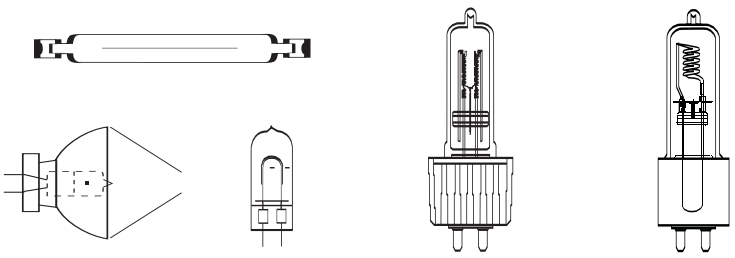
OSRAM BRAND
DISPLAY/OPTIC LIGHT SOURCES

Lighting to provide solutions in diverse applications such as cinema film projection, effect lighting, stage, studio, TV, display and projection systems, microlithography, medical/scientific, industrial, and airfield/aircraft.

Display/Optic Lamp Types

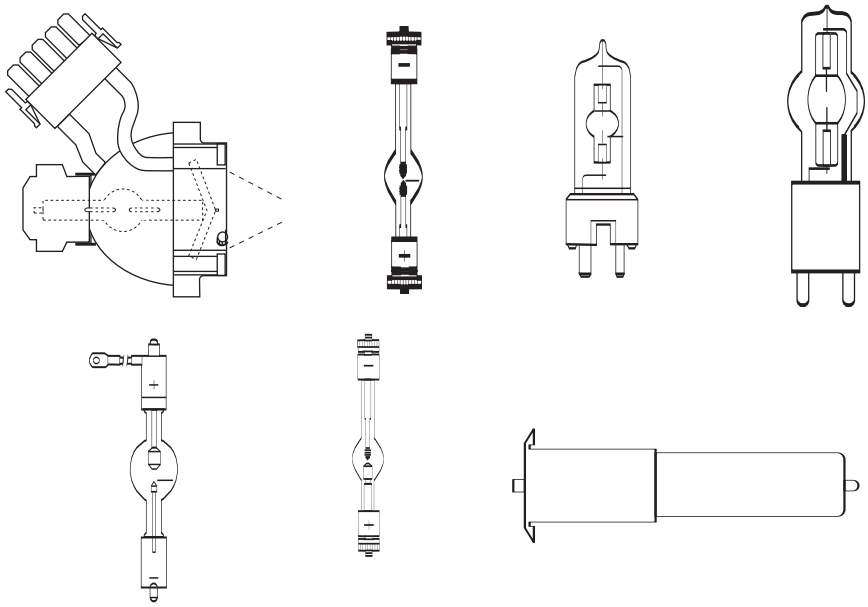
HALOGEN

Airfield/Aircraft
Audiovisual
Special Purpose Heat Lamps
Studio, Theatre, TV & Video
aluPAR®
HLX®
HPL
HPR®
OSRAM STUDIOLINE®
XENOPHOT®



DISCHARGE

HBO®
HCD® 4ArXS
HMI®
HMP®
HSD® 4ArXS
HSR®
HXP®
HTI® SharXS®
LINEX®
P-VIP®
VIP®
XBO®
XERADEX®



IMPORTANT!
DISPLAY/OPTIC WARNINGS

In accordance with ANSI/IESNA Standard RP-27, all Display/Optic Discharge lamps are Risk Group 3 products, and all Display/Optic Incandescent and Tungsten Halogen lamps are Risk Group 2 products.

Please read and understand the Safety and Warning Instructions for each lamp type before use. Safety and Warning Instructions can be found at the end of this Display/Optic section.

SOLUTIONS FOR TODAY

UPGRADES FOR POPULAR PROJECTION LAMPS

IF YOU ARE USING:	UPGRADE TO:	BENEFITS
BHC/DYS/DYV	BHC/DYS/DYV-5	Double the life at 120V[3]
EHJ 64655 HLX	EHJ 64655 HLX /7X	Increase life by 14 times[2]
EHJ 64655 HLX	EVC 64657 HLX	Increased life by 6 times[2]
ELC	ELC-HL	Increased brightness by 150 lumnes[4]
ENX	ENX-5	Double the life at 82V[3]
ENX	ENX-7	Increased life by 2.5 times at 82V[3]
ENX	FXL	Increased light
EVC 64657 HLX	FNT 64656PT HLX	Increased light by 10%[1]
EVD 64663 HLX	64664 HLX	Increased life by 3 times[2] at 36V
EVD 64663 HLX	64665 HLX	Increased life by 6 times[2] at 36V
EYB	EYB-5	Double the life at 82V[3]
EYB	EYB-7	Increased life by 2.5 times at 82V[3]
FCR 64625 HLX	EVA 64623 HLX	Increased life by 40 times[2]
FCS 64640 HLX	FDV 64642 HLX	Increased life by 6 times[2]
FXL or ENX	FXL-HL	Increased light[1]

TECHNICAL DATA

Ordering Abbreviation	Product Number	Watts	Volts	Rated Life (hrs)	Fig.	Base	"l" mm	"a" mm	"d" mm	Bulb Shape	Lumens
64664 HLX	54273	400	36	150	2	G6.35	57	36	18	T6	14,500
64665 HLX	54274	400	36	300	2	G6.35	60	36	18	T6	12,200
BHC/DYS/DYV	54836	600	120	75	3	GZ9.5	64	36.5	20	T6	17,500
BHC/DYS/DYV-5	54835	600	125	75	3	GZ9.5	63.5	36.5	20	T6	17,500
EHJ 64655 HLX	54254	250	24	50	2	G6.35	55	33	13.5	T4	10,000
EHJ 64655 HLX/7X	54272	250	24	700	2	G6.35	55	33	13.5	T4	8,000
ELC	54840	250	24	50	1	GX5.3	44.8	31.7	51	T3.5	800[4]
ELC 64653 HLX	54212	250	24	50	1	GX5.3	44.5	35	51	T3.5	800[4]
ELC-3/X	54841	250	24	300	1	GX5.3	44.8	31.7	51	T3.5	550[4]
ELC-7/X	54814	250	24	700	1	GX5.3	44.8	31.7	51	T3.5	475[4]
ELC-HL	54804	250	24	50	1	GX5.3	44.8	31.7	51	T3.5	950[4]
ENX	54984	360	82	75	1	GY5.3	45	299	51	T3.5	460[4]
ENX-5	54913	360	86	75	1	GY5.3	38.1	299	51	T3.5	540[4]
ENX-7	54916	360	87.5	75	1	GY5.3	38.1	299	51	T3.5	540[4]
EVA 64623 HLX	54251	100	12	2,000	2	GY6.35	44	30	11.5	T4	2,800
EVC 64657 HLX	54255	250	24	300	2	G6.35	55	33	13.5	T4	9,000
EVD 64663 HLX	54259	400	36	50	2	G6.35	60	36	15	T6	16,000
EYB	54446	360	82	75	4	G5.3	57.2	31.8	11.2	T3.5	10,000
EYB-5	54448	360	85.5	75	4	G5.3	54	31.8	11.2	T3.5	10,000
EYB-7	54455	360	87.5	75	4	G5.3	57.2	31.8	11.2	T3.5	10,000
FCR 64625 HLX	54248	100	12	50	2	GY6.35	44	30	11.5	T3.5	3,600
FCS 64640 HLX	54263	150	24	50	2	G6.35	50	32	13.5	T4	6,000
FDV 64642 HLX	54264	150	24	300	2	G6.35	50	32	13.5	T4	5,000
FNT 64656PT HLX	54253	275	24	75	2	G6.35	55	33	13.5	T4	10,000
FXL	54912	410	82	75	1	GY5.3	38.1	299	51	T3.5	640[4]
FXL-HL	54904	410	82	40	1	GY5.3	38.1	299	51	T3.5	850[4]

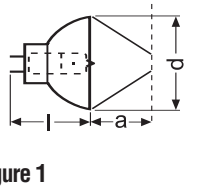


Figure 1

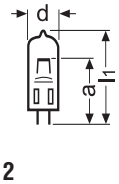


Figure 2

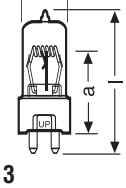


Figure 3

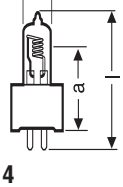


Figure 4

[1] Lamps designed for increased light output can have a reduced operating life

[2] Lamps designed with a longer operating life can produce fewer lumens

[3] Lamps operated at less than their rated voltage provide a longer life, reduced light output and lower color temperature. A 5% reduction in voltage can double lamp life, decrease luminous flux by 15% and decrease color temperature by 2%.

[4] Screen Lumens

OSRAM Airfield Lamps

Effective solutions for airfield lighting around the globe.


IRC Reflector


IRC PK30d


PK30d


R7s


GZ(Y)9.5

OSRAM lamps for the airfield lighting industry provide reliable solutions for complex optical systems. State-of-the-art manufacturing yields high quality lamps with precision filament alignment that is required in these demanding applications.

Why are airfield lighting systems necessary?

- Aviation safety
- Essential visual guidance for approach
- Landing
- Taxiing and take-off

Tungsten halogen technology

Reliability, longevity, and reasonable maintenance costs account for the success of tungsten halogen lamps as light sources for demanding airfield lighting applications.

Pre-focus technique

Simple replacement and easy adjustment reduces maintenance costs.

IRC technology (Infrared Reflective Coating)

The innovative IRC technology increases the efficiency of halogen lamps by reflecting a major part of the generated unwanted IR radiation back to the coil where it is converted into visible light. The infrared reflective coating at the outside of the burner acts as an IR mirror but lets nearly 100% of visible light pass.

- More light output
- Less electrical power
- Increased lifetime

or

- A mix of all

Xenophot® technology (HLX)

Using xenon instead of krypton as the filling gas increases the luminous efficacy of a lamp- that's our basic idea behind our XENOPHOT technology.

OSRAM aluPAR® Lamps with aluminum reflector

lighter, brighter, cooler

Seeing is believing!

Don't get weighed down with old technology!

Features and Benefits

- Tungsten halogen aluPAR lamps are made with an aluminum reflector which makes them up to 50% lighter than standard glass PAR lamps.
  - Lower transportation costs
  - Easier handling
- aluPAR is an environmentally preferable ECOLOGIC® product
- Fully compatible with current market standards

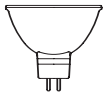
Applications

- Stage, Studio, Film
- Concert/Disco lighting touring
- Architectural lighting

2006 IES PROGRESS Report SELECTION

ECOLOGIC®

SEE THE WORLD IN A NEW LIGHT **OSRAM**


MR11, MR13, MR16


A21, A23


Bi-Pin

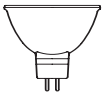

Med 2-pin


GZ9.5


PS25

AUDIOVISUAL

ANSI Code	Product Number	Ordering Abbreviation	Application	Watts	Volts	Base	Lumens	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
BAA	54924	**BAA**	Projector	75	28	GX5.3		2000	MR16	24	
BBA	11619	**BBA 118V**	Photoflood No.1/Enlarger & Printer	250	120	Med	8700	4	A21	12	
BRJ/EVB	54250	**BRJ/EVB 64633 HLX**	Projector, Microfilm, Microscope, Studio	150	15	G6.35	5600	50	T3.25	40	58
BRL	54249	**BRL 64610 HLX**	Projector, Microfilm, Microscope, Studio	50	12	G6.35	1600	50	T3	40	58
BRN	54698	**BRN**	Projector	1200	120	G17t		20	T7	24	13,58
BVE	54812	**BVE**	Projector, Microfilm, Stage & Studio	625	120	GY9.5		50	T6	24	58
CAX	58831	**CAX**	Projector, Microfilm, Microscope, Studio	50	120	DC Bayonet	750	250	T4	24	
DDL	54660	**DDL**	Projector - Microfilm	150	20	GX5.3		500	MR16	24	117
DDM	54737	**DDM**	Projector - Slide	80	19	GX5.3	400	50	MR16	24	117
DDS	54944	**DDS**	Projector - Microfilm	80	21	GX5.3		1000	MR16	24	117
DED	54726	**DED**	Projector - Microfilm	85	13.8	GX5.3	150	1000	MR16	24	60,117
DNE	54409	**DNE**	Projector	150	120	G7.9	100	15	TB16	24	60,117
DNF	54411	**DNF**	Projector - 8mm	150	21	GX7.9	300	25	MR18	24	60,117
DYH	54561	**DYH**	Projector, Stage & Studio	600	120	G5.3	17000	75	T6	24	
DZE/FDS	54755	**DZE/FDS**	Projector, Microfilm, Stage & Studio	150	24	GZ9.5	4000	100	T4	24	
EBV	11558	**EBV 118V**	Super Photoflood/ No.2	500	120	Med	17800	8	PS25	24	
ECA	13365	**ECA 120V**	Super Photoflood	250	120	Med Brass	6500	20	A23	24	
ECT	11560	**ECT 120V**	Photoflood	500	120	Med	13650	60	PS25/5	24	
EFM	54123	**EFM 64607**	Projector - 8mm	50	8	GZ6.35		50	MR16	20	60,117
EFN	54126	**EFN 64615 HLX**	Projector - 8mm	75	12	GZ6.35		50	MR16	20	60,117
EFP	54189	**EFP 64627 HLX**	Projector - 8mm	100	12	GZ6.35		50	MR16	20	60,117
EFP/X	54192	**EFP/X 64629 HLX**	Projector - 8mm	100	12	GZ6.35		600	MR16	20	60,117
EFR	54210	**EFR 64634 HLX**	Projector - 8mm	150	15	GZ6.35		50	MR16	20	60,117
EFR-5/X	54211	**EFR-5/X 64620 HLX**	Projector - 8mm	150	15	GY6.35		500	MR16	20	60,117
EHA	54585	**EHA**	Projector, Microfilm, Stage & Studio	500	120	GY9.5		50	T6	24	13
EHE	54038	**EHE 64626 HLX**	Projector	100	12	PG22	3600	50	T4	30	58
EHJ	54254	**EHJ 64655 HLX**	Projector, Microfilm, Microscope, Studio	250	24	G6.35	10000	50	T4	40	58
EHJ	54231☼	**EHJ 64655 HLX BULK**	Projector, Microfilm, Microscope, Studio	250	24	G6.35	10000	50	T4	250	
EHJ	54272☼	**EHJ 64655 HLX/7X**	Projector, Microfilm, Microscope, Studio	250	24	G6.35	8000	700	T4	24	58
EJA	54753	**EJA**	Projector - Fiber-optics	150	21	GX5.3	354	40	MR16	24	117
EJL	54730	**EJL**	Projector - 16mm Color printer	200	24	GX5.3	725	50	MR16	24	117
EJM	54747	**EJM**	Projector - 8mm	150	21	GX5.3	170	40	MR16	24	117
EJV	54732	**EJV**	Projector - 8mm, Printer	150	21	GX5.3	270	100	MR16	24	117



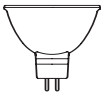
MR11, MR13, MR16

Bi-Pin

AUDIOVISUAL

ANSI Code	Product Number	Ordering Abbreviation	Application	Watts	Volts	Base	Lumens	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
EKE	54842	**EKE**	Projector - 8mm, Fiber-Optics	150	21	GX5.3	160	200	MR16	24	117
EKE/X	58771	**EKE/X**	Projector - 8mm, Fiber-Optics	150	21	GX5.3	80	1000	MR16	24	117
EKP/ENA	54734	**EKP/ENA**	Projector - 8mm	80	30	GX5.3	115	25	MR16	24	117
ELC	54840	**ELC**	Overhead projection, fiber-optic, entertainment	250	24	GX5.3	800	50	MR16	24	117
	54804	**ELC-HL**	Overhead projection, fiber-optic, entertainment	250	24	GX5.3	950	50	MR16	24	117
	54212	**ELC 64653 HLX**	Overhead projection, fiber-optic, entertainment	250	24	GX5.3	900	50	MR16	20	60,117
	54841	**ELC-3/X**	Overhead projection, fiber-optic, entertainment	250	24	GX5.3	550	300	MR16	24	117
	54814	**ELC-7/X**	Overhead projection, fiber-optic, entertainment	250	24	GX5.3	475	700	MR16	24	117
	54811	**ELC-7/X BULK**	Overhead projection, fiber-optic, entertainment	250	24	GX5.3	475	700	MR16	100	117
	54366☼	**ELC-10 64659 HLX**	Overhead projection, fiber-optic, entertainment	250	24	GX5.3	400	1000	MR16	20	117
ELD	54745	**ELD**	Projector - Microfilm	150	21	GX5.3	350	40	MR16	24	117
ELH	54776	**ELH**	Projector - Overhead	300	120	GY5.3	525	35	MR16	24	58,117
ENG	54957	**ENG**	Projector	300	120	GY5.3	690	15	MR16	24	58,117
ENH	54986	**ENH**	Projector - Slide	250	120	GY5.3	340	175	MR16	24	58,117
ENH	55002☼	**ENH SPOT**	Projector - Slide	250	120	GY5.3	340	175	MR16	24	58,117
ENH-5	54988	**ENH-5**	Projector - Overhead	250	125	GY5.3	340	175	MR16	24	58,117
ENL	58786	**ENL**	Projector - Display, Fiber-Optics	50	12	GX5.3	85	4000	MR16	24	117
ENX	54984	**ENX**	Projector - Overhead	360	82	GY5.3	460	75	MR16	24	58,117
ENX-5	54913	**ENX-5**	Projector - Overhead	360	86	GY5.3	540	75	MR16	24	117
ENX-7	54916	**ENX-7**	Projector - Overhead	360	87.5	GY5.3	540	75	MR16	24	117
EPT	58782	**EPT**	Projector - Fiber-Optics	42	10.8	GX5.3		8000	MR16	24	
EPX	54927	**EPX**	Projector - Microfilm	90	14.5	GX5.3	43	500	MR16	24	60,117
EPZ	54743	**EPZ**	Projector - Microfilm	50	13.8	GX5.3	80	3000	MR16	24	60,117
ESA/FHD	54260	**ESA/FHD 64225**	Projector	10	6	G4	200	100	T3	40	
ESB	54261	**ESB 64250 HLX**	Projector	20	6	G4	480	100	T3.5	40	
ETJ	54928	**ETJ**	Projector	250	120	GY5.3	600	175	MR16	24	58,117
EVA	54251	**EVA 64623 HLX**	Projector, Microfilm, Microscope, Studio	100	12	GY6.35	2800	2000	T4	40	58
EVC	54255	**EVC 64657 HLX**	Projector, Microfilm, Microscope, Studio	250	24	G6.35	9000	300	T4	40	58
EVD	54259	**EVD 64663 HLX**	Projector, Microfilm, Studio	400	36	GX6.35	16000	50	T6	40	58
EVW	54723	**EVW**	Projector	250	82	GY5.3	390	50	MR16	24	58,117
EXR	54392	**EXR**	Projector - Slide	300	82	GX5.3	925	35	MR13	24	58,117
EXW	54388	**EXW**	Projector - Slide	300	82	GX5.3	1050	15	MR13	24	58,117
EXY	54394	**EXY**	Projector - Slide	250	82	GX5.3	400	200	MR13	24	58,117


Bi-Pin


MR11, MR13, MR16


Med 2-pin


GZ9.5

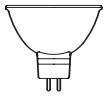

B15d


E14

AUDIOVISUAL

ANSI Code	Product Number	Ordering Abbreviation	Application	Watts	Volts	Base	Lumens	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
EYB	54446	**EYB**	Projector, Stage & Studio	360	82	G5.3	10000	75	T3.5	24	58
EYB-5	54448	**EYB-5**	Projector, Microfilm, Stage & Studio	360	85.5	G5.3	10000	75	T3.5	24	58
EYB-7	54455	**EYB-7**	Projector, Microfilm, Stage & Studio	360	87.5	G5.3	10000	75	T3.5	24	58
EZE	54386	**EZE**	Projector, Stage & Studio	150	82	GX5.3	350	150	MR13	24	58,117
FCR	54248	**FCR 64625 HLX**	Projector, Microfilm, Microscope, Studio	100	12	GY6.35	3600	50	T3.5	40	58
FCS	54263	**FCS 64640 HLX**	Projector	150	24	G6.35	6000	50	T4	40	58
FDS/DZE	54277☼	**FDS/DZE 64643**	Projector, Microfilm, Microscope, Studio	150	24	GY9.5	5000	100	T5	12	58
FDT	54276☼	**FDT 64628**	Projector, Stage & Studio	100	12	GY9.5	3000	50	T4	12	58
FDV	54264	**FDV 64642 HLX**	Projector, Microfilm, Microscope, Studio	150	24	G6.35	5000	300	T4	40	58
FHS	54979	**FHS**	Projector - Slide	300	82	GX5.3	650	70	MR16	24	58,117
FKT/EYH	54547	**FKT/EYH**	Projector - Video Camera	250	120	G5.3	5400	200	T6	24	
FLE	54383	**FLE**	Projector	360	82	GY5.3	1250	75	MR16	24	9,117
FNS	58849☼	**FNS 64512**	Projector, Stage & Studio	300	120	GX6.35	9300	15	T6	12	58
FNT	54044	**FNT 64656 HLX**	Projector, Microfilm, Microscope, Studio	275	24	G6.35	10000	75	T4	100	58
FNT	54253	**FNT 64656 HLX**	Projector, Microfilm, Microscope, Studio	275	24	G6.35	10000	75	T4	40	58
FSX	54897	**FSX/230**	Projector	400	230	GY9.5		75	T6	24	13,58
FSY	54898	**FSY**	Projector	400	240	GY9.5		75	T6	24	13,58
FXL	54912	**FXL**	Projector - Overhead	410	82	GY5.3	640	75	MR16	24	58,117
FXL-HL	54904	**FXL-HL**	Projector - Overhead	410	82	GY5.3	850	40	MR16	24	58,117
GCB	54430	**GCB**	Projector, Stage & Studio, Video	200	30	G5.3	5300	200	T3	24	
	54246	**14V/35W/M/GZ4**	Medical Overhead Projection	35	14	GZ4		50	MR11	20	58,117
	58729	**60T4QCL**	Medical Overhead Illumination	60	24	DC Bayonet	1280	500	T4	12	
	54400	**85T3/RM**	Projector	85	82	GX5.3		40	MR16	24	117
	54466	**120/T4/SPECIAL**	Projector	120	24	Special	2750	500	T4	24	
	58939	**220T4Q/2PPF**	Medical Overhead Illumination	220	22	GY9.35	6200	200	T4	12	
	58941	**235T4Q/2PPF**	Medical Overhead Illumination	235	33	GZ9.5	5800	200	T4	12	
	76311	**8013**	Projector	10	6	BA15d		200		100	59
	76313	**8017**	Projector	15	6	B15d		1000		100	
	76314	**8018**	Projector	15	6	B15d		100		100	34,59
	76321	**8100**	Projector		5	E14		600		100	58
	54256	**62138 HLX**	Projector	100	12	G6.35	2800	50	T3	40	60


Bi-Pin


MR11, MR13, MR16


Med 2-pin

AUDIOVISUAL

ANSI Code	Product Number	Ordering Abbreviation	Application	Watts	Volts	Base	Lumens	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
	54050	**64223**	Projector	10	6	G4	150	300	T3	100	
	54245☼	**64223**	Projector	10	6	G4	150	300	T3	40	
	54021	**64251 HLX**	Projector	20	6	PG22	500	100	T3	30	
	54122	**64255**	Projector	20	8	GZX4		50	MR11	20	60,117
	54901☼	**64258 AHLX**	Projector	20	12	G4	350	2000	T3	40	58
	54262	**64258 HLX**	Projector	20	12	G4	350	2000	T3	40	58
	54022	**64260**	Projector	30	12	PG22	800	50	T3	30	
	54247	**64261**	Projector	30	12	G6.35	750	50	T3.25	40	
	53999	**64265 HLX**	Projector	30	6	G4	765	100	T2	100	
	54606☼	**64265 HLX**	Projector	30	6	G4	765	100	T2	40	
	54258	**64275**	Projector	35	6	G4	780	50	T3	40	
	54301☼	**64291 XIR 40W**	Medical	40	22.8	G6.35	1200	600		40	59,203
	54302☼	**64292 XIR 150W**	Medical	150	22.8	G6.35	6000	600		40	59,203
	54275	**64513**	Projector, Stage & Studio	300	120	GX6.35	7700	150	T6	12	58
	54354☼	**64514**	Projector, Stage & Studio	300	120	GX6.35	8100	75	T6	12	58
	58524☼	**64515**	Projector, Stage & Studio	300	230	GX6.35	9600	15	T6	12	58
	54356☼	**64516**	Projector, Stage & Studio	300	230	GX6.35	7400	75	T6	12	11,58,202,211
	54138	**64602**	Projector, Microfilm, Microscope, Studio	50	12	G6.35	1000	1100	T3.25	100	58
	54607☼	**64602**	Projector, Microfilm, Microscope, Studio	50	12	G6.35	1000	1100	T3.25	40	58
	54028	**64611 HLX**	Projector	50	12	G6.35	1350	100	T3.25	100	58
	54608☼	**64611 HLX**	Projector	50	12	G6.35	1350	100	T3.25	40	58
	54124	**64617**	Projector	75	12	G5.3-4.8		25	MR11	20	60,117
	54121	**64617 SPOT**	Projector	75	12	G5.3-4.8		25	MR11	20	60,117
	54032	**64621 HLX**	Projector, Microfilm, Stage & Studio	100	12	PG22	2750	2000	T3	30	58
	54125	**64624**	Projector	100	12	G5.3-4.8		25	MR11	20	60,117
	54233	**64635 HLX**	Projector, Fiber-Optic	150	15	GZ6.35		50	MR16	20	60,117
	54214	**64637**	Projector	100	12	GZ6.35		1500	MR16	20	58,117
	54252	**64638 HLX**	Projector	100	24	G6.35	2900	300	T3	40	
	54257	**64650**	Projector, Microfilm, Microscope, Studio	50	23	G6.35	1000	1300	T4	40	
	54278	**64654 HLX**	Projector, Microfilm, Microscope, Studio	250	24	GY9.5	9000	300	T6	12	58
	54273☼	**64664 HLX**	Projector, Microfilm, Microscope, Studio	400	36	G6.35	14500	150	T6	12	58,267
	54274☼	**64665 HLX**	Projector, Microfilm, Microscope, Studio	400	36	G6.35	400	300	T6	12	58
	54303☼	**64668 XIR 80W**	Medical	80	22.8	G6.35	3000	750		40	59,203
	76305	**70313 (390158)**	Special Purpose	30	6	P47d				100	
	76304	**70314 (390153)**	Special Purpose	25	6	P47d				100	


Med 2-pin


A21, A23

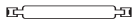

GZ9.5


Bi-Pin


P28s


P40s


PAR36


R7s, RX7s


G22


Med Bi-pin

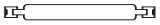
AUDIOVISUAL

ANSI Code	Product Number	Ordering Abbreviation	Application	Watts	Volts	Base	Lumens	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
	76302	**70335 BULK**	Special Purpose	27	6	Special				200	
	54793☼	**JCP 650W/100V**	Overhead projection, fiber-optic, entertainment	650	100	GY9.5	18750	100	T6	12	

STUDIO,THEATRE, TV & VIDEO

ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts	Volts	Base	Lumens	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
BCA	11655	**BCA 118V**	4800	250	120	Medium	8912	12	A21	12	
BHC/DYS/DYV	54836	**BHC/DYS/DYV**		600	120	GZ9.5	17500	75	T6	24	58
BHC/DYS/DYV-5	54835	**BHC/DYS/DYV-5**		600	125	GZ9.5	17500	75	T6	24	16,58
BCM	54694	**BCM**	3200	20000	230	G38	580000	350	T32	1	58
BTL	54685	**BTL**	3050	500	120	P28s	11000	750	T6	12	
BTM	54686	**BTM**	3200	500	120	P28s	13000	100	T6	12	58
BTN	54687	**BTN**	3200	750	120	P28s	17000	500	T7	12	58
BTP	54688	**BTP**	3200	750	120	P28s	20000	200	T7	12	
BTR	54689	**BTR**	3200	1000	120	P28s	27500	250	T6	12	58
BVM	58827☼	**BVM 64540**	3400	650	230	GZ6.35	20000	15	T8	12	11
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	
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	T11	6	58
DNS/FMC	54655	**DNS/FMC**	3050	500	120	P28s	11000	500	T6	24	
DPY	54647	**DPY**	3200	5000	120	G38	143000	500	T17	1	58
DTA	54716	**DTA**	3200	1500	120	P40s	39000	100	T8	6	
DTY	54696	**DTY**	3200	10000	120	G38	290500	350	T24	1	58
DWE	54500	**DWE**	3200	650	120	G53	24000	100	PAR36	1	
DWT	58937	**DWT**	3000	1000	120	RX7s	22000	2000	T6	12	
DXW	53997	**DXW**	3200	1000	120	R7s	28000	150	T5	12	101
	58497	**DYS/300**	3200	300	120	GZ9.5	7500	100	T4	24	
ECR	54702☼	**ECR 64815 CP/83 230V**	3200	10000	230	G38	280000	400	T22	6	58
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	58
EGR	54662	**EGR**	3200	750	120	G22	20000	200	T7	12	58
EGT	54664	**EGT**	3200	1000	120	G22	27500	250	T6	12	58
EGW	58510☼	**EGW 64535**	3400	650	120	GY6.35	20000	15	T8	12	
EHC/EHB	54506	**EHC/EHB**	3200	500	120	G9.5	13000	300	T4	12	


Med Bi-pin


R7s, RX7s


GZ9.5


Bi-Pin


G22


Med 2-pin

STUDIO,THEATRE, TV & VIDEO

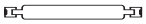
ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts	Volts	Base	Lumens	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
EHD	54508	**EHD**	3000	500	120	G9.5	10600	2000	T4	12	
EHF	54510	**EHF**	3300	750	120	G9.5	20400	300	T5	12	
EHG	54512	**EHG**	3000	750	120	G9.5	15400	2000	T5	12	
EHP	58942	**EHP**	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	60
EKB	54837	**EKB**	3200	420	120	GZ9.5	11000	75	T6	24	58
FAD	54574	**FAD**	3200	650	120	R7s	16500	100	T4	12	
FAL	58860	**FAL**	3200	420	120	R7s	11000	75	T4	24	24
FCB	54483	**FCB**	3200	600	120	R7s	16500	75	T4	24	
FCM	54442	**FCM**	3200	1000	120	R7s	28000	400	T3	12	60
FDA	54471	**FDA**	3200	400	120	R7s	10400	250	T4	12	24
FDB	54435	**FDB**	3200	1500	120	R7s	41200	400	T4	12	60
FDG	54387	**64579 115-120V**	3200	1000	120	R7s	33000	15	T4	12	12
FDN	54534	**FDN**	3200	500	120	R7s	12800	400	T2.5	12	60
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	
FER	54571	**FER**	3200	1000	120	RX7s	27500	500	T6	12	
FEV	54441	**FEV**	3200	200	120	DC Bayonet	5500	50	T4	12	
FEX	54514	**FEX/230**	3200	2000	230	RX7s	50000	300	T8	12	11
FEX	54518	**FEX/240**	3200	2000	240	RX7s	50000	300	T8	12	
FEY	54559	**FEY**	3200	2000	120	RX7s	57400	400	T8	12	
FFJ	54488	**FFJ**	3200	600	120	R7s	16500	75	T4	24	24
FFM	58862	**FFM**	3200	420	120	R7s	11000	75	T4	24	24
FFT	54350	**FFT**	3200	1000	120	R7s	27000	300	T3	12	
FHM	54532	**FHM**	3200	1000	120	R7s	27300	300	T3	12	60
FKJ	54681☼	**FKJ CP/71**	3200	1000	230	G22	26000	200	T6	20	58
FKK	54699☼	**FKK CP/73**	3200	2000	230	G38	52000	400	T11	1	58
FKW	54711	**FKW**	3200	300	120	GY9.5	7800	200	T6	24	58
FLK	54589	**FLK**	3200	575	115	G9.5	16500	300	T5	12	188
FLK	54551☼	**FLK/X 115V**	3200	575	115	G9.5	10000	2000	T5	12	188
	54549	**FLK PLUS HPR 575/115**	3200	575	115	G9.5	16500	300	T6	12	187
FMR	54412	**FMR**	3000	600	120	GY9.35	12500	2000	T5	24	
FRG	54629	**FRG**	3200	500	120	GY9.35	13000	150	T6	24	58
FRK	54631	**FRK**	3200	650	120	GY9.5	16900	200	T7	24	58
FRL	54638☼	**FRL CP/89**	3200	650	230	GY9.5	16250	150	T7	25	58
FSH	54436	**FSH**	3200	125	120	G5.3	2500	200	T3	24	
FTK	54875	**FTK**	3200	500	120	GY9.5	12000	200	T6	24	58
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	
GLA	54516	**GLA 575/115/2000**	3050	575	115	G9.5	10500	2000	T6	12	18


Med Bi-pin


Bi-Pin


S11


S14


R7s, RX7s


PAR36


A21, A23


HPL

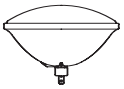

G22

STUDIO,THEATRE, TV & VIDEO

ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts	Volts	Base	Lumens	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
GLC	54507	**GLC 575/115/300**	3250	575	115	G9.5	15500	300	T6	12	18,20
GLD	54522☼	**GLD 750/115/300**	3250	750	115	G9.5	19000	300	T6	12	18
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	
	11624	**111A**	2900	75	120	SC Bayonet	1120	15	S11	24	
	11625	**140**	2900	75	120	Medium	1150	35	S14	24	
	58930	**150/25T4**	2700	150	25	R7s	2700	3000	T4	25	
	55052	**20PAR/36/CAP/WFL**		20	12	G53		4000	PAR36	12	
	11657	**211 118V**	3200	75	120	Medium	1215	200	A21	12	
	11656	**212 118V**	3050	150	120	Medium	2700	200	A21	12	
	54499	**4515 PAR36 30W**		30	6	G53	67000	100	PAR36	12	
	54001	**64501**	3400	150	120	GX6.35	4500	25	T4	25	
	58639	**64573**	3400	1000	120	GX6.35	33000	15	T8	25	
	58958☼	**64573**	3400	1000	120	GZ6.35	33000	15	T8	12	
	58525☼	**64575**	3400	1000	230	GX6.35	33000	15	T8	12	
	54232	**64614**		75	12	G5.3-4.8		25	T2.5	20	60
	54701☼	**64805 CP/85 (CP/29)**	3200	5000	230	G38	135000	400	T19	1	58
	58497☼	**DYS/300**	3200	300	115	GZ9.5	7500	100	T6	24	
	54625	**HPL 375/115 (UCF)**	3200	375	115	Sp Med Bipin	10540	300	T6	12	26
	54649	**HPL 375/115/X (UCF)**	2950	375	115	Sp Med Bipin	8000	1000	T8	12	26
	54623	**HPL 550/77 (UCF)**	3265	550	77	Sp Med Bipin	16170	300	T6	12	26
	54604	**HPL 550/77/X (UCF)**	3065	550	77	Sp Med Bipin	12160	1500	T6	12	26
	54622	**HPL 575/115 (UCF)**	3265	575	115	Sp Med Bipin	16520	300	T6	12	26
	54807	**HPL 575/115/X (UCF)**	3065	575	115	Sp Med Bipin	12360	1500	T6	12	26
	54817	**HPL 575/120 (UCF)**	3265	575	120	Sp Med Bipin	16460	300	T6	12	26
	54815	**HPL 575/120/X (UCF)**	3050	575	120	Sp Med Bipin	12360	1500	T6	12	26
	54618	**HPL 575/230 (UCF)**	3200	575	230	Sp Med Bipin	14900	400	T6	12	26
	54665☼	**HPL 575/230/X (UCF)**	3050	575	230	Sp Med Bipin	11780	1500	T6	12	26
	54619	**HPL 575/240 (UCF)**	3200	575	240	Sp Med Bipin	14900	400	T6	12	26
	54703☼	**HPL 575/240/X (UCF)**	3050	575	240	Sp Med Bipin	11780	1500	T6	12	26
	54602	**HPL 750/115 (UCF)**	3265	750	115	Sp Med Bipin	21900	300	T6	12	26
	54611	**HPL 750/115/X (UCF)**	3050	750	115	Sp Med Bipin	16400	1500	T6	12	26
	54605	**HPL 750/120 (UCF)**	3250	750	120	Sp Med Bipin	21900	300	T6	12	26
	54653	**HPL 750/120/X (UCF)**	3065	750	120	Sp Med Bipin	16400	1500	T6	12	26
	54603	**HPL 750/230 (UCF)**	3200	750	230	Sp Med Bipin	19750	300	T6	12	26
	54670☼	**HPL 750/230/X (UCF)**	3050	750	230	Sp Med Bipin	15600	1500	T6	12	26
	54614	**HPL 750/240 (UCF)**	3200	750	240	Sp Med Bipin	19750	300	T6	12	26
	54704☼	**HPL 750/240/X (UCF)**	3050	750	240	Sp Med Bipin	15600	1500	T6	12	26
	54825	**HPL 750/77 (UCF)**	3265	750	77	Sp Med Bipin	22950	300	T6	12	26
	54798☼	**HWHV 1200W/220V**	3200	1200	220	GX9.5	33500	300	T7	12	207
	54799☼	**HWLV 1200W/80V**	3200	1200	80	G22	37500	300	T7	12	207
	54796☼	**HWMV 1200W/115V**	3200	1200	115	GX9.5	37000	300	T7	12	207


QXL


STUDIOLINE


PAR 56, 64

STUDIO,THEATRE, TV & VIDEO

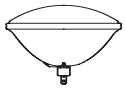
ANSI Code	Product Number	Ordering Abbreviation	Color Temp (K)	Watts	Volts	Base	Lumens	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
	54882	**QXL 750/77**	3250	750	77	QXL	22950	300	T6	12	178,180,181,184
	54883	**QXL 750/77/X**	3050	750	77	QXL	18000	1500	T6	12	178,180,181,184
	20607	**STUDIOLINE 55W/3200**	3200	55		2G11	3800	8000	T5	10	
	20608	**STUDIOLINE 55W/5600**	5600	55		2G11	3800	8000	T5	10	

LARGE PAR - ALUPAR®

ANSI Code	Product Number	Ordering Abbreviation	Luminous Intensity (cd)	Watts	Volts	Base	Color Temp (K)	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
	56003☼	**aluPAR 56/NSP/300W/120V**	68000	300	120	GX16d	2950	2000	PAR56	6	30,198,199
	56004☼	**aluPAR 56/MFL/300W/120V**	24000	300	120	GX16d	2950	2000	PAR56	6	29,198,199
	56005☼	**aluPAR 56/WFL/300W/120V**	11000	300	120	GX16d	2950	2000	PAR56	6	31,198,199
	56000☼	**aluPAR 56/NSP/300W/230V**	70000	300	230	GX16d	2950	2000	PAR56	6	30,198,199
	56001☼	**aluPAR 56/MFL/300W/230V**	30000	300	230	GX16d	2950	2000	PAR56	6	29,198,199
	56002☼	**aluPAR 56/WFL/300W/230V**	10000	300	230	GX16d	2950	2000	PAR56	6	31,198,199
	56086☼	**aluPAR 56/NSP/500W/120V**	96000	500	120	GX16d	2950	4000	PAR56	6	30,198,199
	56213☼	**aluPAR 56/MFL/500W/120V**	45000	500	120	GX16d	2950	4000	PAR56	6	29,198,199
	56006☼	**aluPAR 56/WFL/500W/120V**	21000	500	120	GX16d	2950	4000	PAR56	6	31,198,199
	56007☼	**aluPAR 64/NSP/500W/120V**	110000	500	120	GX16d	2950	2000	PAR64	6	30,198,199
	56008☼	**aluPAR 64/MFL/500W/120V**	37000	500	120	GX16d	2950	2000	PAR64	6	29,198,199
	56009☼	**aluPAR 64/WFL/500W/120V**	13000	500	120	GX16d	2950	2000	PAR64	6	31,198,199
	56018☼	**aluPAR 64/NSP/500W/230V**	140000	500	230	GX16d	3200	300	PAR64	6	30,198,199
	56019☼	**aluPAR 64/MFL/500W/230V**	65000	500	230	GX16d	3200	300	PAR64	6	29,198,199
	56017☼	**aluPAR 64/VNSP/1000W/120V**	400000	1000	120	GX16d	3200	800	PAR64	6	32,198,199
	56010☼	**aluPAR 64/NSP/1000W/120V**	330000	1000	120	GX16d	3200	800	PAR64	6	30,198,199
	56011☼	**aluPAR 64/MFL/1000W/120V**	12000	1000	120	GX16d	3200	800	PAR64	6	29,198,199
	56012☼	**aluPAR 64/WFL/1000W/120V**	40000	1000	120	GX16d	3200	300	PAR64	6	31,198,199
	56014☼	**aluPAR 64/NSP/1000W/230V**	297000	1000	230	GX16d	3200	300	PAR64	6	30,198,199
	56015☼	**aluPAR 64/MFL/1000W/230V**	138000	1000	230	GX16d	3200	300	PAR64	6	29,198,199
	56016☼	**aluPAR 64/WFL/1000W/230V**	38000	1000	230	GX16d	3200	300	PAR64	6	31,198,199

LARGE PAR - OTHER

ANSI Code	Product Number	Ordering Abbreviation	Luminous Intensity (cd)	Watts	Volts	Base	Color Temp (K)	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
EXC	56280	**EXC/230**	320000	1000	230	GX16d	3200	300	PAR64	6	27,30
EXC	56232	**EXC/240**	320000	1000	240	GX16d	3200	300	PAR64	6	27,30
EXD	56281	**EXD/230**	270000	1000	230	GX16d	3200	300	PAR64	6	27
EXD	56233	**EXD/240**	270000	1000	240	GX16d	3200	300	PAR64	6	27
EXE	56283	**EXE/230**	125000	1000	230	GX16d	3200	300	PAR64	6	27
EXE	56234	**EXE/240**	125000	1000	240	GX16d	3200	300	PAR64	6	27
FFN	56214	**FFN**	400000	1000	120	GX16d	3200	800	PAR64	6	27,32
FFP	56215	**FFP**	330000	1000	120	GX16d	3200	800	PAR64	6	27,30
FFR	56217	**FFR**	125000	1000	120	GX16d	3200	800	PAR64	6	27,29


PAR 56, 64


RSC


Med Bi-pin


G22


B15d


E14

STUDIO,THEATRE, TV & VIDEO

LARGE PAR - OTHER

ANSI Code	Product Number	Ordering Abbreviation	Luminous Intensity (cd)	Watts	Volts	Base	Color Temp (K)	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
FFS	56216	**FFS**	40000	1000	120	GX16d	3200	800	PAR64	6	27,31
	14974	**350PAR56/SP**		350	75	MEP		750	PAR56	12	27

SPECIAL PURPOSE HEAT LAMPS

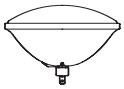
ANSI Code	Product Number	Ordering Abbreviation	Watts	Volts	Base	Lumens	Avg Rated Life(hrs)	Bulb	Pkg Qty	Footnotes
	59850	**500T3Q/IR 120V**	500	120	Flex Nick Leads		5000	T3	12	139
	59822	**500T3Q/IR/7 120V**	500	120	RSC		5000	T3	12	139
	54555☼	**1000Q/T6/RTP/C**	1000	120	G9.5	27500	300	T6	12	121
	54584	**1000Q/T6/RTPFS**	1000	120	G9.5	27500	300	T6	12	
	54752	**1000T6QRTP/X**	1000	120	G9.5	25000	2000	T6	12	
	54560	**1000TQ/RTP/CR/BULK**	1000	120	G9.5	25000	2000	T6	12	127
	54633	**1500T6Q/RTP/GS**	1500	120	G9.5	42000	300	T6	12	
	54537	**2000T8Q/120V/G22**	2000	120	G22	45000	2000	T8	12	184
FRN	54588	**FRN 2000T7Q**	2000	120	G9.5	56500	200	T7	12	
	54548	**2500T8Q/120V**	2500	120	GY9.5	75000	300	T6	12	
	59934	**1200T3Q/IR/CL/HT 144V**	1200	144	Flex Nick Leads		3000	T3	12	121,125,139
	59860	**1000T3Q/IR 230-250V**	1000	240	Flex Nick Leads		5000	T3	12	139
	54521	**1000/240V/G9.5**	1000	240	G9.5	23000	150	T6	12	
	59864	**1600T3Q/IR 240V**	1600	240	Flex Nick Leads		5000	T3	12	139
	59841	**1600T3Q/IR/7 240V**	1600	240	RSC		5000	T3	12	139
	59936	**1600T3Q/IR 277V**	1600	277	Flex Nick Leads		5000	T3	12	139
	59867	**2500T3Q/IR 480V**	2500	480	Flex Nick Leads		5000	T3	12	139
	59803	**2500T3Q/IR/7 480V**	2500	480	RSC		5000	T3	12	139
	59859	**3650T3Q/IR/CL 480V**	3650	480	Flex Nick Leads		5000	T3	12	139
	59870	**3800T3Q/IR 570V**	3800	570	Flex Nick Leads		5000	T3	12	139

OPTOELECTRONICS

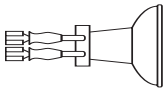
Ordering Abbreviation	Product Number	Watts	Volts	Base	Operating Position	Avg Rated Life(hrs)	Pkg Qty	Footnotes
8013	76311	10	6	BA15d	h 105	200	100	59
8017	76313	15	6	BA15d	Any	1000	100	
8018	76314	15	6	BA15d	h 30	100	100	34,59
8100	76321		6	E14	s 105	600	100	58
70314 (390153)	76304	25	6	P47d			100	
70335 BULK	76302	27	6	Special			200	

AIRCRAFT

Watts	Bulb	Volts	Base	Product Number	Ordering Abbreviation	Application	Beam Type	CBCP	Filament	Avg Rated Life(hrs)	MOL (mm)	Pkg Qty	Footnotes
100	T3	12	PG22	54032	**64621 HLX**	Aircraft				2000	48	30	58



PAR46,64



MR11, MR16 (leads)

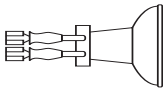
AIRCRAFT

Watts	Bulb	Volts	Base	Product Number	Ordering Abbreviation	Application	Beam Type	CBCP	Filament	Avg Rated Life(hrs)	MOL (mm)	Pkg Qty	Footnotes
250	PAR46	28	G53	15399	**4551**	Aircraft Taxiing	VNSP	75000	CC-6	25	95.25	12	32
450	PAR46	28	G53	56229	**Q4681**	Aircraft Landing / Taxiway	VNSP	310000	CC-6	50	63.5	12	27,32
600	PAR64	28	G53	14936	**4559**	Aircraft Landing / Taxiway	VNSP	600000	CC-8	25	101.6	6	32
				56222	**Q4559**	Aircraft Landing / Taxiway	VNSP	600000	CC-8	100	101.6	6	27,32
				56223	**Q4559X**	Aircraft Landing / Taxiway	VNSP	765000	CC-8	100	101.6	6	27,32
1000	PAR64	28	G53	14988	**4557**	Aircraft Landing/Taxiway	VNSP	540000	CC-8	25	101.6	6	32
				14994	**5557**	Aircraft Landing/Taxiway	VNSP	540000	CC-8	50	101.6	6	32,67

AIRFIELD

Watts	Bulb	Base	Product Number	Ordering Abbreviation	Application	Current (A)	Lumens	Filament	Avg Rated Life(hrs)	LCL (mm)	MOL (mm)	Pkg Qty	Footnotes
30	MR16	Leads-A	58964☼	**6.6A/30MR16/64331A/FL**	Airfield / Airport	6.6			1000		45.6	20	205
			58506⏏	**6.6A/30MR16/64331A/SP**	Airfield/Airport	6.6			1000		45.6	20	205
		Leads-A/C	58730⏏	**6.6A/30MR16/64331AC/FL**	Airfield / Airport	6.6			1000		45.6	10	138
			58938☼	**6.6A/30MR16/64331AC/FL**	Airfield / Airport	6.6			1000		45.6	20	138
	T3.5	GZ9.5	58850☼	**6.6A/30T3.5/64322/EXL/DL**	Airfield/Airport	6.6	400	C-8	2000	25.4	44.5	12	
			58893☼	**6.6A/30T3.5/EXL**	Airfield/Airport	6.6	600	C-8	1000	25.4	44.5	12	
	T10	Med Prefocus	17980	**6.6A/30T10/1P**	Airfield/Airport	6.6	400	C-2V	1000	38.1	100	60	
40	MR11	Leads-A	58899☼	**6.6A/40MR11/64333A**	Airfield / Airport	6.6			1500		37	20	205
		Leads-B	58787⏏	**6.6A/40MR11/64333B**	Airfield / Airport	6.6			1500		37	10	208
			58889☼	**6.6A/40MR11/64333B**	Airfield / Airport	6.6			1500		37	20	208
45	MR16	Leads-A	58545	**6.6A/45MR16/64337A 45-15**	Airfield / Airport	6.6			1500		45.6	10	205
			58907☼	**6.6A/45MR16/64337A 45-15**	Airfield / Airport	6.6			1500		45.6	20	205
		Leads-B	58758⏏	**6.6A/45MR16/64337B 45-15**	Airfield / Airport	6.6			1500		45.6	10	208
			58908☼	**6.6A/45MR16/64337B 45-15**	Airfield / Airport	6.6			1500		45.6	20	208
	T3	R7s	58704	**6.6A/45T3/CL/64315**	Airfield/Airport	6.6	750	C-8	1000	23	47.5	25	
	T3.5	G6.35	59928☼	**6.6A/45T3.5Q/64321**	Airfield / Airport	6.6	840	C-8	1200	33	45	40	58,60
			58813⏏	**6.6A/45T3.5Q/64321**	Airfield / Airport	6.6	840	C-8	1200	33	45	100	58,60
		GZ9.5	58846☼	**6.6A/45T3.5/64320/EXM**	Airfield/Airport	6.6	875	C-8	1000	25.4	44.5	12	58,60
			58892☼	**6.6A/45T3.5/EXM**	Airfield/Airport	6.6	875	C-8	1000	25.4	44.5	12	58,60
	T4	PK30d-A	58697	**6.6A/45T4/64319 FEMALE**	Airfield/Airport	6.6	800	C-8	1000	20	53	100	58,120,205,271
			58877	**6.6A/45T4CL/64318**	Airfield/Airport	6.6	800	C-8	1000	16	58	100	58,205,271
		PK30d-C	58705	**6.6A/45T4/CL/64317**	Airfield/Airport	6.6	800	C-8	1000	16	58	100	58,209
			58722	**6.6A/45T4/64319Z**	Airfield/Airport	6.6	800	C-8	1000	20	53	100	58,121,209,268
	T10	Med Prefocus	17981	**6.6A/45T10/P**	Airfield/Airport	6.6	675	C-2V	1000	38.1	100	60	
48	MR16	Leads-A	58891☼	**6.6A/48MR16/64337A 48-15**	Airfield/Airport	6.6			1500		45.6	20	205,271
			58905☼	**6.6A/48MR16/64337A LL IRC**	Airfield/Airport	6.6			3000		45.6	20	205,271
		Leads-A/C	58894☼	**6.6A/48W/MR16/64338AC**	Airfield / Airport	6.6			1000		45.6	20	58


PK30d


MR11, MR16 (leads)


Med 2-pin

AIRFIELD

Watts	Bulb	Base	Product Number	Ordering Abbreviation	Application	Current (A)	Lumens	Filament	Avg Rated Life(hrs)	LCL (mm)	MOL (mm)	Pkg Qty	Footnotes
48	MR16	Leads-B	58906☼	**6.6A/48MR16/64337B LL IRC**	Airfield/Airport	6.6			3000		45.6	20	208,271
		Leads-C	58952☼	**6.6A/48MR16/64337C LL IRC**	Airfield/Airport	6.6			3000		45.6	20	209
62	MR16	Leads-A	58493	**6.6A/62W/MR16/64336A**	Airfield/Airport	6.6			1500		44	20	205
65	T4	PK30d-C	58726	**6.6A/65T4/64328Z/HLX**	Airfield/Airport	6.6	1450	C Bar 6	1000	20	53	100	58,123,209,268
100	T4	PK30d-A	58709	**6.6A/100T4/64341/HLX**	Airfield/Airport	6.6		C Bar 6	1000	20	55	100	58,205,271
		PK30d-C	58703	**6.6A/100T4/64341Z/HLX**	Airfield/Airport	6.6	2700	C Bar 6	1000	20	55	100	125,209,268
			58706	**6.6A/100T4/64342/HLX**	Airfield/Airport	6.6	2700	C Bar 6	1000	20	58	100	58,209
105	MR16	Leads-A	58953☼	**6.6A/105MR16/64339A**	Airfield / Airport	6.6			1000		45.6	20	205,271
		Leads-A/C	58960☼	**6.6A/105MR16/64339AC**	Airfield/Airport	6.6			1000		45.6	20	138
		Leads-B	58759⛆	**6.6A/105MR16/64339B**	Airfield/Airport	6.6			1000		45.6	10	208
			58961☼	**6.6A/105MR16/64339B**	Airfield/Airport	6.6			1000		45.6	20	208
		Leads-C	58963☼	**6.6A/105MR16/64339C**	Airfield / Airport	6.6			1000		45.6	20	209,268
115	T4	GY9.5	58854☼	**6.6A/115T4Q/58798/2PPF/EVV**	Airfield/Airport	6.6	2900	C Bar 6	1000	39.1	57	12	140
150	T4	GY9.5	58855☼	**6.6A/150T4Q/64354/EWR/DL**	Airfield/Airport	6.6	4000	C Bar 6	1500	39.1	56.5	12	140
			58777⛆	**6.6A/150T4Q/64354/EWR/DL**	Airfield/Airport	6.6	4000	C Bar 6	1500	39.1	56.5	30	58,140
		PK30d-A	58717	**6.6A/150T4/64361/HLX**	Airfield/Airport	6.6	3600	C Bar 6	1000	20	58	100	58,205,271,274
		PK30d-C	58724	**6.6A/150T4Q/64361Z/HLX**	Airfield/Airport	6.6	3600	C Bar 6	1000	20	58	100	58,209,268
200	PAR64	GX16d	56220⛆	**6.6A/200PAR64Q/2P**	Airfield/Airport	6.6		CC-6	2000		114.3	6	27,278
	T4	G6.35	59078☼	**6.6A/200T4Q/64386**	Airfield / Airport	6.6	4700	C Bar 6	1200	33	47	40	58,60
			58815	**6.6A/200T4Q/64386**	Airfield / Airport	6.6	4700	C Bar 6	1200	33	47	100	58
		GY9.5	58851☼	**6.6A/200T4Q/2PPF/58750/EZL/DL**	Airfield/Airport	6.6	5200	CC-6	1000	39.1	65	12	140
		P30d	58821	**6.6A/200T4Q/CL/DCR/58746/DL**	Airfield/Airport	6.6	5000	CC-6	1000	27	80.9	100	58,60
		PK30d-A	58649	**6.6A/200T4/64382A/HLX**	Airfield/Airport	6.6	4800	CC-6	1000	20	64	100	58,205
		PK30d-C	58708	**6.6A/200T4/64382C/HLX**	Airfield/Airport	6.6	4800	CC-6	1000	20	64	100	58,209,273
	T5	R7s	58707	**6.6A/200T5/CL/64380**	Airfield/Airport	6.6	4400	CC-8	1000	21.3	60.2	25	

4ArXS (For Architainment eXtreme Seal)

Innovative metal halide lamps for creative architectural and effect lighting

4 ArXS
For Architainment eXtreme Seal

XS

Optimized lamp seal technology to withstand interior base temperatures up to 450 °C.

4 ArXS HSD®

4ArXS HSD are new powerful metal halide lamps from OSRAM with innovative eXtreme Seal technology. The 4ArXS opens up new prospects for creative architectural and effect lighting.

Features and Benefits:

- Average service life of 2000 to 6000 hours
- Outstanding luminous intensity and color consistency throughout the life of the lamp
- Low devitrification of the bulb wall
- Daylight type (6000 K) and “bright light” type (7000 – 8000K)
- Simple and reliable cold starting

Applications:

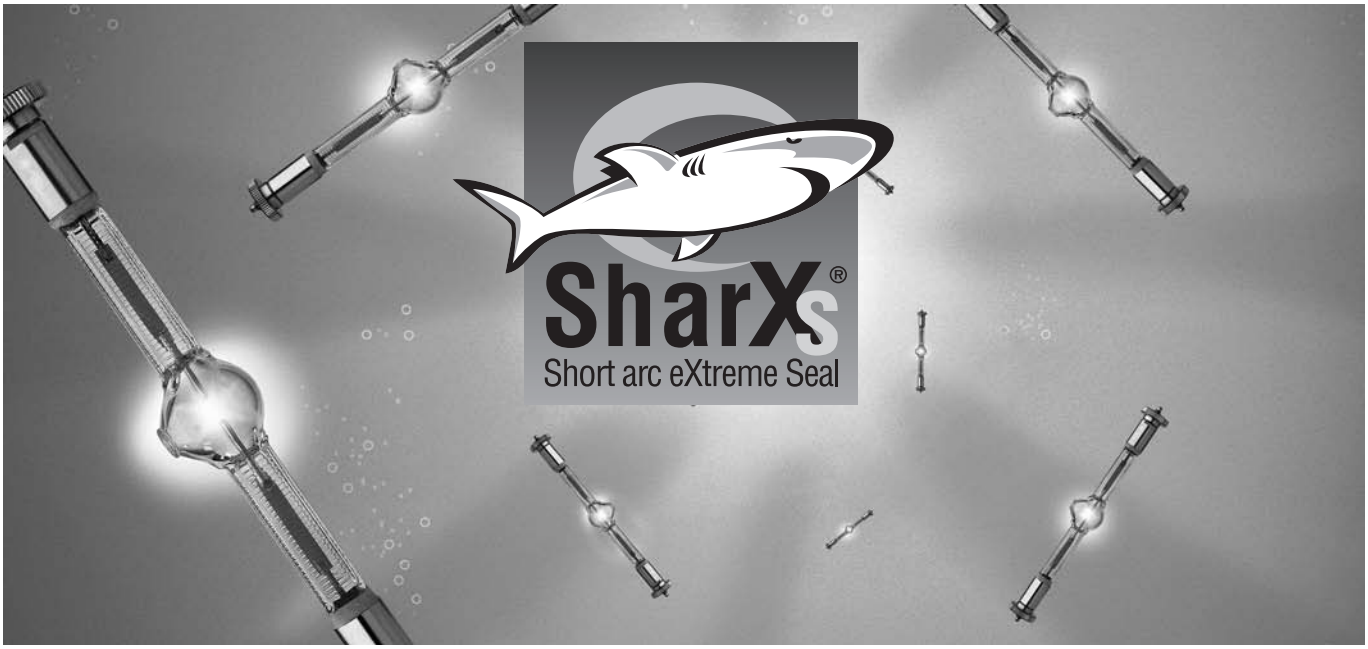
- Architectural lighting
- Projected advertising
- Nightclub lighting
- TV shows, concerts, musicals and theatre

LIGHT THEM UP!




SharXS® HTI® from OSRAM

The original light with a bite



The SharXS (Short arc eXtreme Seal) HTI family uses state-of-the-art HTI technology to achieve a particularly high luminous efficacy. The arc in these innovative light sources has been reduced to 3-7mm. What this means for you is the SharXS HTI produces a higher luminance from the same wattage and therefore saves electricity and reduces operating costs.

Features and Benefits

- Less sensitive to heat
- Always ready for a hot restart
- Allows more compact luminaire design
- Pre-focus base for accurate lamp installation
- OSRAM SFc10-4 Pre-focus socket with its unique high performance contact system pairs with all lamp wattages

eXtreme-Seal (XS) Technology

Optimized lamp seal technology to withstand interior base temperatures up to 450 °C.

Ideal for intelligent luminaires

- Moving heads
- Scanners
- Projectors
- Color changers

SharXS HTI in its element

SharXS lamps are at home in all areas of entertainment lighting

- Shows
- Clubs
- Special Events
- Concerts
- TV studios
- Advertising and retail

Baby SharXS® HTI® from OSRAM

An offspring with just as sharp of a bite

SharXS HTI now in just 93mm

Measuring only 93mm, the latest offspring in the family has all the benefits of the full-size OSRAM SharXS HTI.

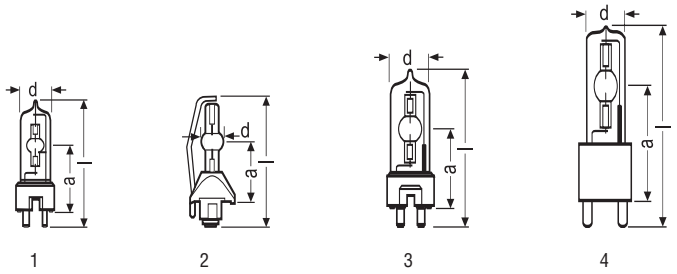
- Short 5mm arc for greater efficiency
- eXtreme Seal(XS) technology for improved thermal loading
- Modular design with the same dimensions for all wattages

Good genes: the new Baby SharXS

The tiny Baby SharXS develops all its power from just 93mm. The small dimensions of the Baby SharXS will inspire designers to create compact luminaires. Because of their lower weight, not only will these luminarirs be easier to handle but more of them will fit on a lighting rig.

NOTES:

HMI® METAL HALIDE



1 2 3 4

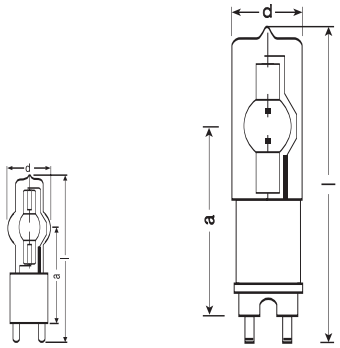
HMI® SINGLE-ENDED

Ordering Abbreviation	HMI 200 W/SE	HMI 250 W/SE	HMI 400 W/SE
Product Number	54061	54062	54137
Watts (W)	200	270	400
Volts (V)	70	50	70
Current (A)	3.0	5.0	6.9
CRI	>90	>90	>90
Lumens (lm)	16000	16200	33000
Color Temp (K)	6000	6000	6000
Length l max (mm)	80	84	110
Distance a (mm)	39	35	60
Diameter d (mm)	20	12	23
Electrode Gap - cold (mm)	5	5	6
Avg Rated Life (hrs)	200	250	650
Operating Position	Any	p 45	Any
Base	GZY9.5	FaX1.5	GZ9.5
Hot Restart	Yes	Yes	Yes
Fig No	1	2	3
Symbols & Footnotes	1	1,60	90

HMI® SINGLE-ENDED

Ordering Abbreviation	HMI 575 W/SEL XS	HMI 700 W/SE XS	HMI 1200 W/SEL XS
Product Number	54063	54310☼	54067
Watts (W)	575	700	1200
Volts (V)	95	95	100
Current (A)	7.0	9.0	13.8
CRI	>90	>90	>90
Lumens (lm)	49000	55000	110000
Color Temp (K)	6000	6000	6000
Length l max (mm)	145	145	200
Distance a (mm)	70	70	107
Diameter d (mm)	30	30	42
Electrode Gap - cold (mm)	7	7	10
Avg Rated Life (hrs)	1000	750	1000
Operating Position	Any	Any	Any
Base	G22	G22	G38
Hot Restart	Yes	Yes	Yes
Fig No	4	4	4
Symbols & Footnotes	90,161	161	90,161

HMI® METAL HALIDE



1 2

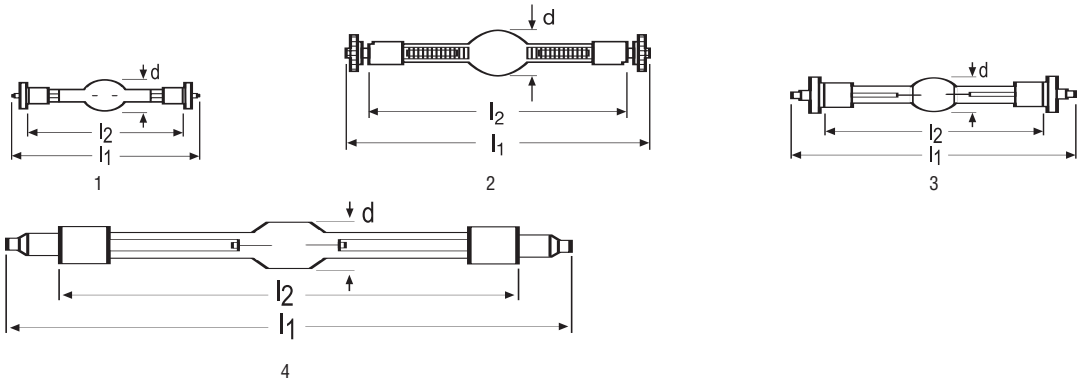
HMI® SINGLE-ENDED

Ordering Abbreviation	HMI 2500 W/SE XS	HMI 4000 W/SE XS	HMI 6000 W/SE XS
Product Number	54070	54321☼	54099
Watts (W)	2500	4000	6000
Volts (V)	115	200	123
Current (A)	25.6	24.0	55.0
CRI	>90	>90	>90
Lumens (lm)	240000	380000	600000
Color Temp (K)	6000	6000	6000
Length l max (mm)	225	250	360
Distance a (mm)	127	142	210
Diameter d (mm)	60	75	75
Electrode Gap - cold (mm)	14	20	23
Avg Rated Life (hrs)	500	500	500
Operating Position	Any	Any	s 135
Base	G38	G38	GX38
Hot Restart	Yes	Yes	Yes
Fig No	1	1	2
Symbols & Footnotes	90,161	90,161	58,90,139,161

HMI® SINGLE-ENDED

Ordering Abbreviation	HMI 12000 W/SE XS	HMI 12000W/SE/GX51	HMI 18000 W/SE/GX51
Product Number	54113	54357☼	54289☼
Watts (W)	12000	12000	18000
Volts (V)	160	160	225
Current (A)	84.0	84.0	88.0
CRI	>90	>90	>90
Lumens (lm)	1150000	1150000	1600000
Color Temp (K)	6000	6000	6000
Length l max (mm)	450	460	495
Distance a (mm)	255	260	260
Diameter d (mm)	100	100	100
Electrode Gap - cold (mm)	27	27	44
Avg Rated Life (hrs)	300	300	300
Operating Position	s 135	s 135	s 135
Base	GX38	GX51	GX51
Hot Restart	Yes	Yes	Yes
Fig No	2	2	2
Symbols & Footnotes	58,90,139,161	58,90,161	58,90,161

HMI® METAL HALIDE



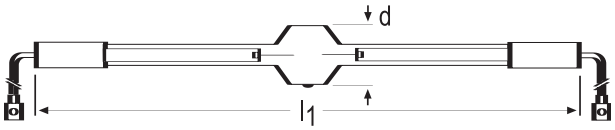
HMI® DOUBLE-ENDED

Ordering Abbreviation	HMI 575 W/DXS	HMI 575 W/GS	HMI 1200 W/DXS	HMI 1200 W/GS	HMI 1200 W/S XS
Product Number	54313	54098	55139	54066	54088
Watts (W)	575	575	1200	1200	1200
Volts (V)	95	95	100	100	100
Current (A)	7.0	7.0	13.8	13.8	13.8
CRI	>90	>90	>90	>90	>90
Lumens (lm)	49000	49000	110000	110000	110000
Color Temp (K)	6000	6000	6000	6000	6000
Length l1 max (mm)	135	135	220	220	135
Length l2 max (mm)	115	115	180	180	115
Diameter d (mm)	21	21	27	27	21
Electrode Gap - cold (mm)	7	7	10	10	7
Avg Rated Life (hrs)	1000	1000	750	750	750
Operating Position	Any	Any	Any	Any	Any
Base	SFc10-4	SFc10-4	SFc15.5	SFc15.5	SFc10-4
Hot Restart	Yes	Yes	Yes	Yes	Yes
Fig No	1	1	2	2	3
Symbols & Footnotes	55,90,161	52,90	55,90,161	52,90	43,90,161,196,201

HMI® DOUBLE-ENDED

Ordering Abbreviation	HMI 2500 W/DXS	HMI 2500 W/S XS	HMI 4000 W	HMI 4000 W/DXS
Product Number	54265	54068	54071	54314
Watts (W)	2500	2500	4000	4000
Volts (V)	115	115	200	200
Current (A)	25.6	25.6	24.0	24.0
CRI	>90	>90	>90	>90
Lumens (lm)	240000	240000	380000	380000
Color Temp (K)	6000	6000	6000	6000
Length l1 max (mm)	355	210	405	405
Length l2 max (mm)	290	150	340	340
Diameter d (mm)	31.5	31.5	36	36
Electrode Gap - cold (mm)	14	14	34	34
Avg Rated Life (hrs)	500	500	500	500
Operating Position	p 30	p 30	p 15	p 15
Base	SFa21	SFa21	SFa21	SFa21
Hot Restart	Yes	Yes	Yes	Yes
Fig No	4	4	4	4
Symbols & Footnotes	55,60,161	43,60,90,161,201	60,90,219	55,60,90,161,219

HMI® METAL HALIDE



2

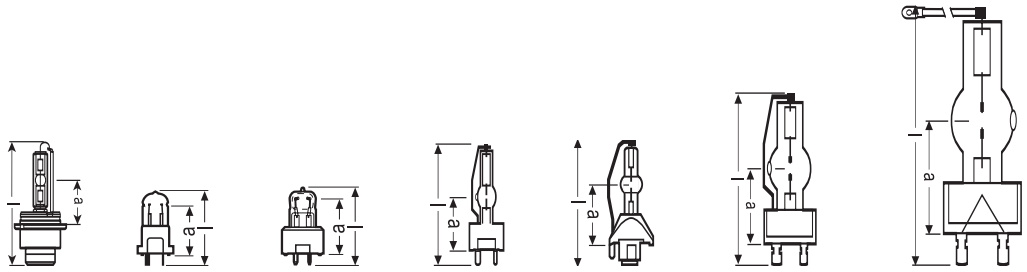
HMI® DOUBLE-ENDED

Ordering Abbreviation	HMI 6000 W	HMI 6000 W/DXS	HMI 12000 W/DXS	HMI 12000 W/XS
Product Number	54073	54315	54316	54074
Watts (W)	6000	6000	12000	12000
Volts (V)	123	123	160	160
Current (A)	55.0	55.0	84.0	84.0
CRI	>90	>90	>90	>90
Lumens (lm)	570000	570000	1150000	1150000
Color Temp (K)	6000	6000	6000	6000
Length l1 max (mm)	450	450	470	470
Length l2 max (mm)				
Diameter d (mm)	54	54	64	64
Electrode Gap - cold (mm)	21	21	25	25
Avg Rated Life (hrs)	500	500	500	500
Operating Position	p 15	p 15	p 15	p 15
Base	S25.5	S25.5	S30	S30
Hot Restart	Yes	Yes	Yes	Yes
Fig No	2	2	2	2
Symbols & Footnotes	60,90	55,60,90,161	55,60,90,161	60,90,161

HMI® DOUBLE-ENDED

Ordering Abbreviation	HMI 18000 W/DXS
Product Number	54317
Watts (W)	18000
Volts (V)	225
Current (A)	88.0
CRI	>90
Lumens (lm)	1700000
Color Temp (K)	6000
Length l1 max (mm)	500
Length l2 max (mm)	
Diameter d (mm)	70
Electrode Gap - cold (mm)	44
Avg Rated Life (hrs)	300
Operating Position	p 15
Base	S30
Hot Restart	Yes
Fig No	2
Symbols & Footnotes	55,60,90,161,219

HTI® METAL HALIDE



1 2 3 4 5 6 7

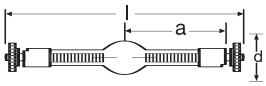
HTI® SINGLE-ENDED

Ordering Abbreviation	HTI S 35/12	HTI 150 W	HTI 152 W	HTI 405 W/SE XS	HTI 600 W/SE
Product Number	69000	54078	54079	54139	54087
Watts (W)	35	150	150	400	600
Volts (V)	85	90	95	55	95
Current (A)	2.5	1.8	1.8	7.3	7.7
CRI	>90	>70	>90	>90	>90
Lumens (lm)	3200	9500	9500	28000	48000
Average Luminance (cd/cm2)	6500	5000	4200	40000	25000
Color Temp (K)	4250	6500	5000	5800	5300
Length l max (mm)	79.5	46	48	80	84
Distance a (mm)	27.1	30	30	36.5	35
Electrode Gap - cold (mm)	4.2	5.0	6.75	3.0	5.5
Avg Rated Life (hrs)	3000	750	2000	500	300
Operating Position	p 10	Any	Any	p 45	p 45
Base	P32d-2	GY9.5 Bipin Prefocus	GY9.5 Bipin Prefocus	GY9.5 Bipin Prefocus	FaX1.5
Hot Restart	Yes	No	No	No	Yes
Fig No	1	2	3	4	5
Symbols & Footnotes	60	2,90	90	1,10,48,53,60,161	10,37,60,90,112

HTI® SINGLE-ENDED

Ordering Abbreviation	HTI 700 W/SE/75	HTI 705 W/SE XS	HTI 1200 W/SE XS	HTI 1800W/SE XS	HTI 2500 W/SE XS
Product Number	54329☼	54130	54141	54770☼	54142
Watts (W)	700	700	1200	1800	2500
Volts (V)	70	70	100	100	115
Current (A)	10	10	13.8	20	25.6
CRI	>80	>80	>90	>90	>90
Lumens (lm)	59000	59000	99000	155000	240000
Average Luminance (cd/cm2)			26000	35000	30000
Color Temp (K)	7500	5500	5400	5600	6000
Length l max (mm)	85	85	135	135	180
Distance a (mm)	39	39	59	59	85
Electrode Gap - cold (mm)	4	4	7	7	14
Avg Rated Life (hrs)	500	500	600	750	600
Operating Position	p 45	p 45	s 135	s 135	s 135
Base	FaX1.5	GY9.5 Bipin Prefocus	GY22	GY22	G22+Cable
Hot Restart	Yes	No	Yes	Yes	Yes
Fig No	5	4	6	6	7
Symbols & Footnotes	10,60,161	10,60,161	10,19,58,90,161	10,19,58,90,161	28,58,90,161

HTI® METAL HALIDE



1

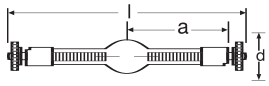
HTI® SHARXS® DOUBLE-ENDED

Ordering Abbreviation	HTI 400W/D3/75 SHARXS	HTI 400W/D3/75 SHARXS BULK	HTI 575W/D4/60 SHARXS
Product Number	54241	54280☼	54296☼
Watts (W)	400	400	575
Volts (V)	49	49	69
Current (A)	8.5	8.5	8.3
CRI	>80	>80	>85
Lumens (lm)	26000	26000	49000
Average Luminance (cd/cm2)	55000	55000	49000
Color Temp (K)	7500	7500	6000
Length l max (mm)	136	136	136
Distance a (mm)	57.5	57.5	57.5
Diameter d (mm)	18	18	20
Electrode Gap - cold (mm)	3	3	4
Avg Rated Life (hrs)	1000	1000	750
Operating Position	Any	Any	Any
Base	SFc10-4	SFc10-4	SFc10-4
Hot Restart	Yes	Yes	yes
Fig No	1	1	1
Symbols & Footnotes	90,161,166,167	90,161,166,167,290	90,161,166,167

HTI® SHARXS® DOUBLE-ENDED

Ordering Abbreviation	HTI 575W/D4/75 SHARXS	HTI 700W/D4/60 SHARXS	HTI 700W/D4/60 SHARXS BULK
Product Number	54270☼	54282☼	54283☼
Watts (W)	575	700	700
Volts (V)	64	70	70
Current (A)	9	10.0/11.0	10.0/11.0
CRI	>80	>80	>80
Lumens (lm)	44000	59000	59000
Average Luminance (cd/cm2)	49000	60000	60000
Color Temp (K)	7500	6000	6000
Length l max (mm)	136	136	136
Distance a (mm)	57.5	57.5	57.5
Diameter d (mm)	20.5	20	20
Electrode Gap - cold (mm)	4	4	4
Avg Rated Life (hrs)	750	750	750
Operating Position	Any	Any	Any
Base	SFc10-4	SFc10-4	SFc10-4
Hot Restart	yes	Yes	Yes
Fig No	1	1	1
Symbols & Footnotes	90,161,166,167	90,161,166,167	90,161,166,167,290

HTI® METAL HALIDE



1

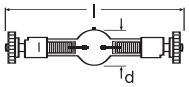
HTI® SHARXS® DOUBLE-ENDED

Ordering Abbreviation	HTI 700W/D4/75 SHARXS	HTI 700W/D4/75 SHARXS BULK	HTI 1200W/D7/60 SHARXS
Product Number	54242	54281☼	54268☼
Watts (W)	700	700	1200
Volts (V)	70	70	100
Current (A)	10.0/11.0	10.0/11.0	12.7/13.8
CRI	>80	>80	>90
Lumens (lm)	59000	59000	110000
Average Luminance (cd/cm2)	60000	60000	41000
Color Temp (K)	7500	7500	6000
Length l max (mm)	136	136	136
Distance a (mm)	57.5	57.5	57.5
Diameter d (mm)	20.5	20.5	21
Electrode Gap - cold (mm)	4	4	7
Avg Rated Life (hrs)	750	750	750
Operating Position	Any	Any	Any
Base	SFc10-4	SFc10-4	SFc10-4
Hot Restart	Yes	Yes	Yes
Fig No	1	1	1
Symbols & Footnotes	90,161,166,167	90,161,166,167,290	90,161,166,167,196

HTI® SHARXS® DOUBLE-ENDED

Ordering Abbreviation	HTI 1200W/D7/60 SHARXS BULK	HTI 1200W/D7/75 SHARXS	HTI 1500W/D7/60 SHARXS
Product Number	54202☼	54269☼	54319☼
Watts (W)	1200	1200	1500
Volts (V)	100	100	110
Current (A)	12.7/13.8	12.7/13.8	13.6
CRI	>90	>80	>90
Lumens (lm)	110000	110000	155000
Average Luminance (cd/cm2)	41000	41000	
Color Temp (K)	6000	7500	6000
Length l max (mm)	136	136	136
Distance a (mm)	57.5	57.5	57.5
Diameter d (mm)	21	21	25
Electrode Gap - cold (mm)	7	7	7
Avg Rated Life (hrs)	750	750	750
Operating Position	Any	Any	Any
Base	SFc10-4	SFc10-4	SFc10-4
Hot Restart	Yes	Yes	Yes
Fig No	1	1	1
Symbols & Footnotes	90,161,166,167,196,290	90,161,166,167	90,161,166,167

HTI® METAL HALIDE



1

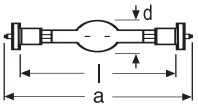
HTI® BABY SHARXS® DOUBLE-ENDED

Ordering Abbreviation	HTI 250W/D5/80 BABY SHARXS	HTI 300W/D5/57 BABY SHARXS	HTI 300W/D5/65 BABY SHARXS
Product Number	54297☼	54298☼	54299☼
Watts (W)	250	300	300
Volts (V)	90	80	80
Current (A)	3.2	4.3	4.3
CRI	>80	>85	>85
Lumens (lm)	18000	20000	22000
Color Temp (K)	8000	5700	6500
Length l max (mm)	93	93	93
Distance a (mm)	35	35	35
Diameter d (mm)	16	16	16
Electrode Gap - cold (mm)	5	5.5	5.5
Avg Rated Life (hrs)	3000	3000	750
Operating Position	Any	Any	Any
Base	SFc10-4	SFc10-4	SFc10-4
Hot Restart	Yes	Yes	Yes
Fig No	1	1	1
Symbols & Footnotes	1,161,167,206	1,161,167,206	1,161,167,206

HTI® BABY SHARXS® DOUBLE-ENDED

Ordering Abbreviation	HTI 400W/D5/60 BABY SHARXS	HTI 575W/D5/56 BABY SHARXS
Product Number	54300☼	54359☼
Watts (W)	400	575
Volts (V)	95	95
Current (A)	7.0	7.0
CRI	>85	>85
Lumens (lm)	33000	43000
Color Temp (K)	6000	5600
Length l max (mm)	93	93
Distance a (mm)	35	35
Diameter d (mm)	18	18
Electrode Gap - cold (mm)	5.5	5
Avg Rated Life (hrs)	750	500
Operating Position	Any	Any
Base	SFc10-4	SFc10-4
Hot Restart	Yes	Yes
Fig No	1	1
Symbols & Footnotes	1,161,167,206	1,161,167,206

HTI® METAL HALIDE



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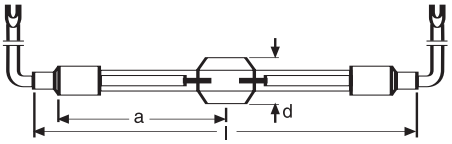

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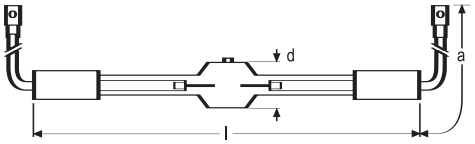
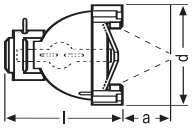


3

HTI® DOUBLE-ENDED - OTHER

Ordering Abbreviation	HTI 300 W/DX	HTI 2500 W/DEL	HTI 4000 W/DE
Product Number	54143	54399	54133
Watts (W)	300	2500	4000
Volts (V)	100	115	115
Current (A)	3.6	26.0	39.0
CRI	90	90	90
Lumens (lm)	22000	270000	360000
Average Luminance (cd/cm2)	20000		35000
Color Temp (K)	6500	6000	6300
Length l max (mm)	92	295	270
Distance a (mm)	70	108	140
Diameter d (mm)	16	31.5	40
Electrode Gap - cold (mm)	5.5	25	15
Avg Rated Life (hrs)	750	2000	500
Operating Position	p 45	p 45	p 30
Base	SFc10-4	Special	S25.5
Hot Restart	Yes	Yes	Yes
Fig No	1	2	3
Symbols & Footnotes	60,90	60,90	60,90

HTI® METAL HALIDE



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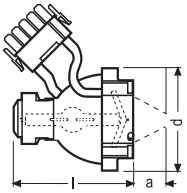
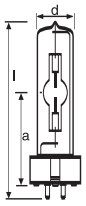


2

HTI® WITH DICHROIC REFLECTOR

Ordering Abbreviation	HTI 250 W/22	HTI 250 W/32	HTI 250 W/32C	HTI 400 W/24	HTI 403 W/24
Product Number	54080	54081	54089	54083	54104
Watts (W)	270	270	270	400	400
Volts (V)	45	45	45	55	55
Current (A)	6.0	6.0	6.0	7.3	7.3
CRI	70	70	70	70	70
Color Temp (K)	5600	5600	5600	5600	5600
Length l max (mm)	73	73	73	73	73
Working Distance a (mm)	22	32	32	24	24
Diameter d (mm)	67	67	67	67	67
Electrode Gap - cold (mm)	2.5	2.5	2.5	4.0	4.0
Avg Rated Life (hrs)	250	250	250	250	750
Operating Position	P 20	P 20	P 20	P 20	P 20
Hot Restart	Yes	Yes	Yes	Yes	Yes
Fig No	1	1	2	2	2
Symbols & Footnotes	1,60	1,60,63	60,90	1,60	1,60

HSR® METAL HALIDE



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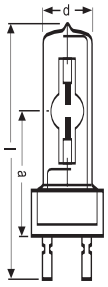
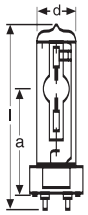


2

HSR® WITH OUTER JACKET

Ordering Abbreviation	HSR 400/60	HSR 575/60	HSR 575/72	HSR 700/60	HSR 1200/60
Product Number	54102	54115	54116	54107	54168
Watts (W)	400	575	575	700	1200
Volts (V)	67	95	95	72	100
Current (A)	6.9	7.0	7.0	11.0	13.8
CRI	>85	>85	>85	>85	>85
Lumens (lm)	33000	49000	49000	58000	110000
Average Luminance (cd/cm2)	20000	10000	10000	10000	20000
Color Temp (K)	6000	6000	7200	6000	6000
Length l max (mm)	110	125	125	155	175
Distance a (mm)	62	65	65	75	85
Diameter d (mm)	23	30	30	30	40
Electrode Gap - cold (mm)	5	7	7	8	10
Avg Rated Life (hrs)	650	1000	1000	1000	1000
Operating Position	Any	Any	Any	Any	Any
Base	GX9.5	GX9.5	GX9.5	G22	G22
Hot Restart	No	No	No	NO	No
Fig No	1	1	1	2	2
Symbols & Footnotes	90	90	90	90	90

HSD® METAL HALIDE



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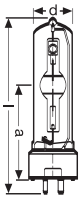

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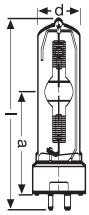


3

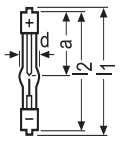
HSD® 4ARXS METAL HALIDE

Ordering Abbreviation	HSD 150W/70 4ARXS	HSD 150W/UL/75 4ARXS	HSD 200W/60 4ARXS	HSD 250W/60 4ARXS	
Product Number	54311☼	54312☼	54167	54170	
Watts (W)	150	150	200	250	
Volts (V)	97	97	70	90	
Current (A)	1.8	1.8	3.3	3.1	
CRI	>85	>85	>80	>85	
Lumens (lm)	12000	11000	13000	17000	
Color Temp (K)	7000	7500	6000	6000	
Length l (mm)	105	105	108	108	
Distance a (mm)	56	56	55	55	
Diameter d (mm)	20	20	23	23	
Electrode Gap - cold (mm)	5.5	5.5	5	5	
Avg Rated Life (hrs)	3000	6000	2000	2000	
Operating Position	Any	Any	Any	Any	
Base	G12	G12	GY9.5	GY9.5	
Hot Restart	No	No	No	No	
Fig No	1	1	2	2	
Symbols & Footnotes	90,161	90,161	90,161,191	90,161	

HSD® 4ARXS METAL HALIDE

Ordering Abbreviation	HSD 250W/80 4ARXS	HSD 575W/72 4ARXS	HSD 250W/UL/75 4ARXS	HSD 575W/60 4ARXS	HSD 575W/UL/75 4ARXS
Product Number	54243	54129	54288☼	54271☼	54287☼
Watts (W)	250	575	250	575	575
Volts (V)	95	88	90	88	88
Current (A)	3.2	7.4	3.1	7.4	7.4
CRI	>85	>85	>85	>85	>80
Lumens (lm)	17000	45000	15000	45000	43000
Color Temp (K)	8000	7200	7500	6000	7500
Length l (mm)	108	135	108	135	135
Distance a (mm)	55	65	55	65	65
Diameter d (mm)	23	30	23	30	30
Electrode Gap - cold (mm)	5	7	5	7	7
Avg Rated Life (hrs)	3000	3000	6000	3000	6000
Operating Position	Any	Any	Any	Any	Any
Base	GY9.5	GX9.5	GY9.5	GX9.5	GX9.5
Hot Restart	No	No	No	No	No
Fig No	2	3	2	3	3
Symbols & Footnotes	90,161	90,161	90,161	90,161	90,161

XBO®<=450W XENON SHORT ARC



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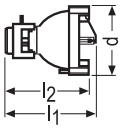

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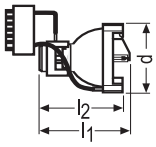
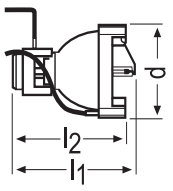


3

Ordering Abbreviation	XBO 75 W/2	XBO 75 W/2 OFR	XBO 100 W OFR	XBO R 100 W/45 OFR	XBO R 100 W/45C OFR
Product Number	69231	69232	69233	69197	69191
Watts (W)	75	75	100	100	100
Volts (V)	14	14	14	13	13
Type of Current	DC	DC	DC	DC	DC
Current (A)	5.4	5.4	7.0	7.0	7.0
Current Control Range (A)					
Lumens (lm)	1000	1000	1900		
Luminous Intensity (cd)	100	100	270		
Average Luminance (cd/cm2)	40000	40000	31000		
Luminous Area -- w x h (mm)	0.25 x 0.5	0.25 x 0.5	0.4 x 0.8	0.4 x 0.9	0.4 x .09
Length l1 max (mm)	90	90	90	83	83
Length l2 max (mm)	82	82	82	75	75
Distance a (mm)	43	43	44.5	0	0
Diameter d (mm)	10	10	11	67	67
Avg Rated Life Vertical (hrs)	400	400	500		
Avg Rated Life Horizontal (hrs)	400	400		500	500
Operating Position	s 105	s 105	s 105	p 15	p 15
Cooling	0	0	Required	Required	Required
Base Anode	SFa9-2	SFa7.5-2	SFa9-2		
Base Cathode	SFa7.5-2	SFa7.5-2	SFa7.5-2		
Fig No	1	1	1	2	3
Symbols & Footnotes	38,58,129,157,179	56,58,129,157,179	56,58,129,157,179	56,60,129,146,157, 168,190	44,56,60,129,157,190

XBO®<=450W XENON SHORT ARC



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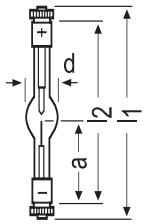
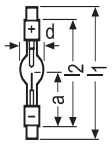


2

Ordering Abbreviation	XBO R 101 W/45C OFR	XBO 150 W/1	XBO 150 W/1 OFR	XBO 150 W/4	XBO 150 W/CR OFR
Product Number	69190	69234	69235	69238	69237
Watts (W)	100	150	150	150	150
Volts (V)	13	20	20	20	18
Type of Current	DC	DC	DC	DC	DC
Current (A)	7.0	7.5	7.5	7.5	8.5
Current Control Range (A)					
Lumens (lm)		3000	3000	3000	2900
Luminous Intensity (cd)		300	300	300	290
Average Luminance (cd/cm2)		15000	15000	15000	20000
Luminous Area -- w x h (mm)	0	0.5 x 2.2	0.5 x 2.2	0.5 x 2.2	0.5 x 1.6
Length l1 max (mm)	83	150	150	150	150
Length l2 max (mm)	75	127	127	127	127
Distance a (mm)	0	57	57	57	57
Diameter d (mm)	67	20	20	20	20
Avg Rated Life Vertical (hrs)		1200	1200	1200	3000
Avg Rated Life Horizontal (hrs)	500				1200
Operating Position	p 15	s 15	s 15	s 15	s15 p15
Cooling	Required	Required	Required	Required	Required
Base Anode		SFc12-4	SFc12-4	SFc12-4	SFc12-4
Base Cathode		SFcX12-4	SFcX12-4	SFcX12.4	SFcX12-4
Fig No	1	2	2	2	2
Symbols & Footnotes	44,56,60,129,157, 190,202	39,58,129,157,179,212	56,58,129,157,179,212	40,58,129,157,179	56,58,60,68,129,157, 179,213

Symbols/Footnotes on page 275-281

XBO®<=450W XENON SHORT ARC



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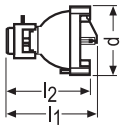

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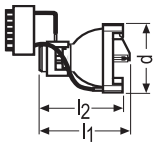

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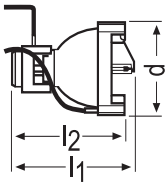

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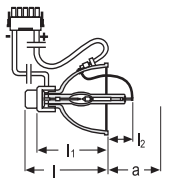
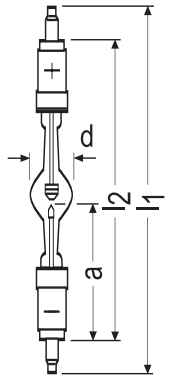


5

Ordering Abbreviation	XBO 150 W/S	XBO R 180 W/45/OFR	XBO R 180 W/45C OFR	XBO R 181 W/45C OFR	XBO R 300 W/60C OFR
Product Number	69236	69186	69183	69184	69167
Watts (W)	150	180	180	180	300
Volts (V)	20	14	14	14	17
Type of Current	DC	DC	DC	DC	DC
Current (A)	7.5	12.0	12.0	12.0	16.0
Current Control Range (A)					14 - 19
Lumens (lm)	2200				
Luminous Intensity (cd)	220				
Average Luminance (cd/cm2)	18000				
Luminous Area -- w x h (mm)	0.5 x 1.9	0	0	0	0
Length l1 max (mm)	117	90	90	90	62
Length l2 max (mm)	96	75	75	75	30
Distance a (mm)	47.5	0	0	0	60
Diameter d (mm)	20	67	67	67	82.5
Avg Rated Life Vertical (hrs)	1000	500	500	500	
Avg Rated Life Horizontal (hrs)	800				1000
Operating Position	s15 p15	p 15	p 15	p 15	p20
Cooling	Required	Required	Required	Required	Required
Base Anode	SFa12-11				
Base Cathode	SFa12-11				
Fig No	1	2	3	4	5
Symbols & Footnotes	43,58,60,68,129,157,179	36,56,60,129,157,190	44,56,60,129,157,190	44,56,60,129,157,190,202	44,56,60,129,157,165

XBO®<=450W XENON SHORT ARC



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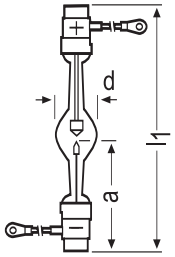
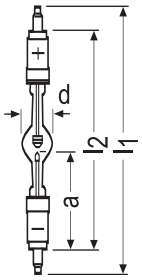


2

Ordering Abbreviation	XBO 450 W	XBO 450 W OFR	XBO 450 W/1	XBO 450 W/2 OFR	XBO 450 W/4
Product Number	69241	69245	69242	69243	69244
Watts (W)	450	450	450	450	450
Volts (V)	17	17	17	17	17
Type of Current	DC	DC	DC	DC	DC
Current (A)	25.0	25.0	25.0	25.0	25.0
Current Control Range (A)	17-30	17-30	17-30	17-30	17-30
Lumens (lm)	13000	13000	13000	13000	13000
Luminous Intensity (cd)	1300	1300	1300	1300	1300
Average Luminance (cd/cm2)	35000	35000	45000	35000	35000
Luminous Area -- w x h (mm)	0.9 x 2.7	0.9 x 2.7	0.7 x 2.2	0.9 X 2.7	0.9 x 2.7
Length l1 max (mm)	260	260	260	177	260
Length l2 max (mm)		212	212	0	212
Distance a (mm)	95.5	95.5	95.5	79	95.5
Diameter d (mm)	29	29	29	29	29
Avg Rated Life Vertical (hrs)	2000	2000	800	2000	2000
Avg Rated Life Horizontal (hrs)			800		
Operating Position	s 30	s 30	s 100	s 30	s 30
Cooling	Required	Required	Required	Required	Required
Base Anode	SFa20-8	SFa20-8	SFa20-8	SK19/36	SFa20-8
Base Cathode	SFa20-10	SFa20-10	SFa20-10	SK19/36	SFa20-10
Fig No	1	1	1	2	1
Symbols & Footnotes	41,42,58,129,157,179	56,58,129,157,179	58,129,157,179	56,58,129,157,179	40,58,129,157,179

XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



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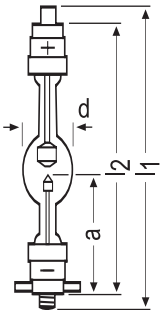

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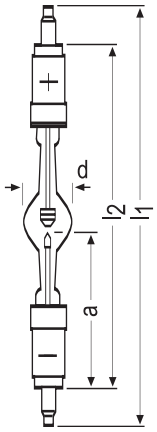

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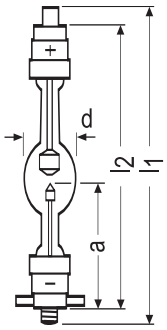

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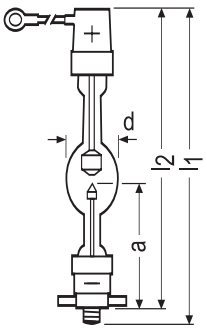
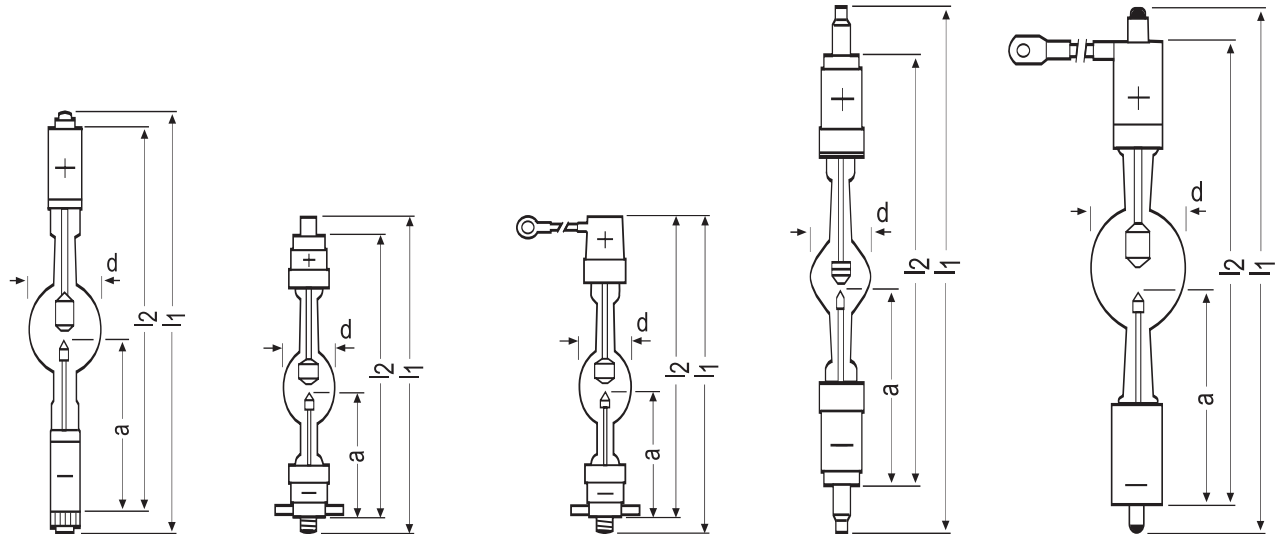


5

Ordering Abbreviation	XBO 500 W/H OFR	XBO 700 W/HS OFR	XBO 900 W OFR	XBO 1000 W/HS OFR	XBO 1000 W/HSC OFR
Product Number	69257	69260	69261	69263	69264
Watts (W)	500	700	900	1000	1000
Volts (V)	17	18	19	19	19
Type of Current	DC	DC	DC	DC	DC
Current (A)	28	37	45	50	50
Current Control Range (A)	17-30	30-45	30-53	30-55	30-55
Lumens (lm)	14500	20000	30000	32000	32000
Luminous Intensity (cd)	1450	2000	3000	3000	3000
Average Luminance (cd/cm2)	40000	40000	50000	60000	60000
Luminous Area -- w x h (mm)	0.9 x 2.5	1.1 x 2.9	1.1 x 3.3	1.1 x 2.8	1.1 x 2.8
Length l1 max (mm)	190	235	325	235	236
Length l2 max (mm)	165	205	277	205	222
Distance a (mm)	75	95	123	95	95
Diameter d (mm)	35	40	40	40	40
Warranty	2000	1500	2400	2000	2000
Operating Position	s30 p30	s20 p20	s 30	s20 p20	s20 p20
Cooling	Required	Required	Required	Required	Required
Magnetic Arc Stabilization	Required				
Base Anode	SFa16-8	SFa27-11	SFa25-10	SFa27-11	SK27/50
Base Cathode	SFa15-10	SFcX27-8	SFa25-12	SFcX27-8	SFcX27-8
Fig No	1	2	3	4	5
Symbols & Footnotes	45,56,58,60,109,129, 157,179	43,45,56,58,60,129, 157,179	56,58,129,157,179	43,45,56,58,60,129, 157,179	43,44,45,56,58,60,129, 157,179

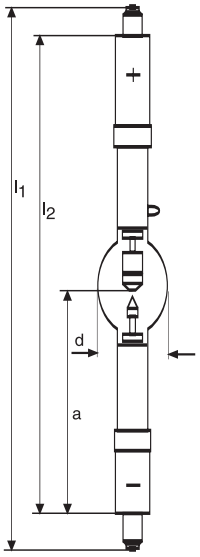
XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



1 2 3 4 5

Ordering Abbreviation	XBO 1000 W/HTP OFR	XBO 1600 W/HS OFR	XBO 1600 W/HSC OFR	XBO 1600 W OFR	XBO 1600 W/CA OFR
Product Number	69265	69268	69269	69266	69267
Watts (W)	1000	1550	1550	1600	1600
Volts (V)	21	23	23	24	24
Type of Current	DC	DC	DC	DC	DC
Current (A)	45	65	65	65	65
Current Control Range (A)	30-55	50-75	50-70	45-75	45-75
Lumens (lm)	35000	70000	70000	60000	60000
Luminous Intensity (cd)	3200	5500	5500	6000	6000
Average Luminance (cd/cm2)	45000	70000	70000	65000	65000
Luminous Area -- w x h (mm)	1.0 x 4.0	1.0 x 3.2	1.0 x 3.2	1.4 x 4.0	1.4 x 4.0
Length l1 max (mm)	330	235	236	370	370
Length l2 max (mm)	277	205	222	322	322
Distance a (mm)	123	95	95	142.5	143
Diameter d (mm)	46	46	46	52	52
Warranty	2400	2000	2000	2400	2400
Operating Position	s30 p30	s20 p20	s20 p20	s 30	s 30
Cooling	Required	Required	Required	Required	Required
Magnetic Arc Stabilization	Required				
Base Anode	SFa25-14	SFa27-11	SK27/50	SFa27-10	SFaX27-10
Base Cathode	SFc25-14	SFcX27-8	SFcX27-8	SFa27-12	SFa27-12
Fig No	1	2	3	4	5
Symbols & Footnotes	45,51,56,58,60,109,129, 157,179	43,45,56,58,60,129, 157,179	43,44,45,56,58,60,129, 157,179	56,58,129,157,179	47,56,58,129,157,179

XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



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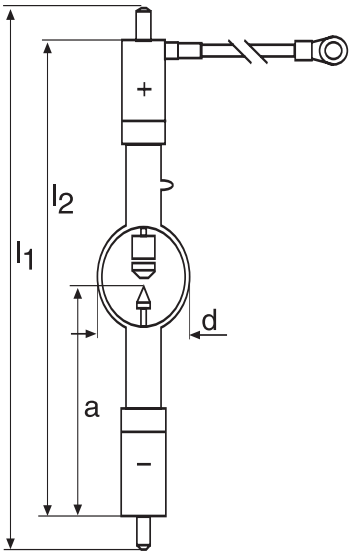

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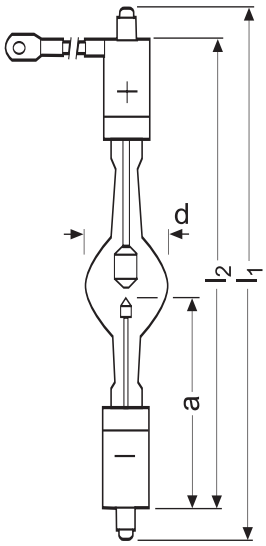

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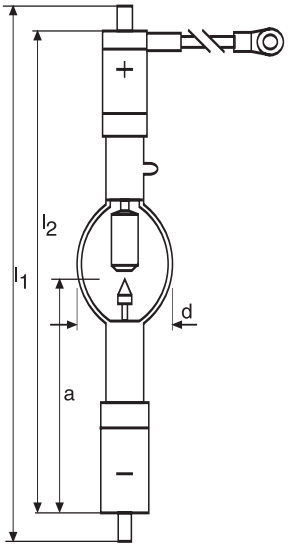
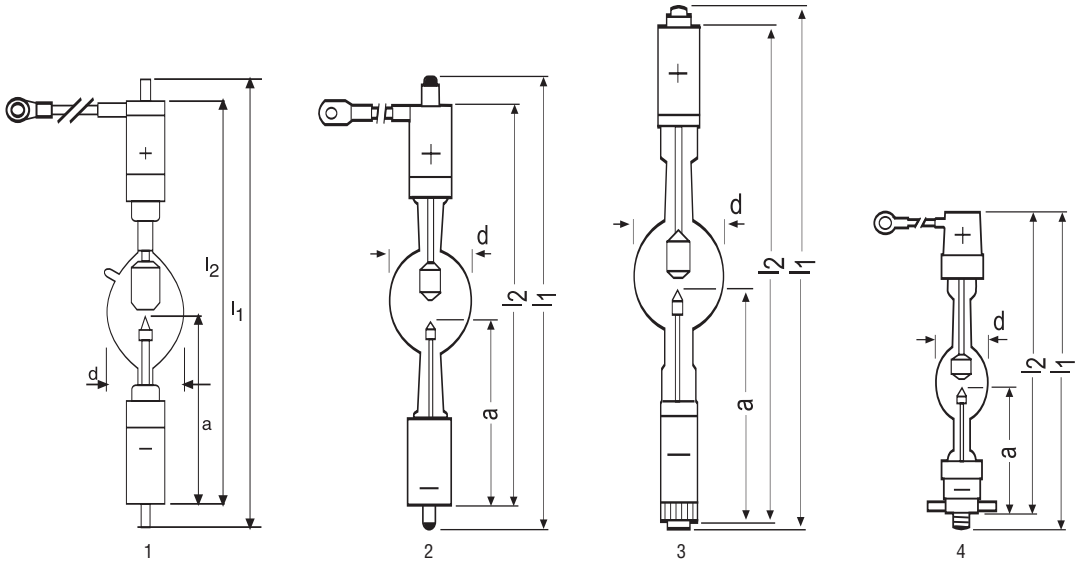


4

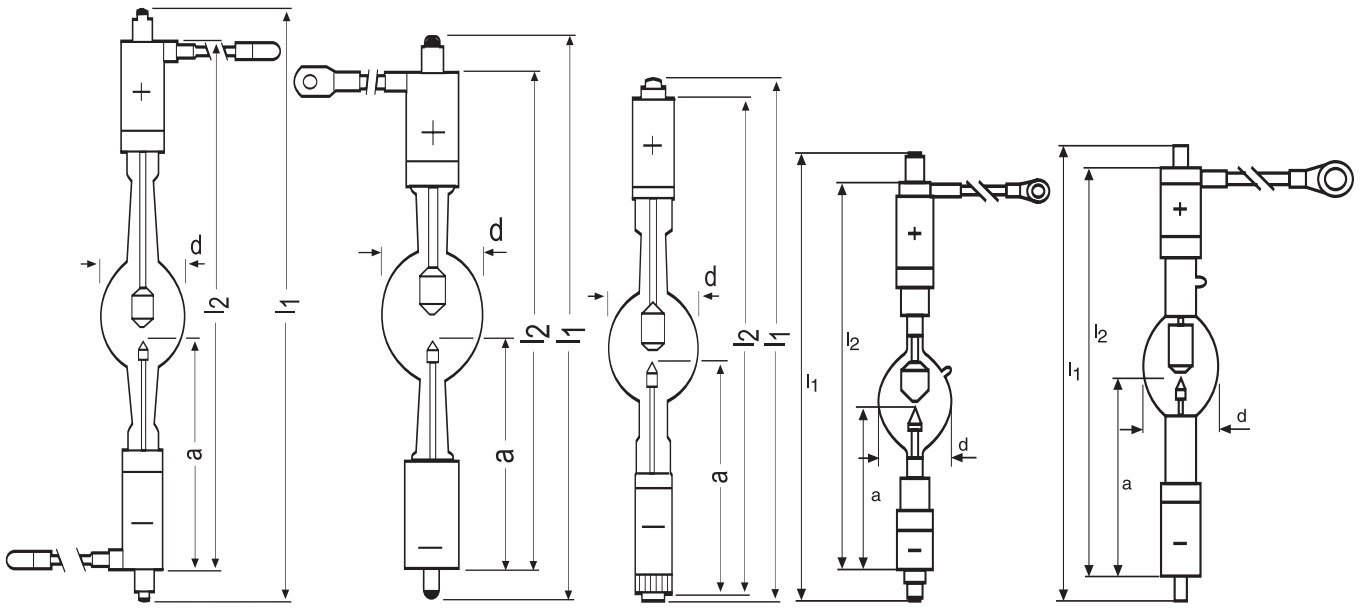
Ordering Abbreviation	XBO 2000 W/DTP OFR	XBO 2000 W/H CL OFR	XBO 2000 W/H OFR	XBO 2000 W/H XL OFR	XBO 2000 W/HCC OFR
Product Number	69155☼	69470☼	69385☼	69477☼	69384☼
Watts (W)	2000	2000	2000	2000	2000
Volts (V)	25	28	28	27	28
Type of Current	DC	DC	DC	DC	DC
Current (A)	80	70	70	70	70
Current Control Range (A)	50-85	50-85	50-85	50-85	50-85
Lumens (lm)	80000	80000	80000	80000	80000
Luminous Intensity (cd)	7500	7500	7500	7500	7500
Average Luminance (cd/cm2)	75000	80000	80000	75000	80000
Luminous Area -- w x h (mm)	1.3 x 4.0	1.3 x 4.8	1.3 x 4.8	1.3 x 4.8	1.3 x 4.8
Length l1 max (mm)	403	370	370	365	370
Length l2 max (mm)	354	322	322	320	322
Distance a (mm)	160	142.5	142.5	142.5	142.5
Diameter d (mm)	52	46	52	52	52
Warranty	2400	2400	2400	3500	2400
Operating Position	s30 p30	s30 p30	s30 p30	s30 p30	s30 p30
Cooling	Required	Required	Required	Required	Required
Magnetic Arc Stabilization	Required			Required	
Base Anode	SFa 25-14	SFaX27-10	SFaX27-10	SFaX27-10	SFaX27-10
Base Cathode	SFc25-14	SFaX27-12	SFaX27-12	SFaX27-12	SFaX27-12
Fig No	1	2	3	4	3
Symbols & Footnotes	51,56,58,60,109,129, 157,179,279	45,56,58,60,129,157, 179,281	45,56,58,60,129,157, 179,193	45,56,58,60,129,157, 179,280	44,45,56,58,60,129,157, 179,195

XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



Ordering Abbreviation	XBO 2000 W/HPS OFR	XBO 2000 W/HS OFR	XBO 2000 W/HTP OFR	XBO 2000 W/SHSC OFR	XBO 2001 W/HTP OFR
Product Number	69486☼	69270	69247	69256	69310
Watts (W)	2000	2000	2000	2000	2000
Volts (V)	25	24	27	27	25
Type of Current	DC	DC	DC	DC	DC
Current (A)	80	80	70	70	80
Current Control Range (A)	60-90	50-85	50-85	50-85	50-85
Lumens (lm)	75000	80000	80000	80000	80000
Luminous Intensity (cd)	8000	7500	7500	7500	7500
Average Luminance (cd/cm2)	160000	80000	75000	80000	75000
Luminous Area -- w x h (mm)	1.3 x 3.2	1.3 x 4.0	1.3 x 4.8	1.3 x 4.0	1.3 x 4.0
Length l1 max (mm)	332	342	375	236	375
Length l2 max (mm)	295	302	322	222	322
Distance a (mm)	128	145	142.5	95	142.5
Diameter d (mm)	46	60	52	46	60
Warranty	2400	2400	2400	2000	2400
Operating Position	s15 p15	s30 p30	s30 p30	s20 p20	s30 p30
Cooling	Required	Required	Required	Required	Required
Magnetic Arc Stabilization			Required		Required
Base Anode	SFaX30-14/68	SFaX27-9.5	SFa25-14	SK27/50	SFa25-14
Base Cathode	SFc30-20/50	SFa27-7.9	SFc25-14	SFcX27-8	SFc25-14
Fig No	1	2	3	4	3
Symbols & Footnotes	56,58,60,129,157,179, 282,283	43,45,56,58,60,129, 157,179	45,51,56,58,60,109, 129,157,179	49,56,58,60,129,157,179	45,51,56,58,60,109,129, 157,179

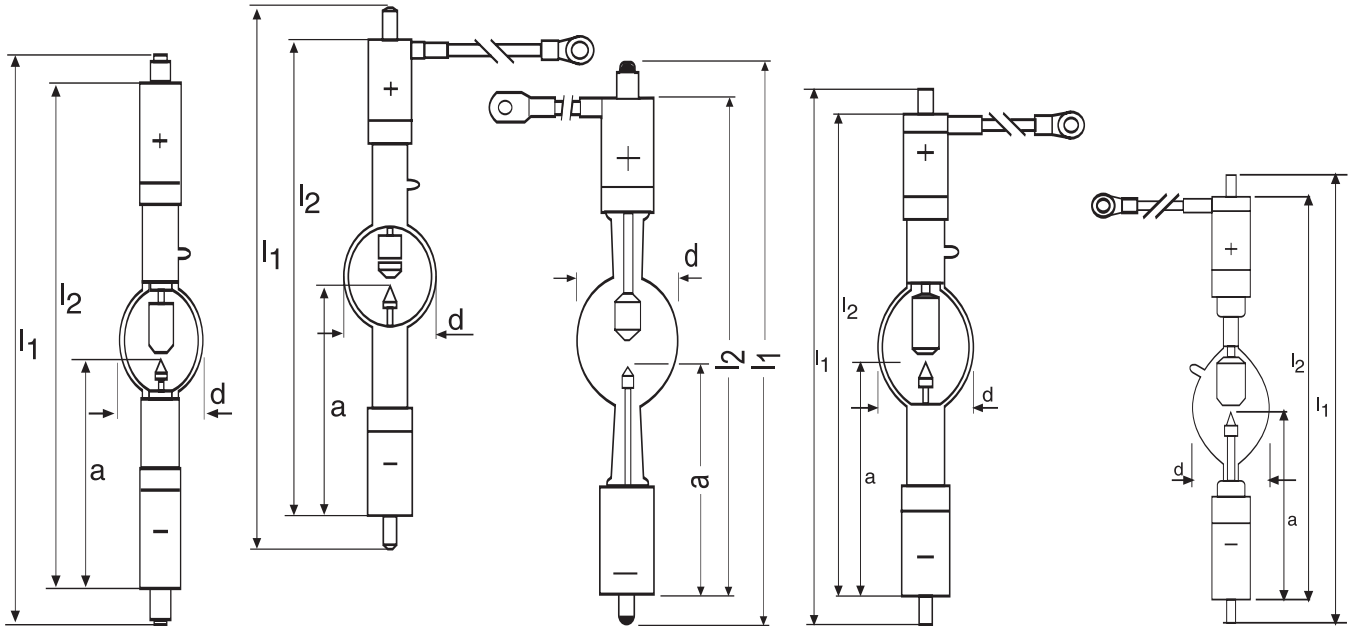
XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



1 2 3 4 5

Ordering Abbreviation	XBO 2500 W OFR	XBO 2500 W/HS OFR	XBO 2500 W/HTP OFR	XBO 3000 W/DHP OFR	XBO 3000 W/DHS OFR
Product Number	69248	69249	69160☼	69480☼	69462☼
Watts (W)	2500	2500	2500	2600	3000
Volts (V)	29	28	28	29	29
Type of Current	DC	DC	DC	DC	DC
Current (A)	85	90	90	90	110
Current Control Range (A)	60-95	70-100	70-100	80-110	60-120
Lumens (lm)	100000	100000	100000	140000	130000
Luminous Intensity (cd)	9500	10000	9500	13500	12000
Average Luminance (cd/cm2)	61000	80000	60000	180000	105000
Luminous Area -- w x h (mm)	1.5 x 6.0	1.5 x 4.5	1.5 x 6.0	1,3 x 3,5	1.7 x 4.0
Length l1 max (mm)	428	342	398	340	340
Length l2 max (mm)	382	302	357	294	300
Distance a (mm)	167.5	145	165	123	145
Diameter d (mm)	60	60	60	55	55
Warranty	2000	1500	1500	1500	1500
Operating Position	s 30	s30 p20	s30 p30	s15 p15	s30 p30
Cooling		Required	Required	Required	Required
Magnetic Arc Stabilization			Required		Required
Base Anode	SFaX27-13	SFaX27-9.5	SFa27-14	SFaX27-14/80	SFaX 27-9.5
Base Cathode	SFaX27-14	SFa27-7.9	SFc27-14	SFc27-16/45	SFa 27-7.9
Fig No	1	2	3	4	5
Symbols & Footnotes	56,58,129,157,179	43,45,56,58,60,129, 157,179	45,51,56,58,60,109, 129,157,179	56,58,60,129,157,179, 279,282	43,45,56,58,60,129,157, 179,279

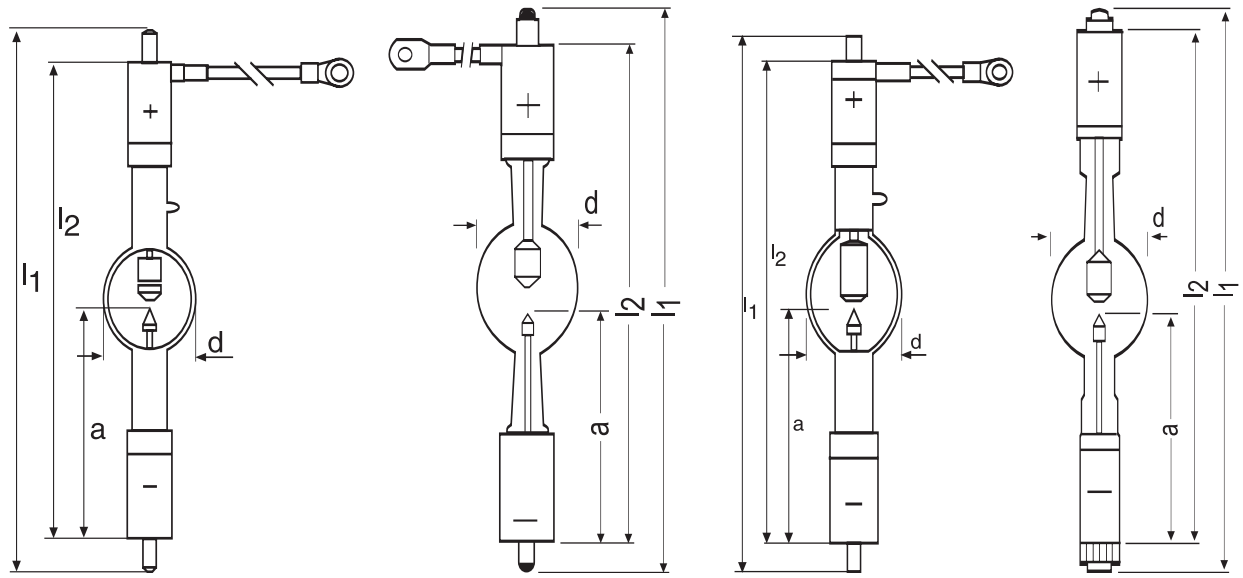
XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



1 2 3 4 5

Ordering Abbreviation	XBO 3000 W/DTP OFR	XBO 3000 W/H CL OFR	XBO 3000 W/H OFR	XBO 3000 W/H XL OFR	XBO 3000 W/HPS OFR
Product Number	69154☼	69475☼	69251	69478☼	69487☼
Watts (W)	3000	3000	3000	3000	3000
Volts (V)	27	30	30	30	29
Type of Current	DC	DC	DC	DC	DC
Current (A)	110	100	100	100	105
Current Control Range (A)	60-120	60-110	60-110	70-110	70-110
Lumens (lm)	130000	130000	130000	130000	140000
Luminous Intensity (cd)	15000	12000	12000	12000	13500
Average Luminance (cd/cm2)	120000	85000	85000	90000	180000
Luminous Area -- w x h (mm)	1.5 x 4.0	1.7 x 5.0	1.7 x 5.0	1.7 x 5.0	1.3 x 3.5
Length l1 max (mm)	403	428	428	423	332
Length l2 max (mm)	352	382	382	380	295
Distance a (mm)	160	167.5	167.5	167.5	128
Diameter d (mm)	60	55	66	60	55
Warranty	1500	1500	1500	2200	1000
Operating Position	s30 p30	s30 p30	s30 p30	s30 p30	s15 p15
Cooling	Required	Required	Required	Required	Required
Magnetic Arc Stabilization	Required	Required	Required	Required	
Base Anode	SFc27-14	SFaX27-13	SFaX27-13	SFaX27-13	SFaX30-14/68
Base Cathode	SFa27-14	SFa27-14	SFa27-14	SFa27-14	SFc30-20/50
Fig No	1	2	3	4	5
Symbols & Footnotes	51,56,129,157,179,279	45,56,58,60,129,157, 179,281	45,56,58,60,109,129, 157,179	45,56,58,60,129,157, 179,280	56,58,60,129,157,179, 282,283

XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



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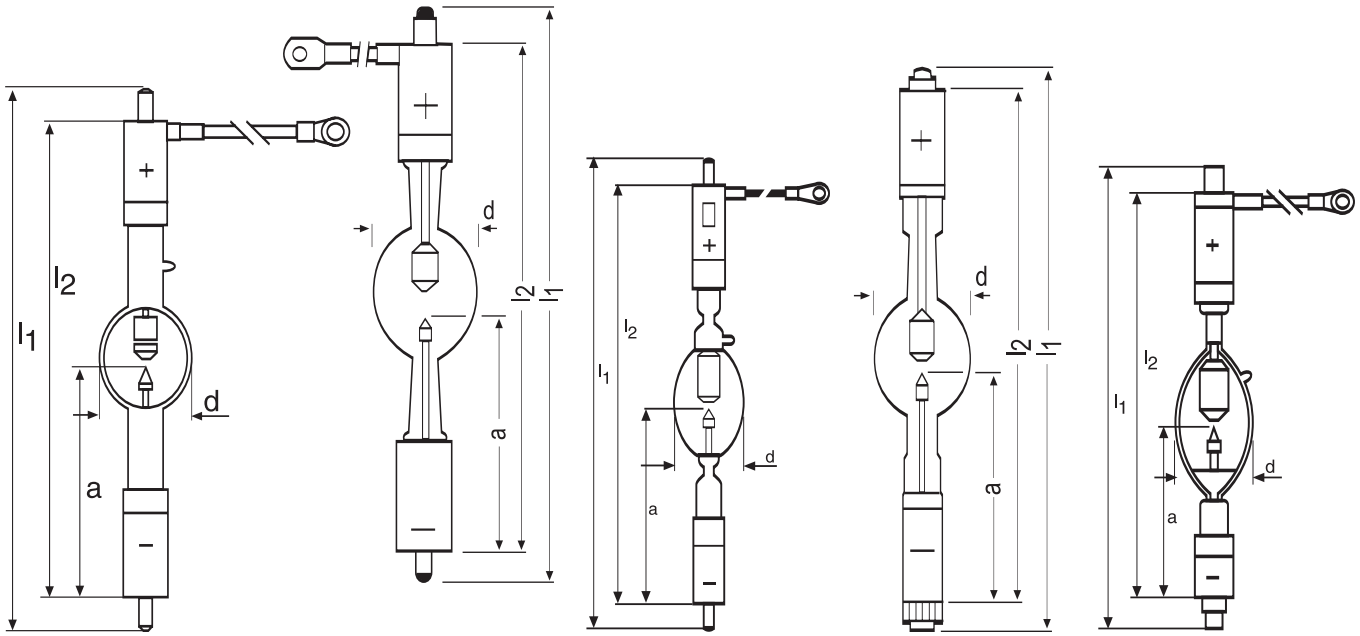
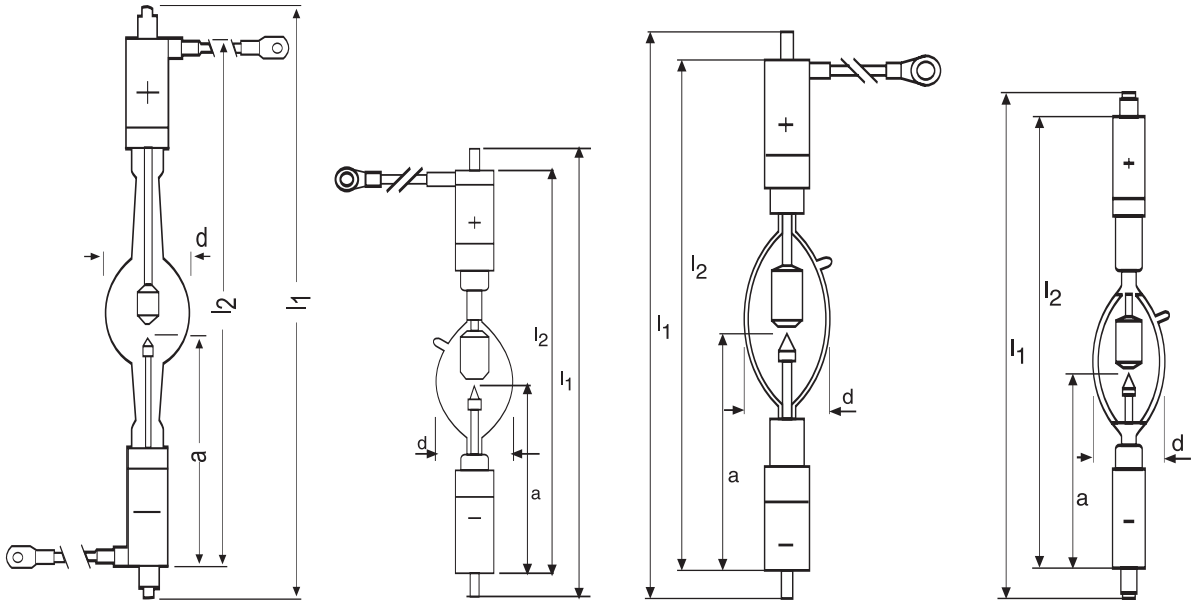
Ordering Abbreviation	XBO 3000 W/HS CL OFR	XBO 3000 W/HS OFR	XBO 3000 W/HS XL OFR	XBO 3000 W/HSLA OFR	XBO 3000 W/HTP OFR
Product Number	69153☼	69250	69479☼	69390☼	69252
Watts (W)	3000	3000	3000	3000	3000
Volts (V)	29	29	30	29	29
Type of Current	DC	DC	DC	DC	DC
Current (A)	100	100	100	110	100
Current Control Range (A)	60-110	60-110	70-110	60-120	60-110
Lumens (lm)	130000	130000	130000	130000	130000
Luminous Intensity (cd)	12000	12000	12000	12000	12000
Average Luminance (cd/cm2)	90000	90000	90000	105000	85000
Luminous Area -- w x h (mm)	1.7 x 5.0	1.7 x 5.0	1.7 x 5.0	1.7 x 4.0	1.7 x 5.0
Length l1 max (mm)	342	342	340	342	405
Length l2 max (mm)	302	302	300	302	357
Distance a (mm)	145	145	145	145	162.5
Diameter d (mm)	55	60	60	54	66
Warranty	1500	1500	2200	1500	1500
Operating Position	s30 p30	s30 p30	s30 p30	s30 p30	s30 p30
Cooling	Required	Required	Required	Required	Required
Magnetic Arc Stabilization	Required	Required	Required	Required	
Base Anode	SFaX27-9.5	SFaX27-9.5	SFaX27-9.5	SFaX 27-9.5	SFa27-14
Base Cathode	SFa27-7.9	SFa27-7.9	SFa27-7.9	SFa 27-7.9	SFc27-14
Fig No	1	2	3	2	4
Symbols & Footnotes	56,58,60,129,157, 179,281	43,45,56,58,60,109, 129,157,179	43,45,56,58,60,129, 157,179,280	43,45,56,58,60,109, 129,157,179,210	45,51,56,58,60,129, 157,179

XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



Ordering Abbreviation	XBO 4000 W/HS CL OFR	XBO 4000 W/HS OFR	XBO 4000 W/HS XL OFR	XBO 4000 W/HTP OFR	XBO 4000 W/DHP OFR
Product Number	69394☼	69254	69474☼	69296	69481☼
Watts (W)	4000	4000	4000	4000	4200
Volts (V)	28	28	27	30	34
Type of Current	DC	DC	DC	DC	DC
Current (A)	135	135	135	130	125
Current Control Range (A)	80-150	80-150	80-150	100-140	100-130
Lumens (lm)	155000	155000	155000	155000	170000
Luminous Intensity (cd)	17000	17000	17000	16000	17000
Average Luminance (cd/cm2)	90000	90000	90000	90000	140000
Luminous Area -- w x h (mm)	1.9 x 6.0	1.9 x 6.0	1.9 x 6.0	1.9 x 6.0	1.6 x 5.0
Length l1 max (mm)	410	410	408	433	340
Length l2 max (mm)	370	370	368	382	294
Distance a (mm)	171	171	171	167.5	123
Diameter d (mm)	60	70	70	70	55
Warranty	1000	1000	1500	1000	700
Operating Position	s20 p20	s20 p20	s20p20	s20 p20	s15 p15
Cooling	Required	Required	Required	Required	Required
Magnetic Arc Stabilization	Required	Required	Required		
Base Anode	SFaX30-9.5	SFaX30-9.5	SFaX30-9.5	SFa27-14	SFaX27-14/80
Base Cathode	SFa30-7.9	SFa30-7.9	SFa30-7.9	SFc27-14	SFc27-16/45
Fig No	1	2	3	4	5
Symbols & Footnotes	56,58,60,129,157,179, 281	43,45,56,58,60,109,129, 157,179	43,45,56,58,60,129, 157,179,280	45,51,56,58,60,129, 157,179	56,58,60,129,157,179, 279,282

XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



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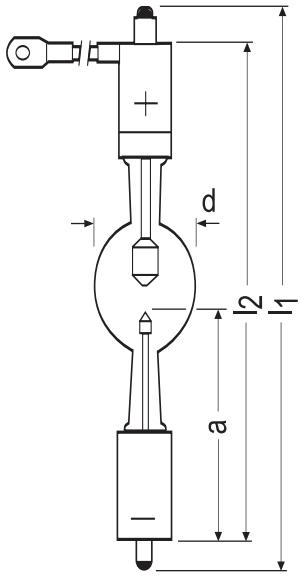
Ordering Abbreviation	XBO 4200 W/CA OFR	XBO 4200 W/GS OFR	XBO 4200 W/HPS OFR	XBO 4500 W/DHP OFR	XBO 4500 W/DTP OFR
Product Number	69294	69350	69488☼	69463☼	69459☼
Watts (W)	4200	4200	4200	4500	4500
Volts (V)	29	29	35	30	32
Type of Current	DC	DC	DC	DC	DC
Current (A)	140	140	120	145	145
Current Control Range (A)	80-160	80-160	80-130	80-150	80-150
Lumens (lm)	190000	190000	170000	190000	190000
Luminous Intensity (cd)	20000	20000	17000	22000	25000
Average Luminance (cd/cm2)	100000	100000	160000	115000	115000
Luminous Area -- w x h (mm)	2.1 x 5.7	2.1 x 5.7	1.5 x 4.5	1.9 x 5.0	1.9 x 5.0
Length l1 max (mm)	428	428	332	408	433
Length l2 max (mm)	382	382	295	368	384
Distance a (mm)	167.5	167.5	128	171	165
Diameter d (mm)	70	60	55	60	60
Warranty	1000	1000	500	1000	1000
Operating Position	s 15	s 15	s15 p15	s15 p15	s15 p15
Cooling	Required	Required	Required	Required	Required
Magnetic Arc Stabilization		Required		Required	Required
Base Anode	SFaX27-13	SFaX27-13	SFaX30-14/68	SFaX30-9.5	SFcX27-14
Base Cathode	SFaX27-14	SFaX27-14	SFc30-20/50	SFa30-7.9	SFa27-14
Fig No	1	1	2	3	4
Symbols & Footnotes	47,56,58,129,157, 179,220	52,56,58,109,129, 157,179	56,58,60,129,157,179, 282,283	56,58,60,129,157, 179,279,282	51,56,58,60,129,157, 179,279

XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



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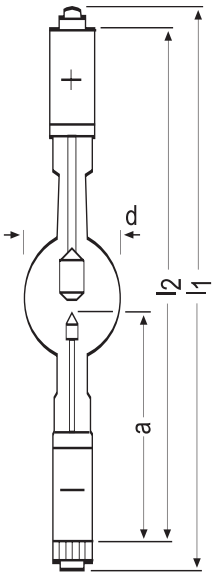

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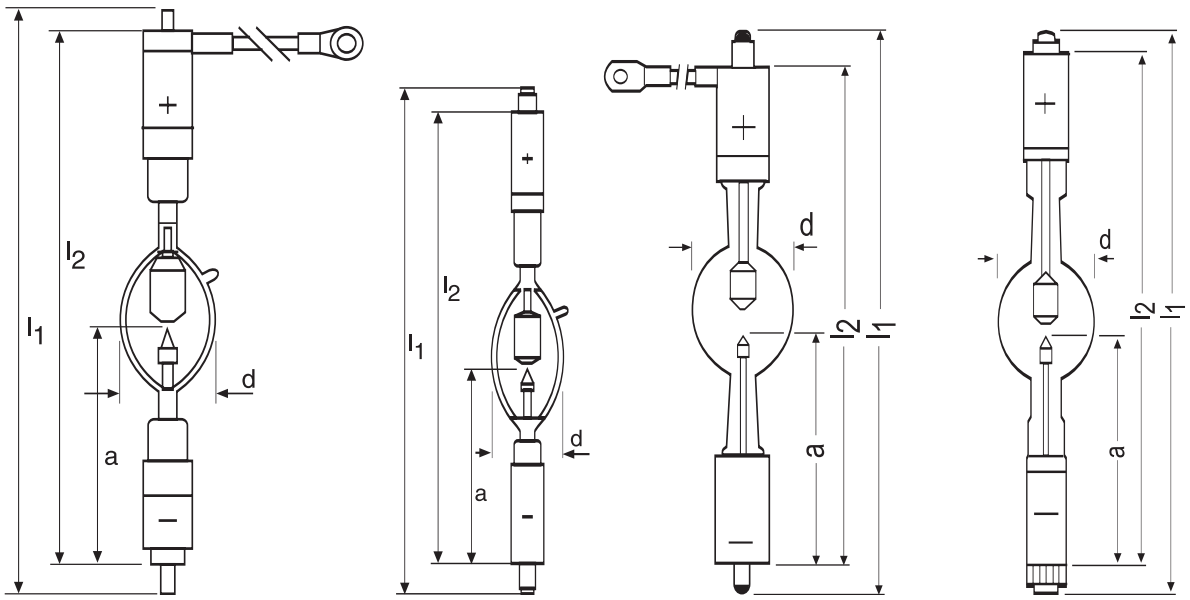
Ordering Abbreviation	XBO 4500 W/HS OFR	XBO 4500 W/HSLA OFR	XBO 4500 W/HTP OFR	XBO 5000 W/H OFR	XBO 5000 W/HTP OFR
Product Number	69359	69389☼	69360	69315	69336
Watts (W)	4500	4500	4500	5000	5000
Volts (V)	32	30	32	35	34
Type of Current	DC	DC	DC	DC	DC
Current (A)	135	145	135	140	140
Current Control Range (A)	80-150	80-150	80-150	100-150	100-150
Lumens (lm)	190000	160000	190000	225000	225000
Luminous Intensity (cd)	22000	22000	22000	27000	27000
Average Luminance (cd/cm2)	120000	115001	105000	95000	95000
Luminous Area -- w x h (mm)	1.9 x 6.0	1.9 x 5.0	1.9 x 6.0	2.2 x 6.5	2.2 x 6.5
Length l1 max (mm)	410	410	433	433	433
Length l2 max (mm)	370	370	382	382	382
Distance a (mm)	171	171	171	168	165
Diameter d (mm)	70	60	70	70	70
Warranty	1000	1000	1000	1000	1000
Operating Position	s15 p15	s15 p15	s15 p15	s15 p15	s15 p15
Cooling	Required	Required	Required	Required	Required
Magnetic Arc Stabilization	Required	Required	Required	Required	Required
Base Anode	SFa30-7.9	SFaX30-9.5	SFa27-14	SFaX27-13	SFa27-14
Base Cathode	SFaX30-9.5	SFa30-7.9	SFc27-14	SFaX27-14	SFc27-14
Fig No	1	1	2	1	2
Symbols & Footnotes	43,45,56,58,60,109,129, 157,179	43,45,56,58,60,109,129, 157,179,210	45,51,56,58,109,129, 157,179	45,56,58,60,109,129, 157,179	45,51,56,58,60,109,129, 157,179

XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



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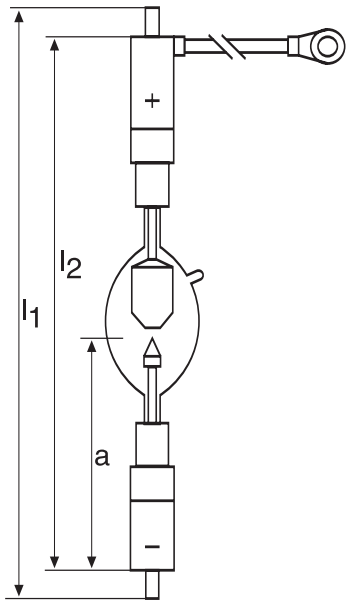
Ordering Abbreviation	XBO 6000 W/DHP OFR	XBO 6000 W/DTP OFR	XBO 6000 W/HS OFR	XBO 6000 W/HSLA OFR	XBO 6000 W/HTP OFR
Product Number	69476☼	69460☼	69339	69386☼	69340
Watts (W)	6000	6000	6000	6000	6000
Volts (V)	35	39	37	35	37
Type of Current	DC	DC	DC	DC	DC
Current (A)	170	155	160	170	160
Current Control Range (A)	140-175	140-175	110 - 165	140-175	110 - 165
Lumens (lm)	280000	270000	280000	280000	280000
Luminous Intensity (cd)	30000	33000	40000	30000	40000
Average Luminance (cd/cm2)	160000	130000	105000	160000	105000
Luminous Area -- w x h (mm)	1.9 x 6.0	1.9 x 7.0	2.0 x 7.5	1.9 x 6.0	2.0 x 7.5
Length l1 max (mm)	431	433	433	433	433
Length l2 max (mm)	391	386	393	393	382
Distance a (mm)	170.5	165	170.5	170.5	165
Diameter d (mm)	70	70	78	70	78
Warranty	600	600	750	600	750
Operating Position	s15 p15	s15 p15	s15 p15	s15 p15	s15 p15
Cooling	Required	Required	Required	Required	Required
Magnetic Arc Stabilization	Required	Required	Required	Required	Required
Base Anode	SFaX30-9.5	SFc27-14	SFaX30-9.5	SFaX30-9.5	SFaX27-14
Base Cathode	SFa30-7.9	SFa27-14	SFa30-7.9	SFa30-7.9	SFc27-14
Fig No	1	2	3	3	4
Symbols & Footnotes	56,58,60,129,157,179, 279,282	51,56,58,60,109,129,157, 179,279	43,45,56,58,60,109,129, 157,179	43,45,56,58,60,109,129, 157,179,210	43,45,51,56,58,60,109, 129,157,179

XBO®>450W XENON SHORT ARC CINEMA FILM PROJECTION



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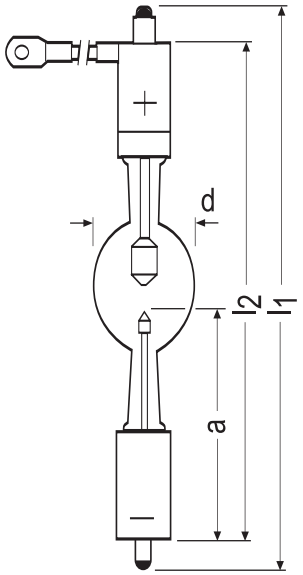

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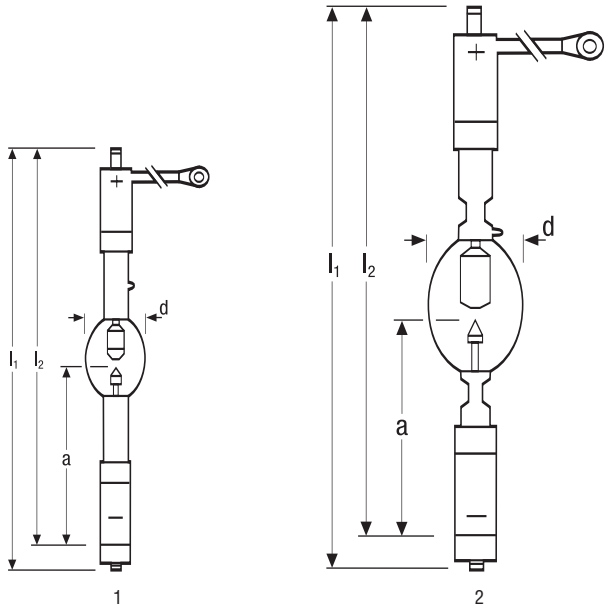
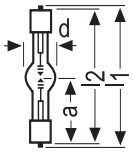
Ordering Abbreviation	XBO 6500 W/DHP OFR	XBO 6500 W/HSLA OFR	XBO 7000 W/HS OFR	XBO 8000 W/HS OFR
Product Number	69461☼	69489☼	69295	69351
Watts (W)	6500	6500	7000	8000
Volts (V)	38	38	42	45
Type of Current	DC	DC	DC	DC
Current (A)	170	170	160	175
Current Control Range (A)	140-175	140-175	110-165	150-180
Lumens (lm)	300000	300000	350000	400000
Luminous Intensity (cd)	32000	32000	35000	40000
Average Luminance (cd/cm2)	160000	160000	100000	110000
Luminous Area -- w x h (mm)	2.0 x 6.3	2.0 x 6.3	2.0 x 7.5	2.5 x 10.5
Length l1 max (mm)	431	433	433	433
Length l2 max (mm)	391	393	393	393
Distance a (mm)	170.5	170.5	170.5	170.5
Diameter d (mm)	70	70	78	90
Warranty	500	500	650	500
Operating Position	s15 p15	s15 p15	s15 p15	s 15, p15
Cooling	Required	Required	Required	Required
Magnetic Arc Stabilization	Required	Required	Required	Required
Base Anode	SFaX30-9.5	SFaX30-9.5	SFaX30-9.5	SFaX 30-9.5
Base Cathode	SFa30-7.9	SFa30-7.9	SFa30-8.0	SFa 30-7.9
Fig No	1	2	2	2
Symbols & Footnotes	56,58,60,129,157,179,279,282	43,45,56,58,60,109,129,157, 179,210	43,45,56,58,60,109,129,157,179	43,45,56,58,60,109,129,157,179

XSTAGE™ XENON SHORT ARC ENTERTAINMENT



Ordering Abbreviation	Xstage 2000W OFR	Xstage 3000W OFR	Xstage 4000W OFR	Xstage 7000W OFR
Product Number	69482☼	69483☼	69484☼	69485☼
Watts (W)	2000	3000	4000	7000
Volts (V)	23	30	30	40
Type of Current	DC	DC	DC	DC
Current (A)	90	100	130	160
Current Control Range (A)	70-110	70-110	80-135	110-165
Lumens (lm)	80000	140000	150000	330000
Luminous Intensity (cd)	9000	13500	17000	33000
Average Luminance (cd/cm2)	170000	200000	120000	120000
Luminous Area -- w x h (mm)	1.2x2.7	1.3x3.5	1.9x5.0	2.0x7.0
Length l1 max (mm)	300	300	315	405
Length l2 max (mm)	262	262	277	354
Distance a (mm)	120	120	120	162.5
Diameter d (mm)	46.5	55	60	70
Warranty	1000	1000	1000	1000
Operating Position	any	any	any	any
Cooling	Required	Required	Required	Required
Magnetic Arc Stabilization				
Base Anode	SFaX27-9.5	SFaX27-9.6	SFaX27-9.7	SFaX27-9.8
Base Cathode	SFc28-27	SFc28-28	SFc28-29	SFc28-30
Fig No	1	1	1	2
Symbols & Footnotes	56,129,157,179	56,129,157,179	56,129,157,179	56,129,157,179

HBO® MERCURY SHORT ARC



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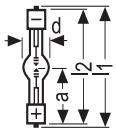

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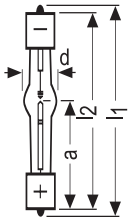

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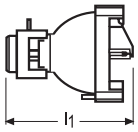
Ordering Abbreviation	HBO 50 W AC L1	HBO 50 W AC L2	HBO 50 W/3	HBO 100 W/2	HBO 103 W/2
Product Number	69213	69214	69215	69217	69182
Watts (W)	50	50	50	100	100
Volts (V)	42	37	23	20	23
Type of Current	AC	AC	DC	DC	DC
Current (A)	1.3	1.45	2.3	5.0	4.44
Lumens (lm)	2000	2000	1300	2200	2550
Luminous Intensity (cd)	230	230	150	260	270.0
Average Luminance (cd/cm2)	30000	30000	90000	170000	150000
Luminous Area – w x h (mm)	0.3 x 1.0	0.3 x 1.0	0.2 x 0.35	0.25 x 0.25	0.25 x 0.25
Luminous Efficacy (lm/W)	40	40	26	22	30
Length l1 max (mm)	53	53	53	90	90
Length l2 max (mm)	47	47	47	82	82
Distance a (mm)	22	22	22	43	43
Diameter d (mm)	8.5	8.5	9	10	10
Avg Rated Life (hrs)	100	100	200	200	300
Operating Position	s 45	s 45	s 45	s 90	s 90
Cooling	Convection	Convection	Convection	Convection	Convection
Base Anode	SFa6-2	SFa6-2	SFa6-2	SFa7.5-2	SFa7.5-2
Base Cathode	SFa6-2	SFa6-2	SFa8-2	SFa9-2	SFa9-2
Fig No	1	1	2	3	3
Symbols & Footnotes	58	58	58	58	58,222

HBO® MERCURY SHORT ARC



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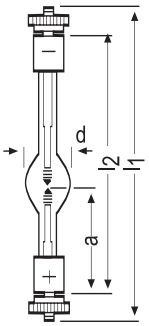
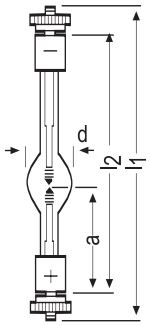


2

Ordering Abbreviation	HBO R 103 W/45	HBO 200 W/2 L1	HBO 200 W/2 L2	HBO 200 W/2 TM L2	HBO 200 W/4
Product Number	69311	69198	69222	69223	69224
Watts (W)	100	200	200	200	200
Volts (V)	23	61	53	47	61
Type of Current	DC	DC or AC	DC or AC	DC or AC	AC
Current (A)	4.3				3.6
Lumens (lm)		9500	9500	9500	9500
Luminous Intensity (cd)		1000	1000	1000	1000
Average Luminance (cd/cm2)		40000	40000	40000	40000
Luminous Area – w x h (mm)		0.6 x 2.2	0.6 x 2.2	0.6 x 2.2	0.6 x 2.2
Luminous Efficacy (lm/W)		47.5	47.5	47.5	47.5
Length l1 max (mm)	81.50	128	128	128	128
Length l2 max (mm)		102	102	102	102
Distance a (mm)		40	40	40	40
Diameter d (mm)	67	17	17	17	17
Avg Rated Life (hrs)	300	400	400	200	200
Operating Position	p 20	s 45	s 45	s 45	s 45
Cooling	Convection	Convection	Convection	Convection	Convection
Base Anode	Pin	SFc10-4	SFc10-4	8-32 UNC-3A	SFc10-4
Base Cathode	Pin	SFc10-4	SFc10-4	8-32 UNC-3A	SFc10-4
Fig No	1	2	2	2	2
Symbols & Footnotes	60,190,223	58,86,226,227	58,86,226,227	58,87	58,225

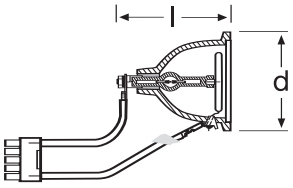
HBO® MERCURY SHORT ARC



1

Ordering Abbreviation	HBO 200 W/DC	HBO 200 W/DC TM	HBO 202 W/4
Product Number	69225	69163☼	69316
Watts (W)	200	200	200
Volts (V)	57	56	61
Type of Current	DC	DC	AC
Current (A)	3.5		3.6
Lumens (lm)	10000	9500	0
Luminous Intensity (cd)	1100	1000	1000
Average Luminance (cd/cm2)	40000	40000	40000
Luminous Area – w x h (mm)	0.75 x 2.3	0.6 x 2.2	0.6 x 2.2
Luminous Efficacy (lm/W)	50	50	47.5
Length l1 max (mm)	128	128	128
Length l2 max (mm)	102	102	102
Distance a (mm)	40	40	40
Diameter d (mm)	17	17	17
Avg Rated Life (hrs)	1000	400	200
Operating Position	s 15	s20	s 45
Cooling	Convection	Convection	Convection
Base Anode	SFc10-4	8-32 UNC-3A	SFc10-4
Base Cathode	SFc10-4	8-32 UNC-3A	SFc10-4
Fig No	1	1	1
Symbols & Footnotes	58	58,200	58,69

HXP® MERCURY SHORT ARC



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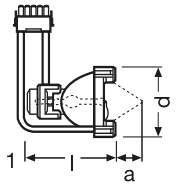
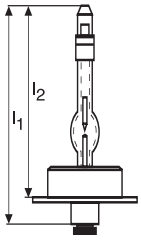


2

Ordering Abbreviation	HXP R 120 W/17C	HXP R 120 W/45 C UV	HXP R 120 W/45 C VIS
Product Number	69125	69120	69119
Watts (W)	120	120	120
Volts (V)	75	75	75
Type of Current	AC	AC	AC
Current (A)	1.4	1.4	1.4
Lumens (lm)	4400		2800
Color Temp (K)			9500
Length l max (mm)	77	77	77
Diameter d (mm)	56	64	64
Working Distance A (mm)	17.3	45	45
Avg Rated Life (hrs)	2000	2000	2000
Hot Restart	p 20	p 20	p 20
Operating Position	Special	Special	Special
Base	Yes	Yes	Yes
Fig No	1	2	2
Symbols & Footnotes	60,170,172,173,174	60,100,169,170,171,172,	60,100,169,170,171,172

HBO® MERCURY SHORT ARC FOR MICROLITHOGRAPHY



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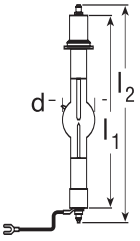

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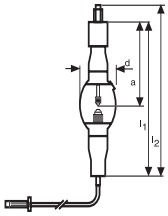

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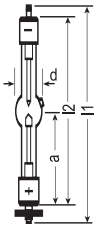

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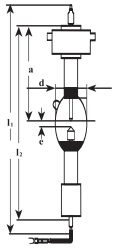
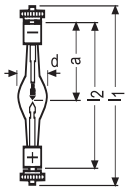


5

Ordering Abbreviation	HBO 200 W/DN-I	HBO 201 W/HS-D2	HBO 510 W/FU	HBO 250 W/BY	HBO 250 W/HS
Product Number	69136	69168	69134	69246	69364
Watts (W)	200	200	200	250	250
Volts (V)	25	25	59	40	40
Type of Current	DC	DC	DC	DC	DC
Current (A)	8.0	8.0	3.0	6.5	6.25
Radiant Intensity 350..450 nm (mW/sr)					
Length l1 max (mm)	145.8	150	111	152	143
Length l2 max (mm)	131	127	120	125	125
Distance a (mm)			55	62	62
Diameter d (mm)	20	20	16	20	20
Electrode Gap -- cold (mm)	1.9	2	2.4	2	2
Avg Rated Life (hrs)	1000	1000	400	1000	1000
Operating Position	Horizontal	Vertical, anode up	Vertical, anode down	Vertical, anode down	Vertical, anode down
Cooling	Convection	Convection	Convection	Forced Base	Convection
Base Anode		SFcX32-22	Cable connection	SFc13-5/20	SFa 13-5/20
Base Cathode		SFcX12-4/15	SfcY 10-4/14	SFc13-5/20	Special
Fig No	1	2	3	4	5
Symbols & Footnotes	129,160,186	129,160,186	182	186	160,186

HBO® MERCURY SHORT ARC FOR MICROLITHOGRAPHY



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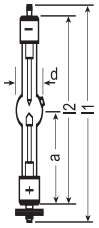

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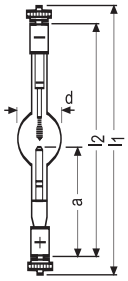

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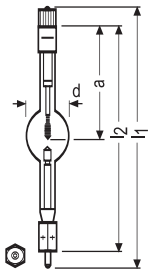
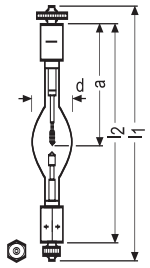


4

Ordering Abbreviation	HBO 350 W	HBO 350 W/S	HBO 450 W/GS	HBO 500 W/A	HBO 500 W/B
Product Number	69226	69228	69343	69205	69206
Watts (W)	350	350	450	500	500
Volts (V)	68	68	50	60	48
Type of Current	DC	DC	DC	DC	DC
Current (A)	5.3	5.15	9.0	8.3	10.3
Radiant Intensity 350..450 nm (mW/sr)	4600	4700		6230	5800
Length l1 max (mm)	128	127	150	190	180
Length l2 max (mm)	102	103	105	161.5	151.5
Distance a (mm)	45	52.5	53	73	78.5
Diameter d (mm)	20	20	22	29	29
Electrode Gap -- cold (mm)	2.9	3	2.2	4.5	3
Avg Rated Life (hrs)	600	600	600	800	800
Operating Position	Vertical, anode down	Vertical, anode down	Vertical, anode down	Vertical, anode down	Vertical, anode down
Cooling	Convection	Convection	Convection	Convection	Convection
Base Anode	SFcY 10-4	SFcY10-4	SFc 13-8	SFcY13-5	SFcX13-5/20
Base Cathode	SFcY 10-4	SFcY10-4	SFc 13-4	SFcY13-5	SFcY 13-15/20
Fig No	1	1	2	3	4
Symbols & Footnotes	89,229,230,231	89,231	291	231,235	96,231,236

HBO® MERCURY SHORT ARC FOR MICROLITHOGRAPHY



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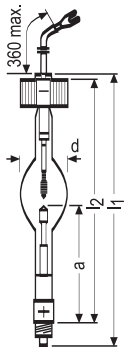

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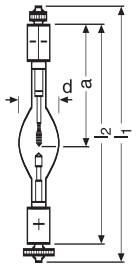

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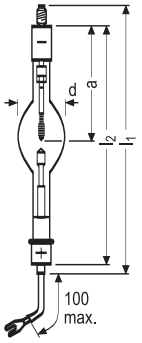

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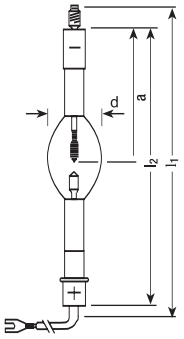
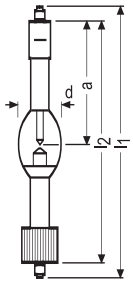


5

Ordering Abbreviation	HBO 1000 W/CEL	HBO 1000 W/NEL	HBO 1002 W/CEL	HBO 1002 W/NEL	HBO 1002 W/NIL
Product Number	69175	69176	69177	69273	69347
Watts (W)	750	750	750	750	750
Volts (V)	47	47	47	47	25
Type of Current	DC	DC	DC	DC	DC
Current (A)	16.0	16.0	16.0	16.0	27.1
Radiant Intensity 350..450 nm (mW/sr)	8300	8300	8300	8300	
Length l1 max (mm)	175	190	175	190	187
Length l2 max (mm)	157	168	157	168	168
Distance a (mm)	78.5	84.5	78.5	78.5	78.5
Diameter d (mm)	28	28	28	28	29
Electrode Gap -- cold (mm)	3	3	3	3	3
Avg Rated Life (hrs)	2500	2500	2500	2500	1500
Operating Position	Vertical, anode down	Vertical, anode down	Vertical, anode down	Vertical, anode down	Vertical, anode down
Cooling	Convection	Convection	Convection	Convection	Forced Base
Base Anode	SxFc15-6/20	SFa15-5/16	SFc15-6/20	SFaX14-5/21	SFaX14-5/21
Base Cathode	SFc15-6/20	SFaX14-5/21	SXFc15-6/20	SFc15-6/25	SFc15-6/25
Fig No	1	2	3	4	5
Symbols & Footnotes	75,237,243	97,237,253,254	78,237,244	98,237,243	98,237,243

HBO® MERCURY SHORT ARC FOR MICROLITHOGRAPHY



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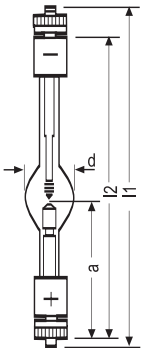

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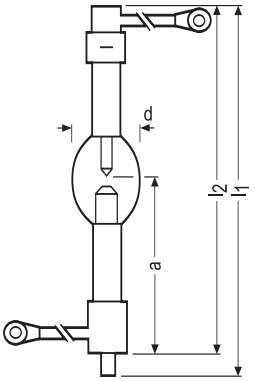
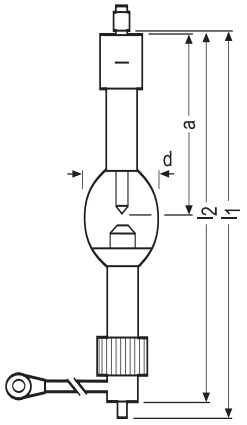


3

Ordering Abbreviation	HBO 1003 W/PI	HBO 1003 W/PIL	HBO 1000 W/D	HBO 1500 W/CIEL	HBO 1500 W/CIL
Product Number	69195	69180	69200	69171	69179
Watts (W)	750	750	1000	1500	1500
Volts (V)	26	26	38	23	23
Type of Current	DC	DC	DC	DC	DC
Current (A)	27.1	25.8	26.5	65.2	65.2
Radiant Intensity 350..450 nm (mW/sr)			10800		
Length l1 max (mm)	197	195	240	262	262
Length l2 max (mm)	169.5	169.5	208	242	242
Distance a (mm)	85	85	89.5	122	122
Diameter d (mm)	29	29	40	52	52
Electrode Gap -- cold (mm)	3	3	3	4	4
Avg Rated Life (hrs)	850	1500	1000	2250	1500
Operating Position	Vertical, anode down	Vertical, anode down	Vertical, anode down	Vertical, anode down	Vertical, anode down
Cooling	Forced Base	Forced Base	Forced Base	Forced Base	Forced Base
Base Anode	SFcX14-6/25	SFcX14-6/25	SFc15-6/25	SFa27-20/22	SFa27-10/35
Base Cathode	SFc15-6/25	SFc15-6/25	SFc15-6/25	SFa27-20/23	SFa27-20/23
Fig No	1	1	2	3	3
Symbols & Footnotes	237,242,249	64,237,242	74,243	258,260,266	260,266

HBO® MERCURY SHORT ARC FOR MICROLITHOGRAPHY



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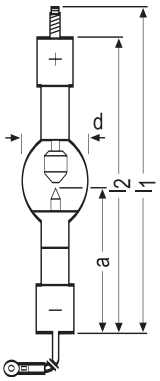

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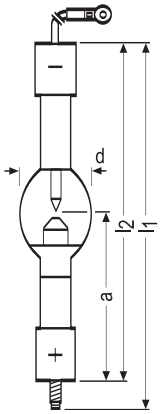
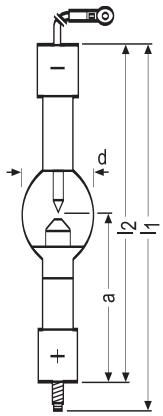


3

Ordering Abbreviation	HBO 1500 W/PI	HBO 1500 W/PIL	HBO 1500 W/PIL HP	HBO 2000 W/NIL	HBO 2001 W/NIEL
Product Number	69319	69181	69122	69303	69306
Watts (W)	1500	1500	1500	1750	1750
Volts (V)	23	23	23	26	26
Type of Current	DC	DC	DC	DC	DC
Current (A)	65.2	65.2	65.0	67.0	67.0
Radiant Intensity 350..450 nm (mW/sr)				5200	
Length l1 max (mm)	267	273	273	241	251
Length l2 max (mm)	240	242	242	221	231
Distance a (mm)	118	118	118	112.25	112.5
Diameter d (mm)	47	46	52	52	52
Electrode Gap -- cold (mm)	4	4	4	4.5	4.5
Avg Rated Life (hrs)	850	1500	1500	1500	2250
Operating Position	Vertical, anode down	Vertical, anode down	Vertical, anode down	Vertical, anode up	Vertical, anode down
Cooling	Forced Base	Forced Base	Forced Base	Forced Base	Forced Base
Base Anode	SFc30-6/25	SFc30-6/25	SFc30-6/25	SFc27-12/35	SFc27-10/35
Base Cathode	SFc27-10/35	SFc27-10/35	SFc27-10/35	SFc27-7/35	SFc27-7/35
Fig No	1	1	1	2	3
Symbols & Footnotes	257,262	61,262	241,242	241,260	241,260

HBO® MERCURY SHORT ARC FOR MICROLITHOGRAPHY



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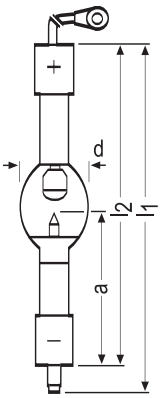

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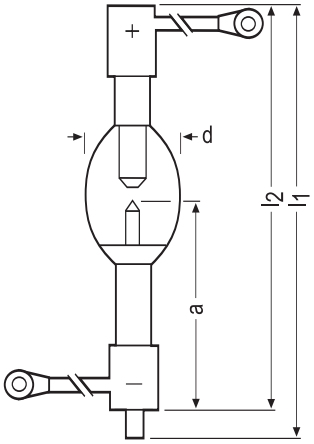

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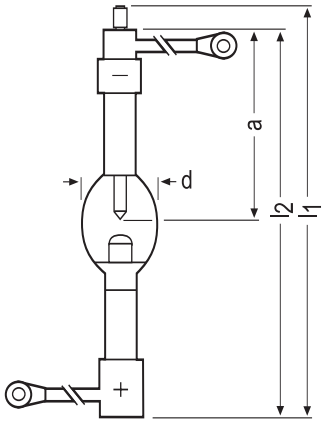
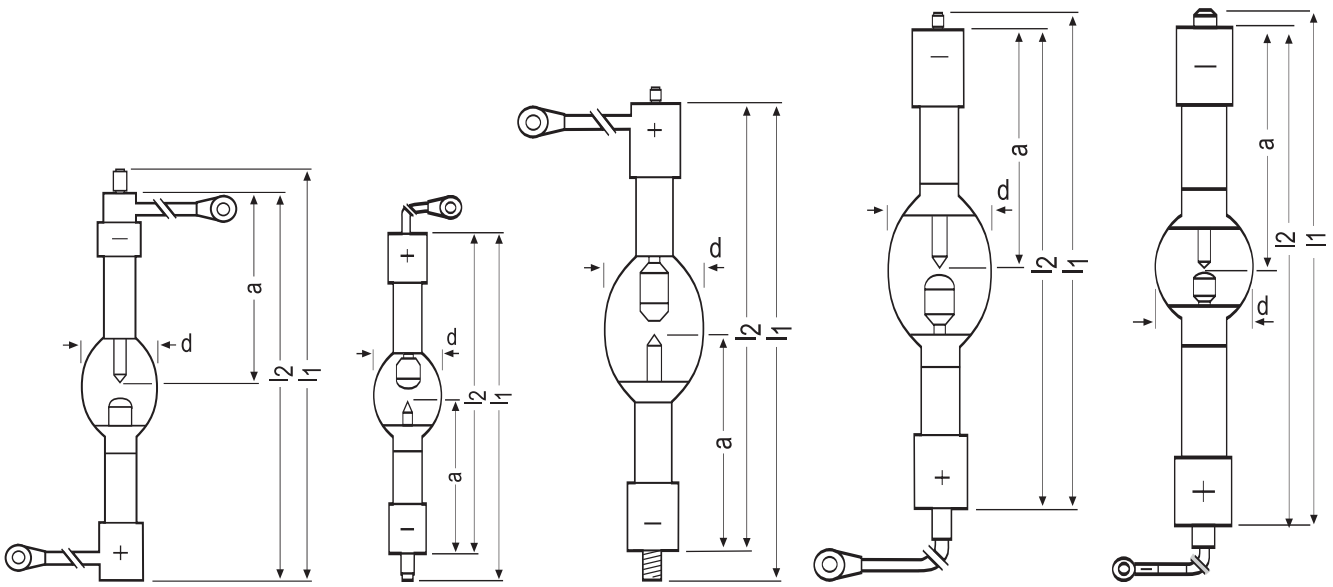


4

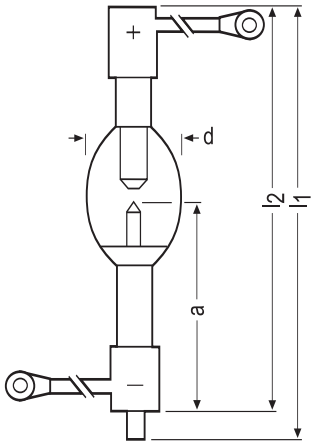
Ordering Abbreviation	HBO 2001 W/NIL	HBO 2002 W/NIL	HBO 2001 W/CIEL	HBO 2001 W/CIL	HBO 2002 W/MA
Product Number	69292	69287	69166	69189	69199
Watts (W)	1750	1750	2000	2000	2000
Volts (V)	26	24	26	26	37
Type of Current	DC	DC	DC	DC	DC
Current (A)	67.0	67.0	77.0	77.0	54.0
Radiant Intensity 350..450 nm (mW/sr)					
Length l1 max (mm)	251	254	329	329	292
Length l2 max (mm)	231	234	309	307	272
Distance a (mm)	112	107.5	148.75	149	138.5
Diameter d (mm)	50	52	62	62	62
Electrode Gap -- cold (mm)	4.5	4.5	4	4.5	3
Avg Rated Life (hrs)	1500	1500	2250	1500	1000
Operating Position	Vertical, anode down	Vertical, anode up	Vertical, anode up	Vertical, anode up	Vertical, anode down
Cooling	Forced Base	Forced Base	Forced Base	Forced Base	Forced Base
Base Anode	SFc27-10/35	SFc27-7/35	SF33.5/50	SF33.5/50	SF27/35
Base Cathode	SFaX27-7/35	SFc27-10x1.25/35	SFa33.5-10/50	SFa33.5-10//50	SFa27-10/35
Fig No	1	2	3	3	4
Symbols & Footnotes	241,260	79,241	79,114,264	79,241,264	79,241,260

HBO® MERCURY SHORT ARC FOR MICROLITHOGRAPHY



Ordering Abbreviation	HBO 2002 W/MAL	HBO 2011 W/NIL	HBO 2500 W/PIL	HBO 2501 W/NIL	HBO 2510 W/NIL
Product Number	69121	69288	69172	69289	69299
Watts (W)	2000	2000	2500	2500	2500
Volts (V)	40	24	28	23	23
Type of Current	DC	DC	DC	DC	DC
Current (A)	50.0	80.0	90.0	110.0	109.0
Radiant Intensity 350..450 nm (mW/sr)					
Length l1 max (mm)	292	256	350	367	367
Length l2 max (mm)	272	236	315	327	327
Distance a (mm)	138.5	107.75	149	157.75	157.5
Diameter d (mm)	62	52	62	70	70
Electrode Gap -- cold (mm)	3	4.5	6.7	4.5	4.5
Avg Rated Life (hrs)	1500	1500	1500	1500	1500
Operating Position	Vertical, anode down	Vertical, anode up	Vertical, anode up	Vertical, anode down	Vertical, anode up
Cooling	Forced Base	Forced Base	Forced Base	Forced Base	Forced Base
Base Anode	SF27/35	SFc27-7/35	SFc30-6/50	SFc33.5-8/50	SFc33.5-8/50
Base Cathode	SFa27-10/35	SFc27-12x1.5/35	SFc30-6.3/50	SFc33.5-14/5	SFc33.5-14/50
Fig No	1	2	3	4	5
Symbols & Footnotes	79,260	79,241	241,242,266	79	72,241

HBO® MERCURY SHORT ARC FOR MICROLITHOGRAPHY



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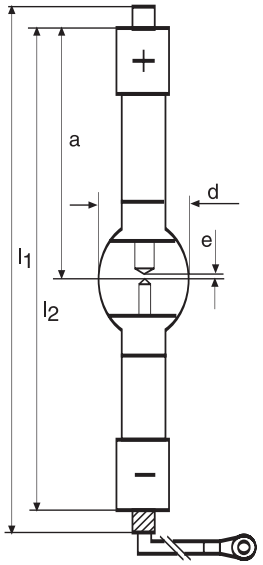

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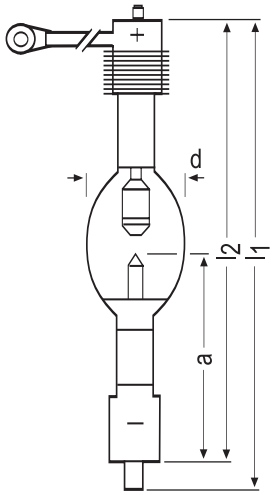
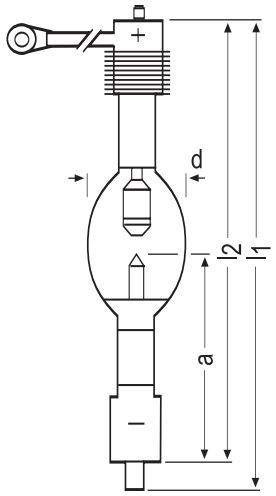


3

Ordering Abbreviation	HBO 2700 W/CIL	HBO 3500 W/NIL	HBO 3500 W/PI	HBO 3500 W/PIL	HBO 3501 W/PI
Product Number	69344	69456☼	69174	69169	69127
Watts (W)	2700	3500	3400	3400	3400
Volts (V)	24	27	23	23	23
Type of Current	DC	DC	DC	DC	DC
Current (A)	110.0	130	148.0	148.0	148.0
Radiant Intensity 350..450 nm (mW/sr)					
Length l1 max (mm)	334	382	340	360	360
Length l2 max (mm)	309	337	315	315	315
Distance a (mm)	148.75	180	154	154	154
Diameter d (mm)	62	82	77	77	77
Electrode Gap -- cold (mm)	4.8	5.5	4.5	4.5	4.5
Avg Rated Life (hrs)	1500	1500	850	1500	850
Operating Position	Vertical, anode up	Vertical, anode up	Vertical, anode up	Vertical, anode up	Vertical, anode up
Cooling	Forced Base	Forced Base	Forced Base	Forced Base	Forced Base
Base Anode	SFa33.5/50	SFc33.5-16-50	SFaX40-6/50	SFaX40-6/50	SFaX40-6/50
Base Cathode	SFa33.5-14.59	SFa33.5-12/50	SFc32.5-6.7/50	SFc32.5-6.7/50	SFc32.5-6.7/50
Fig No	1	2	3	3	3
Symbols & Footnotes	79,129,264	129,260,284	99,241,266	241,266	241,266

HBO® MERCURY SHORT ARC FOR MICROLITHOGRAPHY



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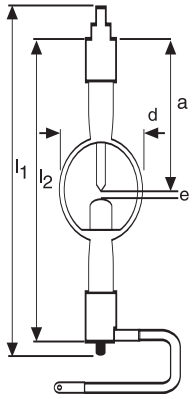

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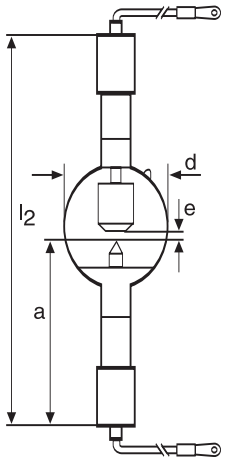

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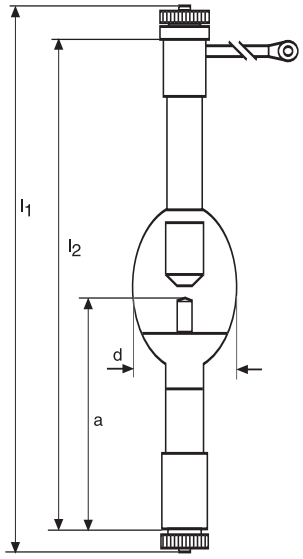
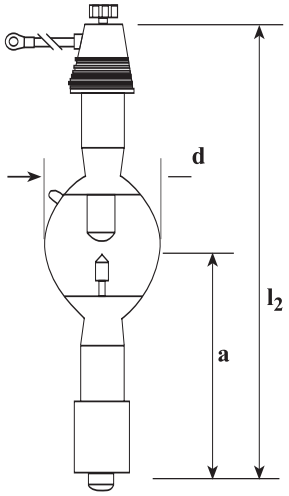


4

Ordering Abbreviation	HBO 3501 W/PIL	HBO 3500 W/HK	HBO 4500 W/CIL	HBO 5000 W/TA	HBO 5001 W/UF
Product Number	69165	69137☼	69162	69135	69161☼
Watts (W)	3400	3500	4500	5000	5000
Volts (V)	23	55	30	50	62
Type of Current	DC	DC	DC	DC	DC
Current (A)	148.0	63.5	148.0	100.0	80.0
Radiant Intensity 350..450 nm (mW/sr)					
Length l1 max (mm)	360	315	360		486
Length l2 max (mm)	315		315	327.5	355
Distance a (mm)	154	142.7	154	148.5	206
Diameter d (mm)	77	70	77	80	85
Electrode Gap -- cold (mm)	4.5	6.4	4.5	7.5	7.5
Avg Rated Life (hrs)	1500	1000	1500	850	850
Operating Position	Vertical, anode up	Vertical, anode up	Vertical, anode up	Vertical, anode up	Vertical, anode up
Cooling	Forced Base	Forced Base	Forced Base	Forced Base	Forced Base
Base Anode	SFc32.5-6.7/50	SFa 27-10/42	SFAX40-6/50	SFa 33.5-12/50	SFa 38-14/65
Base Cathode	SFaX40-6/50	SFc 27-14-8/35	SFC32.5-6.7/50	SFa 33.5-12/50	SFXa 38-14/65
Fig No	1	2	1	3	4
Symbols & Footnotes	163,266	100,189	186	183,266	135,266

HBO® MERCURY SHORT ARC FOR MICROLITHOGRAPHY



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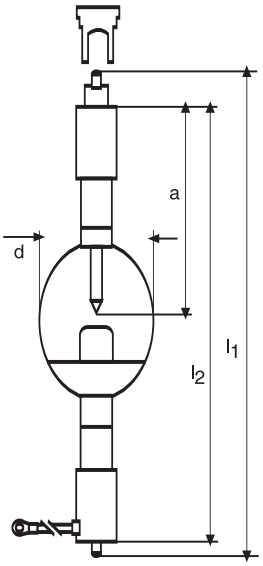
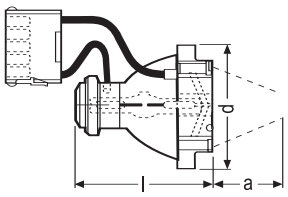


2

Ordering Abbreviation	HBO 5500 W/PI	HBO 5000 W/HK
Product Number	69164	69138☼
Watts (W)	5000	5100
Volts (V)	25	70
Type of Current	DC	DC
Current (A)	200.0	72.0
Radiant Intensity 350..450 nm (mW/sr)		65.8
Length l1 max (mm)		355
Length l2 max (mm)	355	302
Distance a (mm)	154	152.5
Diameter d (mm)	85	82
Electrode Gap -- cold (mm)	5.5	7.5
Avg Rated Life (hrs)	850	1000
Operating Position	Vertical, anode up	Vertical, anode down
Cooling	Forced Base	Forced Base
Base Anode	SFcX 42.5-6/50	SFYa29-10/42
Base Cathode	SFa 37.5-9/50	SFc29-20-12/42
Fig No	1	2
Symbols & Footnotes	135,201,266	80

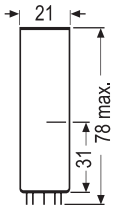
VIP® VIDEO AND DATA PROJECTION



1

Ordering Abbreviation	VIP R 273/45
Product Number	69327
Watts (W)	270
Volts (V)	38
Current (A)	7.1
Lumens (lm)	17000
Average Luminance (cd/cm2)	100000
Color Temp (K)	5800
Length l (mm)	73
Distance a (mm)	45
Diameter d (mm)	67
Arc Length (mm)	1.9
Avg Rated Life (hrs)	1000
Operating Position	Horizontal, tip-off up
Base	
Hot Restart	Yes
Fig No	1
Symbols & Footnotes	1,113,124

SPECTRAL



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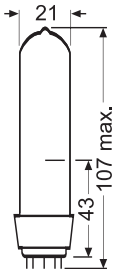
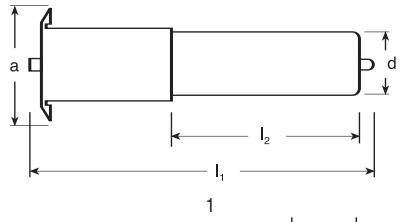


2

Ordering Abbreviation	Na 10 FL	Na/10
Product Number	69284	69282
Elements	Sodium	Sodium
Watts (W)	9	15
Volts (V)	16	15
Current (A)	0.57	1.0
Type of Current	AC	AC
Operating Position	Vertical, base down	Vertical, base down
Base	Pico 9	Pico 9
Fig No	1	2
Symbols & Footnotes	119,128	128

EXCIMER LAMPS



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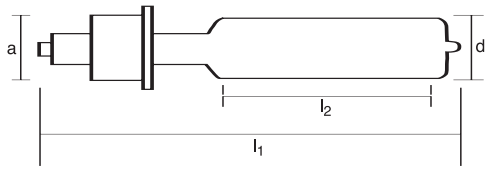

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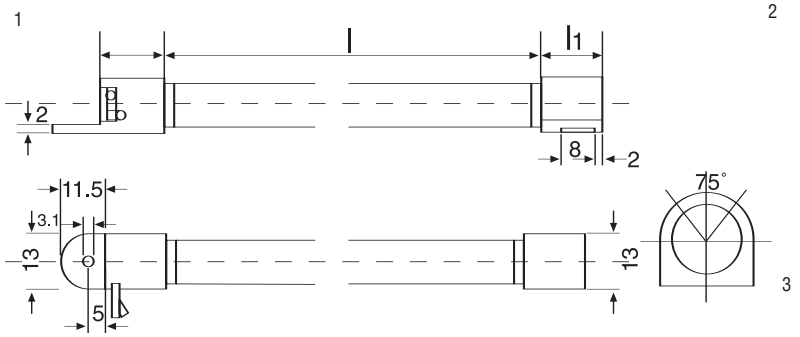


3

XERADEX®

Ordering Abbreviation	XERADEX 20	XERADEX 20/HV	XERADEX 20/SY45/45
Product Number	69338	69352	69349
Watts (W)	20	20	20
Length l1 max (mm)	245	245	300
Length l2 max (mm)	120	120	125
Distance a (mm)	75	75	45
Diameter d (mm)	40	40	40
Avg Rated Life (hrs)	1500	1500	1500
Operating Position	Any	Any	Any
Fig No	1	1	2
Symbols & Footnotes	115,118,145,147	115,118,145,158	115,118,145,148

LINEX®

Ordering Abbreviation	LX40T3/956/A3	LX24T3/956/A4
Product Number	52079	52155
Watts (W)	40	24
Avg Rated Life (hrs)	2000	2000
Base	Special	Special
Illuminance @ 8mm (Lx)	80000	48000
Bulb	T3	T3
Lamp Finish	Coated	Coated
Hot Restart	Yes	Yes
Length L (mm)	350	235
Length L1 (mm)	15	15
MOL (mm)	391.5	267.5
Fig No	3	3
Symbols & Footnotes	176,204	176,204

LAMP BASES

BA15d
IEC 7004-11
DIN 49721
DL
Bayonet

BA15s
IEC 7004-11A
DIN 49720
SC
Bayonet

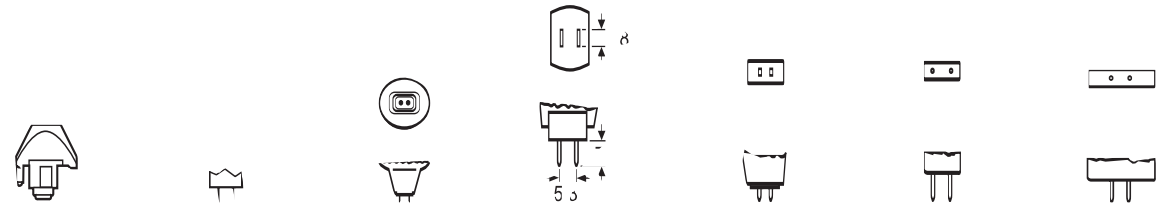
BA20d
IEC 7004-12
DIN 49730

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

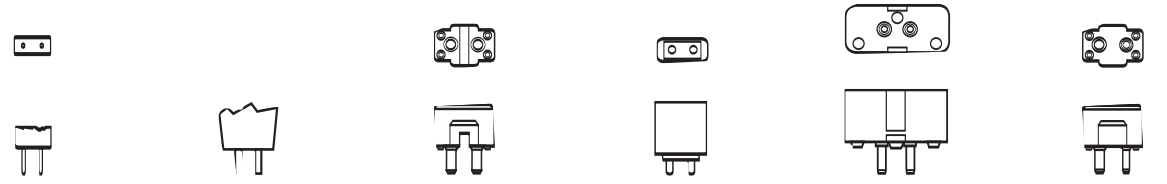
GX5.3
IEC 7004-61
DIN 49640
2-pin

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

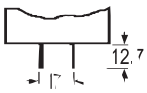
GZX9.5
GZZ9.5
IEC 7004-70 B
DIN 49756
2-pin
pre-focus

G9.5
IEC 7004-70
medium
2-pin

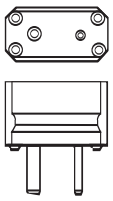
GX9.5
DIN 49638
IEC 7004-70 A
2-pin
pre-focus

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

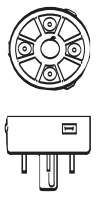
LAMP BASES



GX16d
2-pin



GY16
DIN 49758
IEC 7004-45
2-pin



GY17q
DIN 49758
IEC 7004-74
4-pin

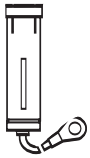
GY17t
DIN 49665
IEC 7004-45
4-pin

G22
IEC 7004-75
medium
Bipost

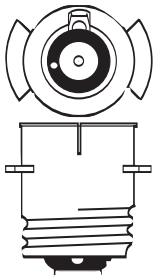
GY22
2-pin

G38
IEC 7004-76
MOGUL
Bipost

GX38q



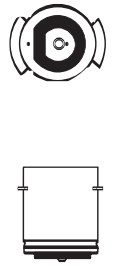
K24s
Length of cable
250 mm
Hole of cable lug
ø 8.4 mm
DIN 49748



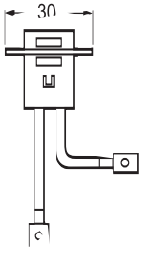
P40s
DIN 49728
IEC 7004-43
medium
pre-focus

Pico9
DIN 41539

PG22-6.35
DIN 49751
IEC 7004-48

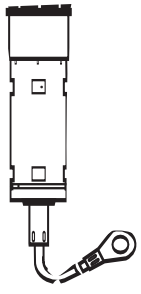


P28s
DIN 49728
IEC 7004-42
MOGUL
pre-focus

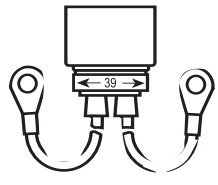


PK30d

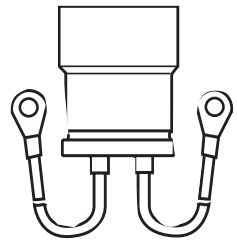
R7s
RX7s
DIN 49750
IEC 7004-92



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

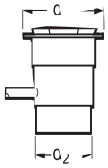


K39 d
with flexible Siaf cable
Length of cable 300 mm.
Hole of cable lug dia. 8.4 mm

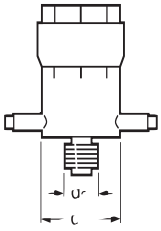


K59 d
with flexible Siaf cable
Length of cable 350 mm.
Hole of cable lug dia. 8.4 mm
DIN 49732

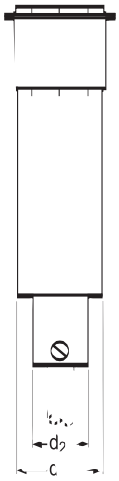
LAMP BASES



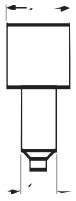
SK27-50



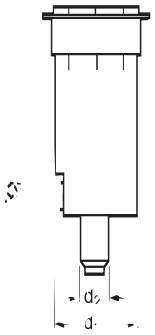
SFcX27-8
(5/16-18UNC-2 A)



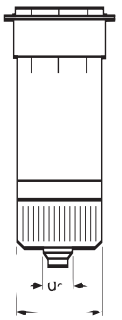
SFa15-10
SFa16-8
SFa16-10
SFa20-8
SFa20-10
SFa25-10
SFa27-8
SFa27-10
SFa27-11
SFa27-12
SFa27-14
SFa28-18



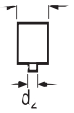
SFa21-12
DIN 49759



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



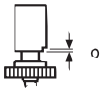
SFc25-14 (M 14x1.5)
SFc27-14 (M 14x1.5)



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

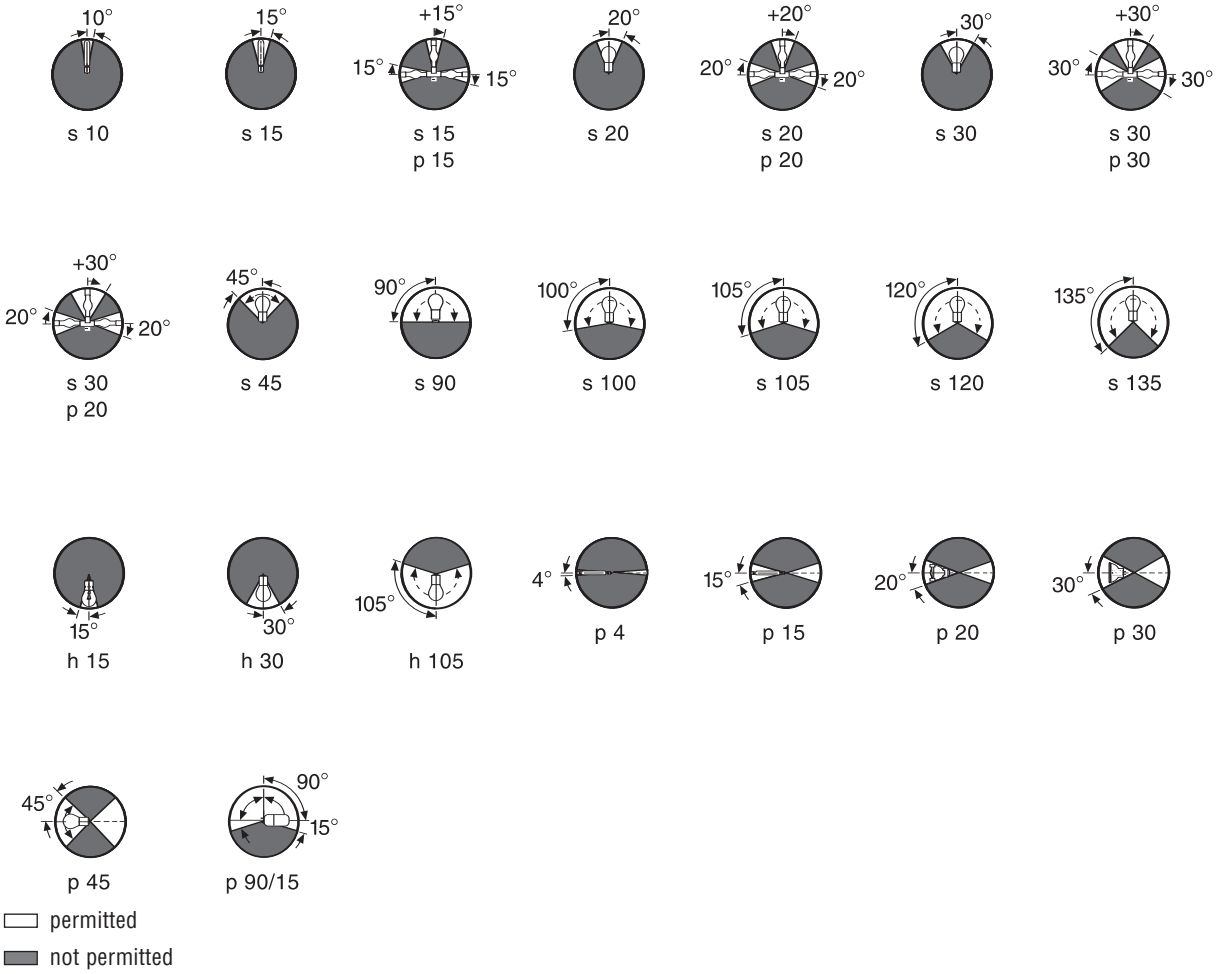
SX15s

X515
DIN 49613

DISPLAY OPTIC REFERENCE

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. A list of power supply manufacturers is available upon request.

Discharge lamps in the HCD®, HMD®, HMI®, HMP®, HTI®, HSR®, HSD®, HBO®, HXP®OSRAM STUDIOLINE®and VIP® types and the spectral lamps contain small quantities of harmful substances (such as mercury).

SYMBOLS & FOOTNOTES FOR DISPLAY/OPTIC LAMPS

Symbol	Description
☼	New item introduced within the past year.
⏦	Item will be discontinued when inventory is depleted.

Footnote	Description
1	Type of current: square-wave AC.
2	Lamp arc needs to be in horizontal operating position.
3	Any operating position allowed with appropriate cooling.
4	In certain countries there are third party property rights relating to equipment which must be observed if these lamps are used in dentistry.
5	Lamp suited for video camera heads; 500hr life @ 1.8V/ 45 min. ON / 15 min. OFF.
6	WARNING: This lamp is designed for heating purposes. It emits a strong Infrared radiation with a temperature at focal point approx. 1300 degrees C. Read Safety and Warning instructions before using this lamp.
7	Lamp also available in BELLAPHOTŌ (Product Number 54163).
8	Lamp also available in BELLAPHOTŌ (Product Number 54840).
9	Lamp service life 75hr life is defined at 76V with a duty cycle of 45 min. ON / 15 min. OFF.
10	Current bar needs to be positioned underneath the discharge arc during operation.
11	Lamp also available in 240 V model.
12	Preferred operating position is horizontal; vertical possible for short periods.
13	Lamp has internal proximity reflector.
14	Base - filament connections: Pins 1 and 4.
15	Lamp has monoplane filament 10 X 10 mm.
16	Lamp has monoplane filament.
17	Lamp also available as a 240V model (Product Number 54977).
18	Lamp has a biplane filament.
19	WARNING: Lamp has a special GY22 base. Ignition voltage must be applied only to the thin pin.
20	Lamp interchangeable with HX 602
21	Lamp interchangeable with HX 600
22	Lamp also available as 115V model (Product Number 54636).
23	Lamp has two separately switchable filaments.
24	Length l = Contact to contact.
25	Lamp also available in 240 V version : Product Number 54619.
26	High-performance HPL halogen lamps are manufactured under license from ETC,Inc.
27	Do not tilt perpendicular to the filament.
28	WARNING: The contact pins on the base are connected internally. The electrode farthest from the base must be connected via cable.
29	MFL=Medium Flood
30	NSP=Narrow Spot
31	WFL=Wide Flood
32	VNSP=Very Narrow Spot.
33	With biplane filament , higher luminous intensity can be achieved.
34	Lamp has a flat core filament with filament area perpendicular to the lamp axis.
35	Hg 100 also suitable for DC operation (no igniter needed when connected to 230V)
36	Lamp also available with connecting cable and plug-in contact.XBO R 180W/45 C OFR (Product Number 69183).
37	Lampholder for FaX 1.5 base = HMI Socket 46721 (Product Number 69302).
38	Lamp also available in ozone-free version XBO 75 W/2 OFR (Product Number 69232)
39	Lamp also available in ozone-free version XBO 150 W/1 OFR (Product Number 69235)
40	Lamp uses Suprasil quartz glass.
41	Lamp also available in ozone-free version XBO 450 W OFR (Product Number 69245)
42	Lamp also available in Suprasil quartz glass version XBO 450 W/4 (Product Number 69244)
43	S=Short
44	C=Base with Cable

SYMBOLS & FOOTNOTES FOR DISPLAY/OPTIC LAMPS

Footnote	Description
45	H=Suitable for horizontal operation
46	TC=Thread and Cable
47	CA=Cable on anode base
48	All HTI« lamps are hot restrikeable with the exception of HTI 150, HTI 152, HTI 405 W/SE, and 705 W/SE.
49	SHSC=Extra short version for horizontal burning position, anode connection via cable (super short)
50	TM=Threaded Modified
51	TP=Threaded Pin
52	GS=Gap Shortened
53	SE=Single Ended
54	DE=Double Ended
55	DX= Double Ended eXtreme Seal technology
56	OFR=Ozone Free
57	Molybdenum pins have 1mm diameter.
58	s (Operating Position) = Vertical, base down
59	h (Operating Position) = Vertical, base up
60	p (Operating Position) = Horizontal
61	Lamp also available with 850 hr HBO 1500 W/PI (Product Number 69319)
62	Lamp also available as version HBO 2001 W/CI with 850hr life (Product number 69219)
63	Lamp is also available with connecting cable and plug-in contact. HTI 250W/32 C (Product Number 54089).
64	Lamp also available as version HBO 1003 W/PI with 850hr life (Product Number 69195)
65	Lamp also available as version HBO 2500 W/PI with 850hr life (Product Number 69178)
66	Technical data if operated on AC: Current = 7.1 A, Volts = 67 V.
67	Average service life of lamp if operated with 400W is 100 hrs.
68	Magnetic arc stabilization required.
69	Lamp same as HBO 200 W/4 (Product Number 69224 but with increased radiation in the wavelength range below 450nm for UV-curing.
70	Technical lamp data if operated on AC: Current=4.2 A, Volts=65 V, Lumens=10,000 lm, Luminous Efficacy=50 lm/W.
71	Electrical data if lamp is operated on AC: Current=7.8 A, Volts=67 V.
72	Lamp has been specially adjustment for uniform illumination in the far field(200-250) mm focal length.
73	Cathode Base with 8-32 UNC-3A thread.
74	Anode Base=Sleeve base with M 6 thread.
75	Anode Base=Hexagon base with M 6 thread.
76	Anode Base with 8-32 UNC-3A thread.
77	Anode Base=Sleeve base with cooling fins and cable connection (M 6).
78	Anode Base with M 6 thread.
79	Anode Base with cable connection (M 8).
80	Anode Base with cable connection (M 6).
81	Anode Base with 8-32 UNC-3 thread.
82	Pin dimensions at front ceramic ring 2mm diameter, 10 mm length. Pin dimensions at rear ceramic base cap 2.5mm diameter, 11mm length.
83	Anode base with M 5x 0.9 thread
84	Cathode Hexagon base with M 5x 0.9 thread
85	Anode base with cable: length 340mm; connector 8/25.
86	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.
87	Product Number 69223 can be used for DC operation (47...65 Volts / 3.1...4.2Amps) and for AC operation (L2 version 49 57 Volt / 4.2 Amps).
88	For DC operation Product Number 69204 can be used (67-85 Volts / 5.9 - 7.4 Amps). For AC operation Product Number 69204 can be used (L2 version 69-77 Volt / 7.8 Amps).
89	Anode and Cathode Base with UNC-3B thread.
90	Type of current: sine-wave (sinusoidal) AC.

SYMBOLS & FOOTNOTES FOR DISPLAY/OPTIC LAMPS

Footnote	Description
91	Photometric data refer to discharge tube (lamp burner).
92	Lamp also available with 850 hrs (HBO 3500 W/PI, Product Number 69174)
93	Lamp also available with 850 hrs (HBO 3501 W/PI, Product Number 69127)
94	Lamp also available as Longlife version HBO 2500 W/PIL with 1500hr life (Product Number 69172).
95	Lamp also available as Longlife version HBO 3500 W/PIL with 1500hr life (Product Number 69169).
96	Cathode base with M 5x 0.9 thread
97	Cathode base with cable connection (M5)
98	Anode Base=Sleeve base with cable connection (M5)
99	Lamp also available as Longlife version HBO 3500 W/PIL with 1500hr life (Product Number 69169).
100	Anode base with cable connection
101	Length l1 = Contact to contact.
102	Lamp has a parabolic reflector.
103	Lamp wattage - After seasoning for 1/2 hour 1000 watts based on 2 filaments together, 400 watts based on 1 filament.
104	Average service life = 25 hrs. based on 2 filaments together, 100 hrs. with 1 filament.
105	Average service life = 50 hrs. based on 2 filaments together, 100 hrs. with 1 filament.
106	Ignition voltage = 36 kVs
107	Ignition: Min. open circuit voltage for cold / hot ignition = 85 / 110 V
108	Cooling: Min. air flow velocity around discharge vessel = 6 m/s
109	Magnetic arc stabilization: necessary for horizontal operation
110	Product number 54100 is the replacement for product number 54048.
111	HMI PAR lens set for OSRAM HMI 1200 PAR 64 comprising of NSP, VNSP, MFL, and VWFL lenses.
112	OSRAM socket #46721, cable length 22" for use with the following OSRAM lamps: HTI 400W/SE (product number 54084), HTI 600W/SE (product number 54087), and HMI 250W/SE (product number 54062).
113	Lamp has a elliptical reflector.
114	Lamp also available as version HBO 2001 W/CIL with 1500hr life (product number 69189)
115	The XERADEX 20 lamp must be operated with DBD 20/110-240/ECG-XERADEX power supply (Product Number 69128 or 69129).
116	This power supply is designed to operate the XERADEX 20 lamp (Product Number 69338).
117	Lumens refers to screen lumens.
118	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).
119	For Na 10 FL (product number 69284) use adapter no. 454/s using Pico 9 bases with P28 sockets.
120	Lamp also available with male connectors (Product Number 58722)
121	Lamp also available with female connectors (Product Number 58697)
122	Lamp also available with male connectors (Product Number 58726)
123	Lamp also available with female connectors (Product Number 58721)
124	All VIP« lamps are for AC operation on electronic power supplies and are hot restrikeable. All VIP« lamps need forced cooling.
125	Lamp also available with female connectors (Product Number 58709)
126	Lamp also available with female connectors (Product Number 58717)
127	Clean room ready packaging.
128	Safety: Because the danger from glare, UV radiation and overpressure during operation, spectral lamps may only be operated in sealed housings specially designed for the purpose. Suitable filters must be fitted to ensure that UV radiation is reduced to permissible levels.
129	This lamp has positive pressure even when cold. Please read safety/warning instructions before using this lamp.
130	Line drawing represented does not show cable connection.
131	Lamp HSD 250/78 also available with 7800K color temperature and average rated life at 3000 hr. Product Number 54118.
132	Lamp XBO 10000 W/HS OFR also available with current control range 160-299 amps. Product Number 69342.
133	Lamp HSD 250 also available with 6000K color temperature and average rated life at 2000 hr. Product Number 54170.
134	Connector = Female, round, with 4mm pin.

SYMBOLS & FOOTNOTES FOR DISPLAY/OPTIC LAMPS

Footnote	Description
135	Lamp life may vary depending on duty cycle and application.
136	Connector = Female.
137	Connector = Male.
138	Snap-on connector, female / male contact.
139	In horizontal operation position it is recommended that the "lead connection" wire be in the top position with filler tip facing down.
140	This lamp type is twice the life of the ANSI standard version.
141	This lamp type is twice the life of the standard version.
142	Please see Product Number 58795 for double life version.
143	Please see Product Number 58789 for double life version.
144	Please see Product Number 58794 for double life version.
145	XERADEX lamp life is rated in terms of 70% of initial UVC output on a continuous burn cycle.
146	Lamp also available with connecting cable and plug-in contact. XBO R 100W/45 C OFR (Product Number 69191).
147	Base is KF50 flange fitting; lamp is designed for use in vacuum environments at pressures above 300 mbar.
148	Base is KF40 flange fitting; lamp is designed for use in high vacuum environments at pressures above 30 mbar and below 10^-3 mbar.
149	Please see Product Number 58779 for double life version.
150	Please see Product Number 58819 for double life version.
151	Please see Product Number 58821 for double life version.
152	Maximum permitted base temperature is 350 degrees C at molybdenum foil / pinch seal region.
153	Distance b = Ignition Electrode. Base for ignition electrode is SFc 6-3.
154	HBO 200W L1 and HBO 200W L2 can be operated on AC or DC.
155	HBO 200W L1 (Product Number 69218) technical data if operated on AC current: Volts = 61 +/- 4, Current (A) = 3.6.
156	HBO 200W L2 (Product Number 69220) technical data if operated on AC current: Volts = 53 +/- 4, Current (A) = 4.2.
157	Distance a is from end of base to the respective electrode tip (cold) - see lamp drawing.
158	Base is KF50 flange fitting; lamp is designed for use in high vacuum environments at pressures above 200 mbar and below 10^-3 mbar.
159	For use indoors or outdoors. When used outdoors, protect the lens of the bulb from direct contact with moisture (rain, snow, etc.) to avoid cracking or breaking.
160	2000hr warranty against non-passive lamp failure.
161	Optimized lamp eXtreme Seal (XS) technology to withstand interior base temperatures of up to 450 degrees celsius.
162	When operated on electronic control gear (ECG) service life extended to 3000h.
163	Also available with 850h, HBO 3501 W/PI: NAED 69127.
164	SHP - series (Super High Performance Technology).
165	Lamp focus is 60mm in front of reflector rim.
166	Lamp is part of the SharXS HTI lamp series. All SharXS HTI lamps are identical in terms of their shape, size, and bases.
167	Base has notch for pre-alignment.
168	Lamp current not to exceed 7.2A.
169	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.
170	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.
171	Excessive airflow may lead to mercury condensation in the discharge lamp bulb and consequently to a performance drop.
172	Operation time after which either aperture lumens decrease to 50% of initial value or the lamp voltage reaches 115 V and the lamp cannot be ignited. Switching cycle: 210 minutes on / 30 minutes off.
173	Operational bulb wall temperatures lower than 850˚C may lead to mercury condensation and prevent the lamp from reaching stable operation conditions; temperatures higher than 950˚C may lead to premature failures of the lamp.
174	For rectangular aperture of 5.0 x 3.8 mm (hor. x vert.) at working distance 17.3 mm.
175	Output is understood as total energy in the range 320 … 500 nm focused on an aperture with diameter d at working distance a in front of the reflector.

SYMBOLS & FOOTNOTES FOR DISPLAY/OPTIC LAMPS

Footnote	Description
176	Beam Angle data refers to aperture.
177	Lamp is suited for use in ASML equipment (PAS 5500/22, /100, /100B, /TFH100).
178	The QXL lamp allows easy one-hand replacement without opening the light fixture. 1/4 turn twist in/out, no tool required.
179	With vertical operating position: anode(+) on top.
180	QXL is a trademark of Electronics Theatre Controls Inc., and used under license
181	The QXL 750/77 lamp has been designed and approved by ETC in the Source Four® Revolution™
182	Anode: Cable connection length 110mm
183	Cathode Base with cable connection (M 12).
184	Lamp uses eXtreme Seal (XS) Technology, which effectively protects the seal up to 500˚C.
185	Cable Connector TP120.
186	This lamp is used for OEB/WEE applications.
187	Lamp is interchangeable with FLK naed 54589
188	Lamp is interchangeable with FLK PLUS HPR 575/115 naed 54549
189	Lamp designed for the manufacture of printed Board Circuits in Hakuto exposure equipment HAP 3500 and 3510 series
190	The focus lies 45mm in front of the mounting rim (working distance).
191	Lamp description changed from HSD 200 to HSD 200W/60 4ARXS
192	Lamp description changed from HTI 575 W/DE to HTI 575/D5/56 Baby-Sharxs
193	Includes screw hole in anode lamp base with installed cable. No screw hole in cathode lamp base.
194	Includes screw hole in anode & cathode lamp base. Includes 1 installed cable for anode lamp base. Cathode cable provided on request when ordering.
195	Includes screw hole in anode & cathode lamp base. Includes 1 anode cable & 1 cathode cable in box, not installed.
196	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)
197	Cathode Base with Cable connection (M 10)
198	Easy disassembly into components allow for environmentally preferred waste disposal
199	Aluminum reflector reduces weight by up to 50% compared to standard glass PAR lamps
200	The HBO 200 W/DC TM is a direct and equal replacement for the HBO 200 W/2 TM (product No. 69221)
201	Lamp bases need to be forced cooled.
202	The connecting cables do not have a plug-in connector.
203	XIR=Xenon Infrared
204	Average service life can vary by application. Call National Customer Sales and Support (888) 677-2627 for more information.
205	Connector = female, flat
206	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.
207	Reinforced pinch-seal neck design for moving head applications
208	Connector = female, round
209	Connector = male, flat
210	LA= Lumen Advanced (High Efficiency Lamp)
211	Photometric values are measured at rated current.
212	Lamp also available in Suprasil quartz glass version: XBO 150 W/4 (Product Number 69238).
213	Lamp is suitable for Crosfield color scanner (CR = Crosfield).
214	Photometric data is measured in vertical operating position at rated wattage.
215	Lamp also available in Suprasil quartz version: XBO 450 W/4 (Product Number 69244).
216	For vertical operating position; anode(+) on top.
217	Lamp has same dimensions as XBO 1600 W/HSC OFR (Product Number 69268).
218	Lamp also available as XBO 2001 W/HTP OFR (Product Number 69310).
219	Necessary input voltage: 380 volt.
220	Lamp also available as XBO 4200 W/GS with 60mm bulb diameter and 500 hrs life.
221	Lamp also available as XBO 5000W/HBM OFR with anode base SFaX30-9,5 and cathode base SFa30-8.
222	Lamp optimized for fluorescence microscopy.
223	Lamp also available with AMP plug contact. HBO R 103/45 C (Product Number 69311).

SYMBOLS & FOOTNOTES FOR DISPLAY/OPTIC LAMPS

Footnote	Description
224	HBO 200W/2 and HBO 500W/2 can be operated on AC or DC.
225	Lamp also available with increased radiation in the wavelength range below 450nm for UV-curing. HBO 202W/4 (Product Number 69316).
226	Lamp also available with threaded pin 8-32 UNC-3A: HBO 200 W/2TM (Product Number 69223).
227	Technical data if operated on AC current: Volts=65, Lumens=10,000 lm, Luminous Efficacy=50 lm/W.
228	Lens set available (NSP,MFL,WFL,SWFL) Ref. No. 46771.
229	Lamps suitable for pulse operation between 250W and 500W. Maximum permissible average power is 350W (also for constant power operation).
230	HBO 350W (Product Number 69226) replaces HBO 350 W/G (Product Number 69227).
231	Lamp service life is defined with a switch-on/switch off duty cycle of 12hours ON / 30 minutes OFF.
232	Distance a = Distance (cold) of either anode base to anode tip or cathode base to cathode tip depending on lamp type.
233	NOTE: Maximum permitted base temperature: 230 degrees C (446 degrees F).
234	lamp base is with 8-32 UNC-3A thread.
235	Lamp base(s) with M 5x0.9 thread.
236	Lamp anode base (hexagon) with thread M5x0.9
237	Lamps suitable for pulse operation between 700W and 1000W. Maximum permissible average power is 750W (also for constant power operation).
238	Available in 2500 hrs. life: HBO 1000 W/CEL (Product Number 69175).
239	Discharge tube needs to be in horizontal operating position.
240	Available in 2500 hrs. life: HBO 1002 W/CEL (Product Number 69177).
241	Lamp should not be ignited more than ten times over lifetime.
242	Lamp has cooling fins on anode base.
243	Cathode Base=Sleeve base with M 6 thread.
244	Cathode Base=Hexagon base with M 6 thread.
245	Lamp has anode base with cooling fins and cable connection (M 6).
246	Lamp is available in 2500 hrs life: HBO 1000 W/NEL (Product Number 69176).
247	Lamp is available in 2500 hrs. life: HBO 1002 W/NEL (Product Number 69273).
248	The radiant Power of the I-line is measured in the wavelength range: 365 + 2.5 nm.
249	Lamp also available as Longlife version HBO 1003 W/PIL (Product Number 69180) with 1500hr life.
250	Lamp filler tip needs to point upwards during operation.
251	Cathode Base=Sleeve base with cooling fins and cable connection (M 6).
252	Cathode Base with M 6 thread.
253	Cathode Base with cooling fins.
254	Anode sleeve base without thread.
255	Anode Base=Sleeve base with cable connection (M 6).
256	Maximum permitted base temperature: 200 degrees C (392 degrees F).
257	Lamp also available as Longlife version HBO 1500 W/PIL (Product Number 69181) with 1500hr life.
258	Lamp also available as Longlife version HBO 1500 W/CIL (Product Number 69179) with 1500hr life.
259	Lamp also available as Longlife version HBO 2001 W/NIL with 1500hr life (Product Number 69292).
260	Cathode Base with cable connection (M 8).
261	Permitted wattage range: 300W to 600W.
262	Anode Base=Cooling fins with cable connection (M 8).
263	The average rated life of this lamp depends on the operating mode (initial power setting).
264	Cathode Base with cable connection (M 6).
265	Lamp also available as Longlife version HBO 2501 W/NIL (Product Number 69289) with 1500hr.
266	Anode Base with cable connection (M 10).
267	Lamp has round-core double filament.
268	Male contacts according to DIN 46248.
269	Lamp is also available with male contact(Product Number 58724).
270	Permitted wattage range: 400W to 700W.
271	Female contact is according to DIN 46247.

SYMBOLS & FOOTNOTES FOR DISPLAY/OPTIC LAMPS

Footnote	Description
272	Despite transverse filament, lamp can be inclined at any angle in s 90 position.
273	Lamp has snap-on male contact to DIN 46248.
274	Lamp also available with male contact according to DIN 46248. 64361/HLX Z (Product Number 58717)
275	Lamp has D.C. Bay Ring.
276	WARNING: Lamp only for use where seal temperature does not exceed 650 degrees F (343 degrees C). Minimum bulb wall temperature 480 degrees F (249 degrees C).
277	Lamp has 1.75 inch (44.45mm) stranded Nickel leads.
278	Max. Beam Candlepower (MBCP) : 175 kcd.
279	D=Digital
280	XL=Xtreme Life
281	CL=Classic Line
282	HP=High Performance
283	S=Sony (Sony projector)
284	Anode base with thread (M16)
285	High temperature base. Retards seal deterioration where seal temperature exceeds 650˚F.
286	For use where seal temperature does not exceed 650˚F.
287	Life at rated voltage and at 650˚F maximum seal temperature.
288	Usually limited to intermittent burning.
289	A suitable protective shield, screening technique, or both must be used to protect people and surroundings from the possibility of a lamp shattering and from possible ultraviolet radiation.
290	Bulk pack= 30/case
291	Anode: Hexagon base with thread 8-32 UNC

Index by Ordering Abreviation

Index by Ordering Abreviation (cont.)

Index by Product Number

Index by Product Number (continued)

Index by Product Number (continued)

Index by ANSI Code

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.

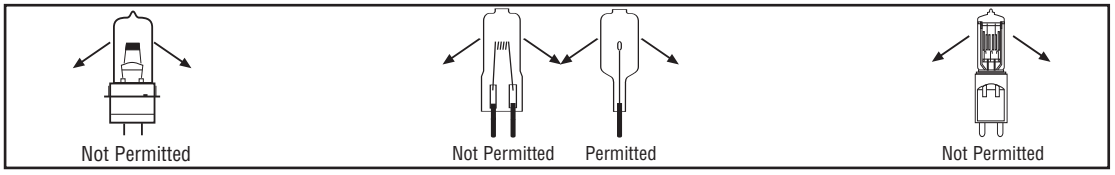
Read and understand this warning before using this bulb!

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***).

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 cur-rent 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 below 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/cm^3 @ 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/m^3 @ 20°C / 68°F
29.6 mg/m^3 @ 30°C / 86°F
62.7 mg/m^3 @ 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

WARNING

VIP SUPER HIGH PRESSURE MERCURY LAMPS (DISPLAY/OPTIC)

WARNING:
In accordance with ANSI/IESNA Standard RP-27, VIP Super High Pressure Mercury Lamps are Risk Group 3 products.

Read and understand this entire statement before using this lamp!

RUPTURE & RADIATION (UV- VISIBLE) HAZARD:
1. The discharge vessel of Super High Pressure Mercury VIP lamps is constructed of quartz glass that is filled with a quantity of mercury. These lamps are not pressurized when cold (i.e., at room temperature).
2. ***All Super High Pressure Mercury VIP lamps have high internal pressures (up to approximately 3,675 psi or 250 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. ***Super High Pressure Mercury VIP lamps generate intense ultraviolet (UV), visible and infrared 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. 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).

VIP SUPER HIGH PRESSURE MERCURY LAMPS (DISPLAY/OPTIC) (continued)

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. 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.
3. If a cold (room temperature) lamp is broken, proceed with clean-up and disposal as indicated in item 2 above.

GENERAL SAFETY & INSTALLATION TIPS

INSTALLATION:

1. Do not use if lamp or any lamp parts such as reflector, front glass, etc. are 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. 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.
4. To prevent skin burns, allow lamp to cool before handling.
5. To avoid breakage, mounting of the lamp must be free of mechanical stress during installation and during operation by allowing for thermal expansion.
6. Super High Pressure Mercury VIP lamps should not be subjected to force/stress during installation.
7. Replace all fixture covers and shields after replacing lamp to prevent eye damage, other personal injury, or property damage.
8. Use only in instruments/equipment specifying this light source.
9. Make sure lamp is properly connected to avoid damaging lamp and/or socket/connector. Electrical connections should be free from dirt and corrosion. Socket/connector condition may affect lamp life.
10. Replace socket/connector or lamp if deterioration (pitting, scorching, corrosion, etc.) of either is observed.

OPERATION:

1. Super High Pressure Mercury VIP lamps are designed for operation on AC only.
2. Operate with compatible power supply and fixture only.
3. Super High Pressure Mercury VIP lamps need approximately 5 minutes (depending on lamp type and cooling conditions) before they reach their operating temperatures. To ensure proper ignition on the following start-up, lamps should not be switched off during the warm-up period.
4. The average service life of Super High Pressure Mercury VIP lamps is influenced by their ON/OFF-duty cycle. Lamp performance is reduced with increased duty cycle.

OPERATING POSITION:

Super High Pressure Mercury VIP lamps may only be operated in the positions described in the OSRAM SYLVANIA product catalog and/or technical literature.

LAMP COOLING:

1. To prevent premature failure, forced-air cooling is required. Maximum permitted lamp temperatures are described in the available technical literature.
2. Discoloration, surface pitting, and/or corrosion of the lamp connections indicate a thermal overload. Components exhibiting these conditions must be cleaned or replaced.

LAMP REMOVAL:

Turn off power to the lamp and allow lamp to cool (forced) for a minimum of 15 minutes prior to shutting main fixture power and opening fixture. Do not remove lamp until it has cooled.

LAMP TRANSPORTATION:

1. All Super High Pressure Mercury VIP lamps should be transported ONLY in their original packaging.
2. Transportation in non-original packaging can result in damage to the lamp thus voiding the 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 SUPER HIGH PRESSURE MERCURY VIP 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 may 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.

Threshold Limit Values (TLVs) are not fine lines between safe and dangerous concentrations but are guidelines to assist in the control of health hazards. They represent the maximum exposure to substances, both short-term and long-term, that a person may experience without resulting in health-related problems. 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 Super High Pressure Mercury VIP lamps have the following mercury contents:

Power level	**Maximum Mercury content (mg)**
100-200W	12

PROPERTIES OF MERCURY:

- Chemical symbol: Hg
- Atomic number: 80
- Molecular Weight: 200.59
- Density: 13.6 g/cm^3 @ 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

VIP® SUPER HIGH PRESSURE MERCURY LAMPS (DISPLAY/OPTIC) (continued)

- 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. Some U.S. states 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.
3. OSRAM SYLVANIA INC. cannot advise lamp users as to general or specific disposal regulations for federal, state/provincial, and/or local municipalities.

Hg Lamp Contains Mercury

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

WARNING

XBO® HIGH PRESSURE XENON LAMPS

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

Read and understand this warning before using this bulb!

XBO 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 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 in place. Do not handle lamps without their protective covers 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 (O_3). 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. It 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 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. XBO lamps should not be subjected to force/stress during installation.
9. Handle lamp only with protective safety cover in place. When installing lamp, remove safety cover 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 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 this XBO lamp at rated current. Note: some low wattage XBO lamps may not be operated above their specified rated wattage. See catalog for details.
16. For those XBO 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.)

XBO® HIGH PRESSURE XENON LAMPS (continued)

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 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.

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 230˚C (445˚F) 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 (480˚F). [Optimum temperature: 175-200°C (345-390˚F)] To prevent premature failure, the lamp ends must not exceed the maximum temperature of 350°C (660˚F). [Optimum temperature: 200-250°C (385-480˚F)] 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 (O_3) is generated by the conversion of oxygen (O_2) 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 depressurized before release for disposal. The following is one example of a depressurizing method for XBO 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 depressurized.
   - 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.

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 upto 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.

HBO® HIGH PRESSURE MERCURY LAMPS (continued)

OPERATING POSITION:

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 250nm. 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 below 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

PROPERTIES OF MERCURY:

- Chemical symbol: Hg
- Atomic number: 80
- Molecular Weight: 200.59
- Density: 13.6 g/cm^3 @ 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/m^3 @ 20°C / 68°F
  29.6 mg/m^3 @ 30°C / 86°F
  62.7 mg/m^3 @ 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 stuffer 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