

# Lucalox™ XO Superlife

## High Pressure Sodium Lamps

Tubular Clear  
70W, 100W, 150W, 250W and 400W

Elliptical Diffuse  
50, 70W and 100W



DATA SHEET

### Product information

Lucalox™ XO Superlife lamps comprise a sodium discharge system operating at a high pressure within a ceramic arc tube which is mounted in an outer glass bulb. These lamps offer outstanding luminous efficacy, lumen maintenance thus reducing energy and maintenance costs. All lamps have two arc tubes. The second arc tube will instantly light after a momentary power interruption. Arc tubes are Monolithic construction for 50-400W lamps.

**Easy replacement of standard HPS lamps, fits standard HPS sockets – no new wiring, ballast or fixture are required.**

### Application areas



Road & Tunnel



Industrial



Street & Pedestrian



Car Park

### Features

#### • Dual arc tube

GE Lucalox™ XO Superlife lamps feature a dual arc tube design that provides extra long life. The second arc tube also assures that critical lighting applications will instantly relight, even after momentary power outages.

#### • Longest life for reduced maintenance

The twin arc tubes provide up to 60,000 hours life, up to 70% longer than XO HPS lamps. This longer rated life reduces relamping costs by significantly increasing the maintenance interval.

• **Continous light after power interruption.** The second tube provides light instantly after momentary power interruption increasing to full light output in less than three minutes.

• **Highly efficient** – up to 135 lumens per watt.

#### Lucalox™ XO Superlife lamps have the following advantages above the standard one:

- Superb performance and longer life
- Rugged monolithic arctube, with GE Reliable Starting Technology for higher reliability
- High Xenon-Fill gas delivers:
  - Higher luminous efficacy,
  - Extra light, up to 17% more lumens than standard without increase in energy consumption
- More resistant to mains voltage fluctuations
- Zirconium gettering system for improved lumen maintenance



GE imagination at work

## Basic data

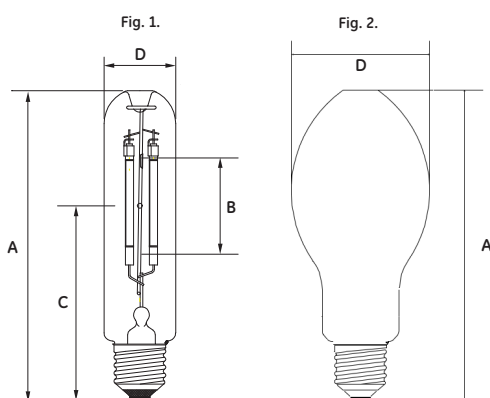
### Lucalox™ XO Superlife – Tubular Clear

Product Code	88258	88256	78737	78738	78739
Product Description	LU 70/XO/SBY/T/E27	LU 100/XO/SBY/T/E40	LU 150/XO/SBY/T/E40	LU 250/XO/SBY/T/E40	LU 400/XO/SBY/T/E40
Nominal Wattage [W]	70	100	150	250	400
Rated Wattage [W]	76	100	153	263	409
Weighted Energy Consumption [kWh/1000 hrs]	83.06	110.24	168.90	288.68	450.56
Volts [V]	90	100	100	100	100
Cap	E27	E40	E40	E40	E40
Nominal Lumen [lm]	6,600	10,500	17,500	33,000	55,800
Rated Lumen [lm]	6,800	10,510	17,600	33,150	55,880
Rated Lamp Efficacy [lm/W]	90	105	114	125	135
Energy Efficiency Class [EEC]	A+	A+	A+	A+	A++
Mercury Content [mg]	19.9	26.6	26.6	46.4	38.3
Rated Average Life [h]	50,000	60,000	60,000	55,000	55,000
Ambient Temperature [°C]	25	25	25	25	25
Bulb	Soft	Hard	Hard	Hard	Hard
Mass Weight [g]	65	140	145	155	174
Operating Position	Universal	Universal	Universal	Universal	Universal
Minimum Starting Temperature [°C]	-40	-40	-40	-40	-40

### Lucalox™ XO Superlife – Elliptical Diffuse

Product Code	97238	88257	88255
Product Description	LU/50/85/XO/SBY/D/E27	LU 70/XO/SBY/D/E27	LU 100/XO/SBY/D/E40
Nominal Wattage [W]	50	70	100
Rated Wattage [W]	53	73	103
Weighted Energy Consumption [kWh/1000 hrs]	58.30	80.28	113.30
Volts [V]	85	90	100
Cap	E27	E27	E40
Nominal Lumen [lm]	3,500	6,000	10,000
Rated Lumen [lm]	3,900	6,060	10,020
Rated Lamp Efficacy [lm/W]	73	83	97
Energy Efficiency Class [EEC]	A	A	A+
Mercury Content [mg]	16.6	19.9	26.6
Rated Average Life [h]	40,000	50,000	60,000
Ambient Temperature [°C]	25	25	25
Bulb	Soft	Soft	Hard
Mass Weight [g]	70	67	140
Operating Position	Universal	Universal	Universal
Minimum Starting Temperature [°C]	-40	-40	-40

## Dimensions



Wattage	A Length [mm] Max.	D Diameter [mm] Max.	C LCL [mm] Nom.	B Arc Gap [mm] Nom.	Cap	Bulb Glass	Mass [g]	Operating Position	Minimum Starting Temp.
<b>Lucalox™ XO Superlife Tubular Clear – Figure 1.</b>									
70	156	39	102	38	E27	Soft	65	Universal	-40°C
100	211	48	132	44	E40/45	Hard	140	Universal	-40°C
150	211	48	132	55	E40/45	Hard	145	Universal	-40°C
250	260	48	158	65	E40/45	Hard	155	Universal	-40°C
400	283	48	175	86	E40/45	Hard	174	Universal	-40°C
<b>Lucalox™ XO Superlife – Elliptical Diffuse – Figure 2.</b>									
50	156	72	-	-	E27	Soft	70	Universal	-40°C
70	156	72	-	-	E27	Soft	67	Universal	-40°C
100	186	76	-	-	E40/45	Hard	140	Universal	-40°C

## Photometric data

Watts	100hr Lumens	CCT [K]	CRI [Ra]	DIN5035 Class.
<b>Lucalox™ XO Superlife – Tubular Clear</b>				
70	6,600	2100	25	4
100	10,500	2100	25	4
150	17,500	2100	25	4
250	33,000	2100	25	4
400	55,800	2100	25	4
<b>Lucalox™ XO Superlife – Elliptical Diffuse</b>				
50	3,500	2100	25	4
70	6,000	2100	25	4
100	10,000	2100	25	4

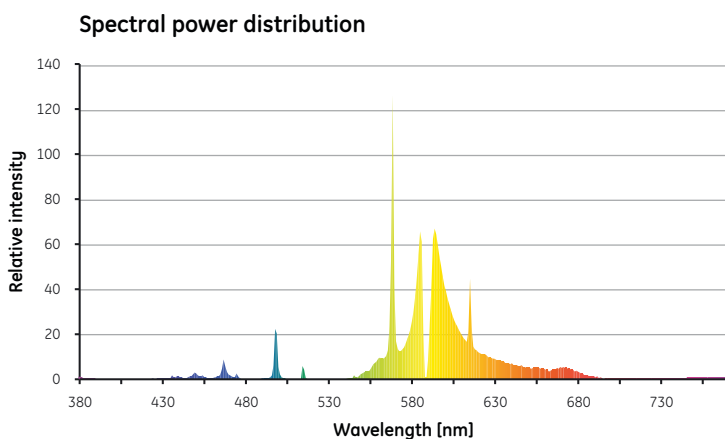
## Electrical data

Data is based on a nominal lamp operating from a nominal choke (reactor) ballast with power factor correction. Supply power is based on a typical commercially available ballast.

### Lucalox™ XO Superlife

Watts	Volts ±15 [V]	Current [A]	Power [W]
<b>Lucalox™ XO Superlife – Tubular Clear</b>			
70	90	0.98	70
100	100	1.2	100
150	100	1.8	150
250	100	2.9	250
400	100	4.5	400
<b>Lucalox™ XO Superlife – Elliptical Diffuse</b>			
50	85	0.76	50
70	90	0.98	70
100	100	1.2	100

## Spectral power distribution

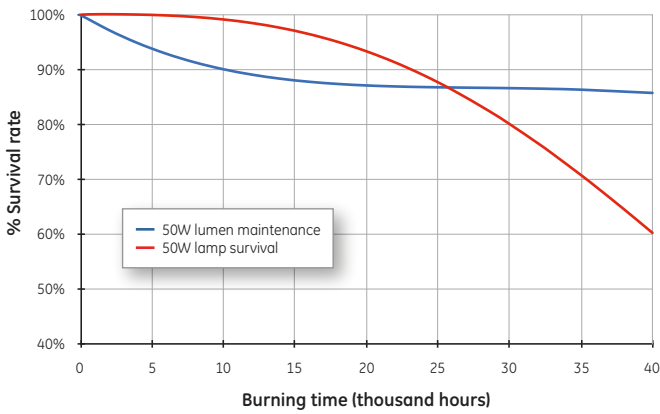


## Survival rate and lumen maintenance

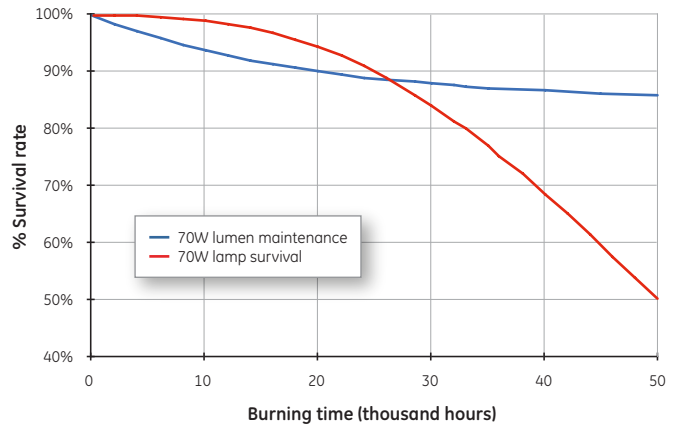
Average lamp life & lumen maintenance is based on laboratory tests of a large number of representative lamps under controlled conditions, including operation at 10 or more hours per start on ballasts having specified electrical characteristics. The following conditions can reduce average lamp life and lumen maintenance:

- Frequent on/off switching
- High line voltage
- Vibration
- High ambient temperature within the fixture ballast and ignitor characteristics

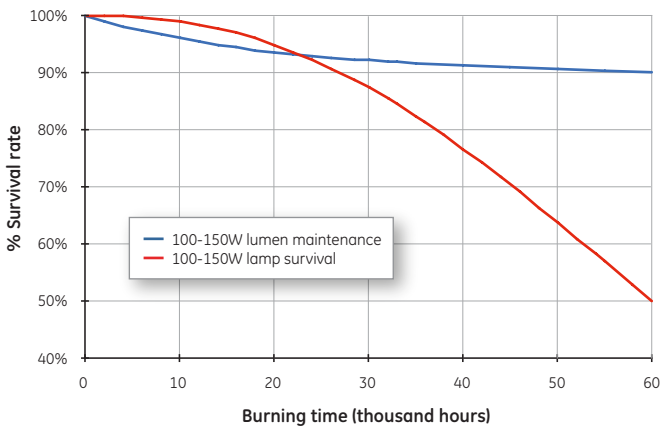
**Lumen maintenance and lamp survival**  
XO Superlife 50W



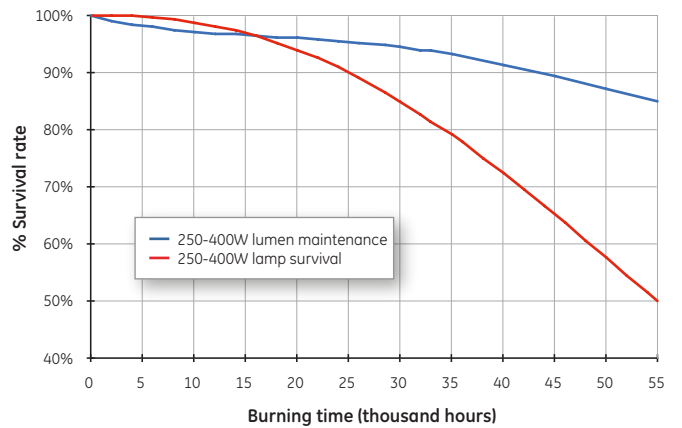
**Lumen maintenance and lamp survival**  
XO Superlife 70W



**Lumen maintenance and lamp survival**  
XO Superlife 100-150W



**Lumen maintenance and lamp survival**  
XO Superlife 250-400W



## Average rated life

The survival of individual lamps or particular groups of lamps depends on these system conditions, and actual data may fall within the lines, or dependent upon the lamp operating conditions even below the lower limit (see Lamp Survival graph). For cost-of-light calculations involving these lamps, the following estimated operating times are suggested for 50% survival:

### Lucalox™ XO Superlife

- 50W – 40,000 hours
- 70W – 50,000 hours
- 100-150W – 60,000 hours
- 250-400W – 55,000 hours

Wattage	50	70	100	150	250	400
B3 [h]	15,000	15,800	16,000	16,000	14,800	14,800
B5 [h]	18,000	19,100	19,900	19,900	18,500	18,500
B10 [h]	23,100	25,000	27,000	27,000	25,000	25,000

## Lumen maintenance

Under the same controlled conditions, initial reference lumens refer to the lamp lumen output after 100-hours burning. Due to variations in systems and service conditions (in particular the burning cycle), actual lamp performance can vary from the reference lumen ratings. The lumen maintenance (light output during life) of individual lamps or particular groups of lamps may fall within the lines, or dependent upon the lamp operating conditions even below the lower limit line (see Lumen maintenance graph).

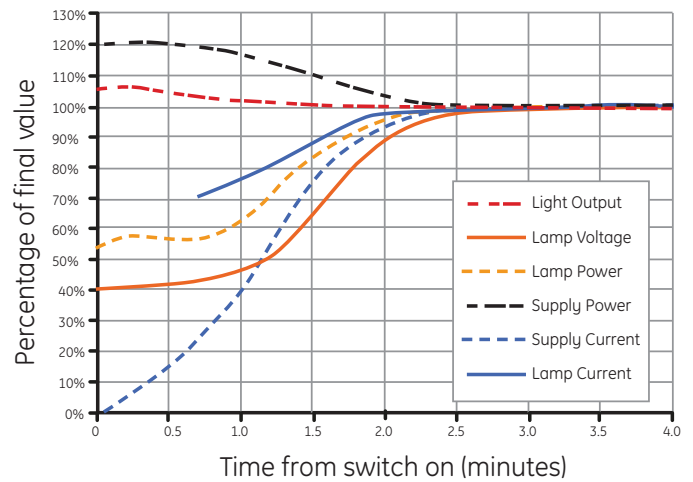
Data is based on a nominal lamp operating from a nominal choke (reactor) ballast with power factor correction. Supply power is based on a typical commercially available ballast.

## Warm-up characteristics

The graph shows typical run-up characteristics for a 150W Lucalox™ XO Superlife lamp. The time needed for the light output to reach 90% of the final value is determined by the supply voltage and ballast design. Typical values are:

Lucalox™ XO Superlife						
Wattage	50	70	100	150	250	400
Run-Up	3	5	3.5	3.5	3	5

Typical warm-up characteristics



## Hot restrike time

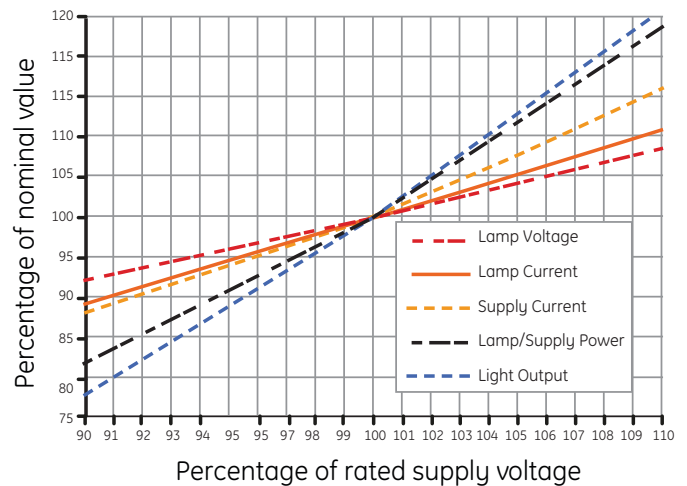
Due to the standby construction the 70 watt ratings restrike within 10 seconds and the 100-400 watt ratings restrike within 5 seconds following a short interruption in the power supply.

## Supply voltage

Lamps are suitable for supplies in the range 220V to 250V 50/60Hz for appropriately rated series choke (reactor) ballasts. Supplies outside this range require a transformer (conventional, high reactance or CWA) to ensure correct lamp operation. Lamps start and operate at 10% below the rated supply voltage when the correct control gear is used.

In order to maximise lamp survival, lumen maintenance and colour uniformity, the supply voltage and ballast design voltage should be within  $\pm 3\%$ . Supply variations of  $\pm 5\%$  are permissible for short periods only. This may be achieved by measuring mean supply voltage at the installation and selecting ballasts with appropriate settings.

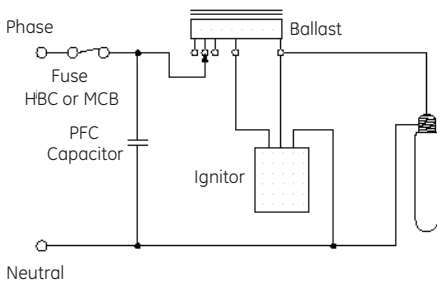
Effect of supply voltage variations on performance



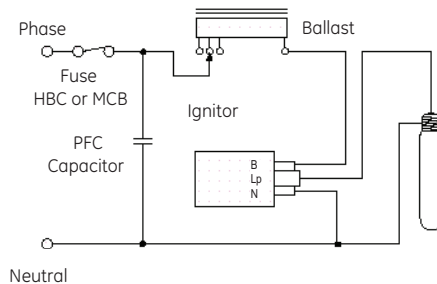
## Ballasts

It is essential to use a ballast appropriate to the supply voltage at the luminaire. Typical wiring diagrams for control circuits incorporating "Superimposed" or "Impulser" ignitor and choke (reactor) ballast are shown. Refer to actual choke and ignitor manufacturers' data for terminal identification and wiring information.

### Typical impulser ignitor circuit



### Typical superimposed ignitor circuit



# Guidance for luminaire manufacturers

## Lamp operating temperature limits

### Lucalox™ XO Superlife

Wattage	Maximum Cap Temperature	Maximum Bulb Temperature
50-150W	210°C	310°C
250-400W	250°C	400°C

## Luminaire voltage rise

To maximise lamp life it is essential that luminaires are designed so that when lamps are enclosed lamp voltage rise does not exceed the following values:

Wattage	50	70	100	150	250	400
<b>Lucalox™ XO Superlife – Tubular Clear</b>						
Voltage Rise (V)	–	5	7	7	10	12
<b>Lucalox™ XO Superlife – Elliptical Diffuse</b>						
Voltage Rise (V)	5	5	5	–	–	–

## Ballast

To achieve correct lamp starting, performance and life, it is important that the lamp and ballast are compatible and suitably rated for the supply voltage at the luminaire. Lucalox™ Superlife and Lucalox™ XO Superlife range is compatible with IEC60662 (High Pressure Sodium Lamps) and IEC62035 (HID Lamp Safety). Ballasts used to operate these lamps should comply with ballast standards IEC60922 & IEC60923 and incorporate adequate overload protective measures to ensure that safety is maintained under abnormal lamp end-of-life rectification conditions as prescribed by IEC60662, IEC62035 and draft changes to luminaire standard EN60598-1. Ballast thermal protection is one method of providing adequate protection.

## Ballast Voltage Adjustment

Series choke (reactor) ballasts incorporating additional tapings at  $\pm 10V$  of the rated supply voltage are recommended. Alternatively, a single additional tapping 10V above the rated supply voltage will ensure lamps are not overloaded due to excessive supply voltage.

## Ignitors

Ignitors should comply with specifications IEC60926 and IEC60927 and have starting pulse characteristics.

## Cable between ignitor and lamp

Cables connected between the lamp and a superimposed ignitor “Lp” terminal, or the ballast when using an impulser ignitor, must be rated at a minimum 50/60Hz voltage of 1000V. Mineral insulated cable is not suitable for connecting the lamp to the control gear. To achieve good starting superimposed ignitors must be adjacent to the luminaire. Cable capacitance of wiring between the ignitor “Lp” terminal and the lamp should not exceed 100pF (<1 metre length) when measured to adjacent earthed metal and/or other cables, unless otherwise stated by the ignitor manufacturer. When using impulser type ignitors longer cable lengths between ballast and lamp are normally permissible. Limits for particular ignitors are available on request from GE Lighting or directly from the ignitor manufacturer.

Wattage	Min. Pulse Voltage [kV] <sup>1</sup>	Max. Pulse Voltage [kV] <sup>2</sup>	Min. Pulse Width [µs] <sup>3</sup>	Min. Pulse Repetition Rate <sup>4</sup>
50	1.8	2.5	2.0	1/½ cycle
70	1.8	2.3	1.95	1/½ cycle
100	2.8	5.0	1.95	1/cycle
150	2.8	5.0	1.95	1/cycle
250	3.3	5	1.95	1/cycle
400	3.3	5	1.95	1/cycle

1. When Loaded with 100 pF
  2. When Loaded with 20pF
  3. At 90% peak voltage
  4. From ignitor into lamp during starting
- Pulse Phase Angle: 60-90°el and/or 240-270° el.

## PFC capacitors for choke (reactor) circuits

Power Factor Correction is advisable in order to minimise supply current and electricity costs. For 220-250V supplies 250V $\pm$ 10% rated capacitors are recommended as follows:

Wattage	50	70	100	150	250	400
PFC Capacitor (µF)	10µF	10µF	12µF	20µF	30µF	40µF