GE Lighting

Polylux XL Triphosphor Fluorescent Lamps

DESCRIPTION

GE Polylux XL lamps are high performance triphosphor lamps offering;

- excellent colour rendering (R_a value of 85)
- higher light output for longer (95% lumen maintenance)
- longer life (up to 18,000 hours on electronic gear)
- up to 18% more light output than standard halophosphate tubes.

Polylux XL lamps should be the natural choice for all fluorescent lighting applications. The excellent colour reproduction flatters skin tones making people appear more natural, and makes merchandise appear more vibrant and colourful. This is one reason why GE Polylux XL lamps, with their comprehensive range of colours, are suited to all retail, domestic, office and other commercial environments.

COLOUR DESCRIPTION AND MAIN APPLICATIONS

Polylux XL 827 (Extra Warm White)
Colour: Very warm ambience. Light colour closest to that produced by incandescent lamps.
Applications: Restaurants, Hotels and Theatre foyers. Suitable for lower lighting levels. Popular in cooler climates.

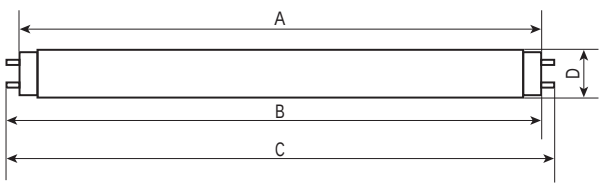
Polylux XL 830 (Warm White)
Colour: Warm and welcoming.
Applications: Retail, Schools and Reception areas. Suitable for higher lighting levels.

Polylux XL 835 (White)
Colour: Intermediate colour.
Applications: General Commercial and Industrial. Some Retail. Ideal balance between warm and cool colours.

Polylux XL 840 (Cool White)
Colour: Cool colour favouring blues and greens.
Applications: Offices, Hospitals, Sports Halls and fast-moving Retail.

Polylux XL 860 (Daylight)
Colour: Very cool
Applications: Favoured in Southern Europe and in countries with tropical climates.

Dimensions (mm)



Lamp Rating	A Max.	B Max.	B Min.	C Max.	D Max.
15W	437.4	444.5	442.0	451.6	26.0
18W	589.8	596.9	594.5	604.0	26.0
30W	894.6	901.7	899.3	908.8	26.0
36W (970 mm)	970.0	977.1	974.8	984.3	26.0
36W (1200 mm)	1199.4	1206.5	1204.1	1213.6	26.0
38W (1050 mm)	1047.0	1054.1	1051.7	1061.1	26.0
58W	1500.0	1507.1	1504.7	1514.2	26.0
70W	1763.8	1770.9	1768.4	1778.0	26.0

Lamp Rating	Fill gas
15W	Argon
18W	Krypton/Argon
30W	Argon
36W (970 mm)	Krypton/Argon
36W (1200 mm)	Krypton/Argon
38W (1050 mm)	Argon
58W	Krypton/Argon
70W	Krypton/Argon

Polylux XL

Polylux XL Coating

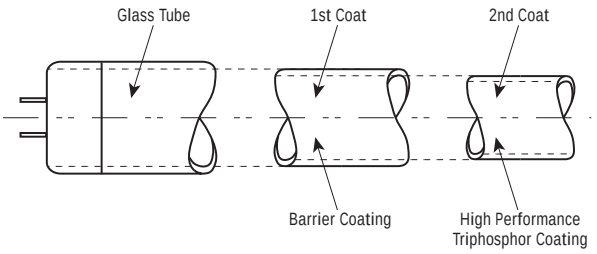


Fig. 1

Typical Lumen Maintenance Curves

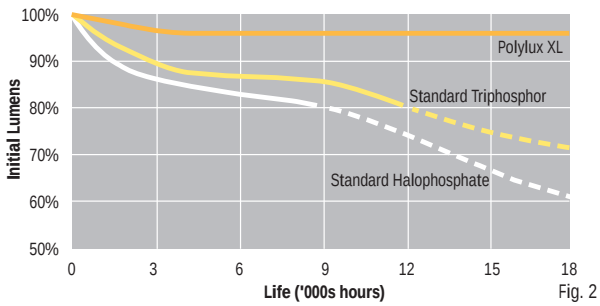


Fig. 2

Light Output Versus Ambient Temperature

Still Air Conditions

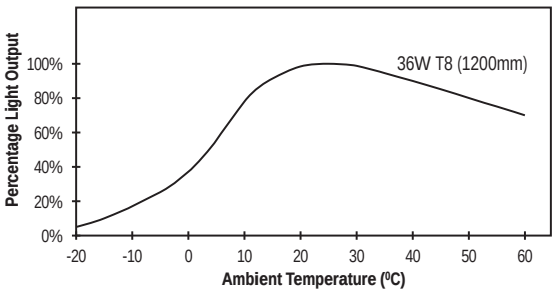


Fig. 3

Mortality Curve

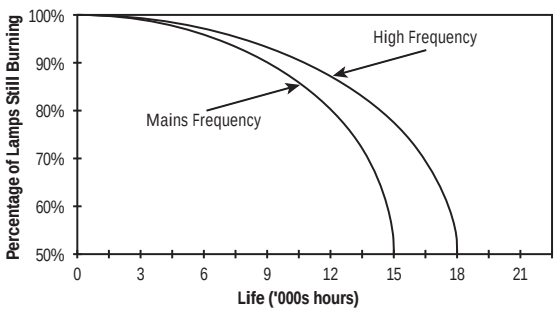


Fig. 4

Effect of Switching on Lamp Life

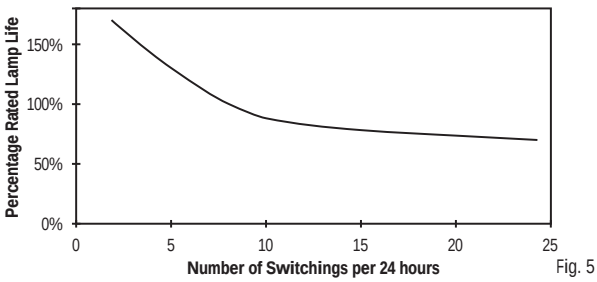


Fig. 5

LIGHT OUTPUT

Colour Rendering

One key property of the GE Polylux XL lamps is the outstanding colour reproduction. With a CRI (R_a) of 85, GE Polylux XL lamps offer considerably improved colour rendering than standard halophosphate lamps.

Lumen Maintenance

The high lumen maintenance properties of Polylux XL are achieved through the introduction of two major changes to conventional coating technology:

- only high performance triphosphor powders are used
- lumen depreciation resulting from mercury absorption into the glass is effectively eliminated, through the use of a barrier pre-coat. (See Fig.1 & 2).

Light Output and the Effect of Temperature

The Lumen Output figures quoted relate to measurements made according to IEC requirements ie. using a reference ballast with the lamp operated in still air conditions at 25°C (± 1°C).

The light output from conventional fluorescent lamps will depend on the surrounding air temperature or any cooling effects arising from air draughts that occur whether deliberate (air handling fitting) or unplanned.

A typical relationship is shown opposite in Fig.3.

LAMP LIFE

Improved Lamp Life for GE Polylux XL Lamps

To take full advantage of the superb maintenance characteristics of the XL range, GE Lighting have made a small change to the inert fill gas pressure to improve lamp life. This change is sufficiently modest not to impact on any other of the lamp parameters.

The quoted lamp life is the “average rated lamp life” which is the average value obtained on a three hour switching cycle (15 minute OFF period following 2 hrs 45 mins running time) using control gear meeting IEC specification. This will be the point in time at which 50% of the lamps originally installed are still operating.

Given this definition, in an installation using Polylux XL lamps and glow starters, 50% of the lamps will still be burning after 15,000 hours; for an installation using approved pre-heat electronic ballasts the life will increase to 18,000 hours. (See Fig.4).

The Effect of Switching on Lamp Life

When a fluorescent lamp is operating, a small amount of the electron emissive material held on the cathodes is continually consumed, the rate of consumption increasing with higher lamp current. Additionally, when starting the lamp (or when switching off and on during normal operation), a relatively large amount of emitter material can be dislodged through sputtering. In some cases the start is sufficiently damaging, particularly when using “cold start” ballasts, to progressively destroy the effectiveness of the emitter and thereby shortening lamp life.

A good start will preheat the lamp cathodes so that when the lamp starting voltage is applied, the cathodes are already freely emitting electrons and the damage through loss of the emissive material is minimised.

High frequency electronic ballasts of the preheating (warm start) type can give a consistent and highly controlled starting regime so that the effect of switching on lamp life is considerably less marked than that occurring with a glow starter. (See Fig.5).

PERFORMANCE AND ELECTRICAL DATA

Watt	Colour Description	CCT ^{O}K	CRI	Life (h)*		Lumens (100h)	Electrical Characteristics		Objective W
				Mains	HF		V	A	
15W	POLYLUX 827	2700	>80	10000	-	1000	56	0.31	15.0
	POLYLUX 830	2950	>80	10000	-	1000	56	0.31	15.0
	POLYLUX 840	4000	>80	10000	-	1000	56	0.31	15.0
18W	POLYLUX XL 827	2700	85	15000	18000	1350	57	0.37	18.0
	POLYLUX XL 830	2950	85	15000	18000	1350	57	0.37	18.0
	POLYLUX XL 835	3400	85	15000	18000	1350	57	0.37	18.0
	POLYLUX XL 840	4000	85	15000	18000	1350	57	0.37	18.0
	POLYLUX XL 860	6300	85	15000	18000	1300	57	0.37	18.0
30W	POLYLUX XL 827	2700	85	15000	18000	2450	96	0.37	30.0
	POLYLUX XL 830	2950	85	15000	18000	2450	96	0.37	30.0
	POLYLUX XL 840	4000	85	15000	18000	2450	96	0.37	30.0
36W	POLYLUX XL 830	2950	85	15000	18000	3100	80	0.56	36.0
(1 m)	POLYLUX XL 840	4000	85	15000	18000	3100	80	0.56	36.0
36W	POLYLUX XL 827	2700	85	15000	18000	3350	103	0.43	36.0
(1.2 m)	POLYLUX XL 830	2950	85	15000	18000	3350	103	0.43	36.0
	POLYLUX XL 835	3400	85	15000	18000	3350	103	0.43	36.0
	POLYLUX XL 840	4000	85	15000	18000	3350	103	0.43	36.0
	POLYLUX XL 860	6300	85	15000	18000	3250	103	0.43	36.0
38W	POLYLUX XL 830	2950	85	15000	18000	3300	108	0.43	38.5
	POLYLUX XL 840	4000	85	15000	18000	3300	108	0.43	38.5
58W	POLYLUX XL 827	2700	85	15000	18000	5200	110	0.67	58.5
	POLYLUX XL 830	2950	85	15000	18000	5200	110	0.67	58.5
	POLYLUX XL 835	3400	85	15000	18000	5200	110	0.67	58.5
	POLYLUX XL 840	4000	85	15000	18000	5200	110	0.67	58.5
	POLYLUX XL 860	6300	85	15000	18000	5000	110	0.67	58.5
70W	POLYLUX XL 830	2950	85	15000	18000	6300	128	0.70	69.5
	POLYLUX XL 835	3400	85	15000	18000	6300	128	0.70	69.5
	POLYLUX XL 840	4000	85	15000	18000	6300	128	0.70	69.5

* Life is rated in accordance with the IEC60081 / EN60081 3hr testing cycle (15 minute OFF period following 2 hrs 45 mins running time).

EFFECT OF SUPPLY VOLTAGE VARIATION ON 50 Hz LAMP CHARACTERISTICS

Note:– The following values are generalisations and should be treated only as an indication of the trend in the characteristic across the 15W-70W lamp range.

LAGGING CIRCUIT

	Lumens ±5%	Lamp Current ±5%	Lamp Voltage ±8%	Lamp Watts ±5%
Nom. Supply	100%	100%	100%	100%
90% Supply	85%	80%	110%	88%
110% Supply	110%	115%	92%	118%

LEADING CIRCUIT

	Lumens ±3%	Lamp Current ±3%	Lamp Voltage ±3%	Lamp Watts ±3%
Nom. Supply	100%	100%	100%	100%
90% Supply	95%	90%	102%	94%
110% Supply	105%	110%	94%	105%

OPERATION WITH HIGH FREQUENCY BALLASTS

High Frequency Lamp Operation

High frequency circuits intended for use with lamps originally designed to operate at mains frequency, take advantage of the improved luminous efficacy of high frequency operation to achieve virtually the same lumens but at a lower power loading compared to the 50Hz circuit.

This reduced lamp loading enables an increase in life to be achieved without a serious loss in light output compared to the mains frequency circuit. In fact the circuits are designed to give around 95% of the equivalent mains frequency circuit light output, but this loss is usually more than compensated for when the lamp is operated in a luminaire because the lower micro-ambient temperature of the fitting gives an improvement in efficacy. (See Fig.3)

Advantages of high frequency lamp operation

The operation of fluorescent lamps at high frequency offers a number of benefits:

- **Improved energy efficiency**

This occurs because there is a reduction in the losses in the lamp (lower end losses because of the reduction in cathode fall voltage) and normally the control circuit has much lower power losses than the equivalent mains frequency circuit.

- **Improved light quality**

Attributable to the elimination of both flicker and the stroboscopic effects associated with mains frequency operation.

- **Improved life (compared with glow starter equivalent circuit)**

Lamp life is directly related to the lamp current because the rate of emitter usage is determined by the lamp current.

The proportional increase in lamp life resulting from the decrease in lamp current will not be fully realised, as the lamp's cathode design has been optimised for mains frequency operation. However, the effect of non-optimised cathode design is only slight and the Polylux XL lamp life will increase from 15,000 hours using switch-start circuits to 18,000 hours using high frequency circuits.

As an example the 36W lamp is run at 32W in high frequency circuits which lowers the lamp current from 430mA to 320mA. This is an approximate 25% reduction in lamp current which produces an associated 20% improvement in life from 15,000 hours to 18,000 hours.

Additionally the controlled preheating that is provided by a warm start electronic ballast ensures that emitter loss during starting is minimised so that the effect of switching on life is minimal.(See Fig.5).

Reference Ballast Characteristics

Fluorescent Lamp		Ballast Characteristics				
Rating	Length (mm)	Watt (lamp)	Rated Voltage V	Calibration Current A	Ratio V/A Ω	Power Factor
15W	450	15	127	0.33	312	0.12
18W	600	20	127	0.37	270	0.12
30W	900	30	220	0.36	480	0.10
36W	1000	40	220	0.56	335	0.10
36W/38W	1200/1050	40	220	0.43	390	0.10
58W	1500	65	220	0.67	240	0.10
70W	1800	65	240	0.70	240	0.10

High Frequency Ballasts approved by GE Lighting

The list given is not considered to be comprehensive, but merely indicates the ballasts tested by GE Lighting in co-operation with independent gear manufacturers. Ballasts produced by other reputable control gear manufacturers meeting the relevant IEC standards would also be considered as suitable.

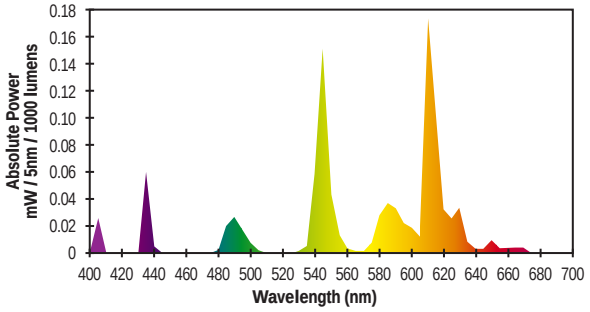
Lamp Rating	Single Lamp Options	Twin Lamp Options	Dimming Single	Dimming Twin
18W		TRIDONIC PC2x16C001	TRIDONIC PC16A011	MAGNETEK DBT218
			ATLAS GH118C	
36W (1.2m)	HELVAR EL1x36HF	HELVAR EL2x36HF	MAGNETEK DBT136	ATLAS GH236C
		ATLAS GK236	ATLAS GH136C	
		TRIDONIC PC2x32C001	TRIDONIC PC32A011	
58W	ATLAS GK158	ATLAS GK258	ATLAS GH158C	ATLAS GH258C
	TRIDONIC PC50C001		TRIDONIC PC50A011	MAGNETEK DBT258
	HELVAR EL1x58HF			
	MAGNETEK BBT158WS			
70W	TRIDONIC PCOC001	ATLAS GK270	HELVAR EL1x70BC	HELVAR EL2x70HFC
		MAGNETEK BBT-270		

SPECTRAL DISTRIBUTION

Spectral Power Distribution curves provide the user with a visual profile of the colour characteristics of a light source. Fluorescent lamps combine a continuous spectra from their phosphor with the line spectra of the mercury discharge.

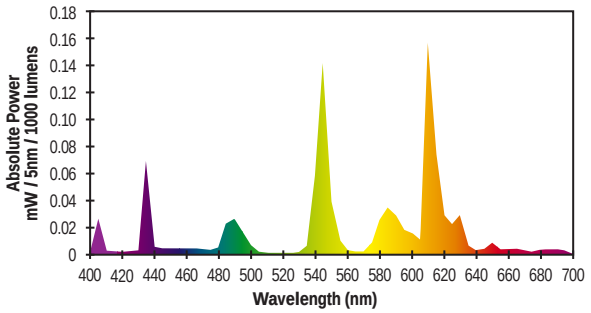
Polylux XL 827

x = 0.463 y = 0.420 CCT 2700



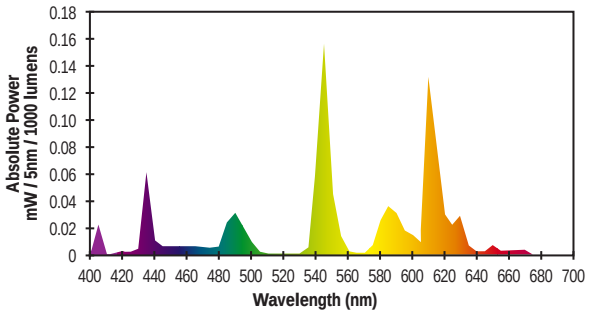
Polylux XL 830

x = 0.440 y = 0.402 CCT 2950



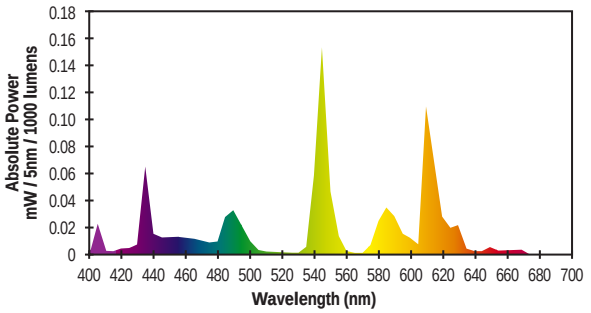
Polylux XL 835

x = 0.415 y = 0.402 CCT 3400



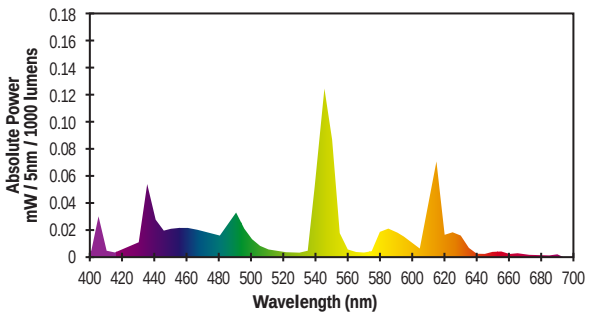
Polylux XL 840

x = 0.380 y = 0.377 CCT 4000



Polylux XL 860

x = 0.316 y = 0.336 CCT 6300



INTERNATIONAL STANDARDS APPLICABLE TO LINEAR FLUORESCENT LAMPS

All GE Lighting linear fluorescent lamps conform to the applicable standards listed below.

Standard	Title
EN 60081	Tubular Fluorescent Lamps - Performance requirements
EN 61195	Tubular Fluorescent Lamps - Safety requirements
EN 60155	Glow Starters
EN 60920	Ballasts for Tubular Fluorescent Lamps - General and Safety requirements
EN 60921	Ballasts for Tubular Fluorescent Lamps - Performance requirements
EN 60924	DC Supplied Electronic Ballasts for Tubular Fluorescent Lamps - General and Safety requirements
EN 60925	DC Supplied Electronic Ballasts for Tubular Fluorescent Lamps - Performance requirements
EN 60928	AC Supplied Electronic Ballasts for Tubular Fluorescent Lamps - General and Safety requirements
EN 60929	AC Supplied Electronic Ballasts for Tubular Fluorescent Lamps - Performance requirements

CE MARKING OF LINEAR FLUORESCENT LAMPS

All GE Lighting products supplied in the European Community (EC) meet the requirements of the Low Voltage Directive (LVD) and are CE Marked as required by the LVD.

The LVD 73/23/EEC of the EC was introduced in February 1973. The aim of the directive is to ensure that all electrical equipment operating on normal-user voltage supplies of between 50 and 1000 V rms. AC (also between 75 and 1500V DC) are safe in all respects related to their electrical properties. The LVD originated with no marking requirements.
CE Marking requirements (denoting product compliance with the LVD) were added by amending Directive 93/68/EEC in August 1993. The LVD is a legal requirement enforceable in each country by reference to the national law of that country adopting the directive. The application of the CE mark itself became a legal requirement in January 1997.

Compliance with the LVD is demonstrated by compliance with the relevant EN safety specification requirements for a particular product. The LVD requires that both the Product and the Quality System under which the product is manufactured meet the requirements of the relevant specifications. The LVD requires any electrical product falling within its scope for sale in the EC is CE Marked and that the supplier holds a Declaration of Conformity declaring conformity with the LVD.

GE Lighting