

# Germipak UV Cell Lamps

LightSources, Inc. and LightTech Lamp Technology Ltd. are pleased to offer a new series of integrated assemblies – germicidal UV cell lamps which are mounted directly inside quartz sleeves. These all-quartz lamps are available in a series of standard models. This concept offers a wide range of custom design possibilities for the original equipment manufacturer (OEM) market. Germipak UV Cell Lamps are very economical components for point of use (POU) water systems and other applications. Standard units have 15 millimeter (mm) lamps and 20 mm diameter sleeves.



Quartz sleeves are of tremendous benefit in that they provide protection for lamps without sacrificing efficiency. Sleeves protect against such common problems as breakage, leakage, temperature fluctuations, and environmental hazards.

Our Germipak UV Cell Lamps are designed for single ended use in a variety of modes including instant start, preheat, and rapid start. Standard units employ a four-pin ceramic base and lamp holders can be designed to fit the equipment designer's needs.

For clients developing a new product line, LightSources and LightTech can custom design proprietary bases. This enables clients to maintain replacement sales with the OEM.

## The LightSources/ LightTech Difference

*The combined strengths of LightSources in the United States and LightTech in Europe make our companies global leaders in the germicidal lamp industry. We provide our clients in the original equipment manufacturer (OEM) market with standard and customized lamps. In addition to offering all standard lamp sizes, LightSources and LightTech can custom design, engineer, and manufacture the ideal lamps to suit our clients' unique needs. This enables our clients to maintain replacement sales within the OEM market, an often untapped source of tremendous revenue and repeat business.*

*Our customized, proprietary lamps are unique to the germicidal lamp industry and one of the many reasons that clients have described LightSources and LightTech as companies where customer commitment is second to none. Whatever your needs are in terms of germicidal lamps, LightSources and LightTech have the solution.*



# Amalgam Lamps

LightSources, Inc. and LightTech Lamp Technology Ltd. are pleased to offer high density, low pressure amalgam lamps with a longstanding reputation for



excellence. Extensive research and testing has allowed us to provide our clients in the original equipment manufacturer (OEM) market with the proven technology to take ultraviolet (UV) applications to the next level. Amalgam lamps are an attractive, cost effective alternative to medium pressure lamps. These lamps provide the highest level of electrical efficiency, converting 35% or more of input power to Ultraviolet-

C (UVC) radiation at 254 nanometers (nm). LightSources and LightTech amalgam lamps can also be custom manufactured to provide additional output at 185 nm. Our custom amalgam lamps range from 15 to 32 millimeters (mm) in diameter. Custom lengths are also available, ranging 300 to 1800 mm.

Some of the benefits of our amalgam technology include:

- HIGH OUTPUT** *Our amalgam lamps produce up to three times the UV output over standard germicidal lamps of the same length.*
- LONG LASTING** *Our amalgam lamps have a 16,000 hour lifespan.*
- CONSISTENCY** *Our amalgam lamps maintain consistently high intensity across a broad temperature spectrum ranging from 4 to 40 degrees Celsius.*
- COST SAVINGS** *Our amalgam lamps save our clients money. By reducing the quantity of lamps needed per application, clients are able to save in terms of capital and maintenance costs.*

Long known for innovation, LightSources and LightTech take great pride in having pioneered pellet technology for amalgam lamps. This cutting edge technology was developed and patented by LightSources in the United States and by LightTech in Europe. The major benefit of **pellet**, as opposed to spot, technology is that lamps function with equal efficiency in both vertical and horizontal arrangements. This is known as "universal installation."

LightSources and LightTech have applied our proprietary **LongLife+™** process to the amalgam line. Specialty coating eliminates the common problem of accelerated depreciation so often associated with higher intensity lamps. With so many options available to clients, the possibilities are limitless.

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LightSources, Inc. and LightTech Lamp Technology Ltd. offer a specialty coating which may be applied to all of our germicidal lamp products. A chemical compound applied to the inside of our lamps enables them to be longer lasting and more efficient. Specialty coating eliminates the common problem of accelerated depreciation so often associated with higher intensity lamps. Our proprietary **LongLife+™** process dramatically lengthens the



lifespan of germicidal lamps. A lamp which would normally last for 9,000 hours, will last up to 16,000 hours with specialty coating, making it a truly wise investment.

Our specialty coating provides the following benefits:

## ■ ECONOMICALLY EFFICIENT

- up to 16,000 Operating hours
- maintaining up to 90% UVC output

## ■ ENVIRONMENTALLY FRIENDLY

- low mercury (Hg) technology less than 5mg Hg for standard lamps and less than 10mg Hg for pellet amalgam lamps, compared to competitor amalgam lamps containing 30+ mg Hg

## ■ UNIVERSAL INSTALLATION

- the only manufacturer to offer vertical orientation for amalgam lamps

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**LightTech**  
  
**LightSources**

\* Life claim testing done under laboratory conditions. Actual performances depend on operating conditions. © Light Sources, Inc. 2006

# Ballasts

LightSources, Inc. and LightTech Lamp Technology Ltd. offer an extensive line of electronic ballasts, covering a wide range of germicidal lamps. Choosing the right



ballast is essential because the interaction of lamps and ballasts is the true determinant of system performance. As elements in electrical circuits, germicidal lamps are not “passive” but rather “active” elements. Passive elements include resistors, inductors, and capacitors. In contrast, germicidal lamps are active elements in that they generate harmonic and transient voltages and currents. Germicidal lamps exhibit a seemingly strange

characteristic – the voltage decreases with increasing current. This process is known as negative AC resistance. Gas discharge devices therefore are inherently unstable; once lit, the current increases without limit unless other circuit elements are used to restore and maintain operation. These elements are commonly called “ballasts.”

LightSources and LightTech offer ballasts that match our lamps. This is a true “systems” approach. Our series of electronic high frequency ballasts provides our clients with an optimal performance germicidal system.

Our line of ballasts delivers all of the advantages of electronic HF operation:

- **HIGH EFFICIENCY**
- **LIGHT WEIGHT**
- **SMALL SIZE**
- **HIGH POWER FACTOR**
- **INSENSITIVITY TO LINE VOLTAGE VARIATION**
- **OPERATION ON MULTIPLE SUPPLY VOLTAGES**

Our ballasts are manufactured in ISO-9002 facilities and meet IPC610 quality requirements.

## The LightSources/ LightTech Difference

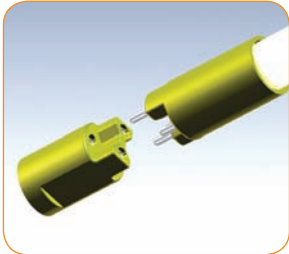
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**LightTech**  
  
**LightSources**

# Proprietary Bases and Sockets

LightSources, Inc. and LightTech Lamp Technology Ltd. manufacture top of the line ceramic bases for all of our quartz lamps. Other base materials such as plastic and metal-ceramic hybrid combinations are also available upon request. Custom designed germicidal lamp bases are available in a wide variety of pin locations, steps, unique contours, and lead-wire configurations.



Ceramic bases are widely regarded as the preferred choice for germicidal and ozone producing lamps. These bases have a sharp looking appearance and they are highly resistance to heat and moisture, as well as the intense ultraviolet (UV) and ozone levels produced by lamps.



Custom-designed ceramic components are available to our clients in the original equipment manufacturer (OEM) market. As a specialty manufacturer with expertise in engineering and manufacturing, LightSources can design and fabricate proprietary end fittings and matching sockets. Many OEMs opt for nonstandard lamp designs in order to fulfill needs that

are critical to a specific germicidal application, instead of building the equipment around a lamp chosen from a limited number of standard, off-the-shelf models. It is often preferable to design the lamp to fit the system. The mechanical, electrical, and output characteristics of a lamp can vary widely with the requirements of each design. LightSources and LightTech can custom manufacture lamp models for the new equipment market in a broad array of shapes and sizes and with a range of performance characteristics.

Our proprietary bases and matching sockets provide the following advantages:

- **PROPRIETARY DESIGN AND CHOICE OF COLOR**
- **EXCLUSIVE BASE CONFIGURATION AND MATCHING SOCKET**
- **UV AND OZONE RESISTANT CERAMIC**
- **HIGHER LAMP RESALES POTENTIAL**

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# High Output Lamps

LightSources, Inc. and LightTech Lamp Technology Ltd are pleased to offer our clients top of the line High Output (HO) germicidal lamps. These lamps yield twice the amount of ultraviolet (UV) output than standard lamps of the same length. All common lamp sizes are available for purchase at LightSources and LightTech.



HO lamps are of tremendous benefit to system designers in that they reduce the number of lamps required for a system to function. It is thereby possible for designers to reduce the footprint of a system or, alternatively, to increase the efficiency and capacity of an existing system while maintaining the same footprint.



Our HO lamps provide the following benefits:

- **DOUBLE THE UV OUTPUT OF STANDARD LAMPS**
- **REDUCED SYSTEM FOOTPRINT**
- **INCREASED EFFICIENCY AND CAPACITY**
- **COST SAVINGS THROUGH REDUCTION OF LAMP USAGE**

## The LightSources/ LightTech Difference

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# Ozone Lamps

LightSources, Inc. and LightTech Lamp Technology Ltd. offer ozone lamps which are made of high quality quartz glass. The type of fused quartz used to make the bulb, or envelope, of a germicidal lamp determines the wavelengths of ultraviolet (UV) emissions that react with the oxygen in the air to produce ozone. Ozone is an extremely active oxidizer. It destroys microorganisms on contact and also acts as a deodorizer. One of the primary advantages of ozone is that it can be carried by air into places that UV radiation cannot directly reach.



We offer our clients Very High (VH) germicidal lamps which generate energy at 185 nanometers (nm) in addition to the Low (L) 254 nm line. VH lamps are made with clear fused quartz and L lamps are made with a specially doped fused quartz that prohibits the emission of energy at 185 nm. VH lamps are used in a variety of

settings including the treatment of air, pool, and spa water. The process of Total Organic Compound (T.O.C.) reduction also utilizes VH lamps. These lamps are also commonly used in the heating ventilation and air conditioning (HVAC) industry.

LightSources and LightTech can custom design and manufacture lamps which can produce various amounts of ozone to meet specific application requirements. For applications in which a moderate amount of ozone may be required, we can splice the two types of quartz together in a ratio to produce the desired amount of ozone.

Our ozone lamps provide the following benefits:

- **EXCLUSIVE USE OF TOP QUALITY QUARTZ GLASS**
- **OXIDATION AND DEODORIZATION**
- **A WIDE RANGE OF APPLICATIONS INCLUDING AIR AND WATER TREATMENT**
- **CUSTOMIZED, PROPRIETARY DESIGN OPTIONS**

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# U-Lamps

LightSources, Inc. and LightTech Lamp Technology Ltd. are pleased to offer our clients top of the line "U" shaped germicidal and ozone lamps. These lamps are the ideal choice whenever a product design requires more intense ultraviolet (UV) radiation in a limited space. U-Lamps are available with center-to-center leg spacing of 22 or 76 millimeters (mm), and offer the perfect solution by effectively doubling arc length. U-Lamps are the most efficient solution for applications in small spaces because they maximize the use of space and provide a high level of UV output.



Our U-Lamps provides the following benefits:

- **GERMICIDAL AND OZONE APPLICATIONS**
- **MAXIMIZATION OF UV OUTPUT IN SMALL SPACES**
- **SUBSTANTIAL COST SAVINGS**
- **THE POWER OF TWO SINGLE LAMPS COMBINED INTO ONE**

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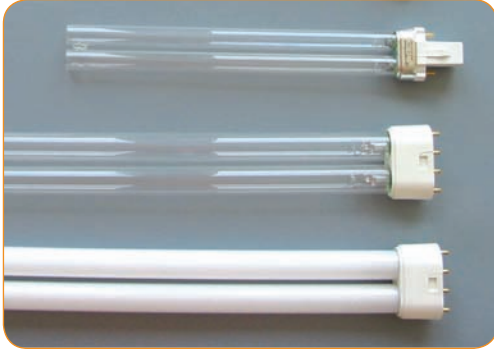
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# Compact Lamps

LightSources, Inc. and LightTech Lamp Technology Ltd. are pleased to offer a superb line of compact lamps for applications in small spaces. These lamps



are available in a specially engineered two-tube linear design. The high efficiency of a compact lamp is created by leaving a small dead space at the end of each of the two parallel tubes. Due to the fact that this area is not part of the path followed by the discharge, and therefore it is further away from the center

of the discharge column, the wall temperature is far lower than anywhere else. This design innovation provides a very uniform output, which works remarkably well and it is why compact lamps are consistently a favorite product among our clients. LightSources and LightTech compact lamps are also available with pellet amalgam technology which produce outstanding ultraviolet (UV) efficiency and are among the highest quality available on the market today.

Our compact lamps provide the following benefits:

- **USEFUL FOR APPLICATIONS IN SMALL SPACES**
- **INNOVATIVE TWO-TUBE LINEAR TECHNOLOGY**
- **TOP QUALITY MATERIALS AND ENGINEERING**
- **CUSTOMIZED, PROPRIETARY DESIGN OPTIONS**

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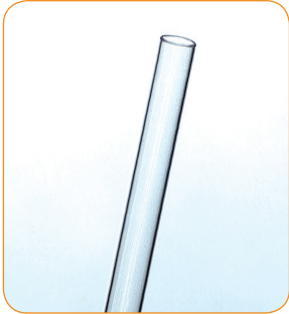
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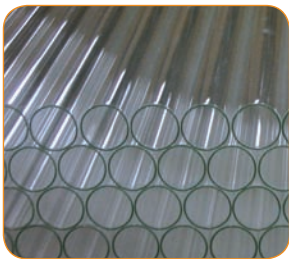
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# Quartz Sleeves

LightSources, Inc. and LightTech Lamp Technology Ltd. make a variety of quartz sleeves and jackets. These products are available in a wide



array of diameters and lengths for use in air purification units, water disinfection units, photochemical reactors, and other specialized equipment. Numerous options are available including open or closed ends, fire polished or saw cut ends, and other custom shapes. They may be applied to a range of lamp types including standard, high output (HO), and amalgam.



Quartz sleeves are of tremendous benefit in that they provide protection for lamps without sacrificing efficiency. Sleeves protect against such common problems as breakage, leakage, temperature fluctuations, and environmental hazards. They are an investment worth making.

Our quartz sleeves provide the following benefits:

- **USEFUL FOR APPLICATIONS IN SMALL SPACES**
- **INNOVATIVE TWO-TUBE LINEAR TECHNOLOGY**
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