



Germicidal Lamps



**Creating True Value
and
True Partnership**



**World Wide Suppliers
of Quality Germicidal Lamps**





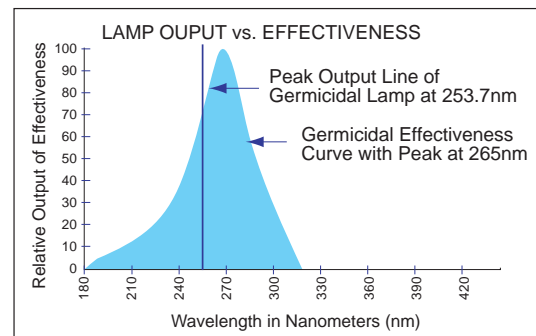
Company Profile:

Founded in 1983, LightSources Inc. has been offering superior products and processes for over 25 years to our OEM customers and is the leading manufacturer of quartz germicidal lamps in the world. In 1993, LightTech Lamp Technology Ltd. was started in Hungary in order to serve the growing demand for germicidal lamps and sleeves for both the European and Asian markets. The combination of our state of the art manufacturing facilities, technology and capability allow us to bring quality products to the market with reduced lead times and high performance. Both companies design and manufacture lamps for a wide variety of special lighting applications spanning multiple market segments within many

industries and applications. While both companies core focus remains on germicidal, photochemical and skin tanning applications, we also manufacture specialty lamps for LCD backlighting and compact fluorescent applications. Both companies are recognized within their respective markets for excellence in product design and manufacture and in meeting our customers' unique requirements for performance, quality and reliability. As true global organizations, our sales staff is available to serve you in several languages.

UV-Action:

- LightSources & LightTech low-pressure, mercury-arc germicidal lamps are specially designed to produce the highest amounts of uv radiation - where 90% of energy is typically generated at 254nm. This radiation is very close to the peak of the germicidal effectiveness curve of 265nm, the most lethal wavelength to microorganisms. (see graph).
- Our germicidal lamps are used extensively in the air purification markets and have been utilized in applications such as food and beverage, medical, HVAC (Heating, Ventilation and Air Conditioning), pharmaceutical and the semiconductor sterilization industries.
- Our germicidal lamps are essential components in the drinking water, wastewater and ground water remediation industries as well.



Ozone-Action:

- "VH" (or Very High ozone producing lamps) generate energy at 185nm in addition to the 254nm wavelength.
- The UV emission at 185nm produces abundant amounts of ozone in air. Ozone is an extremely active and effective oxidizer, destroying microorganisms as well as acting as a deodorizer.
- A primary advantage of the ozone generated by our UV germicidal lamps is that it can be carried through the air into places not easily reachable by direct UV exposure.

Advantages of UV Radiation:

- Environmentally friendly, no dangerous or toxic chemicals that require specialized storage and/or handling and there are no concerns of overdosing. Since no chemicals are added to the air/water there are no process by-products to be concerned with.



- Cost effective - low initial capital cost and reduced operating costs.
- Effective - UV radiation offers immediate treatment process with no requirements for holding tanks or long retention/exposure times.
- Compatibility - UV radiation is highly compatible with other water and air treatment processes while introducing no changes in taste, odor, pH, conductivity or chemical properties of the air/water in which it is used.



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**Where
Partnerships
are Valued**



World Wide Suppliers of Quality Germicidal Lamps



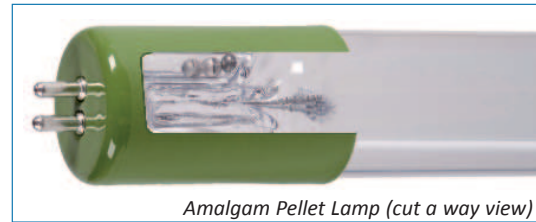
Low Pressure Amalgam Germicidal Lamps

Our companies provide high-quality spot amalgam and pellet amalgam lamps in standard and custom configurations. Our low pressure pellet amalgam lamps function with equal efficiency in both horizontal and vertical operations. Amalgam lamps yield up to three times the UVC output over standard lamps of the same length. We have applied our proprietary LongLife+™ process to the amalgam line. Our special proprietary coating eliminates the common problem of accelerated

depreciation so often associated with higher intensity lamps. Our lamps have an operating life of up to 16,000 hours, maintaining an end-of-life UVC output of 85%.

Advantages:

- ✓ Amalgam lamps offer the best performance over a broad air and water temperature range (4 – 40°C) with consistent UVC output; custom designs for higher temperature applications are available. They are available in both ozone generating and ozone-free lamp types.
- ✓ System designers have the ability to further decrease the number of lamps used in their treatment systems.



Amalgam Pellet Lamp (cut a way view)

Our Proprietary Patented Pellet Amalgam Technology

Pellet amalgam technology has a major benefit over spot amalgam technology. Pellet amalgam lamps are designed to produce higher UVC at full power, but also provide higher UV output under dimming conditions as compared to spot amalgam technology. This difference allows for increased output with reduced costs. Other benefits of our pellet amalgam technology include greater efficiency in any mounting orientation (horizontal or vertical) and stable operation in more extreme ambient environments.

Spot & Pellet Amalgam Lamp Features



- | | |
|---|---|
| ✓ Outside diameters: 15mm – 38mm | ✓ Nominal UVC efficiency at 254nm: 35% |
| ✓ Power range: 42W – 1,000W | ✓ Power per unit length: up to 5W/cm |
| ✓ Stable UVC output performance over a broad Air and Water temperature range (4 – 40°C) | ✓ UVC intensity per unit length: up to 1,700mW/cm |
| ✓ Higher wattage lamps = fewer lamps required = reduced capital and maintenance cost over system life | ✓ Ambient application temperature range: 4 - 40°C |
| ✓ Length: up to 2.5meters | ✓ Operating hours: up to 16,000hrs |
| | ✓ UV Lamp maintenance: 85% ¹ |

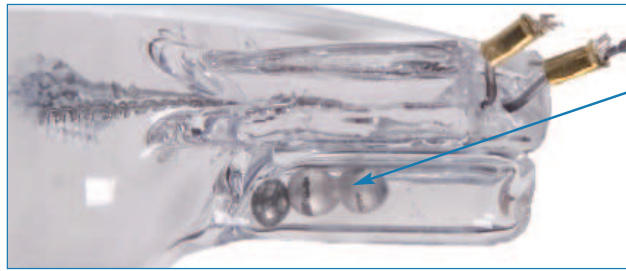
Pellet Amalgam Lamp Features Only:

- ✓ Higher UVC outputs down to 50% dimming* range as compared to Spot Amalgam technology
- ✓ Universal mounting (horizontal, vertical and diagonal)
- ✓ Stable output performance in very high glass wall temperature application where lamp is mounted vertically or diagonally

Higher power Amalgam Lamps are available upon request

**Note: May require additional filament heating*

Note 1: Lamp data is based on measurements performed under laboratory conditions in air at room ambient temperature. Measurements were performed on a high-frequency, current limited electronic ballast and represent average values.



Unbased
Pellet Amalgam Lamp
with view of the pellets

Other Lamp Sizes, Shapes
& Power Levels
Available Upon Request!

Higher Power Amalgam Lamps
Available upon Request!



Spot Amalgam
Lamp

UVC Amalgam Germicidal Lamps

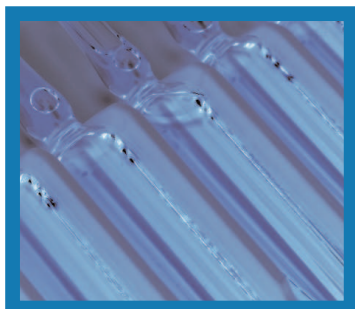
	Tube Diameter mm	BF - BF mm	Arc Length mm	Power ¹ W	Current ^{1,2} A	Voltage ¹ V	UV output ¹ @ 254nm μW/cm ² W		Rated ¹ Life hrs.
Horizontal Spot Amalgam Lamps									
GPHA357T5L	15	357	278	42	1.2	36	110	11	16,000
GPHA843T5L	15	843	764	105	1.2	88	320	35	16,000
GPHA1000T5L	15	1000	921	127	1.2	107	370	42	16,000
GPHA1554T5L	15	1554	1475	190	1.2	164	500	68	16,000
GPHA357T6L	19	357	278	57	1.8	32	130	13	16,000
GPHA843T6L	19	843	764	127	1.8	71	400	43	16,000
GPHA1000T6L	19	1000	921	150	1.8	84	460	52	16,000
GPHA1554T6L	19	1554	1475	240	1.8	134	630	87	16,000
GPHHA357T6L	19	357	278	65	2.1	31	140	14	16,000
GPHHA843T6L	19	843	764	172	2.1	82	490	54	16,000
GPHHA1000T6L	19	1000	921	207	2.1	99	570	65	16,000
GPHHA1554T6L	19	1554	1475	320	2.1	154	750	105	16,000

Universal Pellet Amalgam Lamps

GPHVA357T5L	15	357	278	42	1.2	36	110	11	16,000
GPHVA843T5L	15	843	764	105	1.2	88	320	35	16,000
GPHVA1000T5L	15	1000	921	127	1.2	107	370	42	16,000
GPHVA1554T5L	15	1554	1475	190	1.2	164	500	68	16,000
GPHVA357T6L	19	357	278	57	1.8	32	130	13	16,000
GPHVA843T6L	19	843	764	127	1.8	71	400	43	16,000
GPHVA1000T6L	19	1000	921	150	1.8	84	460	52	16,000
GPHVA1554T6L	19	1554	1475	240	1.8	134	630	87	16,000
GPHHVA1554T6L	19	1554	1475	320	2.1	154	750	105	16,000
GPHHVA1554T10L	32	1554	1434	471	5	95	1160	157	16,000

Note 1: Lamp data is based on measurements performed under laboratory conditions in air at room ambient temperature. Measurements were performed on a high-frequency, current limited electronic ballast and represent average values at 1 meter.

Note 2: LSI Amalgam lamps are designed for operation on a PREHEAT BALLAST only, unless otherwise noted.



Quartz Germicidal Lamps

The type of fused quartz used to make the body of the germicidal lamp determines the emission of the wavelength of the UV energy. "L" or "Low ozone" generating lamps transmit up to 90% of their energy at the 254nm wavelength and typically utilize a doped fused quartz that blocks the emission of 185nm energy. "VH" or "Very high ozone" generating lamps are produced using clear fused quartz which allows for the transmission of energy at both 185nm and 254nm wavelengths. The

185nm energy reacts with the oxygen in the air to produce ozone. In applications where moderate amounts of ozone may be required, we can splice the two types of quartz together to form a custom "L" to "VH" ratio according to the customer's specific requirements.



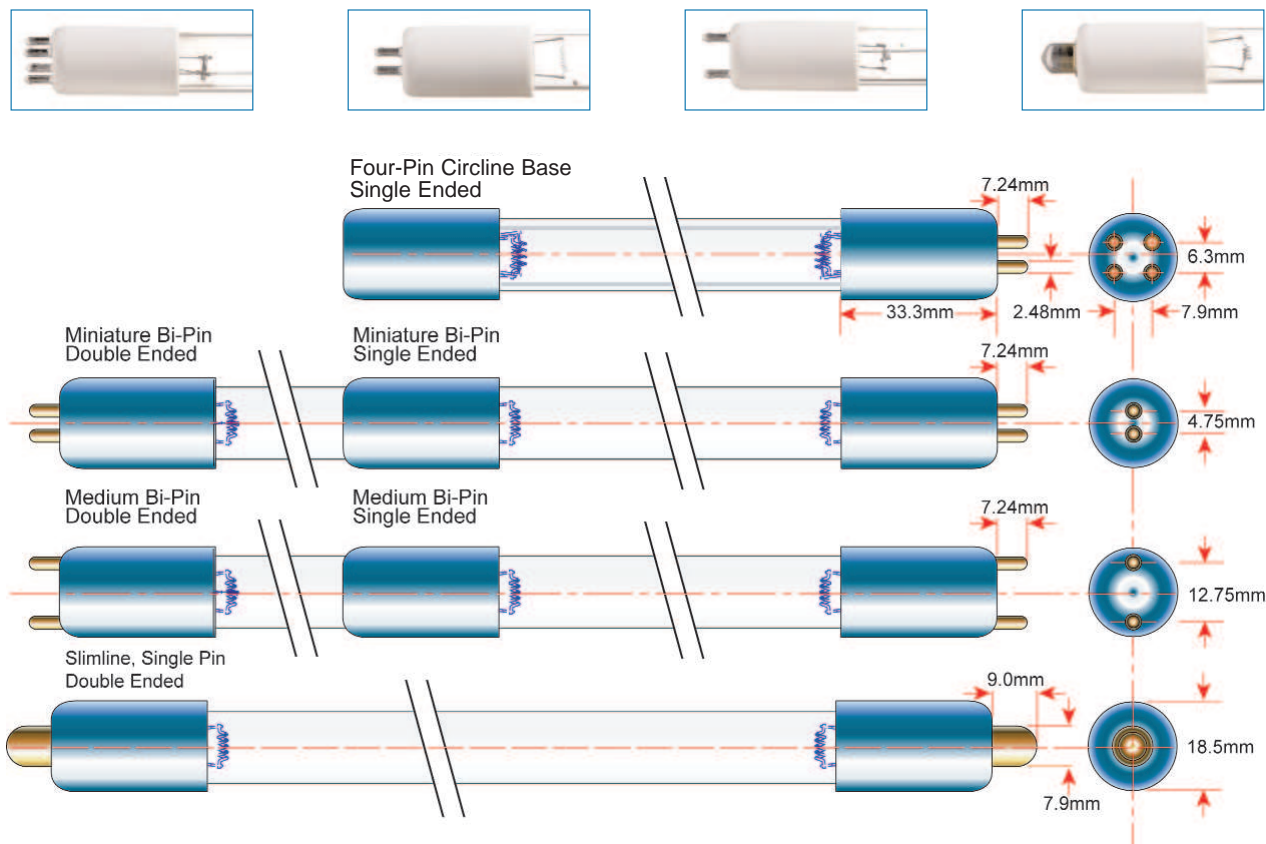
*Other Lamp Sizes, Shapes
& Power Levels
Available Upon Request!*

Standard Output Quartz Germicidal Lamps

	Tube Diameter mm	BF - BF mm	Arc Length mm	Power ¹ W	Current mA	Voltage ¹ V	UV output ¹ @ 254nm μW/cm ² W		Rated ¹ Life hrs.
Preheat Start Lamps - Low Ozone									
GPH212T5L	15	212	132	10	425	25	27	2.7	16,000
GPH287T5L	15	287	207	14	425	34	40	4	16,000
GPH303T5L	15	303	223	15	425	35	43	4.3	16,000
GPH357T5L	15	357	277	17	425	42	57	5.7	16,000
GPH436T5L	15	436	356	21	425	51	72	7.3	16,000
GPH793T5L	15	793	713	38	425	92	125	13.5	16,000
GPH843T5L	15	843	762	41	425	98	150	16	16,000
GPH1148T5L	15	1148	1067	55	425	135	180	22	16,000
GPH1554T5L	15	1554	1474	75	425	179	240	33	16,000
GPH1630T5L	15	1630	1550	79	425	189	252	34.5	16,000
Preheat Start Lamps - Ozone Generating									
GPH212T5VH	15	212	132	10	425	25	27	2.7	16,000
GPH287T5VH	15	287	207	14	425	34	40	4	16,000
GPH303T5VH	15	303	223	15	425	35	43	4.3	16,000
GPH357T5VH	15	357	277	17	425	42	57	5.7	16,000
GPH436T5VH	15	436	356	21	425	51	72	7.3	16,000
GPH793T5VH	15	793	713	38	425	92	125	13.5	16,000
GPH843T5VH	15	843	762	41	425	98	150	16	16,000
GPH1148T5VH	15	1148	1067	55	425	135	180	22	16,000
GPH1554T5VH	15	1554	1474	75	425	179	240	33	16,000
GPH1630T5VH	15	1630	1550	79	425	189	252	34.5	16,000

*Note 1: Lamp data is based on measurements performed under laboratory conditions in air at room ambient temperature.
Measurements were performed on a high-frequency, current limited electronic ballast and represent average values at 1 meter.*

Typical Germicidal Lamp Configurations



Standard Output Quartz Germicidal Lamps

	Tube	BF - BF	Arc	Power ¹	Current	Voltage ¹	UV output ¹		Rated ¹
	Diameter		Length				@ 254nm	Life	
	mm	mm	mm	W	mA	V	μW/cm ²	W	hrs.
Instant Start Lamps - Low Ozone									
G10T5L	15	357	277	17	425	42	57	5.7	16,000
G24T5L	15	692	612	32	425	77	95	11	16,000
G36T5L	15	843	762	41	425	98	150	16	16,000
G48T5L	15	1148	1067	55	425	135	180	22	16,000
G64T5L	15	1554	1474	75	425	179	240	33	16,000
G67T5L	15	1630	1550	79	425	189	252	34.5	16,000
Instant Start Lamps - Ozone Generating									
G10T5VH	15	357	277	17	425	42	57	5.7	16,000
G24T5VH	15	692	612	32	425	77	95	11	16,000
G36T5VH	15	843	762	41	425	98	150	16	16,000
G48T5VH	15	1148	1067	55	425	135	180	22	16,000
G64T5VH	15	1554	1474	75	425	179	240	33	16,000
G67T5VH	15	1630	1550	79	425	189	252	34.5	16,000

Note 1: Lamp data is based on measurements performed under laboratory conditions in air at room ambient temperature.

Measurements were performed on a high-frequency, current limited electronic ballast and represent average values at 1 meter.



High Output (HO) Quartz Lamps

High Output (HO) lamps yield up to 66% more UV output when compared to standard lamps of the same length. HO lamps offer system designers unique opportunities to decrease the number of lamps required without compromising functionality of the system. This has the added potential benefits of reduced system footprint, increased efficiency and/or increased system capacity. HO lamps are produced and are available in the same configurations of standard

lamps. Custom lengths and configurations may also be produced to the customer's specific requirements. The table below represents a sampling of the more common lamp sizes. We can custom design the ideal HO lamp for your unique application.



High Output (HO) Quartz Germicidal Lamps

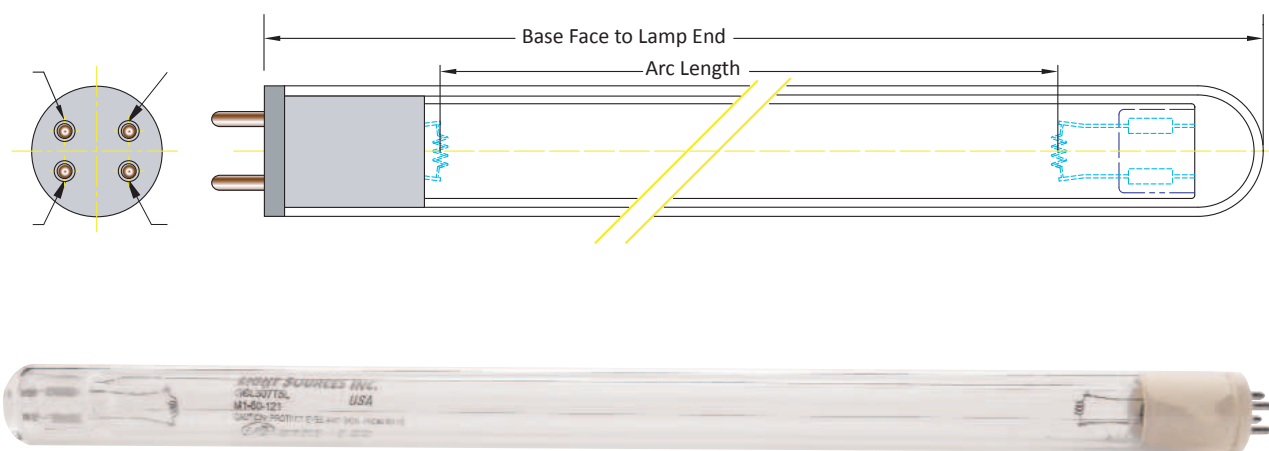
	Tube Diameter mm	BF - BF mm	Arc Length mm	Power ¹ W	Current mA	Voltage ¹ V	UV output ¹ @ 254nm μW/cm ² W		Rated ¹ Life hrs.
Low Ozone									
GHO436T5L	15	436	360	48	800	60	120	13	16,000
GHO36T5L	15	842	755	87	800	110	260	28	16,000
GHO846T5L	15	846	767	90	800	113	265	29	16,000
GHO893T5L	15	893	815	95	800	120	270	30	16,000
GHO64T5L	15	1554	1421	155	800	195	395	54	16,000
Ozone Generating									
GHO436T5VH	15	436	360	48	800	60	120	13	16,000
GHO36T5VH	15	842	755	87	800	110	260	28	16,000
GHO846T5VH	15	846	767	90	800	113	265	29	16,000
GHO893T5VH	15	893	815	95	800	120	270	30	16,000
GHO64T5VH	15	1554	1421	155	800	195	395	54	16,000

*Note 1: Lamp data is based on measurements performed under laboratory conditions in air at room ambient temperature.
Measurements were performed on a high-frequency, current limited electronic ballast and represent average values at 1 meter.*



Germipak UV Cell Germicidal Lamps

LightSources and LightTech offer a series of integrated assemblies consisting of germicidal lamps encapsulated into a quartz sleeve. This cellular concept offers a wide range of custom design possibilities for OEM applications. Germipak UV Cell lamps are very economical components of Point of Use Water Systems and other applications. The standard units listed below have 15mm (T5) diameter lamps and 20.5 mm diameter sleeves.



Germipak Quartz Germicidal Cell Lamps

	Tube Dia mm	Sleeve Dia mm	BF - Lamp Ends mm	Arc Lgth mm	Power ¹ W	Current mA	Voltage ¹ V	UV output ¹ @ 254nm μW/cm ²		Rated ¹ Life hrs.
Low Ozone										
GCL436T5L/Cell	15	20.5	436	356	21	425	51	65	6.5	16,000
GCL793T5L/Cell	15	20.5	793	713	38	425	92	111	12.1	16,000
GCL36T5L/Cell	15	20.5	842	762	41	425	98	130	14	16,000
Ozone Generating										
GCL436T5VH/Cell	15	20.5	436	356	21	425	51	65	6.5	16,000
GCL793T5VH/Cell	15	20.5	793	713	38	425	92	111	12.1	16,000
GCL36T5VH/Cell	15	20.5	842	762	41	425	98	130	14	16,000

Note 1: Lamp data is based on measurements performed under laboratory conditions in air at room ambient temperature.

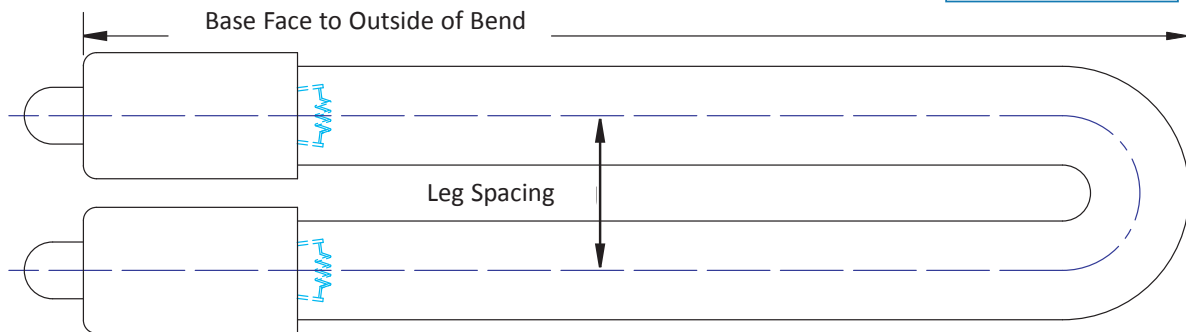
Measurements were performed on a high-frequency, current limited electronic ballast and represent average values at 1 meter.



Quartz U-Shaped Germicidal Lamps

Our quartz U-shaped germicidal and ozone lamps can produce more intense UV radiation in a limited space, allowing designers more flexibility. These lamps are available with center-to-center leg spacing from 22mm to 76mm, and offer the perfect solution by effectively doubling the arc length and UVC output.

*Custom Leg Spacing
and Configurations
Available!*



*Various lengths and
base configurations available*



Quartz Germicidal U-Lamps

	Tube Diameter mm	BF - OB / LS mm	Arc Length mm	Power ¹ W	Current mA	Voltage ¹ V	UV output ¹ @ 254nm μW/cm ² W		Rated ¹ Life hrs.
Low Ozone									
GU76-10T5L	15	169/76	277	17	425	42	57	5.7	16,000
GU22-10T5L	15	186/22	277	17	425	42	57	5.7	16,000
GU22-390T5L	15	390/22	699	36	425	85	105	12	16,000
GU76-390T5L	15	390/76	711	37	425	88	110	12.8	16,000
GU76-36T5L	15	412/76	762	41	425	98	135	14.3	16,000
GU22-36T5L	15	429/22	762	41	425	98	135	14.3	16,000
Ozone Generating									
GU76-10T5VH	15	169/76	277	17	425	42	57	5.7	16,000
GU22-10T5VH	15	186/22	277	17	425	42	57	5.7	16,000
GU22-390T5VH	15	390/22	699	36	425	85	105	12	16,000
GU76-390T5VH	15	390/76	711	37	425	88	110	12.8	16,000
GU76-36T5VH	15	412/76	762	41	425	98	135	14.3	16,000
GU22-36T5VH	15	429/22	762	41	425	98	135	14.3	16,000

Note 1: Lamp data is based on measurements performed under laboratory conditions in air at room ambient temperature.

Measurements were performed on a high-frequency, current limited electronic ballast and represent average values at 1 meter.



Soft Glass Germicidal Lamps

Soft glass lamps are specialty 254nm UVC emitting soft glass germicidal lamps. They operate on a variety of current (180 to 1,700mA inputs) and offer maximum efficiency in producing UVC radiation at 254nm.

We offer custom configurations to meet OEM requirements. Standard soft glass lamps are available in T4, T5, T6, T8 and T12 bodies. At our glass factory in Hungary, we engineer our germicidal soft glass to the highest standards and from the best

materials. We design our soft glass specifically for low pressure mercury vapor lamps that serve the water and air purification industries. Our newly developed manufacturing process provides higher UVC output over the life of the lamp.

Advantages:

- ✓ Maximum efficiency in producing UVC radiation at 254nm
- ✓ Newly developed manufacturing process provides higher UVC output over lamp life
- ✓ Custom configurations available to meet OEM requirements



MDBP = Medium Bi- pin
MNBP = Mini Bi- pin

SL = Slimline =
SP = Single Pin
4P = 4- Pin Circline base,
single ended

UV Soft Glass Germicidal Lamps

	Tube Dia mm	Base Config.	BF - BF BF-EOL mm	Arc Lgth mm	Power ¹ W	Current mA	Voltage@ ¹ Hi Freq ¹ V	UV output ¹ @ 254nm μW/cm ²	W	Rated ¹ Life hrs.
Standard Lamps										
LTC4T5	15.7	MNBP	134.7	77	4	180	23	9	0.9	9,000
LTC6T5	15.7	MNBP	210.9	154	6	180	34	16	1.6	9,000
LTC8T5	15.7	MNBP	287.1	231	8	180	45	21	2.1	9,000
LTC11T5	15.7	MNBP	210.9	154	11	280	40	22	2.2	9,000
LTC11T5SE	15.7	4P	241.1	170	12	280	43	24	2.4	9,000
LTC16T5	15.7	MNBP	287.1	231	16	370	44	40	4	9,000
LTC16T5SE	15.7	4P	317.3	245	17	370	46	42	4.2	9,000
LTC40T5	15.7	SL	842	767	41	425	98	141	15.6	9,000
LTC64T5	15.7	SL	1554	1481	76	425	180	225	31	9,000
LTC40T5SE	15.7	4P	842	767	41	425	98	141	15.6	9,000
LTC64T5SE	15.7	4P	1554	1481	76	425	180	225	31	9,000
LTC10T8	25.7	MDBP	330.3	247	10	280	36	23	2.3	9,000
LTC15T8	25.7	MDBP	436.2	353	15	350	44	47	4.8	9,000
LTC30T8	25.7	MDBP	893.4	810	30	380	80	100	11.3	9,000
High Output Lamps										
LTC80T5SE	15.7	4P	842	767	83	800	103	245	27	9,000
LTC125T5SE	15.7	4P	1554	1481	155	800	195	360	50	9,000
LTC25T8	25.7	MDBP	436.2	353	25	620	41	71	7.2	9,000
LTC55T8	25.7	MDBP	893.4	810	55	800	70	170	19	9,000
LTC75T8	25.7	MDBP	1198.2	1115	75	900	85	215	26.5	9,000
LTC115T12	37.7	MDBP	1198.2	1118	115	1700	69	280	34	9,000

Note 1: Lamp data is based on measurements performed under laboratory conditions in air at room ambient temperature.

Measurements were performed on a high-frequency, current limited electronic ballast and represent average values at 1 meter.



UVC Compact Germicidal Lamps

Our companies offer a superb line of UVC emitting compact germicidal lamps for applications in small spaces. These lamps are consistently a favorite product among our clients. Compact lamps are available in a specially engineered two-tube linear innovative design, which allows a very uniform output. We provide all standard lamp sizes as well as custom configurations.

Available in Quartz
& Pellet Amalgam
Configurations!

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. Because this area is not part of the path followed by the discharge (*farther away from the center of the discharge column*) the wall temperature is lower than anywhere else creating a dedicated mercury cold spot. These compact designs are available in soft glass (254nm only) and quartz glass for both 254nm and 185nm technology. Light Sources and LightTech also offer compact lamp designs using our patented pellet amalgam Technology. Providing outstanding UVC efficiency, it is one of the best value solutions available in today's market.



2G7

G23

2G11



UVC Compact Germicidal Lamps

	Tube Dia mm	Base Config.	BF - OL (Max) mm	Power ¹ W	Current mA	Voltage@ ¹ † 50/60 hz V	UV output ¹ @ 254nm μW/cm ² w	Rated ¹ Life hrs.
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Soft Glass Low Pressure

LTC5W/G23	12.5	G23	83	5	180	34	9	1	8000
LTC7W/G23	12.5	G23	115	7	175	47	16	1.8	8000
LTC9W/G23/2G7	12.5	G23 / 2G7	145	9	170	60	22	2.4	8000
LTC11W/G23	12.5	G23	214	11	160	89	33	3.6	8000
LTC13W/G23	12.5	GX23	155.2	13	290	59	31	3.4	8000

Soft Glass High Power

LTC18W2G11	17.5	2G11	225	18	370	60	51	5.5	8000
LTC24W/2G11	17.5	2G11	320	24	350	87	65	7	8000
LTC35WHO/2G11	17.5	2G11	225	35	850	40 [†]	105	11	8000
LTC36W/2G11	17.5	2G11	415	36	440	105	110	12	8000
LTC55W/2G11	17.5	2G11	535	55	540	103 [†]	156	17	8000
LTC60WHO/2G11	17.5	2G11	415	60	670	120	169	18	8000
LTC95WHO/2G11	17.5	2G11	535	95	950	100 [†]	304	32	8000

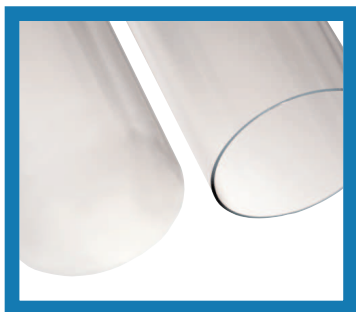
Quartz Glass High Power

LTCQ35WHO/2G11	15	2G11	225	36	800	45 [†]	110	11	9000
LTCQ36W/2G11	15	2G11	415	36	440	105	119	13	9000
LTCQ55W/2G11	15	2G11	535	55	540	103 [†]	168	18	9000
LTCQ60WHO/2G11	15	2G11	415	60	670	118	179	19	9000
LTCQ95WHO/2G11	15	2G11	535	95	950	100 [†]	328	34	9000

*Custom quartz high wattage (> 150W) pellet amalgam compact lamps available.

Measurements were performed on a 50/60 Hz ballast and represent average values at 1 meter

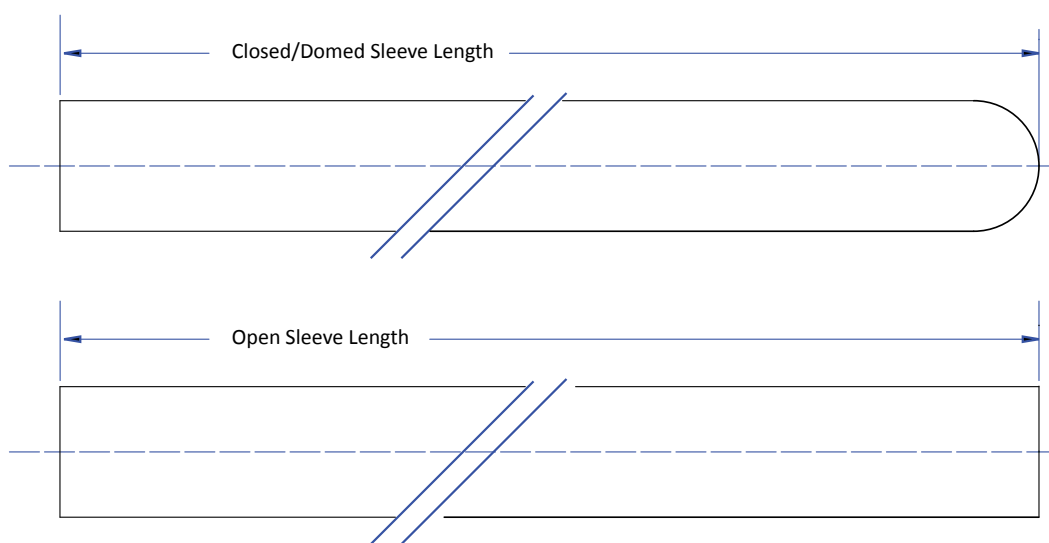
†Measurements were performed on a high-frequency, current limited electronic ballast and represent average values at 1 meter.



Quartz Sleeves for Germicidal Lamps

Quartz sleeves are a good investment, offering protection against air and water flow, breakage, leakage, temperature fluctuations, and environmental hazards. LightSources offer a variety of standard and custom quartz sleeves and jackets that can be applied to a range of germicidal UVC lamp types, including standard, high output (HO), and amalgam. We offer OEMs numerous options, such as open, closed (domed), flared or beaded end and fire polish finishing.

Our quartz sleeves 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.



Quartz Sleeves/Jackets - Most Commonly Used

I.D. mm	O.D. mm	Wall Thickness mm	I.D. mm	O.D. mm	Wall Thickness mm
17.0	19.0	1.00	26.0	30.0	2.00
18.0	20.5	1.25	26.4	30.0	1.80
19.6	22.0	1.20	30.0	33.0	1.50
20.0	22.0	1.00	32.0	36.0	2.00
20.0	22.5	1.25	34.0	38.0	2.00
20.0	23.0	1.50	35.0	38.0	1.50
22.0	24.5	1.25	38.0	42.0	2.00
22.0	25.0	1.50	42.0	45.0	1.50
25.0	28.0	1.50	44.0	48.0	2.00
			45.0	48.0	1.50



Medium Pressure UV Lamps

Light Sources offers superior quality vacuum-sealed medium pressure ultraviolet (MPUV or MPHO) lamps for diverse water and air disinfection applications. Medium pressure UV lamp's are used in a variety of applications from curing (UVA) to microbial disinfection (UVC). The primary use is in the waste water disinfection and ship ballast water systems. MPUV lamps emit significantly more UVC energy than LPUV lamps allowing systems to have a higher flow rate of water and/or fit in

extremely compact footprint areas. High powered MPUV/ MPHO lamps emit energy over the 200 through 400 nm (polychromatic) range as well as operating at a much higher temper range of 600 - 900°C. Light Sources offers the ability to customize your MPUV /MPHO lamps to your own specification and application needs. Lamps are available from 100 watts per inch to over 700 watts per inch, with arc lengths ranging from 2 to 85 inches.

All of our MPUV lamps are constructed from the finest materials and manufacturing techniques available, including:

- ✓ High-quality, ultra-low water content fused quartz
- ✓ Hermetic seal using molybdenum foil within a hard quartz capillary
- ✓ Pure tungsten pin electrodes with an over-wind of throated tungsten



Make Your Own Lamp Designs Come Alive!

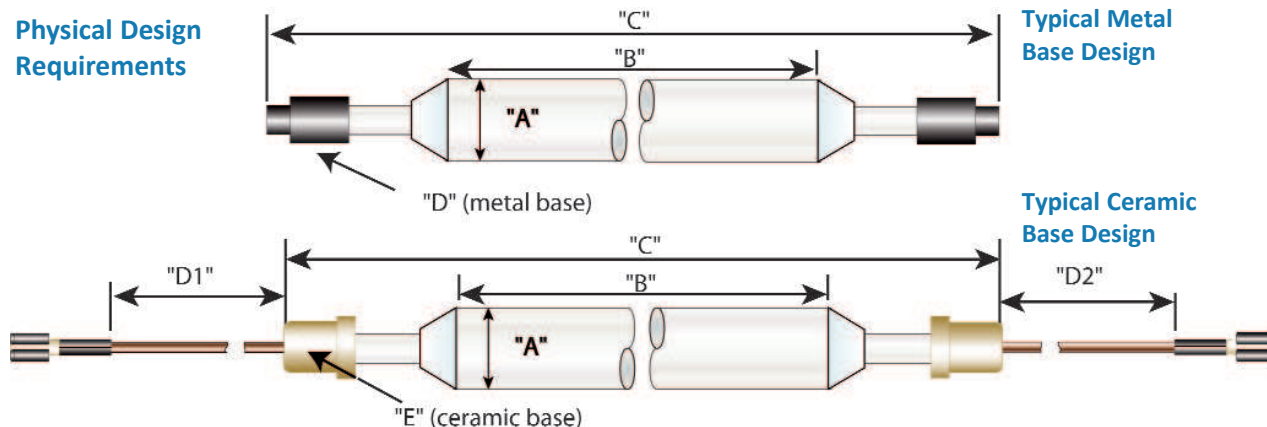
Light Sources welcomes the opportunity to work with clients and OEM's worldwide to create new and innovative MPUV lamp types. We have manufactured thousands of lamp models over the years that cover most of the industry's (UVA) curing/exposure applications and microbial disinfection applications (UVC).

Need Help?

Contact us with your unique specifications and we'll be pleased to help you design a lamp just for your application. For New Designs- Check out the basic information required to get started.

Have an Existing Sample?...and you don't know the electrical information... Send us your sample for evaluation and the change you want to make! Flared or beaded end and fire polish finishing available.

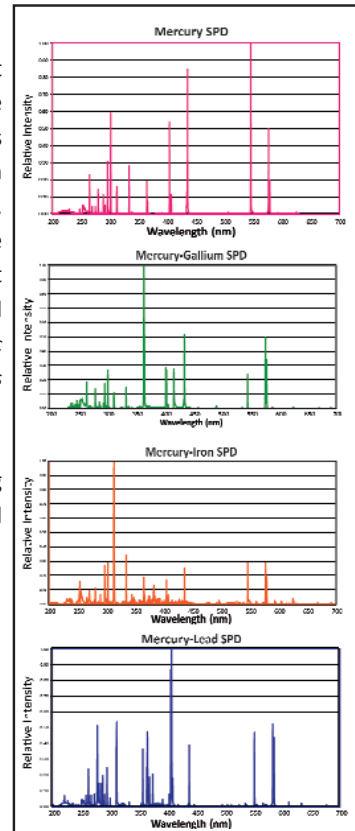
Physical Design Requirements



Chemical Additives/doped lamps - Most Common

MPUV/ MPHO lamps are much higher power than an LP germicidal lamp. Lamps start at approximately 100W/inch and go up to 700w/in. The standard MPUV mercury lamps have output peaks at 254nm and 365nm. Other applications call for other wavelengths such as 385nm and 417nm. These additional radiation peaks are created by dosing the lamps with heavy metal compounds. The most common additives in MPUV/MPHO lamps are Gallium, Lead and Iron. The addition of metal halide salts into a standard mercury lamp alters the spectra of the lamp. When adding a metal halide to a lamp -all the wavelengths of that the metal will be produced and the mercury spectra will have its lines lowered/changed in intensity. All the materials in the arc are interactive. *(The prediction intensity for specific lines in a metal halide lamps can only be stated based on the lines listed in spectroscopy manuals as "strong" lines and "persistent" lines will be more intense.)*

Metal halide lamps require ballasts designed to run metal halide lamps. The starting voltage for an additive lamp is higher than for a standard mercury by several hundred volts and can vary with lamp age and number of times the lamp is ignited.



Custom Lamp Design Requirements

Lamp Voltage = _____ V \pm 5% (Standard) - _____ V

Lamp Current = _____ A (nominal)

Total Wattage = _____ KW

Max Starting Voltage = _____ V

Outside Diameter (A) = _____ mm

Arc Length (between coatings) (B) = _____ mm

Overall Length (C) = _____ mm

If Metal Base (D) = _____ see Page 2

If Ceramic Base (E) = _____ see Page 2

Wire Lengths (D1) = _____ mm

Wire Lengths (D2) = _____ mm

Wire Terminations

☐ None- Bare wire

Lugs (F) :

☐ Ring Lug, #8 screw

☐ Ring Lug, #10 screw

☐ Ring Lug, 1/4" screw

☐ Ring Lug, Metric M5 screw

☐ Spade Lug, #8 screw

☐ Spade Lug, #10 screw

☐ 1/4 Female Quick Disconnect

☐ Wire Pin

☐ Other-Specify _____

Common Quartz Diameters:

A: 18 x 20.5

B: 20 x 22.5

C: 22 x 25

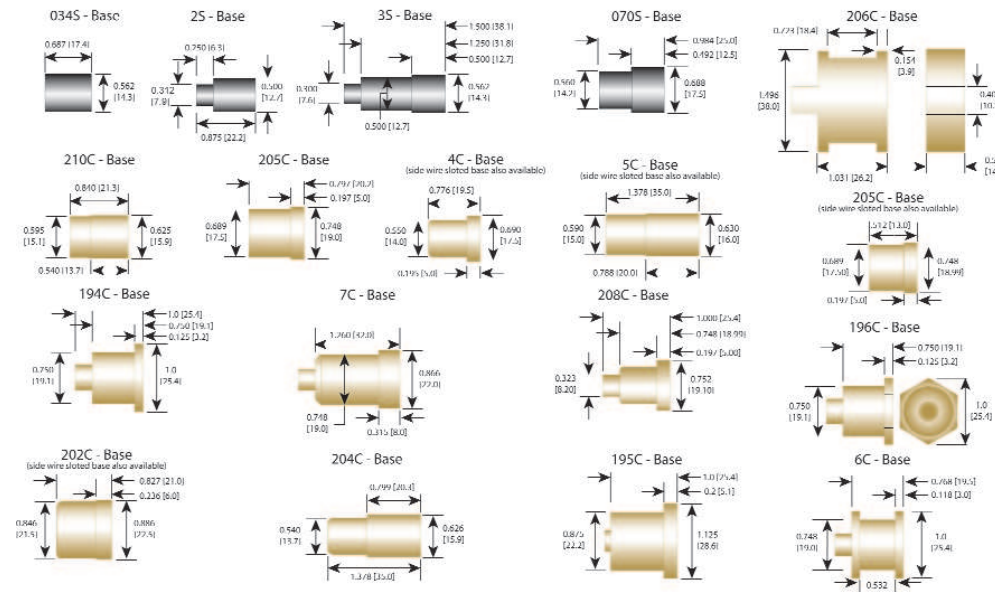
K: 13 x 15

E: 16 x 18

J: 25 x 28

M: 22 x 26

Common Metal and Ceramic Bases:



Have an Existing Sample?...and you don't know the electrical information. Send us your sample for evaluation of physical and electrical information. You can make changes to the lamp design!

www.germicidal.com



Proprietary & Patented Special Bases and Sockets

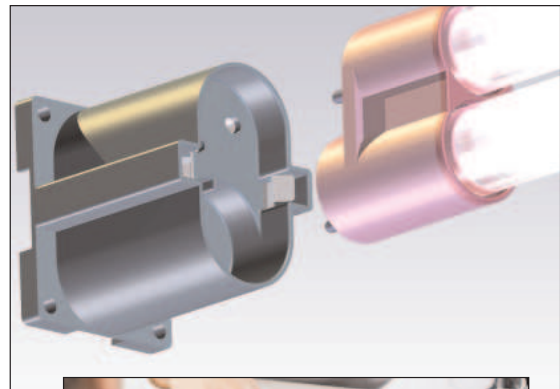
LightSources and LightTech distinguish ourselves by our ability to produce customized lamps, and by offering proprietary and patented base solutions that keep our customers systems competitive in the global markets.

Working closely with our ceramics manufacturer we have the ability to design and fabricate proprietary end fittings and matching sockets. All end fittings and sockets are individually tested at our factory before shipment. This is one of the best value solutions available in today's market.

Our customized, proprietary lamps and end fittings provide unique solutions to our OEM clients in the germicidal, specialty and tanning lamp industries. With our custom designed lamp bases and matching sockets our OEM clients are ensured aftermarket lamp sales.

What's Your Competitive Advantage?

- ✓ Grow your revenue by maintaining replacement sales within the OEM market
- ✓ Source customized lamps that will only fit into *YOUR* unique systems
- ✓ Benefit from greater flexibility in your system designs



What's Your Visual Business Identity?

- ✓ Distinguish your lighting products with identifiable and unique bases, sockets, end caps or pin configurations
- ✓ Bases or sockets in colors that conform to your corporate identity standards
- ✓ Choose any colors that will set your systems apart from competitors.

*(all standard pantone colors available;
premium colors available
upon request)*

- ✓ Distinguish your bases or sockets with your logo* decal or any other company details.

Note: Applies to germicidal lamps only;
tanning and specialty lamps are marked
by etches on the glass.*





Terminology

Lamp Length in mm
(unless otherwise noted)

4P = 4-Pin
MDBP = Medium Bi-Pin
MNBP = Miniature Bi-Pin
SL = SP (Single Pin)
SE = Single Ended
DE = Double Ended



G		36 in	T5	L	/Base type and Connection type (See Below)
G	PH	356 mm	T5	VH	
G	HO	36 in	T5	L	
G	CL	36 in	T5	L	
G	U	36 in	T5	VH	
G	PHA	357 mm	T5	L	
G	PHVA	357 mm	T5	L	
G	PHHA	357 mm	T5	L	
G	PHHVA	357 mm	T6	L	

Germicidal	<p>PH = Preheat</p> <p>HO = High Output</p> <p>CL = Cell Lamp</p> <p>U = U Shape Lamp</p> <p>PHA = Preheat Spot Amalgam</p> <p>PHVA = Preheat Pellet Amalgam</p> <p>PHHA = Preheat HO Spot Amalgam</p> <p>PHHVA = Preheat HO Pellet Amalgam</p>	<p>36 in</p> <p>356 mm</p> <p>36 in</p> <p>36 in</p> <p>36 in</p> <p>357 mm</p> <p>357 mm</p> <p>357 mm</p> <p>357 mm</p>	<p>T5</p> <p>T5</p> <p>T5</p> <p>T5</p> <p>T5</p> <p>T5</p> <p>T5</p> <p>T5</p> <p>T6</p> <p>T = Tubular</p>	<p>L</p> <p>VH</p> <p>L</p> <p>L</p> <p>VH</p> <p>L</p> <p>L</p> <p>L</p> <p>L = Low Ozone (aka: Ozone Free)</p> <p>VH = Ozone (aka: Very High Ozone Generating)</p>
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Add to Lamp Nomenclature your Base Type and Connection Configurations:

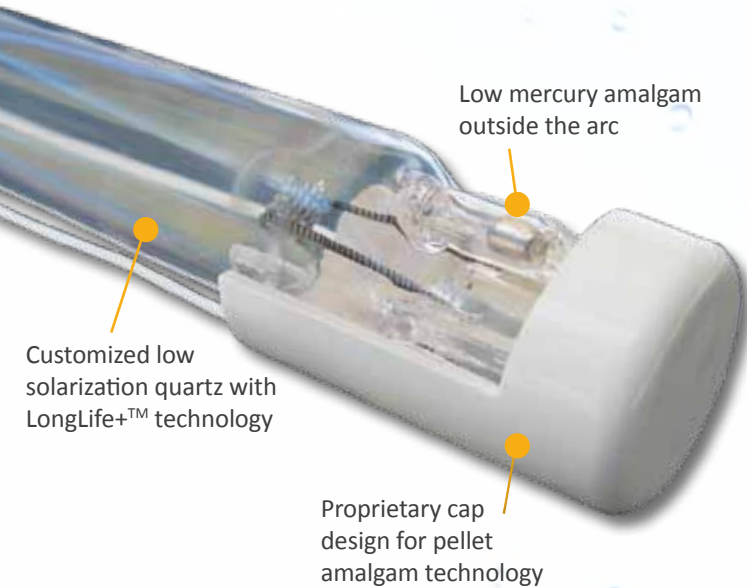
Base Type:	Connection Type:	Lamp Diameter:
4P = 4-Pin Circline base, single ended	SE = Single Ended	T5 = 15 mm OD (0.6 in)
MDBP = Medium Bi-Pin (G13; 12.7mm)	DE = Double Ended	T6 = 19 mm OD (0.75 in)
MNBP = Miniature Bi-Pin (G5; 5mm)		T8 = 25 mm OD (1.00 in)
SL = Slimline = SP = Single Pin		T10 = 32 mm OD (1.25 in)
		T12 = 38 mm OD (1.50 in)

Germicidal... Cutting edge technology for your future success!

High Power Pellet Amalgam Lamp Features

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, Inc. in the United States, China, Canada and Europe.

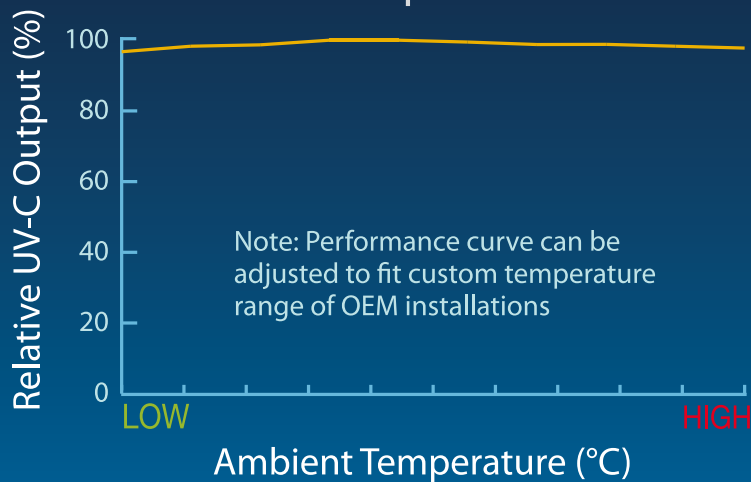
■ Universal operation capability[†]



■ Increased output under dimming conditions when compared to SPOT lamps of similar design.

- **Outside diameter:** 25mm - 38mm
- **Length:** up to 2.5meters
- **Electrical power:** up to 1,200W
- **UV efficiency at 254nm:** up to 35%
- **UVC intensity per unit length:** up to 1,750mW/cm
- **Ambient application temperature range:** 4 - 40°C
- **Operating hours:** up to 16,000hrs
- **End of life efficiency:** up to 90%

**Pellet Amalgam Technology
Ambient Temperature Profile**





A Great Plus: Universal Installation

Electronic Ballast Features

LightSources high output pellet amalgam lamp offers universal installation. Lamps can be designed for equal efficiency in horizontal or vertical operations.[†]

- **Operating parameters matched to LightSources lamps:** lamp current, preheat current, preheat time, power level, increased and optimized wall-plug to UV efficiency
- **Customized development with optional add-on features:** adjustable power level, remote or manual operation, optional control and monitor via RS-485 port of PLC or Windows PC, lamp fault indication by LED and/or relay contact



[†]**Note:** In vertical operation, the pellet amalgam should be located in the down position to assure optimum performance. Operation with the amalgam located in the up position is not recommended.



UVC Germicidal Lamps - Global Leaders

Air, Water and Surface

LightTech and Light Sources offer high-quality standard and custom products and unmatched innovation. With both our state of the art manufacturing facility we can make a vast array of standard and tailor-made lamps - We cater to OEMs (Original Equipment Manufacturers) with proprietary innovations



Global leader in the Air, Water and Surface UVC Sterilization industry

◇ Amalgam Lamps

◇ Soft Glass

◇ U Shaped

◇ Cell Lamps

◇ Compact PL lamps

◇ Standard Output

◇ High Output

◇ Ozone Producing

◇ Medium Pressure (MPUV/ MPHO)

◇ OEM- Proprietary Base Solutions

◇ Custom Lamp Configurations





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In 1990 the EPA developed the TCLP test (Toxicity Characteristic Leaching Procedure) to simulate the effect of disposing waste in conventional landfills under complex environmental conditions. The method is designed to determine the mobility of toxic material in liquid, solid and multiphasic waste.

The EPA developed the Toxic Characteristic Leaching Procedure to determine the toxicity of waste. The TCLP test does NOT measure the total mercury content but rather the potential of mercury to leach into groundwater if a waste is disposed of in a landfill. TCLP is designed to simulate the leaching a waste will undergo if disposed in a sanitary landfill. This test includes mercury, lead, cadmium, and other hazardous materials. Passing this test for mercury, for instance, requires a yield of less than 0.2 milligrams per liter upon completion of the test. Lamps that PASS the TCLP are considered as non-hazardous waste by the EPA. We are proud to be among the first to offer the majority of our germicidal lamps as TCLP compliant.

While lamps that pass TCLP may be classified as non-hazardous waste by the EPA, LightSources and LightTech strongly encourage the recycling of spent germicidal lamps. Please contact your local environmental agency for assistance with lamp recycling or visit www.lamprecycle.org.

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