



# GE Lighting

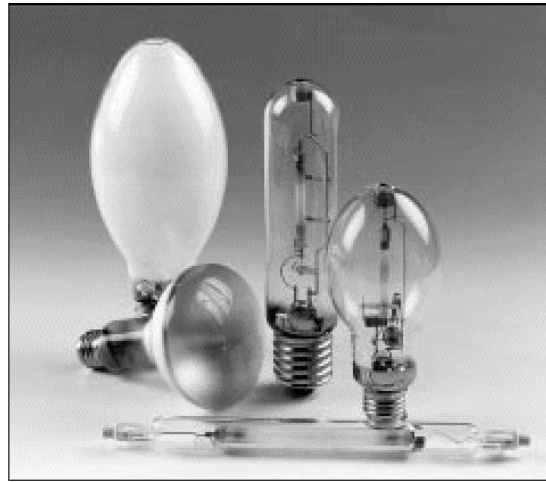
## Special Lucalox™

High Pressure Sodium Lamps

Lucalox™ Reflector 70W

Lucalox™ TD Double-ended 250W,  
400W & 1000W

Lucalox™ Internal Ignitor 50 & 70W



### Description

#### Lucalox™ Reflector Lamp (Fig. 1)

- Reflector-shaped HPS lamps, with internal reflector offer high efficiency and the same colour rendering as conventional HPS lamps
- Internal reflector is impervious to dirt and dust
- Burning position: universal

#### Double-Ended Lucalox™ Lamps (Fig. 2)

- Lucalox™ efficiency in an ultra compact size
- Small size fits ultra compact fixtures
- Excellent optical control
- Concentrated beam of light exactly where needed
- High efficiency
- Long 24,000 hour life
- Instant restrike

#### Lucalox™ Internal Ignitor Lamps (Fig. 3&4)

- For use in luminaires without internal ignitor equipment
- Simplifies luminaire design

### Applications

- Working environments where lamp soiling is maintenance difficult
- Foundries and steel mills
- Industrial workshops

- Floodlighting
- Security
- Sportlighting

- Security/Wall packs
- Hotel/Motel
- Pedestrian areas/Downlighting

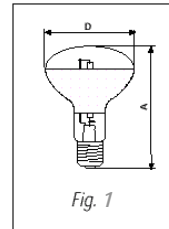


Fig. 1

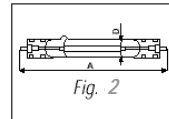


Fig. 2

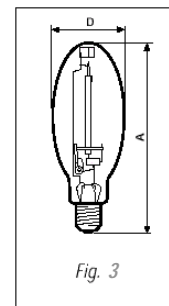


Fig. 3

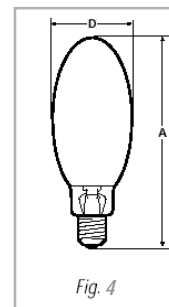


Fig. 4

### Physical Data

Watts	A Length (mm)	D Diameter (mm)	C LCL (mm)	B Arc Gap (mm)	Cap	Bulb Glass	Mass (g)	Operating Position	Minimum Starting Temp.
<b>Lucalox™ – Reflector – Fig. 1</b>									
70	144	96	-	-	E27	Soft	55	Universal	-40 °C
<b>Lucalox™ – TD - Clear Tubular Double-Ended – Fig. 2</b>									
250	191	22.4	-	62.5	Rx7s	Quartz	57	Hor. ±20°	-40 °C
400	256	22.4	-	89.2	Rx7s	Quartz	68	Hor. ±20°	-40 °C
1000	334	22.4	-	202	Rx7s	Quartz	90	Hor. ±20°	-40 °C
<b>Lucalox™ – Internal Ignitor Clear Elliptical – Fig. 3</b>									
50	156	72	97	34.8	E27	Soft	70	Universal	-40 °C
70	156	72	97	34.8	E27	Soft	70	Universal	-40 °C
<b>Lucalox™ – Internal Ignitor Diffuse Elliptical– Fig. 4</b>									
50	156	72	-	-	E27	Soft	70	Universal	-40 °C
70	156	72	-	-	E27	Soft	70	Universal	-40 °C

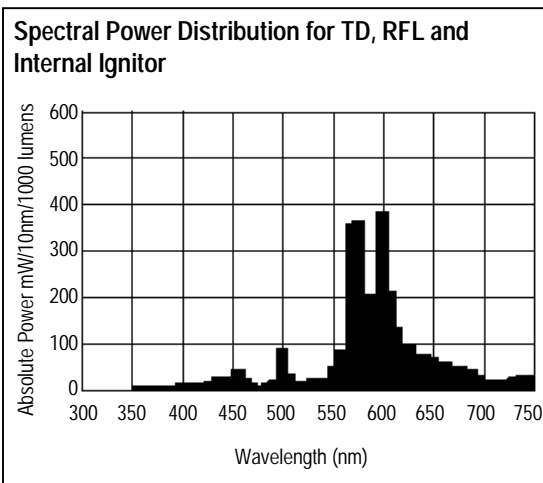


## Photometric Data

Watts	100 Hr. Lumens	Colour Temp. K	Chromaticity Co-ordinates		Colour Rendering Ra	Prop. DIN5035 Class.
			x	y		
<b>Lucalox™ – Reflector</b>						
70	4000*	2,000	0.53	0.43	25	4
<b>Lucalox™ – TD – Clear Tubular Double-Ended</b>						
250	23,000	2,000	0.53	0.43	25	4
400	43,000	2,000	0.53	0.43	25	4
1000	137,000	2,000	0.53	0.43	25	4
<b>Lucalox™ – Internal Ignitor Clear Elliptical</b>						
50	3,400	2,000	0.53	0.43	25	4
70	6,000	2,000	0.53	0.43	25	4
<b>Lucalox™ – Internal Ignitor Diffuse</b>						
50	3,300	2,000	0.53	0.43	25	4
70	5,800	2,000	0.53	0.43	25	4

\* Peak Intensity 6400CD, Approx. Beam Spread 24°.

Photometric data is quoted for the lamp in a horizontal orientation operating from a nominal ballast at rated supply volts.



## 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.

## Lamp Data

Watts	Volts ±15 (V)	Current (A)	Power (W)	Current Crest Factor
<b>Lucalox™ – Reflector</b>				
70	90	0.98	70	1.45
<b>Lucalox™ – TD Clear Tubular Double-Ended</b>				
250	100	2.95	250	1.45
400	100	4.40	400	1.45
1000	250	4.70	1000	1.45
<b>Lucalox™ – Internal Ignitor Clear &amp; Diffuse Elliptical</b>				
50	85	0.76	50	1.45
70	90	0.98	70	1.45

# Lamp Survival 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 hours pre 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

## Average Rated Life

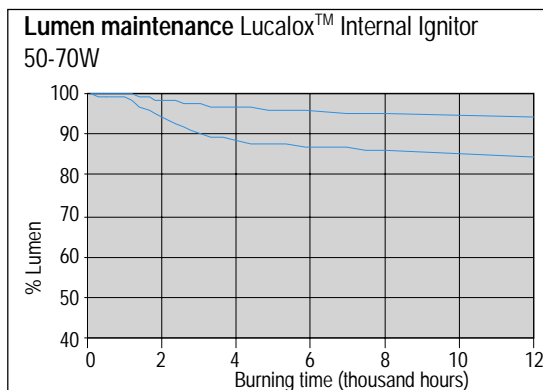
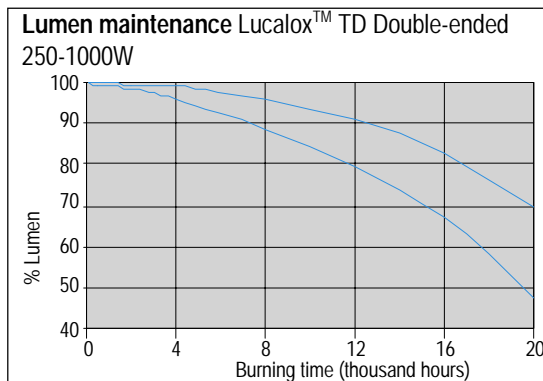
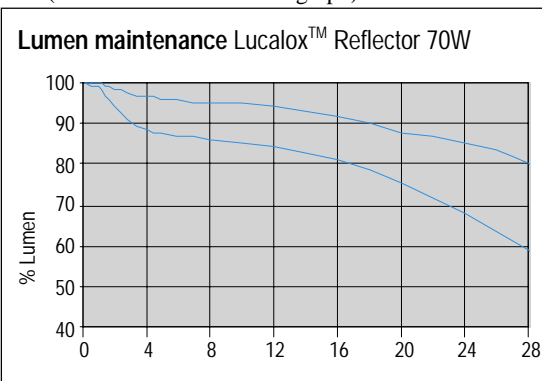
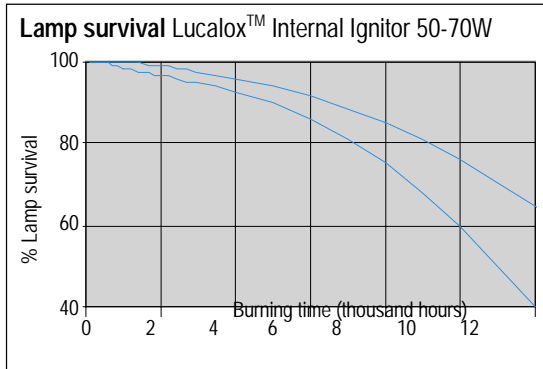
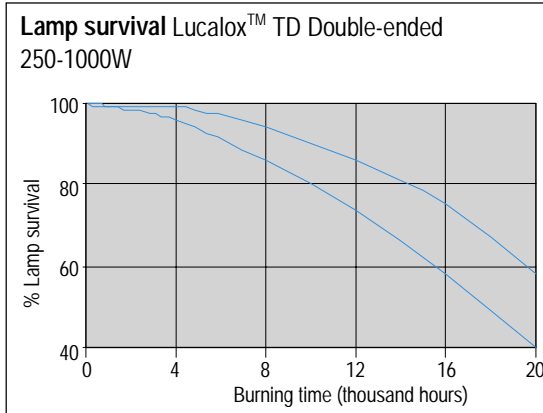
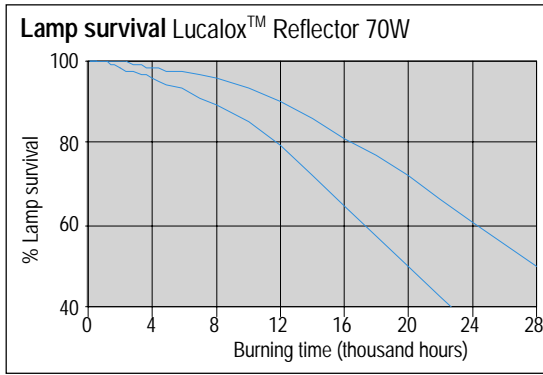
The survival of individual lamps or particular groups of lamps depends on these system conditions, and actual data may fall within the lines, or dependent upon the lamp operating conditions even below the lower limit below (see Lamp Survival graph)

For cost-of-light calculations involving these lamps, the following estimated operating times are suggested for 50% survival:

- Lucalox™ Reflector – 70W – 24000 hours
- Lucalox™ TD Double-ended - 250-1000W – 20000 hours
- Lucalox™ Internal Ignitor – 50-70W – 12000 hours

## Lumens

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).



## Run-Up Characteristics

The graph shows typical run-up characteristics for a 250W Lucalox™ lamp. Time for the light output to reach 90% of the final value is determined by supply voltage and ballast design. Typical values are :

Watts	50	70	150	250	400	1000
Run-Up (Mins)	4	<5	6	6	6	8

## Hot Re-strike Time

### Lucalox™ Reflector & TD Clear Tubular Double-Ended

All ratings re-strike within 1 minute following a short interruption in the supply. Actual re-strike time is determined by ignitor type, pulse voltage and cooling rate of the lamp.

### Lucalox™ Internal Ignitor

All ratings must re-strike between 1 and 7 minutes following a short interruption of Power supply.

### Lucalox™ TD Clear Tubular Double-Ended

TD lamps can re-strike immediately using suitable high starting pulse.

## 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.

However, 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.

## Control Gear

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.

A typical wiring diagram for Lucalox™ Internal Ignitor HPS lamps and choke (reactor) ballasts is shown separately.

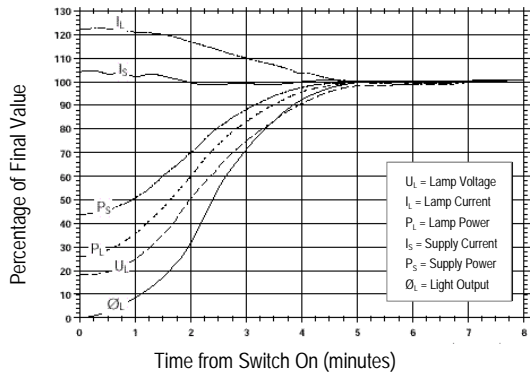
## Warning

Do not use a Lucalox® Internal Ignitor HPS lamp in an installation that has an external ignitor unit!

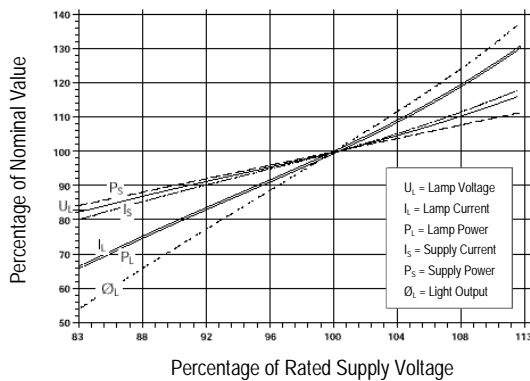
## Compliance with IEC Standards

All Tubular and Elliptical Lamps comply with IEC 60662.

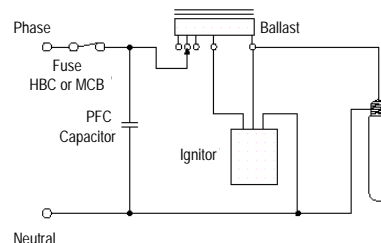
## Typical Run-up Characteristics



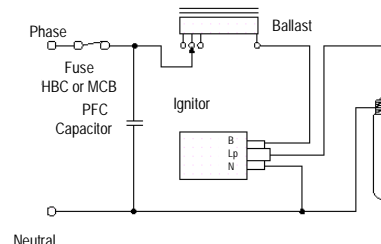
## Effect of Supply Voltage Variations on Performance



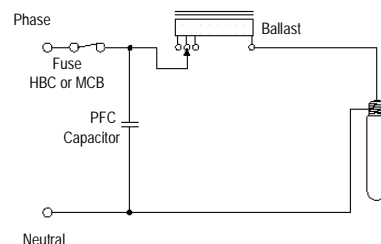
## Typical Impulser Ignitor Circuit



## Typical Superimposed Ignitor Circuit



## Lucalox Internal Ignitor



# GUIDANCE FOR LUMINAIRE MANUFACTURERS

## Lamp Operating Temperature Limits

	50/70W	100-400W
Maximum Cap Temperature: 210°C (Lucalox™ -TD: 350°C)		250°C
Maximum Bulb Temperature: 400°C (Lucalox™ -TD: 750°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:

Watts	50	70	250	400	1000
<b>Lucalox™ – Reflector</b>					
Voltage Rise (V)	-	5	-	-	-
<b>Lucalox™ – TD – Clear Tubular Double-Ended</b>					
Voltage Rise (V)	-	-	7	12	20
<b>Lucalox™ – Internal Ignitor Clear Elliptical</b>					
Voltage Rise (V)	5	5	-	-	-
<b>Lucalox™ – Internal Ignitor Diffuse Elliptical</b>					
Voltage Rise (V)	5	5	-	-	-

## Control Gear

To achieve correct lamp starting, performance and life it is important that lamp and control gear are compatible and suitably rated for the supply voltage at the luminaire.

## Ballasts

Lamps are fully compatible with ballasts manufactured for high pressure sodium lamps to IEC 60662. Ballasts should comply with specifications IEC 60922 and IEC 60923.

**Ballast Thermal Protection** — Use of ballasts incorporating thermal cut-out is not a specific requirement but is a good optional safety measure for the installation.

**Ballast Voltage Adjustment** — Series choke (reactor) ballasts incorporating additional tappings 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 as follows:

Watts	Min. Pulse Voltage (kV) <sup>(1)</sup>	Max. Pulse Voltage (kV) <sup>(2)</sup>	Min. Pulse Width ( $\mu$ s) <sup>(3)</sup>	Min. Pulse Repetition Rate <sup>(4)</sup>	Min. HF Peak Current (A)
<b>Lucalox™ – Reflector</b>					
70	1.8	2.3	1.95	1/1/2 cycle	0.2
<b>Lucalox™ – TD – Clear Tubular Double-Ended</b>					
250	2.8	-	0.95	1 / cycle	0.2
400	2.8	-	0.95	1 / cycle	0.2
1000	3.5	-	0.2	1 / cycle	0.2

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.

### Warning

**Do not use a Lucalox™ Internal Ignitor HPS lamp in an installation that has an external ignitor unit!**

**Timed Ignitors** — Use of a “timed” or “cut-out” ignitor is not a specific requirement, but it is a good optional safety feature for installation. The timed period must be adequate to allow lamps to cool and restart when the supply is interrupt-ed briefly (see “Hot Re-strike Time”).

**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 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.

## 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:

Watts	50	70	100	150	250	400	1000
PFC Capacitor ( $\mu$ F)	8	8	-	-	30	40	N/A



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GE Lighting is constantly developing and improving its products. For this reason, all product descriptions in this publication are intended as a general guide, and we may change some specifications from time to time in the interest of product improvement. Special Lucalox™ data sheet v.3 - July 2001