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Display/Optic Specialty Lighting 2011 Product Catalog

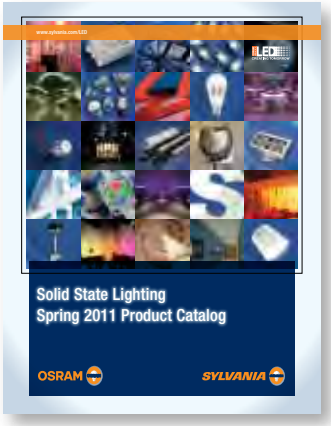
Discharge
Fluorescent
Halogen
Incandescent
LEDs
Lampholders

OSRAM

SYLVANIA

We wrote the books on innovative lighting solutions.

Our four new Product Catalogs provide specifications on more than 3000 SYLVANIA and OSRAM branded products. All are designed and manufactured to the highest possible standards to best suit your lighting applications. And all are backed by OSRAM SYLVANIA, the industry leader in lighting solutions for over a century.



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Important Notice

The data and suggested applications contained in this catalog, as well as any additional information our representatives may be able to furnish, are for general information only and are not intended and should not be taken as representations or warranties as to the suitability of a lamp for any particular application or use in any particular equipment, nor are our representatives authorized to make any such representations or give any such warranties. Applications and conditions of use are many and varied and beyond our control. We do not have the same degree of knowledge that the purchaser has with respect to the design of his equipment and the conditions of its use. Therefore, it is up to the purchaser to make his own determination as to the suitability of a lamp for his intended application or use and to assume responsibility for that determination.

OSRAM SYLVANIA claims to supply the best possible products at all times. For this reason, OSRAM SYLVANIA reserves the right to make changes in its products when it believes such changes will improve its products.

The specifications and information shown in this catalog are believed to be accurate. Although OSRAM SYLVANIA believes this information to be correct, no warranty is made or implied as to the accuracy of this information and OSRAM SYLVANIA does not accept or assume responsibility of liability for errors, changes, omissions, or for harm resulting therefrom.

In accordance with our established policy to consistently improve our products, the specifications contained herein are subject to change without notice.

The OSRAM SYLVANIA Test and Measurement Laboratory is a participant in the Energy Efficient Lighting (EEL) Program of the National Voluntary Laboratory Accreditation Program (NVLAP-NIST) and is accredited for testing of lighting products according to the guidelines for the EEL Program. OSRAM SYLVANIA lamp and ballast measurements are conducted under laboratory conditions utilizing American National Standards Institute (ANSI), Canadian Standards Association (CSA), Commission Internationale de l'Eclairage (CIE), and Illuminating Engineering Society of North America (IESNA) standards and practices. The OSRAM SYLVANIA Electronic Component and Systems Development Group participate in the Underwriters Laboratories Inc. Client Test Data Program. Ballast designs are tested for conformance to Underwriters Laboratory (UL) safety standards using practices audited, assessed and approved by UL. Actual lamp and ballast performance may vary depending on application and environment (i.e. ambient temperature, input voltage, ballast type, etc.)

OSRAM SYLVANIA designs and manufactures lamps and ballasts to meet American National Standard Institutes (ANSI) and/or IEC (International Electrotechnical Commission) standards of construction and performance through Total Quality Manufacturing (TQM) practices where applicable. In addition, ballasts are designed and manufactured to meet Underwriters Laboratory (UL) and Canadian Standards Association (CSA) safety standards as necessary. Ratings may change as a result of changes made to remain compliant with modified or updated standards. OSRAM SYLVANIA will release new or updated technical bulletins when appropriate. All product data presented in this catalog supersedes all data published before 2/1/11.

Many OSRAM SYLVANIA products listed in this catalog qualify under the North American Free Trade Agreement (NAFTA) as manufactured in Canada, the United States of America or Mexico.

The Environment. Handle with Care.

Global Care™ represents OSRAM SYLVANIA's commitment to environmental and social responsibility.

Global Care represents our comprehensive approach and commitment to social and environmental responsibility worldwide. As a leader in innovative lighting solutions, we are dedicated to developing products and processes that contribute to solving global sustainability challenges, address energy efficiency and economic needs, and protect the environment today and into the future. Being a good neighbor – to our communities and to our environment – is a fundamental part of our business ethic at OSRAM SYLVANIA. Our Global Care commitment is realized through a variety of corporate initiatives:

- OSRAM SYLVANIA ECOLOGIC® products are engineered to pass the Federal TCLP test for hazardous waste determination. Close to a thousand of our products, the most in the industry, proudly bear the ECOLOGIC mark.
- SYLVANIA Lighting Services sends more spent lamps to recyclers than any other lighting services company in the United States.
- In 2006, we launched the Recycle Pak program, making it easier for our customers to recycle fluorescent lamps using pre-paid recycling kits delivered right to their door.
- For the tenth consecutive year, OSRAM SYLVANIA was recognized in 2011 as an ENERGY STAR® Partner of the Year. Nearly all SYLVANIA compact fluorescent lamps now carry the ENERGY STAR label for energy efficiency.
- We package many of our lamps in recycled and recyclable materials, and use soy-based inks. We reduce the amount of plastic packaging used where possible, and many of our lamps are packaged with 100% recycled paperboard.
- Packaging and transportation and logistics efficiencies result in significantly reduced cost-to-ship, fuel consumption and overall environmental impact.
- We continually find ways to reduce or eliminate the use of hazardous materials such as lead and mercury in our products.

We're proud of everything that we've accomplished so far. But our job is far from done. OSRAM SYLVANIA is committed to continually finding innovative ways to protect our environment and make our communities better places in which to live.

The future of lighting is being created today at OSRAM SYLVANIA.

Leading you into the future of light
For more than a century, OSRAM SYLVANIA has been a leader in introducing products that deliver energy savings, reduce impact on the environment and increase our customers' bottom line. We have consistently refined and improved our traditional lighting technologies, while embracing the challenge to explore and develop innovative products to meet future demands.

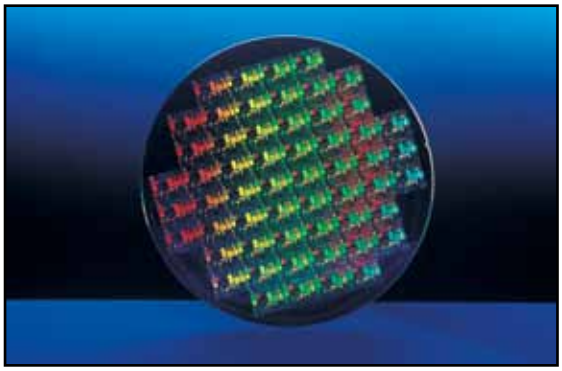
Innovation drives profitable growth
Consistently, over 40 percent of our worldwide sales result from products that are less than five years old. Our R&D facilities in Massachusetts and Germany, which employ more than 1,400, are strategically located close to our global production facilities. In addition, our global R&D team is supported by a corporate investment equal to 6.6 percent of sales.

Follow a leader in lighting innovation
Our innovative products are driven by unparalleled expertise in all facets of lighting science and technology, and by the highest levels of customer support and service. Let us show you how lighting behaves, how it motivates, and how it influences our lives and our performance. Most importantly, let us show you how our experience in specification and application will ensure you get the best performance and ROI from our products. Look to OSRAM SYLVANIA to provide tomorrow's lighting solutions for today's lighting projects.

Display/Optic Markets Served

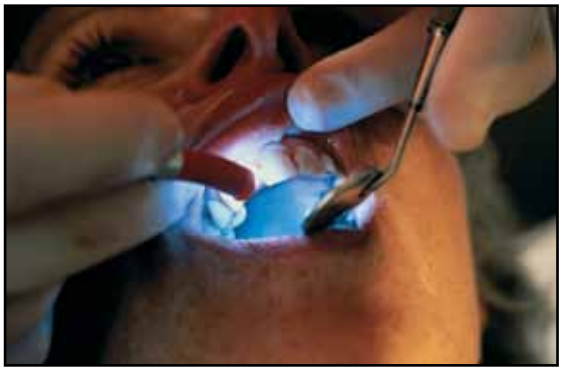
The Display/Optic business group at OSRAM SYLVANIA offers an ever expanding range of OSRAM branded halogen, discharge, fluorescent and incandescent lamps, along with a variety of quality lampholders designed for high temperature lamps. We offer the most innovative LED solutions backed by global LED resources, including R&D (e.g. thermal and optical engineering; also for electronics and controls), projection management, manufacturing and quality assurance.

With an expansive product portfolio, OSRAM offers state-of-the-art light sources for the Entertainment, Cinema, Display, Semiconductor, Industrial and Medical markets.



SEMICONDUCTOR and INDUSTRIAL:
High precision light illumination.

- Airfield/Aircraft
- Air/Water Purification – Germicidal
- Integrated Circuit Production
- IR Heating
- Liquid Crystal Display (LCD) Production
- Material Technology and Aging
- Ozone Production
- Paper Mill/Paper Finishing
- PET (polyethylene terephthalate) Blow Molding
- Photopolymerisation (UV-Curing)
- Printed Circuit Board (PCB) Production
- Printing Industry
- Rapid Thermal Processing (RTP)
- Wafer Cleaning



MEDICAL:
Light that helps doctors make diagnoses.

- Animal Breeding
- Bilirubin Medical Treatment
- Boroscopy
- Endoscopy
- Microscopy
- Photodynamic Therapy (PDD/PDT)
- Surgical Lighting
- UV Polymerisation (UV-Curing)
- Wellness & Therapy

AWARDS

- OSRAM was awarded two OSCARS® for technical achievement from the Academy of Motion Picture Arts and Sciences®:
  1984 – for development of XBO® xenon lamps used in cinema projection
  1987 – for inventing and continuous improvement of HMI® metal halide discharge lamps used for television and film lighting
- 2007 – OSRAM was the recipient of the highly regarded 59th Primetime Emmy Engineering Award in recognition of outstanding achievement in engineering development of HMI® technology

Photo: Academy of Motion Picture Arts and Sciences

ENTERTAINMENT:
Turning light into a light show.

- Architectural/Architainment Lighting
- Blacklight Illumination
- Club & Disco Lighting
- Exhibition Lighting
- Film and TV Production
- Microfilm, Overhead, Video, Advertising and Slide Projection
- Photo Finishing
- Photometry
- Professional and Speed Photography
- Reprography
- Solar Simulation
- Spotlights and Attraction Lighting
- Stage Lighting
- Theater, Concerts, Studio, TV

DISPLAY:
Creating light for images in all dimensions.

- Data and Video Projection
- Front and Rear Projection

CINEMA:
An impressive performance on screen.

- Cinema Digital and Film Projection

Product Catalog Glossary of Terms

Ampere A unit expressing the rate of flow of electric current.

ANSI (American National Standards Institute) The organization that develops voluntary guidelines and produces performance standards for the electrical and other industries.

Audible Noise (Sound) All fluorescent lamp ballasts produce some noise. Most OSRAM SYLVANIA brand ballasts are sound rated A (up to 75% quieter than magnetic types) and acceptable for most applications. Care should be taken when mounting the ballast to reduce vibration.

Average Rated Life An average rating, in hours, indicating when 50% of a large group of lamps have failed, when operated at nominal lamp voltage and current; manufacturers use 3 hours per start for fluorescent lamps and 10 hours per start for HID lamps when performing lamp life testing procedures; every lamp type has a unique mortality curve that depicts its average rated life. For Display/Optic specialty lamps, average rated life refers to the operating period after which on statistical average, 50% of the lamps will perform within their specified values.

Ballast A device used with an electric discharge lamp to obtain the necessary circuit conditions (voltage, current and waveform) for starting and operating; all fluorescent and HID light sources require a ballast for proper operation. Dimming ballasts are special ballasts which, when used together with a dimmer, will vary the light output of a lamp. OSRAM Display/Optic discharge lamps are either designed for AC operation (sine wave and/or square wave with recommended operational frequencies below 1KHz) or DC operation (current regulated or power regulated). Please see OSRAM lamp specifications for correct ballast or electronic control gear selection.

Ballast Basics Ballasts have two primary functions: 1) start the lamp and 2) control operation of the lamp once it has started. High frequency electronic ballasts operate lamps more efficiently and eliminate the hum and visible flicker normally associated with standard magnetic ballasts. Electronic ballasts also typically have better power quality than magnetic ballasts.

Ballast Life OSRAM SYLVANIA ballasts are designed to have an average life expectancy of 60,000 hours. To maximize life, ambient temperature should be kept as low as possible. It is also important to maintain effective dissipation of heat using the lighting fixture as a heat sink for the ballast enclosure.

Ballast Losses Power consumed by a ballast that dissipates as heat instead of being converted into light. Electronic ballasts operate more efficiently than magnetic or hybrid ballasts. A typical ballast loss for a standard two lamp energy saving magnetic ballast is 12 watts, where an electronic equivalent would only be 7 watts.

Ballast Types There are three types of lighting ballasts: 1) Magnetic: an inefficient device that uses a core and coil assembly transformer to perform the minimum functions required to start and operate the lamp; 2) Hybrid or "low frequency electronic": essentially a magnetic ballast with a few electronic components that switch off voltage to the lamp coil once the lamp has started. A minimal increase in efficiency is obtained via more expensive magnetic core material and the absence of power to the lamp coils during operation; 3) High frequency electronic: a ballast that operates lamps at frequencies above 20,000 Hz. Maximum efficiency is obtained through the use of electronic circuitry and optimum lamp operating characteristics.

Base The lamp base mechanically holds the lamp in place in the application. The lamp base directly or indirectly (via a cable or lead-in wires) conducts electricity from the circuit to the lamp and can be designed to dissipate heat. Lamp bases should be operated within specified temperature ranges.

Beam Angle The angle between the two directions for which the intensity (candlepower) is 50% of the maximum intensity as measured in a plane through the nominal beam centerline (center beam candlepower).

Beam Spread In any plane the angle between the two directions in the plane in which the candle-power is equal to a stated percent of the maximum candlepower in the beam.

Black Body (Planckian Radiator) An ideal thermal radiator whose SPD curve is defined by its temperature in degrees Kelvin (K) and whose color coordinates lie exactly on the Planckian curve.

Brightness (See Luminance.)

Bulb Hard, soft or quartz glass enclosure, which can contain a vacuum, elemental inert gas or metal and a means of light generation (filament or electrodes).

Candela (cd) The unit of measure indicating the luminous intensity (candlepower) of a light source in a specific direction; any given light source will have many different intensities, depending upon the direction considered.

Candlepower Distribution A curve that represents the variation in luminous intensity (expressed in candelas) in a plane through the light center of a lamp or luminaire; each lamp or lamp/luminaire combination has a unique set of candlepower distributions that indicate how light will be spread.

Center Beam Candlepower (CBCP) The intensity of light produced at the center of a reflector lamp beam, expressed in candelas.

Chromaticity The aspect of color that includes consideration of its dominant wavelength and purity.

Color Rendering Index (CRI) The Color Rendering Index (CRI) measures the effect a light source has on the perceived color of objects and surfaces. High CRI light makes virtually all colors look natural and vibrant. Low CRI causes some colors to appear washed out or even to take on a completely different hue.

Color Temperature (CT) Color temperature, which is measured in degrees Kelvin (K), indicates whether a lamp has a warm, midrange or cool color appearance. "Warm" light sources have a low color temperature (2000-3000K) and feature more light in the red/orange/yellow range. Light with a higher color temperature (>5000K) features more blue light and is referred to as "cool."

Compact Fluorescent Lamps Compact fluorescent lamps employ small diameter tubes that are bent so they begin and end in a single base. This allows them to be produced in a wide variety of configurations, greatly extending the applications for fluorescent lighting.

Current A measure of the rate of flow of electricity, expressed in amperes (A).

Description (See Ordering Abbreviation.)

Dimming Dimmable lighting systems were developed originally to meet the need for lighting that was easier on the eye. To an increasing extent, these systems are now also being used for cost saving reasons. Users can control the lighting with remote controls and switches, or control circuits with daylight sensors can be used. Leading edge phase dimming is used for low voltage tungsten halogen lamps operated with magnetic transformers.

Directional Lighting Illumination on the workplane or on an object predominantly from a single direction.

Display/Optic Specialty Lamps Employ a variety of technologies to meet the very precise levels of performance required by the cinema, entertainment display, medical, science, industry and other high-tech fields.

Double-End Lamps that have two bases opposite one another for series electrical connection, mechanical mounting and heat dissipation.

Electronic Control Systems (See Ballast.)

EMI/RFI Electronic Ballasts contain circuits that limit electrical noise conducted onto the power line or radiated through the air, otherwise referred to as EMI/RFI. OSRAM SYLVANIA ballasts comply with FCC 47 CFR Part 18, non-consumer limits for commercial applications. Ballasts for residential application must meet consumer limits. OSRAM SYLVANIA has a complete line of magnetic ballasts for residential use.

Filament A tungsten wire purposely positioned inside a lamp bulb, that when heated electrically generates radiation in the visible, infrared and ultra-violet ranges. Tungsten material is most often used, as it has great tensile strength, is very durable and can be heated very near its melting point without evaporating rapidly. Lamp filaments are offered in a variety of designs optimized for specific applications.

Fixture (See Luminaire.)

Floodlight A reflector lamp with a relatively wide beam pattern. Also a luminaire consisting of lamp and reflector at fixed distance providing a wide field of illumination.

Fluorescent Lamp A low pressure mercury vapor discharge light source. The electric discharge generates ultra-violet (UV) energy, which is absorbed by a phosphor and converted to visible light.

Focal Distance The distance between a lamp (light producing element) and the focal point of the reflector surrounding it. Lamp alignment can be adjusted to influence both illumination and color quality. Sometimes referred to as "working distance".

Footcandle (fc) A unit of illuminance equal to 1 lumen per square foot.

Frequency The number of times per second that an alternating current system reverses from positive to negative and back to positive, expressed in cycles per second or hertz (Hz).

Global Care Represents OSRAM SYLVANIA's commitment to environmental and social responsibility.

Halogen Lamps High pressure tungsten filament lamps containing halogen gases. The halogen gases allow the filaments to operate at higher efficacies than incandescent lamps. Halogen lamps also provide brighter, whiter light with better color characteristics, longer service life and improved energy efficiency.

Harmonic An electrical frequency that is an integer multiple of the fundamental frequency; for example, if 60 Hz is the fundamental frequency, then 120 Hz is the second harmonic and 180 Hz is the third harmonic. Some electronic devices, such as ballasts or power supplies, can cause harmonic distortion, directly affecting power quality.

Hertz (Hz) A unit of frequency equal to one cycle per second; see frequency.

High-Intensity Discharge (HID) Lamps In which an arc passing between two electrodes in a pressurized tube causes various metallic additives to vaporize and release large amounts of light. All HID lamps offer outstanding energy efficiency and service life. Metal halide lamps also offer good to excellent color rendering index (CRI).

Hot Ignition The restarting of a previously operating lamp shortly after turn-off. Hot ignition is a high performance feature in many OSRAM SYLVANIA discharge lamp types.

Illuminance Light arriving at a surface, expressed in lumens per unit area; 1 lumen per square foot equals 1 footcandle, while 1 lumen per square meter equals 1 lux.

Incandescent Lamp A light source using the principle of incandescence. When an electric current passes through a filament wire (usually tungsten), the heated wire glows. Filaments of standard incandescent lamps are enclosed in a vacuum or gas-filled bulb. They provide low initial cost, good color rendition and excellent optical control.

Lamp Manufactured light source, synonymous with light bulb; the three broad categories of electric lamps are incandescent, fluorescent and high-intensity discharge.

Lamp Disposal When disposing of spent lamps, always consult federal, state, local and/or provincial hazardous waste disposal rules and regulations to ensure proper disposal.

Lamp Flicker Cyclic variation in output of a light source. High frequency electronic ballasts provide a minimal level of lamp flicker. Lamp flicker from magnetic ballasts may cause eye fatigue for some people.

Lamp Fuse Wire or device designed to protect a lamp from over-voltage or over-current conditions. OSRAM requires that all Display/Optic lamps be fused in their applications to prevent lamp over-powering. Certain lamps contain their own internal fuse. Please ensure lamps in your specific application are fused with respect to their power source.

Lamp Lumen Depreciation Factor (LLDF) The multiplier to be used in illumination calculations to relate the initial rated output of light sources to the anticipated minimum rated output based on the relamping program to be used.

LED A light-emitting diode (LED) is a semiconductor light source used as indicator lamps in many devices, and are increasingly used for lighting. Introduced as a practical electronic component in the early 1960's, early LEDs emitted low-intensity red light, but modern versions are available across the visible, ultraviolet and infrared wavelengths, with very high brightness.

Lens A glass or plastic element used in luminaires to change the direction and control the distribution of light rays.

Light Radiant energy that is capable of producing a visual sensation.

Light Center Length (LCL) The distance from a specified reference point on a lamp base to its light center.

Light Loss Factor (LLF) A factor used in calculating illuminance after a given period of time and under given conditions. It takes into account temperature and voltage variations, dirt accumulation on luminaire and room surfaces, lamp depreciation, maintenance procedures and atmosphere conditions. Formerly called maintenance factor.

LPW Performance Lumens per watt. The number of lumens produced by a light source for each watt of electrical power supplied to the light source. Also see Luminous Efficacy.

Lumens (lm) A unit of luminous flux; overall light output; quantity of light, expressed in lumens. For example, a dinner candle provides about 12 lumens and a 60-watt soft white incandescent lamp provides about 840 lumens.

Lumen Depreciation The decrease in lumen output of a light source over time; every lamp type has a unique lumen depreciation curve (sometimes called a lumen maintenance curve) depicting the pattern of decreasing light output. See Lamp Lumen Depreciation Factor, LLDF and Mean Lumens.

Luminaire A light fixture; the complete lighting unit, including lamp, reflector, ballast, socket, wiring, diffuser and housing.

Luminaire Efficiency The ratio of luminous flux (lumens) emitted by a luminaire to that emitted by the lamp or lamps used therein.

Luminance (L) Unit of measurement: candela per square meter [cd/m^2]. Luminance is measured brightness of a light source on an illuminated surface.

Luminance Contrast The relationship between the luminances of an object and its immediate background (square feet or square meters).

Luminance Ratio The ratio between the luminances of any two areas in the visual field.

Luminous Efficacy The rate at which a lamp is able to convert power (watts) into light (lumens), expressed in lumens per watt (LPW or lm/W). See also LPW Performance.

Luminous Intensity Unit of measurement: Candela (cd). A light source emits its luminous flux in different directions and different luminous intensities. Luminous Intensity is the luminous flux radiated in a particular direction.

Lux (lx) A unit of illuminance equal to 1 lumen per square meter.

Maximum Overall Length (MOL) The total length of a lamp, from top of bulb to bottom of base.

Mean Lumens Lumen output of a light source after the source has been used. Mean lumen values for fluorescent and HID lamps are typically measured at 40% of their rated lives. Most high pressure sodium and mercury lamps are measured at 50% of their rated lives. All measurements are made on ANSI reference ballasts. Mean lumens are not typically measured for incandescent and tungsten halogen lamps.

Mean Spherical Candela (MSCD) The average value of the luminous intensity of a light source in all directions. To convert MSCD to Lumens, multiply by 4π(12.57).

Metal Halide Lamps Are high pressure mercury lamps with added metal iodides or iodides of the rare earths dysprosium (Dy), holmium (Ho) and thulium (Tm) and complex compounds of cesium (Cs) and tin (Sn). They decompose in the core of the discharge arc and the metals can be excited to emit light with an intensity and spectral distribution that depends on the vapor pressure of the metal halides. The luminous efficacy and the color rendering properties of the mercury discharge are significantly improved as the gaps in the mercury spectrum are filled by the spectral contribution of the other metals.

NAED A five-digit number used to identify a specific OSRAM SYLVANIA lamp. This NAED number in this catalog is labeled Product Number and should be used when ordering OSRAM SYLVANIA products. NAED is the abbreviation for National Association of Electrical Distributors.

Nanometer (nm) A unit of length equal to 109 meters; commonly used as a unit of wavelength.

Nominal Watts Wattage used to describe a lamp. Also see Power and Watt.

OFR Abbreviation for "ozone free" technology. Lamps with the designation OFR do not generate ozone during operation.

Operating Position Some lamps are specified/designed to be operated in certain positions, i.e., horizontal or base up.

Ordering Abbreviation Provides a shorthand description of the lamp, using a unique code which can be used when ordering a lamp if the Product Number is not known. An example would be: CF15EL/R30/830/MED, which translates to a15-watt Soft White DULUX® EL reflector electronic self-ballasted compact fluorescent lamp with an R30 reflector, 82CRI, 3000K color temperature and a medium screw base.

PAR Lamps Pressed aluminized reflector lamp, with the outer bulb formed from two pressed glass parts that are fused or sealed together. PAR lamps may be incandescent, halogen or HID types.

Parallel vs. Series Wiring configurations for ballasts. Ballasts with parallel lamp circuitry have the benefit of companion lamps remaining lit, even if one of the lamps operated by the ballast should fail. Systems with series lamp wiring (magnetic ballasts and many rapid start electronic types) result in all lamps operated on the ballast going out if one should fail.

Power The rate at which energy is taken from an electrical system or dissipated by a load, expressed in watts (W); power that is generated by a utility is typically expressed in volt-amperes (VA).

Power Factor A measure of the effectiveness with which an electrical device converts volt-amperes to watts; devices with power factors (>0.90) are "high power factor" devices.

Preheat A class of fluorescents requiring a starter, which allows the lamp and filaments to be properly heated before allowing the ballast to supply the correct current flow.

Product Number (See NAED.)

Programmed Rapid Start (PRS) A method of starting fluorescent lamps where cathode heat is applied prior to lamp ignition, then removed or reduced once the lamp has ignited. PROStart® ballasts maximize the number of lamp starting cycles while maintaining energy efficiency. This is the preferred mode of lamp starting for applications with occupancy sensors and several on/off cycles per day. Additionally, the lamps will strike reliably in cold conditions down to 0°F.

Rapid Start (RS) Rapid start ballasts apply a low filament voltage to preheat the cathodes. Simultaneously, a starting voltage (lower than that used in instant start) is also applied to strike the arc. When the cathodes are hot enough, the lamp will strike. The filament voltage continues to be applied throughout the operation of the lamp. Rapid start ballasts appear to have a slight turn on delay compared to instant start. They will typically not be able to start lamps reliably under 50°F.

Reference Ballast A ballast specially constructed to have certain prescribed characteristics for use in testing electric-discharge lamps and other ballasts. Reference ballasts are typically defined by ANSI.

Reflector A device used to redirect the light by the process of reflection. Display/Optic reflector lamps utilize ellipsoidal (converging light rays) or parabolic (collimating light rays) reflectors. Dichroic coated reflectors are designed to reflect visible light and pass through unwanted infrared wavelengths.

Resistance (R) A measure of resistance to flow of current, expressed in ohms (Ω).

Safety Ballasts should be installed and operated in compliance with the National Electric Code (NEC), Underwriters Laboratories Inc. (UL) requirements, and all applicable codes and regulations. Since it is possible to come in contact with potentially hazardous voltages, only qualified personnel should perform ballast installation. All installation, inspection and maintenance of lighting fixtures should be done with the power to the fixture turned off.

Shielding A general term to include all devices used to block, diffuse or redirect light rays, including baffles, louvers, shades, diffusers and lenses.

Single-End Lamps having a single lamp base or point of electrical connection.

Spectral Power Distribution (SPD) A curve illustrating the distribution of radiant power produced by the lamp at each wavelength across the spectrum.

Spotlight A luminaire using halogen/incandescent or a high intensity discharge (HID) lamp that produces a narrow beam angle designed to illuminate a specifically defined area. It can also be called a reflector lamp.

TCLP Test (Toxicity Characteristic Leaching Procedure) Federal EPA regulations (RCRA of1990) have defined a TCLP test to determine whether wastes are to be treated as hazardous or non-hazardous.

Tungsten Halogen Cycle A regenerative cycle of tungsten and halogen atoms, which, when incorporated into the design of halogen light sources, prevents blackening of the lamp envelope during life.

Voltage (V) A measure of electrical potential, expressed in volts (V). Voltage is the "force" that pushes electrical current through a conductor.

Watt (W) A unit of electrical power equal to 1 joule per second. Lamps are rated in watts to indicate power consumption. Also see Nominal Watts.

Wavelength (l) Distance between two successive points of a periodic wave; the wavelengths of light are typically expressed in nanometers (nm), or billionths of a meter.

Working Distance (See Focal Distance.)

NOTES:

DISCHARGE

HBO® MERCURY SHORT ARC

HBO® REFLECTOR

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Type of Current	Current (A)	Lumens (lm)	Luminous Intensity (cd)	Average Luminance (cd/cm^2)	Luminous Area (mm)
HBO R 103 W/45	69311	100	22.5	DC	4.3				

HBO® DOUBLE END

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Type of Current	Current (A)	Lumens (lm)	Luminous Intensity (cd)	Average Luminance (cd/cm^2)	Luminous Area (mm)
HBO 50 W AC L1	69213	50	42	AC	1.3	2000	230	30000	0.3 x 1.0
HBO 50 W AC L2	69214	50	37	AC	1.45	2000	230	30000	0.3 x 1.0
HBO 50 W/3	69215	50	23	DC	2.3	1300	150	90000	0.2 x 0.35
HBO 100 W/2	69217	100	20.5	DC	5.0	2200	260	170000	0.25 x 0.25
HBO 103 W/2	69182	100	22.5	DC	4.44	2550	270	150000	0.25 x 0.25
HBO 200 W/2 L1	69198	200	57	DC or AC		9500	1000	40000	0.6 x 2.2
HBO 200 W/2 L2	69222	200	49	DC or AC		9500	1000	40000	0.6 x 2.2
HBO 200 W/4	69224	200	61	AC	3.6	9500	1000	40000	0.6 x 2.2
HBO 200 W/DC	69225	200	57	DC	3.5	10000	1100	40000	0.75 x 2.3
HBO 200 W/DC TM	69163	200	57	DC		9500	1000	40000	0.6 x 2.2
HBO 201 W/HS-D2	69168	200	25	DC	8				
HBO 202 W/4	69316	202	57	AC	3.6		1000	40000	0.6 x 2.2
HBO 250 W/BY	69246	250	40	DC	6.5	12500			
HBO 250 W/HS	69364	250	40	DC	6.25				
HBO 350 W	69226	350	68	DC	5.3			53000	
HBO 350 W/S	69228	350	68	DC	5.15			53000	
HBO 500 W/A	69205	500	60	DC	8.3			37000	
HBO 500 W/B	69206	500	48	DC	10.3			64000	
HBO 1003 W/PI	69195	700	27	DC	27.1				
HBO 1003 W/PIL	69180	700	27	DC	25.8				
HBO 1000 W/NEL	69176	750	47	DC	16				
HBO 1002 W/CEL	69177	750	47	DC	16				
HBO 1002 W/NEL	69273	750	47	DC	16				
HBO 1002 W/NIL	69347	750	27	DC	27.1				
HBO 1000 W/D	69200	1000	38	DC	26.5				
HBO 1500 W/CIEL	69171	1500	23	DC	65.2				
HBO 1500 W/CIL	69179	1500	23	DC	65.2				
HBO 1500 W/PIL	69181	1500	23	DC	65.2				
HBO 2000 W/NIL	69303	1750	26	DC	67				
HBO 2001 W/NIEL	69306	1750	26	DC	67				
HBO 2002 W/NIL	69287	1750	26	DC	67				
HBO 2001 W/CIEL	69166	2000	26	DC	77				

For the current listing of available products and more complete product information, please visit us at www.sylvania.com

Radiant Intensity 365+-2.5nm (mW/sr)	MOL (mm)	Electrode Gap – Cold (mm)	Average Rated Life (hrs)	Operating Position	Cooling	Base Anode	Base Cathode	Pkg Qty	Symbols & Footnotes
	81.5		300	p 20	Convection	Pin	Pin	2	47

Radiant Intensity 365+-2.5nm (mW/sr)	MOL (mm)	Electrode Gap – Cold (mm)	Average Rated Life (hrs)	Operating Position	Cooling	Base Anode	Base Cathode	Pkg Qty	Symbols & Footnotes
	53		100	s 45	Convection	SFa6-2	SFa6-2	10	
	53		100	s 45	Convection	SFa6-2	SFa6-2	10	45
	53		200	s 45	Convection	SFa6-2	SFa8-2	10	45
	90		200	s 90	Convection	SFa7.5-2	SFa9-2	10	45
	90		300	s 90	Convection	SFa7.5-2	SFa9-2	10	45
	128		400	s 45	Convection	SFc10-4	SFc10-4	10	45,56
	128		400	s 45	Convection	SFc10-4	SFc10-4	10	45,56
	128		200	s 45	Convection	SFc10-4	SFc10-4	10	45
	128		1000	s 15	Convection	SFc10-4	SFc10-4	10	
	128		400	s 20	Convection	8-32 UNC-3A	8-32 UNC-3A	10	45
	150	2	1000	Vertical, anode up	Convection	SFcX32-22	SFcX12-4/15	10	
	128		200	s 45	Convection	SFc10-4	SFc10-4	10	45,55
	152	2	1000	Vertical, anode down	Forced Base	SFc13-5/20	SFc13-5/20	10	
	143	2	1000	Vertical, anode down	Convection	SFa 13-5/20	Special	10	
	128	2.9	600	Vertical, anode down	Convection	SFcY 10-4	SFcY 10-4	10	
	127	3	600	Vertical, anode down	Convection	SFcY10-4	SFcY10-4	10	
	190	4.5	800	Vertical, anode down	Convection	SFcY13-5	SFcY13-5	10	
	180	3	800	Vertical, anode down	Convection	SFcX13-5/20	SFcY 13-15/20	10	
2400	195	3	850	Vertical, anode down	Forced Base	SFcX14-6/25	SFc15-6/25	8	
2200	195	3	1500	Vertical, anode down	Forced Base	SFcX14-6/25	SFc15-6/25	8	51
	190	3	2500	Vertical, anode down	Convection	SFa15-5/16	SFaX14-5/21	1	
	175	3	2500	Vertical, anode down	Convection	SFc15-6/20	SXFc15-6/20	1	
	190	3	2500	Vertical, anode down	Convection	SFaX14-5/21	SFc15-6/25	1	
2400	187	3	1500	Vertical, anode down	Forced Base	SFaX14-5/21	SFc15-6/25	8	
	240	3	1000	Vertical, anode down	Forced Base	SFc15-6/25	SFc15-6/25	1	
4850	262	4	2250	Vertical, anode down	Forced Base	SFa27-20/22	SFa27-20/23	6	
4850	262	4	1500	Vertical, anode down	Forced Base	SFa27-10/35	SFa27-20/23	6	
4850	273	4	1500	Vertical, anode down	Forced Base	SFc30-6/25	SFc27-10/35	6	48
	241	4.5	1500	Vertical, anode up	Forced Base	SFc27-12/35	SFc27-7/35	6	
5500	251	4.5	2250	Vertical, anode down	Forced Base	SFc27-10/35	SFc27-7/35	1	
5100	254	4.5	1500	Vertical, anode up	Forced Base	SFc27-7/35	SFc27-10x1.25/35	4	
6,000	329	4	2250	Vertical, anode up	Forced Base	SF33.5/50	SFa33.5-10/50	4	49

Symbols/Footnotes on pages 37-40

DISCHARGE

HBO® MERCURY SHORT ARC

HBO® DOUBLE END

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Type of Current	Current (A)	Lumens (lm)	Luminous Intensity (cd)	Average Luminance (cd/cm^2)	Luminous Area (mm)
HBO 2001 W/CIL	69189	2000		DC	77				
HBO 2002 W/MA	69199	2000	37	DC	54				
HBO 2011 W/NIL	69288	2000	25	DC	80				
HBO 2100 W/PIL	69501	2100	24	DC	87.5				
HBO 2500 W/PIL	69172	2500	28	DC	90				
HBO 2501 W/NIL	69289	2500	23	DC	110				
HBO 2510 W/NIL	69299	2500	23	DC	109				
HBO 2700 W/CIL	69344	2700	26	DC	110				
HBO 3500 W/PI	69174	3400	23	DC	148				
HBO 3501 W/PI	69127	3400	23	DC	148				
HBO 3500 W/HK	69137	3500	55	DC	63.5				
HBO 4500 W/CIL	69162	4500	30	DC	148				
HBO 5000 W/HK	69138	5000	70	DC	72				
HBO 5000 W/TA	69135	5000	50	DC	100				
HBO 5001 W/UF	69161	5000	62	DC	80				
HBO 5500 W/PI	69164	5500	28	DC	200				
HBO 5500 W/PIL	69521	5500	27	DC	200				

HXP® MERCURY SHORT ARC

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Type of Current	Current (A)	Lumens	Color Temp
HXP R 120 W/17C	69125	120	82	AC	1.4	4400	9500
HXP R 120 W/45 C UV	69120	120	85	AC	1.4		
HXP R 120 W/45 C VIS	69119	120	85	AC	1.4	2800	9500

EMH® METAL HALIDE

EMH® SINGLE END

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
EMH 150W/SE/70	55086	150	90	1.8	70	8000	7000
EMH 250W/SE/80	55087	250	94	3.3	60	15000	8000
EMH 575W/SE/75	57027	575	95	7	70	42000	7500

EMH® DOUBLE END

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
EMH 575W/DE/60	57028	575	95	7	75	42000	6000
EMH 575W/DE/75	57029	575	95	7	60	42000	7500

For the current listing of available products and more complete product information, please visit us at www.sylvania.com

Radiant Intensity 365+-2.5nm (mW/sr)	MOL (mm)	Electrode Gap – Cold (mm)	Average Rated Life (hrs)	Operating Position	Cooling	Base Anode	Base Cathode	Pkg Qty	Symbols & Footnotes
6000	329	4.5	1500	Vertical, anode up	Forced Base	SF33.5/50	SFa33.5-10/50	4	49
4200	292	3	1000	Vertical, anode down	Forced Base	SF27/35	SFa27-10/35	4	
5700	256	4.5	1500	Vertical, anode up	Forced Base	SFc27-7/35	SFc27-12x1.5/35	6	
	273	4.5	1500	Vertical, anode down	Forced Base	SK 33s/42	SFc27-12/35	6	
8200	350	6.7	1500	Vertical, anode up	Forced Base	SFc30-6/50	SFc30-6.3/50	1	52
10600	367	4.5	1500	Vertical, anode down	Forced Base	SFc33.5-8/50	SFc33.5-14/5	4	
7800	367	4.5	1500	Vertical, anode up	Forced Base	SFc33.5-8/50	SFc33.5-14/50	4	
8280	332	4.8	1500	Vertical, anode up	Forced Base	SFa33.5/50	SFa33.5-14.59	1	
9000	340	4.5	850	Vertical, anode up	Forced Base	SFaX40-6/50	SFc32.5-6.7/50	4	
9000	360	4.5	850	Vertical, anode up	Forced Base	SFaX40-6/50	SFc32.5-6.7/50	4	
	315	6.4	1000	Vertical, anode up	Forced Base	SFa 27-10/42	SFc 27-14-8/35	4	
14320	360	4.5	1500	Anode up	Forced Base	SFAX40-6/50	SFC32.5-6.7/50	4	
	355	7.5	1000	Vertical, anode down	Forced Base	SFYa29-10/42	SFc29-20-12/42	4	
	327.5	7.5	850	Vertical, anode up	Forced Base	SFa 33.5-12/50	SFa 33.5-12/50	4	
	486	7.5	850	Vertical, anode up	Forced Base	SFa 38-14/65	SFXa 38-14/65	1	
12410	352.5	5.5	850	Vertical, anode up	Forced Base	SFcX 42.5-6/50	SFa 37.5-9/50	1	78
		5.5	1500	Vertical, anode up	Forced Base	SFcX 42.5-6	SFa32.5-9	1	

MOL (mm)	Working Distance A (mm)	Avg Rated Life (hrs)	Hot Restart	Operating Position	Base	Pkg Qty	Symbols & Footnotes
77	17.3	2000	Yes	p 20	Special	50	47,70
77	45	2000	Yes	p 20	Special	2	47,69,70,71
77	45	2000	Yes	p 20	Special	2	45,69,70,71

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
46	5	500	Any	GY9.5	No	10	
108	5	2000	Any	GY9.5	No	10	
125	7	750	Any	GX9.5	No	10	

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
135	7	750	Any	SFc10-4	Yes	10	
135	7	750	Any	SFc10-4	Yes	10	

Symbols/Footnotes on pages 37-40

DISCHARGE

HMI® METAL HALIDE

HMI® SINGLE END

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
HMI 200W/SE	54220	200	70	3.0	90	16000	6000
HMI 250W/SE	54062	270	50	5.0	90	16200	6000
HMI 400 W/SE	54219	400	70	6.9	90	33000	6000
HMI 575W/SEL/XS	54063	575	95	7.0	90	49000	6000
HMI 1200W/SEL/XS	54067	1200	100	13.8	90	110000	6000
HMI 1800W/SE/XS	54177	1800	123	14.6	90	165000	6000
HMI 2500W/SE/XS	54070	2500	115	25.6	90	240000	6000
HMI 4000W/SE/XS	54321	4000	200	24.0	90	380000	6000
HMI 6000W/SE/XS	54099	6000	123	55	90	600000	6000
HMI 12000W/SE/XS	54113	12000	160	84	90	1150000	6000
HMI 18000W/SE GX51	54324	18000	225	88	90	1600000	6000

HMI® DOUBLE END

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
HMI 575 W/DXS	54313	575	95	7.0	90	49000	6000
HMI 1200 W/DXS	55139	1200	100	13.8	90	110000	6000
HMI 2500 W/DXS	54265	2500	115	25.6	90	240000	6000
HMI 2500W/S/XS	54068	2500	115	25.6	90	240000	6000
HMI 4000 W/DXS	54314	4000	200	24.0	90	380000	6000
HMI 6000 W/DXS	54315	6000	123	55.0	90	570000	6000
HMI 12000 W/DXS	54316	12000	240	84.0	90	1150000	6000
HMI 18000W/DXS	54213	18000	232	78	90	1700000	6000
HMI 24000W/DXS	54325	24000	280	86	90	2300000	6000

HSD® 4ARXS METAL HALIDE

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
HSD 150W/70 4ARXS	54311	150	92	1.8	85	12000	7000
HSD 150W/UL/75 4ARXS	54312	150	98	1.8	85	11000	7500
HSD 200W/60 4ARXS	54167	200	65	3.3	80	13000	6000
HSD 250W/60 4ARXS	54170	250	85	3.1	85	17000	6000
HSD 250W/80 4ARXS	54243	250	85	3.2	85	17000	8000
HSD 250W/UL/75 4ARXS	54288	250	85	3.1	85	15000	7500
HSD 575W/72 4ARXS	54129	575	80	7.4	85	45000	7200

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
80	5	200	Any	GZY9.5	Yes	10	
84	5	250	p 45	FaX1.5	Yes	10	47
110	6	650	Any	GZZ9.5	Yes	10	
145	7	1000	Any	G22	Yes	10	67
200	10	1000	Any	G38	Yes	1	67
210	10	750	Any	G38	Yes	1	67
225	14	500	Any	G38	Yes	1	67
250	20	500	Any	G38	Yes	1	67
360	23	500	s 135	GX38	Yes	1	45,67
450	27	300	s 135	G38	Yes	1	45,67
495	44	300	s 135	GX51	Yes	1	☼,45,67

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
135	7	1000	Any	SFc10-4	Yes	10	44,67
220	10	1000	Any	SFc15.5	Yes	1	
355	14	500	p 30	SFa21	Yes	1	44,47,67
210	14	500	p 30	SFa21	Yes	1	37,47,67,78
405	34	500	p 15	SFa21	Yes	1	44,67
450	21	500	p 15	S25.5	Yes	1	44,67
470	25	500	p 15	S30	Yes	1	44,67
500	44	375	p 15	S30	Yes	1	44,67
500	50	375	p 15	S30	Yes	1	

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
105	5.5	3000	Any	G12	No	10	67
105	5.5	6000	Any	G12	No	10	67
108	5	2000	Any	GY9.5	No	10	67
108	5	2000	Any	GY9.5	No	10	67
108	5	3000	Any	GY9.5	No	10	67
108	5	6000	Any	GY9.5	No	10	67,68
135	7	3000	Any	GX9.5	No	10	67

Symbols/Footnotes on pages 37-40

DISCHARGE

HSR® METAL HALIDE

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
HSR 400/60	54102	400	67	6.9	85	33000	6000
HSR 575/60	54115	575	80	7	85	45000	6000
HSR 575/72	54116	575	98	7	85	49000	7200
HSR 1200/60	54168	1200	95	13.8	85	110000	6000

HTI® METAL HALIDE

HTI® SINGLE END

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
HTI S 35/12	69000	35	85	2.5	90	9500	5000
HTI 152 W	54079	35	85	1.8	90	9500	5000
HTI 150 W	54078	150	95	1.8	70	9500	6500
HTI 700 W/SE/75	54329	700	70	10	80	59000	7500
HTI 1200 W/SE XS	54141	1200	95	13.8	90	99000	5400
HTI 1800W/SE XS	54770	1800	140	14.6	90	165000	5600
HTI 2500 W/SE XS	54142	2500	105	25.6	90	240000	6000

HTI® REFLECTOR

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Color Temp
HTI 250 W/22	54080	250	45	6	70	5600
HTI 250 W/32	54081	250	45	6	70	5600
HTI 250 W/32C	54089	250	45	6	70	5600
HTI 400 W/24	54083	400	55	7.3	70	5600

HTI® DOUBLE END SHARXS®

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
HTI 400W/D3/75 SHARXS	54241	400	50	8.5	80	26000	7500
HTI 400W/D3/75 SHARXS BULK	54280	400	50	8.5	80	26000	7500
HTI 575W/D4/60 SHARXS	54296	575	69	8.3	85	49000	6000
HTI 575W/D4/75 SHARXS	54270	575	64	9	80	43000	7500
HTI 700W/D4/60 SHARXS	54282	700	70	10.0/11.0	80	59000	6000
HTI 700W/D4/60 SHARXS BULK	54283	700	70	10.0/11.0	80	59000	6000
HTI 700W/D4/75 SHARXS	54242	700	70	10.0/11.0	80	59000	7500
HTI 700W/D4/75 SHARXS BULK	54281	700	70	10.0/11.0	80	59000	7500
HTI 1200W/D7/60 SHARXS	54268	1200	95	12.7/13.8	90	110000	6000
HTI 1200W/D7/60 SHARXS BULK	54202	1200	95	12.7/13.8	90	110000	6000

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
110	5	650	Any	GX9.5	No	10	
125	7	3000	Any	GX9.5	No	10	
125	7	1000	Any	GX9.5	No	10	
175	10	1000	Any	G22	No	20	

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
79.5	4.2	3000	p 10	P32d-2	Yes	10	47
48	6.75	3000	Any	GY9.5	No	12	
46	5.0	750	Any	GY9.5	No	12	
85	4	500	p 45	FaX1.5	Yes	10	47,67
135	7	750	s 135	GY22	Yes	1	22,45,67
135	7	750	s 135	GY22	Yes	1	22,45,67
180	14	600	s 135	G22+Cable	Yes	1	22,45,67

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Hot Restart	Pkg Qty	Symbols & Footnotes
73	2.5	250	P 20	Yes	2	47
73	2.5	250	P 20	Yes	2	47,50
73	2.5	250	P 20	Yes	2	47
73	4.0	250	P 20	Yes	2	47

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
136	3	1000	Any	SFc10-4	Yes	10	67,68
136	3	1000	Any	SFc10-4	Yes	30	67,68
136	4	750	Any	SFc10-4	Yes	10	67,68
136	4	750	Any	SFc10-4	Yes	10	67,68
136	4	750	Any	SFc10-4	Yes	10	67,68
136	4	750	Any	SFc10-4	Yes	30	67,68
136	4	750	Any	SFc10-4	Yes	10	67,68
136	4	750	Any	SFc10-4	Yes	30	67,68
136	7	750	Any	SFc10-4	Yes	10	67,68,75
136	7	750	Any	SFc10-4	Yes	30	67,68,75

Symbols/Footnotes on pages 37-40

DISCHARGE

HTI® METAL HALIDE

HTI® DOUBLE END SHARXS®

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
HTI 1200W/D7/75 SHARXS	54269	1200	95	12.7/13.8	80	110000	7500
HTI 1500W/D7/60 SHARXS	54319	1500	110	13.6	90	145000	6000
HTI 1500W/D7/75 SHARXS	54327	1500	110	13.6	80	145000	7500
HTI 2000W/D10/60 MAXI SHARXS	54328	2000	105	19	85		6000

HTI® DOUBLE END BABY SHARXS®

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
HTI 250W/D5/80 BABY SHARXS	54297	250	75	3.2	85	18000	8000
HTI 300W/D5/57 BABY SHARXS	54298	300	75	4.3	80	20000	5700
HTI 300W/D5/65 BABY SHARXS	54299	300	95	4.3	85	22000	6500
HTI 400W/D5/60 BABY SHARXS	54300	400	95	7.0	85	33000	6000
HTI 575W/D5/56 BABY SHARXS	54359	575	93	7.0	85	43000	5600

HTI® DOUBLE END – OTHER

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
HTI 4000 W/DE	54133	4000	105	39.0	90	360000	6300

LOK-IT® Metal Halide

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	CRI	Lumens (lm)	Color Temp
HSD 300W/80/P28 LOK-IT	54349	300	95	3.2	85	27000	8000
HTI 700W/75/P28 LOK-IT	54221	700	100	10	85	50000	7500
HTI 700W/75/P50 LOK-IT	54229	700	100	10	85	50000	7500
HTI 1500W/60/P50 LOK-IT	54225	1500	100	16	90	135000	6000

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
136	7	750	Any	SFc10-4	Yes	10	67,68
136	7	750	Any	SFc10-4	Yes	10	44,67
136	7	750	Any	SFc10-4	Yes	10	67,68
220	10	750	Any	SFc15.5	Yes	10	

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
93	5	3000	Any	SFc10-4	Yes	10	67,80
93	5.5	3000	Any	SFc10-4	Yes	10	67,80
93	5.5	750	Any	SFc10-4	Yes	10	67,80
93	5.5	750	Any	SFc10-4	Yes	10	67,80
93	5	500	Any	SFc10-4	Yes	10	67

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
270	15	500	p 30	S25.5	Yes	1	47

MOL (mm)	Electrode Gap – Cold (mm)	Avg Rated Life (hrs)	Operating Position	Base	Hot Restart	Pkg Qty	Symbols & Footnotes
122	5	2000	Any	PGJX28	No	1	☼
117	4	750	Any	PGJX28	No	1	☼
125	4	750	Any	PGJX50	No	1	☼
128	5	750	Any	PGJX50	No	1	☼,67

Symbols/Footnotes on pages 37-40

DISCHARGE

EXCIMER

XERADEX®

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	MOL (mm)	Avg Rated Life (hrs)	Operating Position	Pkg Qty	Symbols & Footnotes
DBD 20/110-240/ECG-XERADEX	69128	20	110	255			1	58
XERADEX 20/S46/85	69348	20		286	1500	Any	1	60,64
XERADEX 20/SY45/45	69349	20		300	1500	Any	1	58,60,64,66
XERADEX L40/120/SB-SX48/KF50	69558	20	110	251.5	2500	Any	1	
XERADEX L40/120/SB-SX48/KF50HV	69550	20	110	251.5	2500	Any	1	

SPECTRAL

Ordering Abbreviation	Product Number	Elements	Watts (W)	Volts (V)	Current (A)	Type of Current	Operating Position	MOL (mm)	Base	Pkg Qty	Symbols & Footnotes
Na/10	69282	Sodium	15	15	1.0	AC	Vertical, base down	107	Pico 9	1	

ULTRA VIOLET

BLACKLIGHT, PREHEAT (Starter Required)

Ordering Abbreviation	Product Number	Watts (W)	Bulb	Avg Rated Life @ 3hrs/start (hrs)	Base	Nominal Length (in)	MOL (in)	Pkg Qty	Symbols & Footnotes
F15T8/350BL/ECO	21623	15	T8	7500	Med Bipin	18	17.78	24	,3,4,6,7,12
F20T12/350BL/ECO	22113	20	T12	9000	Med Bipin	24	23.78	24	,3,4,6,7,13
F15T12/350BL/500/PH	21445	22	T12		Med Bipin	15	14.78	30	3,4,6,7,17
F25T8/350BL/18in/ECO	21703	25	T8	7500	Med Bipin	18	17.78	24	,3,4,6,7,14
F30T8/350BL/ECO	23113	30	T8	7500	Med Bipin	36	35.78	24	,3,4,6,7,15
F18T12/350BL/700/PH	21525	32	T12		Med Bipin	18	17.78	30	3,4,6,7,18

BLACKLIGHT, RAPID START (No starter required)

Ordering Abbreviation	Product Number	Watts (W)	Bulb	Avg Rated Life @ 3hrs/start (hrs)	Base	Nominal Length (in)	MOL (in)	Pkg Qty	Symbols & Footnotes
F40/350BL/ECO	24922	40	T12	20000	Med Bipin	48	47.78	30	1,2,3,4,7,8,16
FR48T12/350BL/VHO/180	25251	115	T12	10000	Recessed DC	48	45.91	30	1,4,7,19

BLACKLIGHT BLUE, PREHEAT (Starter Required)

Ordering Abbreviation	Product Number	Watts (W)	Bulb	Avg Rated Life @ 3hrs/start (hrs)	Base	Nominal Length (in)	MOL (in)	Pkg Qty	Symbols & Footnotes
F4T5/BLB	20425	4	T5	6000	Mini Bipin	6	5.91	24	3,4,6,7
F8T5/BLB	20825	8	T5	7500	Mini Bipin	12	11.91	24	3,4,6,7
F15T8/BLB	21625	15	T8	7500	Med Bipin	18	17.78	6	3,4,6,7,10

BLACKLIGHT BLUE, RAPID START (No starter required)

Ordering Abbreviation	Product Number	Watts (W)	Bulb	Avg Rated Life @ 3hrs/start (hrs)	Base	Nominal Length (in)	MOL (in)	Pkg Qty	Symbols & Footnotes
F40/BLB/RP	24026	40	T12	20000	Med Bipin	48	47.78	6	1,2,3,4,7,8,11

UV-A

Ordering Abbreviation	Product Number	Watts (W)	Bulb	Avg Rated Life @ 3hrs/start (hrs)	Base	Nominal Length (in)	MOL (in)	Pkg Qty	Symbols & Footnotes
DULUX L 18W/71	23353	18	T5	1000	2G11		8.54	10	☼

UV-C SOFT GLASS COMPACT

Ordering Abbreviation	Product Number	Watts (W)	Bulb	Avg Rated Life @ 3hrs/start (hrs)	Base	Nominal Length (in)	MOL (in)	Pkg Qty	Symbols & Footnotes
GCF5DS/G23/SE/OF	23396	5	S (T4)	8000	G23			10	☼,5,6,9
GCF7DS/G23/SE/OF	20390	7	S (T4)	8000	G23			10	☼,5,6,9
GCF9DS/G23/SE/OF	21062	9	S (T4)	8000	G23			10	☼,5,6,9
GCF11DS/G23/SE/OF	23398	11	S (T4)	8000	G23			10	☼,5,6,9
GFT18DL/2G11/SE/OF	21054	18	L (T5)	8000	2G11			10	☼,5,6,9
GFT24DL/2G11/SE/OF	20849	24	L (T5)	8000	2G11			10	☼,5,6,9
GFT36DL/2G11/SE/OF	23392	36	L (T5)	8000	2G11			10	☼,5,6,9

UV-C SOFT GLASS LINEAR

Ordering Abbreviation	Product Number	Watts (W)	Bulb	Avg Rated Life @ 3hrs/start (hrs)	Base	Nominal Length (in)	MOL (in)	Pkg Qty	Symbols & Footnotes
G4T5/OF	23397	4	T5	6000	G5		5.91	25	☼,5,6,9
G6T5/OF	23399	6	T5	8000	G5		8.91	25	☼,5,6,9
G8T5/OF	21061	8	T5	8000	G5		11.91	25	☼,5,6,9
G11T5/OF	23354	11	T5	8000	G5		8.91	25	☼,5,6,9
G15T8/OF	21083	15	T8	8000	G13		17.78	20	☼,5,6,9
G25T8/OF	23355	25	T8	8000	G13			20	☼,5,6,9
G30T8/OF	21086	30	T8	8000	G13		35.78	10	☼,5,6,9
G55T8/OF	23356	55	T8	8000	G13			10	☼,5,6,9

ULTRA VIOLET – DIAZO

Ordering Abbreviation	Product Number	Watts (W)	Bulb	Avg Rated Life @ 3hrs/start (hrs)	Base	Nominal Length (in)	MOL (in)	Pkg Qty	Symbols & Footnotes
F40T12/SDB/65W	24465	65	T12	1000	Med Bipin	48	47.78	30	20

Symbols/Footnotes on pages 37-40

DISCHARGE

XBO® <= 450W XENON SHORT ARC

XBO REFLECTOR

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	Lumens (lm)	Luminous Intensity (cd)	Average Luminance (cd/cm^2)	Luminous Area (mm)
XBO R 100 W/45 OFR	69197	100	13	7.0				0.4 x 0.9
XBO R 100 W/45C OFR	69191	100	13	7.0				0.4 x .09
XBO R 101 W/45C OFR	69190	100		7.0				
XBO R 180 W/45/OFR	69186	180	14	12				
XBO R 180 W/45C OFR	69183	180	14	12				
XBO R 181 W/45C OFR	69184	180		12				
XBO R 300 W/60C OFR	69167	300	18	16				

XBO DOUBLE END

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	Lumens (lm)	Luminous Intensity (cd)	Average Luminance (cd/cm^2)	Luminous Area (mm)
XBO 75 W/2	69231	75	14	5.4	1000	100	40000	0.25 x 0.5
XBO 75 W/2 OFR	69232	75	14	5.4	1000	100	40000	0.25 x 0.5
XBO 100 W OFR	69233	100	14	7.2	1900	270	30000	0.4 X 0.8
XBO 150 W/1	69234	150	25	7.5	3000	300	15000	0.5 x 2.2
XBO 150 W/1 OFR	69235	150	25	7.5	3000	300	15000	0.5 x 2.2
XBO 150 W/4	69238	150	25	7.5	3000	300	15000	0.5 x 2.2
XBO 150 W/CR OFR	69237	150	16.5	8.5	2900	290	20000	0.5 x 1.6
XBO 450 W OFR	69245	450	17	25	13000	1300	35000	0.9 x 2.7

XBO® >450W XENON SHORT ARC

DIGITAL

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	Current Control Range (A)	Lumens (lm)	Luminous Intensity (cd)	Average Luminance (cd/cm^2)
XBO 1200 W/DHP OFR	69596	1200	20	60	40-70	45000	4000	90000
XBO 2000 W/DHP OFR	69150	2000	25	80	60-90	80000	7500	90000
XBO 2000 W/DTP OFR	69155	2000	25	80	50-85	80000	7500	75000
XBO 2000 W/HPN OFR	69061	2000	24	80	60-85	80000	7500	90000
XBO 2000 W/HPS OFR	69486	2000	25	80	60-90	80000	7500	100000
XBO 3000 W/DHP OFR	69480	3000	30	90	60-100	140000	13500	180000
XBO 3000 W/DHS OFR	69462	3000	29	110	60-120	130000	12000	105000
XBO 3000 W/DTP OFR	69154	3000	27	110	60-120	130000	15000	120000
XBO 3000 W/HPS OFR	69487	3000	30	105	70-110	140000	13500	180000
XBO 3000 W/HSLA OFR	69390	3000	29	110	60-120	130000	12000	130000
XBO 4000 W/DHP OFR	69481	4000	33	120	100-130	185000	17500	135000
XBO 4000 W/HPN OFR	69060	4000	35	115	90-125	190000	17000	160000
XBO 4200W/HPS OFR	60009	4200	35	135	70-130	195000	17500	165000

Avg Rated Life – Horizontal (hrs)	Avg Rated Life – Vertical (hrs)	Operating Position	Cooling	Base Anode	Base Cathode	MOL (mm)	Pkg Qty	Symbols & Footnotes
500		p 20	Required			83	2	47,65
500		p 20	Required			83	2	38,47
500		p 20	Required			83	2	38,47
500		p 20	Required			90	2	31,47
500		p 20	Required			90	2	38,47
500		p 20	Required			90	2	38,47
1000		p 20	Required			80	2	38,47

Avg Rated Life – Horizontal (hrs)	Avg Rated Life – Vertical (hrs)	Operating Position	Cooling	Base Anode	Base Cathode	MOL (mm)	Pkg Qty	Symbols & Footnotes
400	400	s 105		SFa9-2	SFa7.5-2	90	10	32,45
400	400	s 105		SFa7.5-2	SFa7.5-2	90	10	45
500	500	s 100	Required	SFA9-2	SFA7.5-2	90	10	45
	1200	s 15	Required	SFc12-4	SFcX12-4	150	10	33,45
	1200	s 15	Required	SFc12-4	SFcX12-4	150	10	45
	1200	s 15	Required	SFc12-4	SFcX12.4	150	10	34,45
1200	3000	s 15 p 15	Required	SFc12-4	SFcX12-4	150	10	45,47,54
	2000	s 30	Required	SFa20-8	SFa20-10	260	1	45

Luminous Area (mm)	MOL (mm)	Warranty (hrs)	Operating Position	Cooling	Magnetic Arc Stabilization	Base Anode	Base Cathode	Symbols & Footnotes
1.2 x 3.0	345	3000	s 70 p 20	Required		SFaX27-14x80	SFc27-16/45	45,84,88
1.3 x 3.5	345	2400	s 70 p 20	Required		SFaX27-14x80	SFc27-16/45	45,47,84,88
1.3 x 4.0	403	2400	s 30 p 30	Required	Required	SFa25-14	SFc25-14	21,24,42,45,47,84
1.3 x 3.5	345	2400	s 70 p 20	Required		SFaX27-9.5	SFa27-20	
1.2 x 3.2	334	2400	s 60 p 30	Required		SFaX30-14/68	SFc30-20/50	45,47,88,89
1.3 x 3.5	345	1500	s 110	Required		SFaX27-14x80	SFc27-16/45	45,47,84,88
1.7 x 4.0	342	1500	s 30 p 30	Required	Required	SFaX 27-9.5	SFa 27-7.9	37,39,45,47,57,84
1.5 x 4.0	403	1500	s 30 p 30	Required	Required	SFa27-14	SFc27-14	24,42,45,47,84
1.3 x 3.5	334	1000	s 70 p 20	Required		SFaX30-14/78	SFc30-20/50	45,47,88,89
1.5 x 4.0	342	1500	s 30 p 30	Required	Required	SFaX 27-9.5	SFa 27-7.9	37,39,45,47,57,83
1.7 x 4.9	345	1000	s 70 p 20	Required	Required	SFaX27-14x80	SFc27-16/45	45,47,57,84,88
1.5 x 4.6	345	500	s 70 p 20	Required		SFaX27-9.5	SFa27-20	
1.5 x 4.6	334	500	s 60 p 30	Required		SFaX30-14/68	SFc30-20/50	

Symbols/Footnotes on pages 37-40

DISCHARGE

XBO® >450W XENON SHORT ARC

DIGITAL

Ordering Abbreviation	Product Number	Nominal Watts (W)	Nominal Volts (V)	Current (A)	Current Control Range (A)	Lumens (lm)	Luminous Intensity (cd)	Average Luminance (cd/cm²)
XBO 4500 W/DHP OFR	69463	4500	30	145	80-150	190000	22000	115000
XBO 4500 W/DTP OFR	69459	4500	32	145	80-150	190000	25000	115000
XBO 4500 W/HSLA OFR	69389	4500	30	145	80-150	190000	22000	115000
XBO 6000 W/DHP OFR	69476	6000	35	170	140-175	280000	30000	160000
XBO 6000 W/DTP OFR	69460	6000	39	155	140-175	270000	33000	130000
XBO 6000 W/HSLA OFR	69386	6000	35	170	140-175	280000	30000	160000
XBO 6500 W/DHP OFR	69523	6500	38	170	140-175	300000	32000	160000
XBO 6500 W/HPN OFR	69062	6500	38	170	140-180	300000	32000	160000
XBO 6500 W/HSLA OFR	69522	6500	38	170	140-175	300000	32000	160000

EXTREME LIFE

Ordering Abbreviation	Product Number	Nominal Watts (W)	Nominal Volts (V)	Current (A)	Current Control Range (A)	Lumens (lm)	Luminous Intensity (cd)	Average Luminance (cd/cm²)
XBO 1600 W/HS XL OFR	69524	1550	23	65	50-75	70000	5500	70000
XBO 1600 W/HSC XL OFR	69525	1550	23	65	50-70	70000	5500	70000
XBO 1600 W/XL OFR	69526	1600	24	65	45-75	60000	6000	65000
XBO 2000 W/H XL OFR	69477	2000	28	70	50-85	80000	7500	80000
XBO 2000 W/HTP XL OFR	69495	2000	28	70	50-85	80000	7500	75000
XBO 2500 W/HS XL OFR	69507	2500	28	90	70-100	100000	10000	80000
XBO 3000 W/H XL OFR	69478	3000	29	100	60-110	130000	12000	85000
XBO 3000 W/HS XL OFR	69479	3000	29	100	60-110	130000	12000	90000
XBO 3000 W/HTP XL OFR	69152	3000	29	100	60-110	130000	12000	85000
XBO 4000 W/HS XL OFR	69474	4000	28	135	80-150	155000	17000	90000
XBO 4000 W/HTP XL OFR	69151	4000	30	130	100-140	155000	16000	90000
XBO 4500 W/HS XL OFR	69542	4500	32	135	80-150	190000	22000	105000
XBO 4500 W/HTP XL OFR	69543	4500	32	135	80-150	190000	22000	105000
XBO 5000 W/H XL OFR	69520	5000	35	140	100-150	225000	27000	95000
XBO 5000 W/HBM XL OFR	69544	5000	34	140	100-150	225000	27000	95000
XBO 6000 W/HS XL OFR	69528	6000	37	160	110-165	280000	40000	105000
XBO 6000 W/HTP XL OFR	69545	6000	37	160	110-165	280000	40000	105000
XBO 7000 W/HS XL OFR	69527	7000	42	160	110-165	350000	35000	100000

Luminous Area (mm)	MOL (mm)	Warranty (hrs)	Operating Position	Cooling	Magnetic Arc Stabilization	Base Anode	Base Cathode	Symbols & Footnotes
1.9 x 5.0	410	1000	s 15 p 15	Required	Required	SFaX30-9.5	SFa30-7.9	45,47,84,88
1.9 x 5.0	433	1000	s 15 p 15	Required	Required	SFcX27-14	SFc27-14	24,42,47,84
1.9 x 5.0	410	1000	s 15 p 15	Required	Required	SFaX30-9.5	SFa30-7.9	37,39,45,47,57,83
1.9 x 6.0	433	600	s 15 p 15	Required	Required	SFaX30-9.5	SFa30-7.9	45,47,84,88
1.9 x 7.0	433	600	s 15 p 15	Required	Required	SFc27-14	SFa27-14	21,24,42,45,47,84
1.9 x 6.0	433	600	s 15 p 15	Required	Required	SFaX30-9.5	SFa30-7.9	38,39,45,47,57,83
2.0 x 6.3	433	500	s 15 p 15	Required	Required	SFaX30-9.5	SFa30-7.9	88
2.0 x 6.3	427	500	s 70 p 20	Required		SFaX30-9.5	SFa30-20	
2.0 x 6.3	433	500	s 15 p 15	Required	Required	SFaX30-9.5	SFa30-7.9	37,39,45,47,57,84

Luminous Area (mm)	MOL (mm)	Warranty (hrs)	Operating Position	Cooling	Magnetic Arc Stabilization	Base Anode	Base Cathode	Symbols & Footnotes
1.0 x 3.2	235	2500	s 20 p 20	Required		SFa27-11	SFcX27-8	37,39,45,47,85
1.0 x 3.2	236	2500	s 20 p 20	Required		SK27/50	SFcX27-8	37,38,39,85
1.4 x 4.0	370	3500	s 30	Required		SFa27-10	SFa27-12	85
1.3 x 4.8	370	3500	s 30 p 30	Required	Recommended	SFaX27-10	SFaX27-12	39,45,47,85
1.3 x 4.8	370	3500	s 30 p 30	Required	Required	SFa25-14	SFc25-14	39,42,45,47,57,85
1.5 x 4.5	342	2200	s 30 p 30	Required		SFaX27-9.5	SFa27-7.9	37,39,45,46,85
1.7 x 5.0	428	2200	s 30 p 30	Required	Required	SFaX27-13	SFa27-14	39,45,47,57,85
1.7 x 5.0	342	2200	s 30 p 30	Required	Recommended	SFaX27-9.5	SFa27-7.9	37,39,45,47,57,85
1.7 x 3.0	405	2200	s 30 p 30	Required	Required	SFa27-14	SFc27-14	39,42,45,47,57,85
1.9 x 6.0	410	1500	s 20 p 20	Required	Required	SFaX30-9.5	SFa30-7.9	24,37,39,45,47
1.9 x 6.0	433	1500	s 20 p 20	Required	Required	SFa27-14	SFc27-14	39,42,45,47,57,85
2.0 x 6.5	410	1400	s 15 p 15	Required	Required	SFa30-9.5	SFaX30-7.9	37,39,45,47,57,85
2.0 x 6.5	430	1400	s 15 p 15	Required	Required	SFa27-14	SFc27-14	39,42,45,47,57,85
2.2 x 6.5	433	1200	s 15 p 15	Required	Required	SFaX30-16	SFaX28-18	39,45,47,57,84
2.2 x 6.5	436	1200	s 15 p 15	Required	Required	SFaX30-9.5	SFaX30-7.9	39,45,47,57,85
2.0 x 7.5	433	750	s 15 p 15	Required	Required	SFaX30-9.5	SFa30-7.9	37,39,45,47,57,85
2.0 x 7.5	433	750	s 15 p 15	Required	Required	SFa30-14	SFc30-14	39,42,45,47,57,85
2.6 x 9.0	433	650	s 15 p 15	Required	Required	SFaX30-9.5	SFa30-7.9	37,39,45,47,57,85

Symbols/Footnotes on pages 37-40

DISCHARGE

XBO® >450W XENON SHORT ARC

TRADITIONAL

Ordering Abbreviation	Product Number	Nominal Watts (W)	Nominal Volts (V)	Current (A)	Current Control Range (A)	Lumens (lm)	Luminous Intensity (cd)	Average Luminance (cd/cm²)
XBO 500 W/H OFR	69257	500	17	28	17-30	14500	1450	40000
XBO 900 W OFR	69261	900	19	45	30-53	30000	3000	50000
XBO 1000 W/HS OFR	69263	1000	19	50	30-55	32000	3000	60000
XBO 1000 W/HSC OFR	69264	1000	19	50	30-55	32000	3000	60000
XBO 1000 W/HTP OFR	69265	1000	21	45	30-55	35000	3200	45000
XBO 1600 W/CA OFR	69267	1600	24	65	45-75	60000	6000	65000
XBO 2000 W/HCC OFR	69384	2000	28	70	50-85	80000	7500	80000
XBO 2000 W/HS OFR	69270	2000	24	80	50-85	80000	7500	80000
XBO 2000 W/SHSC OFR	69256	2000	27	70	50-85	80000	7500	80000
XBO 2001 W/HTP OFR	69310	2000	25	80	50-85	80000	7500	75000
XBO 2500 W OFR	69248	2500	29	85	60-95	100000	9500	61000
XBO 2500 W/HTP OFR	69160	2500	28	90	70-100	100000	9500	60000
XBO 4200 W/CA OFR	69294	4200	29	140	80-160	190000	20000	100000
XBO 4200 W/GS OFR	69350	4200	29	140	80-160	190000	20000	100000
XBO 8000 W/HS OFR	69351	8000	45	175	150-180	400000	40000	110000

CLASSIC

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	Current Control Range (A)	Lumens (lm)	Luminous Intensity (cd)	Average Luminance (cd/cm²)
XBO 1600 W CL OFR	69530	1600	24	65	45-75	60000	6000	65000
XBO 1600 W/HS CL OFR	69354	1550	23	65	50-75	70000	5500	70000
XBO 1600 W/HSC CL OFR	69355	1550	23	65	50-70	70000	5500	70000
XBO 2000 W/H CL OFR	69470	2000	28	70	50-85	80000	7500	80000
XBO 2000 W/HS CL OFR	69547	2000	24	80	50-85	80000	7500	80000
XBO 2000 W/HTP CL OFR	69548	2000	27	70	50-85	80000	7500	75000
XBO 2000 W/SHSC CL OFR	69353	2000	27	70	50-85	80000	7500	80000
XBO 2500 W/HS CL OFR	69549	2500	28	90	70-100	100000	10000	80000
XBO 3000 W/H CL OFR	69475	3000	29	100	60-110	130000	12000	85000
XBO 3000 W/HS CL OFR	69153	3000	29	100	60-110	130000	12000	90000
XBO 3000 W/HTP CL OFR	69551	3000	29	100	60-110	130000	12000	85000
XBO 4000 W/HS CL OFR	69394	4000	28	135	80-150	155000	17000	90000
XBO 4000 W/HTP CL OFR	69552	4000	30	130	100-140	155000	16000	90000
XBO 5000 W/H CL OFR	69356	5000	35	140	100-150	225000	27000	95000
XBO 5000 W/HBM CL OFR	69531	5000	34	140	100-150	225000	27000	95000
XBO 6000 W/HS CL OFR	69357	5900	37	160	110-165	280000	40000	105000
XBO 7000 W/HS CL OFR	69358	7000	42	160	110-165	350000	35000	100000

Luminous Area (mm)	MOL (mm)	Warranty (hrs)	Operating Position	Cooling	Magnetic Arc Stabilization	Base Anode	Base Cathode	Symbols & Footnotes
0.9 x 2.5	190	2000	s 30 p 30	Required	Required	SFa16-8	SFa15-10	39,45,47,57
1.1 x 3.3	325	2400	s 30			SFa25-10	SFa25-12	45
1.1 x 2.8	235	2000	s 20 p 20	Required		SFa27-11	SFcX27-8	37,39,45,47
1.1 x 2.8	236	2000	s 20 p 20	Required		SK27/50	SFcX27-8	37,38,39,45,47
1.0 x 4.0	330	2400	s 30 p 30		Required	SFa25-14	SFc25-14	39,42,45,47,57
1.4 x 4.0	370	2400	s 30	Required		SFaX27-10	SFa27-12	40,45,37,39,45,47
1.3 x 4.8	370	2400	s 30 p 30	Required		SFaX27-10	SFaX27-12	38,39,45,47,74
1.3 x 4.0	342	2400	s 30 p 30	Required		SFaX27-9.5	SFa27-7.9	47,30
1.3 x 4.0	236	2000	s 20 p 20	Required		SK27/50	SFcX27-8	41,45,47
1.3 x 4.0	375	2400	s 30 p 30		Required	SFa25-14	SFc25-14	39,42,45,47,57
1.5 x 6.0	428	2000	s 30			SFaX27-13	SFaX27-14	45
1.5 x 6.0	398	1500	s 30 p 30	Required	Required	SFa27-14	SFc27-14	,39,42,45,47,57
2.1 x 5.7	428	1000	s 15	Required		SFaX27-13	SFaX27-14	40,45
2.1 x 5.7	428	1000	s 15	Required		SFaX27-13	SFaX27-14	43,45,57
2.5 x 10.5	433	500	s 15 p 15	Required	Required	SFaX 30-9.5	SFa 30-7.9	37,39,45,47,57,87

Luminous Area (mm)	MOL (mm)	Warranty (hrs)	Operating Position	Cooling	Magnetic Arc Stabilization	Base Anode	Base Cathode	Symbols & Footnotes
1.4 x 4.0	370	2400	s 30	Required		SFa27-10	SFa27-12	45,87
1.0 x 3.2	235	2000	s 20 p 20	Required		SFa27-11	SFcX27-8	37,39,45,47,87
1.0 x 3.2	236	2000	s 20 p 20	Required		SK27/50	SFcX27-8	37,38,39,87
1.3 x 4.8	370	2400	s 30 p 30	Required	Recommended	SFaX27-10	SFaX27-12	24,45,47,87
1.3 x 4.0	342	2400	s 30 p 30	Required	Recommended	SFaX27-9.5	SFa27-7.9	37,39,45,47,87
1.3 x 4.8	375	2400	s 30 p 30	Required	Required	SFa25-14	SFc25-14	39,42,45,47,57,87
1.3 x 4.0	236	2000	s 20 p 20	Required		SK27/50	SFcX27-8	87
1.5 x 4.5	342	1500	s 30 p 30	Required		SFaX27-9.5	SFa27-7.9	37,39,87
1.7 x 5.0	428	1500	s 30 p 30	Required	Recommended	SFaX27-13	SFa27-14	39,45,47,57,87
1.7 x 5.0	342	1500	s 30 p 30	Required	Recommended	SFaX27-9.5	SFa27-7.9	37,39,45,47,57,87
1.7 x 5.0	405	1500	s 30 p 30	Required	Recommended	SFa27-14	SFc27-14	42,45,47,87
1.9 x 6.0	410	1000	s 20 p 20	Required	Required	SFaX30-9.5	SFa30-7.9	24,45,47,87
1.9 x 6.0	433	1000	s 20 p 20	Required		SFa27-14	SFc27-14	39,42,45,47,57,87
2.2 x 6.5	433	800	s 15 p 15	Required	Required	SFaX30-16	SFaX28-18	39,45,47,57,87
2.2 x 6.5	436	800	s 15 p 15	Required	Required	SFaX 30-9.5	SFaX 30-7.9	
2.0 x 7.5	433	500	s 15 p 15	Required	Required	SFaX30-9.5	SFa30-7.9	37,39,45,47,57,87
2.6 x 9.0	433	500	s 15 p 15	Required	Required	SFaX30-9.5	SFa30-7.9	37,39,45,47,57,87

Symbols/Footnotes on pages 37-40

DISCHARGE

XSTAGE® XENON SHORT ARC

Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Current (A)	Current Control Range (A)	Lumens (lm)	Luminous Intensity (cd)	Average Luminance (cd/cm^2)	Luminous Area (mm)
XSTAGE 2000W OFR	69482	2000	23	90	70-110	80000	9000	170000	1.2 x 2.7
XSTAGE 3000W OFR	69483	3000	30	100	70-110	140000	13500	200000	1.3 x 3.5
XSTAGE 4000W OFR	69484	4000	30	130	80-135	150000	17000	120000	1.9 x 5.0
XSTAGE 7000W OFR	69485	7000	40	160	110-165	330000	33000	120000	2.0 x 7.0

MOL (mm)	Average Rated Life (hrs)	Average Rated Life Horizontal (hr)	Operating Position	Cooling	Base Anode	Base Cathode	Pkg Qty	Symbols & Footnotes
300	650	1000	s 90	Required	SFaX27-9.5	SFc28-27	1	90
300	650	1000	s 90	Required	SFaX27-9.5	SFc28-27	1	90
315	650	1000	s 90	Required	SFaX27-9.5	SFc28-27	1	90
405	650	1000	p 90/45	Required	SFaX28-27	SFc28-27	1	90

Symbols/Footnotes on pages 37-40

FLUORESCENT

STUDIOLINE®

Ordering Abbreviation	Product Number	Color Temp	Watts (W)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
STUDIOLINE 55W/3200	20607	3200	55	2G11	3800	8000	T5	10	
STUDIOLINE 55W/5600	20608	5600	55	2G11	3800	8000	T5	10	


Bi-Pin


GZ9.5


P28s


P40s


G22


Med 2-Pin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HALOGEN

SINGLE END

ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts (W)	Volts (V)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
BCM	54713	BCM 208V	3200	20000	208	G38	570000	400	T24	4	☼,45
BCM	54694	BCM 230V	3200	20000	230	G38	580000	350	T32	6	45
BHC/DYS/DYV	54836	BHC/DYS/DYV	3200	600	120	GZ9.5	17500	75	T6	24	45
BHC/DYS/DYV-5	54835	BHC/DYS/DYV-5	3200	600	125	GZ9.5	17500	75	T6	24	45
BRJ/EVB	54250	BRJ/EVB 64633 HLX		150	15	G6.35	5600	50	T3.5	40	45
BRL	54249	BRL 64610 HLX		50	12	G6.35	1600	50	T3.5	40	45
BRN	54698	BRN	3350	1200	120	G17t		20	T7	24	45
BTH	54365	BTH	3250	575	115	P28s	15500	300	T6	12	
BTL	54685	BTL	3050	500	120	P28s	11000	750	T6	12	
BTM	54686	BTM	3200	500	120	P28s	13000	100	T6	12	45
BTN	54687	BTN	3200	750	120	P28s	17000	500	T6	12	45
BTP	54688	BTP	3200	750	120	P28s	20000	200	T7	12	
BTR	54689	BTR	3200	1000	120	P28s	27500	250	T6	12	45
BVT	54690	BVT	3050	1000	120	P40s	23000	500	T7	6	
BVV	54691	BVV	3200	1000	120	P40s	27500	200	T6	6	
BVW	54692	BVW	3200	2000	120	P40s	59000	280	T9.5	6	
CAX	58831	CAX	3000	50	120	BA15d	750	250	T4	24	
CXZ	54717	CXZ	3200	1500	120	G38	38500	325	T8	6	
CYV	54706	CYV	3200	1000	120	G38	27500	200	T7	6	
CYX	54613	CYX	3200	2000	120	G38	55000	300	T9.5	6	45
DPY	54647	DPY	3200	5000	120	G38	143000	500	T19	20	45
DPY	54671	DPY M	3200	5000	120	G38	140000	500	T19	20	45
DTA	54716	DTA	3200	1500	120	P40s	39000	100	T8	6	
DTY	54696	DTY	3200	10000	120	G38	290500	350	T24	6	45
	58497	DYS/300	3200	300	120	GZ9.5	7500	100	T6	24	
DZE/FDS	54755	DZE/FDS	3300	150	24	GZ9.5	4000	100	T4	24	
ECR	54702	ECR 64815 CP/83 230V	3200	10000	230	G38	280000	400	T22	6	45
EFX	54787	EFX	3000	500	120	G22	10000	2000	T5	12	
EGE	54648	EGE	3000	500	120	P28s	10000	2000	T5	12	
EGG	54652	EGG	3000	750	120	P28s	15000	2000	T5	12	
EGJ	54654	EGJ	3200	1000	120	P28s	25500	400	T6	12	
EGK	54656	EGK	3200	1000	120	P28s	24500	400	T6	12	
EGN	54659	EGN	3200	500	120	G22	13000	100	T6	12	45
EGR	54662	EGR	3200	750	120	G22	20000	200	T7	12	45
EGT	54664	EGT	3200	1000	120	G22	27500	250	T6	12	45
EHA	54585	EHA	3200	500	120	GY9.5		50	T6	24	
EHC/EHB	54506	EHC/EHB	3200	500	120	G9.5	13000	300	T4	12	
EHD	54508	EHD	3000	500	120	G9.5	10600	2000	T4	12	

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GZ9.5


Med 2-Pin

HALOGEN

SINGLE END

ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts (W)	Volts (V)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
EHE	54038	EHE 64626 HLX	3450	100	12	PG22	3600	50	T3.5	30	45
EHF	54510	EHF	3300	750	120	G9.5	20400	300	T5	12	
EHG	54512	EHG	3000	750	120	G9.5	15400	2000	T5	12	
EHJ	54254	EHJ 64655 HLX	3550	250	24	G6.35	10000	50	T12	40	45
EHJ	54231	EHJ 64655 HLX BULK	3550	250	24	G6.35	10000	50	T12	250	46
EKB	54837	EKB	3200	420	120	GZ9.5	11000	75	T6	24	45
ESA/FHD	54260	ESA/FHD 64225		10	6	G4	200	100	T3	40	
ESB	54261	ESB 64250 HLX		20	6	G4	480	100	T3	40	
EVA	54251	EVA 64623 HLX	3300	100	12	GY6.35	2800	2000	T3.5	40	45
EVC	54255	EVC 64657 HLX		250	24	G6.35	9000	300	T4	40	45
EVD	54259	EVD 64663 HLX	3550	400	36	G6.35	16000	50	T6	40	45
EYB	54446	EYB	3250	360	82	G5.3	10000	75	T3.5	24	45
EYB-5	54448	EYB-5	3250	360	86	G5.3	10000	75	T3.5	24	45
FCR	54248	FCR 64625 HLX		100	12	G6.35	3600	50	T3.5	40	45
FCS	54263	FCS 64640 HLX	3550	150	24	G6.35	6000	50	T3.5	40	45
FDS/DZE	54277	FDS/DZE 64643	3400	150	24	GY9.5	5000	100	T5	12	45
FDT	54276	FDT 64628	3400	100	12	GY9.5	3000	50	T4	12	45
FDV	54264	FDV 64642 HLX		150	24	G6.35	5000	300	T4	40	45
FEL	54570	FEL	3200	1000	120	G9.5	27500	300	T6	12	
FEP	54515	FEP/240	3200	1000	240	G9.5	23000	150	T6	12	
FEV	54441	FEV	3200	200	120	BA15d	5500	50	T4	12	
FKJ	54669	FKJ 64747 CP/71 1000W 230V	3200	1000	230	G22	26000		T8	20	☼,45
FKK	54635	FKK 64789 CP73 230V	3200	2000	230	G38	52000	400	T10.5	10	☼
FKT/EYH	54547	FKT/EYH	3125	250	120	G5.3	5400	200	T6	24	
FKW	54711	FKW	3200	300	120	GY9.5	7800	200	T6	24	45
FLK	54589	FLK	3200	575	115	G9.5	16500	300	T6	12	
	54551	FLK/X	3000	575	115	G9.5	10000	2000	T5	12	
FMR	54412	FMR	3000	600	120	GY9.5	12500	2000	T5	24	
FNS	58849	FNS 64512	3350	300	115	GX6.35	9300	15	T6	12	45
FNT	54253	FNT 64656 HLX	3550	275	24	G6.35	10000	75	T12	40	45
FRG	54629	FRG	3200	500	120	GY9.5	13000	150	T6	24	45
FRL	54489	64717 CP/89 FRL 650W 230V	3200	650	230	GY9.5	16250	150	T7	12	☼
FRM	54490	64717 CP/89 FRM 650W 240V	3200	650	240	GY9.5	16250	150	T7	12	☼
FRK	54631	FRK	3200	650	120	GY9.5	16900	200	T7	24	45
FRL	54638	FRL CP/89	3200	650	230	GY9.5	16250	150	T7	25	,45
FSH	54436	FSH	3200	125	120	G5.3	2500	200	T3	24	
FSX	54897	FSX/230	3200	400	230	GY9.5		75	T6	24	45
FSY	54898	FSY	3200	400	240	GY9.5		75	T6	24	45

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Bi-Pin


Med 2-Pin


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GZ9.5


HPL

SINGLE END

ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts (W)	Volts (V)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
FTK	54875	FTK	3200	500	120	GY9.5	12000	200	T6	24	45
FVL	54459	FVL	3200	200	120	GX5.3	5200	200	T4	24	
FVM	54900	FVM	3200	105	120	GX5.3	2250	250	T4	24	
GCA	54428	GCA	3200	250	120	G5.3	5700	200	T3	24	
GCT	54491	64718 T/27 GCT 650W 230V	3000	650	230	GY9.5	14850	400	T7	12	☼
GCT	54492	64718 T/27 GCT 650W 240V	3000	650	240	GY9.5	14850	400	T7	12	☼
GCV	54495	64670 T/25 GCV 500W 230V	3000	500	230	GY9.5	11000	300	T7	12	☼
GCV	54496	64670 T/25 GCV 500W 240V	3000	500	240	G9.5	11000	300	T7	12	☼
GKB	54493	64716 GKB 600W 230V	3050	600	230	G9.5	13500	300	T6	12	☼
GKV	54494	64716 GKV 600W 240V	3050	600	240	G9.5	13500	300	T6	12	☼
GLA	54516	GLA	3050	575	115	G9.5	13500	1500	T6	12	
GLC	54507	GLC 575/115/300	3250	575	115	G9.5	15500	300	T6	12	
GLD	54522	GLD 750/115/300	3250	750	115	G9.5	19000	300	T6	12	
GLE	54523	GLE 750/115/1500	3050	750	115	G9.5	17400	1500	T6	12	
GLF	54460	GLF	3100	235	230	G5.3	5100	100	T4	24	
GLG	54520	HP 375W 115V GLG	3250	375	115	G9.5	10000	300	T6	12	
GLH	54525	HP 375W/115V/X GLH	3050	375	115	G9.5	7500	2000	T6	12	☼
	54855	HP 1200/80	3200	1200	80	G22	37500	250	T8	12	
	54625	HPL 375/115 (UCF)	3200	375	115	Sp Med Bipin	10540	300	T6	12	23
	54649	HPL 375/115/X (UCF)	2950	375	115	Sp Med Bipin	8000	1000	T8	12	23
	54623	HPL 550/77 (UCF)	3265	550	77	Sp Med Bipin	16170	300	T6	12	23
	54604	HPL 550/77/X (UCF)	3065	550	77	Sp Med Bipin	12160	2000	T6	12	23
	54622	HPL 575/115 (UCF)	3265	575	115	Sp Med Bipin	16520	300	T6	12	23
	54807	HPL 575/115/X (UCF)	3065	575	115	Sp Med Bipin	12360	2000	T6	12	23
	54817	HPL 575/120 (UCF)	3265	575	120	Sp Med Bipin	16460	300	T6	12	23
	54815	HPL 575/120/X (UCF)	3050	575	120	Sp Med Bipin	12360	2000	T6	12	23
	54618	HPL 575/230 (UCF)	3200	575	230	Sp Med Bipin	14900	400	T6	12	23
	54665	HPL 575/230/X (UCF)	3050	575	230	Sp Med Bipin	11780	1500	T6	12	23
	54619	HPL 575/240 (UCF)	3200	575	240	Sp Med Bipin	14900	400	T6	12	23
	54703	HPL 575/240/X (UCF)	3050	575	240	Sp Med Bipin	11780	1500	T6	12	23
	54825	HPL 750/77 (UCF)	3265	750	77	Sp Med Bipin	22950	300	T6	12	23
	54602	HPL 750/115 (UCF)	3265	750	115	Sp Med Bipin	21900	300	T6	12	23
	54611	HPL 750/115/X (UCF)	3050	750	115	Sp Med Bipin	16400	1500	T6	12	23
	54605	HPL 750/120 (UCF)	3250	750	120	Sp Med Bipin	21900	300	T6	12	23
	54653	HPL 750/120/X (UCF)	3065	750	120	Sp Med Bipin	16400	2000	T6	12	23
	54603	HPL 750/230 (UCF)	3200	750	230	Sp Med Bipin	19750	300	T6	12	23
	54670	HPL 750/230/X (UCF)	3050	750	230	Sp Med Bipin	15600	1500	T6	12	23
	54614	HPL 750/240 (UCF)	3200	750	240	Sp Med Bipin	19750	300	T6	12	23

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Bi-Pin


HPL


Med Bi-Pin


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HALOGEN

SINGLE END

ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts (W)	Volts (V)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
	54704	HPL 750/240/X (UCF)	3050	750	240	Sp Med Bipin	15600	1500	T6	12	23
	58729	60T4QCL	3100	60	24	BA15d	1280	500	T12	12	
	58939	220T4Q/2PPF	3250	220	22	GY9.35	6200	200	T4	12	
	58941	235T4Q/2PPF	3250	235	33	GZ9.5	5800	200	T4	12	
	54256	62138 HLX		100	12	G6.35	2800	50	T3.5	40	47
	54245	64223	2900	10	6	G4	150	300	T3	40	
	54021	64251 HLX	3200	20	6	PG22	500	100	T3	30	
	54262	64258 HLX		20	12	G4	350	2000	T3	40	45
	54022	64260	3300	30	12	PG22	800	50	T3	30	
	54247	64261	3300	30	12	G6.35	750	50	T3.5	40	
	54606	64265 HLX	3200	30	6	G4	765	100	T3	40	
	54258	64275	3150	35	6	G4	780	50	T3	40	
	54318	64291 XIR 40W	3100	40	23	G6.35	1200	600	T4	40	
	54322	64292 XIR 150W	3250	150	23	G6.35	6000	600	T4	40	
	54001	64501	3400	150	115	GX6.35	4500	25	T4	25	
	54354	64514	3400	300	120	GX6.35	8100	75	T6	12	45
	58524	64515	3300	300	230	GX6.35	9600	15	T6	12	45
	54356	64516	3100	300	230	GX6.35	7400	75	T6	12	45,86
	58525	64575	3400	1000	230	GX6.35	33000	15	T8	12	
	54607	64602	3050	50	12	G6.35	1000	1100	T3.5	40	45
	54608	64611 HLX	3250	50	12	G6.35	1350	100	T3.5	40	45
	54032	64621 HLX	3300	100	12	PG22	2750	2000	T3.5	30	45
	54252	64638 HLX	3350	100	24	G6.35	2900	300	T4	40	
	54320	64647		113	24	G6.35	3600	300	T4	40	
	54257	64650	3100	50	23	G6.35	1000	1300	T4	40	
	54304	64654 HLX 24V		250	24	GY9.5	9000	300	T4	12	45
	54273	64664 HLX	3500	400	36	G6.35	14500	150	T6	12	45
	54274	64665 HLX	3400	400	36	G6.35	400	300	T6	12	45
	54323	64668 XIR 80W	3200	80	22.8	G6.35	3000	400		40	
	54951	64672 500W 230V	2900	500	230	GY9.5	8500	2000	T7	12	
	54964	64672 500W 240V	2900	500	240	GY9.5	8500	2000	T7	12	
	54497	64678 800W 230V	3200	800	230	G9.5	20000	250	T6	12	☼
	54965	64680 500W 230V	3200	500	230	GY9.5	14500	50	T7	12	
	54969	64680 500W 240V	3200	500	240	GY9.5	14500	50	T7	12	
	54701	64805 CP/85 (CP/29)	3200	5000	230	G38	135000	400	T19	1	45
	54793	JCP 650W/100V	3250	650	100	GY9.5	18750	100	T6	12	
	54181	Med Hal OS03000-U		2.5	3.5	Special Mini		15		6	
	54182	Med Hal OS03100-U		2.7	3.5	Special Mini		15		6	

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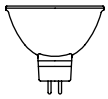
QXL


MR11, MR13, MR16

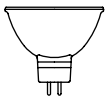
SINGLE END

ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts (W)	Volts (V)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
	54183	Med Hal OS03400-U		1.6	2.5	Special Mini		20		6	
	54184	Med Hal OS07800-U		4.3	6	Special Mini		75		6	
	54185	Med Hal OS08800-U	2980	3.7	4.6	Special Mini		30		6	
	54882	QXL 750/77	3250	750	77	Special	22950	300	T6	12	72,73
	54883	QXL 750/77/X	3050	750	77	Special	18000	1500	T6	12	72,73

REFLECTOR

ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts (W)	Volts (V)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
BAA	54924	BAA	3000	75	28	GX5.3		2000	MR16	24	
DDL	54660	DDL	3150	150	20	GX5.3		500	MR16	24	
DDM	54737	DDM		80	19	GX5.3	400	50	MR16	24	59
DDS	54944	DDS		80	21	GX5.3		1000	MR16	24	
DED	54726	DED		85	14	GX5.3	150	1000	MR16	24	45,59
DNE	54409	DNE		150	120	G7.9	100	15	MR16	24	45,59
DNF	54411	DNF		150	21	GX7.9	300	25	MR18	24	47
EFM	54123	EFM 64607		50	8	GZ6.35		50	MR16	20	47
EFN	54126	EFN 64615 HLX		75	12	GZ6.35		50	MR16	20	47
EFP	54189	EFP 64627 HLX		100	12	GZ6.35		50	MR16	20	47
EFP/X	54192	EFP/X 64629 HLX		100	12	GZ6.35		600	MR16	20	47
EFR	54210	EFR 64634 HLX		150	15	GZ6.35		50	MR16	20	47
	54211	EFR-5/X 64620 HLX		150	15	GY6.35		500	MR16	20	47
EJA	54753	EJA	3400	150	21	GX5.3	354	40	MR16	24	59
EJL	54730	EJL		200	24	GX5.3	725	50	MR16	24	59
EJM	54747	EJM	3400	150	21	GX5.3	170	40	MR16	24	59
EJV	54732	EJV		150	21	GX5.3	270	100	MR16	24	59
EKE	54842	EKE	3300	150	21	GX5.3	160	200	MR16	24	59
EKE/X	58771	EKE/X	3150	150	21	GX5.3	80	1000	MR16	24	59
EKP/ENA	54734	EKP/ENA		80	30	GX5.3	115	25	MR16	24	59
ELC	54840	ELC	3400	250	24	GX5.3	800	50	MR16	24	59
ELC	54212	ELC 64653 HLX	3400	250	24	GX5.3	900	50	MR16	20	47,59
	54841	ELC-3/X	3250	250	24	GX5.3	550	300	MR16	24	59
	54814	ELC-7/X	3200	250	24	GX5.3	475	700	MR16	24	59
	54804	ELC-HL	3400	250	24	GX5.3	950	50	MR16	24	59
ELD	54745	ELD	3200	150	21	GX5.3	350	40	MR16	24	59
ELH	54776	ELH		300	120	GY5.3	525	35	MR16	24	47,59
ENG	54957	ENG		300	120	GY5.3	690	15	MR16	24	47,59

Symbols/Footnotes on pages 37-40

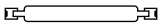


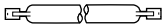
MR11, MR13, MR16

HALOGEN

REFLECTOR

ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts (W)	Volts (V)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
ENH	54986	ENH		250	120	GY5.3	340	175	MR16	24	47,59
ENH-5	54988	ENH-5	3150	250	125	GY5.3	340	175	MR16	24	47,59
ENL	58786	ENL	3000	50	12	GX5.3	85	4000	MR16	24	59
ENX	54984	ENX		360	82	GY5.3	460	75	MR16	24	45,59
	54913	ENX-5		360	86	GY5.3	540	75	MR16	24	59
	54916	ENX-7		360	88	GY5.3	540	75	MR16	24	59
EPT	58782	EPT	2900	42	11	GX5.3		8000	MR16	24	
EPX	54927	EPX		90	14	GX5.3	43	500	MR16	24	45,59
EPZ	54743	EPZ		50	14	GX5.3	80	3000	MR16	24	45,59
ETJ	54928	ETJ	3150	250	120	GY5.3	600	175	MR16	24	45,59
EVW	54723	EVW		250	82	GY5.3	390	50	MR16	24	45,59
EXR	54392	EXR		300	82	GX5.3	925	35	MR13	24	45,59
EXY	54394	EXY		250	82	GX5.3	400	200	MR13	24	45,59
EZE	54386	EZE		150	82	GX5.3	350	150	MR13	24	45,59
FHS	54979	FHS		300	82	GX5.3	650	70	MR13	24	45,59
FLE	54383	FLE		360	82	GY5.3	1250	75	MR16	24	21,59
FXL	54912	FXL		410	82	GY5.3	640	75	MR16	24	45,59
	54400	85T3/RM		85	82	GX5.3		40	MR16	24	
	54122	64255		20	8	GZX4		50	MR11	20	47
	54124	64617		75	12	G5.3-4.8		25	MR11	20	47
	54121	64617SPOT		75	12	G5.3-4.8		25	MR11	20	47
	54125	64624		100	12	G5.3-4.8		25	MR11	20	47
	54233	64635 HLX		150	15	GZ6.35		50	MR16	20	47
	54223	64637 12V		100	12	GZ6.35		1500	MR16	20	


R7s, RX7s


RSC


Bi-Pin

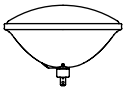
DOUBLE END

ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts (W)	Volts (V)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
DWT	58937	DWT	3000	1000	120	RX7s	22000	2000	T6	12	
DXW	53997	DXW	3200	1000	120	R7s	28000	150	T5	12	
EHP	58942	EHP	2900	300	120	R7s	5000	2500	T4	12	
EHR	58936	EHR	3000	400	120	R7s	7500	2000	T4	12	
EJG	54598	EJG	3200	750	120	R7s	20600	400	T3	12	47
FAD	54574	FAD	3200	650	120	R7s	16500	100	T4	12	
FAL	58860	FAL	3200	420	120	R7s	11000	75	T4	24	
FCB	54483	FCB	3200	600	120	R7s	16500	75	T4	24	
FCM	54442	FCM	3200	1000	120	R7s	28000	400	T3	12	47
FDA	54471	FDA	3200	400	120	R7s	10400	250	T4	12	
FDB	54435	FDB	3200	1500	120	R7s	41200	400	T4	12	47
FDN	54534	FDN	3200	500	120	R7s	12800	400	T2.5	12	47
FER	54571	FER	3200	1000	120	RX7s	27500	500	T6	12	
FEY	54559	FEY	3200	2000	120	RX7s	57400	400	T8	12	
FFJ	54488	FFJ 120V	3200	600	120	R7s		75	T4	24	
FFM	58862	FFM	3200	420	120	R7s	11000	75	T4	24	
FFT	54350	FFT	3200	1000	120	R7s	27000	300	T3	12	
FHM	54532	FHM	3200	1000	120	R7s	27300	300	T3	12	47

LOK-IT® HALOGEN

Product Number	Ordering Abbreviation	Color Temp (K)	Watts (W)	Volts (V)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
54524	750W/115V/32/P50 LOK-IT	3250	750	115	PGJX50d LOK-IT	19000	300	T6	12	
51972	780W/80V/32/P50 LOK-IT	3250	780	80	PGJX50d LOK-IT	22500	300	T6	12	☼
54529	800W/230V/32/P50 LOK-IT	3250	800	230	PGJX50d LOK-IT	20000	300	T6	12	☼
54871	1200W/80V/32/P50 LOK-IT	3200	1200	80	PGJX50d LOK-IT	37500	250	T8	12	

Symbols/Footnotes on pages 37-40



PAR 56, 64

PAR36

HALOGEN

LARGE PAR

aluPAR®

ANSI Code	Product Number	Ordering Abbreviation	Watts (W)	Volts (V)	Base	Centerbeam Candlepower (cp)	Color Temp (K)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
	56000	aluPAR 56/NSP/300W/230V	300	230	GX16D	70000	2950	2000	PAR56	6	,27,76,77
	56001	aluPAR 56/MFL/300W/230V	300	230	GX16D	30000	2950	2000	PAR56	6	,26,76,77
	56002	aluPAR 56/WFL/300W/230V	300	230	GX16D	10000	2950	2000	PAR56	6	,28,76,77
	56003	aluPAR 56/NSP/300W/120V	300	120	GX16D	68000	2950	2000	PAR56	6	,27,76,77
	56004	aluPAR 56/MFL/300W/120V	300	120	GX16D	24000	2950	2000	PAR56	6	,26,76,77
	56005	aluPAR 56/WFL/300W/120V	300	120	GX16D	11000	2950	2000	PAR56	6	,28,76,77
	56086	aluPAR 56/NSP/500W/120V	500	120	GX16D	96000	2950	4000	PAR56	6	,27,76,77
	56213	aluPAR 56/MFL/500W/120V	500	120	GX16D	43000	2950	4000	PAR56	6	,26,76,77
	56006	aluPAR 56/WFL/500W/120V	500	120	GX16D	19000	2950	4000	PAR56	6	,28,76,77
	56007	aluPAR 64/NSP/500W/120V	500	120	GX16D	110000	2950	2000	PAR64	6	,27,76,77
	56008	aluPAR 64/MFL/500W/120V	500	120	GX16D	37000	2950	2000	PAR64	6	,26,76,77
	56009	aluPAR 64/WFL/500W/120V	500	120	GX16D	13000	2950	2000	PAR64	6	,28,76,77
FFN	56017	aluPAR 64/VNSP/1000W/120V/FFN	1000	120	GX16D	400000	3200	800	PAR64	6	,29,76,77
FFP	56010	aluPAR 64/NSP/1000W/120V/FFP	1000	120	GX16D	330000	3200	800	PAR64	6	,29,76,77
FFR	56011	aluPAR 64/MFL/1000W/120V/FFR	1000	120	GX16D	125000	3200	800	PAR64	6	,26,76,77
FFS	56012	aluPAR 64/WFL/1000W/120V/FFS	1000	120	GX16D	40000	3200	800	PAR64	6	,26,76,77

LARGE PAR – OTHER

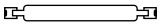
ANSI Code	Product Number	Ordering Abbreviation	Watts (W)	Volts (V)	Base	Centerbeam Candlepower (cp)	Color Temp (K)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
	55052	20PAR/36/CAP/WFL	20	12	G53			4000	PAR36	12	
	54499	4515 PAR36 30W	30	6	G53			100	PAR36	12	
	64075	PAR56 12V 300W	300	12	Screw Term				PAR56	6	,28
	14974	350PAR56/SP	350	75	MEP		2900	750	PAR56	12	24
	56229	Q4681	450	28	G53	310000		50	PAR46	12	24,29
	56222	Q4559	600	28	G53	600000		100	PAR64	6	24,29
	56223	Q4559X	600	28	G53	765000		100	PAR64	6	24,29
DWE	54500	DWE	650	120	G53		3200	100	PAR36	12	
EXD	56233	EXD/240	1000	240	GX16D	275000	3200	300	PAR64	6	24
EXE	56234	EXE/240	1000	240	GX16D	130000	3200	300	PAR64	6	24
FFN	56214	FFN	1000	120	GX16D	400000	3200	800	PAR64	6	24,29
FFP	56215	FFP	1000	120	GX16D	330000	3200	800	PAR64	6	24,27
FFR	56217	FFR	1000	120	GX16D	125000	3200	800	PAR64	6	24,26
FFS	56216	FFS	1000	120	GX16D	40000	3200	800	PAR64	6	24,28


GZ9.5


Bi-Pin


PK30d


Med 2-pin


R7s, RX7s

CURRENT CONTROLLED

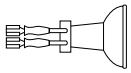
CURRENT CONTROLLED SINGLE END

Ordering Abbreviation	Product Number	Watts (W)	Bulb	Base	Current (A)	Lumens (lm)	Filament	Avg Rated Life (hrs)	MOL (mm)	Pkg Qty	Symbols & Footnotes
6.6A/30T3.5/64322/EXL/DL	58850	30	T4	GZ9.5	6.6	400	C-8	2000	44.5	12	
6.6A/64323C30-15	59084	30	T4	LEADS-C	6.6			1500		100	
6.6A/45T3.5Q/64321	59928	45	T4	G6.35	6.6	900	C-8	1200	45	40	45,47
6.6A/45T3.5/64320/EXM	58846	45	T4	GZ9.5	6.6	875	C-8	1000	44.5	12	45,47
6.6A 64318A 45-15 PK30	58988	45	T4	PK30D-A	6.6	800		1500	50	100	
6.6A 64319 IRC-A 45-30 PK30D	59004	45	T4	PK30D-A	6.6	800		3000	48	100	
6.6A 64319A 45-15 PK30D	59010	45	T4	PK30D-A	6.6	800		1500	50	100	
6.6A 64317 IRC-C 45-30 PK30D	58947	45	T4	PK30D-C	6.6	800		3000	48	100	
6.6A 64317C 45-15 PK30D	58910	45	T4	PK30D-C	6.6	800		1500	56	100	
6.6A 64318Z/C 45-15 PK30D	58989	45	T4	PK30D-C	6.6	800		1500	50	100	
6.6A 64319Z/C 45-15 PK30D	59011	45	T4	PK30D-C	6.6	800		1500	50	100	
6.6A/45T4/64319Z	58722	45	T4	PK30D-C	6.6	800	C-8	1000	53	100	,45,82
6.6A 64328 HLX-Z/C 65-15 PK30D	59069	65	T4	PK30D-C	6.6	1450		1500	48	100	
6.6A/65T4/64328Z/HLX	58726	65	T4	PK30D-C	6.6	1450	C Bar 6	1000	53	100	45,82
6.6A 64341 HLX-A 100-15 PK30D	59072	100	T4	PK30D-A	6.6	2700		1500	48	100	
6.6A/100T4/64341/HLX-A	58709	100	T4	PK30D-A	6.6	2700	C Bar 6	1000	55	100	45,79
6.6A 64341 HLX-Z/C 100-15 PK30D	59073	100	T4	PK30D-C	6.6	2700		1500	48	100	
6.6A 64342 HLX-C 100-15 PK30D	59074	100	T4	PK30D-C	6.6	2700		1500	56	100	
6.6A 64361 HLX-A 150-15 PK30D	59077	150	T4	PK30D-A	6.6	3600		1500	50	100	
6.6A 64361 HLX-Z/C 150-15 PK30D	59079	150	T4	PK30D-C	6.6	3600		1500	50	100	
6.6A/200T4Q/64386	59078	200	T4	G6.35	6.6	4700	C Bar 6	1200	47	40	45,47
6.6A/200T4Q/2PPF/58750/EZL/DL	58851	200	T4	GY9.5	6.6		CC-6	1000	65	12	63
6.6A 64382 HLX-A 200-15 PK30D	59080	200	T4	PK30D-A	6.6	4800		1500	57	100	
6.6A 64382 HLX-C 200-15 PK30D	59081	200	T4	PK30D-C	6.6	4800		1500	57	100	

CURRENT CONTROLLED DOUBLE END

Ordering Abbreviation	Product Number	Watts (W)	Bulb	Base	Current (A)	Lumens (lm)	Filament	Avg Rated Life (hrs)	MOL (mm)	Pkg Qty	Symbols & Footnotes
6.6A/45T3/CL/64315	58704	45	T3	R7s	6.6	750	C-8	1000	47.5	25	
6.6A/200T5/CL/64380	58707	200	T4	R7s	6.6	4400	CC-8	1000	60.2	25	

Symbols/Footnotes on pages 37-40



Mr11, MR16 (leads)

HALOGEN

CURRENT CONTROLLED

CURRENT CONTROLLED REFLECTOR

Ordering Abbreviation	Product Number	Watts (W)	Bulb	Base	Current (A)	Lumens (lm)	Filament	Avg Rated Life (hrs)	MOL (mm)	Pkg Qty	Symbols & Footnotes
6.6A/30MR16/64331A/FL	58964	30	MR16	LEADS-A	6.6			1000	45.6	20	79
6.6A/30MR16/64331A/SP	58506	30	MR16	LEADS-A	6.6			1000	45.6	20	79
6.6A/30MR16/64331AC/FL	58938	30	MR16	LEADS-A/C	6.6			1000	45.6	20	91
6.6A/40MR11/64333A	58899	40	MR11	LEADS-A	6.6			1500	37	20	79
6.6A/40MR11/64333B	58889	40	MR11	LEADS-B	6.6			1500	37	20	81
6.6A/45MR16/64337A 45-15	58907	45	MR16	LEADS-A	6.6			1500	45.6	20	79
6.6A/45MR16/64337B 45-15	58908	45	MR16	LEADS-B	6.6			1500	45.6	20	81
6.6A/64337 IRC-A 48-30	59070	48	MR16	LEADS-A	6.6			3000	45	20	
6.6A/48MR16/64337A 48-15	58891	48	MR16	LEADS-A	6.6			1500	45.6	20	79
6.6A/48W/MR16/64338AC	58894	48	MR16	LEADS-A/C	6.6			1000	45.6	20	45
6.6A/48MR16/64337B LL IRC	58906	48	MR16	LEADS-B	6.6			3000	45.6	20	81
6.6A/48MR16/64337C LL IRC	58952	48	MR16	LEADS-C	6.6			3000	45.6	20	82
6.6A 64337 IRC-C 48-30	59071	48	MR16	PK30D-C	6.6			3000	45	20	
6.6A/62W/MR16/64336A	58493	62	MR16	LEADS-A	6.6			1500	44.0	20	79
6.6A/105MR16/64339A	58953	105	MR16	LEADS-A	6.6			1000	45.6	20	79
6.6A/105MR16/64339AC	58960	105	MR16	LEADS-A/C	6.6			1000	45.6	20	91
6.6A/105MR16/64339B	58961	105	MR16	LEADS-B	6.6			1000	45.6	20	81
6.6A/105MR16/64339C	58963	105	MR16	LEADS-C	6.6			1000	45.6	20	82

INFRARED

INFRARED SINGLE END

ANSI Code	Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
	1000Q/T6/RTP/C	54555	1000	120	G9.5	27500		T6	12	
	1000T6Q/RTP/CR/BULK	54560	1000	120	G9.5	25000	2000	T6	15	62
	1000Q/T6/RTPFS	54584	1000	120	G9.5	27500	300	T6	12	
	1000T6Q/RTP/X	54752	1000	120	G9.5	25000	2000	T6	12	
FRN	FRN 2000T7Q	54588	2000	120	G9.5	56500	200	T7	12	
	2000T8Q/120V/G22	54537	2000	120	G22	45000	2000	T8	12	73
	2500T8Q/120V	54548	2500	120	GY9.5	75000	300	T8	12	

INFRARED DOUBLE END

ANSI Code	Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Base	Lumens (lm)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
	500T3Q/IR 120V	59850	500	120	Flex Nick Leads		5000	T3	12	
	500T3Q/IR/7 120V	59822	500	120	R7s		5000	T3	12	
	1200T3Q/IR/CL/HT 144V	59934	1200	144	Flex Nick Leads		3000	T3	12	
	1000T3Q/IR 230-250V	59860	1000	240	Flex Nick Leads		5000	T3	12	
	1600T3Q/IR 240V	59864	1600	240	Flex Nick Leads		5000	T3	12	
	1600T3Q/IR/7 240V	59841	1600	240	R7s		5000	T3	12	
	1600T3Q/IR 277V	59936	1600	277	Flex Nick Leads		5000	T3	12	
	2500T3Q/IR 480V	59867	2500	480	Flex Nick Leads		5000	T3	12	
	2500T3Q/IR/7 480V	59803	2500	480	R7s		5000	T3	12	
	3650T3Q/IR/CL 480V	59859	3650	480	Flex Nick Leads		5000	T3	12	
	3800T3Q/IR 570V	59870	3800	570	Flex Nick Leads		5000	T3	12	

Symbols/Footnotes on pages 37-40


S14

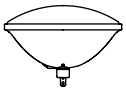

B15d


E14


S11


A21, A23


PS25


PAR 46, 64

INCANDESCENT

SINGLE END

ANSI Code	Ordering Abbreviation	Product Number	Watts (W)	Volts (V)	Lumens (lm)	Color Temp (K)	Avg Rated Life (hrs)	Base	Bulb	Pkg Qty	Symbols & Footnotes
	8013	76311	10	6			200	BA15D		100	46
	8017	76313	15	6			1000	B15D		100	
	8018	76314	15	6			100	B15D		100	46
	70314 (390153)	76304	25	6				P47D		100	
	70313 (390158)	76305	30	6				P47D	P35	100	
	8100	76321	30	5			600	E14		100	45
	111A	11624	75	120	1120	2900	15	SC Bayonet	S11	24	
	140	11625	75	120	1150	2900	35	Medium	S14	24	
	211 118V	11657	75	120	1215	3200	200	Medium	A21	12	
	212 118V	11656	150	120	2700	3050	200	Medium	A21	12	
BBA	BBA 118V	11619	250	120	8700	3400	4	Medium	A21	12	
BCA	BCA 118V	11655	250	120	8912	4800	12	Medium	A21	12	
ECA	ECA 120V	13365	250	120	6500		20	Medium Brass	A23	24	
EBV	EBV 118V	11558	500	120	17800	3400	8	Medium	PS25	24	
ECT	ECT 120V	11560	500	120	13650	3200	60	Medium	PS25	24	
	70335 BULK	76302		6				Special		200	

PAR

Product Number	Ordering Abbreviation	Watts (W)	Volts (V)	Base	Centerbeam Candlepower (cp)	Avg Rated Life (hrs)	Bulb	Pkg Qty	Symbols & Footnotes
15399	4551	250	28	G53	75000	25	PAR46	12	29
14988	4557	1000	28	G53	540000	50	PAR64	6	
14936	4559	600	28	G53	600000	100	PAR64	6	29
14994	5557	1000	28	G53	540000	50	PAR64	6	29,53

For the current listing of available products and more complete product information, please visit us at www.sylvania.com

LED SOLUTIONS

LEDs are solid state light sources delivering light in a single narrow spectrum or in case of white light in a broad spectrum. The solutions based on LED technology offer various advantages depending on the application. LEDs use low voltage, making their design simple, flexible and efficient. Low power consumption, long life and environmentally friendly compact form factors allow LEDs to be designed into endless lighting applications. OSRAM's Remote Phosphor Technology provides unparalleled color quality for the most demanding applications.

INDUSTRIAL

ZELION® T (TUBULAR) MODULE

- Applications: Airfield and taxiway lighting plus other linear lighting applications
- CCT = 5500K
- Optical efficiency: 52.5 lumens per watt
- 16" or 24" lengths
- Self-contained, sealed unit
- Shock & vibration resistant

ZELION® O (OMNIDIRECTIONAL) MODULE

- Applications: Airfield and taxiway lighting, power signaling and portable lights
- Side-emitting, 360° output
- Power from 1W to 5W
- Dimmable
- Color Selection: R,G,B,W

MEDICAL

ITOS® O (OPTICAL) MODULE

- Applications: Lighting for medical instruments
- CCT = 3000K
- Direct replacement for tungsten-halogen lamp
- Long life (> 20,000 hours)

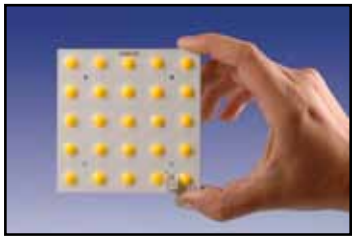
Please contact your OSRAM SYLVANIA sales representative for more information on these products.

Symbols/Footnotes on pages 37-40

LED SOLUTIONS

ENTERTAINMENT

KREIOS® D AND KREIOS® T MODULE



- Applications: Stage, studio and TV
- D=Daylight color temperature of 3200K
- T=Tungsten color temperature of 5600K
- Soft white light module
- Luminous Intensity: 445 – 555 lumens @ 140 mA
- Remote Phosphor Technology ensures stable color and lumen maintenance

KREIOS® G GOBO IMAGE PROJECTOR

- Applications: Retail, architainment lighting
- Sharp image
- 16° Beam Angle
- Homogeneous light output at projection distance (1000 lx @ 1 M)
- 800 lm output

KREIOS® R (REFLECTOR) MODULE

- Application: Concerts
- MR16 equivalent
- 1000 lm output (White)
- R,G,B,W

Please contact your OSRAM SYLVANIA sales representative for more information on these products.

LAMPHOLDERS

STOCKED TYPES

Single End (See Lampholder Catalog for Made-to-Order Types)

Product Number	Description	Max Watts (W)	Max Volts (V)	Max Operating Temp (°C)	Wire Gauge (AWG) / Type	Lead Length (in)	Sku/Case Qty	Symbols & Footnotes
69370	G12 24IN/18GA/UL3239	150	1000	200	18/UL3239	24	4/84	
69371	G22 NO LEADS	3000	1000	350	8-16 Compatible	-	2/42	
69372	G38 NO LEADS	3000	1000	350	8-16 Compatible	-	1/15	
69367	GY9.5 24IN/18GA/UL3239	500	1000	200	18	24	2/42	
69780	LOK-IT PGJX28 12IN/16GA/UL5359	-	250	350	16/UL5359	12	20/80	☼
64855	LOK-IT PGJX50 NO LEADS	-	250	350	6-14 Compatible	-	1/36	
69025	LOK-IT PGJX50 NO LEADS [BULK]	-	250	350	6-14 Compatible	-	24/24	
69786	R1DL RIM MT 12IN/18GA/ULSFF1	500	120	200	18/ULSFF1	12	20/100	
69783	S25 36IN/18GA/ULSF2	1000	250	300	18/ULSF2	36	20/100	☼
69785	S4 NO LEADS	1000	250	300	-	-	24/240	☼
69784	S48 48IN/18GA/ULSF2	1000	300	300	18/USSF2	48	20/100	☼
69021	TP120 12IN/18GA/ULSF1	750	250	250	18/ULSF1	12	20/100	
69010	TP220XL 36IN/16GA/ULSF2	1000	250	300	16/ULSF2	36	20/100	
69005	TP22H 44IN/16GA/UL10723	1000	250	300	16/UL10723	44	20/100	
69018	TP22H CE/160CM/16GA/UL1659	1000	250	250	16/UL1669	63	10/40	
69017	TP22H CE/165CM/16GA/UL1659	1000	250	300	16/UL1659	65	10/40	
69006	TP22XL 36IN/16GA/ULSF2	1000	250	300	16/ULSF2	36	10/50	
69020	TP23H 12IN/16GA/UL5359	1200	250	200	16/UL5359	12	20/100	
69022	TP30 12IN/18GA/ULSFF1	500	300	200	18/ULSFF1	12	20/100	
69023	TP61 28IN/18GA/ULSF1	750	250	250	18/ULSF1	28	25/125	

PAR (See Lampholder Catalog for Made-to-Order Types)

Product Number	Description	Max Watts (W)	Max Volts (V)	Max Operating Temp (°C)	Wire Gauge (AWG) / Type	Lead Length (in)	Sku/Case Qty	Symbols & Footnotes
69013	PAR1 48IN/16GA/ULSF2	1000	250	300	16/ULSF2	48	10/50	

Double End (See Lampholder Catalog for Made-to-Order Types)

Product Number	Description	Max Watts (W)	Max Volts (V)	Max Operating Temp (°C)	Wire Gauge (AWG) / Type	Lead Length (in)	Sku/Case Qty	Symbols & Footnotes
69012	S26 36IN/16GA/ULSF2	3000	600	350	16/SF2	36	20/100	
69011	S26A 18IN/16GA/ULSF2	3000	600	350	16/SF2	18	20/100	
69004	SFC10-4 115MM NO LEADS	1500	1000	250	-	-	8/8	

Symbols/Footnotes on pages 37-40

SYMBOLS & FOOTNOTES FOR DISPLAY/OPTIC LAMPS

Symbol	Description
☼	New item introduced within the past year.
	See your OSRAM SYLVANIA Lighting Representative for product availability. Product to be discontinued when inventory depleted.
	This ECOLOGIC® lamp was designed to pass the Federal TCLP criteria for classification as non-hazardous waste in most states. Disposal regulations may vary; check local and state regulations.

Footnote	Description
1	Average life rating at 12 hours operation per start is 28,800 hours.
2	Average rated life is measured at 3 hours per start on 2-lamp, rapid start magnetic ballasts per IES recommended practice. Lamp life on single-lamp rapid start ballasts may be reduced.
3	Approximate initial lumens after 100 hours operation.
4	The life ratings of fluorescent lamps are based on 3 hr. burning cycles under specified conditions and with ballast meeting ANSI specifications. If burning cycle is increased, there will be a corresponding increase in the average hours life.
5	Germicidal lamps can be operated on corresponding wattage preheat ballasts.
6	Starter required.
7	These lamps are not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
8	40W Rapid Start Lamps may be used in starter operated fixtures designed for 40W preheat lamps. Life rating for preheat service is approximately 15,000 hours average.
9	WARNING: To prevent possible serious injury, eyes and skin should not be exposed to direct or reflected ultraviolet power emitted by this lamp. This lamp is in Risk Group 3 per ANSI/IESNA RP-27.3-96. Adequate protection should be provided by clothing, gloves, opaque materials and ordinary window glass. Although this lamp will operate in standard fluorescent fixtures, it should not be used for general lighting applications.
10	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 1 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.25 meters (10 inches) should be limited; for example exposure at 0.14m (6 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
11	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 1 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.3 meters (12 inches) should be limited; for example exposure at 0.14m (6 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
12	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.55 meters (22 inches) should be limited; for example exposure at 0.4m (16 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
13	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.65 meters (26 inches) should be limited; for example exposure at 0.45m (18 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
14	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.7 meters (28 inches) should be limited; for example exposure at 0.54m (20 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
15	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.75 meters (30 inches) should be limited; for example exposure at 0.55m (22 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.

Footnote	Description
16	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 1.0 meters (39 inches) should be limited; for example exposure at 0.64m (24 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
17	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.6 meters (24 inches) should be limited; for example exposure at 0.45m (18 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
18	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.8 meters (31 inches) should be limited; for example exposure at 0.55m (22 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
19	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 2 per ANSI/IESNA RP-27.3-96. Exposure at less than 2.0 meters (79 inches) should be limited; for example exposure at 1.4m (55 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
20	CAUTION: This lamp emits ultraviolet (UV) power during operation and is in Risk Group 1 per ANSI/IESNA RP-27.3-96. Exposure at less than 0.3 meters (12 inches) should be limited; for example exposure at 0.15m (6 inches) should not exceed 4 hours in an 8 hour interval (see ANSI/IESNA RP-27.1-96). Certain medications and chemicals can increase an individual's sensitivity. Consult your physician for specific information. Protective eyewear should be worn in occupational situations involving long term exposure in close proximity to the lamp. This lamp is not intended and should not be used for diagnostic, therapeutic or cosmetic purposes.
21	Lamp service life 75hr life is defined at 76V with a duty cycle of 45 min. ON / 15 min. OFF.
22	WARNING: Lamp has a special GY22 base. Ignition voltage must be applied only to the thin pin.
23	High-performance HPL halogen lamps are manufactured under license from ETC, Inc.
24	Do not tilt perpendicular to the filament.
25	WARNING: The contact pins on the base are connected internally. The electrode farthest from the base must be connected via cable.
26	MFL = Medium Flood
27	NSP = Narrow Spot
28	WFL = Wide Flood
29	VNSP = Very Narrow Spot
30	Hg 100 also suitable for DC operation (no ignitor needed when connected to 230V).
31	Lamp also available with connecting cable and plug-in contact. XBO R 180W/45 C OFR (Product Number 69183).
32	Lamp also available in ozone-free version XBO 75 W/2 OFR (Product Number 69232).
33	Lamp also available in ozone-free version XBO 150 W/1 OFR (Product Number 69235).
34	Lamp uses Suprasil quartz glass.
35	Lamp also available in ozone-free version XBO 450 W OFR (Product Number 69245).
36	Lamp also available in Suprasil quartz glass version XBO 450 W/4 (Product Number 69244).
37	S = Short
38	C = Base with Cable
39	H = Suitable for horizontal operation
40	CA = Cable on anode base
41	SHSC = Extra short version for horizontal burning position, anode connection via cable (super short)
42	TP = Threaded Pin

Symbols/Footnotes on pages 37-40

SYMBOLS & FOOTNOTES FOR DISPLAY/OPTIC LAMPS

Footnote	Description
43	GS = Gap Shortened
44	DXS = Double-End eXtreme Seal technology
45	s (Operating Position) = Vertical, base down
46	h (Operating Position) = Vertical, base up
47	p (Operating Position) = Horizontal
48	Lamp also available with 850 hr HBO 1500 W/PI (Product Number 69319).
49	Lamp also available as version HBO 2001 W/CI with 850hr life (Product number 69219).
50	Lamp is also available with connecting cable and plug-in contact. HTI 250W/32 C (Product Number 54089).
51	Lamp also available as version HBO 1003 W/PI with 850hr life (Product Number 69195).
52	Lamp also available as version HBO 2500 W/PI with 850hr life (Product Number 69178).
53	Average service life of lamp if operated with 400W is 100 hrs.
54	Magnetic arc stabilization required.
55	Lamp same as HBO 200 W/4 (Product Number 69224) but with increased radiation in the wavelength range below 450nm for UV-curing.
56	For DC operation both Product Numbers 69198 & 69222 can be used (47...65Volts / 3.1...4.2Amps). For AC operation Product Number 69198 (L1 version 57 65 Volt / 3.6 Amps) or Product Number 69222 (L2 version 49 57 Volt / 4.2 Amps) can be used.
57	Magnetic arc stabilization: necessary for horizontal operation.
58	The XERADEX 20 lamp must be operated with DBD 20/110-240/ECG-XERADEX power supply (Product Number 69128 or D4569129).
59	Lumens refers to screen lumens.
60	XERADEX lamps are only to be operated in appropriate equipment. Read and understand the Product Safety Warnings before using this product. XERADEX lamps generate a strong 172 nm (VUV) radiation. This short-wave radiation will convert atmospheric oxygen (O2) surrounding the lamp into ozone (O3). Ozone gas is toxic when inhaled in high concentrations over long periods of time. Ozone levels can be measured and monitored with commercial measuring equipment. Always keep ozone levels below the applicable TLV (threshold limit value).
61	For Na 10 FL (product number 69284) use adapter no. 454/s using Pico 9 bases with P28 sockets.
62	Clean room ready packaging.
63	This lamp type is twice the life of the ANSI standard version.
64	XERADEX lamp life is rated in terms of 70% of initial UVC output on a continuous burn cycle.
65	Lamp also available with connecting cable and plug-in contact. XBO R 100W/45 C OFR (Product Number 69191).
66	Base is KF40 flange fitting; lamp is designed for use in high vacuum environments at pressures above 30 mbar and below 10^-3 mbar.
67	Optimized lamp eXtreme Seal (XS) technology to withstand interior base temperatures of up to 450 degrees celsius.
68	Lamp is part of the SharXS HTI lamp series. All SharXS HTI lamps are identical in terms of their shape, size and bases.
69	125 mm (front ring to plug) and 95 mm (rear cap to plug) silicon cables terminated with MATE-N-LOK plug no. 350809-1 with pins no. 926868-3 by AMP Inc.
70	It takes time for the mercury in the lamp to evaporate. Typically 95% of luminous output are generated after approximately 120 seconds. For quality inspection purposes allow for five minutes burning time.
71	Excessive airflow may lead to mercury condensation in the discharge lamp bulb and consequently to a performance drop.
72	QXL is a trademark of Electronics Theatre Controls Inc., and used under license.
73	Lamp uses eXtreme Seal (XS) Technology, which effectively protects the seal up to 500°C.
74	Includes screw hole in anode & cathode lamp base. Includes 1 anode cable & 1 cathode cable in box, not installed.
75	HTI 1200W/D7/60 SharXS lamp (Product No. 54268-10 case & 54202-30 case) is a direct and equal replacement for the HMI 1200W/S lamp (Product No.54088).
76	Easy disassembly into components allow for environmentally preferred waste disposal.
77	Aluminum reflector reduces weight by up to 50% compared to standard glass PAR lamps.

Footnote	Description
78	Lamp bases need to be forced cooled.
79	Connector = female, flat
80	Lamp is part of the Baby SharXS HTI lamp series. All Baby SharXS HTI lamps are identical in terms of their shape, size and bases.
81	Connector = female, round
82	Connector = Male, flat
83	LA = Lumen Advanced (High Efficiency Lamp)
84	D = Digital
85	XL = Xtreme Life
86	Photometric values are measured at rated current.
87	CL = Classic Line
88	HP = High Performance
89	S = Sony (Sony projector)
90	Average Rated Life in horizontal position is 1000 hrs while Average Rated Life for moving applications is 650 hrs.
91	Snap-on connector, female / male contact.

Symbols/Footnotes on pages 37-40

LAMP BASES

BA15d
IEC 7004-11
DIN 49721
DL
Bayonet

BA15s
IEC 7004-11A
DIN 49720
SC
Bayonet

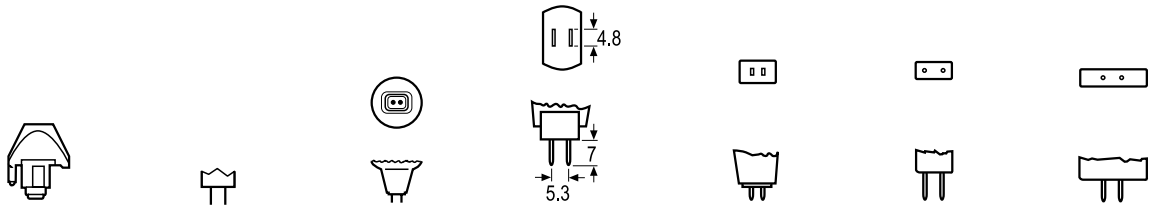
BA20d
IEC 7004-12
DIN 49730

E10
IEC 7004-22
DIN 49610
miniature
Edison

E14
IEC 7004-23
DIN 49615
small
Edison

E27/E26
IEC 7004-21
DIN 49620
E26-NA
E27-EURO

E40/E39
IEC 7004-21
DIN 49625
E39-NA
E40-EURO



FaX1.5-3x1

G4
IEC 7004-72
DIN 49757
2-pin

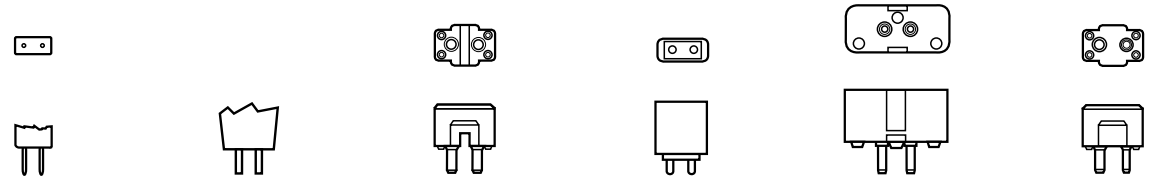
GX5.3
IEC 7004-61
DIN 49640
2-pin

G5.3-4.8
2-pin

GY5.3
2-pin

G6.35-15
G6.35-20
G6.35-25
IEC 7004-59
2-pin

GX6.35-25
IEC 7004-59
2-pin



GY6.35-15
IEC 7004-59
2-pin

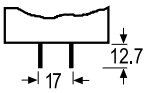
GZ6.35
IEC 7004-59 A
DIN 49754
2-pin

GZX9.5
GZZ9.5
IEC 7004-70 B
DIN 49756
2-pin
pre-focus

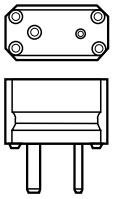
G9.5
IEC 7004-70
medium
2-pin

GX9.5
DIN 49638
IEC 7004-70 A
2-pin
pre-focus

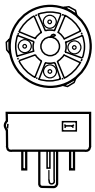
GY9.5
GZ9.5
DIN 49756
IEC 7004-70 B
2-pin
pre-focus



GX16d
2-pin

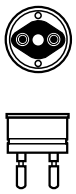


GY16
DIN 49758
IEC 7004-45
2-pin



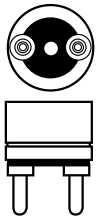
GY17q
DIN 49758
IEC 7004-74
4-pin

GY17t
DIN 49665
IEC 7004-45
4-pin



G22
IEC 7004-75
medium
Bipost

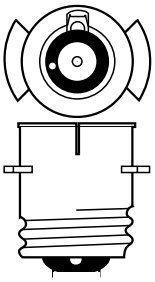
GY22
2-pin



G38
IEC 7004-76
MOGUL
Bipost

GX38q

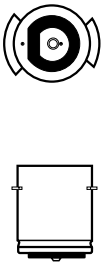
K24s
Length of cable
250 mm
Hole of cable lug
ø 8.4 mm
DIN 49748



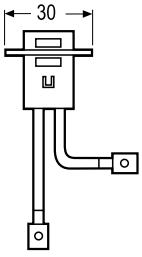
P40s
DIN 49728
IEC 7004-43
medium
pre-focus

Pico9
DIN 41539

PG22-6.35
DIN 49751
IEC 7004-48

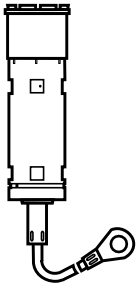


P28s
DIN 49728
IEC 7004-42
MOGUL
pre-focus

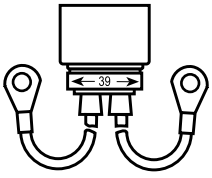


PK30d

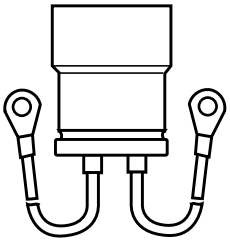
R7s
RX7s
DIN 49750
IEC 7004-92



K30 s
Length of cable
275 mm
Hole of cable lug
dia 8.4 mm
DIN 49748



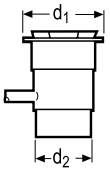
K39 d
with flexible Siaf cable
Length of cable 300 mm.
Hole of cable lug dia. 8.4 mm



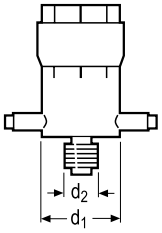
K59 d
with flexible Siaf cable
Length of cable 350 mm.
Hole of cable lug dia. 8.4 mm
DIN 49732

Symbols/Footnotes on pages 37-40

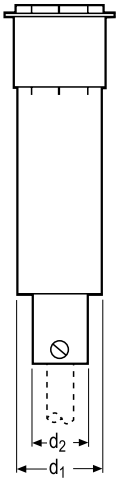
LAMP BASES



SK27-50

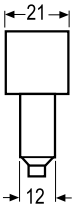


SFcX27-8
(5/16-18UNC-2 A)

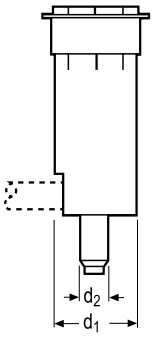


SFa15-10
SFa16-8
SFa16-10
SFa20-8
SFa20-10
SFa25-10

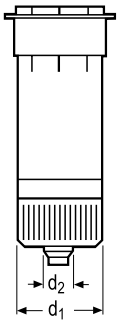
SFa27-8
SFa27-10
SFa27-11
SFa27-12
SFa27-14
SFa28-18



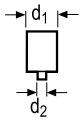
SFa21-12
DIN 49759



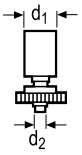
SFaX27-10
SFaX27-9.5
SFaX27-12
SFaX27-13
SFaX27-14
SFaX30-9.5
SFaX30-16



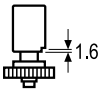
SFc25-14 (M 14x1.5)
SFc27-14 (M 14x1.5)



SFa5-2
SFa6-2
SFa7.5-2
SFa8-2
SFa9-2
SFa12-11
SFa21-5



SFcX12-4
(with M4 thread and
centering collar)
SFcX 13-4
SFcX 15-4
(with US inch thread 8-32
UNC-3A and centering collar)



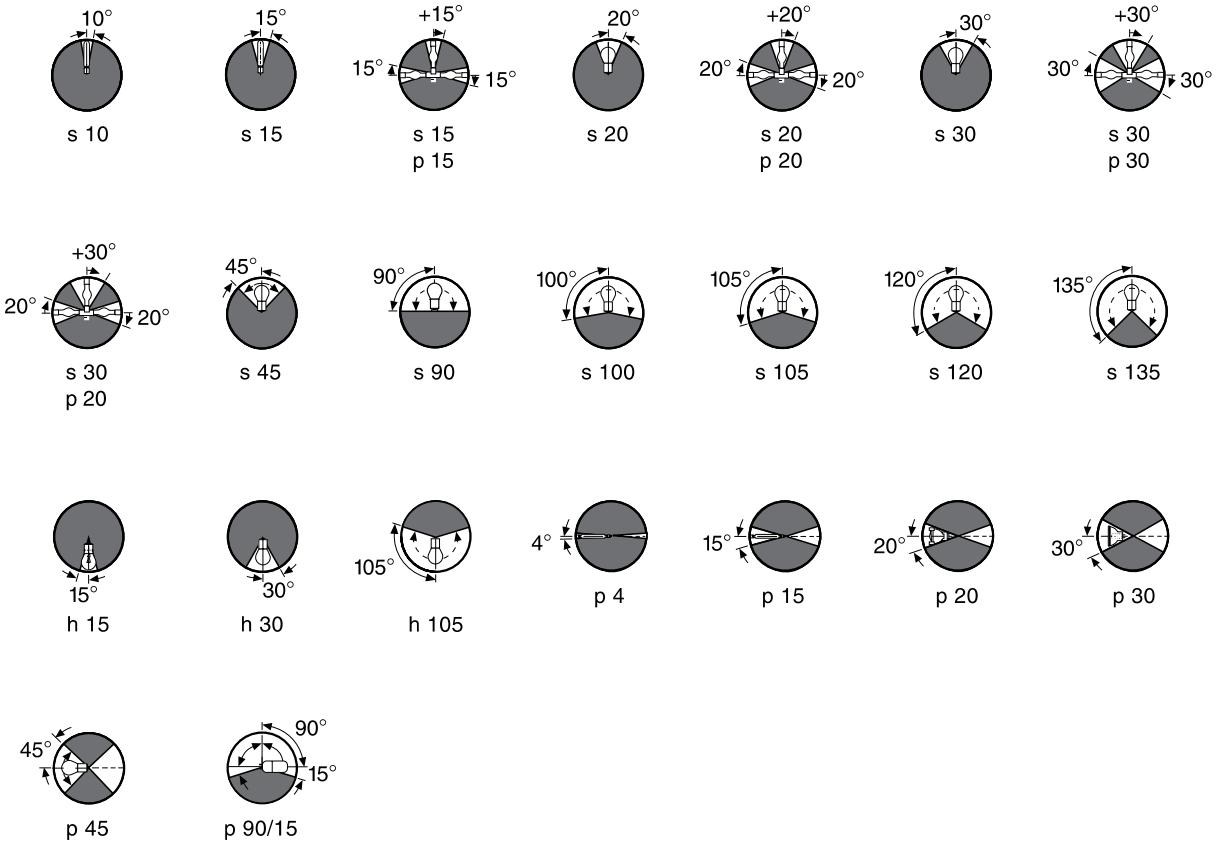
SFc10-4 M4-thread
SFc6-3 M3-thread
SFc12-4 M4-thread
SFc13-4 M4-thread

SX15s

X515
DIN 49613

OPERATING POSITIONS

Schematic diagrams



GENERAL INFORMATION

In North America, OSRAM brand Display/Optic lighting products are sold by OSRAM SYLVANIA AND OSRAM SYLVANIA LTD. Sales are subject to standard terms and conditions of sale prevailing as of the date of purchase.

Operational data and dimensions are nominal values. OSRAM reserves the right to make technical modifications without notice. All supplies are subject to availability.
® = Registered trademarks of OSRAM GmbH

Lamps are designated in accordance with ANSI standard C78.370-1982 (As amended).

When disposing of spent lamps, always consult federal, state, local and/or provincial hazardous waste disposal rules and regulations to ensure proper disposal.

Use of improper, unapproved or unsuitable ballasts will negatively impact the performance of Display/Optic lamps and could void the lamp warranty.

The following lamp types contain small quantities of harmful substances (such as mercury): HBO®, HSR®, HMI®, HTI®, HXP®, OSRAM STUDIOLINE®, VIP®, P-VIP®, Spectral and Ultra Violet lamps.

Symbols/Footnotes on pages 37-40

WARNING

TUNGSTEN HALOGEN & INCANDESCENT DISPLAY/OPTIC LAMPS

The following information pertains to all Display/Optic Tungsten-Halogen and Incandescent lamps including Infrared Heat Lamps, Current-Controlled Airfield Lamps, PAR and other Reflector Lamps.

WARNING:
In accordance with ANSI/IESNA Standard RP-27, Display/Optic incandescent & tungsten halogen lamps are Risk Group 2 products.

Read and understand this warning before using this bulb!

THIS LAMP EMITS ULTRAVIOLET AND INFRARED RADIATION. ALWAYS WEAR SUITABLE EYE PROTECTION WHEN WORKING NEAR THIS LAMP. THIS LAMP OPERATES AT HIGH PRESSURE AND AT HIGH TEMPERATURE AND MAY SHATTER UNEXPECTEDLY. THIS LAMP MUST BE USED IN A FIXTURE THAT HAS A SUITABLE PROTECTIVE SHIELD AND/OR SCREEN TO PROTECT PEOPLE AND SURROUNDINGS AGAINST THE RISK OF PERSONAL INJURY AND/OR PROPERTY DAMAGE FROM LAMP SHATTERING AND EXPOSURE TO INFRARED OR ULTRAVIOLET RADIATION.

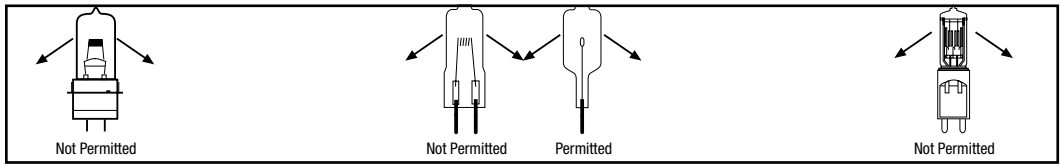
ALL OF THE FOLLOWING PROCEDURES MUST BE FOLLOWED FOR SAFETY AND TO OBTAIN SATISFACTORY LAMP PERFORMANCE.

GENERAL SAFETY AND INSTALLATION TIPS:

1. This lamp generates UV (ultraviolet) and/or IR (infrared) radiation. Prolonged exposure to this lamp may cause skin and eye irritation from the radiation when operated at or above rated voltage.
   Please note that lamp with reference number 64614 has enhanced UV output as a result of its reflector coating.
2. To avoid risk of serious eye injury from the intense light, do not stare at operating lamp.
3. Because this lamp radiates considerable heat, do not use in close proximity to people, combustible materials or substances adversely affected by heat or drying.
4. To avoid shattering of glass parts and/or lens/reflector, keep water, other liquids and metal objects from contacting hot glass surfaces. Protect the entire lamp from moisture (rain, snow, etc.) to avoid cracking or breaking.
5. Protect the lamp from contamination, abrasion and scratches. Do not use if lamp is scratched, cracked or damaged in any way.
6. For safe and proper lamp operation, operate at rated voltage and wattage. Operation above rated voltage increases UV output and internal pressure, thus increasing the risk of rupture.
7. This lamp (for reflectorized lamps, this applies to inner lamp capsule) operates at high internal pressure and at high surface temperature and may unexpectedly shatter resulting in hot, flying fragments of glass or metal. Although this lamp was carefully constructed, tested and inspected before packing and shipping, under certain conditions beyond the manufacturer's control, the glass parts could crack or break.
8. For PAR and other reflectorized lamps: Even though this lamp may continue to operate after the reflector and/or lens is broken or damaged, it should be replaced as soon as possible since the pressure-filled inner lamp capsule could unexpectedly shatter if scratched or otherwise damaged, creating a risk of personal injury or property damage.

LAMP MOUNTING AND OPERATION:

1. Use only in equipment/fixture specifying this lamp type, including voltage and wattage. Use in circuits, which do not exceed rated voltage and in sockets and equipment designed for its use.
2. Do not touch or handle the quartz glass with bare fingers. Contaminants can burn in at high operating temperatures and cause glass to recrystalize. This makes the glass opaque and milky; it increasingly loses its strength, and the risk of bursting increases. If lamp is touched, clean with denatured alcohol and wipe dry with a soft, clean lint-free cloth before operating.
3. Make sure lamp is properly installed into socket to obtain good electrical contact and to avoid damaging lamp and/or socket. A heat resistant connector should be used to make electrical contact to the lamp base for safety and to obtain rated lamp life. To avoid damage to lamps with bipin bases, do not twist. Pull old lamp straight out and push new lamp straight in. For safe and proper operation of lamps with lead wires, please ensure that the lamp is securely supported and the lead-wires are securely connected to the electrical supply.
   For PAR 36, 46, 56, 64 lamps: To avoid breaking, the lamp must be supported by its rim.
4. Operating temperatures deteriorate lamp sockets. Socket condition may affect lamp life. Replace socket if deterioration of socket or lamp base contacts is observed.
5. Do not move, bump or bounce equipment/fixture during operation because mechanical shock can cause shattering and failure of the lamp.
6. For PAR 36, 46, 56 and 64 lamps: Lamp should be operated with a protective shield (especially in public places – churches, auditoriums, etc) to prevent the risk of personal injury or property damage from flying lamp fragments in the event of the lamp cracking or breaking.
7. To avoid risk of burns or electrical shock, do not remove or insert lamp when power is on, allow lamp to cool to room temperature before removing or storing.
8. Replace all equipment/fixture covers and shields after servicing to prevent personal injury or property damage.
9. All Display/Optic lamps have a range of permissible operating positions. Please see relevant operating position information in our literature or on-line catalog and only operate lamps at the operating positions specified. The basic rule for all single-ended Display/Optic halogen and incandescent lamps is that the lamp may only be tilted/inclined perpendicular to the plane through both filament lead-wires (see illustrations and list of affected filament designs below).



Affected Filament Designs:

C-2V, C-6, C-6F, C-13, C-13D, CC-2V, CC-6, CC-13, CC-13D, 2C-8, 2CC-8

10. Keep lamp seal temperature below 350°C (660°F) and the lamp wall temperature between 250°C (480°F) and 900°C (1650°F). When used in equipment designed to provide cooling to operating lamp, do not obstruct equipment cooling system.
11. Filaments for high luminance applications are designed in such a way that the incandescent elements do not block each other in the direction of projection. The positioning of single filament coils in one plane is called a monoplane filament. Biplane filaments have the incandescent elements staggered forward and backward in two parallel planes while maintaining adequate spacing to prevent arc-over.
12. Note: Photometric values of a frosted lamp will vary from the published values of the same non-frosted type.

TUNGSTEN HALOGEN & INCANDESCENT DISPLAY/OPTIC LAMPS (continued)

LAMP DIMMING:

1. Incandescent lamps (non-halogen): Incandescent lamps perform according to fixed relationships between luminous flux, luminous efficacy, color temperature, electrical voltage, electrical current and electrical power consumption. In general, a 5% increase in applied lamp voltage results in half the lamp life, and conversely a 5% reduction of lamp voltage results in twice the lamp life.
2. Tungsten-Halogen Lamps: In standard incandescent lamp operation, there is an inverse relationship of lamp life vs. supply voltage; i.e., the lower the voltage, the longer the life. In some tungsten halogen lamps, however, this holds true only when operated within 5 to 10% of the rated voltage. Further dimming, beyond the 10%, may affect the halogen chemistry in the lamp and may cause filament corrosion. There are also tungsten halogen lamps that only achieve nominal lamp lives regardless of the level of dimming that is used. Unlike standard incandescent lamps, the relationships in halogen lamps are not clear-cut because of the halogen chemical cycle. For the vaporized tungsten to be removed from the inner bulb wall, a minimum bulb wall temperature is necessary. This temperature is directly related to the power input to the lamp such that a reduction in power effects a reduction in the bulb wall temperature. Special design techniques have been incorporated in modern halogen lamps to prevent blackening regardless of the level of dimming. Consideration must be given to lamp dimming in applications that require maximum constancy of color temperature (photographic and video recording, for example), since the color temperature changes with the filament temperature.

CURRENT-CONTROLLED HALOGEN LAMPS:
Some lamp types are designed for constant current operation, primarily for airfield applications. They are usually operated in series with an isolation transformer tap connected to each lamp to ensure that all lamps have the same brightness. Constant current-operated lamps differ in performance from the published values of constant applied voltage lamps. Direct series connection of non-constant current designed lamps is not recommended.

INFRARED HEAT LAMPS:
These lamps are designed for use in applications specifically requiring an infrared radiation source. Infrared radiation from these lamps causes surfaces to be heated. These lamps operate at high temperatures. Allow sufficient cooling time before handling. A listing of Kelvin temperatures, method for electrical connection and operating positions with appropriate cooling recommendations for tungsten halogen special heat lamps can be found in the OSRAM literature or in the on-line catalog.

CAUTION: The infrared reflector lamp, HLX 64635 is specially designed to produce high temperatures at its focal point (approximately 1300°C / 2372°F) for soldering, welding and heating applications.

LAMP DISPOSAL:

1. Disposal of spent lamps must be in accordance with applicable federal, state/provincial and local regulations.
2. Lamp users in North America may obtain specific state or province information concerning disposal regulations, toll free, by calling 1-866-666-6850.
3. OSRAM SYLVANIA Products Inc. cannot advise lamp users as to general or specific disposal regulations for federal, state/provincial and/or local municipalities.

WARNING

METAL HALIDE DISPLAY/OPTIC LAMPS [HCD®, HMI®, HMD®, HMP®, HSD®, HSR®, HTI®]

WARNING:
In accordance with ANSI/IESNA Standard RP-27, Display/Optic metal halide lamps are a Risk Group 3 product.

Read and understand this warning before using this lamp!

THIS LAMP EMITS ULTRAVIOLET AND INFRARED RADIATION. ALWAYS WEAR SUITABLE EYE PROTECTION WHEN WORKING NEAR THIS LAMP. THIS LAMP OPERATES AT HIGH PRESSURE AND AT HIGH TEMPERATURE AND MAY SHATTER UNEXPECTEDLY. THIS LAMP MUST BE USED IN A FIXTURE THAT HAS A SUITABLE PROTECTIVE SHIELD AND/OR SCREEN TO PROTECT PEOPLE AND SURROUNDINGS AGAINST THE RISK OF PERSONAL INJURY AND/OR PROPERTY DAMAGE FROM LAMP SHATTERING AND EXPOSURE TO INFRARED OR ULTRAVIOLET RADIATION.

RUPTURE & RADIATION (UV-IR-VISIBLE) HAZARD:

1. All Display/Optic metal halide lamps operate at high internal pressures (upwards of 500psi or 35bar possible) and may unexpectedly rupture resulting in the discharge of hot fragments (approximately 800°C / 1472°F) of quartz and/or metal particles, as well as the release of mercury/mercury vapor. In the event of such a rupture, there is a risk of personal injury, burns and fire.
2. All Display/Optic metal halide lamps generate ultraviolet (UV), infrared (IR) and visible radiation during operation. This radiation can cause permanent damage to the eyes (including blindness) and serious injury to the skin (including burns and blistering). To avoid eye damage, other personal injury and/or property damage, the lamp MUST be operated in a suitable fixture.
3. A suitable fixture is one that will prevent the arc from being viewed directly while operating, and in the event of a lamp rupture, will prevent hot (up to 800°C / 1472°F), flying fragments of quartz and/or metal from escaping into the area.
4. To minimize the risk of a lamp rupture, replace the lamp at or before the end of rated life (see OSRAM SYLVANIA product catalog for rated life) or when the lamp shows signs of blackening.
5. The discharge vessel of Display/Optic metal halide lamps is constructed of quartz glass that is filled with a quantity of mercury, elemental metals and/or rare earth elements. These lamps are **not** at positive pressure when cold (not operating, at room temperature).

GENERAL SAFETY & INSTALLATION TIPS

BROKEN LAMPS (MERCURY VAPOR RELEASE AND DISPOSAL):

1. In the event of a lamp rupturing during operation, all personnel should leave the area immediately to avoid the inhalation of mercury vapor. The area should then be thoroughly ventilated for a minimum of 30 minutes or until the mercury vapor in the area is below the ACGIH TLV (American Conference of Governmental Industrial Hygienists Threshold Limit Value). Inhaling vapor or small particles of mercury or its compounds can be harmful to lungs, kidneys and nervous system. Penetration of the skin or ingestion can also be harmful.
2. To avoid mercury vapor getting into air conditioning systems, mercury vapor-absorbing filters should be used. ***When the lamp housing has cooled, mercury residue may be picked up with special mercury adsorptive agents or a mercury vacuum cleaner (available from laboratory safety equipment suppliers) and disposed of in accordance with local, state and federal regulations.*** There should be no direct skin contact with and/or inhalation of mercury residues that may be residing in lamp housing, optics or lamp parts.
   If a cold (room temperature) lamp is broken, proceed with clean up and disposal as indicated above (in the ***bold, italic statement***).

Symbols/Footnotes on pages 37-40

WARNING

METAL HALIDE DISPLAY/OPTIC LAMPS [HCD®, HMI®, HMD®, HMP®, HSD®, HSR®, HTI®] (continued)

INSTALLATION:

1. Do not use if lamp is scratched, cracked or damaged in any way.
2. To prevent electric shock, shut off main power to the fixture before attempting to service or replace lamp.
3. To avoid damaging the quartz and causing premature lamp failure, do not handle lamp with bare hands. Use clean gloves.
4. If the quartz parts are inadvertently touched, clean fingerprints off with denatured alcohol and wipe dry with a clean, soft, lint-free cloth. Do not use cleaning rags or material that can leave a residue.
5. To prevent skin burns, allow lamp to cool before handling.
6. To avoid breakage, mounting of the lamp must be free of mechanical stress during installation and during operation by allowing for thermal expansion along its axis.
7. Display/Optic metal halide lamps should not be subjected to force/stress during installation. Single-ended lamp types use a metal bar, which runs parallel to the lamp body and provides an electrical path for the lamp current (from the socket end to the opposite end of the lamp). To avoid overheating the lamp current bar, Display/Optic metal halide lamp types without outer jackets should not have the lamp current bar positioned above the discharge arc during operation. Single ended lamp types with outer jackets may be operated in any position and with any current bar position.
8. Replace all fixture covers and shields after replacing lamp to prevent eye damage, other personal injury or property damage.
9. Use only in instruments/equipment specifying this light source.
10. **CAUTION – Shorting Hazard:** The HTI 2500 W/SE has both base pins connected to the same point inside the lamp socket. A lead wire on the opposite side of the lamp provides the current connection necessary for operating the lamp.
11. Make sure lamp is properly installed into socket/connector to obtain good electrical and thermal contact and avoid damaging lamp and/or socket/connector. Electrical connections should be free from dirt and corrosion. Socket/connector condition may affect lamp life. Replace socket/connector or lamp if deterioration (pitting, scorching, corrosion, etc.) is observed.

Please note that certain Display/Optic, AC metal halide lamps have dedicated pins or connectors for high voltage ignition.

OPERATION:

1. Magnetic current-limiting ballasts (chokes) provide sine-wave current operation for lamps. However, electronic control gear (ECG) allows for square wave current operation, often at higher frequencies. Some Display/Optic metal halide lamps have been designed for, and therefore require, ECG square-wave operation. Please see OSRAM literature for power requirements for your specific lamp type.
2. Operate with compatible power supply and fixture only.
3. OSRAM Display/Optic metal halide discharge lamps are designed for either hot re-start (high ignition voltages) or cold start (low ignition voltages only). Please see OSRAM literature for power requirements for your specific lamp type.
4. To ensure that lamps operate at the correct power during AC operation, connections on the ballast/choke in the power supply should be made to the correct voltage taps; i.e., tap voltage should match input line voltage. To avoid wall blackening, overheating or other premature failure modes, OSRAM strongly advises against operating Display/Optic metal halide lamps at higher than rated wattage ("boosted operation"). Only OSRAM HMP Display/Optic metal halide lamps are offered with a unique power feature allowing for operation at increased wattage of up to 1.5 times their rated wattage, but with reduced service life. For safe lamp operation and optimum performance, use only those ballasts/power supplies that have been approved by OSRAM. See your OSRAM dealer for a list of approved equipment.
5. Dimming of Display/Optic metal halide lamps, like incandescent lamps, causes a drop in luminous output. If a metal halide lamp is dimmed by electrical means it will not reach its optimum operating state and, unlike incandescent lamps, will not last longer. When dimmed, the lamp wall temperature falls more rapidly on a lamp that has no outer jacket. In metal halide lamps without an outer jacket, reduced power operation causes an increase in the color temperature and a reduction in CRI. Lamps with outer jackets can have either a vacuum or filling gas (often Nitrogen) within. Metal halide lamps with outer jackets tend to maintain their color properties better under dimmed conditions because the outer jacket provides thermal insulation against internal lamp cooling.
6. Display/Optic metal halide lamps need 5 to 20 minutes (depending on lamp type and cooling conditions) before they reach their operating temperatures. To ensure proper ignition on subsequent start-up, lamps should not be switched off during the warm-up period.
7. Average service life of these lamps is determined by the ON/OFF duty cycle. Lamp performance is reduced with increased duty cycle.

OPERATING POSITION:

Display/Optic metal halide lamps may only be used in the operating positions described in the OSRAM SYLVANIA product catalog. Please note that lamp photometric values and arc stability can be effected by the operating position.

OZONE GENERATION:

- During operation, Display/Optic metal halide lamps produce a spectrum that ranges from about 150 nm in the ultraviolet region to the infrared region.
- If the quartz glass bulb is transparent in the ultraviolet region between 180 and 220 nm, this short-wave radiation will convert a small quantity of atmospheric oxygen (O_2) surrounding the lamp into ozone (O_3). Moreover, the oxygen molecules will link together with the nitrogen (N_2) in the air, creating nitrogen oxides (NO_X). (Some believe that the smell attributed to ozone is in actuality from the nitrogen oxides.)
- Ozone gas is toxic when inhaled in high concentrations over long periods of time. Ozone levels can be measured and monitored with commercial measuring equipment. Always keep ozone levels below the applicable TLV (threshold limit value)
- An "ozone smell" (or smell of nitrogen oxide) may be detected shortly after ignition. There are two probable causes for this condition. O_3 and NO_X production is caused by the (short-duration) radiation of the spark gap used for lamp ignition. Or, the cold condition of the quartz glass bulb has slightly shifted its UV-absorption characteristics thus permitting a small amount of radiation in the very short-wave ultraviolet range to be emitted by the bulb. Typically, after the lamp has run up to its operating temperature range, virtually no ozone is produced by the lamp, as a rule, due to the quartz glass absorption and the self-absorption of the plasma.

LAMP COOLING:

1. All Display/Optic metal halide lamp bases must be kept below 230°C (446°F) during operation to prevent premature lamp failure. If convection cooling is inadequate, forced air-cooling may be used. Please see OSRAM literature for cooling requirements of specific lamp types.
2. If forced air-cooling is used, care must be taken to direct airflow at the bases only. Striking elsewhere on the lamp with the airflow will result in poor lamp performance or premature failure.
3. Discoloration, surface pitting, and/or corrosion of the lamp connections indicates a thermal overload. To obtain optimum lamp performance, components exhibiting these conditions must be cleaned or replaced.

LAMP REMOVAL:

- Turn off power to the lamp and allow lamp to cool (forced or convection) for a minimum of 30 minutes prior to shutting main fixture power and opening fixture. Do not remove lamp until it has cooled.
- Lamps should be placed in their original OSRAM SYLVANIA packaging for temporary storage until disposal and/or transportation to a disposal location. See "Lamp Transportation" and "Lamp Disposal" sections for relevant information.

METAL HALIDE DISPLAY/OPTIC LAMPS [HCD®, HMI®, HMD®, HMP®, HSD®, HSR®, HTI®] (continued)

LAMP TRANSPORTATION:

1. All Display/Optic metal halide lamps should be transported ONLY in their original packaging.
2. Transportation in non-original packaging can damage the lamp and void warranty.
3. U.S. Federal regulations require mercury-containing lamps to be shipped ONLY in DOT-compliant packaging. Original OSRAM packaging is DOT-compliant.

MERCURY FILL OF Display/Optic METAL HALIDE LAMPS:

- Mercury is referred to by its chemical symbol, Hg, which is derived from the Greek and Latin "hydrargyrum," a silvery shiny liquid metal at room temperature. In humid air it is covered with a gray oxide skin. Of all metals it has the highest vapor pressure which increases exponentially with rising temperatures. For this reason, mercury is volatile at room temperature. The colorless and odorless vapors produced are poisonous and heavier than air.
- The inhalation (respiration) of mercury or mercury compounds as vapor or dust will lead to the damage of lungs, kidneys and the nervous system. Apart from inhalation, mercury can be transmitted through the skin (penetration) or through the gastro-intestinal tract (ingestion), which is also harmful.
- The ACGIH TLVs are merely guidelines to assist in the control of health hazards. The ACGIH states that the TLVs refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. Therefore, the TLV for mercury should never be exceeded.
- Analytical detection of mercury vapor is possible by means of gas/vapor detector tubes (rough measurement) or air-monitors that absorb mercury vapor.

OSRAM metal halide lamps have the following mercury contents:

Lamp Family	Maximum Mercury Content (mg)
HMI	1200
HMP	70
HTI	180
HSR/HSD	110
HMD	520
HCD	23

PROPERTIES OF MERCURY:

- Chemical symbol: Hg
- Atomic number: 80
- Molecular Weight: 200.59
- Density: 13.6 g/cm3 @ 20°C / 68°F
- Melting Point: -39°C / -38.2°F
- Boiling Point: 357°C / 674°F
- Vapor pressure: 160 Pa @ 20°C / 68°F
  370 Pa @ 30°C / 86°F
  823 Pa @ 40°C / 104°F
- Concentration in air: 13.6 mg/m3 @ 20°C / 68°F
  29.6 mg/m3 @ 30°C / 86°F
  62.7 mg/m3 @ 40°C / 104°F
- CAS Registry Number: 7439-97-6
- RCRA waste number: U151
- Other Names: Hydrargyrum, Colloidal mercury, Kwik, Mercure, Mercurio, Metallic mercury, Quecksilber, Quick silver, Liquid Silver

LAMP DISPOSAL:

1. Disposal of spent lamps must be in accordance with applicable federal, state/provincial and local regulations. State laws may differ in their disposal requirements for lamps.
2. Lamp users in North America may obtain specific state or province information concerning disposal regulations, toll free, by calling 1-866-666-6850.
3. OSRAM SYLVANIA Products Inc. cannot advise lamp users as to general or specific disposal regulations for federal, state/provincial and/or local municipalities. It is the responsibility of the waste generator to ensure proper classification and disposal of waste products.

Hg Lamp Contains Mercury

Manage in accordance with disposal laws
See www.lamprecycle.org or 1-866-666-6850

Symbols/Footnotes on pages 37-40

WARNING

XBO® AND XSTAGE® HIGH PRESSURE XENON LAMPS (DISPLAY/OPTIC)

WARNING:
In accordance with ANSI/IESNA Standard RP-27, these lamps are classified as Risk Group 3 products.

Read and understand this warning before using this bulb!

XBO® and XSTAGE® lamps are at high internal pressure when cold (up to 35 bar or approximately 525 psi) and at operating temperature (up to 80 bar or approximately 1200 psi at bulb wall temperatures of 600°C to 800°C). Therefore, XBO® and XSTAGE® lamps may unexpectedly rupture resulting in the discharge of hot fragments of quartz and/or glass and metal. In the event of such a rupture, there is a risk of personal injury, burns and fire. Only handle lamps with their protective covers or protective wraps in place. Do not handle lamps without their protective covers or wraps unless government-approved (OSHA-approved in the U.S.A.) safety glasses, facemask (with neck protector), chest protector and gauntlets are worn.

RUPTURE & RADIATION (UV-VISIBLE-IR) HAZARDS:
1. Intense ultraviolet (UV), visible, and infrared (IR) radiation is also generated during operation. This radiation can cause permanent damage to the eyes (including blindness) and serious injury to the skin (including burns and blistering). Some operating lamps also generate ozone (O3). Others, designated "OFR," are constructed of materials that prevent the generation of ozone. See the "Ozone Generation" section below.
2. To avoid eye damage, other personal injury and/or property damage, the lamp MUST be operated in a suitable fixture. A suitable fixture is one that will prevent the arc from being viewed directly while operating, is ventilated to the outside for those lamps that produce ozone and, in the event of a rupture, will prevent hot (up to 800°C), flying fragments of quartz and/or glass or metal from escaping into the surrounding area.
3. To minimize the risk of a lamp rupture, the lamp must be replaced at or before the end of rated life (see catalog for rated life) or when the lamp shows signs of advanced blackening or quartz devitrification (recrystalization, a white, frosted appearance).
4. XBO® and XSTAGE® lamps are constructed of quartz glass, tungsten electrodes and either tungsten support rods or molybdenum foils. High wattage XBO lamps used for cinema film projection have nickel-plated end caps (bases). Reflectorized XBO lamps have a dichroic-coated borosilicate glass reflector.

GENERAL SAFETY & INSTALLATION TIPS

INSTALLATION:
1. Do not use if lamp is scratched, cracked or damaged in any way.
2. To prevent electric shock, shut off main power to the fixture before attempting to service or replace lamp.
3. To avoid damaging the quartz and causing premature lamp failure, do not handle lamp with bare hands.
4. Handle lamp ONLY with suitable, clean, safety gloves. See special handling instructions for using government-approved personal protective safety equipment with high-pressure lamps.
5. If the quartz parts (or the reflector for reflectorized lamps) are inadvertently touched, clean fingerprints off with denatured alcohol and wipe dry with a soft, clean, lint-free cloth. Do not use cleaning rags or material that can leave a residue.
6. To prevent skin burns, allow lamp to cool before handling.
7. To avoid breakage, mounting of the lamp must be free of mechanical stress during installation and during operation by allowing for thermal expansion along its axis. For this reason, XBO lamps should be fixed at one end only and the electrical connection on the other end must be flexible enough to avoid stressing the lamp.
8. These lamps should not be subjected to force/stress during installation.
9. Handle lamp only with protective safety cover or safety wrap in place. When installing lamp, remove safety cover or wrap only AFTER fully securing lamp in lamphouse/fixture and immediately preceding the replacement of equipment covers or closing of lamphouse door.
10. Replace all fixture covers and shields after replacing lamp to prevent eye damage, other personal injury and/or property damage.
11. Use only in instruments/equipment specifying this lamp type.
12. Make sure lamp is properly installed into socket/connector to obtain good electrical and thermal contact and avoid damaging lamp and/or socket/connector. Electrical connections should be free from dirt and corrosion.
13. Socket/connector condition may affect lamp life. Replace socket/connector or lamp if deterioration (pitting, scorching, corrosion, etc.) of either is observed.
14. All XBO® and XSTAGE® lamps are designed for DC operation. Make sure that the polarity is correct before turning power on. Incorrect polarity can destroy the lamp in a matter of seconds. Operate with compatible power supply and fixture only.
15. For best performance, operate these lamps at rated current. Note: some low wattage lamps lamps may not be operated above their specified rated wattage. See catalog for details.
16. For those lamps that have a current control range, the current may be increased to its maximum value to compensate for loss of light over the life of the lamp. Operating the lamp at minimum current does not prolong the life of the lamp. The DC current may only be varied within specified control limits for the selected type. (See catalog for these limits for your specific lamp type.)
17. When installing bare lamps that have an included flat washer, slip the washer over the threaded pin on the cathode (— negative) side. Removal of this flat washer (after half the average life) will allow a rotation of the lamp by 180° resulting in better output maintenance over life for horizontally operated lamps. This should be done only if darkening is evident in the upper part of the bulb. In instances where bare lamp cathode bases are provided with two metal pins, they may be engaged with the two slots on the protective cover to screw the cathode end of the lamp into its socket.

LAMP REMOVAL:
1. Turn off power to the lamp and allow it to cool (forced or convection) for a minimum of 15 minutes prior to shutting main fixture power and opening fixture. Do not remove lamp until it has cooled. After the lamp has cooled, place the protective cover around it and reverse the procedure described above. See special handling instructions for using government-approved safety equipment with high-pressure lamps.
2. Lamp should be placed in the original OSRAM SYLVANIA safety wrap and packaging for temporary storage until disposal and/or transportation to a disposal location. See "Lamp Disposal" section below for transportation and spent lamp disposal information.

OPERATING POSITION:
1. XBO bare lamps are designed to operate vertically. Of those, some (having an "H" in their designation) may also be operated in the horizontal position as well. For vertically operated lamps, the anode (+ positive) electrode must be on the top. See catalog for operating position and permissible deviation for your specific type.
2. Some horizontally operated lamps require magnetic arc stabilization. Check the catalog for your specific lamp type.
3. XBO reflector lamps are designed to operate with lamp/reflector axis within 15° of the horizontal position.

WARNING

XBO® AND XSTAGE® HIGH PRESSURE XENON LAMPS (DISPLAY/OPTIC) (continued)

LAMP COOLING:

1. Discoloration, surface pitting and/or corrosion of the lamp indicates a thermal overload. Components exhibiting these conditions must be cleaned or replaced.
2. If forced-air cooling is used, care must be taken to direct airflow at the lamp bases only. Striking the lamp elsewhere with the airflow will result in poor lamp performance or premature failure.
3. To prevent premature failure, the following cooling instructions must be followed:
   Bare lamps – Bases must be kept below 230ºC (445ºF) during operation. If convection cooling is insufficient and additional cooling is required, forced air-cooling may be used. If forced air is used, care must be taken to direct airflow at bases only, since striking elsewhere on the lamp with the airflow will result in poor lamp performance or premature failure. See catalog for your specific lamp type to learn whether forced air-cooling is required.
   Reflector lamps – To avoid damaging the reflector coating, do not allow the outer reflector surface to exceed the maximum temperature of 250°C (480ºF). [Optimum temperature: 175-200°C (345-390ºF)] To prevent premature failure, the lamp ends must not exceed the maximum temperature of 350°C (660ºF). [Optimum temperature: 200-250°C (385-480ºF)] Forced air-cooling is therefore required and the air flow must be directed perpendicular to the lamp/reflector axis, through the slots in the openings of both ceramics. See catalog for diagram.

OZONE GENERATION:

An electrical discharge in xenon gas generates radiant energy ranging from approximately 140 nm in the UV region to far into the infrared region. Xenon lamps are made of quartz glass. The quartz glass allows for the transmission of short UV wavelengths starting from approximately 140 nm, depending on the quartz type. Ozone gas (O3) is generated by the conversion of oxygen (O2) in the air by UV energy in the range of approximately 110-200 nm. Ozone is extremely toxic and will cause serious health problems if inhaled in excess of allowable limits over a prolonged period of time. For more information on allowable limits, please refer to the ACGIH (American Conference of Governmental Industrial Hygienists) publication, "TLVs and BEIs" (Threshold Limit Values and Biological Exposure Indices). Ozone production can be suppressed in xenon discharge lamps by adding materials to the quartz glass that block short-wave UV transmission.

QUARTZ GLASS DESIGN OPTIONS:

OSRAM XBO® xenon lamps are offered in three quartz glass designs. They are:

1. OSRAM XBO W/4: These lamps are fabricated from synthetic Suprasil quartz glass. Suprasil quartz is low in impurities and provides for maximum short-wave UV transmission and consequently allows for the production of ozone. These lamps should always be used with external ventilation with no possible direct exposure to humans. Under no circumstances may the applicable maximum allowable workplace concentration of ozone be exceeded for any OSRAM xenon XBO lamps.
2. OSRAM XBO: These lamps use standard quartz glass and will also emit UV radiation that produces ozone. These lamps, like the W/4 types, must always be externally ventilated. With these types of lamps, health risks must always be minimized by suitably extracting the air from the lamp housing and externally venting it.
3. OSRAM XBO OFR: These lamps are designated "Ozone-Free" and are characterized by the letters "OFR" in the order description. OSRAM XBO OFR type lamps have their quartz glass transparently coated to effectively suppress radiation below approximately 250 nm, resulting in the elimination of ozone production during operation.

LAMP DISPOSAL:

1. There is a risk that a lamp could rupture because of its high internal pressure (both hot and at room temperature). A lamp rupture could result in personal injury or property damage from flying fragments of glass and/or metal. Therefore, spent (end-of-life) lamps should ALWAYS be stored in the protective covers and packaging in which they originally came, and ultimately de-pressurized before release for disposal. The following is one example of a de-pressurizing method for XBO® and XSTAGE® lamps prior to disposal, but it may not be the most suitable or appropriate method depending on the circumstance:
   - The operator must wear government-approved (OSHA-approved in the U.S.A.) safety glasses, facemask (with neck protector), chest protector, and gauntlets during this entire procedure.
   - With protective lamp covers in place, place lamps[1] into steel drum[2] and lock down cover with bolt ring and bolt.
   - Drop drum onto solid surface (concrete floor) from at least five feet. Increase height as needed to ensure all lamps are de-pressurized.
   - Wait for dust to settle (about 5 minutes) before opening drum. Loosen bolt and allow gas to escape before complete removal of cover.

   [1] The lamps should not exceed the half-full point in the drums. Adjust the maximum number of lamps accordingly.
   [2] 8, 20 or 30-gallon drums, depending on quantity of lamps to be de-pressurized, are available. Drums of 20-gauge steel are recommended and are available from many safety supply companies.

2. Disposal of spent lamps must be in accordance with applicable federal, state/provincial and local regulations. State laws differ in their disposal requirements.
3. Lamp users in North America may obtain specific state or province information concerning disposal regulations, toll-free, by calling 1-866-666-6850.
4. OSRAM SYLVANIA Products Inc. cannot advise lamp users as to general or specific disposal regulations for federal, state/provincial and/or local municipalities.

Symbols/Footnotes on pages 37-40

WARNING

HBO® HIGH PRESSURE MERCURY LAMPS

WARNING:
In accordance with ANSI/IESNA Standard RP-27, this HBO bulb is a Risk Group 3 product.

Read and understand this warning before using this bulb!

RUPTURE & RADIATION (UV-VISIBLE) HAZARD:

1. The discharge vessel of HBO lamps is constructed of quartz glass that is filled with a quantity of mercury and either Argon or Xenon gas. Most HBO lamps are not at positive pressure when cold (not operating, at room temperature). However, there are several HBO lamps that DO have a positive internal pressure of up to approximately 8 bar (or approximately 120 psi) in the cold (room temperature) state. The printing of the following bold warning statement on individual packages identifies them as positive-pressure lamps.

   WARNING
   RISK OF LAMP RUPTURING. TO AVOID PERSONAL INJURY OR PROPERTY DAMAGE, ALWAYS WEAR PROTECTIVE CLOTHING WHEN HANDLING THESE LAMPS. Never handle these lamps unless government-approved (OSHA-approved in the U.S.A.) safety glasses, facemask (with neck protector), chest protector and gauntlets are worn.

   These positive-pressure lamps may unexpectedly rupture resulting in the discharge of quartz and/or metal fragments as well as exposing the surrounding area to mercury. In the event of such a rupture, there is a risk of personal injury or property damage. Therefore these positive-pressure lamps should be handled in accordance with these safety instructions.
2. All HBO lamps have high internal pressures (400-1100 psi or 30 to 75 bar) during operation and may unexpectedly rupture resulting in the discharge of hot fragments (approximately 800°C / 1472°F) of quartz and/or metal particles, as well as the release of mercury/mercury vapor. In the event of such a rupture, there is a risk of personal injury, burns and fire.
3. All HBO lamps generate intense ultraviolet (UV) and visible radiation during operation. This radiation can cause permanent damage to the eyes (including blindness) and serious injury to the skin (including burns and blistering). To avoid eye damage, other personal injury and/or property damage, the lamp MUST be operated in a suitable fixture.
4. A suitable fixture is one that will prevent the arc from being viewed directly while operating, and in the event of a lamp rupture, will prevent hot (up to 800°C / 1472°F), flying fragments of quartz and/or metal from escaping into the area.
5. Fixtures for lamps that produce ozone during operation should be ventilated and filtered to the outside for ozone removal.
6. To minimize the risk of a lamp rupture, replace the lamp at or before the end of rated life (see OSRAM SYLVANIA product catalog for rated life) or when the lamp shows signs of blackening.

BROKEN LAMPS (MERCURY VAPOR RELEASE AND DISPOSAL):

1. In the event of a lamp rupturing during operation, all personnel should leave the area immediately to avoid the inhalation of mercury vapor. The area should then be thoroughly ventilated for a minimum of 30 minutes or until the mercury vapor in the area is below the ACGIH TLV (American Conference of Governmental Industrial Hygienists Threshold Limit Value). Inhaling vapor or small particles of mercury or its compounds can be harmful to lungs, kidneys and nervous system. Penetration of the skin or ingestion can also be harmful.
2. To avoid mercury vapor getting into air conditioning systems, instruments/equipment using lamps of 350 watts or greater should be connected to separate air exhaust systems through mercury vapor-absorbing filters. When the lamp housing has cooled, ***mercury residue may be picked up with special mercury adsorptive agents or a mercury vacuum cleaner (available from laboratory safety equipment suppliers) and disposed of in accordance with local, state and federal regulations.*** There should be no direct skin contact with and/or inhalation of mercury residues that may be residing in lamp housing, optics or lamp parts.
   If a cold (room temperature) lamp is broken, proceed with clean-up and disposal as indicated above (in the ***bold, italicized statement***).

GENERAL SAFETY & INSTALLATION TIPS

INSTALLATION:

1. Do not use if lamp is scratched, cracked or damaged in any way.
2. To prevent electric shock, shut off main power to the fixture before attempting to service or replace lamp.
3. To avoid damaging the quartz and causing premature lamp failure, do not handle lamp with bare hands.
4. Only handle lamp with suitable, clean safety gloves. See special, bolded warning for using government-approved safety equipment when handling positive-pressure lamps.
5. If the quartz parts are inadvertently touched, clean fingerprints off with denatured alcohol and wipe dry with a soft, clean, lint-free cloth. Do not use cleaning rags or material that can leave a residue.
6. To prevent skin burns, allow lamp to cool before handling.
7. To avoid breakage, mounting of the lamp must be free of mechanical stress during installation and during operation by allowing for thermal expansion along its axis. For this reason, HBO lamps should be fixed at one end only and the electrical connection on the other end must be flexible enough to avoid stressing the lamp.
8. HBO lamps should not be subjected to force/stress during installation.
9. Replace all fixture covers and shields after replacing lamp to prevent eye damage, other personal injury or property damage.
10. Use only in instruments/equipment specifying this light source.
11. Make sure lamp is properly installed into socket/connector to obtain good electrical and thermal contact and avoid damaging lamp and/or socket/connector. Electrical connections should be free from dirt and corrosion.
12. Socket/connector condition may affect lamp life. Replace socket/connector or lamp if deterioration (pitting, scorching, corrosion, etc.) of either is observed.

OPERATION:

1. Some HBO lamps are designed for operation on only AC or only DC while some are designed for operation on either AC or DC.
2. Note: all HBO lamps with power consumption of 350 W and higher are only suited for DC operation. Make sure that the polarity is correct before turning power on. Incorrect polarity can destroy the lamp in a matter of seconds.
3. Operate with compatible power supply and fixture only.
4. To ensure that AC-suited lamps operate at correct power during AC operation, connections on the ballast/choke in the power supply should be made to the voltage taps that are marked the same as the marking on the lamp base (L1 or L2). Some power supplies are equipped with a switch (or taps) for selecting L1 or L2. For correct and safe lamp operation, use only those ballasts/power supplies that have been approved or meet minimum requirements as specified by OSRAM. See your OSRAM dealer for list of approved equipment.
5. HBO lamps need 5 to 20 minutes (depending on lamp type and cooling conditions) before they reach their operating temperatures. To ensure proper ignition on subsequent start-up, lamps should not be switched off during the warm-up period.
6. The average service life of high wattage HBO lamps (≥350 watts) is determined by their ON/OFF duty cycle. These lamps have been designed for a limited amount of ignitions only (less than 10). Lamp performance is reduced with increased duty cycle.

WARNING

HBO® HIGH PRESSURE MERCURY LAMPS (continued)

OPERATING POSITION: WARNING

HBO lamps may only be operated in the operating positions described in the OSRAM SYLVANIA product catalog.

Some HBO lamps are designed to operate horizontally (mainly low wattage types in the power range of 50 to 200 W) and others, vertically (all lamp types with power consumption of 350 W and higher). Greater arc stability is obtained in vertically operating lamps when they are operated as close to vertical as possible. See catalog for permissible operating positions and electrode positions.

OZONE GENERATION:

During operation, HBO lamps produce a spectrum that ranges from about 150 nm in the ultraviolet region to the infrared region.

If the quartz glass bulb is transparent in the ultraviolet region between 180 and 220 nm, this short-wave radiation will convert a small quantity of atmospheric oxygen (O_2) surrounding the lamp into ozone (O_3). Moreover, the oxygen molecules will link together with the nitrogen (N_2) in the air, creating nitrogen oxides (NO_X). (Some believe that the smell attributed to ozone is in actuality from the nitrogen oxides.)

Ozone gas is toxic when inhaled in high concentrations over long periods of time. Ozone levels can be measured and monitored with commercial measuring equipment. Always keep ozone levels below the applicable TLV (threshold limit value).

The production of ozone and nitrogen oxide can be suppressed by using doped quartz glass, which absorbs the ozone-producing ultraviolet radiation. The quartz glass used in high wattage i-line (365nm) enhanced HBO lamps only transmits wavelengths above 250 nm, which provides effective, ozone-free lamps. Please be advised that the OSRAM HBO 4000 W/PL lamp is designed to generate UV wavelengths below 250 nm. Consequently, this lamp will generate ozone in operation and should be externally ventilated.

An "ozone smell" (or smell of nitrogen oxide) may be detected shortly after ignition. There are two probable causes for this condition. O_3 and NO_X production is caused by the (short-duration) radiation of the spark gap used for lamp ignition. Or, the cold condition of the quartz glass bulb has slightly shifted its UV-absorption characteristics thus permitting a small amount of radiation in the very short-wave ultraviolet range to be emitted by the bulb. Typically, after the lamp has run up to its operating temperature range, virtually no ozone is produced by the lamp, as a rule, due to the quartz glass absorption and the self-absorption of the plasma.

LAMP COOLING:

1. To prevent premature failure, lamp base temperatures must be kept below 230°C (446°F) for 50 to 350 watt lamps and below 200°C (392°F) for all lamps with power consumption of more than 350 watts.
2. Discoloration, surface pitting and/or corrosion of the lamp connections indicates a thermal overload. Components exhibiting these conditions must be cleaned or replaced.
3. If convection cooling is insufficient and additional cooling is required, cooling fins may be applied to the bases and/or forced air may be used.
4. If forced air is used, care must be taken to direct airflow at the bases only. Striking elsewhere on the lamp with the airflow will result in poor lamp performance or premature failure.

LAMP REMOVAL:

Turn off power to the lamp and allow lamp to cool (forced or convection) for a minimum of 30 minutes prior to shutting main fixture power and opening fixture. Do not remove lamp until it has cooled. See special, bolded warning for using government-approved safety equipment when handling positive-pressure lamps.

Lamps should be placed in their original OSRAM SYLVANIA packaging for temporary storage until disposal and/or transportation to a disposal location. See "Lamp Transportation" and "Lamp Disposal" sections following for relevant information.

LAMP TRANSPORTATION:

1. All HBO lamps should be transported ONLY in their original packaging.
2. Transportation in non-original packaging can damage the lamp and void warranty.
3. U.S. Federal regulations require mercury-containing lamps to be shipped ONLY in DOT-compliant packaging. Original OSRAM packaging is DOT-compliant.
4. When transporting positive-pressure lamps, the bolded warning found in the "Rupture & Radiation Hazard" section MUST be placed on outside surface of the shipping carton and the warning instructions must also be placed inside the shipping packaging.

MERCURY FILL OF HBO LAMPS:

Mercury is referred to by its chemical symbol, Hg, which is derived from the Greek and Latin "hydrargyrum," a silvery shiny liquid metal at room temperature. In humid air it is covered with a gray oxide skin. Of all metals it has the highest vapor pressure which increases exponentially with rising temperatures. For this reason, mercury is volatile at room temperature. The colorless and odorless vapors produced are poisonous and heavier than air.

The inhalation (respiration) of mercury or mercury compounds as vapor or dust will lead to the damage of lungs, kidneys and the nervous system. Apart from inhalation, mercury can be transmitted through the skin (penetration) or through the gastro-intestinal tract (ingestion), which is also harmful.

The ACGIH threshold limit values (TLVs) are merely guidelines to assist in the control of health hazards. The ACGIH says that the TLVs refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. Therefore, the TLV for mercury should never be exceeded.

Analytical detection of mercury vapor is possible by means of gas/vapor detector tubes (rough measurement) or air-monitors that absorb mercury vapor.

OSRAM HBO® lamps have the following mercury contents:

Power level	Maximum Mercury content (mg)
50-200 W	110
350 W	300
500 W	500
1,000 W	1,000
1,500 W	800
2,000-2,500 W	5,000
3,500 W and higher	12,000

Symbols/Footnotes on pages 37-40

HBO® HIGH PRESSURE MERCURY LAMPS (continued)

PROPERTIES OF MERCURY:

- Chemical symbol: Hg
- Atomic number: 80
- Molecular Weight: 200.59
- Density: 13.6 g/cm3 @ 20°C / 68°F
- Melting Point: -39°C / -38.2°F
- Boiling Point: 357°C / 674°F
- Vapor pressure: 160 Pa @ 20°C / 68°F
  370 Pa @ 30°C / 86°F
  823 Pa @ 40°C / 104°F
- Concentration in air: 13.6 mg/m3 @ 20°C / 68°F
  29.6 mg/m3 @ 30°C / 86°F
  62.7 mg/m3 @ 40°C / 104°F
- CAS Registry Number: 7439-97-6
- RCRA waste number: U151
- Other Names: Hydrargyrum, Colloidal mercury, Kwik, Mercure, Mercurio, Metallic mercury, Quecksilber, Quick silver, Liquid Silver

LAMP DISPOSAL:

1. Disposal of spent lamps must be in accordance with applicable federal, state/provincial and local regulations. State laws differ in their disposal requirements for lamps containing mercury.
2. Lamp users in North America may obtain specific state or province information concerning disposal regulations, toll free, by calling 1-866-666-6850.

Hg Lamp Contains Mercury
Manage in accordance with disposal laws
See www.lamprecycle.org or 1-866-666-6850

3. OSRAM SYLVANIA Products Inc. cannot advise lamp users as to general or specific disposal regulations for federal, state/provincial and/or local municipalities.

Special disposal note for cold, positive-pressure lamps (see "RUPTURE & RADIATION HAZARD" section for applicable lamps)

There is a risk that these lamps could rupture because of their high internal pressure when hot (during operation) and when cold (at room temperature when not operating). A lamp rupture could result in personal injury or property damage from flying fragments of quartz and/or metal. Therefore, spent (end-of-life) lamps should ALWAYS be stored in the packaging in which they originally came.

Lamp Disposal Labeling

The following information appears on the packages and/or stuffers of mercury-containing Display/Optic lamps. For more information on lamp disposal labeling, see the inside back cover of this catalog.

Hg Lamp Contains Mercury
Manage in accordance with disposal laws
See www.lamprecycle.org or 1-866-666-6850

LIMITED PRODUCT WARRANTY HBO® SEMICONDUCTOR LAMPS

OSRAM SYLVANIA INC. (OSI) warrants that its HBO OSRAM mercury short arc lamp (HBO Lamp) for microlithography will be in conformity with OSI published specifications and free from defects in material and workmanship. In the event a non conformity or defect causes a catastrophic (non-passive) failure which results in damage to customer's Stepper machine during the average rated life of the HBO Lamp, customer's sole and exclusive remedy will be reimbursement for actual direct expenses incurred by the customer for parts, materials and outside labor for the repair of the damaged Stepper, up to a maximum of $1.5 million per occurrence. As a precondition of such reimbursement, customer must notify OSI within 10 days of the catastrophic failure; make available the HBO Lamp for testing; allow, if requested, the inspection of the damaged Stepper machine; and provide such other documentation or information as OSI may reasonably require to review and process customer's claim, including an itemized proof of loss with supporting documentation and invoices. This limited warranty shall be void if a catastrophic lamp failure results from accident, abuse, misuse, misapplication or occurs during operation of the HBO Lamp beyond its average rated life or during operation of a Stepper machine beyond its operating specifications.

EXCEPT AS EXPRESSLY SET FORTH HEREIN, THERE ARE NO OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILTY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE HBO LAMP.

OSI'S SOLE LIABILITY TO CUSTOMER, AS A RESULT OF THE SALE OR USE OF THE HBO LAMP, IS LIMITED TO THE REIMBURSEMENT REMEDY DETAILED ABOVE. IN NO EVENT WILL OSI BE LIABLE TO THE CUSTOMER, OR ITS CUSTOMERS, AFFILIATES OR DISTRIBUTORS FOR ANY LOST PROFITS, LOST SAVINGS, DOWN TIME, INABILITY TO USE CUSTOMER'S STEPPER MACHINE OR FOR ANY OTHER CONSEQUENTIAL, DIRECT, INDIRECT, SPECIAL, EXEMPLARY AND PUNITIVE DAMAGES OR FOR ANY OTHER DAMAGES OF ANY KIND OR NATURE.

For purposes of notification to OSI, send all requested information, including invoices and other supporting documentation to:

Display/Optic Laboratory
OSRAM SYLVANIA
c/o Danzas AEI
8470 Gran Vista Street
El Paso, TX 79907
Phone: 915-775-2939
Fax: 915-775-2924

January 2007

SEE THE WORLD IN A NEW LIGHT OSRAM

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OSRAM XBO® XENON SHORT-ARC LAMP LIMITED WARRANTY

For Standard and Xtreme (XL) Types and for Application in Christie Digital Projectors

This document describes the limited warranty for the OSRAM XBO Xenon Short-Arc lamps listed in Schedule 1 attached hereto (the "lamps"). OSRAM SYLVANIA Products Inc. ("OSRAM SYLVANIA") extends this limited warranty to the original purchaser only.

These lamps are warranted to perform in accordance with OSRAM's published specifications for the number of hours set forth in Schedule 1 (the "Warranty Lifetime"). A lamp is deemed defective if during the Warranty Lifetime (i) the lumen intensity decreases below 50% of the initial lumen value, (ii) the lamp fails to ignite or (iii) unacceptable lamp flickering occurs as determined by OSRAM SYLVANIA in its sole judgment. Purchaser's sole remedy, and OSRAM SYLVANIA's sole obligation under this warranty, is limited to, at OSRAM SYLVANIA's option, granting credit to Purchaser for the purchase price of a defective lamp or providing a free replacement lamp (labor not included). This limited warranty does not apply to any lamp that has been subjected to abuse or mishandling. OSRAM SYLVANIA's warranty applies only when the lamp is properly handled and installed, including correct alignment and cooling and correct arc magnetic stabilization; is operated on a suitable power supply within the electrical values recommended by OSRAM; and is used in a properly functioning projection system, all in accordance with the instructions set forth in OSRAM's *Technology and Applications XBO Theatre Lamps and Guidelines for Control Gears and Igniters.*

In the event of a lamp rupture that occurs during the Warranty Lifetime that is caused solely due to a defect in the lamp's materials or workmanship, OSRAM SYLVANIA will (i) credit the Purchaser the purchase price for the lamp or provide a free replacement lamp (labor not included) or (ii) in the event the projector filter and/or mirror is damaged as a result of a ruptured lamp, will credit the Purchaser the replacement invoice amount for such damaged projector part (labor included).

THE FOREGOING SHALL CONSTITUTE THE SOLE AND EXCLUSIVE REMEDY OF PURCHASER. THE TOTAL LIABILITY OF OSRAM SYLVANIA SHALL NOT EXCEED THE PURCHASE PRICE ALLOCABLE TO THE LAMP (AND ANY APPLICABLE PROJECTOR PART), WHICH GIVES RISE TO A CLAIM. NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS MADE OR IMPLIED. OSRAM SYLVANIA WILL NOT, UNDER ANY CIRCUMSTANCE, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, TORT, OR OTHERWISE, BE LIABLE FOR ANY COSTS OR DAMAGES, INCLUDING LOST PROFITS OR REVENUES, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS AND/OR DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY.

To obtain service under this warranty, a Product Complaint Report (PCR) must be completed and e-mailed or faxed to the OSRAM SYLVANIA National Customer Service and Sales Center (instructions on the form). Upon receiving a Return Materials Authorization Number, Purchaser shall promptly return the subject lamp with the original invoice number, or in the case of a ruptured lamp, pictures of the lamp, and if applicable, the replacement invoices for the damaged projector filter and/or mirror, to the address specified by the OSRAM SYLVANIA National Customer Service and Sales Center. To avoid any further damage, transportation in the original OSRAM box is required. Failure to follow this procedure shall void the warranty.

OSRAM SYLVANIA reserves the right to (i) examine all failed lamps, including ruptured lamps, and the projector in which such lamps are used, and (ii) be the sole judge as to whether any lamps are defective and covered under this warranty. OSRAM SYLVANIA's obligation under this warranty is expressly limited to lamps which are determined to be defective, provided the defects involved have not been caused by abuse, misuse, neglect, improper installation or operation, alteration, accident or act of God.

Effective as of January 1, 2010.

SEE THE WORLD IN A NEW LIGHT OSRAM

OSRAM XBO® XENON SHORT-ARC LAMP LIMITED WARRANTY (continued)

For Standard and Xtreme (XL) Types and for Application in Christie Digital Projectors

Schedule 1

XBO Product Description	Initial Lumens[1]	Warranty Lifetime Hours
XBO 500 W/H OFR	14,500	2,000
XBO 900 W OFR	30,000	2,400
XBO 1000 W/HS OFR	32,000	2,000
XBO 1000 W/HSC OFR	32,000	2,000
XBO 1000 W/HTP OFR	35,000	2,400
XBO 1600 W/CA OFR[2]	60,000	2,400
XBO 1600 W XL OFR[2]	60,000	3,500
XBO 1600 W/HS XL OFR	70,000	2,500
XBO 1600 W/HSC XL OFR	70,000	2,500
XBO 2000 W/H XL OFR	80,000	3,500
XBO 2000 W/HCC OFR	80,000	2,400
XBO 2000 W/HS OFR	80,000	2,400
XBO 2000 W/HTP XL OFR	80,000	3,500
XBO 2000 W/SHSC OFR	80,000	2,000
XBO 2001 W/HTP OFR	80,000	2,400
XBO 2500 W OFR[2]	100,000	2,000
XBO 2500 W/HS XL OFR	100,000	2,200
XBO 2500 W/HTP OFR	100,000	1,500
XBO 3000 W/H XL OFR	130,000	2,200
XBO 3000 W/HS XL OFR	130,000	2,200
XBO 3000 W/HTP XL OFR	130,000	2,200
XBO 4000 W/HS XL OFR	155,000	1,500
XBO 4000 W/HTP XL OFR	155,000	1,500
XBO 4200 W/CA OFR[2]	190,000	1,000
XBO 4200 W/GS OFR	190,000	1,000
XBO 4500 W/HS XL OFR	190,000	1,400
XBO 4500 W/HTP XL OFR	190,000	1,400
XBO 5000 W/H XL OFR	225,000	1,200
XBO 5000 W/HBM XL OFR	225,000	1,200
XBO 6000 W/HS XL OFR	280,000	750
XBO 6000 W/HTP XL OFR	280,000	750
XBO 7000 W/HS XL OFR	350,000	650
XBO 8000 W/HS OFR	400,000	500
XBO® Xenon Lamps for CHRISTIE Digital Cinema Projectors		
XBO 2000 W/DTP OFR	80,000	2,400
XBO 3000 W/DTP OFR	130,000	1,500
XBO 4500 W/DTP OFR	190,000	1,000
XBO 6000 W/DTP OFR	280,000	600

[1] Spherical Lumens
[2] Vertical Operation Only

March 30, 2011

SEE THE WORLD IN A NEW LIGHT OSRAM

Symbols/Footnotes on pages 37-40

OSRAM XBO® DHP XENON SHORT-ARC LAMP
LIMITED WARRANTY FOR APPLICATION IN BARCO DIGITAL CINEMA PROJECTORS

OSRAM SYLVANIA Products Inc. ("OSRAM SYLVANIA") extends this limited warranty for the OSRAM XBO DHP Xenon Short-Arc Lamps listed in Schedule 1 attached hereto (the "lamps") that are used in Barco digital cinema projectors.

These lamps are warranted to perform in accordance with OSRAM's published specifications for the number of hours set forth in Schedule 1 (the "Warranty Lifetime"). A lamp is deemed defective if during the Warranty Lifetime (i) the lumen intensity decreases below 50% of the initial lumen value, (ii) the lamp fails to ignite or (iii) unacceptable lamp flickering occurs as determined by OSRAM SYLVANIA in its sole judgment. Purchaser's sole remedy, and OSRAM SYLVANIA's sole obligation under this warranty, is limited to providing a free replacement lamp for a defective lamp (labor not included). This limited warranty does not apply to any lamp that has been subjected to abuse or mishandling. OSRAM SYLVANIA's warranty applies only when the lamp is properly handled and installed, including correct alignment and cooling and correct arc magnetic stabilization; is operated on a suitable power supply within the electrical values recommended by OSRAM; and is used in a properly functioning projection system, all in accordance with the instructions set forth in OSRAM's *Technology and Applications XBO Theatre Lamps and Guidelines for Control Gears and Igniters*.

In the event of a lamp rupture that occurs during the Warranty Lifetime that is caused solely due to a defect in the lamp's materials or workmanship, OSRAM SYLVANIA (i) will provide a free replacement lamp (labor not included) or (ii) in the event the projector filter and/or mirror is damaged as a result of a ruptured lamp, will credit the Purchaser the replacement invoice amount for such damaged projector part (labor included). In the event of a lamp rupture that occurs after expiration of the Warranty Lifetime but within the additional time period specified on Schedule 1 (the "Service Warranty Lifetime") that is caused solely due to a defect in the lamp's materials or workmanship, OSRAM SYLVANIA will credit the Purchaser the replacement invoice amount for any projector filter and/or mirror that is damaged as a result of the ruptured lamp (labor included), but shall not provide a replacement lamp for the ruptured lamp.

THE FOREGOING SHALL CONSTITUTE THE SOLE AND EXCLUSIVE REMEDY OF PURCHASER. THE TOTAL LIABILITY OF OSRAM SYLVANIA SHALL NOT EXCEED THE PURCHASE PRICE ALLOCABLE TO THE LAMP (AND ANY APPLICABLE PROJECTOR PART), WHICH GIVES RISE TO A CLAIM. NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS MADE OR IMPLIED. OSRAM SYLVANIA WILL NOT, UNDER ANY CIRCUMSTANCE, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, TORT, OR OTHERWISE, BE LIABLE FOR ANY COSTS OR DAMAGES, INCLUDING LOST PROFITS OR REVENUES, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS AND/OR DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY.

To obtain service under this warranty, a Product Complaint Report (PCR) must be completed and e-mailed or faxed to the OSRAM SYLVANIA National Customer Service and Sales Center (instructions on the form). Upon receiving a Return Materials Authorization Number, Purchaser shall promptly return the subject lamp with the original invoice number, or in the case of a ruptured lamp, pictures of the lamp, and if applicable, the replacement invoices for the damaged projector filter and/or mirror, to the address specified by the OSRAM SYLVANIA National Customer Service and Sales Center. To avoid any further damage, transportation in the original OSRAM box is required. Failure to follow this procedure shall void the warranty.

OSRAM SYLVANIA reserves the right to (i) examine all failed lamps, including ruptured lamps, and the projector in which such lamps are used, and (ii) be the sole judge as to whether any lamps are defective and covered under this warranty. OSRAM SYLVANIA's obligation under this warranty is expressly limited to lamps which are determined to be defective, provided the defects involved have not been caused by abuse, misuse, neglect, improper installation or operation, alteration, accident or act of God.

Effective as of January 1, 2010.

SEE THE WORLD IN A NEW LIGHT OSRAM

OSRAM XBO® DHP XENON SHORT-ARC LAMP (continued)
LIMITED WARRANTY FOR APPLICATION IN BARCO DIGITAL CINEMA PROJECTORS

Schedule 1

XBO Product Description	Initial Lumens[1]	Warranty Lifetime Hours	Service Warranty Lifetime (Additional Hours beyond Warranty Lifetime Hours for Ruptures Only)
XBO 1200W/DHP OFR	45,000	3,000	500
XBO 2000W/DHP OFR	80,000	2,400	600
XBO 3000W/DHP OFR	140,000	1,500	400
XBO 3000W/DHS OFR	130,000	1,500	500
XBO 4000W/DHP OFR	185,000	1,000	300
XBO 4500W/DHP OFR	190,000	1,000	300
XBO 6000W/DHP OFR	280,000	600	200
XBO 6500W/DHP OFR	300,000	500	200

[1] Spherical Lumens

September 8, 2010

SEE THE WORLD IN A NEW LIGHT OSRAM

Symbols/Footnotes on pages 37-40

OSRAM XBO® XENON SHORT-ARC LAMP
LIMITED WARRANTY FOR CLASSIC (CL) TYPES

This document describes the limited warranty for the OSRAM XBO Xenon Short-Arc lamps listed in Schedule 1 attached hereto (the "lamps"). OSRAM SYLVANIA Products Inc. ("OSRAM SYLVANIA") extends this limited warranty to the original purchaser only.

These lamps are warranted to perform in accordance with OSRAM's published specifications for the number of hours set forth in Schedule 1 (the "Warranty Lifetime"). A lamp is deemed defective if during the Warranty Lifetime (i) the lumen intensity decreases below 50% of the initial lumen value, (ii) the lamp fails to ignite or (iii) unacceptable lamp flickering occurs as determined by OSRAM SYLVANIA in its sole judgment. Purchaser's sole remedy, and OSRAM SYLVANIA's sole obligation under this warranty, is limited to, at OSRAM SYLVANIA's option, granting credit to Purchaser for the purchase price of a defective lamp or providing a free replacement lamp (labor not included). This limited warranty does not apply to any lamp that has been subjected to abuse or mishandling. OSRAM SYLVANIA's warranty applies only when the lamp is properly handled and installed, including correct alignment and cooling and correct arc magnetic stabilization; is operated on a suitable power supply within the electrical values recommended by OSRAM; and is used in a properly functioning projection system, all in accordance with the instructions set forth in OSRAM's *Technology and Applications XBO Theatre Lamps and Guidelines for Control Gears and Igniters.*

In the event of a lamp rupture that occurs during the Warranty Lifetime that is caused solely due to a defect in the lamp's materials or workmanship, OSRAM SYLVANIA will (i) credit the Purchaser the purchase price for the lamp or provide a free replacement lamp (labor not included) or (ii) in the event the projector filter and/or mirror is damaged as a result of a ruptured lamp, will credit the Purchaser the replacement invoice amount for such damaged projector part (labor included).

THE FOREGOING SHALL CONSTITUTE THE SOLE AND EXCLUSIVE REMEDY OF PURCHASER. THE TOTAL LIABILITY OF OSRAM SYLVANIA SHALL NOT EXCEED THE PURCHASE PRICE ALLOCABLE TO THE LAMP (AND ANY APPLICABLE PROJECTOR PART), WHICH GIVES RISE TO A CLAIM. NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS MADE OR IMPLIED. OSRAM SYLVANIA WILL NOT, UNDER ANY CIRCUMSTANCE, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, TORT, OR OTHERWISE, BE LIABLE FOR ANY COSTS OR DAMAGES, INCLUDING LOST PROFITS OR REVENUES, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS AND/OR DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY.

To obtain service under this warranty, a Product Complaint Report (PCR) must be completed and e-mailed or faxed to the OSRAM SYLVANIA National Customer Service and Sales Center (instructions on the form). Upon receiving a Return Materials Authorization Number, Purchaser shall promptly return the subject lamp with the original invoice number, or in the case of a ruptured lamp, pictures of the lamp, and if applicable, the replacement invoices for the damaged projector filter and/or mirror, to the address specified by the OSRAM SYLVANIA National Customer Service and Sales Center. To avoid any further damage, transportation in the original OSRAM box is required. Failure to follow this procedure shall void the warranty.

OSRAM SYLVANIA reserves the right to (i) examine all failed lamps, including ruptured lamps, and the projector in which such lamps are used, and (ii) be the sole judge as to whether any lamps are defective and covered under this warranty. OSRAM SYLVANIA's obligation under this warranty is expressly limited to lamps which are determined to be defective, provided the defects involved have not been caused by abuse, misuse, neglect, improper installation or operation, alteration, accident or act of God.

Effective as of January 1, 2010.

SEE THE WORLD IN A NEW LIGHT OSRAM

OSRAM XBO® XENON SHORT-ARC LAMP (continued)
LIMITED WARRANTY FOR CLASSIC (CL) TYPES

Schedule 1

XBO Product Description	Initial Lumens[1]	Warranty Lifetime Hours
XBO 1600 W CL OFR	60,000	2400
XBO 1600 W/HS CL OFR	70,000	2000
XBO 1600 W/HSC CL OFR	70,000	2000
XBO 2000 W/H CL OFR	80,000	2400
XBO 2000 W/HS CL OFR	80,000	2400
XBO 2000 W/HTP CL OFR	80,000	2400
XBO 2500 W/HS CL OFR	100,000	1500
XBO 3000 W/H CL OFR	130,000	1500
XBO 3000 W/HS CL OFR	130,000	1500
XBO 3000 W/HTP CL OFR	130,000	1500
XBO 4000 W/HS CL OFR	155,000	1000
XBO 4000 W/HTP CL OFR	155,000	1000
XBO 5000 W/H CL OFR	225,000	800
XBO 5000 W/HBM CL OFR	225,000	800
XBO 6000 W/HS CL OFR	280,000	500
XBO 7000 W/HS CL OFR	350,000	500

[1] Spherical Lumens

September 8, 2010

Symbols/Footnotes on pages 37-40

OSRAM XBO® XENON SHORT-ARC LAMP LIMITED WARRANTY FOR APPLICATION IN SONY, NEC AND OTHER CINEMA DIGITAL PROJECTORS

This document describes the limited warranty for the OSRAM XBO Xenon Short-Arc lamps listed in Schedule 1 attached hereto (the "lamps"). OSRAM SYLVANIA Products Inc. ("OSRAM SYLVANIA") extends this limited warranty to the original purchaser only.

These lamps are warranted to perform in accordance with OSRAM's published specifications for the number of hours set forth in Schedule 1 (the "Warranty Lifetime"). A lamp is deemed defective if during the Warranty Lifetime (i) the lumen intensity decreases below 50% of the initial lumen value, (ii) the lamp fails to ignite or (iii) unacceptable lamp flickering occurs as determined by OSRAM SYLVANIA in its sole judgment. Purchaser's sole remedy, and OSRAM SYLVANIA's sole obligation under this warranty, is limited to, at OSRAM SYLVANIA's option, granting credit to Purchaser for the purchase price of a defective lamp or providing a free replacement lamp (labor not included). This limited warranty does not apply to any lamp that has been subjected to abuse or mishandling. OSRAM SYLVANIA's warranty applies only when the lamp is properly handled and installed, including correct alignment and cooling and correct arc magnetic stabilization; is operated on a suitable power supply within the electrical values recommended by OSRAM; and is used in a properly functioning projection system, all in accordance with the instructions set forth in OSRAM's *Technology and Applications XBO Theatre Lamps and Guidelines for Control Gears and Igniters.*

In the event of a lamp rupture that occurs during the Warranty Lifetime that is caused solely due to a defect in the lamp's materials or workmanship, OSRAM SYLVANIA will (i) credit the Purchaser the purchase price for the lamp or provide a free replacement lamp (labor not included) or (ii) in the event the projector filter and/or mirror is damaged as a result of a ruptured lamp, will credit the Purchaser the replacement invoice amount for such damaged projector part (labor included). In the event of a lamp rupture that occurs after expiration of the Warranty Lifetime but within the additional time period specified on Schedule 1 (the "Service Warranty Lifetime") that is caused solely due to a defect in the lamp's materials or workmanship, OSRAM SYLVANIA will credit the Purchaser the replacement invoice amount for any projector filter and/or mirror that is damaged as a result of the ruptured lamp (labor included), but shall not provide a replacement lamp for the ruptured lamp.

THE FOREGOING SHALL CONSTITUTE THE SOLE AND EXCLUSIVE REMEDY OF PURCHASER. THE TOTAL LIABILITY OF OSRAM SYLVANIA SHALL NOT EXCEED THE PURCHASE PRICE ALLOCABLE TO THE LAMP (AND ANY APPLICABLE PROJECTOR PART), WHICH GIVES RISE TO A CLAIM. NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS MADE OR IMPLIED. OSRAM SYLVANIA WILL NOT, UNDER ANY CIRCUMSTANCE, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, TORT, OR OTHERWISE, BE LIABLE FOR ANY COSTS OR DAMAGES, INCLUDING LOST PROFITS OR REVENUES, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS AND/OR DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY.

To obtain service under this warranty, a Product Complaint Report (PCR) must be completed and e-mailed or faxed to the OSRAM SYLVANIA National Customer Service and Sales Center (instructions on the form). Upon receiving a Return Materials Authorization Number, Purchaser shall promptly return the subject lamp with the original invoice number, or in the case of a ruptured lamp, pictures of the lamp, and if applicable, the replacement invoices for the damaged projector filter and/or mirror, to the address specified by the OSRAM SYLVANIA National Customer Service and Sales Center. To avoid any further damage, transportation in the original OSRAM box is required. Failure to follow this procedure shall void the warranty.

OSRAM SYLVANIA reserves the right to (i) examine all failed lamps, including ruptured lamps, and the projector in which such lamps are used, and (ii) be the sole judge as to whether any lamps are defective and covered under this warranty. OSRAM SYLVANIA's obligation under this warranty is expressly limited to lamps which are determined to be defective, provided the defects involved have not been caused by abuse, misuse, neglect, improper installation or operation, alteration, accident or act of God.

Effective as of April 1, 2011.

SEE THE WORLD IN A NEW LIGHT OSRAM

OSRAM XBO® XENON SHORT-ARC LAMP (continued)
LIMITED WARRANTY FOR APPLICATION IN SONY, NEC AND OTHER CINEMA DIGITAL PROJECTORS

Schedule 1

XBO Product Description	Initial Lumens[1]	Warranty Lifetime Hours	Service Warranty Lifetime (Additional Hours beyond Warranty Lifetime Hours for Ruptures Only)
XBO® Xenon Lamps for SONY Digital Cinema Projectors			
XBO 2000 W/HPS OFR	75,000	2,400	400
XBO 3000 W/HPS OFR	140,000	1,000	300
XBO 4200 W/HPS OFR	210,000	500	200
XBO® Xenon Lamps for NEC Digital Cinema Projectors			
XBO 2000 W/HPN OFR	80,000	2,400	–
XBO 4000 W/HPN OFR	190,000	500	200
XBO 6500 W/HPN OFR	300,000	500	200
XBO® Xenon Lamps for OTHER Digital Cinema Projectors			
XBO 3000 W/HSLA OFR	130,000	1,500	400
XBO 4500 W/HSLA OFR	160,000	1,000	300
XBO 6000 W/HSLA OFR	280,000	600	200
XBO 6500 W/HSLA OFR	300,000	500	200

[1] Spherical Lumens

March 30, 2011

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INCANDESCENT

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A Lighting Industry Leader

With over 14,000 employees, OSRAM SYLVANIA is one of the leading lighting systems companies in North America. We are the North American business unit of OSRAM GmbH, one of the world's largest lighting manufacturers. OSRAM SYLVANIA is a member of the SIEMENS worldwide family of companies, which employs over 440,000 people in over 190 countries.

Meeting Customer Expectations

OSRAM SYLVANIA makes ongoing investments in new and aggressive business practices. With the Total Cycle Time program, we have turned time into a strategic business ally. Our SAP program unites the entire organization with a sophisticated information system that helps serve our customers faster and more efficiently. Our ISO 9000, ISO 14001 and QS 9000 certifications show our achievements in delivering the highest quality lighting products.

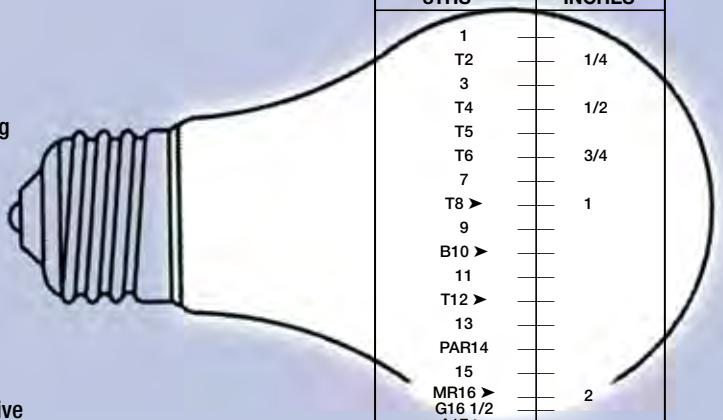
Lighting the World

OSRAM SYLVANIA, together with OSRAM GmbH, is the largest supplier of electronic lighting systems in the world. As leaders in fluorescent, halogen and metal halide technologies, the companies hold numerous international lighting patents and have an extensive engineering and manufacturing network. OSRAM GmbH and OSRAM SYLVANIA literally bring light to the world.

Lamp Disposal Labeling

For all mercury-containing lamps manufactured after November 30, 2003, OSRAM SYLVANIA has incorporated the symbol "Hg" into the lamp etch, except for products where size or thermal constraints prevent etching in this manner. This action is part of the National Electrical Manufacturers Association (NEMA) lamp labeling initiative, the purpose of which is to guide users of lighting products – via internet or telephone – to appropriate contacts regarding disposal of spent mercury-containing lamps (fluorescent, compact fluorescent and most HID).

Disposal labels appear on the inner-most packages of mercury-containing lamps, the outer cartons or both. For Display/Optic and some other specialized lamp types, labeling is included in the stuffer. This labeling format complies with the requirements of existing states' legislation and has been designed to be universally applicable to all US States.



8THS	INCHES
1	
T2	1/4
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T4	1/2
T5	
T6	3/4
7	
T8 ➤	1
9	
B10 ➤	
11	
T12 ➤	
13	
PAR14	
15	
MR16 ➤	2
G16 1/2	
A17 ➤	
ET18	
A19 ➤	
PAR20 ➤	
A21	
22	
23	
	3
G25 ➤	
26	
27	
BT28	
29	
PAR30 ➤	
31	
	4
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35	
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BT37	
PAR38 ➤	
39	
R40, G40 ➤	5
41	
42	
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PAR46 ➤	
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PAR52 ➤	
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BT56/PAR56	7
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61	
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63	
PAR64 ➤	8
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Hg LAMP CONTAINS MERCURY

Manage in Accordance with Disposal Laws

See: www.lamprecycle.org or 1-866-666-6850

For Orders and General Information in the United States:

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National Customer
Service and Sales Center
18725 N. Union Street
Westfield, IN 46074
www.sylvania.com

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1-800-LIGHTBULB

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Phone: 1-800-255-5042
Fax: 1-800-255-5043

National Accounts
Phone: 1-800-562-4671
Fax: 1-800-562-4674

OEM/Special Markets
Phone: 1-800-762-7191
Fax: 1-800-762-7192

Retail
Phone: 1-800-842-7010
Fax: 1-800-842-7011

Display/Optic
Phone: 1-888-677-2627
Fax: 1-800-762-7192

SYLVANIA Lighting Services
Phone: 1-800-323-0572
Fax: 1-800-537-0784

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OEM/Special Markets/Display/Optic
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Fax: 1-800-667-6772

Retail
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Fax: 1-800-667-6772

SYLVANIA Lighting Services
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