>
<th>Current Typ. (A dc, ac)</th>
<th>Time Min. (s)</th>
<th>Voltage (V dc)</th>
<th>Current Typ. (V dc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5±0.25</td>
<td>4</td>
<td>20</td>
<td>1.0±0.1</td>
<td>1.8</td>
</tr>
<tr>
<td>10±1</td>
<td>1.2</td>
<td></td>
<td>7.0±0.5</td>
<td>1</td>
</tr>
</tbody>
</table>

### Filament Ratings

- Recommended operating voltage is 3.5 V ± 0.5 V.
- In these lamps, discharge current is allowed to flow into the filament during operation so that cathode temperature is maintained at an optimum level. So there is no need for input of external power to keep the filament heated.
- Average operating life: Operating life depends on environmental conditions (vacuum atmosphere). It is recommended that these lamps be used in an oil-free environment.
- We recommend using Hamamatsu deuterium lamp power supplies in order to obtain the full performance from our lamps (Refer to page 7 and 9).
DIMENSIONAL OUTLINES

(Unit: mm)

1. L6301, L6565, L6303, L6999
2. L6305, L6566
3. L6307, L6309

4. L6311
5. L7296, L9030
6. L7292, L7293

L2D2 Lamps (Deuterium Lamps)
Cross section of see-through type

Precaution for use L7293-50

When the flange of L7293-50 is used as purpose of lamp cooling, vacuum system part should be separated from the lamp housing part. If vacuum system part is unified to lamp housing part and the lamp flange is fixed to the lamp housing, it may induce broken of lamp snout part.
L2D2 Lamps (Deuterium Lamps)

POWER SUPPLY

Applications using a deuterium lamp require an extremely stable light output, so using a dedicated power supply to operate the lamp is recommended. Hamamatsu deuterium lamp power supplies use a constant current circuit and constant voltage circuit. This combination ensures stable and reliable lamp lighting.

Two types of power supplies are available: 100 V ac input type C9598 and 24 V dc input type M9596. Please select the power supply that best matches your application.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>C9598</th>
<th>M9596</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>AC 100 V to 240 V (Auto Switching)</td>
<td>DC 24 V ± 2.4 V</td>
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<tr>
<td>Input Current (Max.)</td>
<td>0.9</td>
<td>2</td>
<td>A</td>
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<tr>
<td>Output Voltage (DC)</td>
<td>With Load (Typ.)</td>
<td>80</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>Without Load (Min.)</td>
<td>160</td>
<td>V</td>
</tr>
<tr>
<td>Output Current (DC)</td>
<td>300 ± 30</td>
<td>mA</td>
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<tr>
<td>Current Fluctuation (p-p) (Typ.)</td>
<td>0.005</td>
<td>%</td>
<td></td>
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<tr>
<td>Current Drift at +25 °C (Typ.)</td>
<td>±0.02</td>
<td>%/h</td>
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<tr>
<td>Warm-up Time</td>
<td>Approx. 20</td>
<td>s</td>
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<tr>
<td>Trigger Voltage</td>
<td>Approx. 600</td>
<td>V peak</td>
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<tr>
<td>Operation Ambient Temperature</td>
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<td>°C</td>
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<tr>
<td>Storage Temperature</td>
<td>-40 to +60</td>
<td>°C</td>
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<td>Cooling Method</td>
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<tr>
<td>Operating and Storage Humidity</td>
<td>Below 80 (No condensation)</td>
<td>%</td>
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<tr>
<td>Weight</td>
<td>Approx. 1.8</td>
<td>Approx. 0.18</td>
<td>kg</td>
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HEATER VOLTAGE AND CURRENT

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Warm-up</th>
<th>Operation</th>
<th>Applicable Lamps</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Voltage (V dc)</td>
<td>Current (A dc typ.)</td>
<td>Voltage (V dc)</td>
</tr>
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<td>C9598/M9596-2510</td>
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<td>1 ± 0.2</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>C9598/M9596-2517</td>
<td>2.5 ± 0.2</td>
<td>4</td>
<td>1.7 ± 0.2</td>
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<tr>
<td>C9598/M9596-3000</td>
<td>3 ± 0.2</td>
<td>5</td>
<td>0 ± 0</td>
</tr>
<tr>
<td>C9598/M9596-1035</td>
<td>10 ± 0.5</td>
<td>0.8</td>
<td>3.5 ± 0.2</td>
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<tr>
<td>C9598/M9596-1070</td>
<td>10 ± 0.5</td>
<td>1.2</td>
<td>7 ± 0.4</td>
</tr>
<tr>
<td>C9598/M9596-1555</td>
<td>13.5 ± 0.7</td>
<td>0.5</td>
<td>5.25 ± 0.25</td>
</tr>
</tbody>
</table>

* Characteristics are measured at 23±1 °C after 30 min of warming up.

LAMP HOUSING

This lamp housing is designed for Hamamatsu deuterium lamps with an installation flange. Despite being compact and less expensive, this lamp housing works as a good heat radiator housing and allows easy but reliable lamp operation that meets the required lamp specifications. To make it easy to install this lamp housing in equipment, the window and mount surfaces of the lamp housing are finish-machined and have tapped holes.

This lamp housing helps you develop photometric equipment that uses deuterium lamps.

E9522 for L6301-50
E9558 for L7296-50

* The see-through types (L6999-50 and L9030-50) are also available with custom-made.
TECHNICAL INFORMATION

■ Spectral Distribution

Deuterium lamps emit high intensity light in the UV range at wavelengths shorter than 400 nm. Light intensity on the short wavelength side is determined by the window material used.

Figure 1: Spectral Distribution

■ Window Material

The following three types of window material are available for deuterium lamps.
1. UV glass
2. Synthetic silica
3. MgF₂

Figure 2 shows the transmittance of various window materials. UV light at wavelengths shorter than 190 nm attenuates greatly due to its absorption by oxygen. To obtain the fullest performance in window transmittance, it is recommended that the inside of the equipment be filled with nitrogen or vacuum-evacuated to eliminate this absorption effect.

Figure 2: Typical Transmittance of Various Window Materials

- **UV glass**
  UV glass has a higher ultraviolet transmittance than normal optical glass (borosilicate glass). It has the longest cut off wavelength of 185 nm among the three types. However the generation of ozone is lower than other window material types, it is not necessary to have special anti-ozone treatments.

- **Synthetic silica**
  Synthetic silica is obtained by fusing a silica crystal that is artificially grown. Although its cut off wavelength is 160 nm, it contains less impurities than fused silica, and transmittance at 200 nm has been improved by approx. 50%.

- **MgF₂**
  MgF₂ is a crystallized form of alkali metal halide that has an excellent ultraviolet transmittance, a low deliquescent and is used as window material for vacuum ultraviolet applications. Its cut off wavelength is 115 nm.

■ Light Distribution

The non-projecting type uses the side of the cylindrical glass bulb as the emission window, whilst the projecting type uses a plane glass attached to a projection on the bulb. The projecting type has a uniformed transmittance due to the plane glass. Since the window is located far from the discharge position, the amount of dirt produced by spattering from the electrodes is reduced resulting in low deterioration of light output. The non-projecting type requires less space and has a wider directivity since there is no projection, enabling effective use of emitted light. The long-nose projecting type uses an MgF₂ window and is suitable for vacuum ultraviolet applications. This type is used with the tip of the nose inserted into the vacuum equipment.

Figure 3: External View

- Non-projecting type
- Projecting type
- Long-nose projecting type

Figure 4: Directivity (Light Distribution)

Non-projecting type
Projecting type
Long-nose projecting type

■ Arc Distribution

Arc intensity is determined by the aperture (light exit) size. Figure 5 shows typical spectral distributions for lamps with different aperture sizes. At the same input current and voltage, lamps with an aperture of 0.5 mm diameter (high brightness type) provide 1.4 times higher brightness than lamps with an aperture of 1.0 mm diameter (standard type). The half width of spectral distribution also becomes narrower with a reduced aperture size. When higher intensity is required or the object to be irradiated is very small, the high brightness type is recommended.

Figure 5: Arc Distribution

- APERTURE: 0.5 mm
  (High Brightness Type)
- APERTURE: 1.0 mm
  (Standard Type)
L2D2 Lamps (Deuterium Lamps)

TECHNICAL INFORMATION

**Construction**

Figure 6 shows the external view and internal construction of a deuterium lamp. The anode has a unique structure covered with ceramic to prevent abnormal discharge, and the cathode has a highly durable electrode. Since a deuterium lamp uses the positive column flash of arc discharge, the cathode is shifted sideways and an aperture is located immediately in front of the anode so that high intensity is obtained. The aperture plate placed between anode and cathode may be used as an auxiliary electrode for lamps designed for low voltage lighting.

![Figure 6: External View and Electrode Construction](image)

**Terminology**

1. **Solarization**
   Transmittance of UV glass and fused silica drops when they are used over a long period. This is caused by a drop in transparency of the glass resulting from dirt on the glass and the influences of ultraviolet rays. In the worst case, the glass becomes cloudy and its life is shortened. This is called solarization, and transmittance drops, particularly in short wavelength region. This phenomenon is hardly ever seen with synthetic silica.
   In addition, the lamp with MgF₂ window expose strong UV light, so possibly loose transparency with a film will be deposited by CVD (chemical vapor deposition). Therefore, an atmosphere should be high vacuum or an inert gas to avoid the reaction.

2. **Discharge starting voltage**
   When the cathode is sufficiently heated and ready for arc discharge, a pulse trigger voltage is applied between anode and cathode, and discharge starts. The discharge starting voltage of 30 W deuterium lamps is approx. 350 V (400 V max.). However, since the discharge starting voltage rises according to the prolongation of operation time, it is recommended that a voltage of approx. 500 V be applied to assure discharge. (The maximum applied voltage for trigger is 650 V.) The discharge starting voltage varies depending on the trigger method and trigger constant.

3. **Output stability**
   (1) Drift
   Drift refers to variation of output over a long period caused as a result of the change in thermoelectron discharge characteristic of the cathode, change in gas pressure or dirt on the window. It is expressed in variation per hour. In the case of deuterium lamps, it takes 10 to 15 minutes until the inside of the lamp reaches thermal equilibrium after start of discharge, so a warm-up period of 20 to 30 minutes is required.
   (2) Fluctuation
   Fluctuation refers to variation of output caused by deterioration of the cathode or fluctuation of discharge position. Light output fluctuates 0.005 % (p-p) Typ. at intervals between a few minutes and a few hours. In addition, the position of the arc point also fluctuates.

4. **Life**
   (1) Fluctuation of light output
   Life is determined by the point at which fluctuation combining fluctuation and shift exceeds 0.05 % (p-p).

**Discharging the L2D2 Lamps**

In deuterium lamps, an aperture electrode is placed between cathode and anode to compress the discharge, so that high light intensity is obtained. This required, a high voltage trigger discharge across cathode and anode. In general, a typical power supply for deuterium lamps consists of the following three power supplies.

- Constant current power supply of 300 mA (open voltage about 150 V)
- Trigger power supply of 500 V peak to 600 V peak
- Power supply for the heater (about 10 W)

When the L2D2 lamp series with an aperture size of 0.5 mm diameter will be operated by the circuit as shown above, it is recommended to employ CR constant as $R_T=1\, \text{k} \Omega$ and $C_T=0.5\, \mu\text{F}$ to obtain the reliable lamp ignition.
OPERATING TEMPERATURE

Optimum Operating Temperature

To obtain high stability and long operating life, adequate care must be paid to operating conditions including the operating temperature of the lamp. Although the lamp’s bulb wall temperature (Tb) rises as the ambient temperature (Ta) rises, the bulb wall temperature of the L2D2 lamp rises to approx. +245 °C to +280 °C when the ambient temperature is +25 °C. Moreover, the bulb wall temperature of the L2D2 lamps rises even further by +50 °C reaching +280 °C due to the way in which the electrode is constructed. (Bulb wall temperature (Tb) also differs depending on the lamp type and heater voltage as well as lamp housing.) Although the operating temperature of Hamamatsu L2D2 lamps has been designed based on lamps operated under normal temperature, the temperature range given in the table below is recommended as the allowable operating temperature range enabling the use of the lamps over a long period of time with high stability.

Table 1: Allowable Operating Temperature Range for Deuterium Lamps

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>L2D2 Lamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cathode Type</td>
<td>All Cathode type</td>
</tr>
<tr>
<td>Ambient temperature: Ta</td>
<td>+10 °C to +50 °C</td>
</tr>
<tr>
<td>Bulb wall temperature: Tb</td>
<td>+245 °C to +280 °C</td>
</tr>
<tr>
<td>Maximum allowable bulb wall temperature: Tb Max.</td>
<td>+290 °C Max.</td>
</tr>
</tbody>
</table>

*Temperature enclosed by ( ) indicates the optimum ambient temperature.

As the ambient temperature (Ta) rises, cathode temperature increases, resulting in evaporation of the cathode. If the ambient temperature (Ta) drops, the gas pressure inside the bulb is reduced increasing the kinetic energy of the gas and ions causing sputtering of the cathodes thermionic coating. In both cases, the gas inside the bulb is rapidly consumed. This deteriorates the stability and intensity. Thereby drastically shortening the operating life.

For stable operation of deuterium lamps, care should be paid to the installation of the lamps so that the bulb wall temperature (Tb) does not exceed +290 °C.

PRECAUTION AND WARRANTY

Precautions When Using Deuterium Lamps

1. Deuterium lamps emit ultraviolet rays which can be harmful to your eyes and skin. Never look directly at the emitted lights, nor should you allow it to come into contact with your skin. Always wear protective goggles and clothing when operating the lamps. (JIS T 8141)
2. Since the bulb wall reaches a very high temperature (over +200 °C) when the lamp is on, do not touch it with bare hands or bring flammable objects near it. Need to wait at least 30 minutes after turning the lamp off in case of handling.
3. Do not exert mechanical vibration or shock on the lamp, otherwise the stability will deteriorate.
4. Silica glass graded sealing.
   In the case of bulbs using silica glass and MgF₂, the window is formed by connecting different glass sections having slightly different expansion rates. Since the mechanical strength of these seams is low, the bulb fixing method should be so arranged that no force is exerted on these seams during fixing or operation.
5. Before turning on the lamp, wipe the bulb and window gently with alcohol or acetone. Dirt on the window will cause deterioration of the UV transmission, so always wear gloves when handling the lamp.
6. High voltage is used to operate the lamp. Use extreme caution to prevent electric shocks.

Warranty

The warranty period will be one year after our shipment to original purchaser or guaranteed lifetime whichever comes first. The warranty is limited to replacement of the faulty lamp. Faults resulting from natural disasters and incorrect usage will also be excluded from warranty.
Calibrated Deuterium Light Source L7820
The L7820 is the calibrated light source consisting of L2D2 featuring high stability and good repeatability, which are required for calibrated light source.
In order for anybody to achieve stable light, not only the lamp design but also power supply and lamp housing design are optimized. It delivers high stable light in the long and the short term operation especially in the calibrated range of 250 nm to 400 nm.
The L7820 is suitable for quality control of light source, light detector and so on.
The certificate with JCSS logo mark is attached.

UV-VIS Fiber Light Source L7893 Series
This light source L7893 series incorporates a highly stable L2D2 lamp and a Tungsten lamp into a single compact housing with an optical fiber light guide. The combination of these two lamps covers a wide spectral range from 200 nm to 1100 nm, yet offers highly stable light output and long service life. This light source L7893 series is ideal for a compact analytical equipment such as miniature grating units, portable spectrophotometers and reflection meters.

Air-Cooled VUV light Source Unit L8998
Hamamatsu now introduces a vacuum ultraviolet (VUV) light source that combines a 30 watt head-on type deuterium lamp with a vacuum flange. Its compact size and air-cooled configuration allow easy handling and operation. The deuterium lamp uses an MgF2 (magnesium fluoride) window to efficiently transmit VUV radiation down to 115 nm.
The vacuum flange (ICF70), assembled as a standard feature, connects easily to most vacuum chambers.
A metal connector on the lamp housing permits easy connection to a dedicated power supply provided together from Hamamatsu.

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Related Products

**Water-Cooled 150 W VUV Deuterium Lamps**
These water-cooled 150 W lamps provide a radiant output 3 to 4 times higher than 30 W lamps and are chiefly used as excitation light sources. Two window materials, synthetic silica (L1314) and MgF2 (L1835) are available.
The MgF2 window type is widely used as a VUV light source in photo CVD, solar simulator (in space) and other VUV applications. A vacuum flange E3444 series are provided as an option allowing simple connection to a vacuum instrument.

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For details, please refer to the catalogs which are available from our sales office.

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**CE Marking**
This catalog contains products which are subject to CE Marking of European Union Directives. For further details, please consult Hamamatsu sales office.

*PATENTS: USA 6, PATENTS PENDING: JAPAN 7, USA 1, EUROPE 7
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