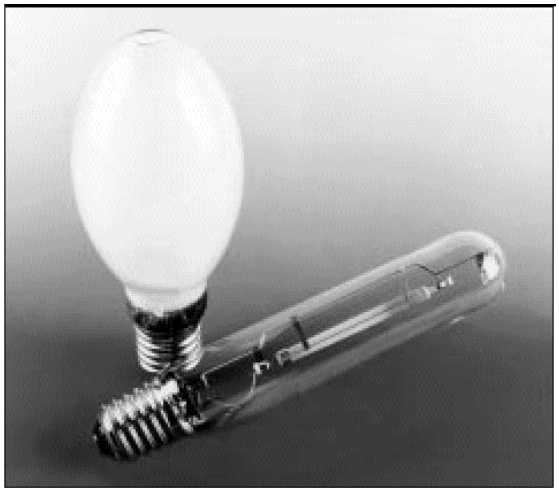
Lucalox™ HO

High Output High Pressure Sodium Lamps

Lucalox™ HO Clear Tubular
50W, 70W, 100W, 150W, 250W, 400W & 600W

Lucalox™ HO Diffuse Elliptical
100W, 150W, 250W & 400W



- Superb Performance and Longer Life GE's external amalgam reservoir keeps more sodium for longer, slowing the voltage rise which gives a rated average life of up to 28,500 hours.
- High Xenon-Fill delivers
  — high luminous efficiency up to 150 lm/W
  — extra light up to 20% more lumens — with no increase in energy consumption
  — improved lumen maintenance
- More tolerance of Fluctuating Voltage Xenon dampens the effect of main voltage fluctuations limiting colour change and early failures.

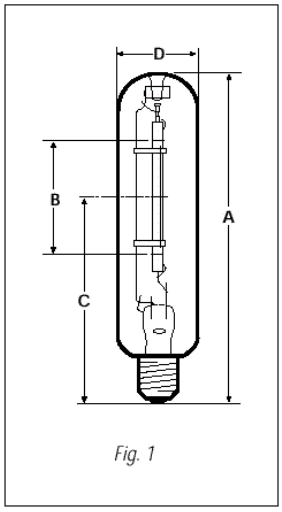


Fig. 1

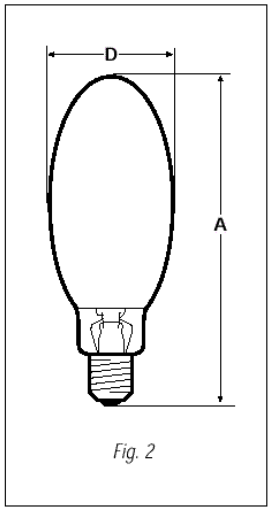


Fig. 2

Applications

The main fields of applications are as follows:

Traffic Lighting
– Main streets & pedestrian areas
– Arterial roads & motorways
– Squares & bridges
– Tunnels & subways
– Sidestreets
– Pedestrian crossings
– Street crossings
– Canals, locks
– Railway yards
– Airports, aprons
– Ports & piers
– Refineries

Industrial Installations
– Factory yards
– Parking lots
– Electrical plants
– Shipyards

Plant Cultivation
– Horticultures
– Greenhouses

Physical Data

Watts	A Length (mm)	B Arc Gap (mm)	C LCL (mm)	D Diameter (mm)	Cap	Bulb Glass	Mass (g)	Operating Position	Minimum Starting Temp.
Lucalox™ - High Output Clear Tubular – Fig. 1									
50	156	34.8	97	38.5	E27	Soft	65	Universal	-40°C
70	156	34.8	97	38.5	E27	Soft	65	Universal	-40°C
100	211	42.3	133	48	E40/45	Hard	140	Universal	-40°C
150	211	48.3	133	48	E40/45	Hard	150	Universal	-40°C
250	260	64.3	158	48	E40/45	Hard	155	Universal	-40°C
400	278	85.3	175	48	E40/45	Hard	175	Universal	-40°C
600	278	96	117.9	48	E40/45	Hard	180	Universal	-40°C
Lucalox™ - High Output Diffuse Elliptical – Fig. 2									
100	186	–	–	76	E40/45	Hard	140	Universal	-40°C
150	227	–	–	91	E40/45	Hard	175	Universal	-40°C
250	227	–	–	91	E40/45	Hard	195	Universal	-40°C
400	282	–	–	122	E40/45	Hard	250	Universal	-40°C

Photometric Data

Watts	100 Hr. Lumens	Colour Temp. (K)	Chromaticity Coordinates x	Chromaticity Coordinates y	Colour Rendering CRI (Ra)	Properties DIN 5035 Class
Lucalox™ - High Output Clear Tubular						
50	4,000	2,000	0.530	0.430	25	4
70	6,500	2,000	0.530	0.430	25	4
100	10,000	2,000	0.530	0.430	25	4
150	17,500	2,000	0.530	0.430	25	4
250	33,000	2,000	0.530	0.430	25	4
400	56,500	2,000	0.530	0.430	25	4
600	90,000	2,000	0.530	0.430	25	4
Lucalox™ - High Output Diffuse Elliptical						
100	9,600	2,000	0.530	0.430	25	4
150	16,900	2,000	0.530	0.430	25	4
250	31,200	2,000	0.530	0.430	25	4
400	53,700	2,000	0.530	0.430	25	4

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

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.

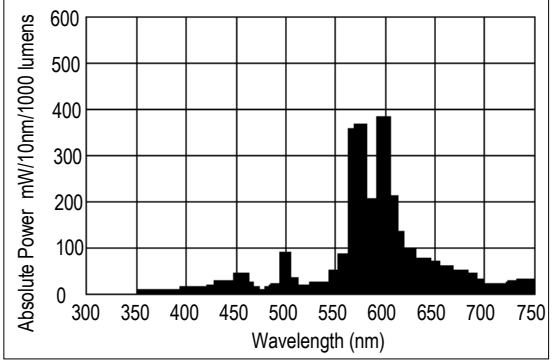
Average Rated Life

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 (see Lamp Survival graph)
For cost-of-light calculations involving these lamps, the following estimated operating time is suggested for 50% survival is 28500 hours.

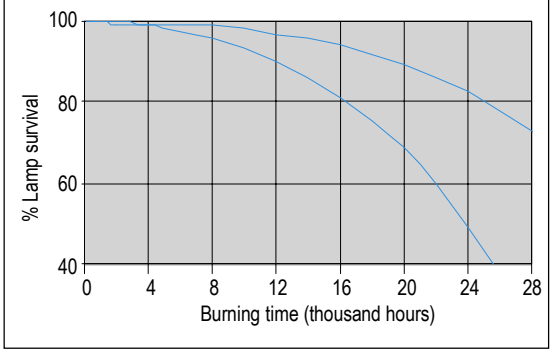
Lumens

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).

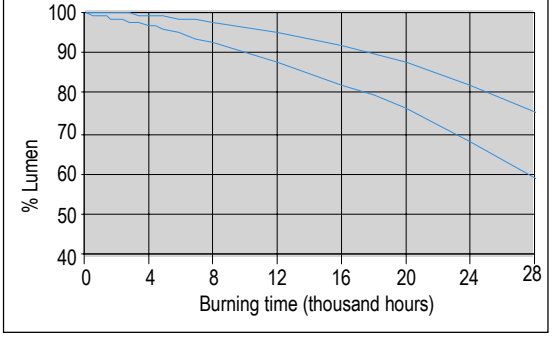
Spectral Power Distribution



Lamp Survival



Lumen Maintenance



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.

Run-Up Characteristics

The graph shows typical run-up characteristics for a 150W Lucalox™ HO 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:

Watts	50	70	100	150	250	400	600
Run-Up (Mins)	5	4	3	2	2.5	2.5	3

Hot Restrike Time

All ratings restrike within 5 minutes. This is due to the lamp having cooled to a temperature at which the internal start-ing aid is required to re-establish the arc. This starting aid is thermally set and will not operate when hot.

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 ±3%. Supply variations of ±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.

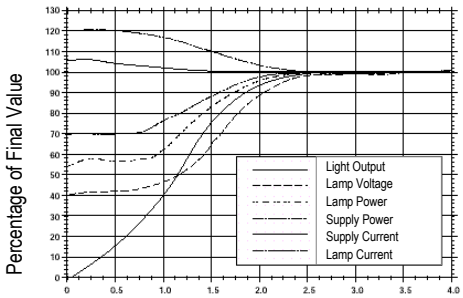
Ballasts

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.

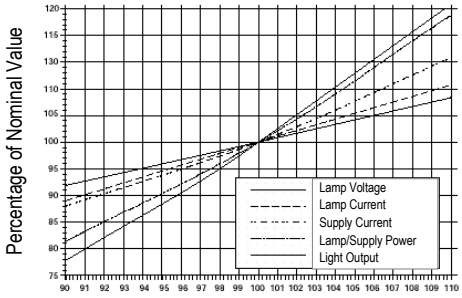
Lamp Data

Watts	Volts ±15 (V)	Current (A)	Power (W)	Current Crest Factor
Lucalox™ - High Output Clear Tubular				
50	85	0.76	50	1.80
70	90	0.98	70	1.80
100	100	1.20	100	1.80
150	100	1.80	150	1.80
250	100	2.95	255	1.80
400	100	4.50	400	1.80
600	105	6.20	600	1.80
Lucalox™ - High Output Diffuse Elliptical				
100	100	1.20	100	1.80
150	100	1.80	150	1.80
250	100	2.95	255	1.80
400	105	4.40	400	1.80

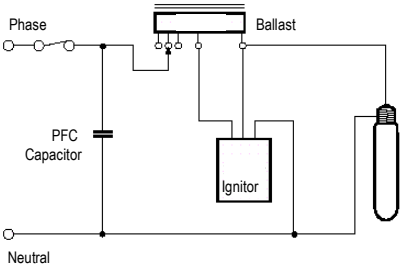
Typical Run-up Characteristics



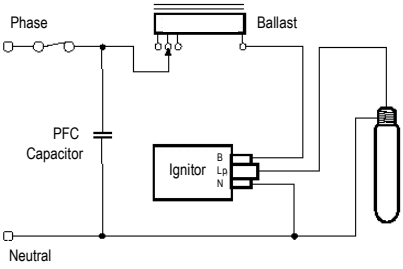
Effect of Supply Voltage Variations on Performance



Typical Impulser Ignitor Circuit



Typical Superimposed Ignitor Circuit



Lamp Operating Temperature Limits

	50/70W	100-400W
Maximum Cap Temperature	210°C	250°C
Maximum Bulb Temperature	400°C	400°C

Luminaire Voltage Rise

To maximize 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	100	150	250	400	600
Clear Tubular							
Voltage Rise (V)	5	5	7	7	10	12	12
Diffuse Elliptical							
Voltage Rise (V)	–	–	5	5	10	7	–

Ballasts

To achieve correct lamp starting, performance and life it is important that lamp and ballast are compatible and suitably rated for the supply voltage at the luminaire. Lamps are fully compatible with ballasts are manufactured for high pressure sodium lamps to IEC60662. Ballasts should comply with specifications IEC60922 and IEC60923.

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

Ballast Voltage Adjustment — Series choke (reactor) ballasts incorporating additional tappings at ±10V of the rated supply voltage are recommended. Alternatively a single additional tapping 10V above the rated supply voltage will ensure lamps are not over loaded 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) [1]	Max. Pulse Voltage (kV) [2]	Min. Pulse Width (µs) [3]	Min. Pulse Repetition Rate [4]	Min. HF Peak Current (A)
50	1.8	2.3	1.95	1 /1/2 cycle	0.7
70	1.8	2.3	1.95	1 /1/2 cycle	0.7
100	2.8	4.5	1.95	1 / cycle	1.0
150	2.8	4.5	1.95	1 / cycle	1.0
250	3.3	5.0	1.95	1 / cycle	1.0
400	3.3	5.0	1.95	1 / cycle	1.0
600	3.3	5.0	1.95	1 / cycle	1.0

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.

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

A period of 10 minutes continuous or intermittent opera-tion is recommended before the ignitor is automatically switched off. Commercially available 10/11 minute timed ignitors are suitable.

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 cables are 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 adja-cent 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±10% rated capacitors are recommended as follows:

Watts	50	70	100	150	250	400	600
PFC Capacitor (µF)	8	10	12	20	30	40	50