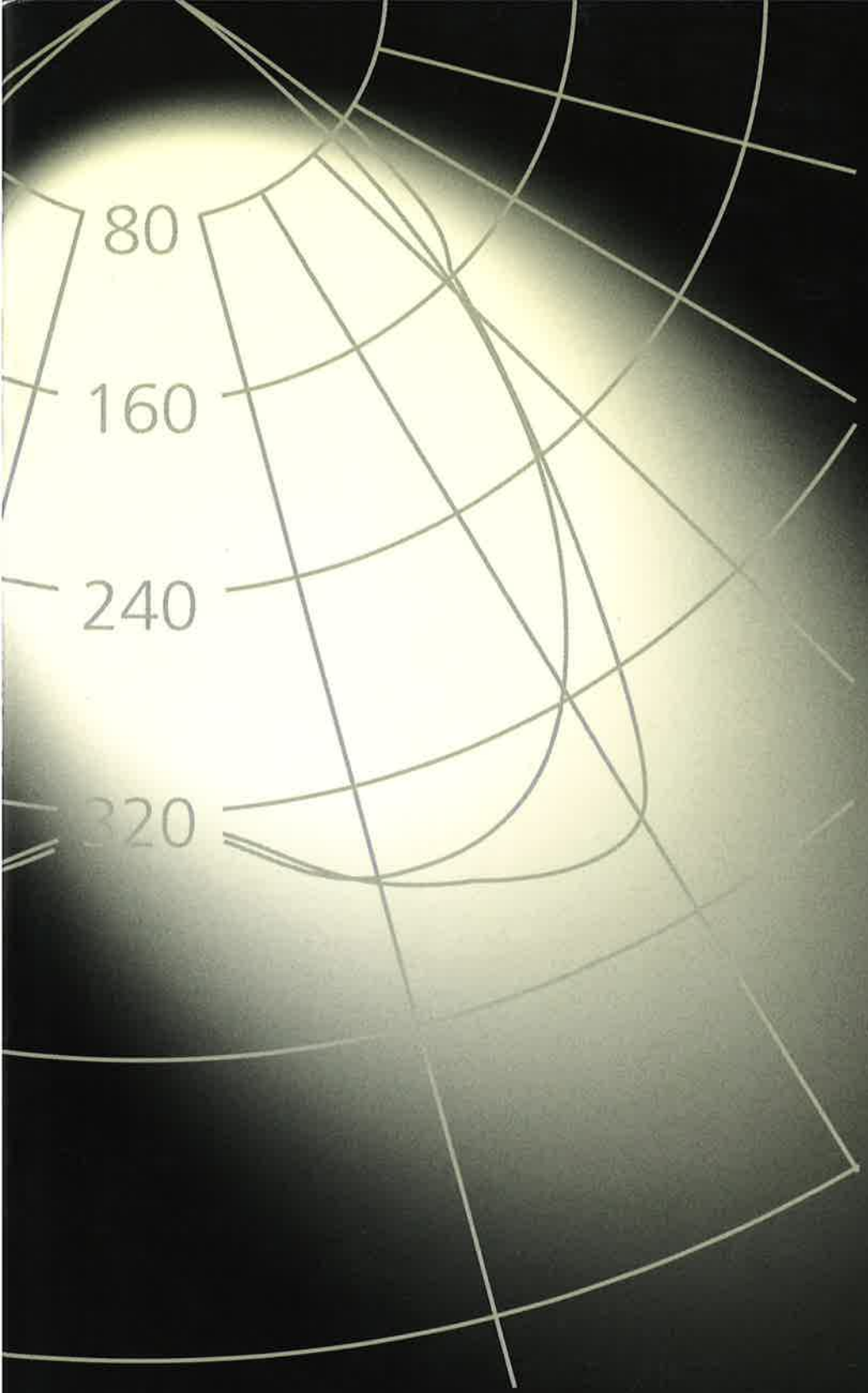
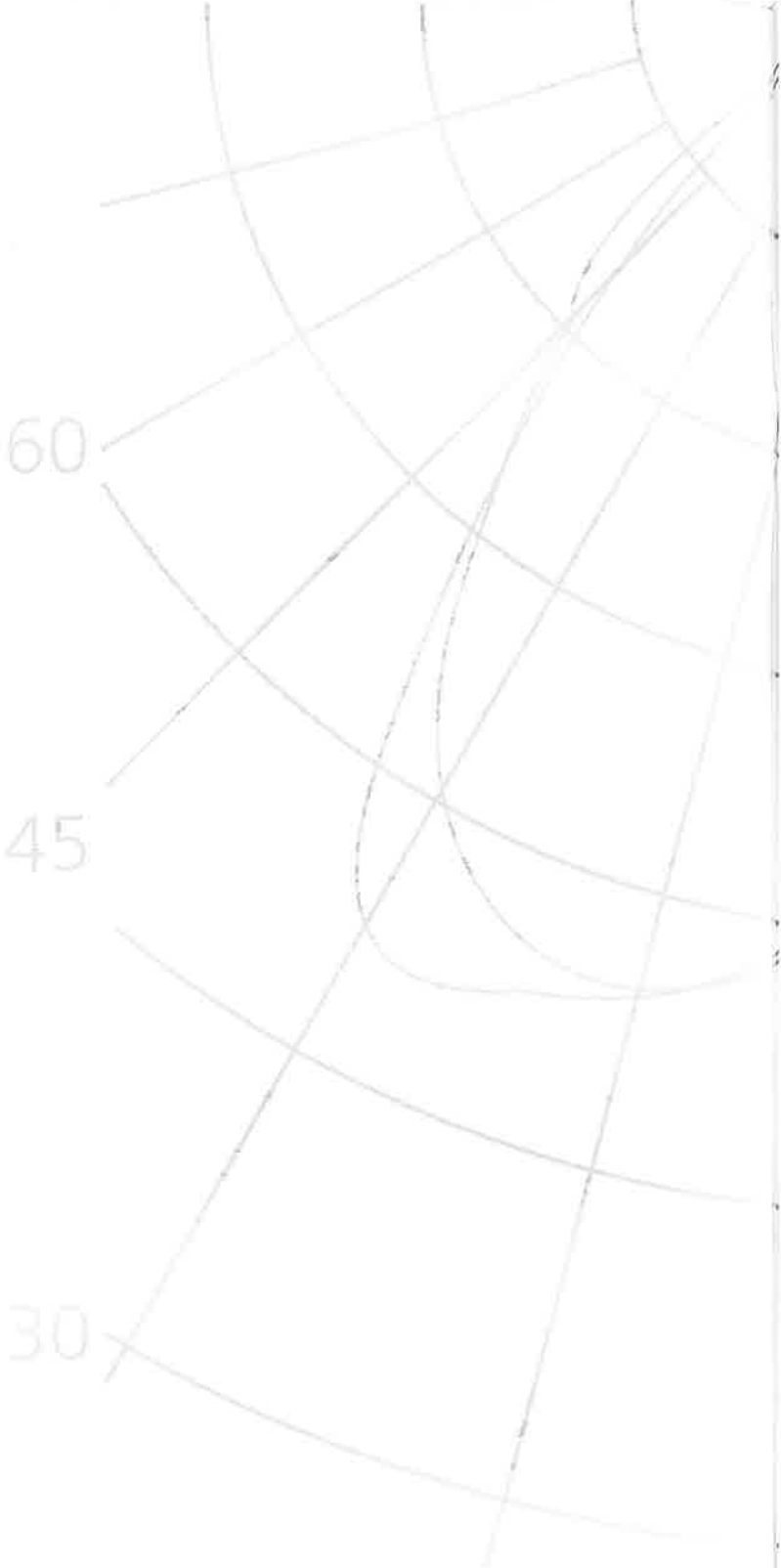


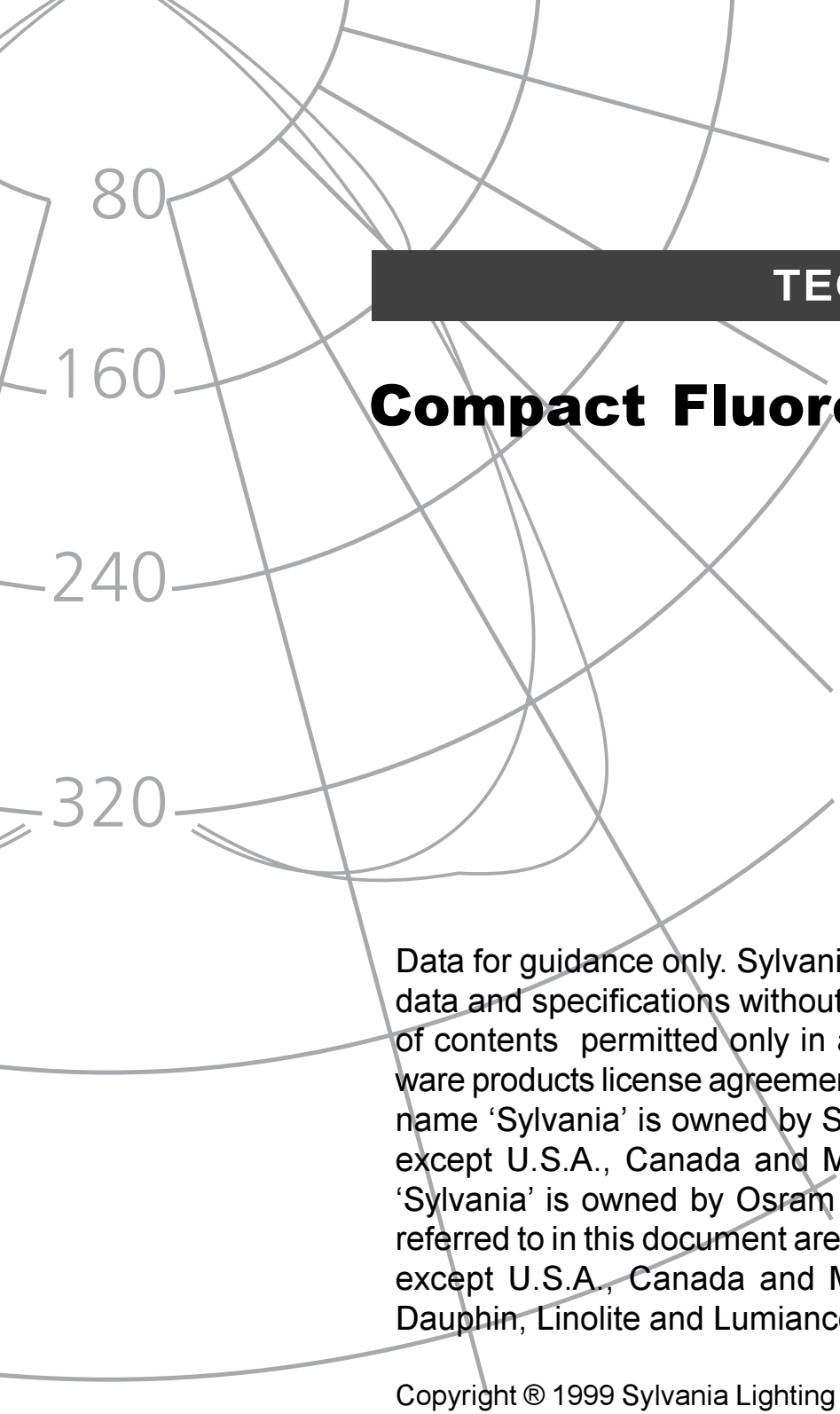

# Technical Manual

## Compact Fluorescent

Sylvania Lighting International

A Source of Inspiration






SYLVANIA

TECHNICAL MANUAL

# Compact Fluorescent Lamps

# Lynx and Mini-Lynx Product Range Summary

## Introduction

Compact fluorescent (CFL's) is one of the fastest growing new lamp technologies today, evolved from tubular fluorescent lamps. CFL's are designed as an energy efficient, environmentally friendly and easy-to-use range of lamps. They are used in applications such as:

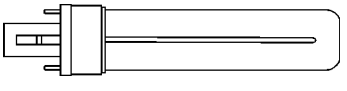
Outdoor Amenity

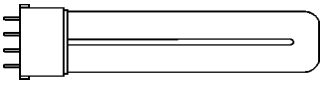
Task Lighting

Home Lighting, replacing the traditional GLS lamp

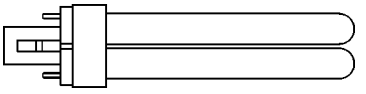
Indoor Commercial Lighting, particularly recessed Downlights and Modular Low brightness types.

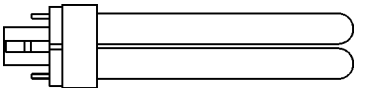
**Lynx Compact-S (Single, 2-pin base) and SE (Single, 4-pin base):** The simplest in construction and most common of the CFL's for new luminaires, they offer the simplest design solutions for a luminaire designer considering CFL's as an option to GLS. They are designed as an energy saver alternative to GLS Incandescent lamps typically used in amenity or task lighting. S versions are starter-incorporated but SE versions are designed principally for electronic ballast operation. Ratings from 5W (250 lumens) up to 11W (900 lumens) are available.



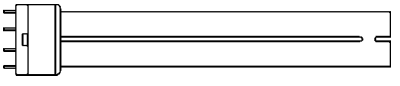


**Lynx Compact-D (Double, 2-pin base) and DE (Double, 4-pin base):** Increased power and lumen output compared to CF-S and SE due to their multi-limb design but without increasing overall length. Typically used in commercial interior lighting. D versions are starter incorporated but DE versions are designed for electronic ballast operation and are suitable for dimming applications. Ratings from 10W (600 lumens) to 26W (1800 lumens) are available.

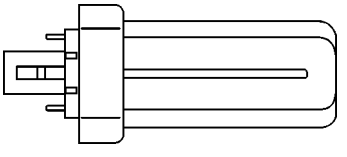


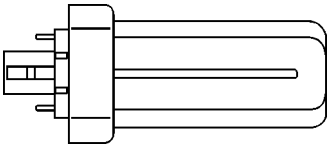


**Lynx Compact-L and LE:** The high power equivalent of the CF-S and CF-SE lamps, similar in output to the New Generation Triphosphor T8 range of Luxline Plus, but of significantly shorter length (less than 600mm) than their linear double-ended counterparts. Popularly used in commercial interior lighting where the appearance of the suspended ceiling is a concern. All types require an external starter. L versions are available in 18W (1200 lumens) up to 36W (3300 lumens) and LE versions, which are only for electronic ballast operation, are available in 40W (3500 lumens) and 55W (4800 lumens) versions.

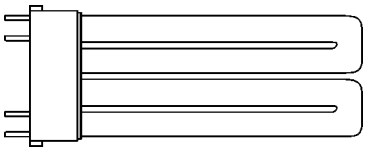


**Lynx Compact -T (Triple, 2-pin base) and TE (Triple, 4-pin base):** These lamps are evolved from the double multi-limb design for use where still more light output is needed without increasing overall length. In addition, the arrangement of the lamp limbs provides the most symmetrical luminous intensity distribution of all CFL lamps. Ballasting and application requirements are generally similar to those for CF-D and CF-DE. Lamps are available from 18W (1200 lumens) up to 32W (2400 lumens).





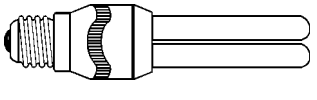
**Lynx Compact F (Flat type, 4-pin):** As an alternative to clustering the multi-limb lamp designs, the limbs of the F ‘flat’ lamp are laid out in a slab form for low height amenity luminaires where more light is needed than from the CF-S range. Ballasting and power ratings are similar to those specified for CF-L range, from 18W (1100 lumens) up to 36W (2800 lumens).



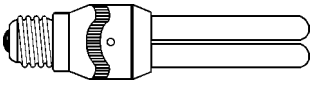
***Self-ballasted CF lamps for direct replacement of GLS Incandescent lamps.***

**Mini-Lynx Range:** The ideal, long life most energy-efficient replacement lamp for a domestic GLS in all but the very smallest luminaires. Mini-Lynx is available in 6 power ratings from 5W (250 lumens = circa 25W GLS) up to 23W (1300 lumens = circa 150W GLS), in either E14 (7W from mid 1998), E27 or B22 and in several useful colours. Advanced features such as auto-switching and application specific colours are offered, as detailed below:

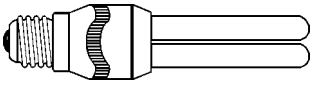
**Mini-Lynx Professional:** Double limbed 5-20W; 15, 20W and 23W triple-limbed lamps driven from a very efficient integral electronic high frequency ballast, which gives high light output sustained for a long 12000 hours of average life.



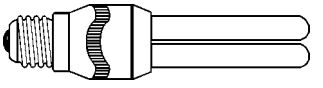
**Mini-Lynx Automatic:** Specification as for the Professional but with an autoswitch feature via a photocell (light sensor). When the ambient light sensed by the cell is less than 15 lux the lamp will switch on automatically. Ideal for exterior night security lighting where no local surveillance is practical or available, which offers increased security and reassurance both for residential and commercial premises.



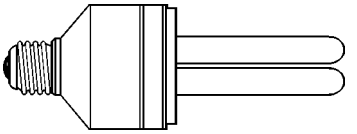
**Mini-Lynx Pastels:** The first lamp range of its kind to offer tinted phosphors. Specification is similar to the Professional series but with Rose and Apricot colour options for leisure applications where a welcoming or more intimate atmosphere is desired. Mini-Lynx Pastels are particularly suited for domestic applications, where their softer light colour options provide a most comfortable atmosphere wherever used.



**Mini-Lynx Instant:** A basic design version of the Professional but with a ‘rapid start’ characteristic which improves the speed of switch-on and avoids flickering or delays during starting.



**Lynx-ES Energy Saver:** A simple, cost-effective magnetically ballasted CFL designed to replace a GLS in the home.



## Principles of Operation

Compact fluorescent lamps belong technologically to the very large group of low pressure tubular Mercury vapour discharge types. Current is fed into the lamp by electrodes sealed into the ends of a glass discharge chamber. The discharge chamber may have several folded interlinks and is filled with a very low pressure of Argon gas and a small quantity of Mercury in vapour form, circa 6 milligram. By means of a process of excitation of the Mercury vapour, photons of ultra-violet light are produced by the discharge which irradiate phosphorescent materials on the inner wall of the glass tube producing visible light. All Sylvania's CFL's use the premium quality new generation trichromatic (triphosphor) materials which are available in five different colour tints for varying application needs.

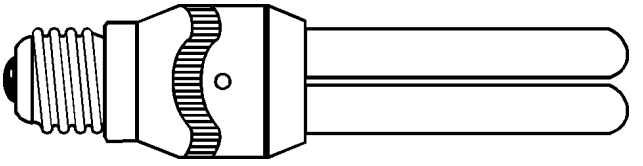
All CFL's require a power stabilisation device known as a ballast, which may be of the magnetic inductor or a high frequency electronic type. In the case of Mini-Lynx and Lynx-ES self ballasted lamps, the ballast together with the starting aid are contained within the device housing and are designed to be directly plugged in to the electrical supply.

All 2-pin and 4-pin lamp cap CFL's must be operated from an external ballast of the correct line voltage input and lamp current output. 2-pin, and self ballasted B22, E14 and E27 types contain an internal starter however they may not be used on a dimming circuit. 4-pin lamps must use a suitable external starter with a peak pulse of around 800 volts.

Mini-Lynx and Lynx-ES Energy Saver lamps contain integral HF electronic and magnetic inductor ballasts respectively. They comply with CENELEC's electromagnetic compatibility and conducted RF emission limits (see page 18 for further information).

In the HF ballast the 230-240V AC supply is first converted into a smooth DC current then into a high frequency output (30KHz) by an electronic ballast which is designed to give the Mini-Lynx its long 12,000 hour life.

## Construction



Sylvania's compact fluorescent lamps are manufactured using modern highest quality materials for a long service life to current EN and IEC standards and are also CE marked. The most important elements of lamp construction are listed below :

| | |
|---|---|
| Lamp glass: | Tough, high optical transmission soda-lime glass mounted in single or multiple-limb configurations for optimum mechanical strength which gives a highly robust construction. |
| Electrodes: | Bead-mount type tungsten coil coated with thermionic emitter for long lamp life. |
| Gas-fill: | Inert Argon at low pressure for easy starting over a wide range of temperatures (e.g. -15 to +50 C). |
| Phosphor type: | New generation Luxline Triphosphor for high luminous efficacy through life. These new phosphors give the highest light output and maintain it to c. 90% of the initial value after more than 10,000 hours. |
| Cap:<br>Lynx-S type | Rugged aluminium protective ferrule crimped over high impact and high temperature resistant plastic housing. Brass contact pins ensure a good electrical contact to the ballast to ensure trouble-free operation through life. |
| Cap:<br>All other types | As above but with the base housing constructed entirely in plastic. |

## Construction cont.

| | |
|---|---|
| Lynx-S, D and Lynx-T 2-pin models only: | Contain an integral glow-starter and RF noise suppression capacitor in the cap guide-post therefore avoiding the need for a starter in the external circuit. |
| Mini-Lynx: | Generally as above but with E14 (SES) nickel-plated E27 (ES) or B22 (BC) mains voltage cap to ensure easy fitting and removal. |
| Mini-Lynx Ballast: | Miniaturised solid state using the highest quality components mounted on the most modern SMD (surface-mounted device) circuit board. These modern manufacturing techniques ensure a long 12,000 hour average life. |

## Applications and Target Markets

Lynx Compact Fluorescent lamps are suitable for a wide range of applications both where Incandescent lamps might be used, or in new applications made possible by their compact construction e.g. small area floodlights, construction site task lighting. Some of the main applications are listed below:

| | |
|---|---|
| Lynx-S 2-pin: | For outdoor and indoor amenity use and for anglepoise-style task and inspection lighting. |
| Lynx-SE 4-pin: | For use with HF electronic ballasts and dimming circuits in emergency/escape applications, traffic bollards and modern beer taps. |
| Lynx-D 2-pin: | Indoor commercial downlights. |
| Lynx-DE 4-pin: | As above but suitable for dimming and emergency/escape purposes, where the use of HF ballasts is essential to meeting installation performance standards. |
| Lynx-L and LE: | For use in small outdoor floodlights (18 and 24W) and for ceiling-mounted indoor commercial 600 X 600 mm format recessed modular luminaires with low brightness mirror-louvre designs (36, 40 and 55W). |
| Lynx-T: | Also for downlights but where the axial lamp orientation to the luminaire reflector provides a better symmetrical intensity pattern. |
| Lynx-TE: | As above but for HF electronic operation. Note that not all types may be dimmed -see pages 33 and 34 of this technical brochure for guidance. |
| Lynx-F: | Ideal for wall and ceiling mounted indoor and outdoor amenity luminaires. The “slab” construction allows full diffuser flashing particularly for square format luminaires and the low profile of the lamp (25mm) allows for a shallow luminaire depth which reduces protrusion from the mounting surface. |

## Applications and Target Markets cont.

| | |
|---|---|
| Mini-Lynx Professional: | For any application where a GLS incandescent is used, where there is sufficient space available in the luminaire and where energy-saving and a long operating life is desired. |
| Mini-Lynx Instant: | As above, but where a quick switch-on, avoiding flickering and delays, is preferred. |
| Mini-Lynx Automatic: | Similar to the Professional but with the added feature of a light sensitive cell to provide automatic switching of the lamp when ambient light levels fall below 15 lux. Ideal for security 'guard' overnight applications such as porch lighting, (in a closed protection) luminaire with moisture and rain ingress protection. |
| Mini-Lynx Pastels: | Similar to Professional but designed to provide a softer light in pubs, clubs and restaurants and home lighting applications such as in dining areas and bedrooms. |
| Lynx-ES Energy Saver: | An inexpensive, magnetically ballasted and larger version of the Mini-Lynx, mainly for use in the home to replace GLS and where there is little or no restriction on size or weight of the replacement CFL. |

## Relative Features and Benefits

The Lynx CFL range was originally conceived in the mid-1980's as a response to the need for long life energy-saving alternatives to GLS incandescent lamps. Subsequent product evolution has allowed the design and development of many new concept luminaires. The principal features and benefits are listed below:

| Product Feature | Related benefit |
|---|---|
| 1. Compact dimensions and light weight (<100g) | Attractive new design or replacement alternative to GLS incandescent |
| 2. High luminous efficacy, c. 60 lumens/Watt | For similar light outputs there are substantial energy savings available compared to a GLS lamp, which has en efficacy of only 13 lumens/Watt |
| 3. Multi-limb designs | More flexible and novel optical and mechanical design of luminaires is possible |
| 4. Long life of 10-12,000 hours | Reduced maintenance required versus a 1000 hour GLS, since the CFL lasts up to 12 times longer, the labour cost or inconvenience of replacing a lamp is vastly reduced |
| 5. Range of lamp colours available with CRI of 85 (DIN Class 1b-very good) | Better adaptation of colours to the application and easier combination with linear T8 of similar Luxline Triphosphor colour in professional installations, which enables all the benefits (90% of initial lumens over 10,000 hours) to be available throughout the installation |

| Product Feature | Related benefit |
|---|---|
| 6. Added integral features<br>e.g. Auto-switch | Modern electronic design allows for auto-control where added security is required, providing reassurance both in home lighting and commercial applications |
| Electronically ballasted versions | Instant light at switch-on. Maximum energy efficiency and low ballast power losses save on power bills. Long life of 12,000 hours |

## Product Range and ILCOS Codes

The following table lists the Lynx range of CFL's:

| Description | ILCOS Code<br>** = for colour temperature insert digits :27/30/35/40/60 as follows:<br>827 = CCT of 2700K<br>830 = CCT of 3000K<br>835 = CCT of 4000K<br>840 = CCT of 4000K<br>860 = CCT of 6000K |
|---|---|
| **LYNX-S** | |
| CF-S 5W/8** | FSD-5/**/1B-I-G23-30/15/105 |
| CF-S 7W/8** | FSD-7/**/1B-I-G23-30/15/135 |
| CF-S 9W/8** | FSD-9/**/1B-I-G23-30/15/165 |
| CF-S 11W/8** | FSD-11/**/1B-I-G23-30/15/235 |
| **LYNX-SE** | |
| CF-SE 5W/8** | FSD-5/**/1B-E-2G7-30/15/85 |
| CF-SE 7W/8** | FSD-7/**/1B-E-2G7-30/15/120 |
| CF-SE 9W/8** | FSD-9/**/1B-E-2G7-30/15/155 |
| CF-SE 11W/8** | FSD-11/**/1B-E-2G7-30/15/220 |
| **LYNX-D** | |
| CF-D 10W/8** | FSQ-10/**/1B-I-G24=D1-30/110 |
| CF-D 13W/8** | FSQ-13/**/1B-I-G24=D1-30/140 |
| CF-D 18W/8** | FSQ-18/**/1B-I-G24=D2-30/155 |
| CF-D 26W/8** | FSQ-26/**/1B-I-G24=D3-30/170 |
| **LYNX-DE** | |
| CF-DE 10W/8** | FSQ-10/**/1B-E-G24=Q1-30/105 |
| CF-DE 13W/8** | FSQ-13/**/1B-E-G24=Q1-30/135 |
| CF-DE 18W/8** | FSQ-18/**/1B-E-G24=Q2-30/145 |
| CF-DE 26W/8** | FSQ-26/**/1B-E-G24=Q3-30/165 |

| Description | ILCOS Code |
|---|---|
| **LYNX-L** | |
| CF-L 18W/8** | FSD-18/**/1B-E-2G11 |
| CF-L 24W/8** | FSD-24/**/1B-E-2G11 |
| CF-L 36W/8** | FSD-36/**/1B-E-2G11 |
| **LYNX-LE** | |
| CF-LE 40W/8** | FSDH-40/**/1B-E-2G11 |
| CF-LE 55W/8** | FSDH-55/**/1B-E-2G11 |
| **LYNX-T** | |
| CF-T 18W/8** | FSM-18/**/1B-I-GX24=D2-50/125 |
| CF-T 26W/8** | FSM-26/**/1B-I-GX24=D3-50/140 |
| **LYNX-TE** | |
| CF-TE 18W/8** | FSM-18/**/1B-E-GX24=Q2-50/115 |
| CF-TE 26W/8** | FSM-26/**/1B-E-GX24=Q3-50/135 |
| CF-TE 32W/8** | FSM-32/**/1B-E-GX24=Q2-50/155 |
| **LYNX-F** | |
| CF-F 18W/8** | FSM-18/**/1B-E-2G10-79/125 |
| CF-F 26W/8** | FSM-24/**/1B-E-2G10-79/165 |
| CF-F 36W/8** | FSM-36/**/1B-E-2G10-79/220 |
| **MINI-LYNX PROFESSIONAL** | |
| MLX 7W/8**/E27 | FBT-7/**/1B-E27-45/45/140 |
| MLX 11W/8**/E27 | FBT-11/**/1B-E27-45/45/140 |
| MLX 15W/8**/E27 Triple | FBT-15/**/1B-E27-45/45/155 |
| MLX 15W/8**/E27 | FBT-15/**/1B-E27-45/45/165 |
| MLX 20W/8**/E27 Triple | FBT-20/**/1B-E27-45/45/155 |
| MLX 20W/8**/E27 | FBT-20/**/1B-E27-45/45/175 |
| MLX 23W/8**/E27 Triple | FBT-23/**/1B-E27-45/45/165 |
| MLX 7W/8**/B22 | FBT-7/**/1B-B22-45/45/140 |

| Description | ILCOS Code |
|---|---|
| MLX 11W/8**/B22 | FBT-11/**/1B-B22-45/45/140 |
| MLX 15W/8**/B22 Triple | FBT-15/**/1B-B22-45/45/155 |
| MLX 15W/8**/B22 | FBT-15/**/1B-B22-45/45/165 |
| MLX 20W/8**/B22 Triple | FBT-20/**/1B-B22-45/45/155 |
| MLX 20W/8**/B22 | FBT-7/**/1B-B22-45/45/175 |
| MLX 23W/8**/B22 Triple | FBT-23/**/1B-B22-45/45/165 |
| | |
| MLX 5W/827/E14 | FBT-5/**/1B-E14-36/36/126 |
| MLX 7W/827/E14 | FBT-7/**/1B-E14-45/45/126 |
| MLX 11W/827/E14 | FBT-11/**/1B-E14-45/45/126 |
| **INSTANT** | |
| MLX 7W/827/E27 instant | FBT-7/**/1B-I-E27-45/45/140 |
| MLX 11W/827/E27 instant | FBT-11/**/1B-I-E27-45/45/140 |
| MLX 15W/827/E27 instant | FBT-15/**/1B-I-E27-45/45/165 |
| MLX 20W/827/E27 instant | FBT-20/**/1B-E27-I-45/45/175 |
| MLX 7W/827/B22 instant | FBT-7/**/1B-I-B22-45/45/140 |
| MLX 11W/827/B22 instant | FBT-11/**/1B-I-B22-45/45/140 |
| MLX 15W/827/B22 instant | FBT-15/**/1B-I-B22-45/45/165 |
| MLX 20W/827/B22 instant | FBT-20/**/1B-B22-I-45/45/175 |
| **PASTEL** | |
| MLX 11W/ROSE/E27 | FBT-11/ROSE/1B-E27-45/45/140 |
| MLX 15W/ROSE/E27 | FBT-15/ROSE/1B-E27-45/45/165 |
| MLX 11W/ROSE/B22 | FBT-11/ROSE/1B-B22-45/45/140 |
| MLX 15W/ROSE/B22 | FBT-15/ROSE/1B-B22-45/45/165 |
| MLX 11W/APRICOT/E27 | FBT-11/APRICOT/1B-E27-45/45/140 |
| MLX 15W/APRICOT/E27 | FBT-15/APRICOT/1B-E27-45/45/165 |
| MLX 11W/APRICOT/B22 | FBT-11/APRICOT/1B-B22-45/45/140 |
| MLX 15W/APRICOT/B22 | FBT-15/APRICOT/1B-B22-45/45/165 |
| **LYNX ENERGY SAVER** | |
| ES 14W/8**/E27 | FSD-14/**/1B-E27-230-E27 |
| ES 18W/8**/E27 | FSD-18/**/1B-E27-230-E27 |
| ES 23W/8**/E27 | FSD-23/**/1B-E27-230-E27 |

## Compliance with Standards: EN's and IEC's

Lynx compact fluorescent lamps comply with CENELEC requirements as expressed in the Low Voltage Directive and Electromagnetic Compatibility standard (EMC) for conducted RF emissions and are CE marked.

Notes and definitions:

**CENELEC:** The European Union standards-setting body which publishes directives and standards relating to the safety and performance of electrical products and which are incorporated into relevant EU member state standards, laws and regulations.

**Low Voltage Directive:** A set of EU regulations concerning electrical safety and the harmonisation and adoption of standards.

**EMC:** Electromagnetic Compatibility standard: Compliance ensures that certain electrical products do not cause interference with the operation of other devices.

**RF Emissions:** May be conducted through the electrical supply or radiated. Conducted limits have been set for CFL's.

**IEC/EN:** International Electrotechnical Commission standards/European norms, which set detailed standards and requirements for specific products.

**CE Marking:** Now obligatory on all CFL's. This mark, placed on the packaging, certifies that it meets all relevant standards.

The following standards are met as relevant:

- EN 60081/IEC 81 and EN 61195 - Fluorescent Lamps (Safety and Performance)
- EN 60901/IEC 901 and EN 61199 - Compact Fluorescent Lamps (Performance)
- EN 60928 and EN 60929 - Electronic ballasts (Safety and Performance)

Non-integral starters and ballasts must comply with EN 60155 (Starters) and EN 60921 or EN 60929 (Ballasts-Performance)

- EN 55015 Radio Disturbance (Limits and methods of measurement)
- EN 50082-1 Immunity (Resistance to magnetic disturbance)
- EN 61000 -3-2 Harmonic Limits (Harmonic currents injected in to the public supply system)

Life test data is provided as stipulated in EN 60901 Annex C1. (Test switching cycle)

# Lamp Data (Electrical)

The data listed below are nominal or design values.

Please consult the data sheet collection for relevant minima and maxima.

## Lynx CFL Type

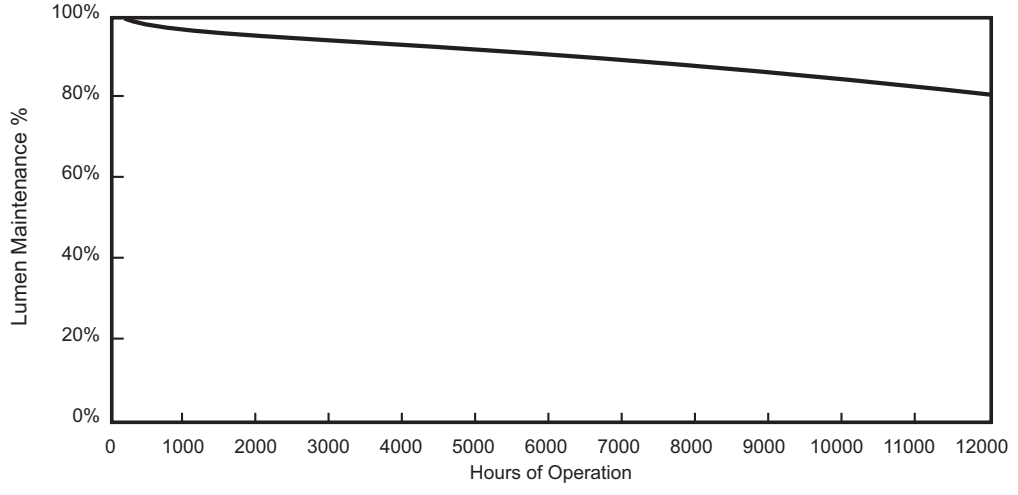
| Description | Lamp Voltage (V) 50 Hz single | Lamp Current (mA) 50 Hz | Lamp Current (mA) HF single or series/tandem | Lamp Current (mA) HF single or multiple |
|---|---|---|---|---|
| **LYNX-S** | | | | |
| CF-S 5W | 35 | 180 | | |
| CF-S 7W | 45 | 175 | | |
| CF-S 9W | 60 | 170 | | |
| CF-S 11W | 90 | 155 | | |
| **LYNX-SE** | | | | |
| CF-SE 5W | 35 | 180 | | |
| CF-SE 7W | 45 | 175 | | |
| CF-SE 9W | 60 | 170 | | |
| CF-SE 11W | 90 | 155 | | |
| **LYNX-D** | | | | |
| CF-D 10W | 67 | 190 | | |
| CF-D 13W | 91 | 175 | | |
| CF-D 18W | 100 | 220 | | |
| CF-D 26W | 105 | 325 | | |
| **LYNX-DE** | | | | |
| CF-DE 10W | 67 | 190 | | |
| CF-DE 13W | 91 | 175 | | |
| CF-DE 18W | 100 | 220 | | |
| CF-DE 26W | 105 | 325 | | |
| **LYNX-L (single/series)** | | | | |
| CF-L 18W | 58 | 375 | 425 | 320 |
| CF-L 24W | 87 | 345 | N.A. | 300 |
| CF-L 36W | 106 | 435 | N.A. | 360 |
| CF-LE 40W | 126 | N.A. | N.A. | 320 |
| CF-LE 55W | 101 | N.A. | N.A. | 550 |

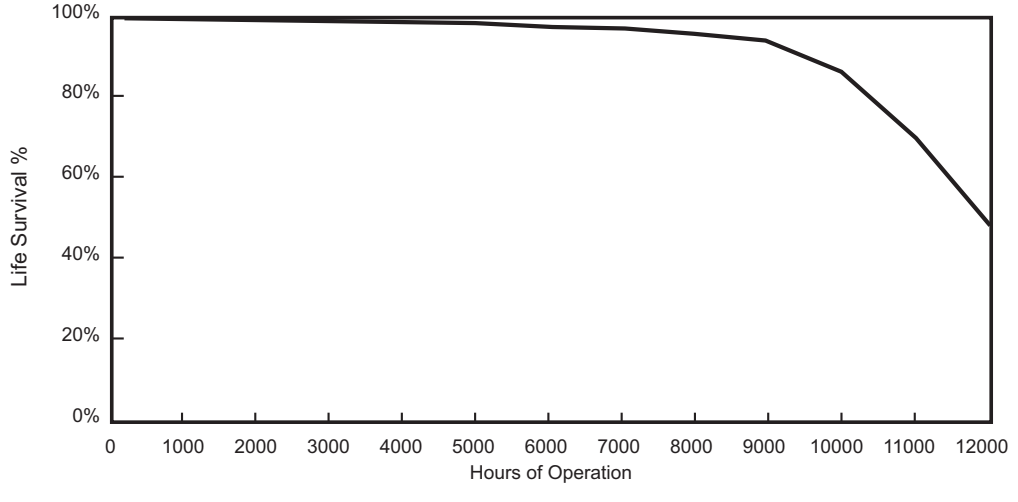
N.A. : not applicable

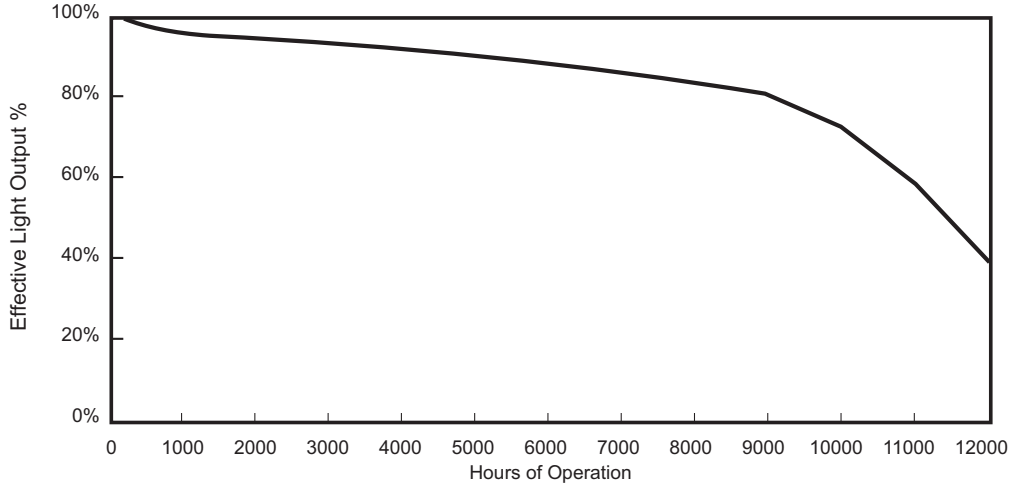
| Description | Lamp Voltage (V) 50 Hz single | Lamp Current (mA) 50 Hz | Lamp Current (mA) HF single or series/tandem | Lamp Current (mA) HF single or multiple |
|---|---|---|---|---|
| **LYNX-T** | | | | |
| CF-T 18W | 100 | 225 | | |
| CF-T 26W | 105 | 325 | | |
| **LYNX-TE** | | | | |
| CF-TE 18W | 80 | 225 | | 210 |
| CF-TE 26W | 80 | 325 | | 300 |
| CF-TE 32W | 100 | N.A. | | 320 |
| **LYNX-F** | | | | |
| CF-F 18W | 58 | 375 | 425 | 320 |
| CF-F 24W | 87 | 345 | N.A. | 300 |
| CF-F 36W | 106 | 435 | N.A. | 360 |
| **MINI-LYNX E27 and B22** | | | | |
| Current (mA) values are for mains operation | | | | |
| MLX 7W | 220 to 240V | 70 | | |
| MLX 11W | 220 to 240V | 100 | | |
| MLX 15W Triple | 220 to 240V | 120 | | |
| MLX 15W | 220 to 240V | 120 | | |
| MLX 20W Triple | 220 to 240V | 160 | | |
| MLX 20W | 220 to 240V | 160 | | |
| MLX 23W Triple | 220 to 240V | 190 | | |
| **MINI-LYNX E14** | | | | |
| MLX 5W E14 | 220 to 240V | 50 | | |
| MLX 7W E14 | 220 to 240V | 70 | | |
| MLX 11W E14 | 220 to 240V | 90 | | |
| **LYNX ENERGY SAVER** | | | | |
| ES 14W | 220 to 240V | 190 | | |
| ES 18W | 220 to 240V | 165 | | |
| ES 23W | 220 to 240V | 220 | | |

N.A. : not applicable

# Lumen Maintenance and Lamp Survival



## Critical Temperatures


Lynx CFL's must be operated within the limit temperatures specified below (in degrees Celsius):

| | Minimum | Maximum |
|---|---|---|
| **Lamp Ambient Temperature** | | |
| Mini-Lynx and ES Energy Saver | -15 | +50 |
| CF-S and SE | -15 | +50 |
| CF-D and DE | -15 | +50 |
| CF-L and LE 18-24W | -30 | +50 |
| CF-L and LE 36-55W | -15 | +50 |
| CF-T and TE (Amalgam types)* | +10 | +50 |
| CF-T and TE (Mercury only) | -15 | +50 |
| CF-F | -15 | +50 |
| **Guide Post Temperature** | | |
| CF-S and SE | | +85 |
| CF-D and DE | | +85 |
| CF-T and TE | | +85 |
| **Cap Rim Temperature** | | |
| Mini-Lynx and ES Energy Saver | | +80 |
| CF-S and SE | | +140 |
| CF-D and DE | | +140 |
| CF-L and LE | | +140 |
| CF-T and TE (Amalgam types)* | | +140 |
| CF-F | | +140 |

(*) Note: Sylvania lamps are currently Mercury only. Amalgam types will be available from Quarter 3/1998

**Amalgam lamps:** The word Amalgam refers to a Mercury metal alloy which replaces free Mercury. Depending on the operating pressure of the lamp more or less Mercury is released into the discharge tube, optimising performance.

**The principal benefits are:**

- Since the Mercury pressure is more stable, light output through life is also more stable
- The lamp will always operate at its optimum pressure within a reasonable range of ambient temperatures
- A much lower Mercury content is needed

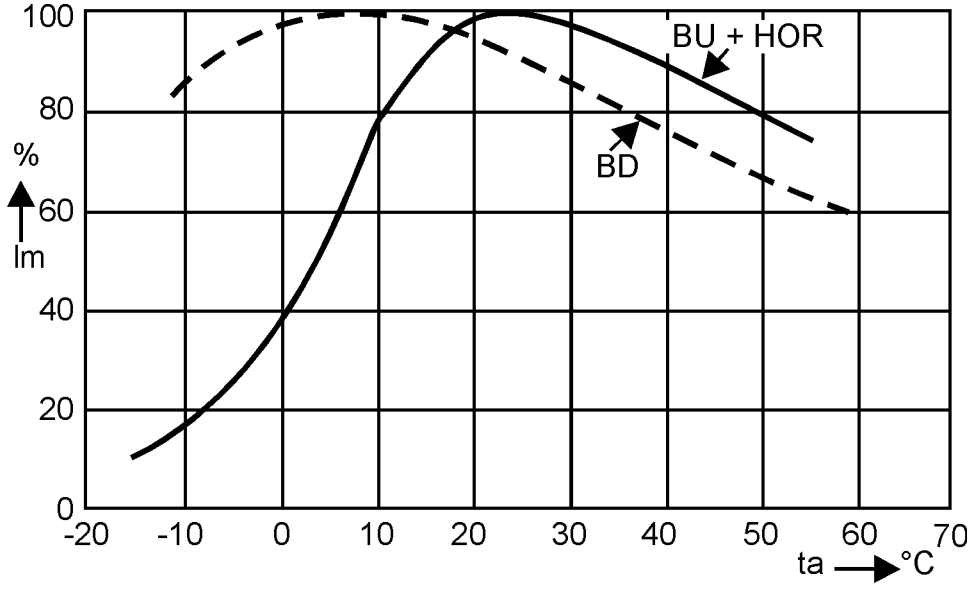
**For the luminaire designer there is:**

- Greater flexibility in operating position
- More light output through life

## Burning Position Limitations

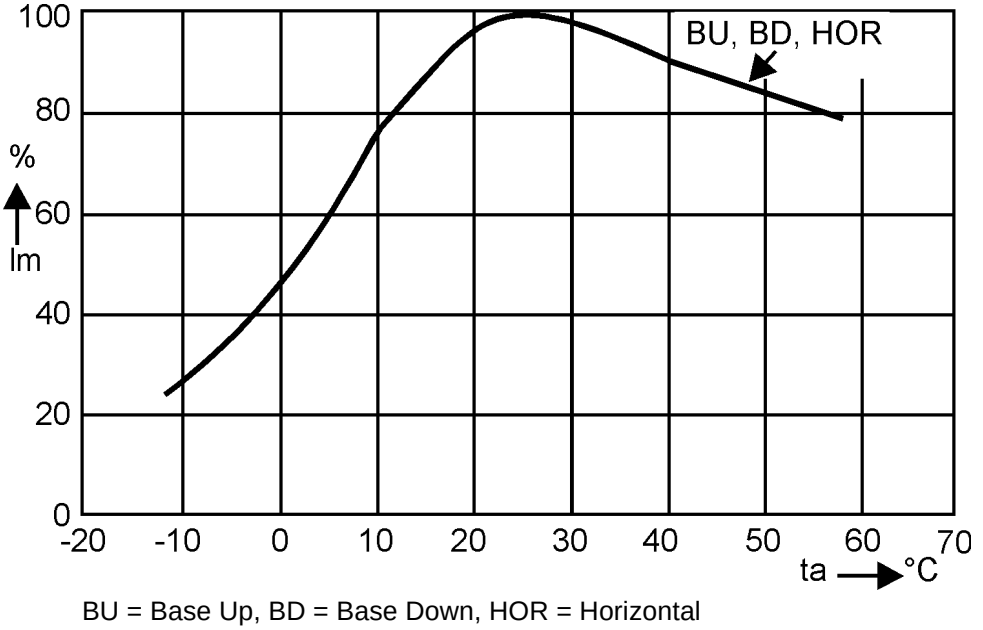
**Lynx-S and -SE**

For outdoor fixtures at low temperatures install lamps cap down for optimum light output




**Lynx-D and -DE**

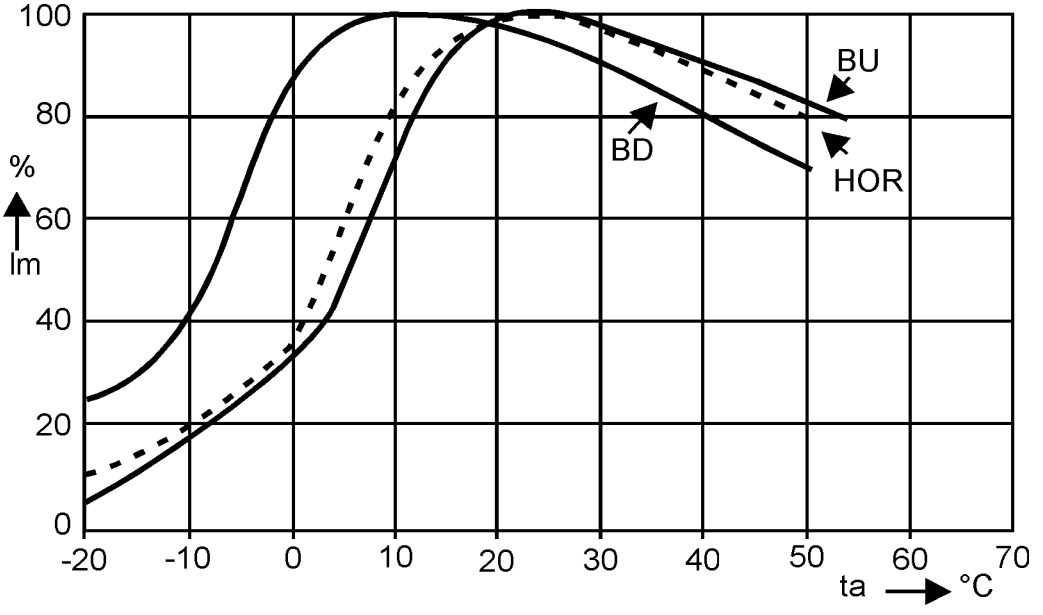
Recommended lamp ambient temperature for optimum light output 10-50 °C




BU = Base Up, BD = Base Down, HOR = Horizontal

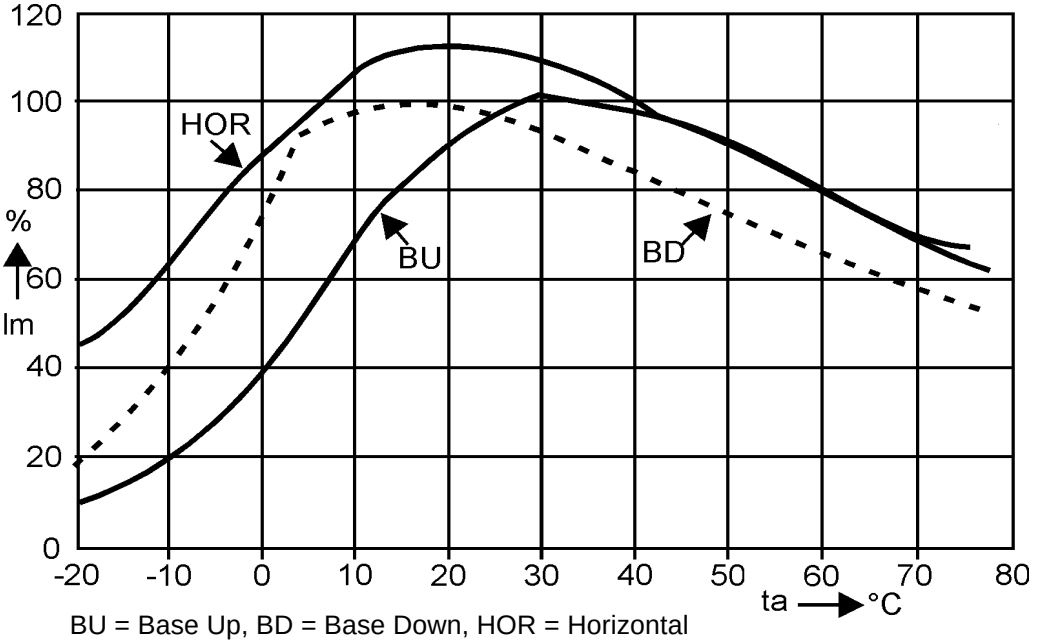
**Lynx-L and -LE**

For outdoor fixtures at low temperatures install lamps cap down for optimum light output



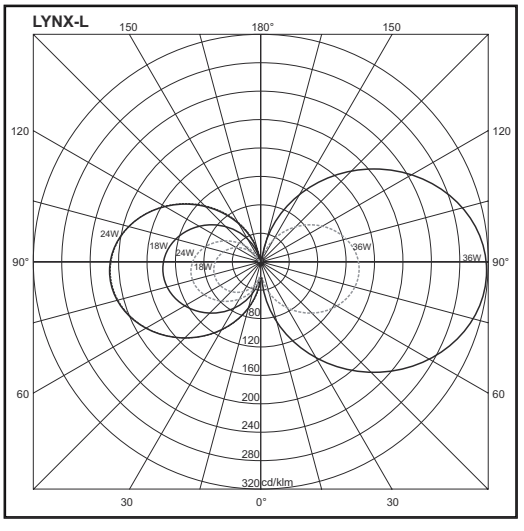

**Mini-Lynx**

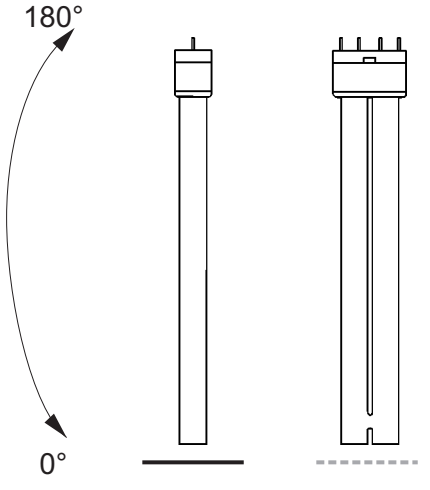
Max. cap rim temperature 80 °C. Lamp ambient temperature -10 to 50 °C

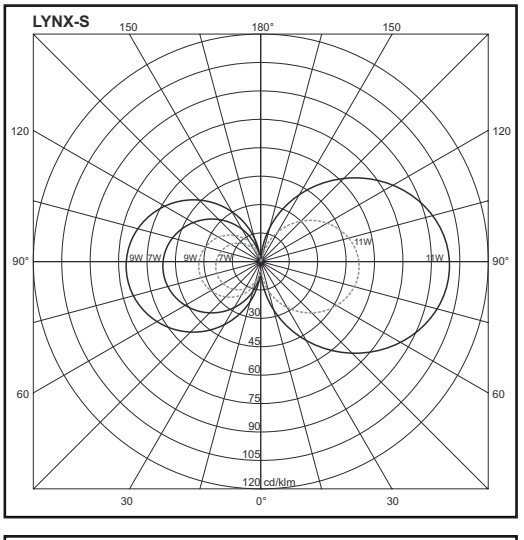


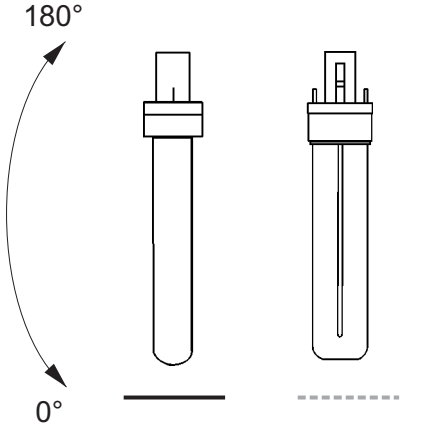

BU = Base Up, BD = Base Down, HOR = Horizontal

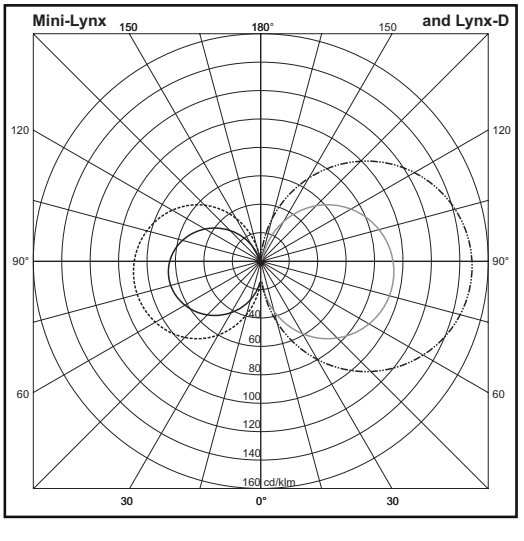
## Intensity Diagrams

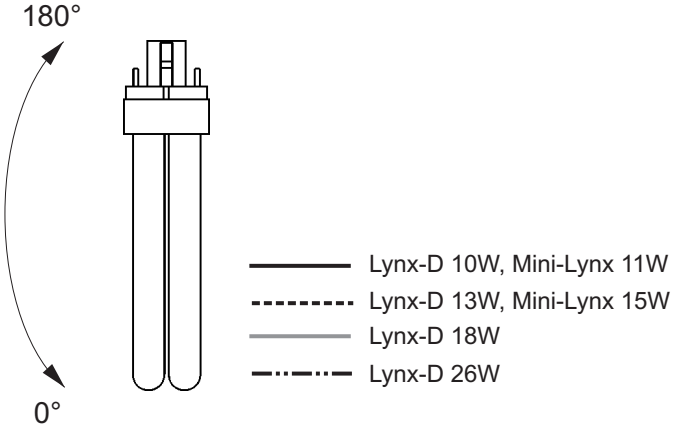


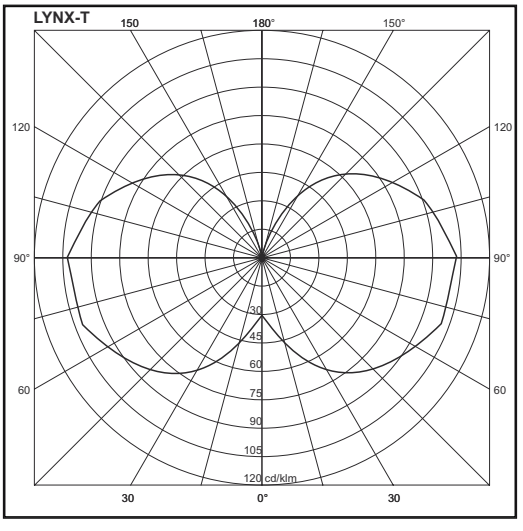



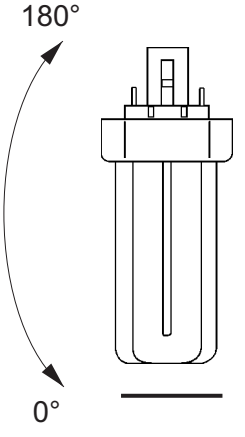



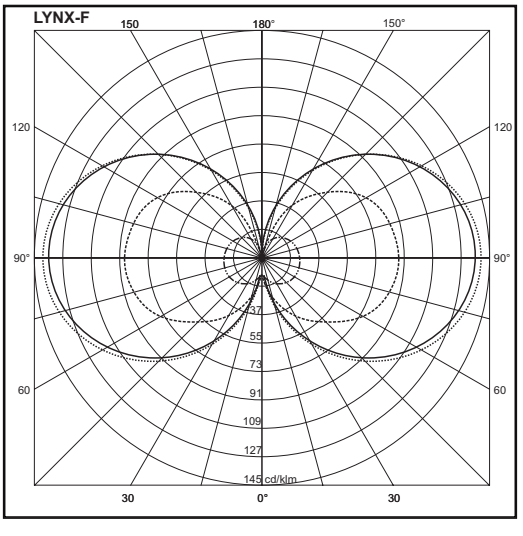



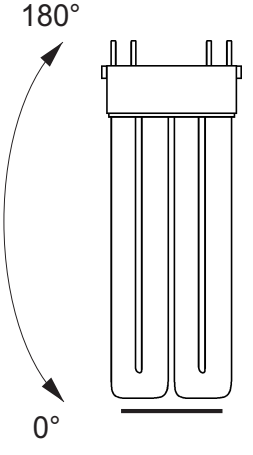




Bare lamps measured at 25 Celsius



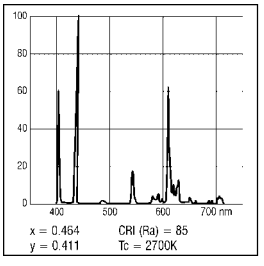



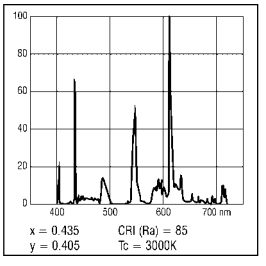




0.0°/ 180.0°
30.0°/ 210.0°
60.0°/ 240.0°
90.0°/ 270.0°

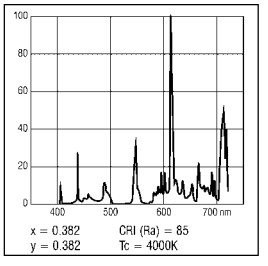
# Lumen Output and Colour Selection (U.K. Range)



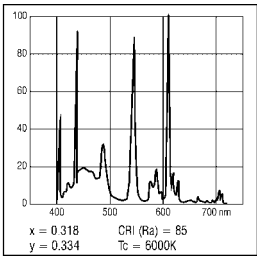

Colour 827




Colour 830




Colour 840




Colour 860

| Lumen Output at 100 hours<br>Colour Temperature<br>Ra / DIN Class | Colour 827<br>2700K<br>85/1b | Colour 830<br>3000K<br>85/1b | Colour 835<br>3500K<br>85/1b | Colour 840<br>4000K<br>85/1b | Colour 860<br>6000K<br>85/1b |
|---|---|---|---|---|---|
| **LYNX-S** | | | | | |
| CF-S 5W | 250 | 250 | 250 | 250 | |
| CF-S 7W | 400 | 400 | 400 | 400 | |
| CF-S 9W | 600 | 600 | 600 | 600 | |
| CF-S 11W | 900 | 900 | 900 | 900 | |
| **LYNX-SE** | | | | | |
| CF-SE 5W | 250 | 250 | 250 | 250 | |
| CF-SE 7W | 420 | 420 | 420 | 420 | |
| CF-SE 9W | 600 | 600 | 600 | 600 | |
| CF-SE 11W | 900 | 900 | 900 | 900 | 900 |
| **LYNX-D** | | | | | |
| CF-D 10W | 600 | 600 | 600 | 600 | 600 |
| CF-D 13W | 900 | 900 | 900 | 900 | 900 |
| CF-D 18W | 1200 | 1200 | 1200 | 1200 | 1200 |
| CF-D 26W | 1800 | 1800 | 1800 | 1800 | 1800 |
| **LYNX-DE** | | | | | |
| CF-DE 10W | 600 | 600 | 600 | 600 | |
| CF-DE 13W | 900 | 900 | 900 | 900 | |
| CF-DE 18W | 1200 | 1200 | 1200 | 1200 | |
| CF-DE 26W | 1800 | 1800 | 1800 | 1800 | |
| **LYNX-L** | | | | | |
| CF-L 18W | 1200 | 1200 | 1100 | 1200 | |
| CF-L 24W | 1800 | 1800 | 1700 | 1800 | |
| CF-L 36W | 2900 | 2900 | 2700 | 2900 | |
| CF-LE 40W | 3500 | 3500 | 3300 | 3500 | |
| CF-LE 55W | 4800 | 4800 | 4800 | 4800 | |

| Lumen Output at 100 hours<br>Colour Temperature<br>Ra / DIN Class | Colour 827<br>2700K<br>85/1b | Colour 830<br>3000K<br>85/1b | Colour 835<br>3500K<br>85/1b | Colour 840<br>4000K<br>85/1b | Colour 860<br>6000K<br>85/1b |
|---|---|---|---|---|---|
| **LYNX T** | | | | | |
| CF-T 18W | 1200 | 1200 | 1200 | | |
| CF-T 26W | 1800 | 1800 | 1800 | | |
| **LYNX-TE** | | | | | |
| CF-TE 18W | 1200 | 1200 | 1200 | | |
| CF-TE 26W | 1800 | 1800 | 1800 | | |
| CF-TE 32W | 2400 | 2400 | 2400 | | |
| **LYNX-F** | | | | | |
| CF-F 18W | 1100 | 1100 | 1100 | | |
| CF-F 24W | 1700 | 1700 | 1700 | | |
| CF-F 36W | 2800 | 2800 | 2800 | | |
| **MINI-LYNX E27 and B22** | | | | | |
| MLX 7W | 460 | | 460 | | |
| MLX 11W | 600 | | 600 | | |
| MLX 15W Triple | 900 | | | | |
| MLX 15W | 900 | | 900 | | |
| MLX 20W Triple | 1200 | | | | |
| MLX 20W | 1200 | | | | |
| MLX 23W Triple | 1350 | | | | |
| **MINI-LYNX E14** | | | | | |
| MLX 5W | 250 | | | | |
| MLX 7W | 460 | | | | |
| MLX 11W | 600 | | | | |
| **LYNX ENERGY SAVER** | | | | | |
| ES 14W | 600 | | | | |
| ES 18W | 900 | | | | |
| ES 23W | 1200 | | | | |

## Ballast Recommendations

Remote ballasted Lynx CFL's may be operated on 50Hz magnetic inductor ballasts, on 12-24V DC input inverters or HF electronic ballasts (see next section for further information).

## DC Operation

It is permissible to operate 4-pin CF-L lamps on 12-24V DC inverters but after a few hours of operation the lamp may show a dark, unlit zone due to Mercury migration. After switching off and cooling down, or reversing the polarity of the DC supply, the lamp will return to normal, however this process will repeat until the lamp is re-switched.

## 50Hz Operation

All Lynx CFL's, except LE and TE 4-pin versions, may be operated on 50Hz electrical supplies. The table on page 32 outlines the requirements. Certain types may be operated in tandem i.e. two lamps may be operated in series from a single ballast. Other types, which do not include a built-in glo-bottle starter, must have a suitable starter in the external circuit.

## Power Factor

Uncorrected magnetic ballasts will give a relatively low power factor between 0.3 and 0.5 lagging, which may be improved using a shunt-connected capacitor connected at the input side of the ballast or incoming terminal block. Please consult the ballast manufacturer for further information.

## Ballast Manufacturers

The following ballast manufacturers will provide control gear for Sylvania CFL lamps:

Tridonic:

Vossloh Schwabe:

Magnetek:

Helvar:

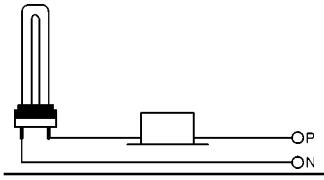
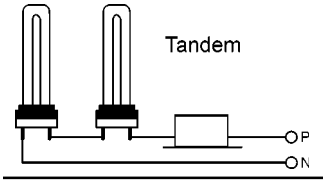
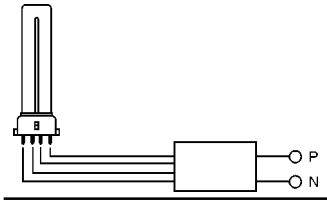
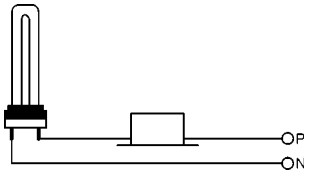
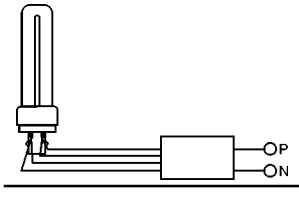
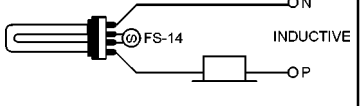
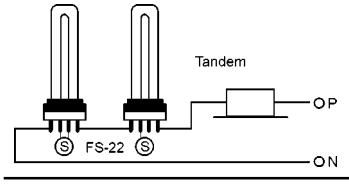
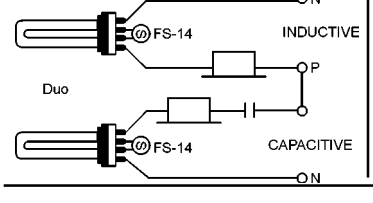
W.J. Parry:

Atlas Components:

Transtar:

(Note: The above list is not exhaustive nor intentionally exclusive).

## Circuit Configurations

| Circuit | Lamp Types | Starter | Choke Type |
|---|---|---|---|
|  | All CF-S | Built-in | up to 9W: 9 Watt single<br>11W: 11W single |
|  | 2 X CF-5W,<br>tandem<br>CF-<br>2 X 7W<br>2 X CF-9W | Built-in | 9 Watt Twin or<br>13W single |
|  | All CF-SE | FS22 | 5-9 Watt single or<br>11W single |
|  | All CF-D | Built-in | 10 &13W: 13W single<br>18W: single<br>26W: single |
|  | All CF-DE | up to 18W: FS-22<br>26W: FS14 (240V) | 18W: single<br>26W: single |
|  | CFL 18W,<br>24W & 36W<br>single lamp<br>operation | FS14 (240V) | 18, 24 or 36W<br>low loss single |
|  | 2 X CF-L 18W<br>in tandem | FS 22 | 36W low loss single |
|  | Lead/lag parallel<br>operation,<br>CF-L 18W,<br>24W & 36W | 2 X FS 14 (240V) | 18, 24 or 36W<br>low loss single |

## 30-40 kHz HF Operation

### The Principal Benefits of Using HF Ballasts

- Flicker-free operation
- Instant light from switch-on and stabilisation after about 30 seconds
- Very low ballast power losses
- Light weight and convenient dimensions, particularly for multi-lamp configurations
- Dimming options are available (except for amalgam versions of CF-TE types)
- Life is often improved by over 20% versus 50Hz operation

Lynx-F, LE, CF-TE and Mini-Lynx are designed or provided with high frequency (HF) ballasts. Modern HF ballasts, which conform to or exceed current standards will be of the low harmonic distortion, high power factor type, and will meet the requirements for radio-frequency (RF) emission.

Note that using a CE-marked HF ballast does not automatically confer CE marking to a luminaire that incorporates it, since the lead positioning between the lamps and the ballast can play a significant role in coupling RF output from the ballast to the neutral of the mains supply. It is strongly advised that RF testing, by an approved test station, is performed on all equipment which embodies an HF ballast, where the end product is to be CE marked.

### Ballast Design Notes

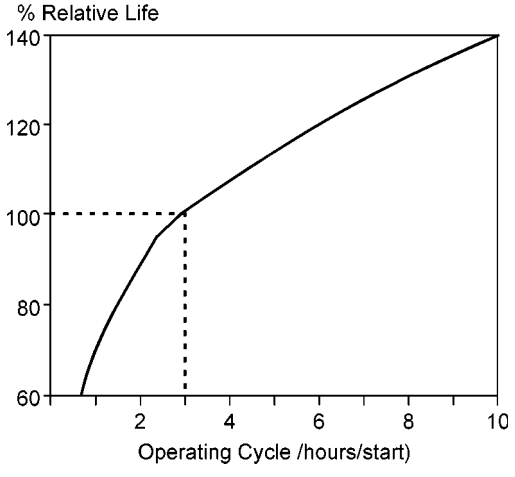
1. Current crest factor: Electrode life may be severely shortened if the lamp current crest factor (peak to r.m.s.) exceeds 1.80.
2. Built-in starter lamp types, such as CF-S, CF-D or CF-T with 2-pin bases should not be operated on electronic ballasts.
3. Ensure that the lamp electrical data on pages 19 and 20 is observed as it will vary compared to 50Hz operation. Consult the ballast manufacturer if compatibility is in doubt. Mini-Lynx incorporates an HF ballast within the plastic housing, which enables a long life, energy saving compact dimension plug-in solution to be offered for the GLS incandescent.

## Switching, Dimming and Continuous Operation

### Switching

The frequency of switching/operating cycle is the most significant factor in determining actual CFL lamp life. Life testing is performed in accordance with EN 60901 Annex C. on the basis of 8 switchings per day. Lower switch frequencies may lead to improved lamp life. See graph for an indication of the relationship.

Operating cycle influence on lamp life
(Exception: Mini-Lynx)




### Dimming

Self ballasted: Mini-Lynx should not be used on any dimming circuits nor with circuits incorporating passive infra-red sensing switches.

Remote ballasted: All 4-pin based Lynx CFL lamps, (with the exception of amalgam type CF-TE 24W and 32W) are suitable for dimming using analogue or digital HF dimming ballasts. Lamp life is not extended by dimming and the following points should be observed in order not to shorten lamp life:

1. Ensure the dimming ballast is of the correct full output lamp current rating for the lamp in use.
2. Only use a ballast type which provides a continuous preheat to the lamp electrodes to ensure that power-up and down are effected smoothly.
3. Lamp preheat currents should be calculated on the basis that the hot resistance of each electrode is four times that when at room temperature, generally about 48 ohm per electrode at 150 -190 mA (hot).

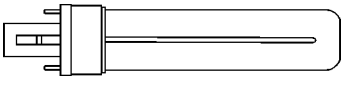
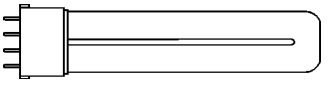
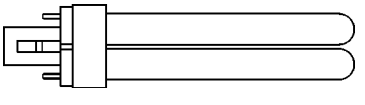
## Continuous Operation

Conditions can arise during continuous operation which can lead to both lamp current and voltage rising. In the case of electrode failure the lamp arc current may be conducted solely by the electrode support causing severe local overheating. If several operating circuits are grouped on to one large capacity circuit breaker or fusible link, the fuse sensitivity may be too low to cause a supply interruption. It is therefore recommended that for continuous operation that each operating circuit is individually fused in the luminaire/device itself.

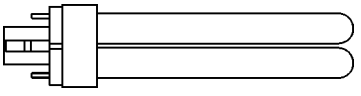
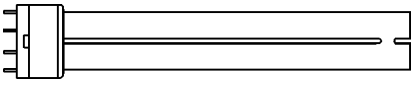
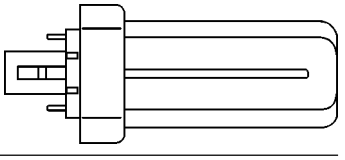
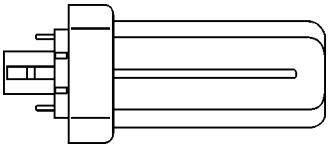
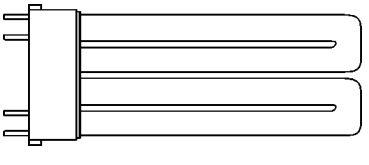
## Dimensions

The following information is provided to allow comparisons of overall size and therefore suitability for the application or luminaire envisaged. For more detailed information please consult the relevant data sheets.

**Critical Lamp Dimensions (mm)**

| | Maximum Overall Length L1 | Top to Base Face L2 | Diameter/ Max. Cross Section D | |
|---|---|---|---|---|
| **LYNX-S** | | | | |
| CF-S 5W | 108.0 | 88.0 | 32.0 |  |
| CF-S 7W | 138.0 | 115.0 | 32.0 | |
| CF-S 9W | 168.0 | 145.0 | 32.0 | |
| CF-S 11W | 236.0 | 213.0 | 32.0 | |
| **LYNX-SE** | | | | |
| CF-SE 5W | 96.0 | 89.0 | 35.0 |  |
| CF-SE 7W | 123.0 | 116.0 | 35.0 | |
| CF-SE 9W | 155.0 | 148.0 | 35.0 | |
| CF-SE 11W | 223.0 | 216.0 | 35.0 | |
| **LYNX-D** | | | | |
| CF-D 10W | 113.0 | 90.0 | 35.0 |  |
| CF-D 13W | 141.0 | 118.0 | 35.0 | |
| CF-D 18W | 155.0 | 132.0 | 35.0 | |
| CF-D 26W | 173.0 | 150.0 | 35.0 | |

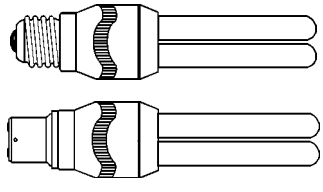
## Critical Lamp Dimensions (mm)

| | Maximum Overall Length L1 | Top to Base Face L2 | Diameter/ Max. Cross Section D | |
|---|---|---|---|---|
| **LYNX-DE** | | | | |
| CF-DE 10W | 106.0 | 90.0 | 35.0 |  |
| CF-DE 13W | 134.0 | 118.0 | 35.0 | |
| CF-DE 18W | 148.0 | 132.0 | 35.0 | |
| CF-DE 26W | 166.0 | 150.0 | 35.0 | |
| **LYNX-L and -LE** | | | | |
| CF-L 18W | 225.0 | | 44.0 |  |
| CF-L 24W | 320.0 | | 44.0 | |
| CF-L 36W | 415.0 | | 44.0 | |
| CF-LE 40W | 533.0 | | 44.0 | |
| CF-LE 55W | 533.0 | | 44.0 | |
| **LYNX-T** | | | | |
| CF-T 18W | 123.0 | 100.0 | 49.0 |  |
| CF-T 26W | 138.0 | 115.0 | 49.0 | |
| **LYNX-TE** | | | | |
| CF-TE 18W | 116.0 | 100.0 | 49.0 |  |
| CF-TE 26W | 131.0 | 115.0 | 49.0 | |
| CF-TE 32W | 147.0 | 131.0 | 49.0 | |
| **LYNX-F** | | | | |
| CF-F 18W | N.S. | 122.0 | 90.0 |  |
| CF-F 24W | N.S. | 165.0 | 90.0 | |
| CF-F 36W | N.S. | 217.0 | 90.0 | |

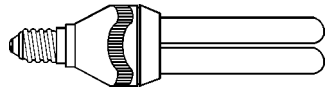
N.S. : not specified - under consideration in draft standards

## Critical Lamp Dimensions (mm)

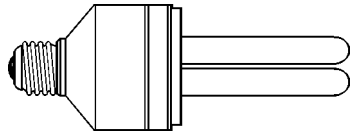
| | Maximum Overall Length L1 | Top to Base Face L2 | Diameter/ Max.Cross Section D |
|---|---|---|---|
| **MINI-LYNX E27 and B22** | | **Maximum Lit Length** | |
| MLX 7W | 140.0 | 67.0 | 44.0 |
| MLX 11W | 140.0 | 67.0 | 44.0 |
| MLX 15W Triple | 140.0 | 67.0 | 57.0 |
| MLX 15W | 169.0 | 96.0 | 44.0 |
| MLX 20W Triple | 158.0 | 85.0 | 57.0 |
| MLX 20W | 180.0 | 107.0 | 44.0 |
| MLX 23W Triple | 168.0 | 95.0 | 57.0 |



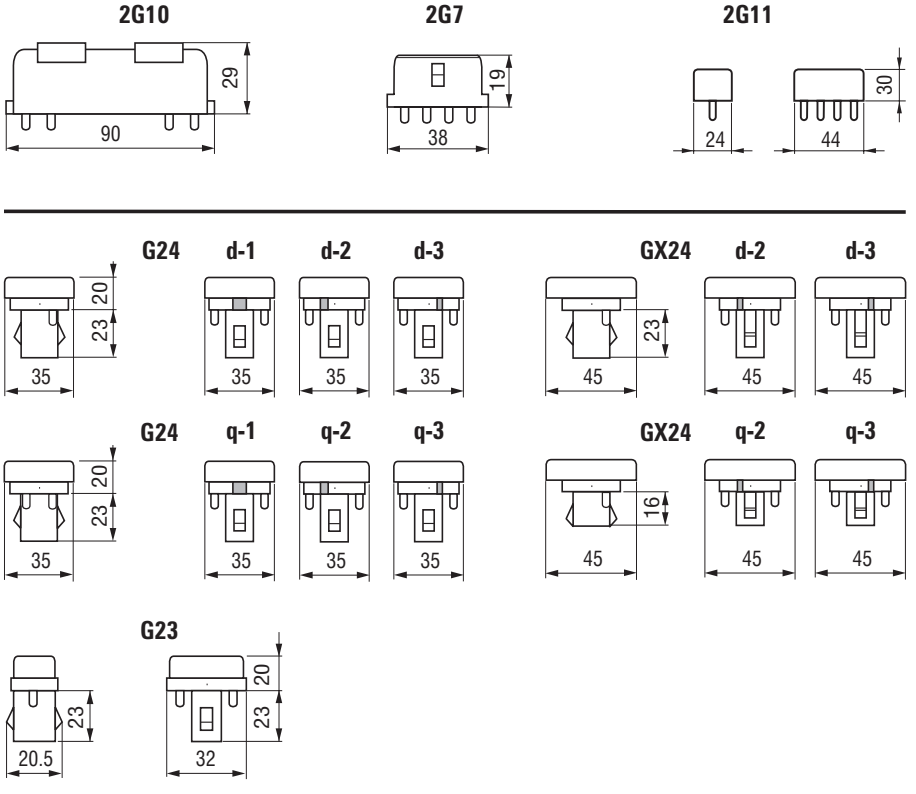
| | | | |
|---|---|---|---|
| **MINI-LYNX E14** | | | |
| MLX 5W | 126.0 | 67.0 | 36.0 |
| MLX 7W | 126.0 | 67.0 | 44.0 |
| MLX 11W | 126.0 | 67.0 | 44.0 |



| | | | |
|---|---|---|---|
| **LYNX ENERGY SAVER** | | | |
| ES 14W | 160.0 | 67.0 | 71.0 |
| ES 18W | 190.0 | 97.0 | 71.0 |
| ES 23W | 204.0 | 111.0 | 71.0 |



# Lamp Cap Types and Critical Dimensions



## CFL's In Use - Cost Saving Potential of CFL's - Home Use

The cost saving potential of CFL's is best illustrated by considering the replacement of a number of GLS incandescents in the home by Mini-Lynx Professional.

If 20 100W GLS are replaced by an equal number of Mini-Lynx Professional 20W lamps it is possible to calculate the pay back time for the cash outlay in terms of the energy saved.

| | | | | |
|---|---|---|---|---|
| **Cost of lamps** | 20 Mini-Lynx at ECU 21.74 each | = | ECU | 434.80 |
| | less 20 100W GLS at ECU 0.73 | | ECU | 14.60 |
| **Net cash outlay** | | | ECU | 420.20 |
| **Cost of energy** | | | | |
| Assumptions: 1000 average hours use per annum, per point. | | | | |
| Life of Mini-Lynx 12,000 hours; Life of GLS 1,000 hours | | | | |
| Unit kWh cost | | | ECU | 0.145 |
| Power saved per point (100-20 Watt) - 80W (0.080 kW) | | | | |
| Power cost saved per point per year | | | ECU | 11.60 |
| **Total power cost saved per year** | | | **ECU** | **232.00** |
| Time to break even | | | 1.8 years or 1800 hours | |

It is easy to see therefore that the purchase of a CFL, when compared to an incandescent lamp, is recovered very quickly. This is a characteristic of all such similar comparisons.

### Cost-of-ownership - Professional Use

For hotels, restaurants, offices and institutional usage a calculation of the total cost-of-ownership over the entire life of the lamp is more appropriate. Just taking into consideration the cost of the replaced GLS lamps but disregarding the cost of maintenance, labour cost for lamp replacements and capital interest yields the following savings:

Assumptions: 20 Mini-Lynx lamps are installed in an office, burning 10 hours per day, 5 days a week: With an average life expectancy of 12.000h one Mini-Lynx lasts 4.61 years and replaces 12 GLS lamps.

| | | | | |
|---|---|---|---|---|
| Cost of lamps: | 20 Mini-Lynx at ECU 21.74 | = | ECU | 434.80 |
| Less 12x20 GLS lamps at ECU 0.73 | | = | ECU | 175.20 |
| Incremental cost of lamps | | = | ECU | 259.60 |
| Energy savings: | 20 x 12000 x .080 kWh at ECU 0.145 | = | ECU | 784.00 |

**A winning situation:**

Energy savings are 6.4 times greater than the cost of the lamps!

# Troubleshooting

## General

Take all sensible safety precautions when investigating an apparent fault.

Always check the fuse or circuit breaker in the external circuit first. If tripped, reset or replace the fuse cartridge but if the fuse trips out again then it is most likely the fault is in the luminaire (device) or lamp. Next ensure that the correct lamp has been inserted into the luminaire socket. The maker's label should give the correct information.

## Self-ballasted lamps

Mini-Lynx and ES Energy Saver lamps are not user-serviceable and should never be dismantled with a view to effecting a repair. Should a fault develop an internal fuse has been provided which when tripped cannot be repaired.

## Remote-ballasted lamps

Please use the following checklist in order to determine how to rectify the fault:

### A. Lamp out

1. Check that the supply is switched on and that the external fuse has not tripped. If the fuse trips again then:

a. Check that the power factor capacitor has not developed a short circuit condition. You may remove it temporarily to check.

b. Check that all wiring insulation is in good condition. An electric strength test with a PAT (portable appliance tester) should be made. Replace any defective wiring. If the lamp still does not start then switch off and verify that all internal wiring connections in the luminaire are properly connected and go to 2.

2. Make sure that there is good ‘Earth’ continuity between the terminal block and the luminaire frame. Repeat the PAT test and go to 3.
3. Switch off the electrical supply for at least 10 seconds and then switch on again (certain electronic ballasts reset after switch-off if they have been overloaded).
4. If no attempt to start the lamp is observed, switch off again and withdraw the device’s local fuse, if serviceable. Check or replace the fuse.
5. If the lamp still does not start and the operating circuit contains a starter, replace it.
6. If repeated starting is observed but the lamp does not sustain, then replace the lamp.
7. Isolate the ballast and for choke inductors only perform a continuity check using a multi-meter equipped with a low voltage DC battery. Never ‘Megger’ test any ballast for any reason. If an open circuit or zero impedance is found then replace the ballast.
8. If the lamp still does not start consult the manufacturer.

### B. Lamp does not appear to give its full output

1. Ensure the correct lamp is fitted.
2. Check the electrical supply available voltage and match it to the ballast maker’s label information. If ballast taps have been provided make sure the most suitable one has been connected.
3. Check that the luminaire is venting properly to avoid heat building up. Alternatively a cold forced air draught may cause lamps to be overcooled requiring a nearby air conditioning inlet to be re-balanced.
4. The lamp is not burning in the optimum position in the luminaire/installation. Consult the manufacturer.

### C. Overheating

Many instances of overheating are related to poor design or over-running a luminaire with a lamp and/or ballast combination for which it was never designed. Sometimes restricted ventilation or improper burning position may be the cause. Use all common sense methods to allow the luminaire to thermally stabilise properly. Consult the manufacturer.

## Disposal

Compact fluorescent lamps contain a small amount of Mercury (c.6mg) within the fluorescent tube chambers. Consult your local authority before the disposal of more than 6 lamps in normal waste since regulations may be in force which require the lamps to be treated as ‘special waste’. Mini-Lynx self ballasted lamps contain electronic components which may also be the subject of additional regulations regarding disposal.

*DO NOT at under any circumstances attempt to crush or break up any compact lamp, which should be disposed of as an integral unit, particularly where waste will be disposed of by landfill.*

# Comparison Table - Competitive Products

| | | SYLVANIA | | | | | | PHILIPS | | | | GE | | | | | | OSRAM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Version | | Description | Colour 827 | Colour 830 | Colour 835 | Colour 840 | Colour 860 | Description | 82 | 83 | 84 | Description | 827 | 830 | 835 | 840 | 860 | Description | 41 | 21 | 31 |
| 5W | S | Lynx S | 25206 | 25449 | 28300 | 25600 | | PLS | • | | | Biax S | • | • | • | • | • | DULUX S | • | | • |
| 7W | S | Lynx S | 25200 | 25450 | 28301 | 25601 | 25604 | PLS | • | | • | Biax S | • | • | • | • | • | DULUX S | • | | • |
| 9W | S | Lynx S | 25201 | 25451 | 28302 | 25602 | 25605 | PLS | • | | • | Biax S | • | • | • | • | • | DULUX S | • | | • |
| 11W | S | Lynx S | 25202 | 25452 | 28303 | 25603 | 25606 | PLS | • | | • | Biax S | • | • | • | • | • | DULUX S | • | | • |
| 5W | SE | Lynx SE | 25623 | | | 25614 | | PLSE | • | | | Biax SE | • | | • | • | | DULUX SE | • | | • |
| 7W | SE | Lynx SE | 25624 | | | 25627 | | PLSE | • | | • | Biax SE | • | | • | • | | DULUX SE | • | | • |
| 9W | SE | Lynx SE | 25625 | | | 25628 | | PLSE | • | | • | Biax SE | • | | • | • | | DULUX SE | • | | • |
| 11W | SE | Lynx SE | 25626 | | | 25629 | | PLSE | • | | • | Biax SE | • | • | • | • | • | DULUX SE | • | | • |
| 10W | D | Lynx D | 25210 | 25395 | 28304 | 25382 | 25455 | PLC 2 pin | • | | • | Biax D | • | • | • | • | • | DULUX D | • | | • |
| 13W | D | Lynx D | 25211 | 25396 | 28305 | 25383 | 25456 | PLC 2 pin | • | | • | Biax D | • | • | • | • | • | DULUX D | • | | • |
| 18W | D | Lynx D | 25150 | 25151 | 28306 | 25152 | 25153 | PLC 2 pin | • | | • | Biax D | • | • | • | • | • | DULUX D | • | | • |
| 26W | D | Lynx D | 25154 | 25155 | 28307 | 25156 | 25157 | PLC 2 pin | • | | • | Biax D | • | • | • | • | • | DULUX D | • | | • |
| 10W | DE | Lynx DE | 25159 | | 28018 | 25161 | | PLC 4 pin | • | | • | Biax DE | • | | • | • | | DULUX DE | • | | • |
| 13W | DE | Lynx DE | 25160 | | 28019 | 25162 | | PLC 4 pin | • | | • | Biax DE | • | | • | • | | DULUX DE | • | | • |
| 18W | DE | Lynx DE | 25140 | | 28020 | 25141 | | PLC 4 pin | • | | • | Biax DE | • | | • | • | | DULUX DE | • | | • |
| 26W | DE | Lynx DE | 25143 | | 28021 | 25144 | | PLC 4 pin | • | | • | Biax DE | • | | • | • | | DULUX DE | • | • | • |
| 18W | L | Lynx L | 25226 | 25233 | | 25234 | | PLL | • | • | • | Biax L | • | • | • | • | | DULUX L | • | • | • |
| 24W | L | Lynx L | 25227 | 25235 | | 25236 | | PLL | • | • | • | Biax L | • | • | • | • | | DULUX L | • | • | • |
| 36W | L | Lynx L | 25228 | 25237 | | 25238 | | PLL | • | • | • | Biax L | • | • | • | • | | DULUX L | • | • | • |
| 40W | LE | Lynx LE | 25460 | 25461 | | 25462 | | PLLE | • | • | • | Biax LE | • | • | • | • | | DULUX L | • | • | • |
| 55W | LE | Lynx LE | 25463 | 25464 | | 25465 | | PLLE | • | • | • | Biax LE | • | • | • | • | | DULUX L | • | • | • |
| 7W | ES | Mini-Lynx | 25530 | | | | | | | | | Biax Electron. | • | | | | | DULUX EL | • | | |
| 11W | ES | Mini-Lynx | 25532 | | | | 25505 | PLCE | • | | | Biax Electron. | • | | | | | DULUX EL | • | • | |
| 15W | ES | Mini-Lynx | 25534 | | | | 25506 | PLCE | • | | | Biax Electron. | • | | | | | DULUX EL | • | • | |
| 20W | ES | Mini-Lynx | 25536 | | | | 25507 | PLCE | • | | | Biax Electron. | • | | | | | DULUX EL | • | | |
| 7W | BC | Mini-Lynx | 25531 | | | | | | | | | | | | | | | | | | |
| 11W | BC | Mini-Lynx | 25533 | | | | | | | | | | | | | | | | | | |
| 15W | BC | Mini-Lynx | 25535 | | | | | | | | | | | | | | | | | | |
| 20W | BC | Mini-Lynx | 25537 | | | | | | | | | | | | | | | | | | |
| 5W | E14 | Mini-Lynx | 27740 | | | | | PLCE | • | | | | | | | | | DULUX EL | • | | |
| 7W | E14 | Mini-Lynx | 27701 | | | | | PLCE | • | | | | | | | | | DULUX EL | • | | |
| 11W | E14 | Mini-Lynx | 27742 | | | | | PLCE | • | | | | | | | | | DULUX EL | • | | |
| 18W | F | Lynx F | 27824 | 27825 | | 27826 | | | | | | | | | | | | DULUX F | • | | |
| 24W | F | Lynx F | 27829 | 27830 | | 27831 | | | | | | | | | | | | DULUX F | • | | |
| 36W | F | Lynx F | 27834 | 27835 | | 27836 | | | | | | | | | | | | DULUX F | • | | |
| 18W | T | Lynx T | 27800 | 27801 | | 27802 | | PLT | • | | • | Biax T 2 pin | • | • | • | • | | DULUX T | • | | |
| 26W | T | Lynx T | 27810 | 27811 | | 27812 | | PLT | • | | • | Biax T 2 pin | • | • | • | • | | DULUX T | • | | |
| 18W | TE | Lynx TE | 27815 | 27817 | | 27816 | | PLTE | • | | • | Biax T 4 pin | • | • | • | • | | DULUX TE | • | | |
| 26W | TE | Lynx TE | 27820 | 27822 | | 27821 | | PLTE | • | | • | Biax T 4 pin | • | • | • | • | | DULUX TE | • | | |
| 32W | TE | Lynx TE | 27841 | 27842 | | 27840 | | PLTE | • | | • | Biax T 4 pin | • | • | • | • | | DULUX TE | • | | |
| 14W | ES | Lynx-ES | 25703 | | | | | SL | • | | | | | | | | | COMPACTA | • | | |
| 18W | ES | Lynx-ES | 25704 | | | | | SL | • | | | | | | | | | COMPACTA | • | | |
| 26W | ES | Lynx-ES | 25705 | | | | | SL | • | | | | | | | | | COMPACTA | • | | |

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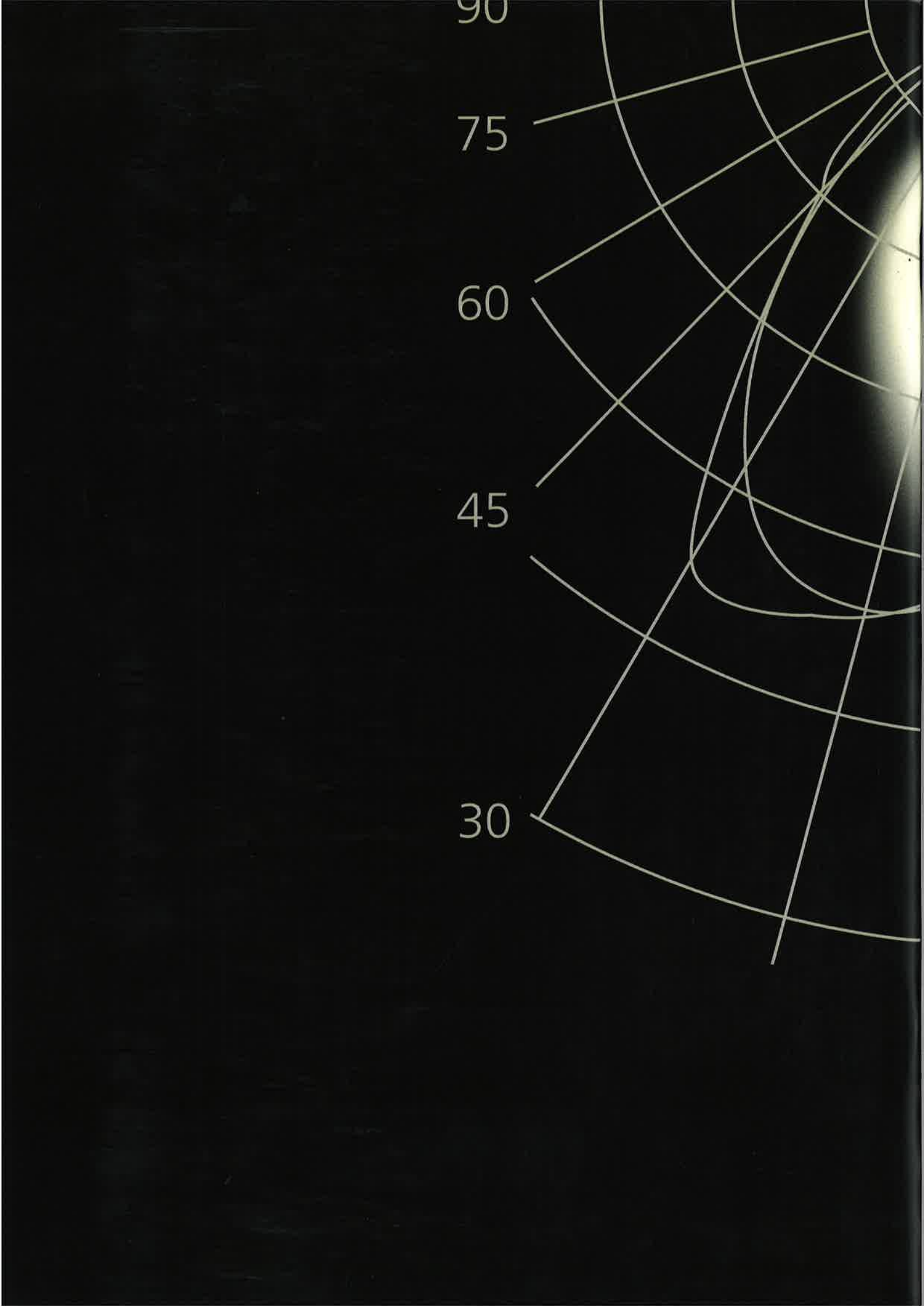
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