# THORN LIGHTING


COMPREHENSIVE CATALOGUE 1975/76

## Introduction

Thorn Lighting has the finest fluorescent tube works in Western Europe making the extensive range of tubes described in this section of the catalogue, including the de luxe colours which are receiving increasing acknowledgment for interior lighting installations where good colour rendering and colour appearance are important.

## Index

**Braided Cathode**
The braided cathode filament—British Patent 131059—is now being used in 1500mm/5ft 65/80W and 80W BC, 1800mm/6ft 75/85W and 2400mm/8ft 85W and 125W tubes.

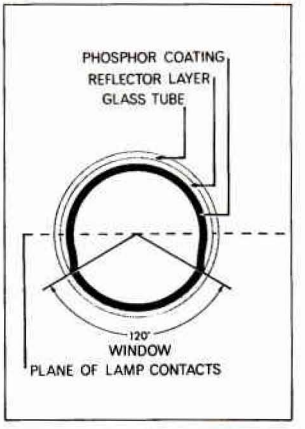
These exclusive braided cathodes give more efficient operation, fewer early failures and longer life than the conventional coiled coil cathode.

The braided cathode consists of a hollow mesh cylinder which is formed by braiding eight very thin strands of tungsten wire together. This means that the emitter is held within the hollow cylinder thus forming a solid core.
The release of electrons is better controlled than with a coiled coil filament and this results in the braided cathode having approximately 70% greater electron emission.

**Cathode Shields**
Cathode shields are incorporated on the high loading tube range (600mm/2ft 40W, 1500mm/5ft 65/80W, 1800mm/6ft 75/85W, 2400mm/8ft 85W and 125W.

This shield traps evaporation from the cathode during life, preventing black marks from forming at the end of the tube. In addition, cathode shields reduce flicker which may sometimes be noticeable from commercial fittings.

**Reflector Tubes**




The reflector fluorescent tubes have an additional highly reflecting coating added between the fluorescent powder and the inside of the glass tube. In this way the majority of light is radiated through an aperture of 120° from the lamp centre in the preferred direction. This lamp is particularly useful in the following applications:

**Lighting in dusty atmospheres**
Dust collection on an ordinary tube and fitting rapidly reduces light output. With a reflector tube, light re-direction is independent of dust, and light output is better maintained.

**Display lighting**
This lamp is useful where space is restricted as in showcases where it is difficult to put an external reflector.

**High intensity lighting**
Reflector lamps enable tubes to be mounted in banks where an external reflector may not be convenient or effective.

**Replacement**
Lamps can be used in old fittings which have deteriorated so as to give an increase in useful light output.

**Rated Life and Group Replacement**
The rated life of all 1200mm/4ft, 1500mm/5ft, 1800mm/6ft and 2400mm/8ft, 38mm/1½in diameter tubes is 7500 hours. The rated life of all other ratings is 5000 hours. In many situations it is advantageous to replace tubes in bulk (Group Replacement) rather than as individual lamps fail. Among the benefits of Group Replacement are:
A saving in initial cost.
A higher average level of lighting
More uniform lighting
Less interruption of work
A saving in running costs.
Further information on Group Replacement is available from Regional Offices.

**Guarantee**
Any fluorescent tube failing within 12 months from the date of purchase by the user (or prior to 3000 hours burning whichever is the shorter), except through misuse, will be replaced free of charge.

**British Standards**
Fluorescent tubes described in this catalogue conform to British Standard 1853:1967 and International Standard 1EC81 where applicable.
Thorn Lighting holds Licence no. 5247 for the manufacture of fluorescent tubes to BS.1853.

**Fluorescent Tube Packing Quantities**
Circles: 12
2400mm/8ft 20
Blacklight Blue: 24
All others: 25

**Miniature Fluorescent Tubes**
Miniature fluorescent tubes give high lumen output with low power consumption (equivalent to a filament lamp five times the wattage).
Their long life, low temperature and slim shape make them particularly suitable for signs, bollards, displays, bulkheads and appliances.

**Colours for General Use**
To encourage rationalisation of the range of fluorescent tube colours available, two colours have been chosen by Thorn as being suitable for the majority of installations:
**White**—The highest efficacy tube available for general lighting purposes.
**Plus White**—Good colour rendering tube for commercial purposes, with high efficacy.
These colours are identified in **bold type** in this catalogue and it is recommended that they be used for general lighting purposes.

**Marking of Rated Wattage on Tubes**
The wattage dissipated by any discharge lamp, including a fluorescent tube, depends mainly on the characteristics of the ballast with which the particular lamp is operated and on the mains supply voltage at any given time.
Because of this the marking of a rated wattage on any given fluorescent tube does not necessarily indicate the wattage which the tube is intended to dissipate in any given circuit arrangement.
The appropriate fluorescent tube and associated ballast specifications list the rated or nominal wattage of any given tube type and also the "objective wattage" which is the actual target wattage the tube should dissipate when operated under prescribed conditions in association with a mid-point reference ballast.

**Bi-pin/BC Adaptor**
**G B1515** Adaptor converting bi-pin lamp cap to BC. The overall length of a 1500mm/5ft bi-pin tube with these adaptors does not exceed the length of a BC tube.

**Carton Colour Coding**
Thorn were the first to operate carton label colour coding on the labels at the ends of tube cartons to assist identification. The coding is as follows:—
White—Buff
Warm White—Pink
Daylight—Magenta
Natural—Green
Northlight/Colour matching—Blue
De Luxe Natural—Red
All other colours are coded white.

**Tube Grades**
There are different grades of tube to suit various types of control gear and the correct type must be used to obtain satisfactory starting performance.

**GP (General Purpose Quickstart) grade tubes (MCFE/U)**
The GP Quickstart tube is manufactured to give satisfactory starting with all switch or switchless start control gear and is now supplied as the standard tube for use in all fittings. For switchless start circuits the metal chassis must extend the full length of the tube and be bonded to earth. The metalwork must not be more than 20mm from the tube. Quickstart, resonant-start and other switchless start circuits must be used only on 200–250V 50 Hz supplies where the neutral conductor is at earth potential.

**MS (Metal Strip) grade tubes (MCFA/U)**
This tube is necessary only for special conditions, e.g. where earthed metalwork is not adjacent to the tube. It has a metallic conducting strip cemented to the outside of the tube, connected to both caps, which must be earthed.

A limited range of the more popular tubes in 600–1500mm/2–5ft lengths can be supplied with metal strip, in White, Warm White and Daylight colours only, to special order.
**NOTE:** Red and Gold tubes are standard grade only i.e. for use on starter switch circuits and not switchless-start circuits.

# Colours and applications

## COLOURS FOR GENERAL USE

To encourage rationalisation of the range of fluorescent tube colours available, two colours have been chosen by Thorn as being suitable for the majority of installations.
**White** – The highest efficacy tube available for general lighting purposes.
**Plus White** – A high efficacy tube with good colour rendering quality.
These colours are identified in **bold type** in this catalogue. Their intermediate white appearance of around 3500K will prove suitable for normal illumination standards of between 200 lux and 1000 lux. The difference in lumen output between **White** and **Plus White** is sufficiently small for lighting schemes to be designed with either of these preferred colours, according to the relative importance of tube cost as against colour rendering quality. It should be noted that the total annual lighting cost when changing from **White** to **Plus White** tubes is minimal, of the order of 3 per cent only.

## CHOICE OF TUBE COLOURS

| Appearance | | | Warm | Intermediate | Cool |
|---|---|---|---|---|---|
| Colour temperature | | | 2000–3000K | 3000–4000K | 4000–6000K |
| LUMEN OUTPUT: High | COLOUR RENDERING: Fair | | WARM WHITE | **WHITE** (3,500K) | DAYLIGHT (Cool white) |
| LUMEN OUTPUT: Average | COLOUR RENDERING: Good | | HOME-LITE DE LUXE WARM WHITE | **PLUS WHITE** * | NATURAL |
| LUMEN OUTPUT: Low | COLOUR RENDERING: Very good | | DE LUXE NATURAL or KOLOR-RITE | | NORTHLIGHT or ARTIFICIAL DAYLIGHT |

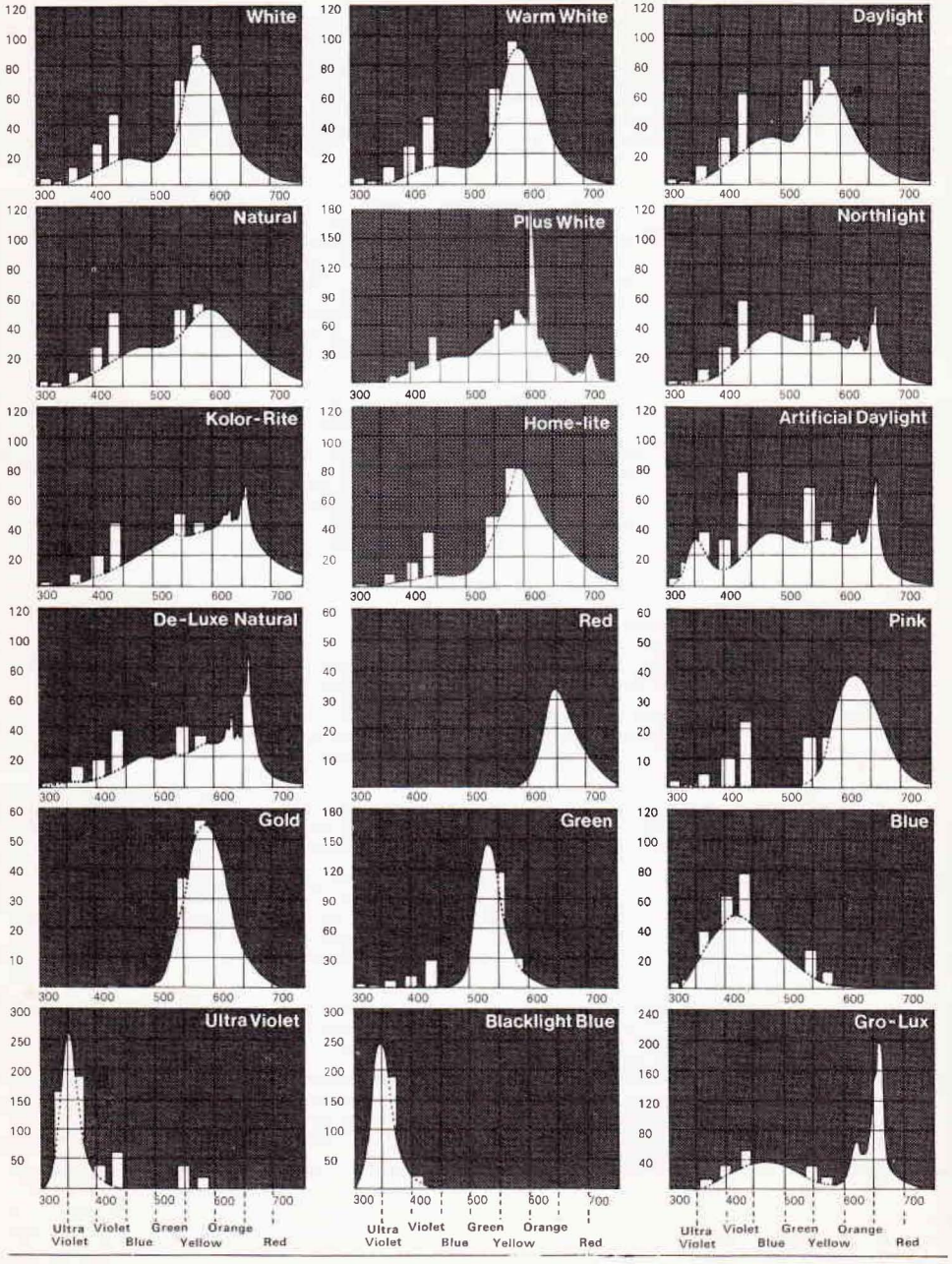
The table shows how the general purpose **White** and **Plus White** compare with other colours in the Thorn 'near white' range.
*Plus White combines high lumen output with good colour.

| Tube colour | Percentage of white tube lumens | Colour rendering quality | Colour appearance | Application and remarks |
|---|---|---|---|---|
| **INDUSTRIAL LIGHTING** | | | | |
| **White** | 100 | Fair | Intermediate | General illumination at maximum efficacy and with moderate colour rendering quality. |
| Daylight | 94 | Fair | Cool | Buildings requiring artificial illumination to blend with natural daylight. Minimum of 300 lux must be provided to avoid an excessively cold appearance when colour rendering will lack orange/red. |
| **Plus White** | 95 | Good | Intermediate | Areas where reasonably good colour rendering is required covering the complete visible spectrum; particularly for illuminance standards around 500 lux. |
| Artificial Daylight | 41 | Very good | Cool | Areas where accurate colour matching is carried out. A minimum of 900 lux must be provided. Conforms to BS950:Part One (6500K). |
| Gold | 55 | Poor | Warm | For special areas requiring low ultra-violet and violet output. |
| **COMMERCIAL LIGHTING** | | | | |
| **White** | 100 | Fair | Intermediate | General and drawing offices requiring maximum lighting efficiency. |
| Natural | 70 | Good | Cool | General office lighting particularly where required to blend with natural daylight. Minimum of 300 lux necessary. |
| **Plus White** | 95 | Good | Intermediate | Good intermediate general lighting of areas where reasonably good colour rendering is required covering the complete visual spectrum; particularly for illuminance standards around 500 lux. |
| °Kolor-rite | 65 | Very good | Cool | Offices, showrooms, studios, colleges, hospitals. |
| De Luxe Warm White | 66 | Good | Warm | Office buildings requiring a warm effect, flattering to the complexion. |
| Home-lite | 80 | Good | Warm | Interiors requiring a warmer appearance than provided by filament lamps. |

| Tube colour | Percentage of white tube lumens | Colour rendering quality | Colour appearance | Application and remarks |
|---|---|---|---|---|
| **DISPLAY LIGHTING** | | | | |
| **Plus White** | 95 | Good | Intermediate | General commercial lighting where reasonably good colour rendering is required covering the complete visible spectrum; particularly for illuminance standards around 500 lux. |
| Northlight/ Colour Matching | 59 | Good | Cool | Tailors (colour matching areas), furriers and for wintry effects. Minimum of 600 lux necessary to avoid an excessively cold appearance. |
| Natural | 70 | Cool | Intermediate | Jewellery, glassware, china, hardware, tailors (main shop areas), summer frocks and department stores. Minimum of 300 lux necessary. |
| De Luxe Natural | 49 | Very good | Intermediate | Florists, fishmongers, butchers, grocers, supermarkets and brightly coloured merchandise. |
| °Kolor-rite | 65 | Cool | Intermediate | The first choice where true reproduction of colour is required, gives the effect of a sunny day. |
| De Luxe Warm White | 66 | Good | Warm | Furniture, restaurants, lounges requiring filament lamp effect. |
| Home-lite | 80 | Good | Warm | Interiors requiring a warmer appearance than provided by filament lamps. |
| **White** | 95 | Fair | Intermediate | General display lighting requiring maximum light output, but without the need for good colour quality. |
| Colours | — | Poor | Poor | Green, gold, blue, red, pink, for special effects. |
| **DOMESTIC LIGHTING** | | | | |
| Warm White | 95 | Fair | Warm | Rooms requiring maximum light output. |
| **Plus White** | 95 | Good | Intermediate | General domestic lighting of areas requiring a good working light standard combined with good colour rendering. |
| De Luxe Warm White | 66 | Good | Warm | Rooms requiring a warmer colour light. |
| Home-lite | 80 | Good | Warm | Interiors requiring a warmer appearance than provided by filament lamps. |
| Pink | 25 | Poor | Warm | Decorative lighting giving a very warm effect. |
| **SPECIAL APPLICATIONS** | | | | |
| Green | 95 | | | |
| Gold | 55 | | | |
| Pink | 25 | Poor | Poor | Saturated colours for display, floodlighting, stage lighting. Note: Red and Gold tubes should only be used in switchstart circuits. |
| Blue | 20 | | | |
| Red | 5 | | | |
| Gro-lux | 30 | — | — | This special tube colour has been developed for plant growth purposes, and for aquarium lighting where it stimulates aquatic plant growth. Gro-lux tubes have a lavender colour appearance with a strong red and blue rendering effect. Colouring of tropical fish, plants and flowers looks especially vivid under Gro-lux tubes. |
| Ultra violet (non-filter) | — | — | — | The ultra-violet tube emits a large proportion of its energy as invisible ultra-violet radiation between 300 and 400 nanometres. The tube also emits a small amount of visible light at the blue end of the spectrum. Available 65/80W, 40W, 20W, 15W and 8W. |
| Germicidal U.V. | — | — | — | Special clear glass 1in diameter 3ft 30 watt tubes are available which give short wave ultra-violet (protection of eyes essential with this lamp). |
| Blacklight Blue | — | — | — | Ultra-violet tubes as above (but with black glass bulb) which transmit ultra-violet only filtering out the visible light. Available 40W (1200mm), 15W, 8W, 6W and 4W. |
| Radar Red | — | — | — | A bright magenta red colour with a higher light output than Red – originally used for radar rooms but also gives a strong red effect to meat and bacon displays. Available 65/80W and 40W. |

# Spectral distribution

**Horizontal scales are wavelengths in nanometres ($10^{-9}$ metres)**
**Vertical scales are power in milliwatts per nanometre band width for a 1500mm (5ft) tube at 65W; the Blacklight Blue is for a 40W tube.**



**Colour Data**
The colour rendering and colour appearance data below is on the same basis as the values specified in BS1853, but there is a trend towards other methods of colour specification, e.g. 6 band values for colour rendering and the CIE uniform chromaticity scale for colour appearance in which the co-ordinates are expressed in u and v values. With this in mind the additional data is provided in table 2.

**Colour Temperatures for Fluorescent Tubes**
The term 'colour temperature' should strictly be applied only to spectral distributions close to the black body distributions. Thus in fluorescent tube colours the 'colour temperature' is merely an indication of the location of the chromacity co-ordinates on a colour chart.
The 'colour temperatures' should not be used as a guide for photographic purposes.

| | |
|---|---|
| Artificial Daylight | 6500K |
| Northlight/Colour Matching | 6500K |
| Tropical Daylight | 6500K |
| Daylight | 4300K |
| °Kolor-rite | 4000K |
| Natural | 4000K |
| De Luxe Natural | 3600K |
| **White** | **3400K** |
| Warm White | 3000K |
| De Luxe Warm White | 3000K |
| Home-lite | 2600K |

**Nominal percentage light output for 1500mm (5ft) tubes at 65W**

**Table 1–8 Bands**

| CIE Bands | nm | Artificial Daylight | Northlight/ Colour Matching | Daylight | Natural | °Kolor-rite | De Luxe Natural | **White** | Warm White | De Luxe Warm White | Home-lite |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Far Violet | 380–420 | | 0·017 | 0·014 | 0·014 | 0·017 | 0·011 | **0·010** | 0·007 | 0·017 | 0·008 |
| 2. Violet | 420–440 | 1·06 | 0·42 | 0·31 | 0·33 | 0·13 | 0·37 | **0·26** | 0·25 | 0·30 | 0·24 |
| 3. Blue | 440–460 | | 0·65 | 0·38 | 0·37 | 0·48 | 0·39 | **0·22** | 0·17 | 0·10 | 0·120 |
| 4. Blue-Green | 460–510 | 9·6 | 9·7 | 5·3 | 5·6 | 7·9 | 6·1 | **3·1** | 2·5 | 2·4 | 1·800 |
| 5. Green | 510–560 | 44·9 | 44·5 | 37·2 | 38·0 | 38·0 | 38·7 | **32·3** | 29·5 | 35·8 | 29·00 |
| 6. Yellow | 560–610 | 33·8 | 34·1 | 48·9 | **44·1** | 39·5 | 37·5 | **54·9** | 67·3 | 45·8 | 54·70 |
| 7. Light Red | 610–660 | 9·9 | 10·0 | 7·8 | 11·2 | 13·0 | 15·8 | **9·1** | 10·2 | 14·9 | 13· 0 |
| 8. Dark Red | 660–760 | 0·63 | 0·63 | 0·17 | 0·69 | 1·06 | 1·2 | **0·19** | 0·21 | 0·81 | 0·52 |
| **Ultra-violet (watts per 65W tube, between 300 and 400 nanometres)** | | 1·30 | 0·47 | 0·53 | 0·41 | 0·32 | 0·42 | **0·44** | 0·40 | 0·40 | 0·36 |
| **Colour appearance 'X' and 'Y' colour co-ordinates** | | | | | | | | | | | |
| X | | 0·313 | 0·317 | 0·373 | 0·378 | 0·3804 | 0·390 | **0·414** | 0·435 | 0·437 | 0·454 |
| Y | | 0·329 | 0·324 | 0·380 | 0·365 | 0·3767 | 0·356 | **0·397** | 0·401 | 0·400 | 0·400 |

**Table 2–6 Bands**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Violet-Blue | 400–455 | 0·79 | 0·83 | 0·57 | 0·58 | 0·435 | 0·62 | **0·41** | 0·34 | 0·36 | 4·1 |
| 2. Blue-Green | 455–510 | 11·2 | 11·0 | 5·3 | 6·3 | 8·03 | 6·3 | **3·3** | 2·7 | 2·6 | 1·8 |
| 3. Green | 510–540 | 23·1 | 19·9 | 12·6 | 15·0 | 19·8 | 14·8 | **9·3** | 8·3 | 13·5 | 7·7 |
| 4. Green-Yellow | 540–590 | 43·7 | 48·0 | 59·9 | 52·7 | 44·7 | 50·0 | **61·3** | 60·7 | 53·2 | 48·1 |
| 5 Orange | 590–620 | 14·4 | 13·1 | 17·5 | 18·1 | 17·7 | 16·5 | **20·7** | 22·4 | 20·6 | 23·3 |
| 6. Red | 620–760 | 6·8 | 7·2 | 4·1 | 7·3 | 9·4 | 11·8 | **4·9** | 5·6 | 9·8 | |
| **Colour appearance – Nominal u and v colour co-ordinates** CIE uniform chromaticity scale | | | | | | | | | | | |
| u | | 0·1978 | 0·203 | 0·219 | 0·228 | 0·2251 | 0·240 | **0·239** | 0·251 | 0·252 | 0·268 |
| v | | 0·3122 | 0·311 | 0·335 | 0·031 | 0·3344 | 0·329 | **0·343** | 0·347 | 0·347 | 0·344 |

**INTRODUCTION OF PLUS WHITE**
The new Plus White tube colour of 3600K appearance and with good colour rendering has now been added to the Thorn range. Full details are available on request.

# Light output

**Lumen outputs**
The lumen outputs quoted in this catalogue are measured at 25°C in accordance with BS.1853.
**Initial lumens**
Initial lumens are measured after 100 hours operation.
**Lighting design lumens**
Lighting design lumens are the lamp outputs at 2000 hours and are recommended as a guide to lighting engineers planning scheme layouts.
Lumen output beyond 2000 hours decreases by 2% to 3% per 1000 hours use according to the colour and loading

**Colours for general use**
The colours identified in bold type (**WHITE** and **PLUS WHITE**) are recommended for general lighting purposes.

## MINIATURE FLUORESCENT TUBES

| Initial lumens | 525mm 21in 13W | 300mm 12in 8W | 225mm 9in 6W | 150mm 6in 4W |
|---|---|---|---|---|
| **White** | 850 | 480 | 300 | 130 |
| **Warm White** | 850 | 480 | 300 | — |
| Daylight | 800 | 440 | 280 | 120 |
| Natural | — | 325 | 230 | — |

All these tubes are 16mm/0·625in diameter.

| Lighting design lumens | 525mm 21in 13W | 300mm 12in 8W | 225mm 9in 6W | 150mm 6in 4W |
|---|---|---|---|---|
| | 750 | 420 | 250 | 100 |
| | 750 | 420 | 250 | — |
| | 700 | 360 | 240 | 90 |
| | — | 280 | 190 | — |

## U-SHAPED 525mm×120mm×25mm TUBE

| Initial lumens | | Lighting Design lumens |
|---|---|---|
| **White** | 2825 | 2575 |
| **Plus White** | 2725 | 2500 |

## FLUORESCENT TUBES

| Initial lumens (100 hours) | 2400 mm 8ft 125W | 2400 mm Super 8 85W | 1800 mm Super 6 85W* | 1800 mm Super 6 75W* | 1500 mm Super 5 80W* | 1500 mm Super 5 65W* | 1500† mm 5ft 50W | 1200 mm 4ft 40W | 900 mm 3ft 30W | 900† mm 3ft 30W | 600 mm 2ft 40W | 600 mm 2ft 20W | 450 mm 18in 15W | 450† mm 18in 15W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **White** | **9500** | **7350** | **6600** | **6050** | **6700** | **5100** | **3850** | **3050** | **2100** | **2400** | **2000** | **1225** | **900** | **950** |
| **Plus White** | **9000** | **7000** | **6200** | **5750** | **5450** | **4800** | — | **2900** | — | — | — | **1150** | — | — |
| Warm White | 9400 | 7250 | 6500 | 5950 | 5600 | 4950 | 3800 | 2950 | 2100 | 2400 | 2000 | 1200 | 900 | 950 |
| Daylight | 9000 | 7000 | 6250 | 5750 | 5450 | 4800 | — | 2900 | 2000 | 2300 | 1900 | 1150 | 850 | 900 |
| Home-lite | — | — | — | — | 4400 | 4000 | — | 2450 | — | — | — | — | — | — |
| Natural | 7150 | 5500 | 4800 | 4400 | 4300 | 3700 | 2800 | 2300 | 1600 | 1800 | 1500 | 900 | — | 700 |
| D.L. Warm White | 6800 | 5300 | — | — | — | — | — | — | 1500 | 1700 | 1400 | 850 | 600 | — |
| °Kolor-rite | 6300 | 4800 | 4300 | 3900 | 3800 | 3350 | — | 2000 | — | 1550 | 1300 | 850 | — | — |
| Northlight/Colour Matching | 5800 | 4500 | 4000 | 3600 | 3400 | 3000 | — | 1900 | — | 1500 | 1250 | 800 | 550 | 600 |
| De Luxe Natural | 5500 | 4300 | 3700 | 3400 | 3200 | 2900 | 2300 | 1750 | — | 1400 | 1150 | 700 | 500 | 550 |
| Artificial Daylight | 4800 | — | 3300 | 3000 | 2900 | 2600 | — | 1500 | — | — | — | 650 | — | — |

| Lighting design lumens (2000 hours) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **White** | **8800** | **6850** | **6300** | **5750** | **5200** | **4750** | **3600** | **2800** | **1850** | **2150** | **1700** | **1100** | **750** | **800** |
| **Plus White** | **8350** | **6500** | **5850** | **5450** | **4950** | **4500** | — | **2700** | — | — | — | **1050** | — | — |
| Warm White | 8700 | 6750 | 6100 | 5650 | 5100 | 4600 | 3550 | 2700 | 1850 | 2150 | 1700 | 1100 | 750 | 800 |
| Daylight | 8400 | 6500 | 5750 | 5450 | 4950 | 4450 | — | 2650 | 1750 | 2050 | 1600 | 1050 | 700 | 750 |
| Home-lite | — | — | — | — | 3900 | 3600 | — | 2200 | — | — | — | — | — | — |
| Natural | 6500 | 5000 | 4350 | 4000 | 3900 | 3400 | 2400 | 2100 | 1400 | 1600 | 1300 | 800 | — | 600 |
| D.L. Warm White | 6200 | 4700 | — | — | — | — | — | — | 1250 | 1450 | 1200 | 750 | 500 | — |
| °Kolor-rite | 5700 | 4400 | 3850 | 3500 | 3400 | 3000 | — | 1800 | — | 1300 | 1100 | 750 | — | — |
| Northlight/Colour Matching | 5300 | 4100 | 3600 | 3200 | 3100 | 2700 | — | 1700 | — | 1250 | 1050 | 700 | 450 | 500 |
| De Luxe Natural | 4800 | 3800 | 3200 | 2900 | 2700 | 2500 | 1900 | 1500 | — | 1100 | 900 | 600 | 400 | 450 |
| Artificial Daylight | 3800 | — | 2600 | 2400 | 2300 | 2100 | — | 1200 | — | — | — | 500 | — | — |

†These tubes are 26mm/1in diameter. All others are 38mm/1·5in diameter.
*The Super 5 tube is a dual purpose 65/80W tube suitable for use in all 65W or 80W bi-pin fittings and the Super 6 tube is dual 75W and 85W rated.

1500mm/5ft 80W BC tubes are still available in a limited range of standard colours

## REFLECTOR TUBES

**Initial lumens** (100 hours)

| | 2400mm 8ft 125W | 2400mm 8ft 85W | 1800mm 6ft 75/85W | 1500mm 5ft at 80W | 1500mm 5ft at 65W | 1200mm 4ft 40W |
|---|---|---|---|---|---|---|
| **White** | **8400** | **6500** | **5800** | **5100** | **4500** | **2700** |
| Warm White | 8300 | 6400 | 5600 | — | 4400 | 2650 |
| Daylight | — | — | 5500 | — | 4200 | 2600 |

**Lighting design lumens** (2000 hours)

| | | | | | | |
|---|---|---|---|---|---|---|
| **White** | **7700** | **6000** | **5200** | **4600** | **4200** | **2450** |
| Warm White | 7600 | 5900 | 5000 | — | 4000 | 2400 |
| Daylight | — | — | 4900 | — | 3800 | 2350 |

## COLOURED TUBES (Bi-pin only)

Five standard colours – Red, Blue, Green, Gold and Pink – are available. These are primarily designed for decorative and effect lighting purposes.

**Lighting design lumens** (2000 hours)

| | 1800mm 6ft 75/85W | 1500mm 5ft at 80W | 1500mm 5ft at 65W | 1200mm 4ft 40W | 900mm 3ft 30W | 600mm 2ft 40W | 600mm 2ft 20W |
|---|---|---|---|---|---|---|---|
| Pink | 1600 | 1400 | 1250 | 750 | 550 | 500 | 290 |
| Red* | — | 250 | 230 | 140 | — | — | 50 |
| Gold* | — | 2700 | 2400 | 1450 | — | — | 550 |
| Green | — | 5200 | 4600 | 2800 | — | — | 1100 |
| Blue | — | 1300 | 1150 | 700 | — | — | 270 |

*Red and Gold tubes should be used only in switchstart circuits.

## GRO-LUX

**Lighting design lumens** (2000 hours)

| 1500mm 5ft at 80W | 1500mm 5ft at 65W | 1200mm 4ft 40W | 900mm* 3ft 30W | 600mm 2ft 20W | 450mm* 18in 15W | 525mm 21in 13W | 300mm 12in 8W |
|---|---|---|---|---|---|---|---|
| 1450 | 1300 | 810 | 530 | 340 | 200 | 180 | 100 |

*26mm/1in diameter.

## TROPICAL DAYLIGHT

**Lighting design lumens** (2000 hours)
450mm/18in 15W: 550

## CIRCULAR TUBES

**Lighting design lumens** (2000 hours)
Circular=Warm White only

| Tube size (diameter) | 400mm 16in | 400mm 16in | 300mm 12in |
|---|---|---|---|
| | 60W | 40W | 32W |
| | 3400 | 2300 | 1600 |

# Electrical data for special control gear

**Electrical data for standard 240V 50Hz tube circuits. Average performance tested at 25°C to BS.2818**
The figures on this page are for intermediate section gear.

| Tube size | 2400mm 8ft | 2400mm 8ft | 1500mm 5ft | 1500mm 5ft | 1200mm 4ft | 600mm 2ft | 600mm 2ft |
|---|---|---|---|---|---|---|---|
| Diameter | 38mm 1·5in | 38mm 1·5in | 38mm 1·5in | 38mm 1·5in | 38mm 1·5in | 38mm 1·5in | 38mm 1·5in |
| Nominal tube watts | 125W | 85W | 80W | 65W | 40W | 40W | 20W |
| Lamp cap | BP | BP | BC or BP | BP | BP | BP | BP |
| Actual lamp watts | 123 | 85 | 76 | 64 | 39·5 | 37 | 19·5 |
| Average tube volts | 150 | 184 | 100 | 110 | 102 | 47 | 58 |
| Average tube amps | 0·94 | 0·55 | 0·87 | 0·67 | 0·44 | 0·88 | 0·37 |
| Rated life (hours) | 7500 | 7500 | 7500 | 7500 | 7500 | 5000 | 5000 |

**SINGLE TUBE SWITCHSTART**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Total circuit watts | | | 94 | | | 58 | |
| Lagging power factor | | | 0·85 | | | 0·85 | |
| Total volt/amps | | | 110 | | | 69 | |
| Mains current at 240V | | | 0·46 | | | 0·29 | |
| Min. starting temperature | | | 0°C | | | 0°C | |
| % Harmonics per phase | | | 17% | | | | |

**SINGLE TUBE SWITCHLESS START**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Total circuit watts | 154 | 100 | 99 | 80 | 54 | | |
| Lagging power factor | 0·98 | 0·99 | 0·85 | 0·91 | 0·93 | | |
| Total volt/amps | 158 | 100 | 116 | 87 | 58 | | |
| Mains current at 240V | 0·66 | 0·42 | 0·48 | 0·36 | 0·24 | | |
| Min. starting temperature | +5°C | +5°C | +5°C | −5°C | −5°C | | |
| % Harmonics per phase | 8% | 7% | 17% | 25% | 25% | | |

**TWIN TUBE SERIES PAIR SWITCHLESS START**

| | | | | |
|---|---|---|---|---|
| Total circuit watts | 207 | | 100 | 54 |
| Lagging power factor | 0·95 | | 0·85 | 0·85 |
| Total volt/amps | 218 | | 118 | 63 |
| Mains current at 240V | 0·91 | | 0·49 | 0·26 |
| Min. starting temperature | +5°C | | +5°C | +5°C |
| % Harmonics per phase | 17% | | | |

**TWIN TUBE SERIES PAIR SWITCH START**

| | | |
|---|---|---|
| Total circuit watts | 94 | 50 |
| Lagging power factor | 0·85 | 0·85 |
| Total volt/amps | 110 | 59 |
| Mains current at 240V | 0·46 | 0·25 |
| Min. starting temperature | 0°C | 0°C |
| % Harmonics per phase | | |

The above circuit watts for control gear tested in accordance with BS.2818 may be reduced by up to 5% when operating in some fittings as the circuit watts reduce as the lamp operating temperature rises.

**Electrical data for 240V 50Hz tube circuits. Average performance tested at 25°C to BS.2818.**
The figures below are for slim section gear.

| Tube size | 8ft | 6ft | 6ft | 6ft | 5ft | 5ft | 4ft | 4ft | 2ft |
|---|---|---|---|---|---|---|---|---|---|
| Diameter | 1½in | 1½in | 1½in | 1½in | 1½in | 1½in | 1½in | 1½in | 1½in |
| Nominal tube watts | 125 | 85 | 75 x 2 | 75 | 65 | 65 | 40 | 40 | 20 |
| Actual lamp watts | 120 | 81 | 153 | 73 | 63 | 63 | 39 | 39 | 19 |
| Average tube volts | 152 | 123 | 129 | 131 | 113 | 113 | 104 | 104 | 58 |
| Average tube amps | 0·92 | 0·77 | 2×0·70 | 0·64 | 0·63 | 0·63 | 0·42 | 0·42 | 0·38 |
| Rated life (hours) | 7500 | 7500 | 7500 | 7500 | 7500 | 7500 | 7500 | 7500 | 5000 |
| | | | | | | | | | |
| Circuit type | SS | SRS | SS Twin | SRS | SS | SRS | SS | SRS | SS |
| Total circuit watts | 142 | 103 | 180 | 90 | 78 | 82 | 51 | 55 | 30 |
| Mains current amps | 0·92 | 0·50 | 0·78 | 0·42 | 0·37 | 0·37 | 0·24 | 0·24 | 0·38 |
| Total volt amps | 220 | 120 | 185 | 100 | 90 | 89 | 60 | 58 | 91 |
| Lagging power factor | 0·63‡ | 0·86 | 0·98 | 0·90 | 0·87 | 0·92 | 0·90 | 0·95 | 0·34* |
| Min. starting temperature | 0°C | —5°C | 0°C | —5°C | 0°C | —5°C | 0°C | —5°C | 0°C |
| % 3rd Harmonics per phase | 14% | 25% | 16% | 25% | 17% | 25% | 17% | 25% | 17% |

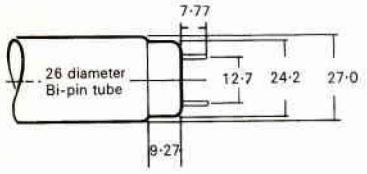
| Tube size | 1500mm 5ft | 900mm 3ft | 450mm 18in | 525mm 21in | 300mm 12in | 225mm 9in | 150mm 6in |
|---|---|---|---|---|---|---|---|
| Diameter | 26mm 1in | 26mm 1in | 26mm 1in | 16mm 0·625in | 16mm 0·625in | 16mm 0·625in | 16mm 0·625in |
| Nominal tube watts | 50W | 30W | 15W | 13W | 8W | 6W | 4W |
| Lamp cap | BP | BP | BP | Min. BP | Min. BP | Min. BP | Min. BP |
| Actual lamp watts | 50 | 30 | 15 | 13 | 8 | 6 | 4 |
| Average tube volts | 160 | 101 | 57 | 92 | 55 | 43 | 30 |
| Average tube amps | 0·38 | 0·36 | 0·34 | 0·17 | 0·17 | 0·16 | 0·15 |
| Rated life (hours) | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 |
| **SINGLE TUBE SWITCHSTART** | | | | | | | |
| Total circuit watts | — | 39 | 25 | 19 | 14 | 12 | 10 |
| Lagging power factor | — | 0·49* | 0·31* | 0·46* | 0·34* | 0·31* | 0·28* |
| Total volt/amps | — | 46 | 81 | 41 | 41 | 39 | 36 |
| Mains current at 240V | — | 0·36 | 0·34 | 0·17 | 0·17 | 0·16 | 0·15 |
| Min. starting temperature | — | 0°C | 0°C | 0°C | 0°C | 0°C | 0°C |
| % Harmonics per phase | — | 17% | — | — | — | — | — |
| **SERIES PAIR SWITCHSTART** | | | | | | | |
| Total circuit watts | — | — | 40 | — | 22 | 18 | 14 |
| Lagging power factor | — | — | 0·85 | — | 0·52* | 0·46* | 0·39* |
| Total volt/amps | — | — | 47 | — | 41 | 39 | 36 |
| Mains current at 240V | — | — | 0·20 | — | 0·17 | 0·16 | 0·15 |
| Min. starting temperature | — | — | 0°C | — | 0°C | 0°C | 0°C |
| **SINGLE TUBE SWITCHLESS START** | | | | | | | |
| Total circuit watts | 66 | 54 | | | | | |
| Lagging power factor | 0·88 | 0·93 | | | | | |
| Total volt/amps | 91 | 58 | | | | | |
| Mains current at 240V | 0·38 | 0·24 | | | | | |
| Min. starting temperature | +5°C | —5°C | | | | | |
| % Harmonics per phase | 32% | 25% | | | | | |

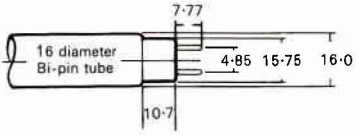
*Uncorrected value. Allow 0·85 if power factor capacitor is fitted

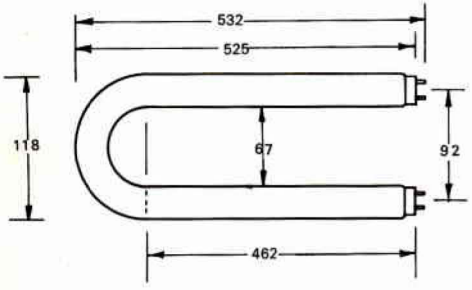
‡Leading power factor.

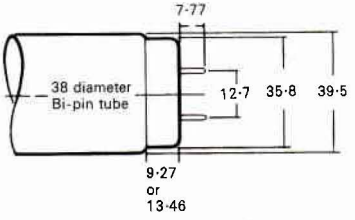
The above circuit watts for control gear tested in accordance with BS. 2818 may be reduced by up to 5% when operating in some fittings as the circuit watts reduce as the lamp operating temperature rises.

# Dimensions




Maximum dimensions (mm)

**STRAIGHT TUBES**

| Rated wattage | Nominal dimensions mm* | in | cap | Length, base face to base face (mm) max. | Length, base face to end of opposite cap pins mm max. | min. | Length overall mm max. | min. |
|---|---|---|---|---|---|---|---|---|
| 125 | 2400×38 | 96×1½ | Bi-pin | 2374·9 | 2382·0 | 2378·4 | 2389·1 | — |
| 85 | 2400×38 | 96×1½ | Bi-pin | 2374·9 | 2382·0 | 2378·4 | 2389·1 | — |
| 75/85 | 1800×38 | 72×1½ | Bi-pin | 1763·8 | 1770·9 | 1768·4 | 1778·0 | — |
| 65/80 | 1500×38 | 60×1½ | Bi-pin | 1500·0 | 1507·1 | 1504·8 | 1514·3 | — |
| 80 | 1500×38 | 60×1½ | BC | — | — | — | 1530·4 | 1517·6 |
| 50 | 1500×26 | 60×1 | Bi-pin | 1500·0 | 1507·1 | 1504·8 | 1514·3 | — |
| 40 | 1200×38 | 48×1½ | Bi-pin | 1119·4 | 1206·5 | 1204·1 | 1213·6 | — |
| 40 | 600×38 | 24×1½ | Bi-pin | 589·8 | 596·9 | 594·5 | 604·0 | — |
| 30 | 900×38 | 36×1½ | Bi-pin | 894·6 | 901·7 | 899·3 | 908·8 | — |
| 30 | 900×26 | 36×1 | Bi-pin | 894·6 | 901·7 | 899·3 | 908·8 | — |
| 20 | 600×38 | 24×1½ | Bi-pin | 589·8 | 596·9 | 594·5 | 604·0 | — |
| 15 | 450×38 | 18×1½ | Bi-pin | 437·4 | 444·5 | 442·1 | 451·6 | — |
| 15 | 450×26 | 18×1 | Bi-pin | 437·4 | 444·5 | 442·1 | 451·6 | — |
| 13 | 525×16 | 21×⅝ | Small bi-pin | 516·8 | 523·9 | 521·5 | 531·0 | — |
| 8 | 300×16 | 12×⅝ | Small bi-pin | 288·2 | 295·3 | 292·9 | 302·4 | — |
| 6 | 225×16 | 9×⅝ | Small bi-pin | 212·0 | 219·1 | 216·7 | 226·2 | — |
| 4 | 150×16 | 6×⅝ | Small bi-pin | 135·8 | 142·9 | 140·5 | 150 | — |

**'U'-SHAPED TUBE** 525×120mm (21in×5in)—see dimensional diagram above.

**CIRCULAR TUBES**

| Lamp watts | Nominal diameter mm | in | Inside lamp diameter/ glass mm max. | min. | Inside lamp diameter/ base mm max. | min. | Outside lamp diameter* mm max. | min. | Bulb diameter mm max. | min. |
|---|---|---|---|---|---|---|---|---|---|---|
| 22 | 200 | 8¼ | 160·4 | 151·1 | 155·6 | 150·8 | 215·9 | 203·2 | 30·9 | 26·2 |
| 32 | 300 | 12 | 245·6 | 237·3 | 246·1 | 239·7 | 311·2 | 298·5 | 34·1 | 29·4 |
| 40 | 400 | 16 | 346·9 | 338·9 | 347·7 | 341·3 | 412·8 | 400·0 | 34·1 | 29·4 |
| 60 | 400 | 16 | 346·9 | 338·9 | 347·7 | 341·3 | 412·8 | 400 | 34·1 | 29·4 |

*Base and glass dimensions the same